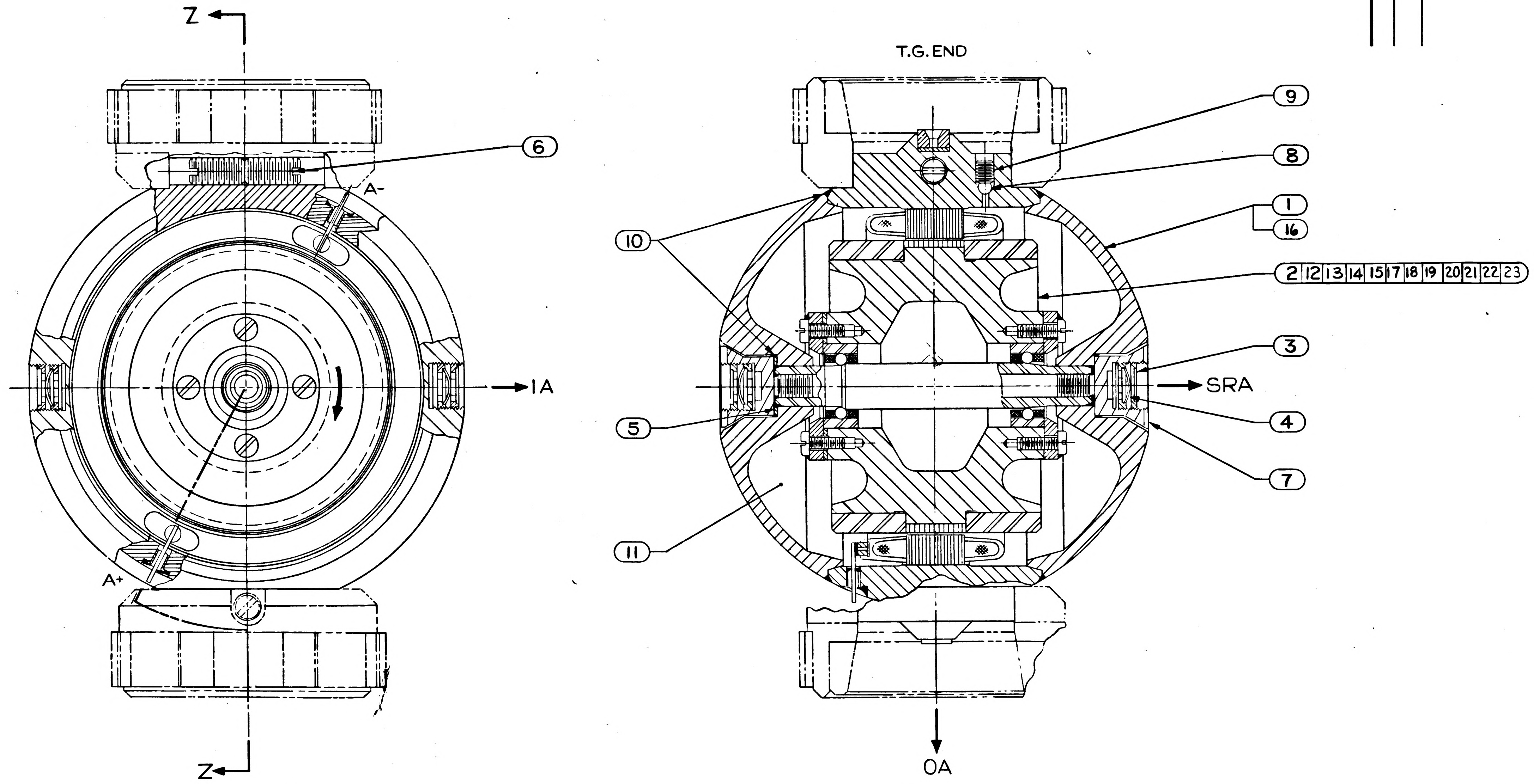
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
	L	THIS SHEET ADDED PER TDRR 37481		15 APR 69	
	M	REVISED PER TDRR 37703		22 JUL 69	M.G. S.D.A.
	N	REVISED PER TDRR 37892		31 OCT 69	M.G J.E.G
	P	REVISED PER TDRR 38530		17 DEC 71	GM



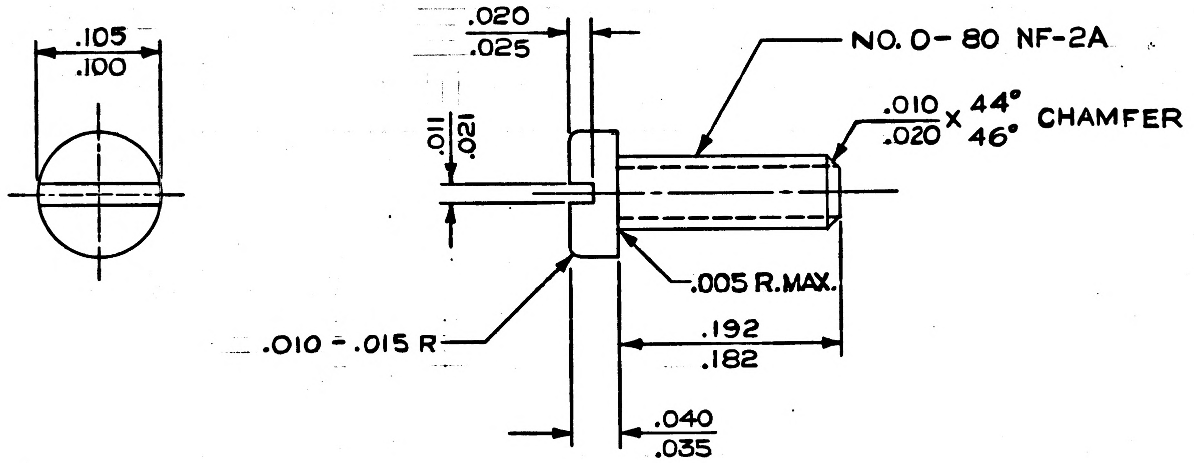
SECTION Z-Z

L THIS SHEET ADDED.

2021611 NEXT ASSY	2021500 USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE DECIMALS + — − — 3 PLACE DECIMALS + — − — ANGLES + — − — DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE MASS CONTRACT P. DIETRICH 14 SEP 64 DRAWN DATE KEATING 10-16-64 CHECKED PUBLICOVES 4 NOV 64 APPROVAL R. A. BOOTH 11-4-64 APPROVAL	MANNED SPACECRAFT CENTER HOUSTON, TEXAS FLOAT ASSEMBLY APOLLO II IRIG
APPLICATION		MATERIAL — APPROVAL	N. J. RHINE 11 4 64 NASA APPROVAL W. KUPFER 4 NOV 64 MIT APPROVAL	SIZE D CODE IDENT NO. 80230 2021619 SCALE 4/1 SHEET 2

11784

REVISIONS						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. CLEAN AND DEBURR PER ATP 2021500, MC 25-901
3. PASSIVATE IN ACCORDANCE WITH MIL-STD-171
4. MATERIAL - QQ-S-763, CLASS 303 OR 303 SE
   CONDITION A
5. BAG AND IDENTIFY PER
   ND 1002019

MASTER

2021638	2021500
NEXT ASSY	USED ON
APPLICATION	

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
LIST OF MATERIALS						

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
NOTE 4

FINISH
NOTE 3

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN P. DIETRICH 21 JULY 64
APPROVED L. W. Kysting 8-17-64
CHECKED [illegible] 8-16-64
APPROVED R A Burt [illegible] 8-18-64

MIT APPROVED W Cuyler [illegible] DATE Aug 64
NASA APPROVED [illegible] DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

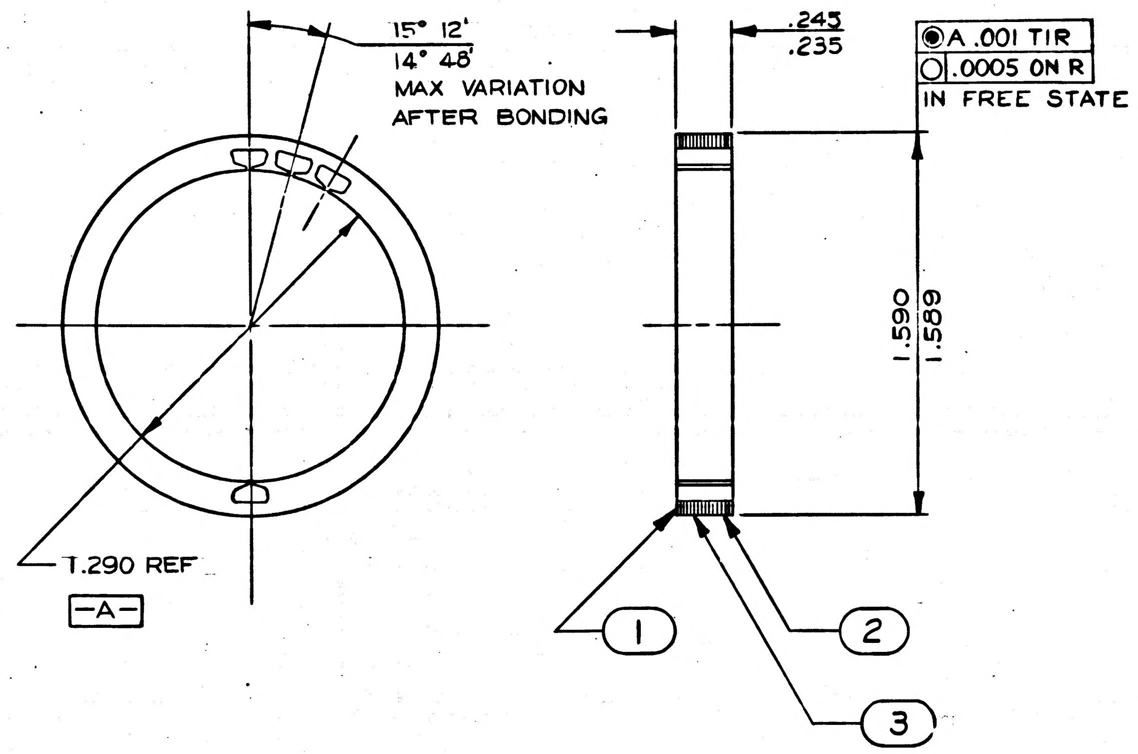
CAP CLAMPING SCREW
APOLLO II IRIG

SIZE B
CODE IDENT NO
DRAWING NO. 2021671
SCALE 10/1
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

(A)

REVISIONS						11521
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A1	REVISED PER TDRR 15210	P.D.	LZ	122964	WK



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BOND CORE TO REQUIRED STACK HEIGHT PER ATP 2021500, MC 25-300
   - A. REF. BONDING FIXTURE MIT DWG 283-10812 OR EQUIVALENT
   - B. BONDING PRESSURE TO BE 300 PSI
3. REMOVE EXCESS CYCLEWELD FROM I.D.
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005 MAX
5. MAXIMUM WEIGHT AFTER O.D. GRIND - 12.8 GRAMS
6. MASK O.D. AND COAT WITH HI-DIELECTRIC ENAMEL PER SCD 2021539 (A1) .004-.005 THICK
7. BAG AND IDENTIFY PER ND 1002019

3	AS REQ'D		2021538	BONDING MATERIAL - CYCLEWELD 55-9		
2	APPR 33		2021674	STATOR LAMINATION		
1	AS REQ'D		2021539	HI-DIELECTRIC ENAMEL		
ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

MASTER

2021632	2021500
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C R Grasso	9 may 64
CHECKED	L.W. Keating-CRG	8-10-64
APPROVED	DC	8-11-64
APPROVED	RA Booth	8-7-64

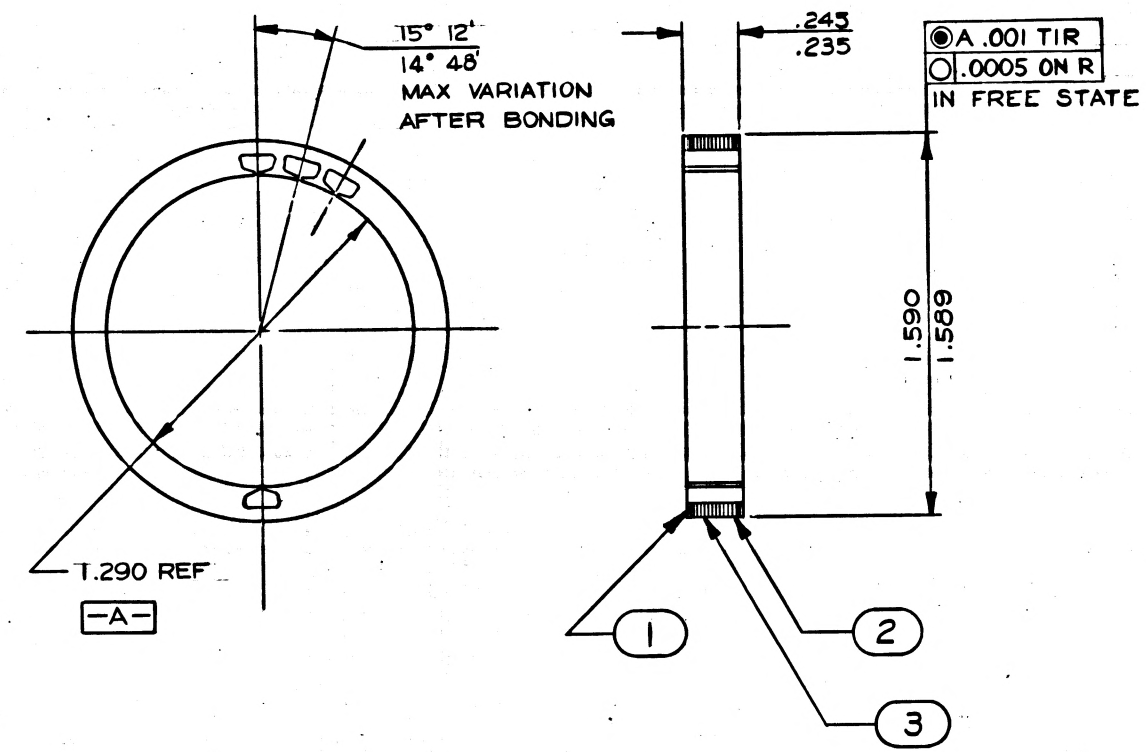
MIT APPROVED DATE
W Kupfer 12 Aug 64
NASA APPROVED DATE
8/14/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STATOR CORE
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021673
SCALE 4/1
SHEET 1 OF 1

REVISIONS						11521
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BOND CORE TO REQUIRED STACK HEIGHT PER ATP 2021500, MC 25-300
   A. REF. BONDING FIXTURE MIT DWG 2B3-10B12 OR EQUIVALENT
   B. BONDING PRESSURE TO BE 300 PSI
3. REMOVE EXCESS CYCLEWELD FROM I.D.
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005 MAX
5. MAXIMUM WEIGHT AFTER O.D. GRIND - 12.8 GRAMS
6. MASK O.D. AND COAT WITH HI-DIELECTRIC ENAMEL PER SCD 2021539 (2 COATS .005 TOTAL)
7. BAG AND IDENTIFY PER ND 1002019

MASTER

3	AS REQ'D		2021538	BONDING MATERIAL - CYCLEWELD 55-9		
2	APPR 33		2021674	STATOR LAMINATION		
1	AS REQ'D		2021539	HI-DIELECTRIC ENAMEL		
ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

2021632	2021500
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C R Grasso	9 Jun 64
CHECKED	L.W. Keating-CRG	8-10-64
APPROVED	DC Hoag	8-11-64
APPROVED	RA Booth	8-7-64

MIT APPROVED W Kupfer 12 Aug 64 DATE
NASA APPROVED DATE 8/14/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

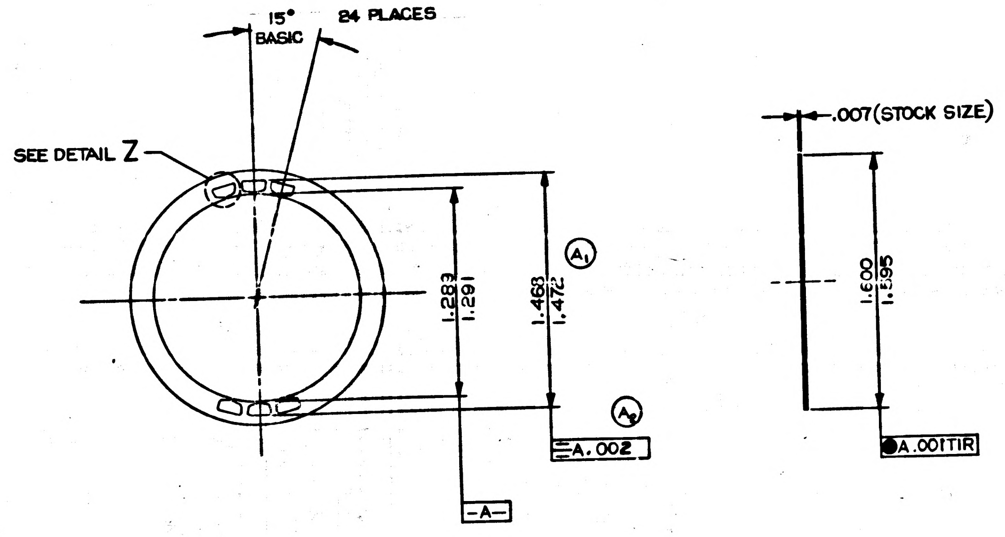
STATOR CORE
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021673
SCALE 4/1
SHEET 1 OF 1

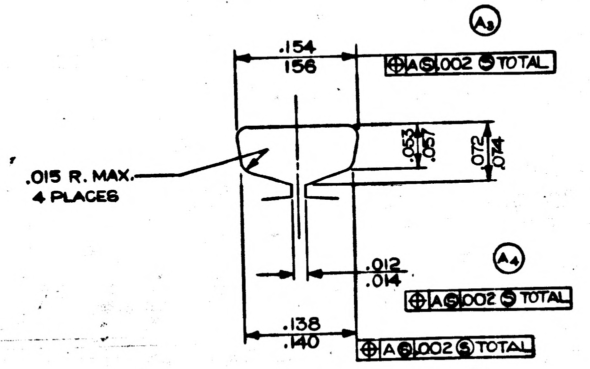
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

11063

REVISIONS						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A5	REVISED PER TDRR 11793	C.R.G		8-24-64	WH



15° BASIC
24 PLACES
SEE DETAIL Z
1.283
1.291
1.468
1.472
A1
A2
A.002
-A-
.007(STOCK SIZE)
1.600
1.595
A.001TIR



A3
.154
156
A S .002 S TOTAL
.015 R. MAX.
4 PLACES
.053
.057
.072
.074
A4
.012
.014
A S .002 S TOTAL
.138
.140
A S .002 S TOTAL
A5

DETAIL Z
SCALE 10/1
24 PLACES

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE ALL BURRS VISIBLE UNDER 10X MAXIMUM MAGNIFICATION. THE EDGE RADII AFTER DEBURRING SHALL NOT EXCEED .002
3. ANNEAL PER ATP 2021500, MC105 AFTER PUNCHING
4. BAG AND IDENTIFY PER ND1002019

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021673	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO.
2021555

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	P. DIETRICH	9JUN64
CHECKED	L.W. Keating	16JUL64
APPROVED	F.D. Stuhlin	7-21-64
APPROVED	R.A. Booth	7-21-64
MIT APPROVED	W. Wrigley	21 July 64
NASA APPROVED	W.J. Rhine	7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

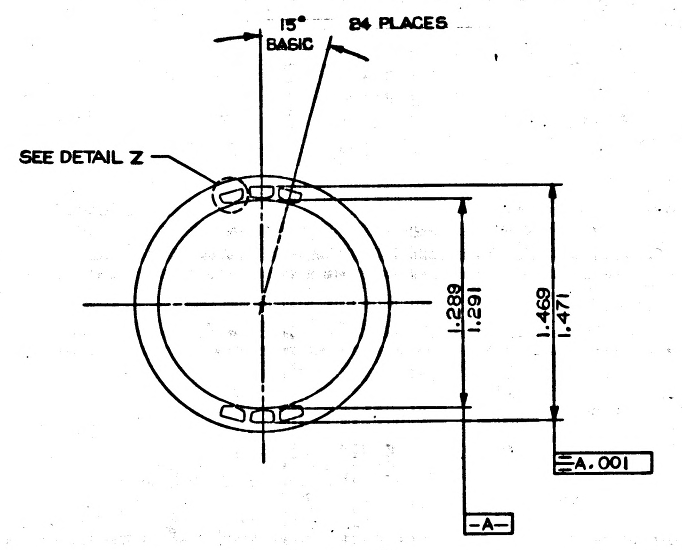
STATOR LAMINATION
FOR MT 1.3-300 SERIES
APOLLO II IRIG

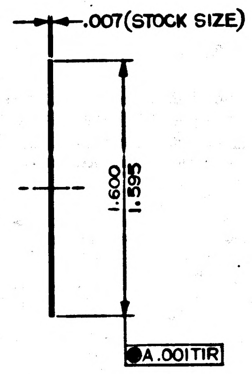
SIZE	CODE IDENT NO	DRAWING NO.
D		2021674

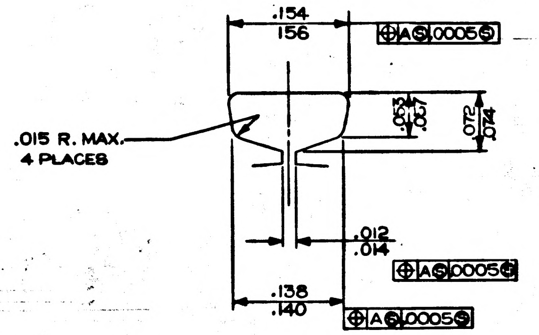
SCALE 2/1 SHEET 1 OF 1

11063

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED


15°
BASIC
24 PLACES
SEE DETAIL Z
1.289
1.291
1.469
1.471
A .001
-A-


.007 (STOCK SIZE)
1.600
1.595
A .001 TIR


.154
156
⊕ A Ⓢ .0005 Ⓢ
.015 R. MAX.
4 PLACES
.053
.057
.072
.074
.012
.014
⊕ A Ⓢ .0005 Ⓢ
.138
.140
⊕ A Ⓢ .0005 Ⓢ

DETAIL Z
SCALE 10/1
24 PLACES

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE ALL BURRS VISIBLE UNDER 10 X MAXIMUM MAGNIFICATION. THE EDGE RADII AFTER DEBURRING SHALL NOT EXCEED .002
3. ANNEAL PER ATP 2021500, MC105 AFTER PUNCHING
4. BAG AND IDENTIFY PER ND1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

MASTER

NEXT ASSY	USED ON
2021673	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K – X1000 M – X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO.
2021555

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	P. DIETRICH	18JUN64
CHECKED	L.W. Keating	16JUN64
APPROVED	F.D. [illegible]	7-21-64
APPROVED	RA Booth	7-21-64

MIT APPROVED DATE
[illegible] 21 July 64
NASA APPROVED
W J [illegible] 7-21-64

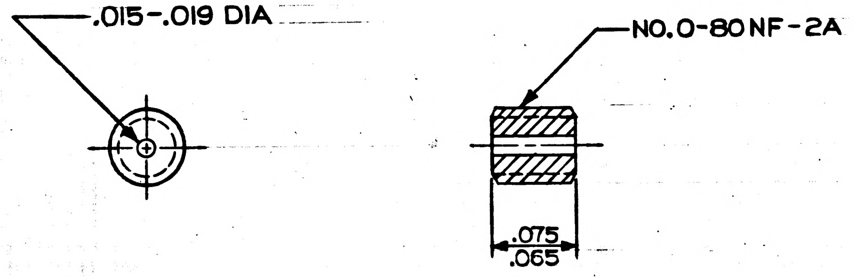
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STATOR LAMINATION
FOR MT 1.3-300 SERIES
APOLLO II IRIG

SIZE D
CODE IDENT NO
DRAWING NO. 2021674
SCALE 2/1
SHEET 1 OF 1

11521

REVISIONS						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63√FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
3. REMOVE ALL BURRS AND BREAK SHARP EDGES
4. GOLD PLATE PER MIL-G-45204, TYPE I, CLASS I
5. BAG AND IDENTIFY PER ND 1002019

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021632	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μf RESISTOR VALUES ARE IN OHMS K = X1000 M = X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL
BRASS QQ-B-626
COMP 24 SOFT

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO

DRAWN P. DIETRICH
CHECKED L.W. Keating-CRC
CHECKED DC Johnson 7/11/64
APPROVED RA Boott 5-24

MIT APPROVED W Kupfer DATE 12 Aug 64

NASA APPROVED DATE 8/14/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MOTOR TERMINAL
APOLLO II IRIG

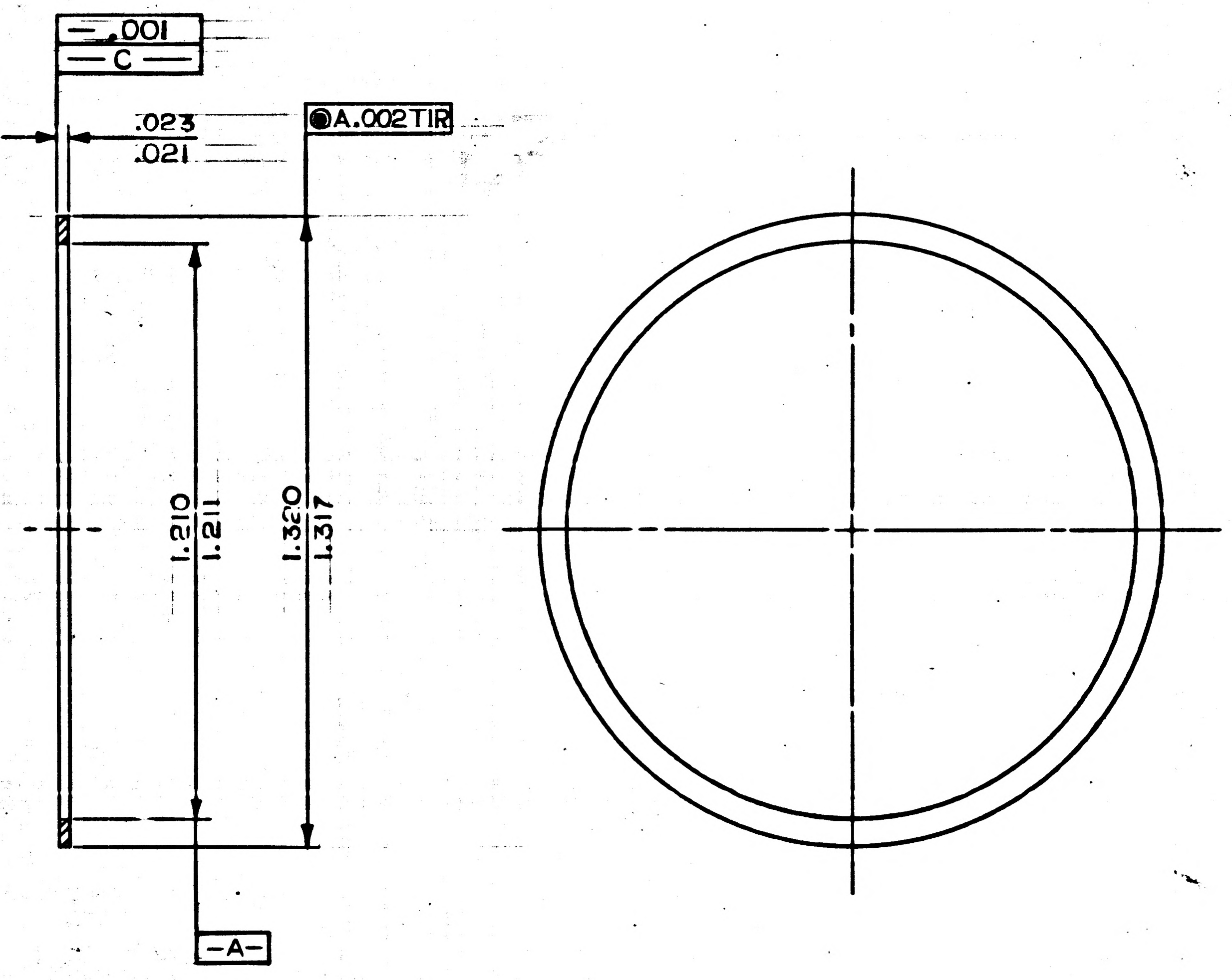
SIZE B | CODE IDENT NO | DRAWING NO. 2021675

SCALE 10/1 | SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

11056

REVISIONS						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63/ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
3. REMOVE ALL BURRS VISIBLE UNDER 10X MAXIMUM MAGNIFICATION. THE EDGE RADII AFTER DEBURRING SHALL NOT EXCEED .002
3. SURFACE GRIND .025 STOCK TO .023-.021 TAKING EQUAL AMOUNTS FROM BOTH SIDES TO INSURE FLATNESS
4. HEAT TREAT PER ATP 2021500, MC 25-107
5. BAG AND IDENTIFY PER ND1002019

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

2021667	2021500
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μf RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO.
2021553

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	P. DIETRICH	18JUN64
CHECKED	L. W. Keating	16JUL64
APPROVED	F. D. Struck	7-21-64
APPROVED	RA Booth	7-21-64

MIT APPROVED DATE
W Kupfer 21 July 64
NASA APPROVED
W J Rhine 7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

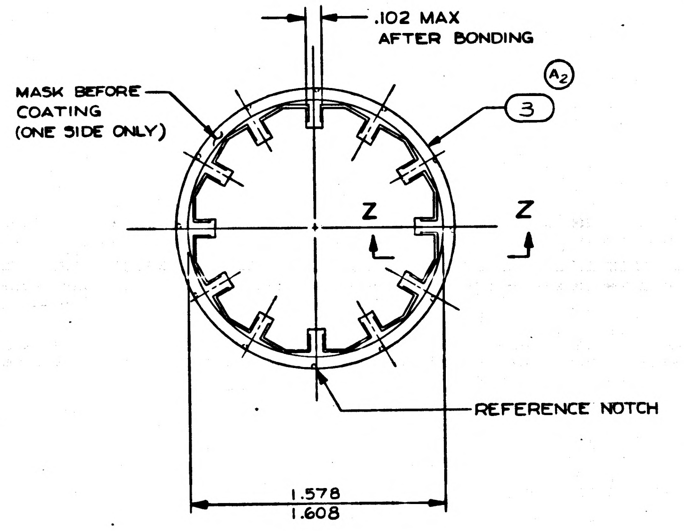
HYSTERESIS RING
LAMINATION
APOLLO II IRIG

SIZE	CODE IDENT NO.	DRAWING NO.
C		2021677

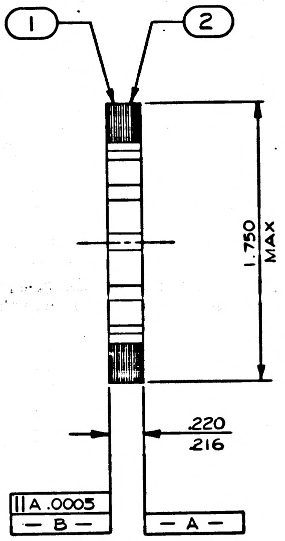
SCALE 4/1 SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

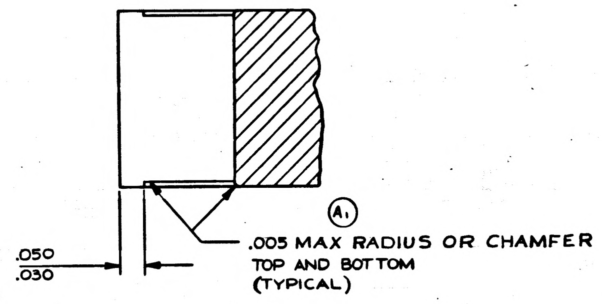
REVISIONS						11784
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A2	REVISED PER TDRR 14048	LZ	RAB	11-4-64	WK



.102 MAX
AFTER BONDING
MASK BEFORE
COATING
(ONE SIDE ONLY)
A2
3
Z
Z
REFERENCE NOTCH
1.578
1.608



1
2
1.750
MAX
.220
.216
// A .0005
— B —
— A —



A1
.005 MAX RADIUS OR CHAMFER
TOP AND BOTTOM
(TYPICAL)
.050
.030

VIEW Z-Z
SCALE : 10/1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. STACK LAMINATIONS WITH REFERENCE NOTCH TO RIGHT OF CENTER 30° C.W. FROM PRECEDING LAMINATION
3. BOND PER ATP 2021500, MC 25-300
   - A. REF. BONDING FIXTURE MIT DWG B-104458 OR EQUIVALENT
4. REMOVE ALL BURRS KEEPING POLE FACE EDGES SHARP AND SQUARE PER VIEW Z-Z
5. MAGNETIC TEST LIMITS PER ATP 2010500, MC 25-110 UTILIZING:
   - A. AREA = .122 CM^2
   - B. MEAN LENGTH = 11.98 CM
6. COAT ALL SURFACES EXCEPT O.D. AND SURFACE SHOWN MASKED WITH .0015 - .0020 THICKNESS OF HI DIELECTRIC ENAMEL PER SCD 2021539
7. SURFACE $\boxed{-B-}$ MAYBE LAPPED A MAXIMUM OF .0005 TO ACHIEVE PARALLELISM TO $\boxed{-A-}$
8. BAG AND IDENTIFY PER ND1002019
   SERIALIZE PER ND1002023

MASTER

A2

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
3	AR		2021539	ENAMEL, ACRYLIC RESIN		
2	AS REQ'D		2021538	ADHESIVE, PHENOLIC RESIN		
1	35 APPROX.		2021680	LAMINATION		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021664	
2021656	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

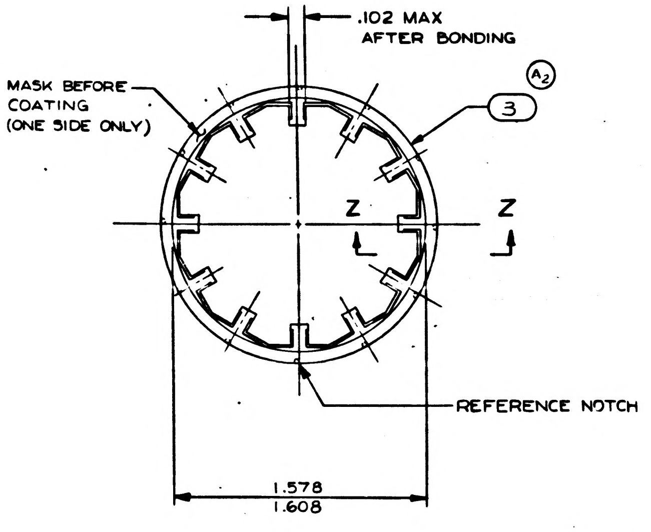
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C.R. Grasso 24 Jun 64
CHECKED L W Keating 20 Jul 64
APPROVED H R Chasbury 8/18/64
APPROVED R A Booth 8-18-64
MIT APPROVED W Kupfer DATE 18 Aug 64

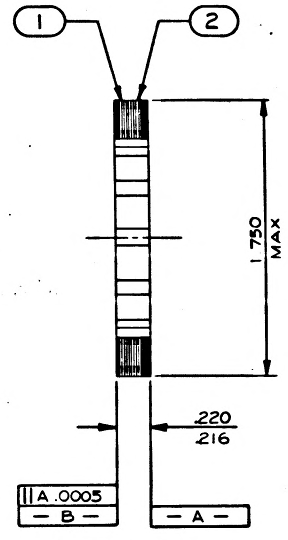
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

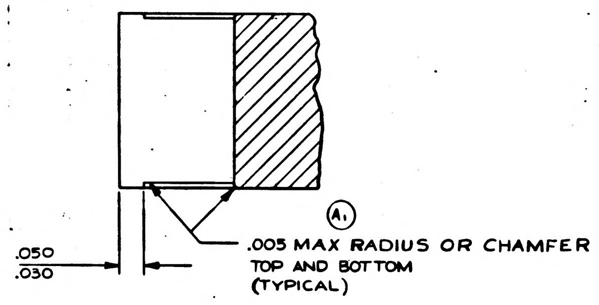
STATOR CORE 12 MY 1.750
APOLLO II IRIG

SIZE D
CODE IDENT NO
DRAWING NO. 2021679
SCALE 2/1
SHEET 1 OF 1

REVISIONS					11784
ZONE	SYM	DESCRIPTION	DR	CHK	APPROVED
	A_2	REVISED PER TDRR 14048	LZ	RAB	64 WK
	B	REVISED PER TDRR 35694	RW	GHR	FEB 68


.102 MAX
AFTER BONDING
MASK BEFORE COATING (ONE SIDE ONLY)
A_2
3
Z
Z
REFERENCE NOTCH
1.578
1.608


1
2
1.750 MAX
.220
.216
// A .0005
— B —
— A —


A_1
.005 MAX RADIUS OR CHAMFER
TOP AND BOTTOM
(TYPICAL)
.050
.030

VIEW Z-Z
SCALE : 10/1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. STACK LAMINATIONS WITH REFERENCE NOTCH TO RIGHT OF CENTER 30°C.W. FROM PRECEDING LAMINATION
3. BOND PER ATP 2021500, MC 25-300
   - A. REF. BONDING FIXTURE MIT DWG B-104458 OR EQUIVALENT
4. REMOVE ALL BURRS KEEPING POLE FACE EDGES SHARP AND SQUARE PER VIEW Z-Z
5. MAGNETIC TEST LIMITS PER ATP 2021500, MC 25-110 UTILIZING:
   - A. AREA = .122 CM^2
   - B. MEAN LENGTH = 11.98 CM
6. COAT ALL SURFACES EXCEPT O.D. AND SURFACE SHOWN MASKED WITH .0015 - .0020 THICKNESS OF HI DIELECTRIC ENAMEL PER SCD 2021539
7. SURFACE -B- MAYBE LAPPED A MAXIMUM OF .0005 TO ACHIEVE PARALLELISM TO -A-
8. BAG AND IDENTIFY PER ND1002019
   SERIALIZE PER ND1002023

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT NO.	DESCRIPTION	MATERIAL	SPECIFICATION
3	AR		2021539	ENAMEL, ACRYLIC RESIN		
2	AS REQ'D		2021538	ADHESIVE, PHENOLIC RESIN		
1	35 APPROX.		2021680	LAMINATION		

A_2

LIST OF MATERIALS

NEXT ASSY	USED ON
2021664	
2021656	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C.R. Grasso 24 Jun 64
CHECKED L.W. Keating 20 Jul 64
APPROVED W.R. Chambers 8/18/64
APPROVED R.A. Booth 8-18-64
MIT APPROVED W Kupfer DATE 18 Aug 64

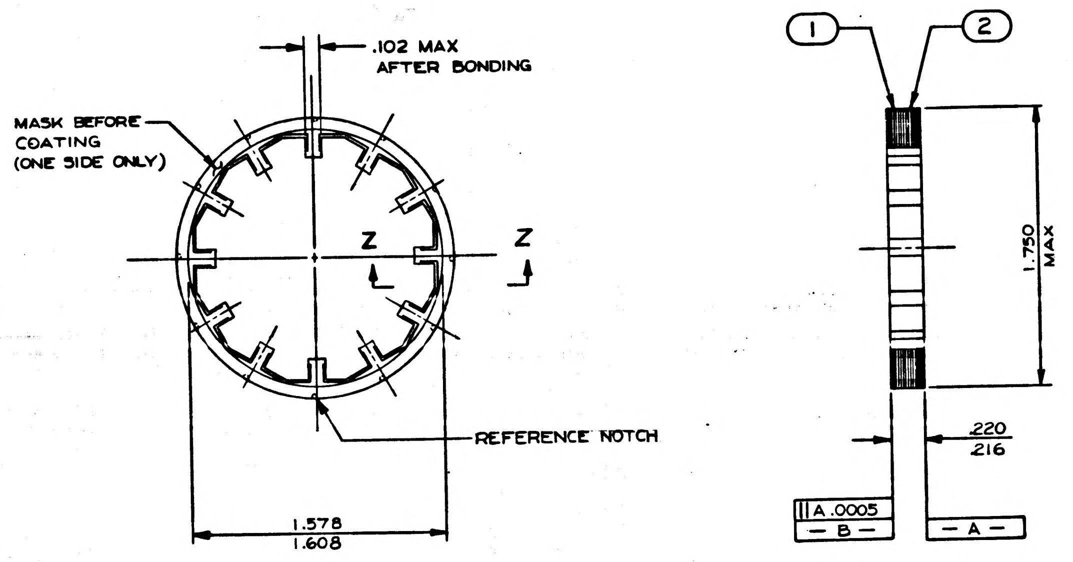
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

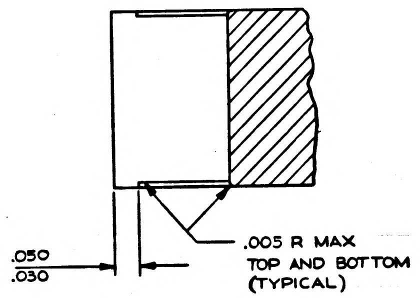
STATOR CORE 12 MY 1.750
APOLLO II IRIG

SIZE D
CODE IDENT NO
DRAWING NO. 2021679
SCALE 2/1
SHEET 1 OF 1

REVISIONS						
ZONE	SYM	DESCRIPTION	ER	CHK	DATE	APPROVED

1784





VIEW Z-Z
SCALE: 10/1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. STACK LAMINATIONS WITH REFERENCE NOTCH TO RIGHT OF CENTER 30° C.W. FROM PRECEDING LAMINATION
3. BOND PER ATP 2021500, MC 25-300
   A. REF. BONDING FIXTURE MIT DWG B-104458 OR EQUIVALENT
4. REMOVE ALL BURRS KEEPING POLE FACE EDGES SHARP AND SQUARE PER VIEW Z-Z
5. MAGNETIC TEST LIMITS PER ATP 2010500, MC 25-110 UTILIZING:
   A. AREA = .122 CM^2
   B. MEAN LENGTH = 11.98 CM
6. COAT ALL SURFACES EXCEPT O.D. AND SURFACE SHOWN MASKED WITH .0015 - .0020 THICKNESS OF HI DIELECTRIC ENAMEL PER SCD 2021539
7. SURFACE [-B-] MAYBE LAPPED A MAXIMUM OF .0005 TO ACHIEVE PARALLELISM TO [-A-]
8. BAG AND IDENTIFY PER ND1002019
   SERIALIZE PER ND1002023

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
2	AS REQ'D		2021538	ADHESIVE, PHENOLIC RESIN		
1	35 APPROX.		2021680	LAMINATION		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021664	
2021656	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

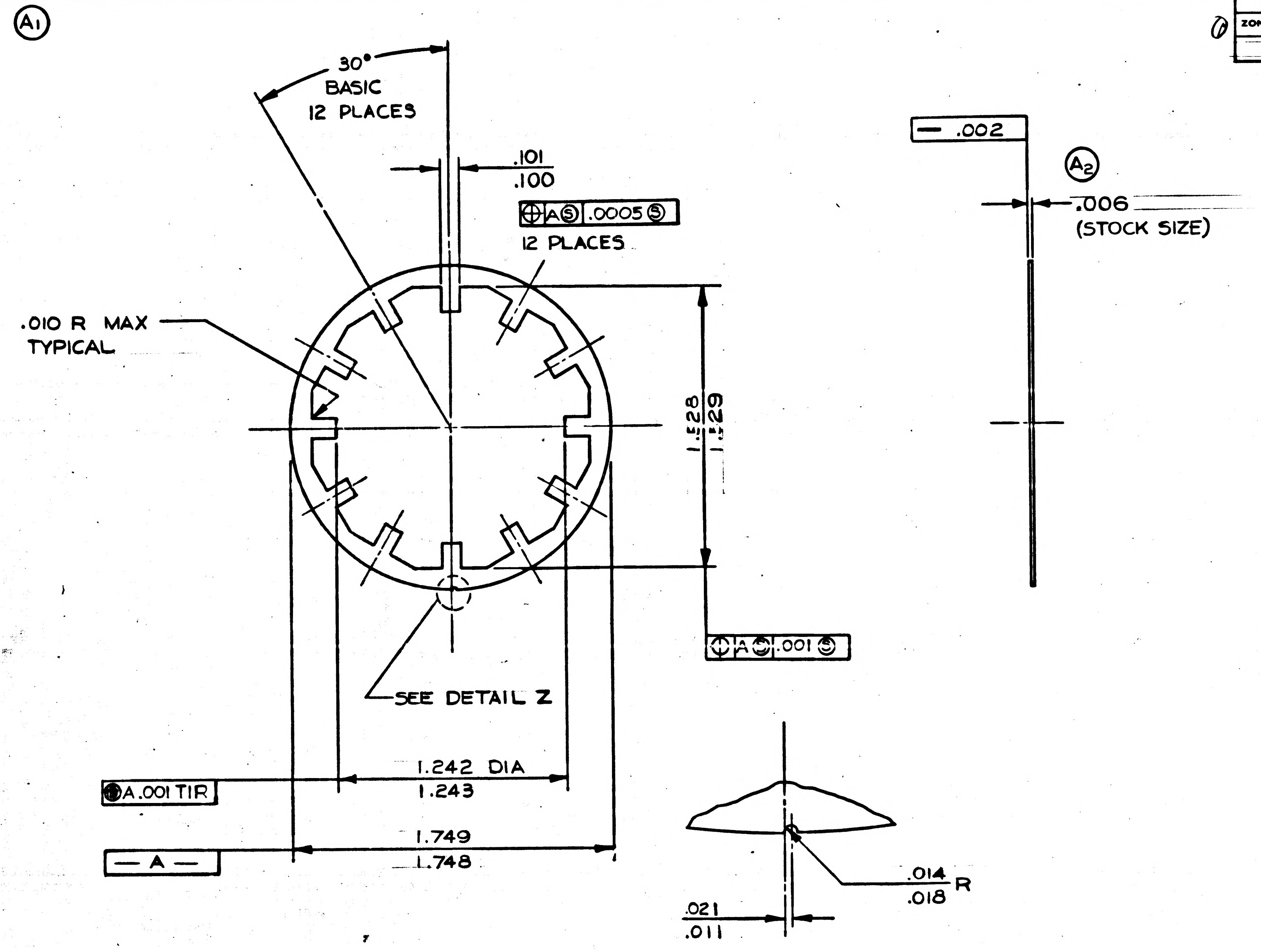
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C.R. Grasso 31 Jul 64
CHECKED L.W. Keating 20 Jul 64
APPROVED M.R. Chamberlain 8/18/64
APPROVED R.A. Booth 8-18-64
MIT APPROVED W. Kupfer DATE 18 Aug 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STATOR CORE 12 MY 1.750
APOLLO II IRIG

SIZE D
CODE IDENT NO
DRAWING NO. 2021679
SCALE 2/1
SHEET 1 OF 1

REVISIONS						11069
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A3	REVISED PER TDRR 11788	P.D.		8-24-64	WK



A1
30° BASIC
12 PLACES
.101
.100
⊕ A Ⓢ .0005 Ⓢ
12 PLACES
.010 R MAX TYPICAL
1.528
1.529
⊕ A Ⓢ .001 Ⓢ
SEE DETAIL Z
1.242 DIA
1.243
⊚ A .001 TIR
1.749
1.748
— A —
— .002
A2
.006 (STOCK SIZE)
.014
.018 R
.021
.011

DETAIL Z
SCALE : 10/1

MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE ALL BURRS VISIBLE UNDER 10 X MAXIMUM MAGNIFICATION. THE EDGE RADII AFTER DEBURRING SHALL NOT EXCEED .002
3. HEAT TREAT PER ATP 2021500, MC25-104
4. ANNEALED LAMINATIONS SHALL HAVE A CLEAR BRIGHT FINISH
5. TAKE A SAMPLING OF LAMINATIONS FROM EACH HEAT TREAT AND CHECK MAGNETIC TEST LIMITS PER ATP 2021500, MC25-110 UTILIZING:
   A. AREA = .557 x NUMBER OF LAM. x LAM. THICKNESS (INCHES) = SQ. CM.
   B. MINIMUM LENGTH = 11.98 CM.
6. BAG AND IDENTIFY PER ND1002019

NEXT ASSY	USED ON
2021679	2021500

APPLICATION

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL (A3)
PER SCD NO.
2021554-2

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C.R. Grasso	18Jun64
CHECKED	L.W. Keating	16JUL64
APPROVED	D. Freeman	7-21-64
APPROVED	RA Booth	7-21-64

MIT APPROVED W Ruffer DATE 21 July 64
NASA APPROVED W. J. Rhine 7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

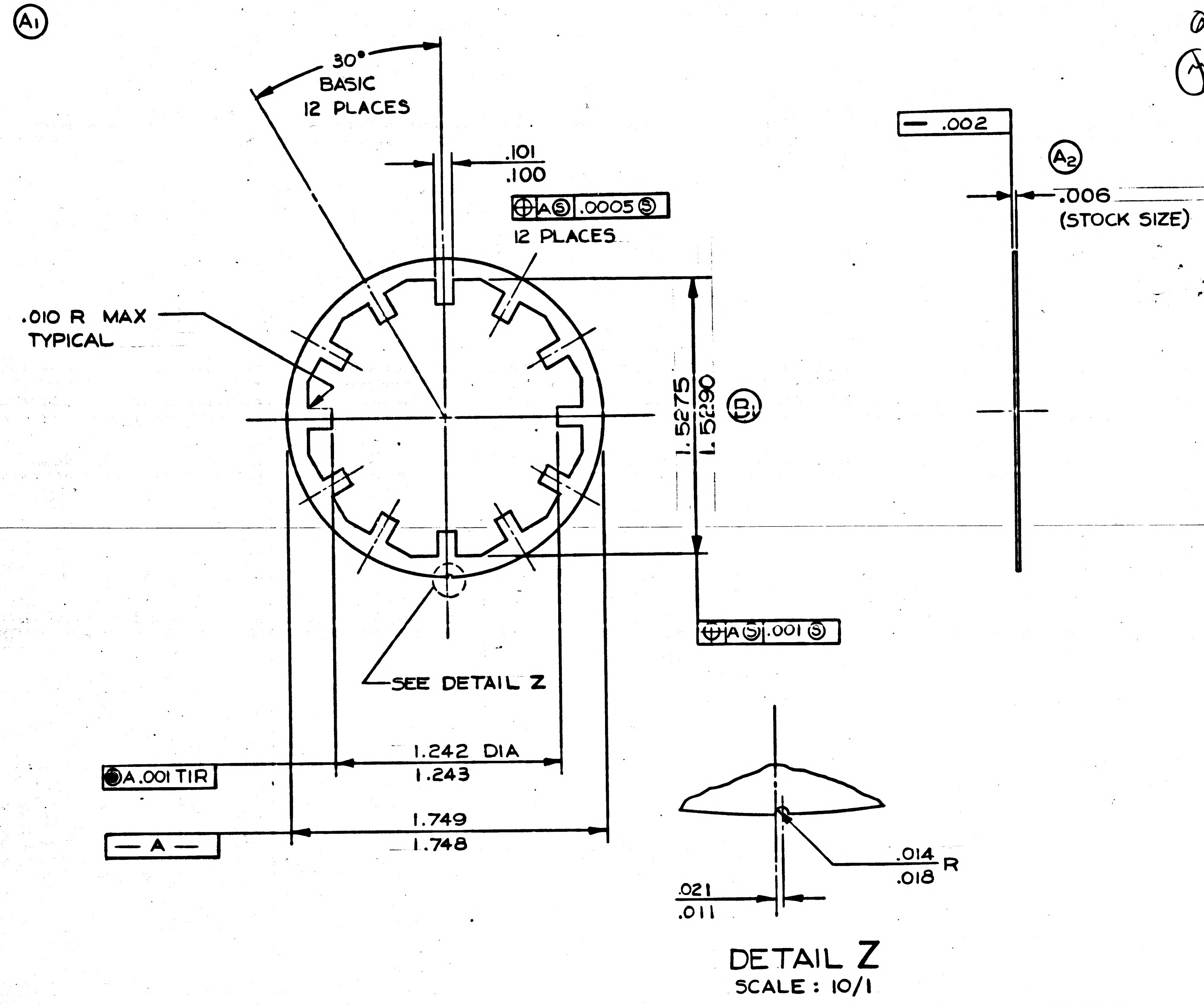
12 MY 1.75 THIN POLE
STATOR LAMINATION
APOLLO II IRIG

SIZE	CODE IDENT NO.	DRAWING NO.
C		2021680

SCALE 2/1 SHEET 1 OF 1

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS							11069
	ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
Ⓓ		A3	REVISED PER TDRR 11788	P.D.		8-24-64	WR
Ⓐ		B1	REVISED PER TDRR 16571	P.D.		2-12-65	WR



Ⓐ1
30° BASIC 12 PLACES
.101
.100
⊕ A Ⓢ .0005 Ⓢ
12 PLACES
.010 R MAX TYPICAL
1.5275
1.5290
Ⓓ
⊕ A Ⓢ .001 Ⓢ
SEE DETAIL Z
1.242 DIA
1.243
◉ A .001 TIR
1.749
1.748
— A —
— .002
Ⓐ2
.006 (STOCK SIZE)
.014
.018
R
.021
.011
DETAIL Z
SCALE : 10/1

MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE ALL BURRS VISIBLE UNDER 10 X MAXIMUM MAGNIFICATION. THE EDGE RADII AFTER DEBURRING SHALL NOT EXCEED .002
3. HEAT TREAT PER ATP 2021500, MC25-104
4. ANNEALED LAMINATIONS SHALL HAVE A CLEAR BRIGHT FINISH
5. TAKE A SAMPLING OF LAMINATIONS FROM EACH HEAT TREAT AND CHECK MAGNETIC TEST LIMITS PER ATP 2021500, MC25-110 UTILIZING:
   - A. AREA = .557 x NUMBER OF LAM. x LAM. THICKNESS (INCHES) = SQ. CM.
   - B. MINIMUM LENGTH = 11.98 CM.
6. BAG AND IDENTIFY PER ND1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021679	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL Ⓐ3
PER SCD NO.
2021554-2

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN C.R. Grasso 18Jun64
CHECKED L.W. Keating 16JUL64
APPROVED D. Freeman 7-21-64
APPROVED R A Booth 7-21-64

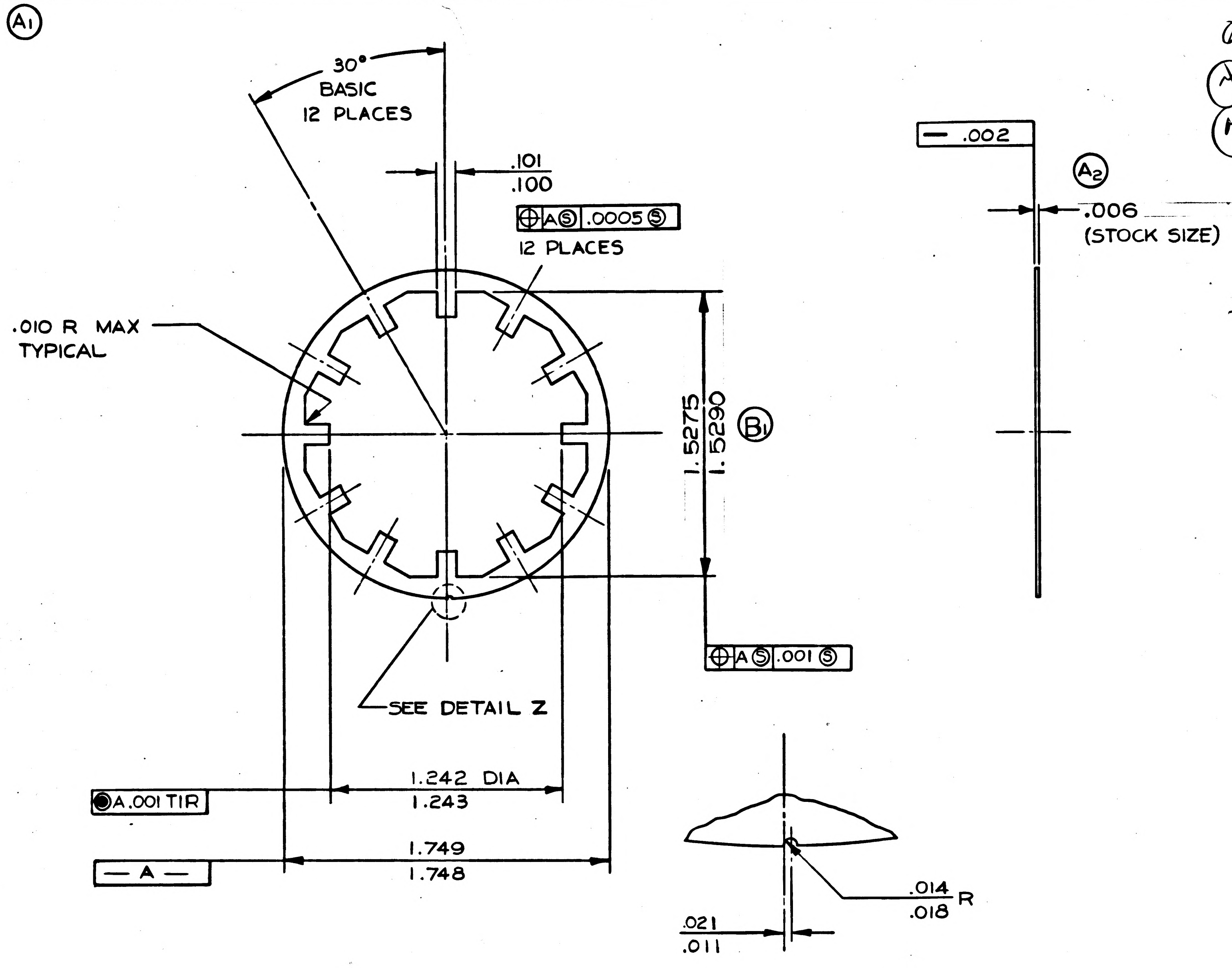
MIT APPROVED DATE
W Ruffer 21 July 64
NASA APPROVED
W. J. Rhine 7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

12 MY 1.75 THIN POLE
STATOR LAMINATION
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021680
SCALE 2/1
SHEET 1 OF 1

REVISIONS						11069
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A3	REVISED PER TDRR 11788	P.D.	[illegible]	8-24-64	WK
	B1	REVISED PER TDRR 16571	P.D.	[illegible]	2-12-65	WK.
	C1	REVISED PER TDRR 20300		[illegible]	6-22-65	WK.



A1
30° BASIC 12 PLACES
.101
.100
⊕ A Ⓢ .0005 Ⓢ
12 PLACES
.010 R MAX TYPICAL
1.5275
1.5290
B1
⊕ A Ⓢ .001 Ⓢ
SEE DETAIL Z
◉ A .001 TIR
1.242 DIA
1.243
— A —
1.749
1.748
— .002
A2
.006 (STOCK SIZE)
.014
.018 R
.021
.011

DETAIL Z
SCALE : 10/1

MASTER

C1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE ALL BURRS VISIBLE UNDER 10 X MAXIMUM MAGNIFICATION. THE EDGE RADII AFTER DEBURRING SHALL NOT EXCEED .002
3. HEAT TREAT PER ATP 2021500, MC25-104
4. ANNEALED LAMINATIONS SHALL HAVE A CLEAR BRIGHT FINISH
5. TAKE A SAMPLING OF LAMINATIONS FROM EACH HEAT TREAT AND CHECK MAGNETIC TEST LIMITS PER ATP 2021500, MC25-110 UTILIZING:
   - A. AREA = .557 x NUMBER OF LAM. x LAM. THICKNESS (INCHES) = SQ. CM.
   - B. MEAN LENGTH = 11.98 CM.
6. BAG AND IDENTIFY PER ND1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021679	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO. A3
2021554-2

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C.R. Grasso	18Jun64
CHECKED	L.W. Keating	16JUL64
APPROVED	D. Freeman	7-21-64
APPROVED	R A Booth	7-21-64
MIT APPROVED	W Ryder 21 July 64	DATE
NASA APPROVED	W. J. Rhine	7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

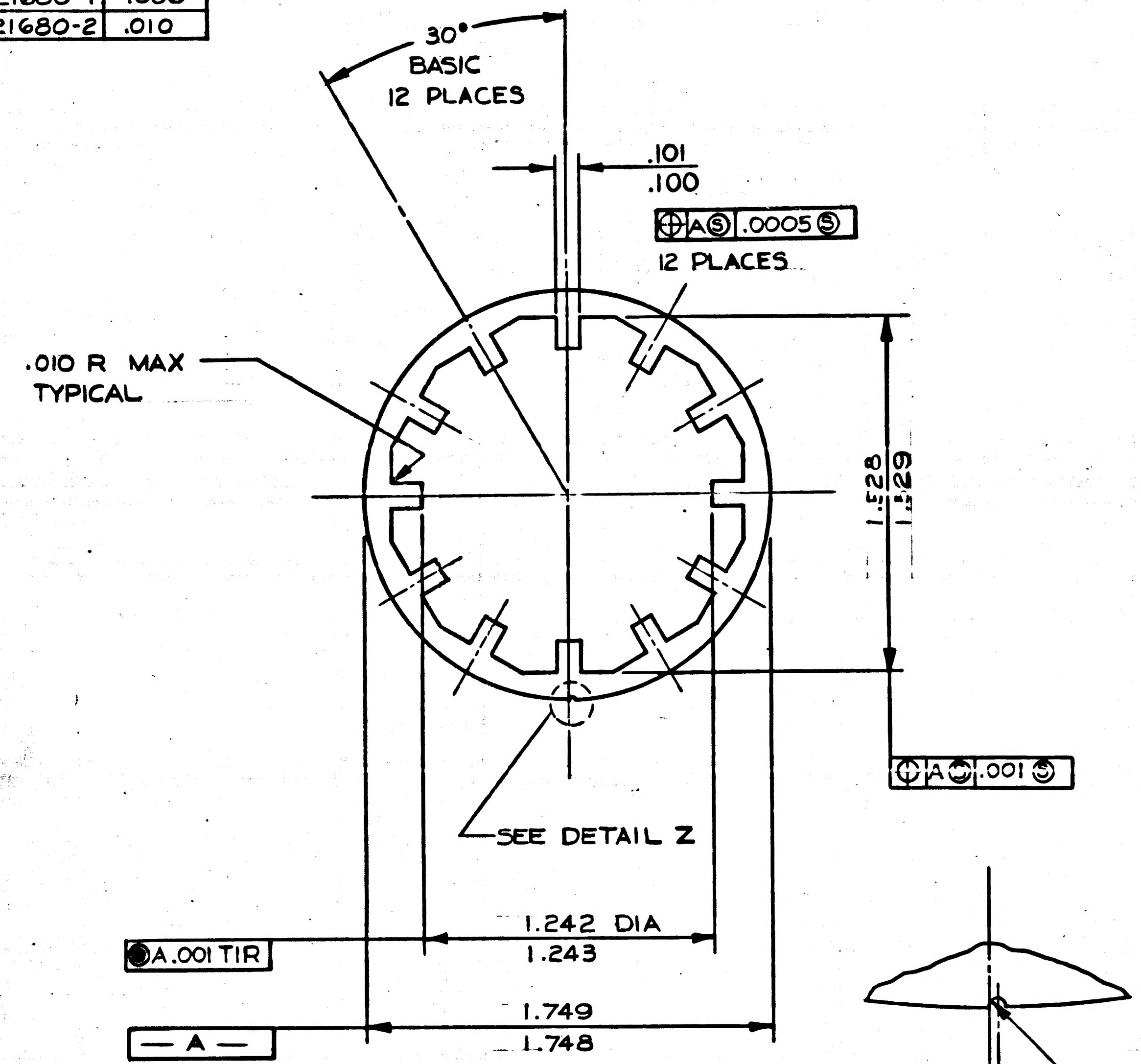
12 MY 1.75 THIN POLE
STATOR LAMINATION
APOLLO II IRIG

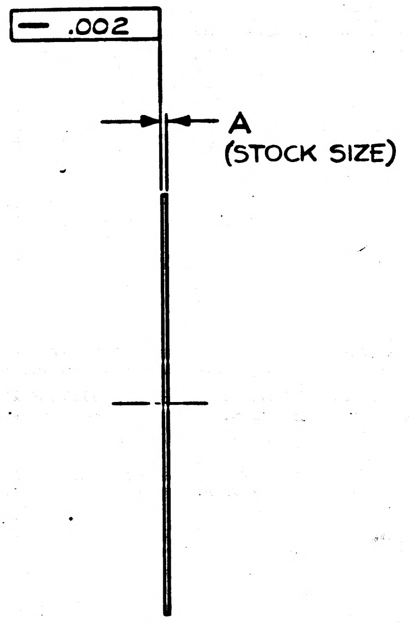
SIZE	CODE IDENT NO.	DRAWING NO.
C		2021680

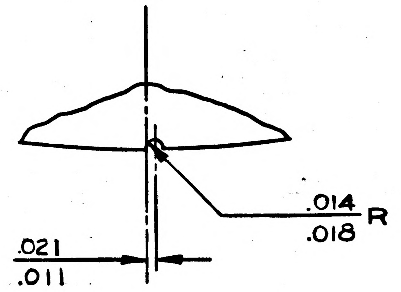
SCALE 2/1
SHEET 1 OF 1

PART NO.	DIM A
2021680-1	.006
2021680-2	.010

REVISIONS						11069
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED







DETAIL Z
SCALE : 10/1

MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE ALL BURRS VISIBLE UNDER 10 X MAXIMUM MAGNIFICATION. THE EDGE RADII AFTER DEBURRING SHALL NOT EXCEED .002
3. HEAT TREAT PER ATP 2021500, MC25-104
4. ANNEALED LAMINATIONS SHALL HAVE A CLEAR BRIGHT FINISH
5. TAKE A SAMPLING OF LAMINATIONS FROM EACH HEAT TREAT AND CHECK MAGNETIC TEST LIMITS PER ATP 2021500, MC25-110 UTILIZING:
   - A. AREA = .557 x NUMBER OF LAM. x LAM. THICKNESS (INCHES) = SQ. CM.
   - B. MINIMUM LENGTH = 11.98 CM.
6. BAG AND IDENTIFY PER ND1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021679	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO.
2021554-1

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C.R. Grasso	18Jun64
CHECKED	L.W. Keating	16JUL64
APPROVED	D. Freeman	7-21-64
APPROVED	RA Booth	7-21-64

MIT APPROVED W Ruffer 21 July 64 DATE
NASA APPROVED W. J. Rhine 7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

12 MY 1.75 THIN POLE
STATOR LAMINATION
APOLLO II IRIG

SIZE	CODE IDENT NO.	DRAWING NO.
C		2021680

SCALE 2/1 SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 12345

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
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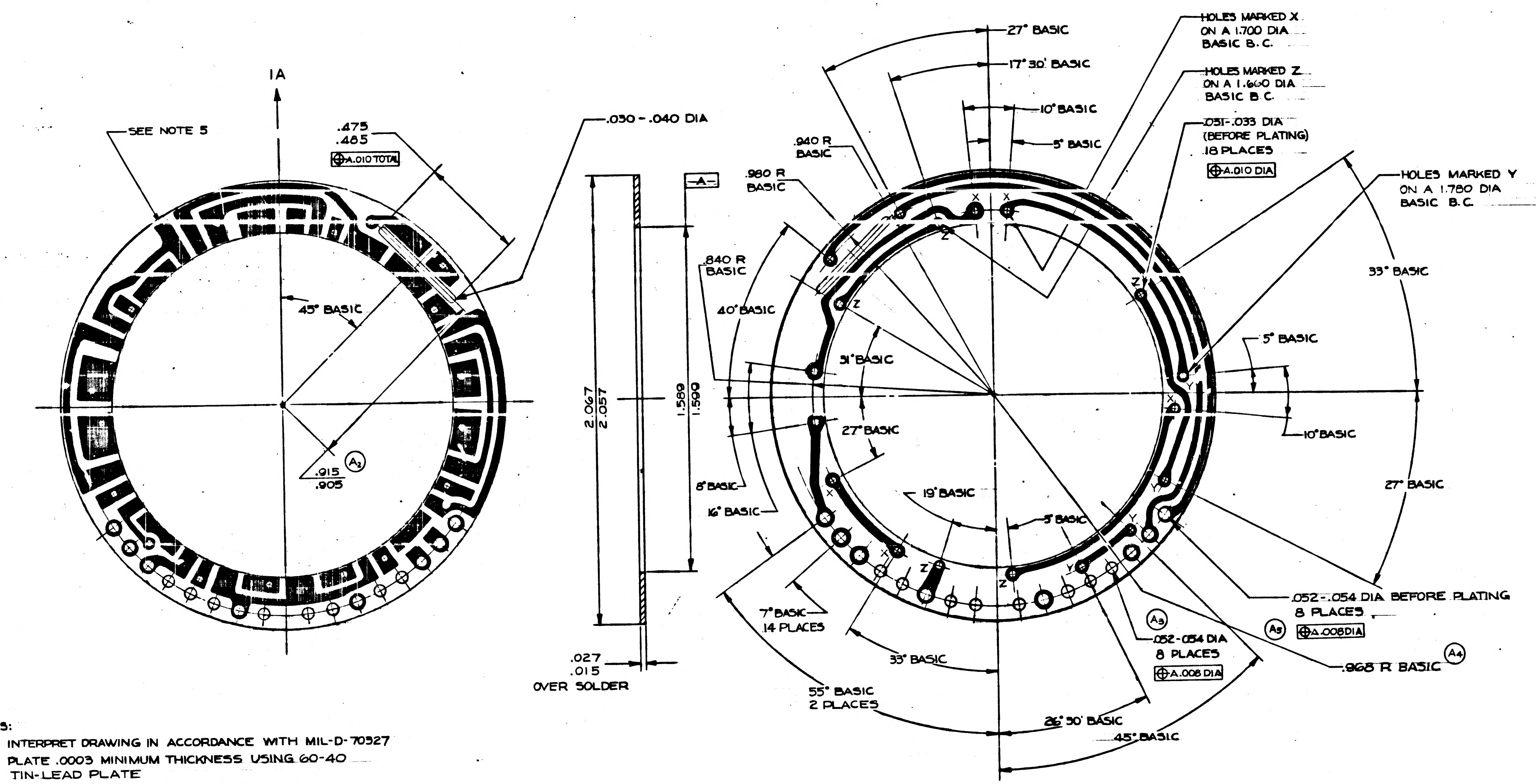


IA
SEE NOTE 5
.475
.485
⊕ A .010 TOTAL
.030 - .040 DIA
45° BASIC
A2
.915
.905
-A-
2.067
2.057
1.589
1.590
.027
.015
OVER SOLDER
27° BASIC
17° 30' BASIC
10° BASIC
5° BASIC
.940 R BASIC
.980 R BASIC
.840 R BASIC
40° BASIC
31° BASIC
27° BASIC
8° BASIC
16° BASIC
19° BASIC
5° BASIC
7° BASIC 14 PLACES
33° BASIC
55° BASIC 2 PLACES
26° 30' BASIC
45° BASIC
HOLES MARKED X ON A 1.700 DIA BASIC B.C.
HOLES MARKED Z ON A 1.660 DIA BASIC B.C.
.031-.033 DIA (BEFORE PLATING) 18 PLACES
⊕ A .010 DIA
HOLES MARKED Y ON A 1.780 DIA BASIC B.C.
33° BASIC
5° BASIC
10° BASIC
27° BASIC
.052-.054 DIA BEFORE PLATING 8 PLACES
A5
⊕ A .008 DIA
A3
.052-.054 DIA 8 PLACES
⊕ A .008 DIA
.968 R BASIC
A4
X
Y
Z

A1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. PLATE .0003 MINIMUM THICKNESS USING 60-40 TIN-LEAD PLATE
3. LACQUER COAT TO PREVENT OXIDATION
4. ALL HOLES TO BE THRU PLATED TO A MINIMUM WALL THICKNESS OF .0015
5. ART WORK PER PRINTED CIRCUIT MASTER 2021683
6. BAG AND IDENTIFY PER ND 1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021656	2021500

APPLICATION

A6

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO.
2021557-3

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C.R. Grasso 31 Aug 64
CHECKED L.W. Keating 9-8-64
APPROVED 9/8/64
APPROVED R.A. Booth 9-8-64
MIT APPROVED W. Kupfer DATE 8 Sep 64
NASA APPROVED W. J. Rhine DATE 9-8-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

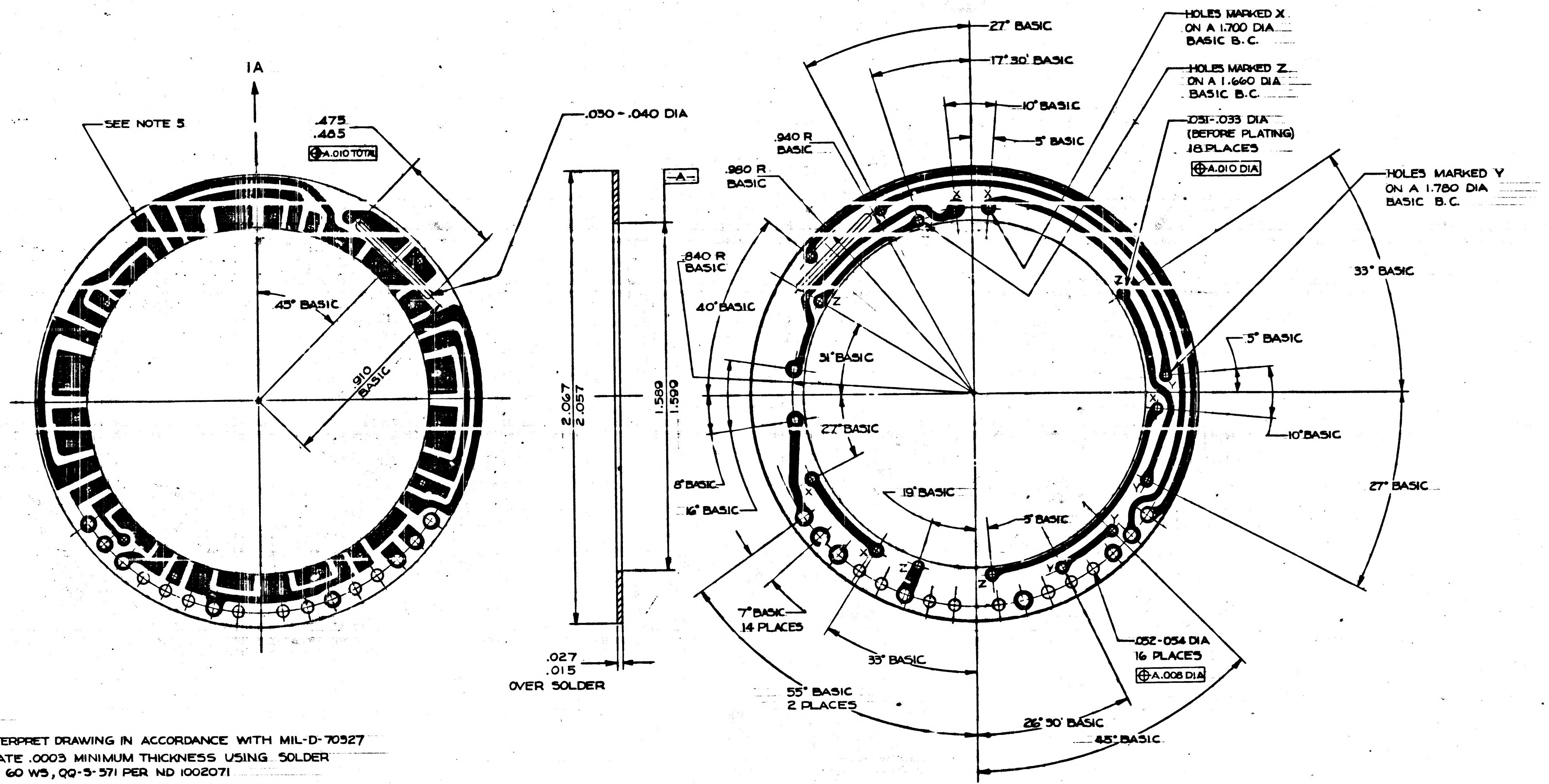
T.G. MICROSYN
PRINTED CIRCUIT
APOLLO II IRIG

SIZE D
CODE IDENT NO
DRAWING NO. 2021682
SCALE 4/1
SHEET 1 OF 1

INCHES
0 2

REVISIONS TDRR 12343

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



SEE NOTE 5
IA
.475
.485
⊕ A .010 TOTAL
.030 - .040 DIA
.45° BASIC
.910 BASIC
2.067
2.057
1.589
1.599
-A-
.027
.015
OVER SOLDER
27° BASIC
17° 30' BASIC
10° BASIC
5° BASIC
.940 R BASIC
.980 R BASIC
.840 R BASIC
40° BASIC
31° BASIC
27° BASIC
8° BASIC
16° BASIC
19° BASIC
5° BASIC
7° BASIC 14 PLACES
33° BASIC
55° BASIC 2 PLACES
26° 30' BASIC
45° BASIC
HOLES MARKED X ON A 1.700 DIA BASIC B.C.
HOLES MARKED Z ON A 1.660 DIA BASIC B.C.
.031-.033 DIA (BEFORE PLATING) 18 PLACES
⊕ A .010 DIA
HOLES MARKED Y ON A 1.780 DIA BASIC B.C.
33° BASIC
5° BASIC
10° BASIC
27° BASIC
.052-.054 DIA 16 PLACES
⊕ A .008 DIA
X
Y
Z

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. PLATE .0003 MINIMUM THICKNESS USING SOLDER SN 60 WS, QQ-S-571 PER ND 1002071
3. LACQUER COAT TO PREVENT OXIDATION
4. ALL HOLES TO BE THRU PLATED TO A MINIMUM WALL THICKNESS OF .0015
5. ART WORK PER PRINTED CIRCUIT MASTER 2021683
6. BAG AND IDENTIFY PER ND 1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021656	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO. 2021557

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C.R. Grasso	31 Aug 64
CHECKED	L.W. Keating	9-8-64
APPROVED		9/8/64
APPROVED	R.A. Booth	9-8-64
MIT APPROVED	W Kupfer	8 Sep 64
NASA APPROVED	W J Rhine	9-8-64

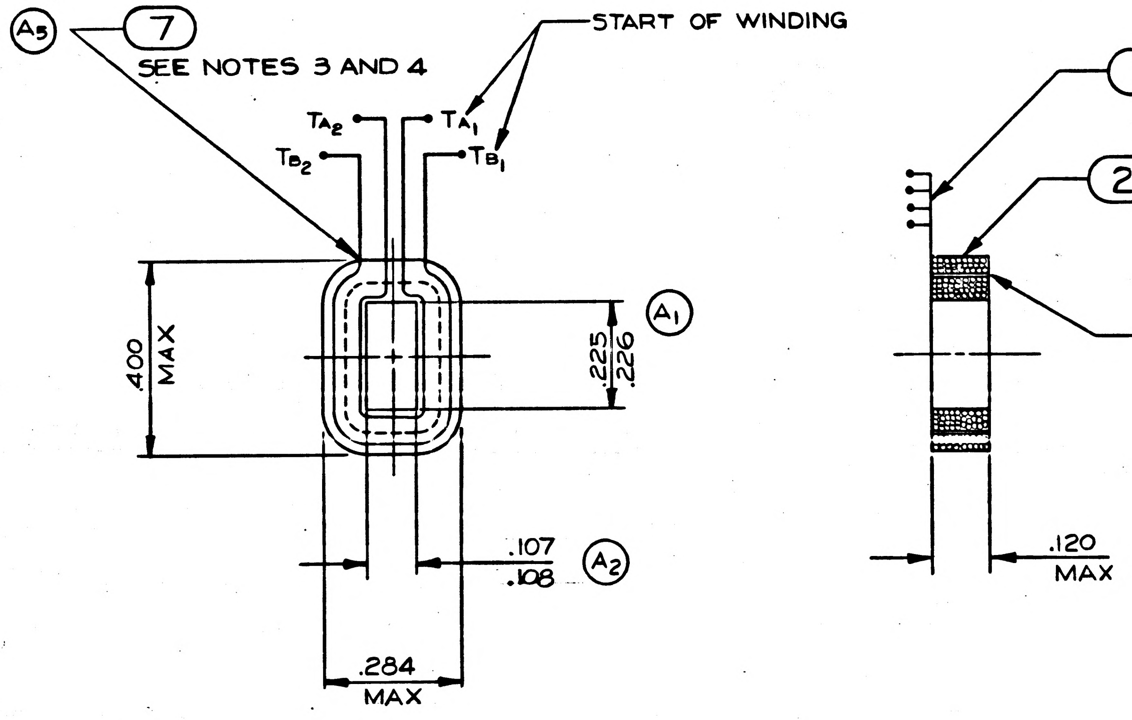
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

T.G. MICROSYN
PRINTED CIRCUIT
APOLLO II IRIG

SIZE	CODE IDENT NO	DRAWING NO.
D		2021682

SCALE 4/1
SHEET 1 OF 1

REVISIONS						11521
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A5	REVISED PER TDRR 13275	CRG		9-22-64	10/27



A3

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BOTH COILS TO HAVE 200 TURNS OF ①
3. SECURE LAST TURN WITH ⑦
4. MIX AND CURE ⑦ PER ATP 2021500, MC25-302
5. IMPREGNATE PER ATP 2021500, MC25-501
6. BAG AND IDENTIFY PER ND 1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
7	AR		2021529	ADHESIVE, EPOXY		
6	AS REQ'D		1010640	LENS PAPER		
5	AS REQ'D		1010722	ANTI FOAM AGENT		
4	AS REQ'D		1010721	CURING AGENT (ACCELERATOR)		
3	AS REQ'D		1010720	CURING AGENT		
2	AS REQ'D		1010719	EPOXY RESIN		
1	AS REQ'D		2021542-2	WIRE MAGNET, ELECTRICAL-SINGLE POLYESTER		

A4

LIST OF MATERIALS

MASTER

NEXT ASSY	USED ON
2021656	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C R Grasso	22 May 64
CHECKED	L. W. Keating - C.R.G.	8-10-64
APPROVED	M. R. Chambers	8-11-64
APPROVED	R A Booth	8-7-64

MIT APPROVED W Crafton DATE 12 Aug 64
NASA APPROVED DATE 8/12/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COIL ASSEMBLY
TORQUING WINDING 12 MY 1.750
APOLLO II IRIG

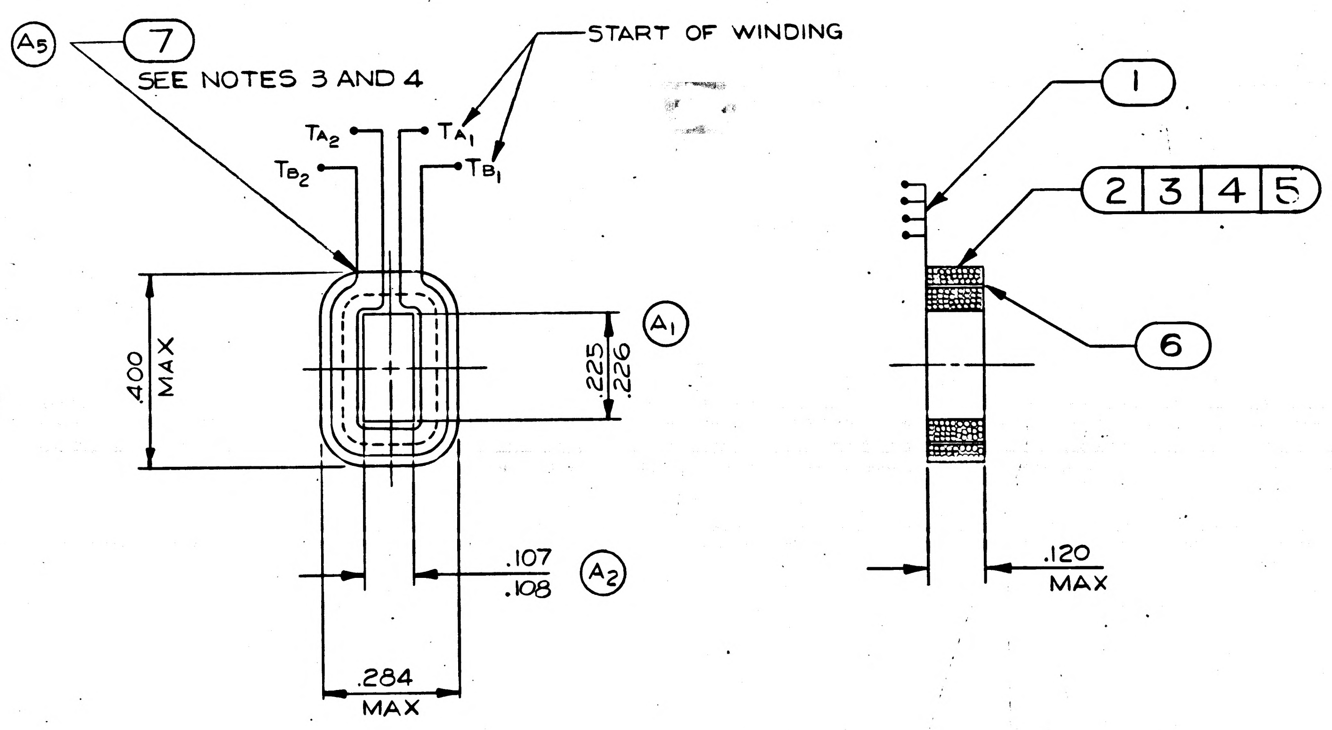
SIZE	CODE IDENT NO.	DRAWING NO.
C		2021684

SCALE 4/1
SHEET 1 OF 1

INCHES
0 1 2

11521

			REVISIONS				
	ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
		A5	REVISED PER TDRR 13275	CRG		9-22-64	10/27
		B	REVISED PER TDRR37090	M.G.		9-DEC-68	



(A3)

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BOTH COILS TO HAVE 200 TURNS OF ①
3. SECURE LAST TURN WITH ⑦
4. MIX AND CURE ⑦ PER ATP 2021500, MC 25-302
5. IMPREGNATE PER ATP 2021500, MC 25-501
6. BAG AND IDENTIFY PER ND 1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
7	AR		2021529	ADHESIVE, EPOXY		
6	AS REQ'D		1010640	LENS PAPER		
5	AS REQ'D		1010722	ANTI FOAM AGENT		
4	AS REQ'D		1010721	CURING AGENT (ACCELERATOR)		
3	AS REQ'D		1010720	CURING AGENT		
2	AS REQ'D		1010719	EPOXY RESIN		
1	AS REQ'D		2021542-2	WIRE MAGNET, ELECT.-SINGLE POLYESTER, 38 AWG		

(A4)

LIST OF MATERIALS

NEXT ASSY	USED ON
2021656	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C R Grasso	22 July 64
CHECKED	L.W. Keating - C.R.G.	8-10-64
APPROVED	H. R. Chambers	8-11-64
APPROVED	R A Booth	8-7-64

MIT APPROVED W Cuffer 12 Aug 64 DATE

NASA APPROVED DATE 8/12/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COIL ASSEMBLY
TORQUING WINDING 12 MY 1.750
APOLLO II IRIG

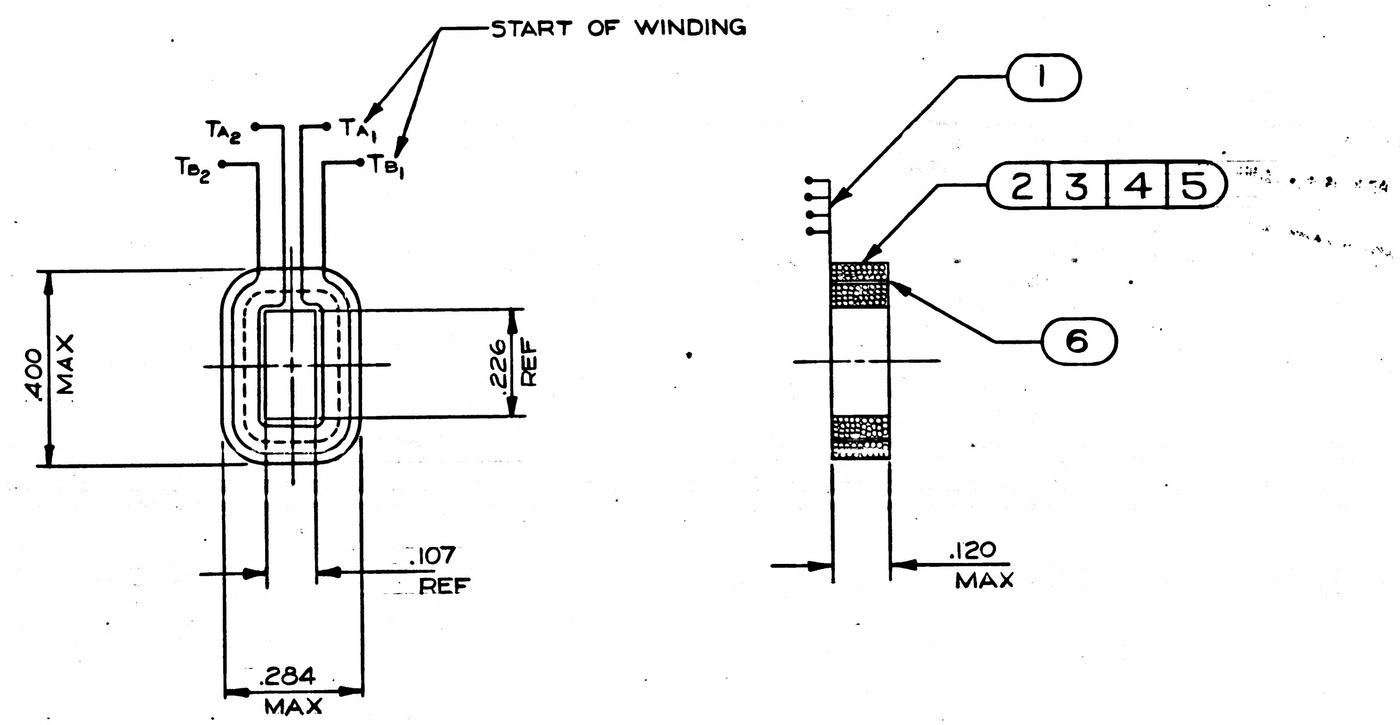
SIZE	CODE IDENT NO.	DRAWING NO.
C	80230	2021684

SCALE 4/1

SHEET 1 OF 1

11521

REVISIONS						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BOTH COILS TO HAVE 200 TURNS OF NO. 38 COPPER WIRE (ITEM NO. 1)
3. BAG AND IDENTIFY PER ND 1002019

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
6	AS REQ'D		1010640	2 LAYERS OF LENS PAPER		
5	AS REQ'D		1010722	DOW CORNING ANTI-FOAM AGENT A		
4	AS REQ'D		1010721	BENZYL DIMETHYLAMINE		
3	AS REQ'D		1010720	METHYL NADIC ANHYDRIDE		
2	AS REQ'D		1010719	DOW 332 IMPREGNANT		
1	AS REQ'D		2021542-2	NO. 38 AWG SINGLE POLYTHERMALEZE COATED WIRE		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021656	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN C R Grasso 22 Jul 64
CHECKED L.W. Keating - C.R.G. 8-10-64
APPROVED M.R. Chambers 8-11-64
APPROVED R A Booth 5-7-64

MIT APPROVED W Cuffer DATE 12 Aug 64
NASA APPROVED DATE 8/12/64

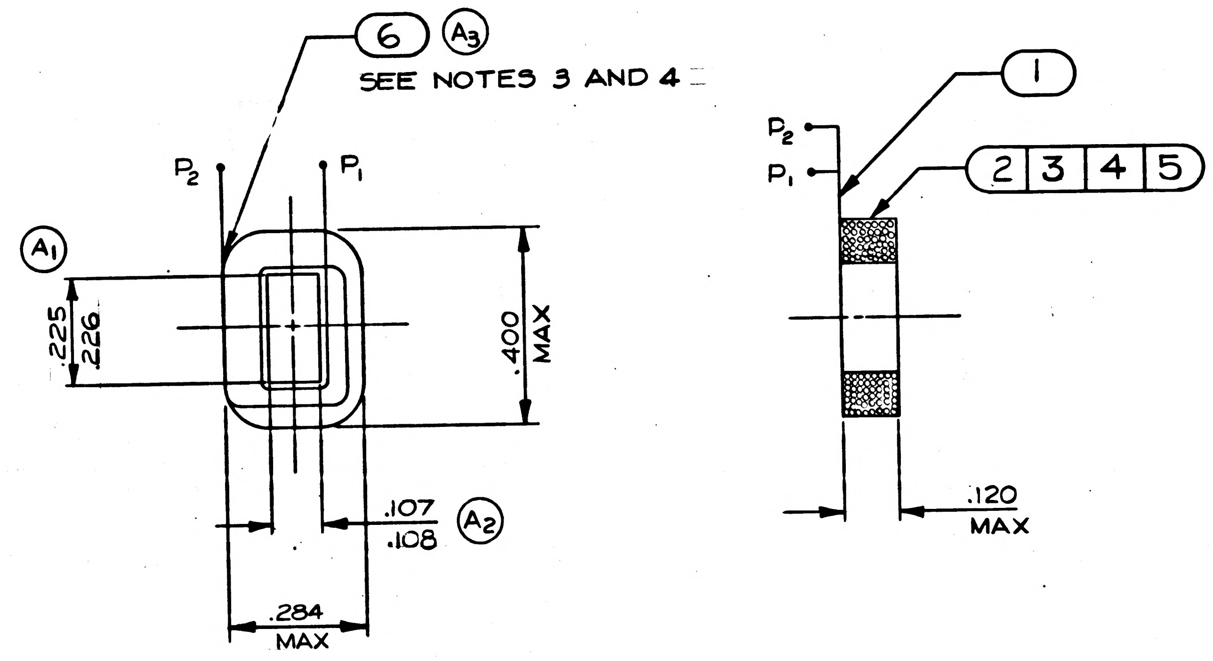
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COIL ASSEMBLY
TORQUING WINDING 12 MY 1.750
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021684
SCALE 4/1
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS						11521
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A5	REVISED PER TDRR 13276	C.R.G.		9-22-64	10/27



A5

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. COIL TO HAVE 400 TURNS OF ①
3. SECURE LAST TURN WITH ⑥
4. MIX AND CURE ⑥ PER ATP 2021500, MC25-302
5. IMPREGNATE PER ATP 2021500, MC 25-501
6. BAG AND IDENTIFY PER ND 1002019

A4

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
6	AR		2021529	ADHESIVE, EPOXY		
5	AS REQ'D		1010722	ANTI FOAM AGENT		
4	AS REQ'D		1010721	CURING AGENT (ACCELERATOR)		
3	AS REQ'D		1010720	CURING AGENT		
2	AS REQ'D		1010719	EPOXY RESIN		
1	AS REQ'D		2021542	WIRE MAGNET, ELECTRICAL-SINGLE POLYESTER		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021656	2021500

APPLICATION

MASTER

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN C R Grasso 22 July 64
CHEC. L. W. Keating-CRG 8-10-64
APPROVED M.R. Chambers 9-11-64
APPROVED R A Booth 9-7-64

MIT APPROVED W Gupfer DATE 12 Aug 64
NASA APPROVED DATE 8/12/64

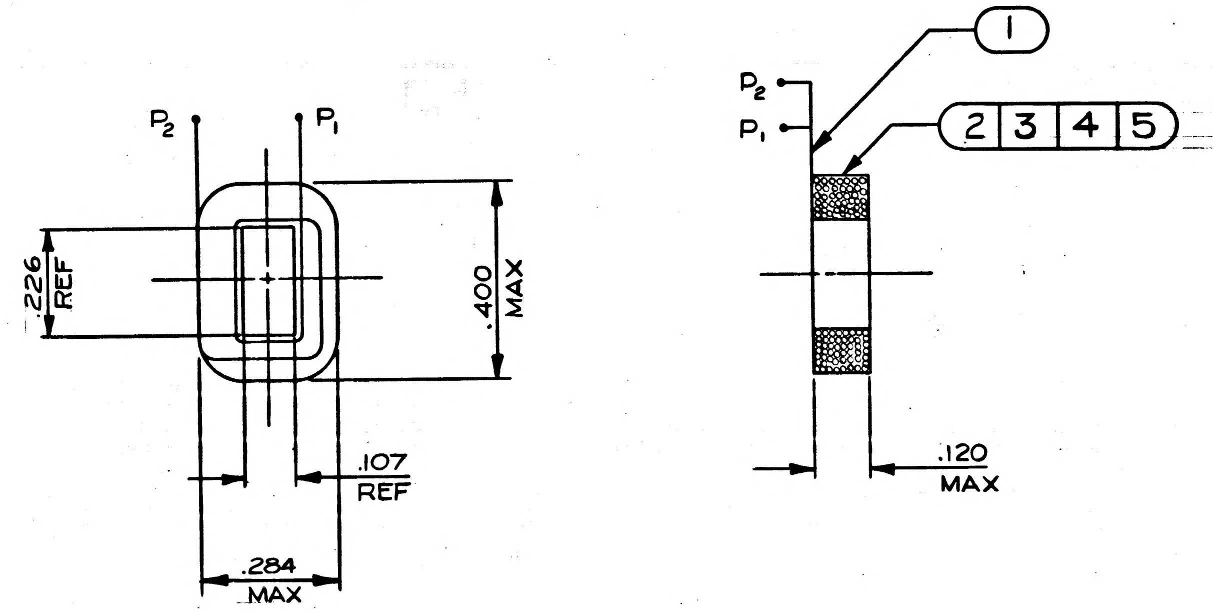
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COIL ASSEMBLY
PRIMARY WINDING 12 MY 1.750
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021685
SCALE 4/1
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS						11521
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. COIL TO HAVE 400 TURNS OF NO. 38 COPPER WIRE (ITEM NO. 1)
3. BAG AND IDENTIFY PER ND 1002019

5	AS REQD		1010722	DOW CORNING ANTI-FOAM AGENT A		
4	AS REQ'D		1010721	BENZYL DIMETHYLAMINE		
3	AS REQ'D		1010720	METHYL NADIC ANHYDRIDE		
2	AS REQ'D		1010719	DOW 332 IMPREGNANT		
1	AS REQ'D		2021542-2	NO. 38AWG SINGLE POLYTHERMALEZE COATED WIRE		
ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

MASTER

2021656	2021500
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN C R Grasso 22 July 64
CHECKED L. W. Keating-CRG 8-10-64
APPROVED M. R. Chambers 9-11-64
APPROVED R A Booth 8-7-64
MIT APPROVED W Copfer DATE 12 Aug 64
NASA APPROVED DATE 8/12/64

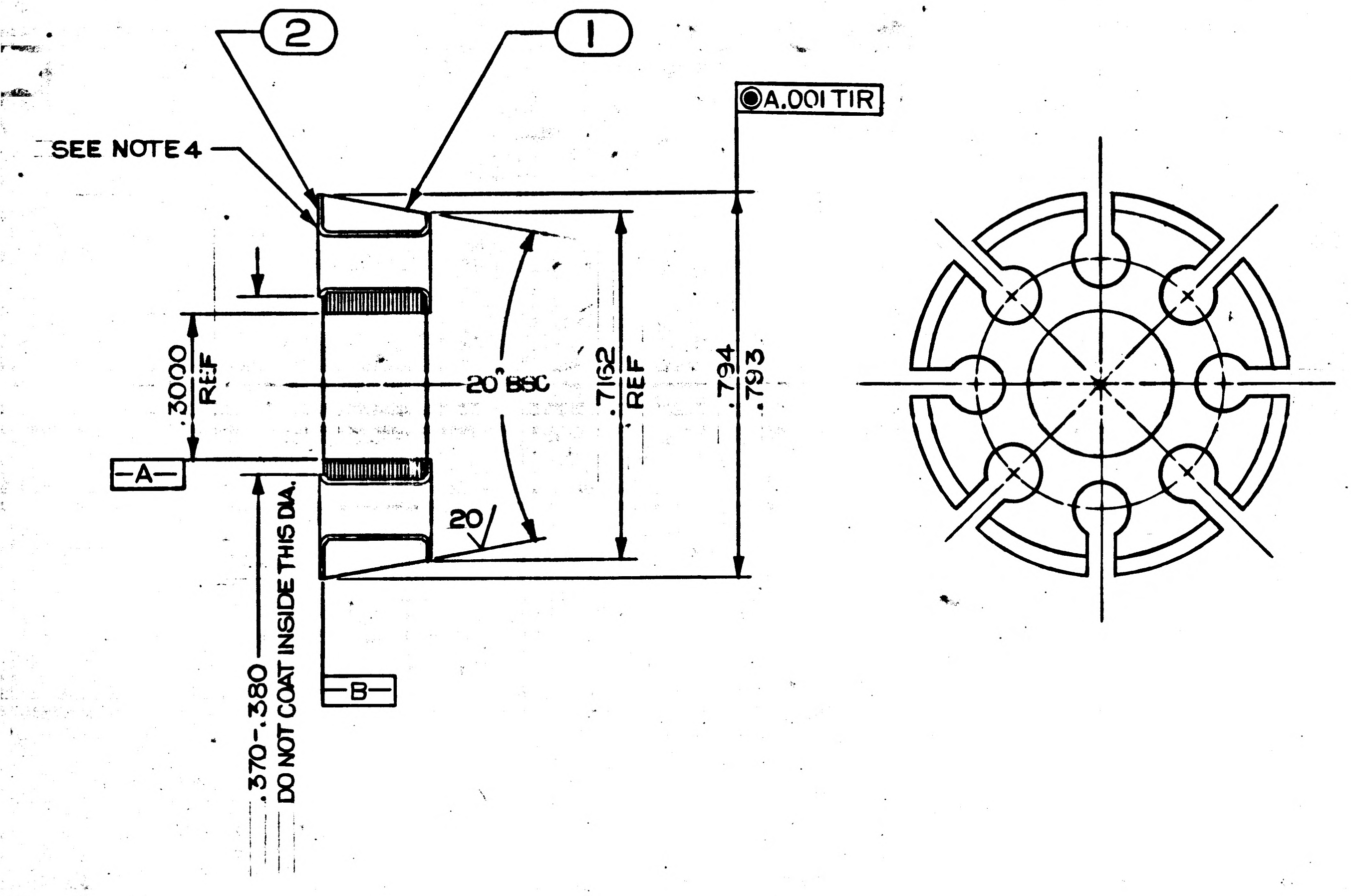
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COIL ASSEMBLY
PRIMARY WINDING 12 MY 1.750
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021685
SCALE 4/1
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS			TDRR 11318			
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A₁	REVISED PER TDRR 11792	CRG		8-24-64	WR



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE ALL BURRS AND KEEP SHARP EDGES
3. MAGNETIC TEST LIMITS PER ATP 2021500, MC 25-112 UTILIZING:
   A. AREA = .0670 CM^2
   B. MEAN LENGTH = 1.865 CM
4. COAT ALL SURFACES EXCEPT I.D, O.D. AND SURF -B- INSIDE .370-.380 DIA WITH .003-.005 OF HI-DIELECTRIC ENAMEL PER SCD 2021539
5. BAG AND IDENTIFY PER ND1002019
   SERIALIZE PER ND 1002023

MASTER

Ⓐ₁

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
2	AS REQD		2021539	ENAMEL, HIGH DIELECTRIC, GREEN SEE NOTE 4		
1	1		2021687	CORE, TIS .750-4C (BONDING)		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021657	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	P. DIETRICH	26JUN64
CHECKED	L. W. Keating	20JULY64
APPROVED		8/3/64
APPROVED	RA Booth	8-4-64

MIT APPROVED DATE
L Hall 8/4/64
NASA
J Barnes 8/4/64

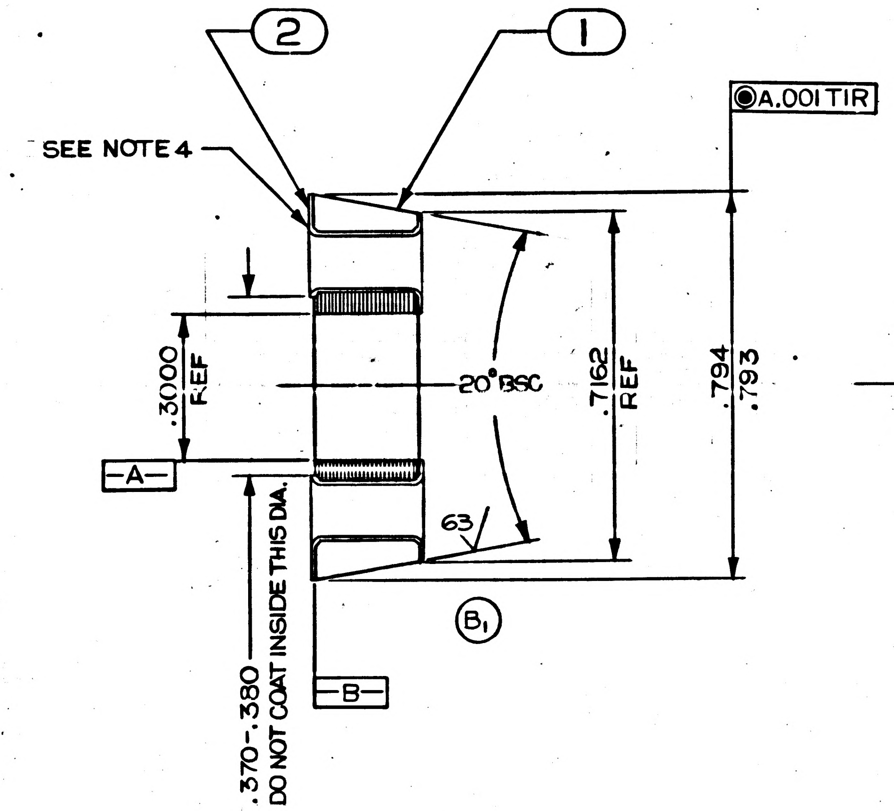
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

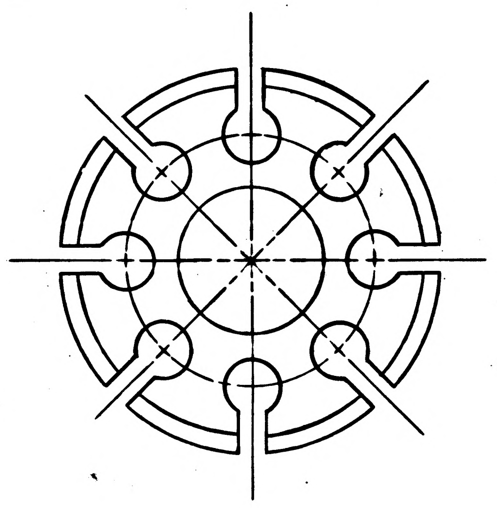
CORE TIS .750-4C
APOLLO II IRIG

SIZE	CODE IDENT NO.	DRAWING NO.
C		2021686
SCALE 4/1		SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS		TDRR 11 318				
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A1	REVISED PER TDRR 11792	CRG		8-24-64	WK
	B2	REVISED PER TDRR 13272	CRG		9-22-64	10/27





B2

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE ALL BURRS AND KEEP SHARP EDGES
3. MAGNETIC TEST LIMITS PER ATP 2021500, MC 25-112 UTILIZING:
   A. AREA = .0670 CM^2
   B. MEAN LENGTH = 1.865 CM
4. COAT ALL SURFACES EXCEPT I.D. AND SURFACE -B- INSIDE .370-.380 DIA WITH .003-.005 OF HI-DIELECTRIC ENAMEL PER SCD 2021539
5. BAG AND IDENTIFY PER ND1002019 SERIALIZE PER ND 1002023

A1

2	AS REQD		2021539	ENAMEL, HIGH DIELECTRIC, GREEN SEE NOTE 4		
1	1		2021687	CORE, TIS .750-4C (BONDING)		
ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021657	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	P. DIETRICH	26JUN64
CHECKED	L. W. Keating	20JULY64
APPROVED		8/4/64
APPROVED	R A Booth	8-4-64

MIT APPROVED DATE
8/4/64
NASA
8/4/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

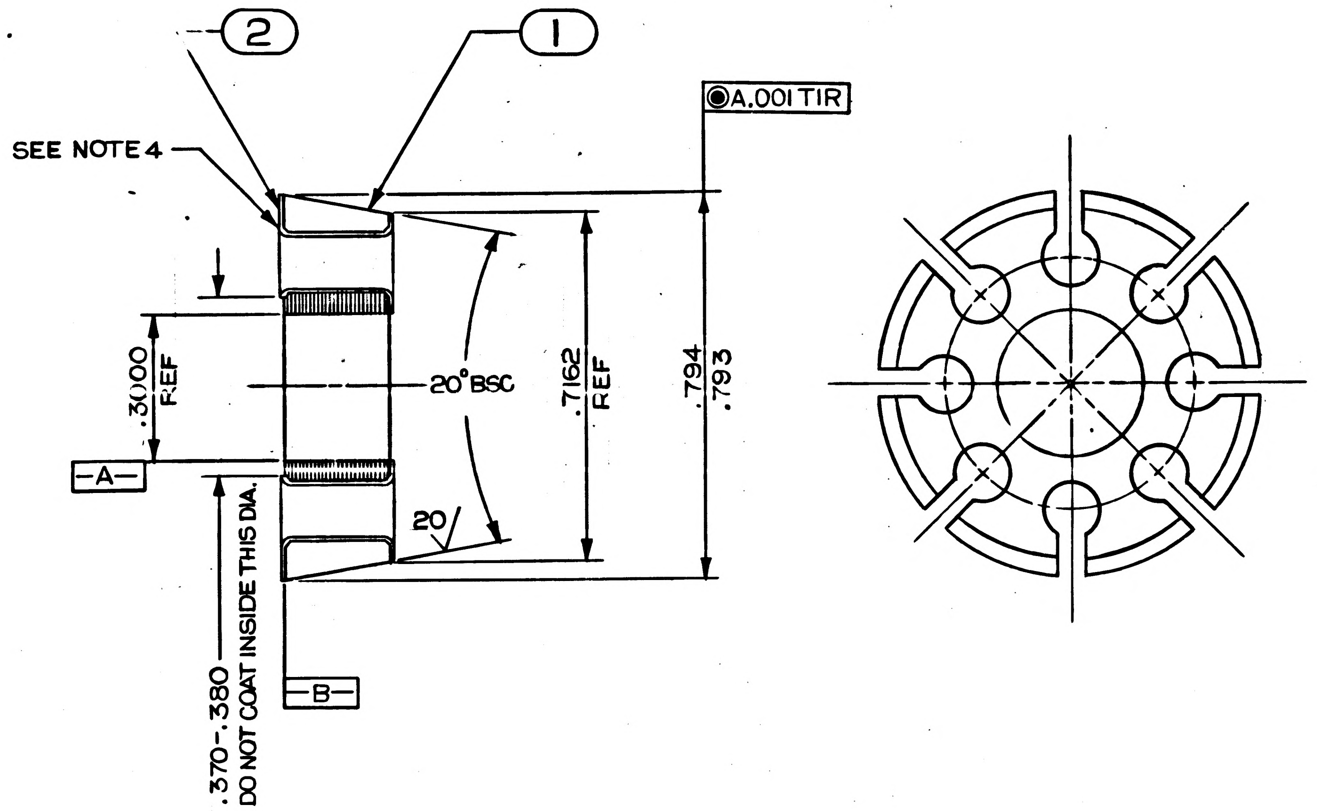
CORE TIS .750-4C
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021686
SCALE 4/1
SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS			TDRR 11318			
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE ALL BURRS AND KEEP SHARP EDGES
3. MAGNETIC TEST LIMITS PER ATP 2021500, MC 25-112 UTILIZING:
   A. AREA = .0670 CM^2
   B. MEAN LENGTH = 1.865 CM
4. COAT ALL SURFACES EXCEPT I.D, O.D. AND SURF -B- INSIDE .370-.380 DIA WITH .003-.005 OF HI-DIELECTRIC ENAMEL PER SCD 2021539
5. BAG AND IDENTIFY PER ND1002019
   SERIALIZE PER ND 1002023

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
2	AS REQD		2021539	HI-DIELECTRIC ENAMEL SEE NOTE 4		
1	1		2021687	CORE, TIS .750-4C		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021657	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS

CONTRACT NO.

DRAWN	P. DIETRICH	26JUN64
CHECKED	L.W. Keating	20JULY64
APPROVED		8/3/64
APPROVED	RA Booth	8-4-64

MIT APPROVED DATE
8/4/64

NASA
8/4/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

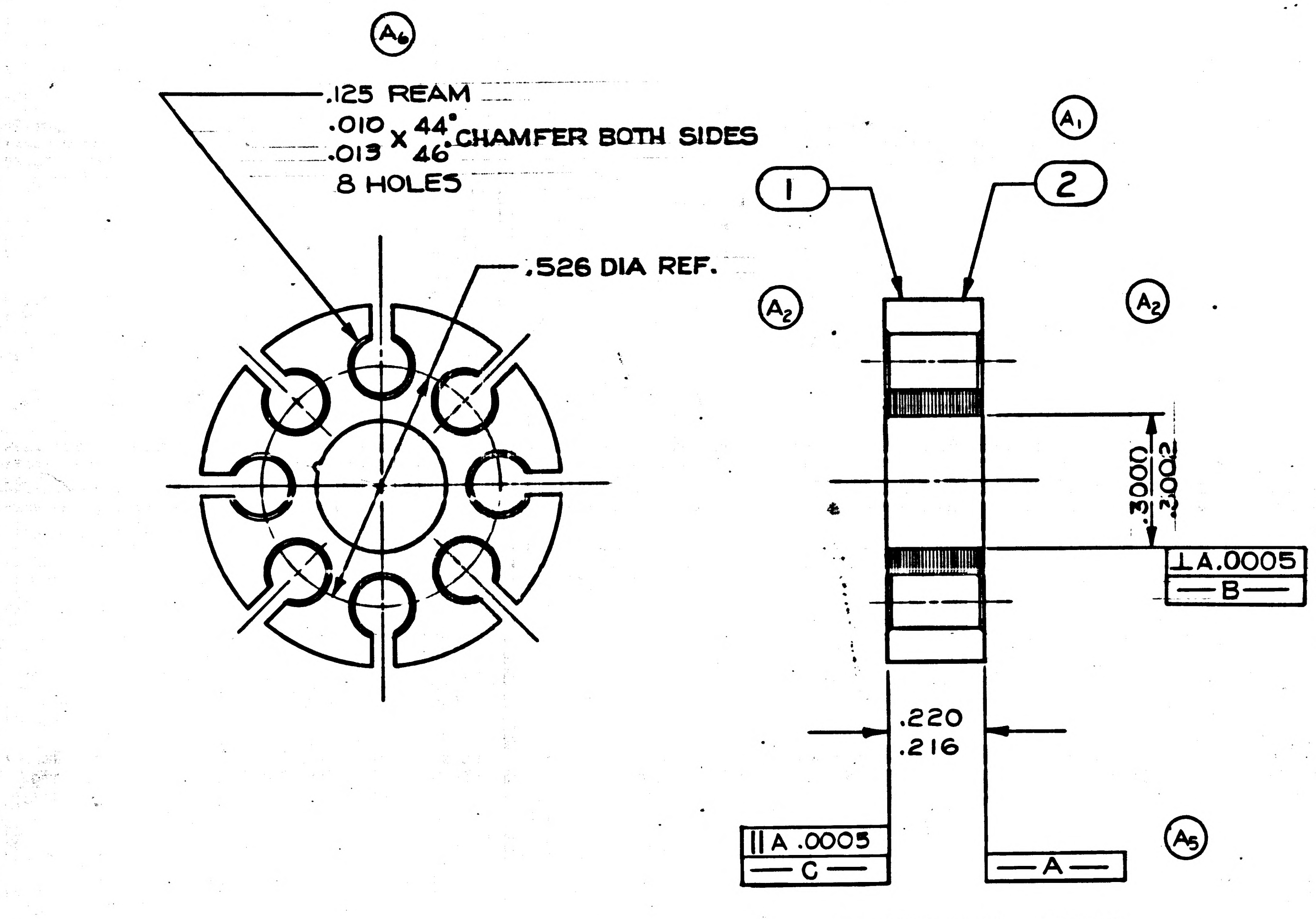
CORE TIS .750-4C
APOLLO II IRIG

SIZE	CODE IDENT NO.	DRAWING NO.
C		2021686

SCALE 4/1 SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS						11061
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A_5	REVISED PER TDRR 11787	CRG		8-24-64	WK



DIMENSIONS AFTER BONDING

A_3

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BOND PER ATP 2021500, (LATER)
3. SURFACE —A— MAY BE LAPPED A MAXIMUM OF .0005 TO ACHIEVE SQUARENESS TO —B— AND PARALLELISM TO —C—
4. BAG AND IDENTIFY PER ND1002019

A_4

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
2	AR		2021538	ADHESIVE, PHENOLIC RESIN		
1	APPROX 35		2021688	LAMINATION TIS .750-4C		

LIST OF MATERIALS

MASTER

NEXT ASSY	USED ON
2021686	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C.R. Grasso	22 June 64
CHECKED	L.W. Keating	20 July 64
APPROVED	D. Freeman	7-21-64
APPROVED	RA Booth	7-21-64

MIT APPROVED W Kupfer DATE 21 July 64
NASA APPROVED W J Rhine 7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

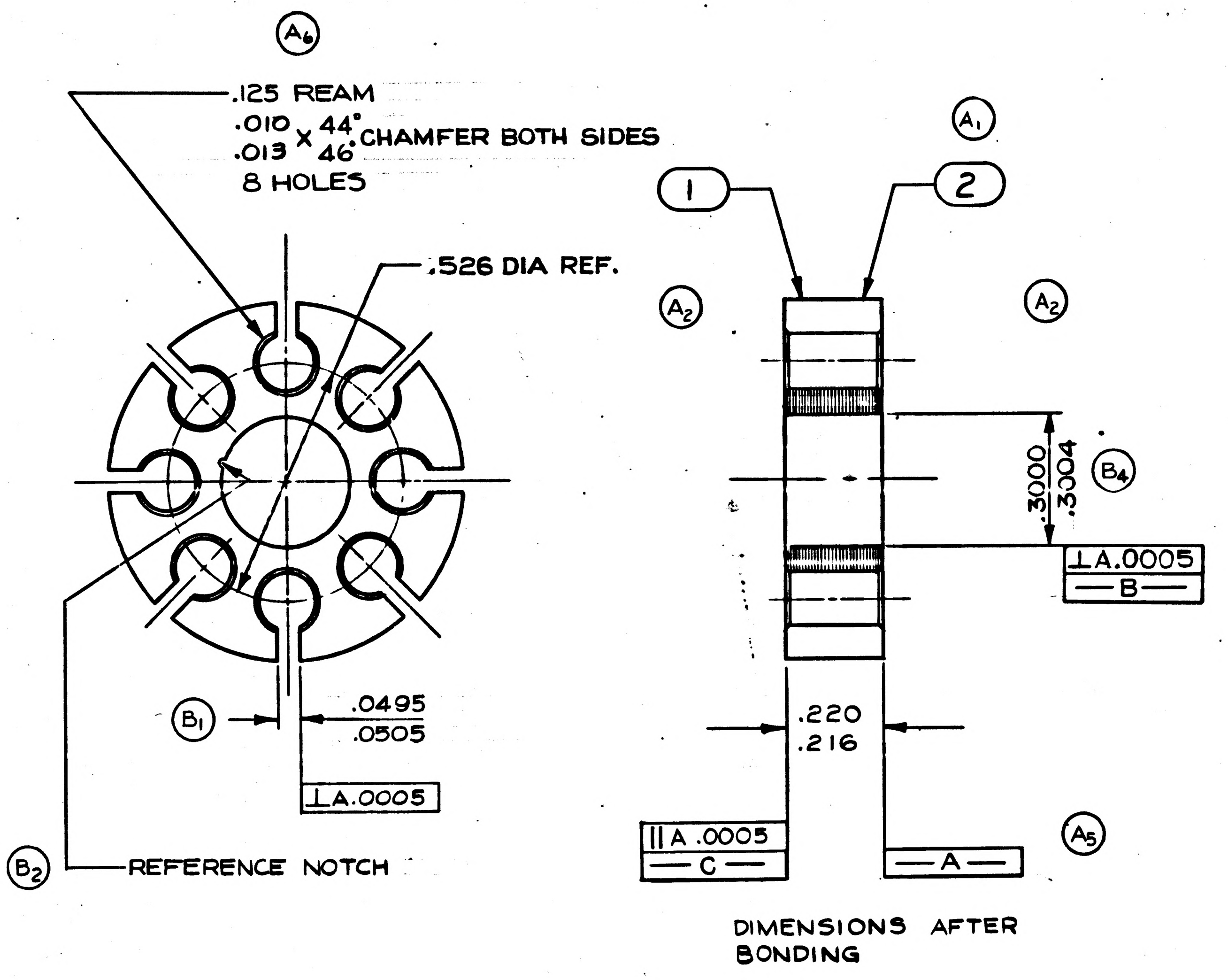
CORE TIS .750-4C
(BONDING)
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021687
SCALE 4/1
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

11061

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A_5	REVISED PER TDRR 11787	CRG	[illegible]	8-24-64	[illegible]
	B_4	REVISED PER TDRR 13269	CRG	[illegible]	9-22-64	[illegible]



A6
.125 REAM
.010 × 44° CHAMFER BOTH SIDES
.013 46°
8 HOLES
.526 DIA REF.
B1
.0495
.0505
⊥A.0005
B2
REFERENCE NOTCH
A1
1
2
A2
A2
.3000
.3004
B4
⊥A.0005
—B—
.220
.216
∥A .0005
—C—
—A—
A5
DIMENSIONS AFTER BONDING

A3 B3

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BOND PER ATP 2021500, MC25-300. STACK LAMINATIONS WITH REFERENCE NOTCH 45° CLOCKWISE FROM REFERENCE NOTCH ON PRECEDING LAMINATION
3. SURFACE -A- MAY BE LAPPED A MAXIMUM OF .0005 TO ACHIEVE SQUARNESS TO -B- AND PARALLELISM TO -C-
4. BAG AND IDENTIFY PER ND1002019

A4

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
2	AR		2021538	ADHESIVE, PHENOLIC RESIN		
1	APPROX 35		2021688	LAMINATION TIS .750-4C		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021686	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C.R. Grasso 22 June 64
CHECKED L.W. Keating 20 July 64
APPROVED D. Freeman 7-21-64
APPROVED RA Booth 7-21-64
MIT APPROVED W Kupfer DATE 21 July 64
NASA APPROVED W J Rhine 7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

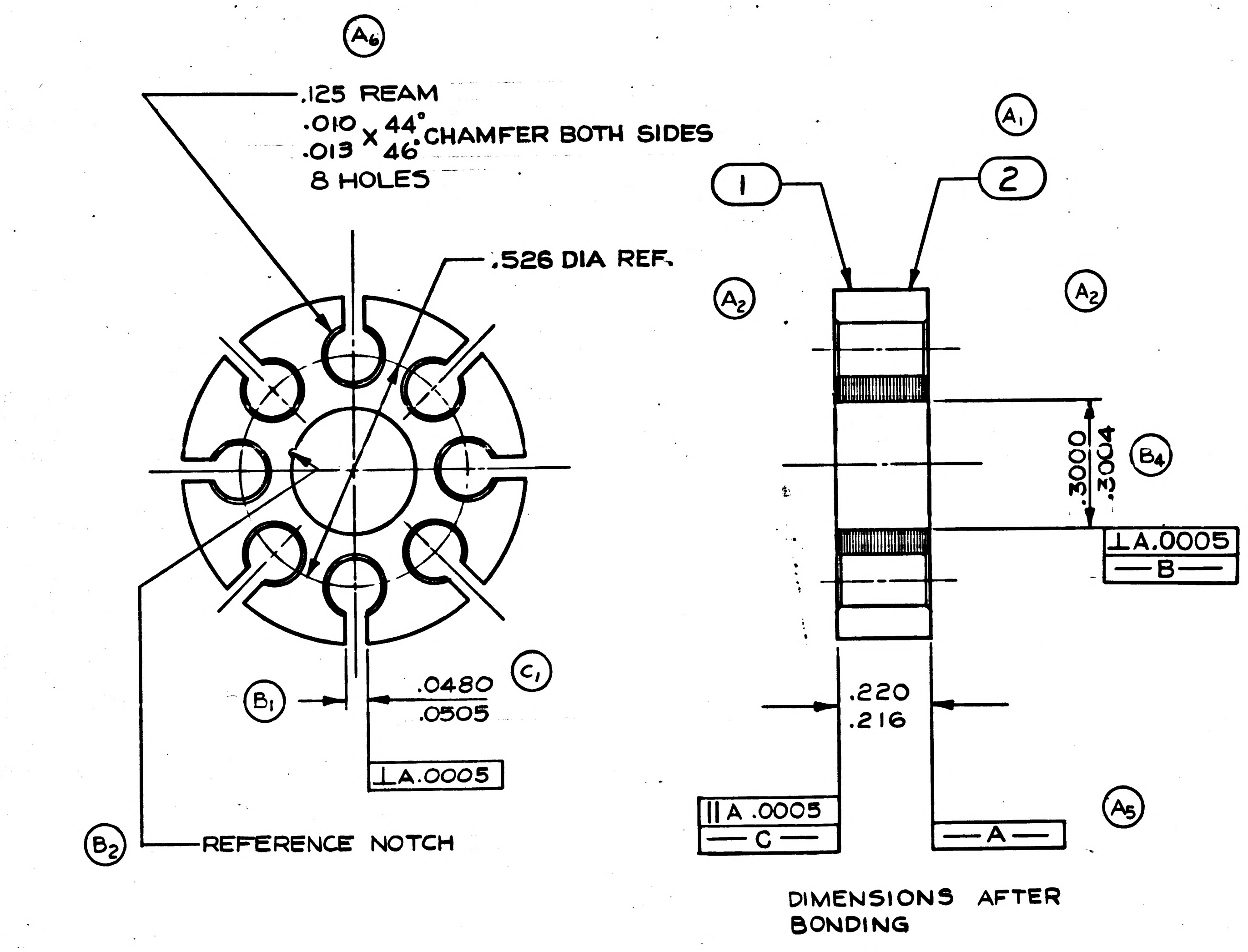
CORE TIS .750-4C
(BONDING)
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021687
SCALE 4/1
SHEET 1 OF 1

MASTER

INCHES
1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS						11061
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A5	REVISED PER TDRR 11787	CRG	LZ	8-24-64	WK
	B4	REVISED PER TDRR 13269	CRG	LZ	9-22-64	10/27
4-C	C1	REVISED PER TDRR 17632		LZ	3-18-65	WK.



A6
.125 REAM
.010 X 44°
.013 46° CHAMFER BOTH SIDES
8 HOLES
.526 DIA REF.
A1
1
2
A2
A2
.3000
.3004
B4
⊥A.0005
—B—
C1
B1
.0480
.0505
⊥A.0005
.220
.216
A5
|| A .0005
—C—
—A—
B2
REFERENCE NOTCH

DIMENSIONS AFTER BONDING

A3 B3

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BOND PER ATP 2021500, MC25-300. STACK LAMINATIONS WITH REFERENCE NOTCH 45° CLOCKWISE FROM REFERENCE NOTCH ON PRECEDING LAMINATION
3. SURFACE -A- MAY BE LAPPED A MAXIMUM OF .0005 TO ACHIEVE SQUARNESS TO -B- AND PARALLELISM TO -C-
4. BAG AND IDENTIFY PER ND1002019

A4

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
2	AR		2021538	ADHESIVE, PHENOLIC RESIN		
1	APPROX 35		2021688	LAMINATION TIS .750-4C		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021686	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C.R. Grasso	22 June 64
CHECKED	L.W. Keating	20 July 64
APPROVED	D. Freeman	7-21-64
APPROVED	RA Booth	7-21-64

MIT APPROVED W Kupfer DATE 21 July 64

NASA APPROVED W J Rhine 7-21-64

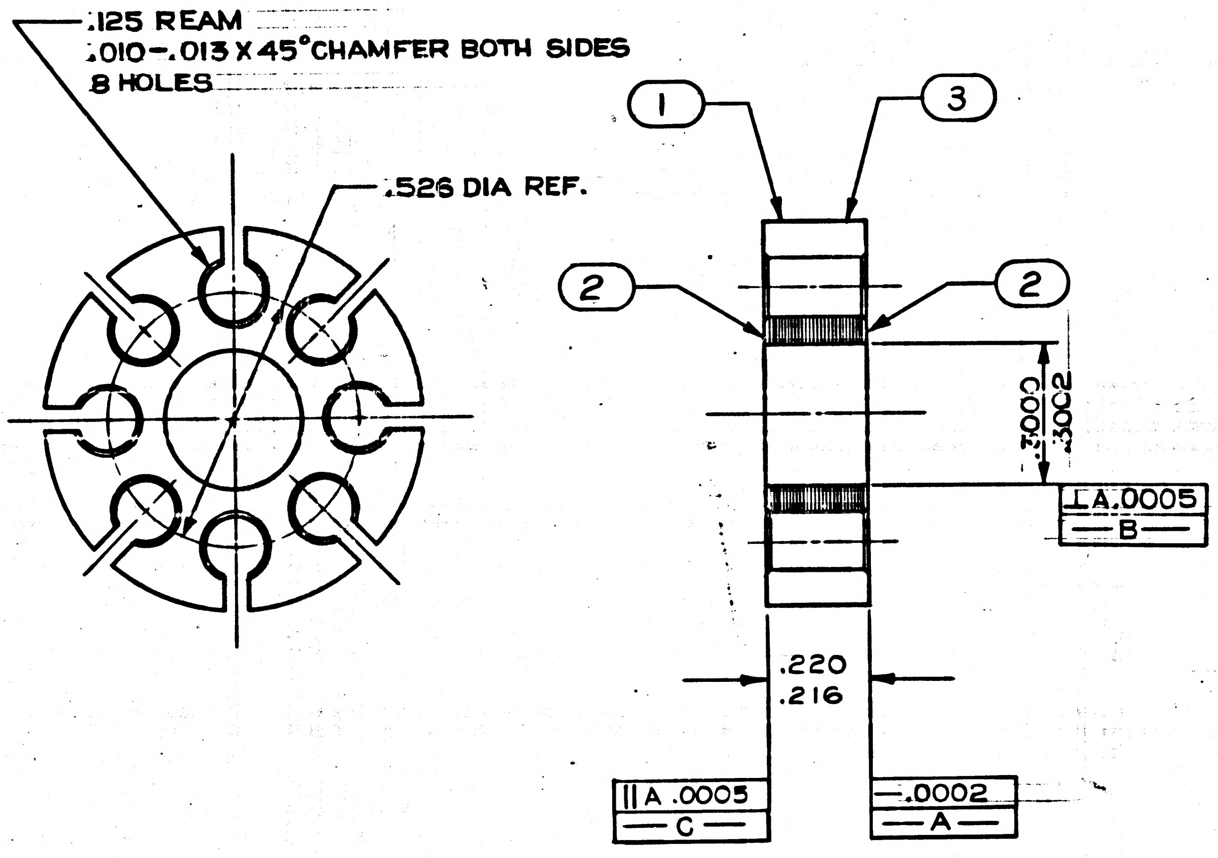
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CORE TIS .750-4C
(BONDING)
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021687
SCALE 4/1
SHEET 1 OF 1

MASTER

REVISIONS						11061
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



DIMENSIONS AFTER BONDING

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BOND PER ATP 2021500, MC 25-300
   A. REF: BONDING FIXTURE, MIT DWG B-82344
3. SURFACE -A- MAY BE LAPPED A MAXIMUM OF .0005 TO ACHIEVE SQUARENESS TO -B- AND PARALLELISM TO -C-
4. BAG AND IDENTIFY PER ND1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
3	AS REQD		2021538	BONDING MATERIAL, CYCLEWELD 55-9		
2	2		2021688-2	LAMINATION TIS .750-4C .010 THICK		
1	32		2021688-1	LAMINATION TIS .750-4C .006 THICK		

LIST OF MATERIALS

MASTER

2021686	2021500
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN C.R. Grasso	22 June 64
CHECKED L.W. Keating	20 July 64
APPROVED D. Freeman	7-21-64
APPROVED RA Booth	7-21-64

MIT APPROVED W Kupfer DATE 21 July 64
NASA APPROVED W J Rhine 7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

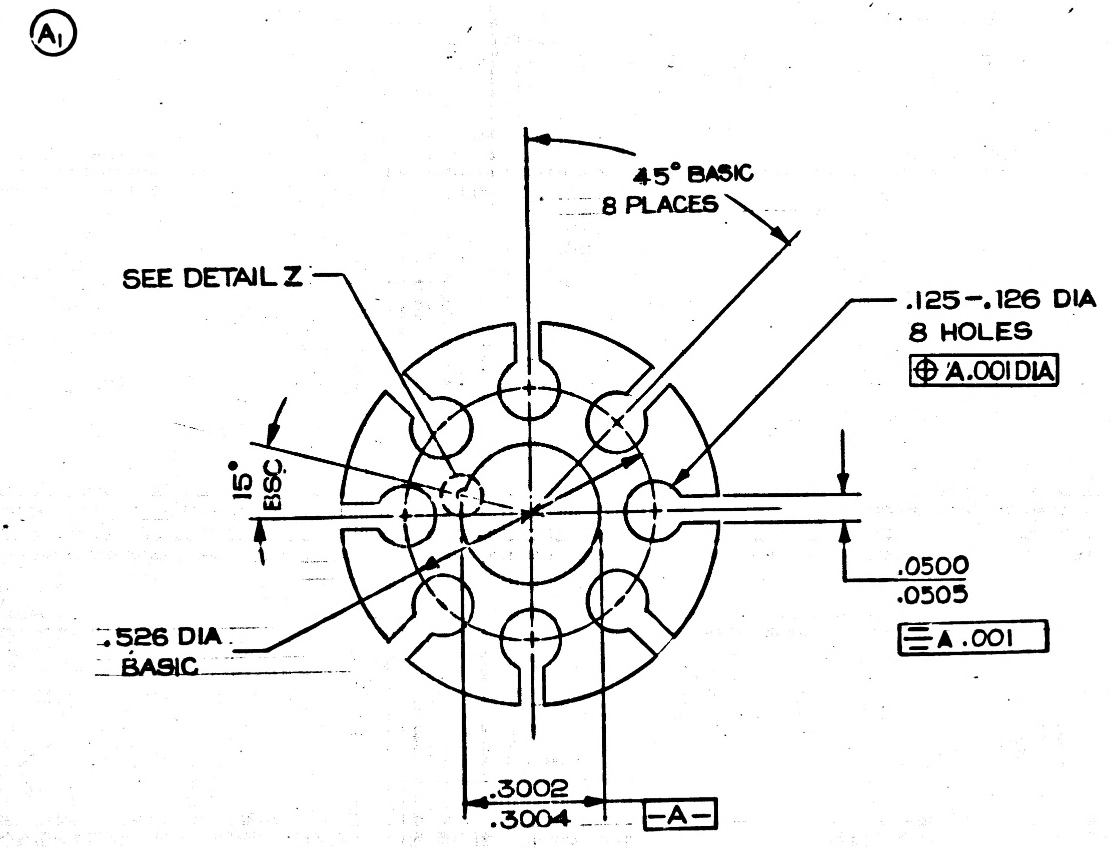
CORE TIS .750-4C
(BONDING)
APOLLO II IRIG

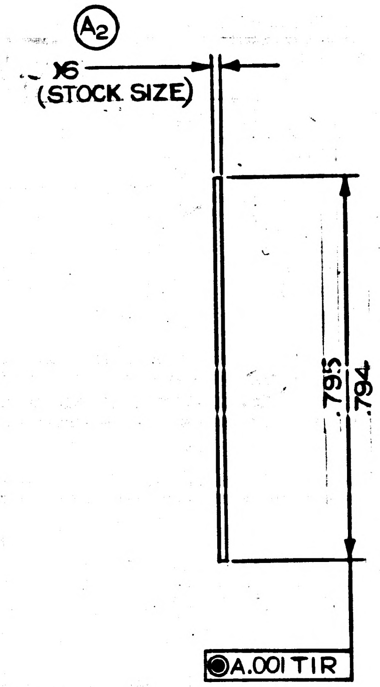
SIZE	CODE IDENT NO.	DRAWING NO.
C		2021687

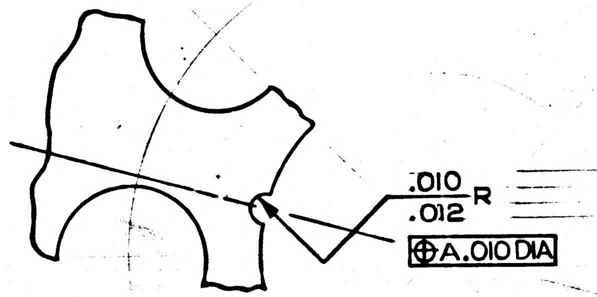
SCALE 4/1 SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS 11057						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A2	REVISED PER TDRR 11789	P.D.		8-24-64	


A1
45° BASIC
8 PLACES
SEE DETAIL Z
.125-.126 DIA
8 HOLES
⊕ A .001 DIA
15° BSC
.0500
.0505
≡ A .001
.526 DIA
BASIC
.3002
.3004
-A-


A2
.X6
(STOCK SIZE)
.795
.794
◎ A .001 TIR


.010
.012 R
⊕ A .010 DIA

DETAIL Z

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL- D-70327
2. REMOVE ALL BURRS VISIBLE UNDER 10 X MAXIMUM MAGNIFICATION. THE EDGE RADII AFTER DEBURRING SHALL NOT EXCEED .002
3. HEAT TREAT PER ATP 2021500, MC25-105
4. TAKE A SAMPLING OF LAMINATIONS FROM EACH HEAT TREAT AND CHECK MAGNETIC TEST LIMITS PER ATP 2021500, MC25-112 UTILIZING
   - A. AREA = .358 X NUMBER OF LAM. X LAM. THICKNESS (INCHES) = SQ. CM.
   - B. MINIMUM LENGTH = 1.97 CM
5. BAG AND IDENTIFY PER ND1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

MASTER

2021687	2021500
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K – X1000 M – X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL,
PER SCD NO.
2021562

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN P. DIETRICH 22JUN64
CHECKED L. W. Keating 16JUL64
APPROVED D. Freeman 7-21-64
APPROVED R A Booth 7-21-64
MIT APPROVED W Ruffer DATE 21 July 64
NASA APPROVED W J Rhine 7-21-64

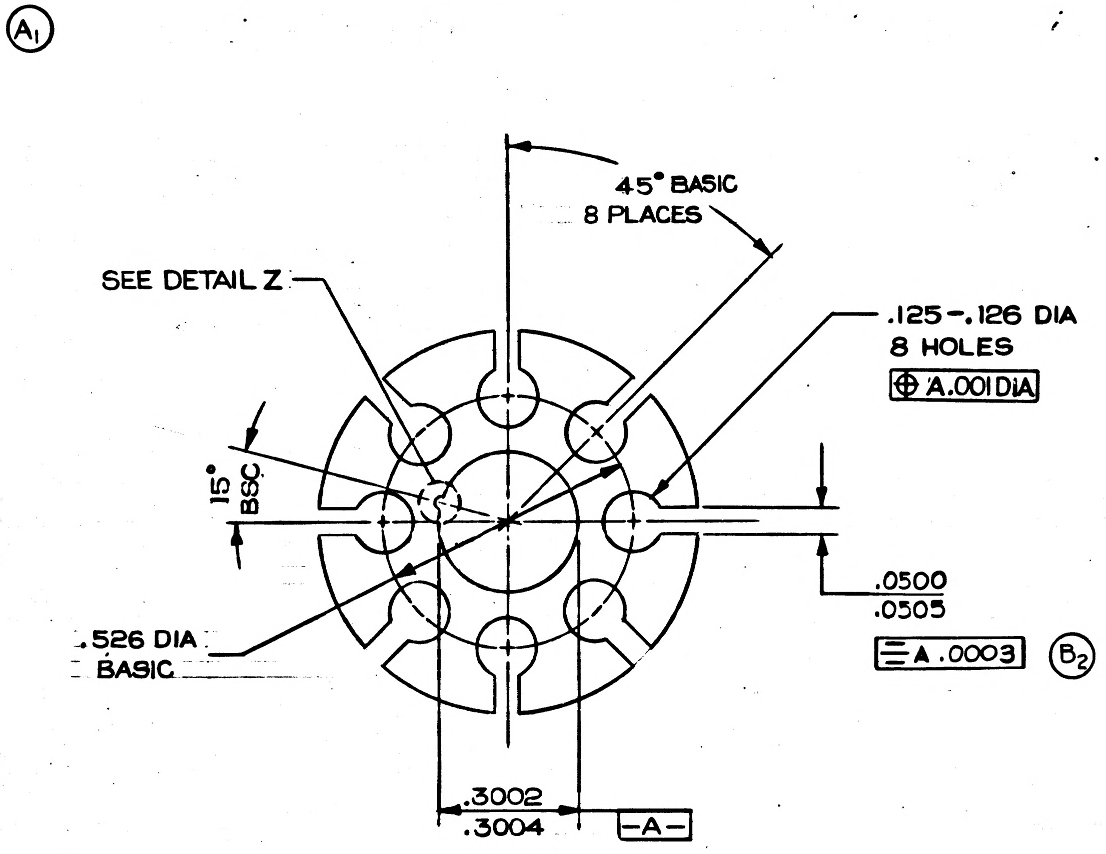
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

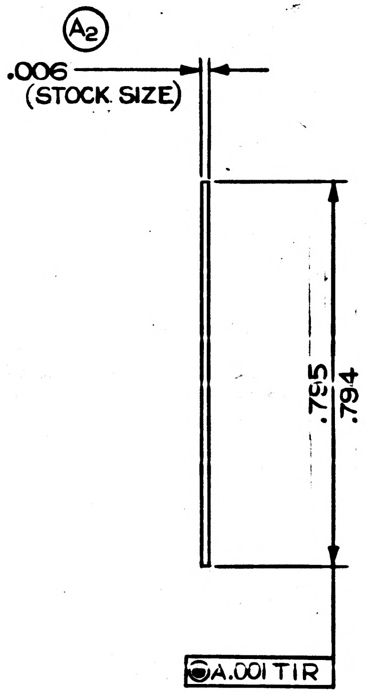
LAMINATION TIS. 750-4C
APOLLO II IRIG

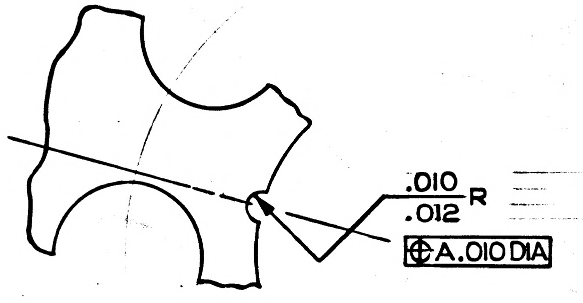
SIZE C
CODE IDENT NO.
DRAWING NO. 2021688
SCALE 4/1
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS						11057
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A2	REVISED PER TDRR 11789	P.D.		8-24-64	
	B2	REVISED PER TDRR 13268	CRG		9-22-64	10/1


A1
45° BASIC
8 PLACES
SEE DETAIL Z
.125-.126 DIA
8 HOLES
⊕ A .001 DIA
15° BSC
.0500
.0505
═ A .0003
B2
.526 DIA
BASIC
.3002
.3004
-A-


A2
.006
(STOCK SIZE)
.795
.794
◎ A .001 TIR


.010
.012
R
⊕ A .010 DIA

DETAIL Z

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL- D-70327
2. REMOVE ALL BURRS VISIBLE UNDER 10 X MAXIMUM MAGNIFICATION. THE EDGE RADII AFTER DEBURRING SHALL NOT EXCEED .002
3. HEAT TREAT PER ATP 2021500, MC25-105
4. TAKE A SAMPLING OF LAMINATIONS FROM EACH HEAT TREAT AND CHECK MAGNETIC TEST LIMITS PER ATP 2021500, MC25-112 UTILIZING
   - A. AREA = .358 X NUMBER OF LAM. X LAM. THICKNESS (INCHES) = SQ. CM.
   - B. MINIMUM LENGTH = 1.97 CM
5. BAG AND IDENTIFY PER ND1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

MASTER

2021687	2021500
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μf RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
B1 PER SCD NO. 2021562-2

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	P. D'ETRICH	22 JUN 64
CHECKED	L. W. Keating	16 JUL 64
APPROVED	D. Freeman	7-21-64
APPROVED	R A Burnett	7-21-64

MIT APPROVED DATE
W Kupfer 21 July 64
NASA APPROVED
W J Rhine 7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

LAMINATION TIS. 750-4C
APOLLO II IRIG

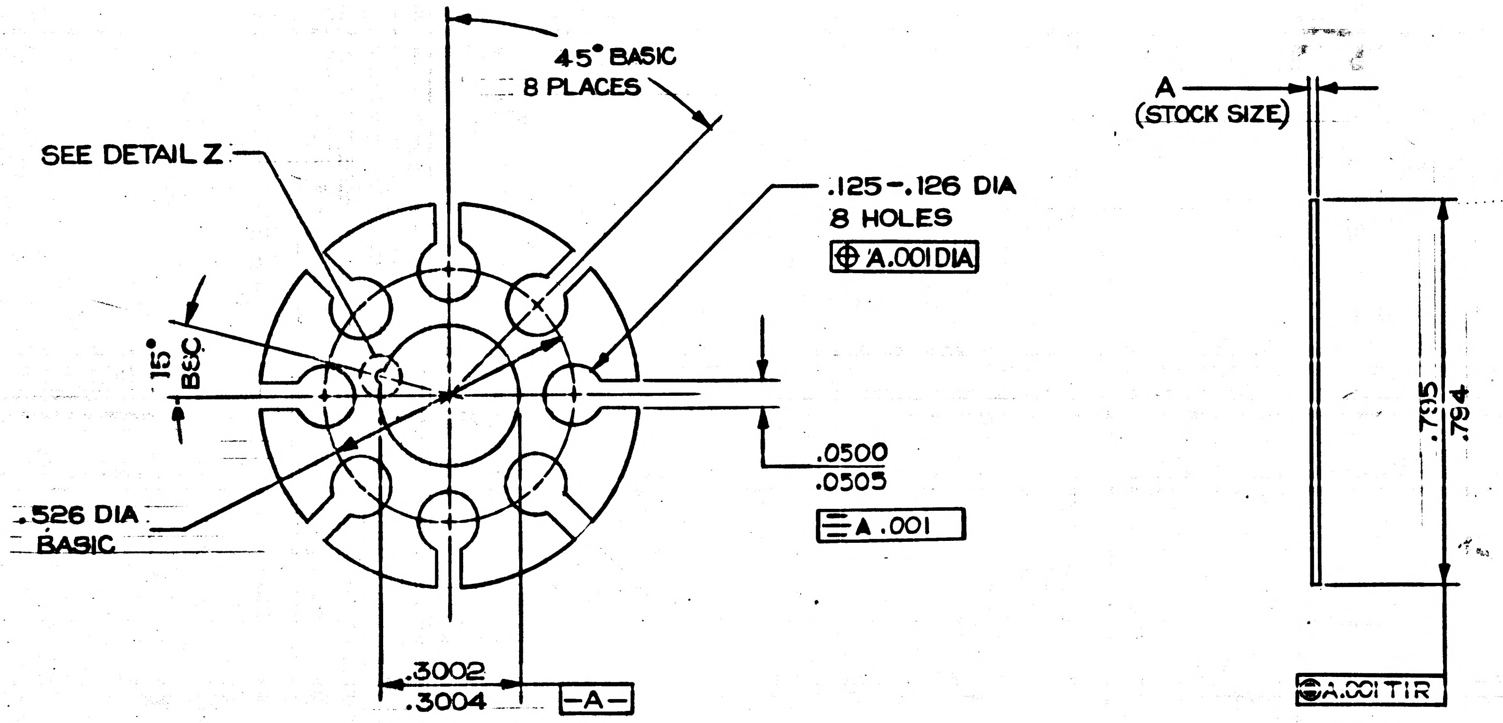
SIZE	CODE IDENT NO.	DRAWING NO.
C		2021688

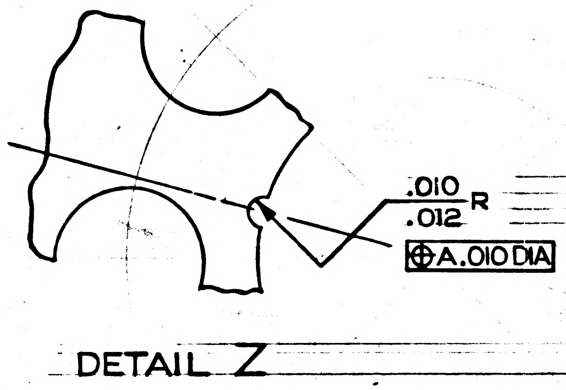
SCALE 4/1 SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO.	DIM A
2021688-1	.006
2021688-2	.010

REVISIONS						11057
ZONE	SYM	DESCRIPTION	BR	CHK	DATE	APPROVED


45° BASIC
8 PLACES
SEE DETAIL Z
.125-.126 DIA
8 HOLES
⊕ A .001 DIA
15° BSC
.0500
.0505
═ A .001
.526 DIA
BASIC
.3002
.3004
-A-
A
(STOCK SIZE)
.795
.794
◎ A .001 TIR


.010
.012 R
⊕ A .010 DIA

DETAIL Z

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL- D-70327
2. REMOVE ALL BURRS VISIBLE UNDER 10 X MAXIMUM MAGNIFICATION. THE EDGE RADII AFTER DEBURRING SHALL NOT EXCEED .002
3. HEAT TREAT PER ATP 2021500, MC25-105
4. TAKE A SAMPLING OF LAMINATIONS FROM EACH HEAT TREAT AND CHECK MAGNETIC TEST LIMITS PER ATP 2021500, MC25-112 UTILIZING
    - A. AREA = .358 X NUMBER OF LAM. X LAM. THICKNESS (INCHES) = SQ. CM.
    - B. MINIMUM LENGTH = 1.97 CM
5. BAG AND IDENTIFY PER ND1002019

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021687	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO.
2021562

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS

CONTRACT NO.

DRAWN	P. DIETRICH	22JUN64
CHECKED	L W. Keating	16JUL64
APPROVED	D. Freeman	7-21-64
APPROVED	RA Booth	7-21-64

MIT APPROVED W Ruffer DATE 21 July 64

NASA APPROVED W J Rhine 7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

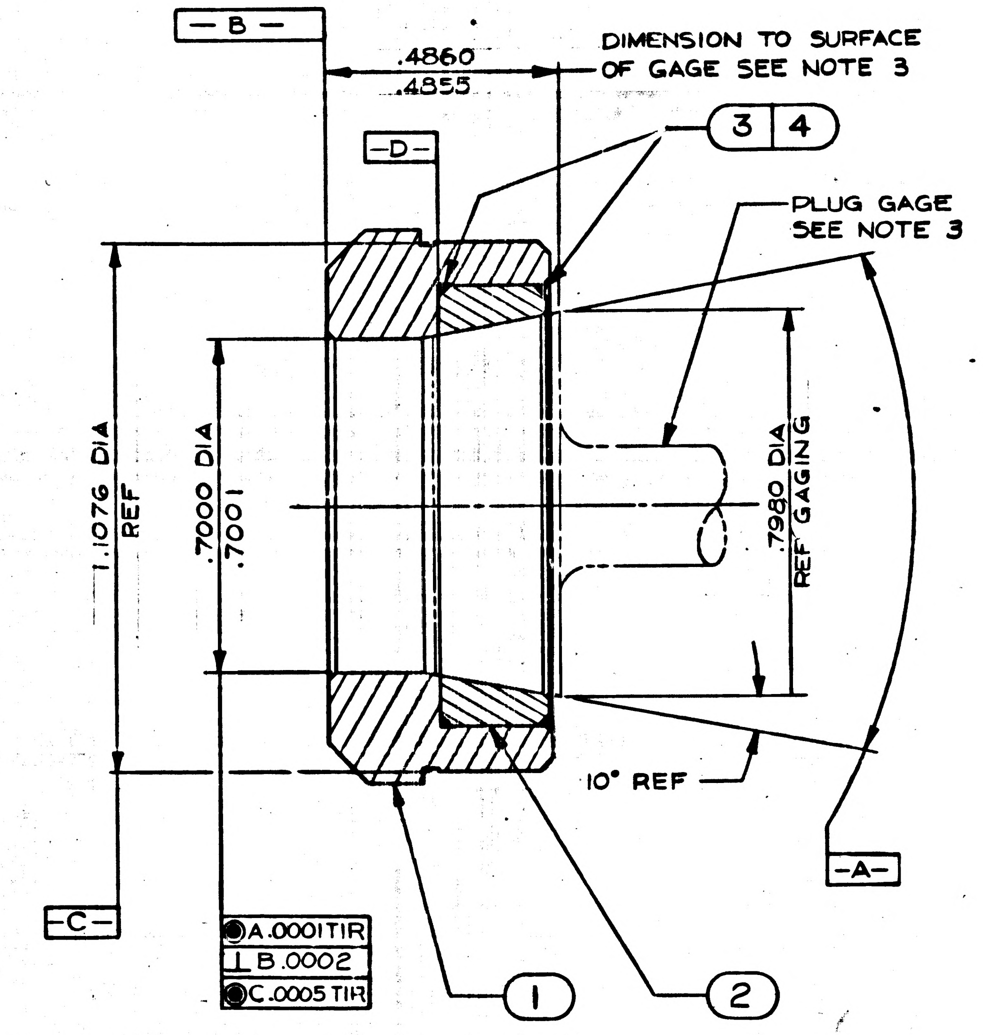
LAMINATION TIS. 750-4C
APOLLO II IRIG

SIZE	CODE IDENT NO.	DRAWING NO.
C		2021688

SCALE 4/1 SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS						11058
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A1	REVISED PER TDRR 11785	P.D.		8-24-64	WR



-B-
.4860
.4855
DIMENSION TO SURFACE OF GAGE SEE NOTE 3
3 4
-D-
PLUG GAGE SEE NOTE 3
1.1076 DIA REF
.7000 DIA .7001
.7980 DIA REF GAGING
10° REF
-A-
-C-
◎A .0001 TIR
⊥B .0002
◎C .0005 TIR
1
2

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. APPLY EPON 828 ADHESIVE (3 4) TO ROTOR HOLDER AND INSTALL INNER ROTOR UNTIL IT BOTTOMS ON SURFACE -D- MIX AND CURE PER ATP 2021500, MC25-303
3. ADJUST TAPER SO THAT A LIGHTLY BLUED PLUG GAGE GIVES 75 % WIPING ACTION WHEN GAGE IS FITTED
   - A. REF: TIS .750 STATOR GAGE MIT DWG C-122234
4. BAG AND IDENTIFY PER ND1002019

(A1)

4			2021531	ACTIVATOR		MC NO. 25-303
3	AS REQ'D		1010748	RESIN, EPOXY		MC NO. 25-303
2	1		2021690	INNER ROTOR		
1	1		2021691	ROTOR HOLDER		
ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

2021637	2021500
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C.R. Grasso	26 June 64
CHECKED	L.W. Keating	20 Jul 64
APPROVED	D. Freeberg	7-21-64
APPROVED	RA Booth	7-21-64

MIT APPROVED DATE
21 July 64
NASA APPROVED
W. J. Rhine 7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INNER ROTOR ASSY
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021689
SCALE 4/1
SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS						11058
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
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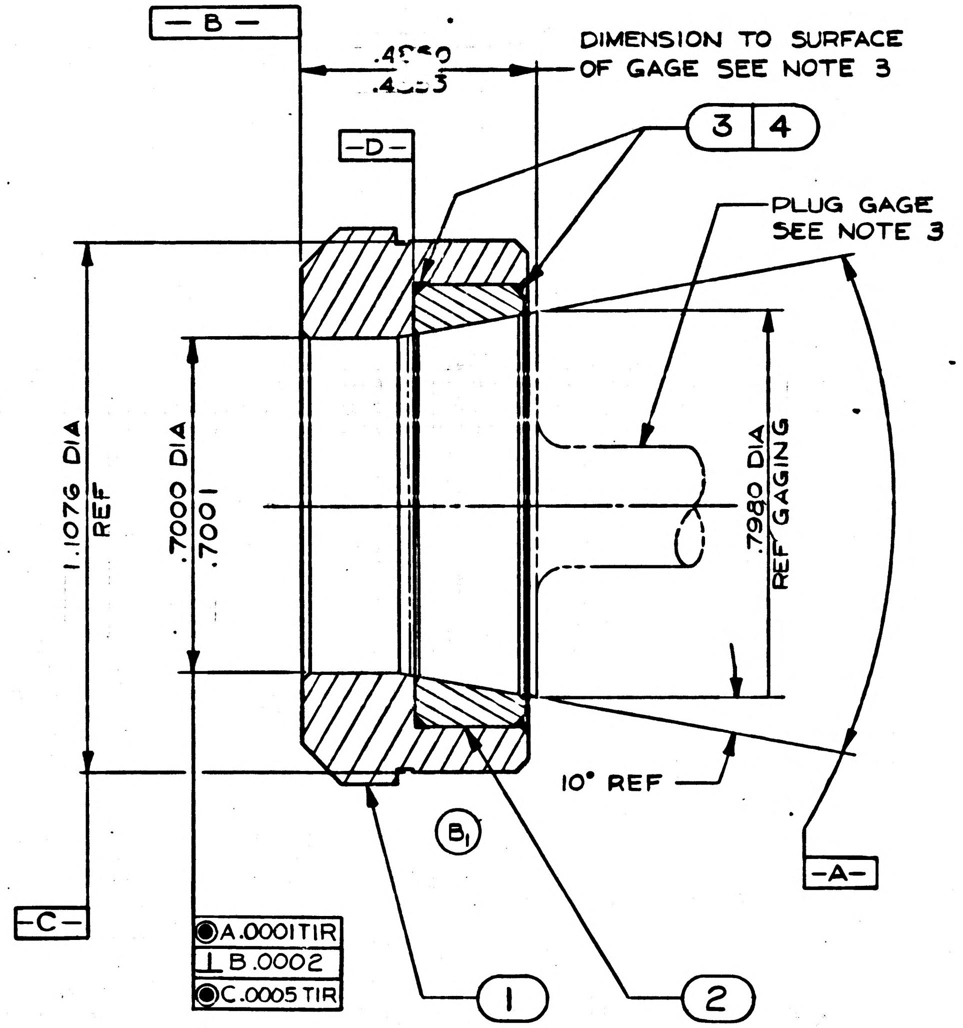
	B1	REVISED PER TDRR 13271	CRG		9-22-64	10/27



-B-
.4550
.4553
DIMENSION TO SURFACE OF GAGE SEE NOTE 3
3 | 4
-D-
PLUG GAGE SEE NOTE 3
1.1076 DIA REF
.7000 DIA
.7001
.7980 DIA REF GAGING
10° REF
B1
-A-
-C-
◎ A .0001 TIR
⊥ B .0002
◎ C .0005 TIR
1
2

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. APPLY EPON 828 ADHESIVE (3 | 4) TO ROTOR HOLDER AND INSTALL INNER ROTOR UNTIL IT BOTTOMS ON SURFACE -D- MIX AND CURE PER ATP 2021500, MC25-303
3. ADJUST TAPER SO THAT A LIGHTLY BLUED PLUG GAGE GIVES 75 % WIPING ACTION WHEN GAGE IS FITTED
   A. REF: TIS .750 STATOR GAGE MIT DWG C-122234
4. BAG AND IDENTIFY PER ND1002019

A1

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
4			2021531	ACTIVATOR		MC NO. 25-303
3	AS REQ'D		1010748	RESIN, EPOXY		MC NO. 25-303
2	1		2021690	INNER ROTOR		
1	1		2021691	ROTOR HOLDER		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021637	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN C.R. Grasso 26 June 64
CHECKED L.W. Keating 20 July 64
APPROVED D. Freeman 7-21-64
APPROVED RA Booth 7-21-64

MIT APPROVED DATE
21 July 64
NASA APPROVED
W. J. Rhine 7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

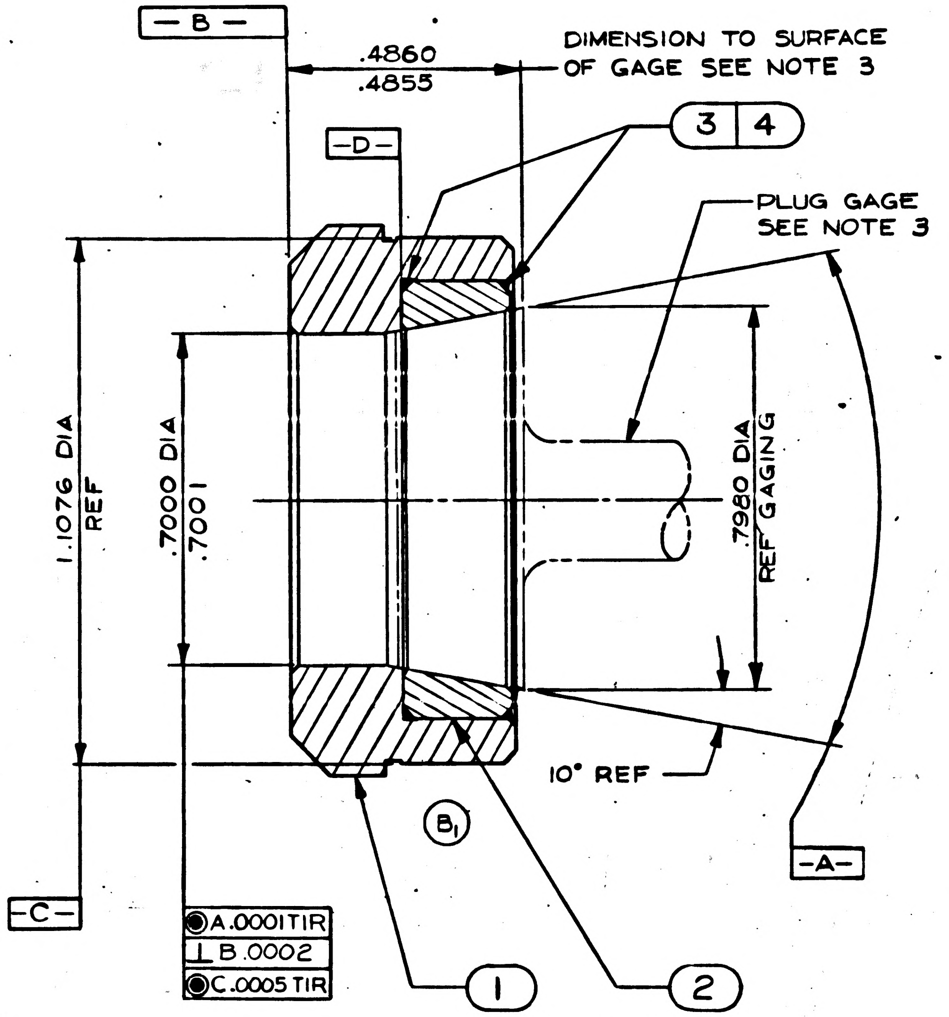
INNER ROTOR ASSY
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021689
SCALE 4/1
SHEET 1 OF 1

MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS						11058
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A1	REVISED PER TDRR 11785	P.D.		8-24-64	WK
	B1	REVISED PER TDRR 13271	CRG		9-22-64	10/27
	C	REVISED PER TDRR 36385	PHG		7-29-68	


-B-
.4860
.4855
DIMENSION TO SURFACE OF GAGE SEE NOTE 3
-D-
3
4
PLUG GAGE SEE NOTE 3
1.1076 DIA REF
.7000 DIA
.7001
.7980 DIA REF GAGING
10° REF
B1
-A-
-C-
◉A.0001TIR
⊥B.0002
◉C.0005TIR
1
2

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE PER ATP 2021500, MC 25-895.
3. ADJUST TAPER SO THAT A LIGHTLY BLUED PLUG GAGE GIVES 75 % WIPING ACTION WHEN GAGE IS FITTED
   A. REF: TIS .750 STATOR GAGE
      MIT DWG C-122234
4. BAG AND IDENTIFY PER ND1002019

Ⓐ1

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
4			2021531	ACTIVATOR		MC NO. 25-303
3	AS REQ'D		1010748	RESIN, EPOXY		MC NO. 25-303
2	1		2021690	INNER ROTOR		
1	1		2021691	ROTOR HOLDER		

LIST OF MATERIALS

2021637	2021500
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

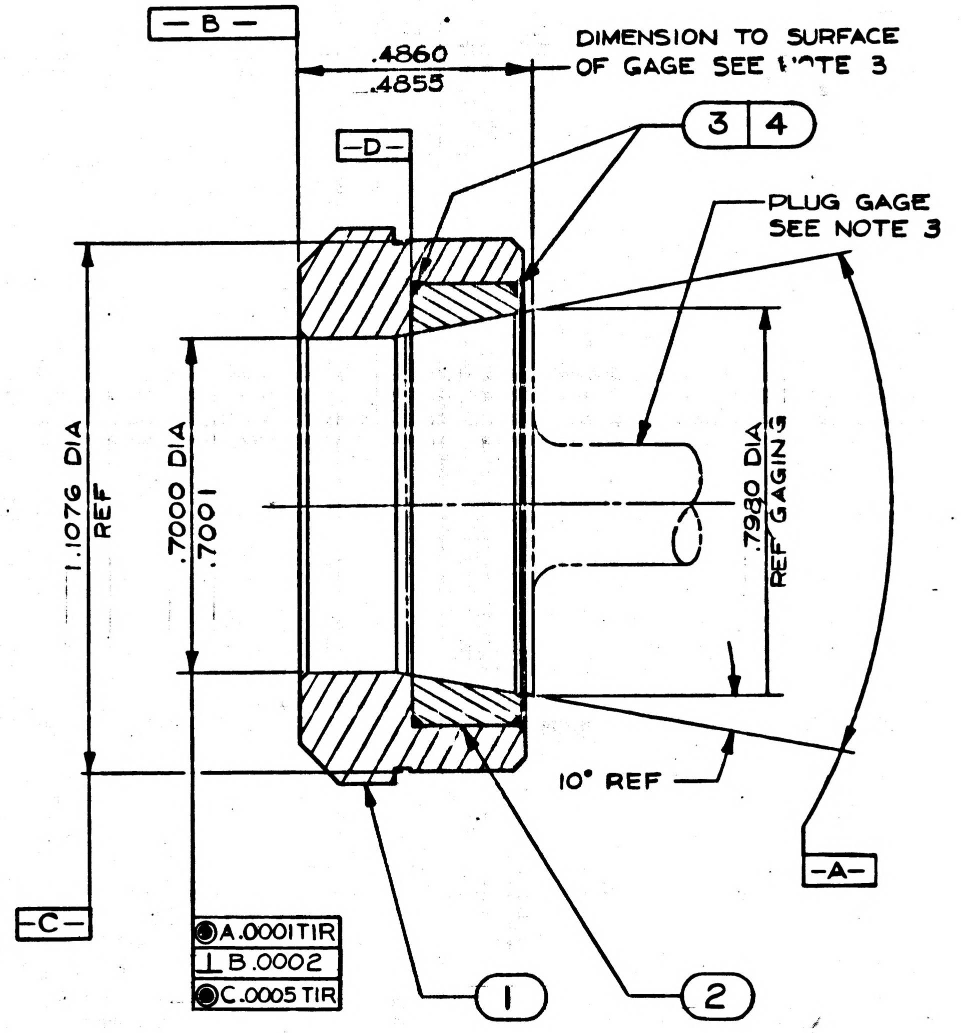
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C.R. Grasso 26 June 64
CHECKED L.W. Keating 20 July 64
APPROVED D. Freeberg 7-21-64
APPROVED RA Booth 7-21-64
MIT APPROVED W. [illegible] DATE 21 July 64
NASA APPROVED W.J. Rhine 7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INNER ROTOR ASSY
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021689
SCALE 4/1
SHEET 1 OF 1

REVISIONS						11058
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



-B-
.4860
.4855
DIMENSION TO SURFACE OF GAGE SEE NOTE 3
3 4
-D-
PLUG GAGE SEE NOTE 3
1.1076 DIA REF
.7000 DIA
.7001
.7930 DIA REF GAGING
10° REF
-A-
-C-
◎A.0001TIR
⊥B.0002
◎C.0005TIR
1
2

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. APPLY EPON 828 ADHESIVE (3|4) TO ROTOR HOLDER AND INSTALL INNER ROTOR UNTIL IT BOTTOMS ON SURFACE -D- MIX AND CURE PER ATP 2021500,MC25-303
3. ADJUST TAPER SO THAT A LIGHTLY BLUED PLUG GAGE GIVES 75% WIPING ACTION WHEN GAGE IS FITTED
   A. REF: TIS .750 STATOR GAGE
   MIT DWG C-122234
4. BAG AND IDENTIFY PER ND1002019

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
4			2021531	ACTIVATOR DTA		MC NO.25-303
3	AS REQ'D		1010748	EPON 828 RESIN		MC NO.25-303
2	1		2021690	INNER ROTOR		
1	1		2021691	ROTOR HOLDER		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021637	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN C.R. Grasso 26June64
CHECKED L.W. Keating 20July64
APPROVED D. Freeman 7-21-64
APPROVED RA Booth 7-21-64
MIT APPROVED W. Trageser DATE 21 July 64
NASA APPROVED W.J. Rhine 7-21-64

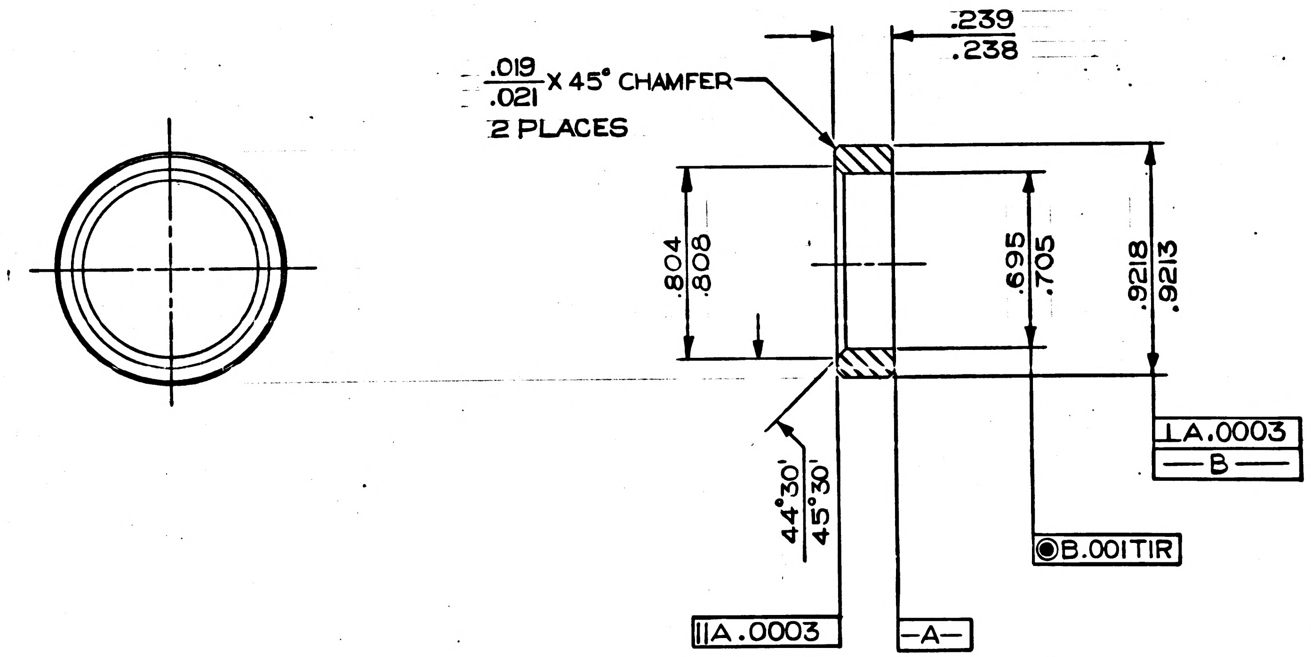
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INNER ROTOR ASSY
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021689
SCALE 4/1
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS						11521
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 32√ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
3. MAXIMUM ALLOWABLE CHIP .004
4. BAG AND IDENTIFY PER ND-1002019

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021689	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO.
2021567

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS

CONTRACT NO.

DRAWN	P. DIETRICH	22JULY64
CHECKED	L.W. Keating - C.R.G.	8-10-64
APPROVED	N. R. Chambers	8-11-64
APPROVED	R A Booth	8-7-64

MIT APPROVED W Koppler DATE 12 Aug 64

NASA APPROVED DATE 8/12/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INNER ROTOR T.I.S.-750
PRE-FINISH GRIND
APOLLO II IRIG

SIZE	CODE IDENT NO.	DRAWING NO.
C		2021690

SCALE 2/1 SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS						11521
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
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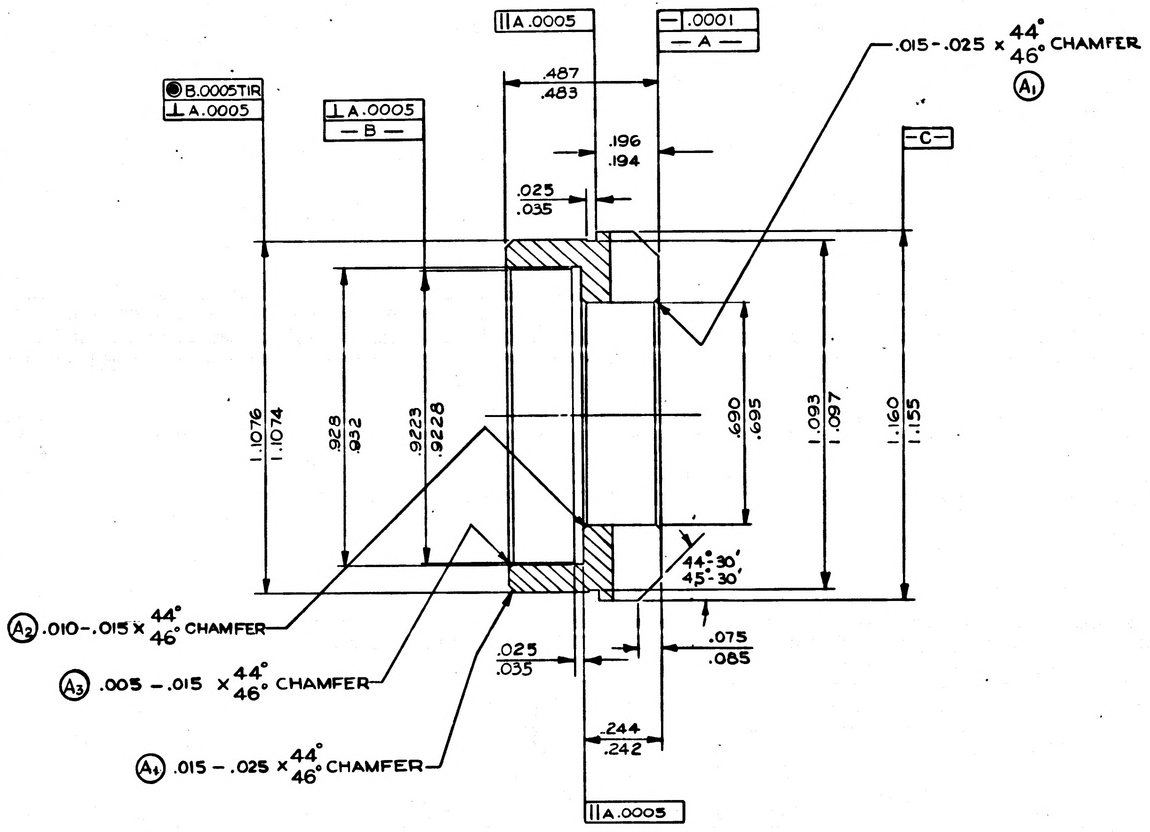
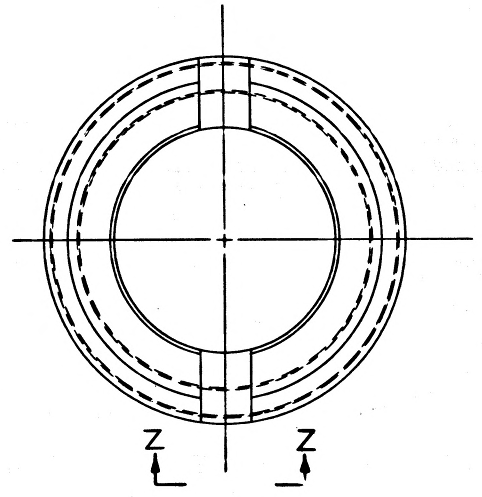
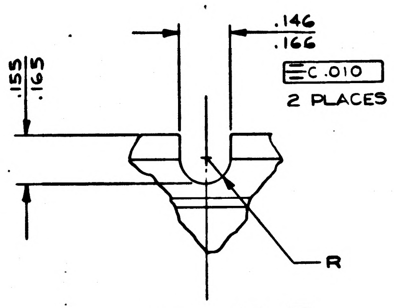


◎ B.0005TIR
⊥ A.0005
⊥ A.0005
— B —
∥ A.0005
— .0001
— A —
.487
.483
.196
.194
.025
.035
.015-.025 × 44° 46° CHAMFER
(A1)
— C —
1.1076
1.1074
.928
.932
.9223
.9228
.690
.695
1.093
1.097
1.160
1.155
44° 30'
45° 30'
(A2) .010-.015 × 44° 46° CHAMFER
(A3) .005 -.015 × 44° 46° CHAMFER
(A4) .015 - .025 × 44° 46° CHAMFER
.025
.035
.075
.085
.244
.242
∥ A.0005





.155
.165
.146
.166
≡ C .010
2 PLACES
R

VIEW Z-Z

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. $\sqrt{32}$ FINISH ALL OVER
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005-.015
4. HEAT TREAT PER ATP 2021500, MC25-102
5. (A4) BAG AND IDENTIFY PER ND 1002019

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021689	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS K = X1000 M = X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO. 2021580

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C.R. Grasso	20 Jul 64
CHECKED	L.W. Keating-CRG	8-10-64
APPROVED		8-11-64
APPROVED	R A Booth	8-7-64

MIT APPROVED W Kupfer DATE 12 Aug 64
NASA APPROVED DATE 8/14/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

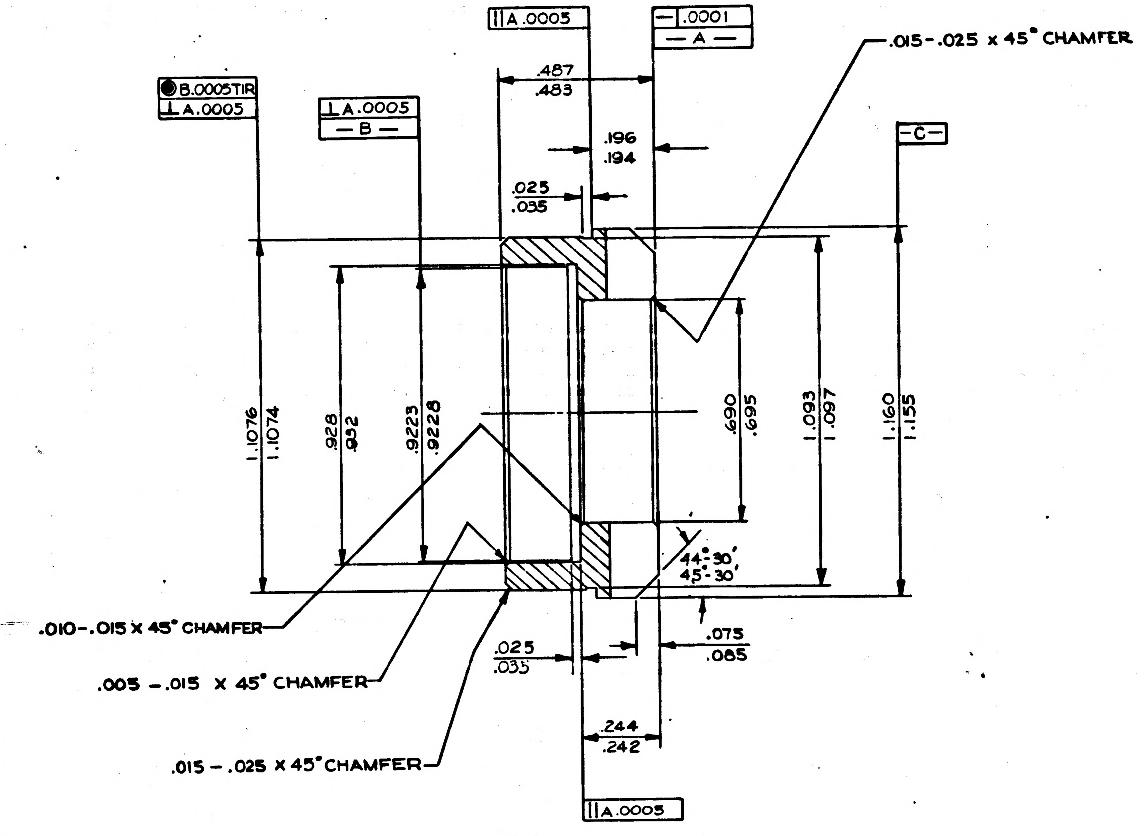
ROTOR HOLDER
APOLLO II IRIG

SIZE	CODE IDENT NO	DRAWING NO.
D		2021691

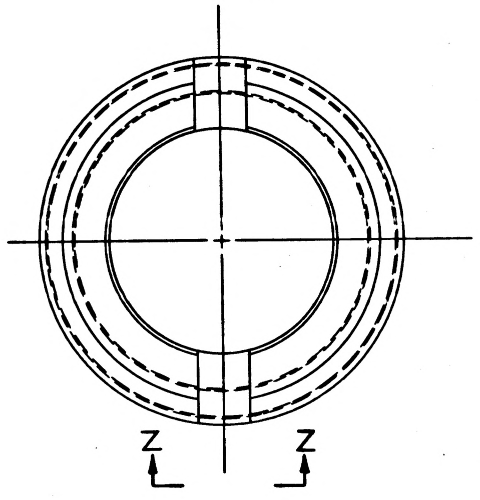
SCALE 4/1 SHEET 1 OF 1

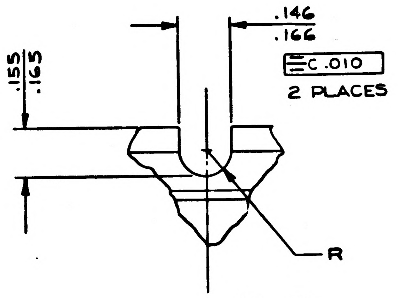
REVISIONS 11521

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



◉ B.0005TIR
⊥ A.0005
⊥ A.0005
— B —
∥ A.0005
— .0001
— A —
.015-.025 x 45° CHAMFER
.487
.483
.196
.194
—C—
.025
.035
1.076
1.1074
.928
.932
.9223
.9228
.690
.695
1.093
1.097
1.160
1.155
44° 30'
45° 30'
.010-.015 X 45° CHAMFER
.005 -.015 X 45° CHAMFER
.015 - .025 X 45° CHAMFER
.025
.035
.075
.085
.244
.242
∥ A.0005





.146
.166
.155
.165
⌯ C .010
2 PLACES
R

VIEW Z-Z

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 32√ FINISH ALL OVER
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005-.015
4. BAG AND IDENTIFY PER ND 1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021689	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO. 2021580

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C.R. Grasso 20 Jul 64
CHECKED L.W. Keating-CRG 8-10-64
APPROVED J Pulliam 8-11-64
APPROVED RA Booth 8-7-64
MIT APPROVED W Kupfer DATE 12 Aug 64
NASA APPROVED DATE 8/14/64

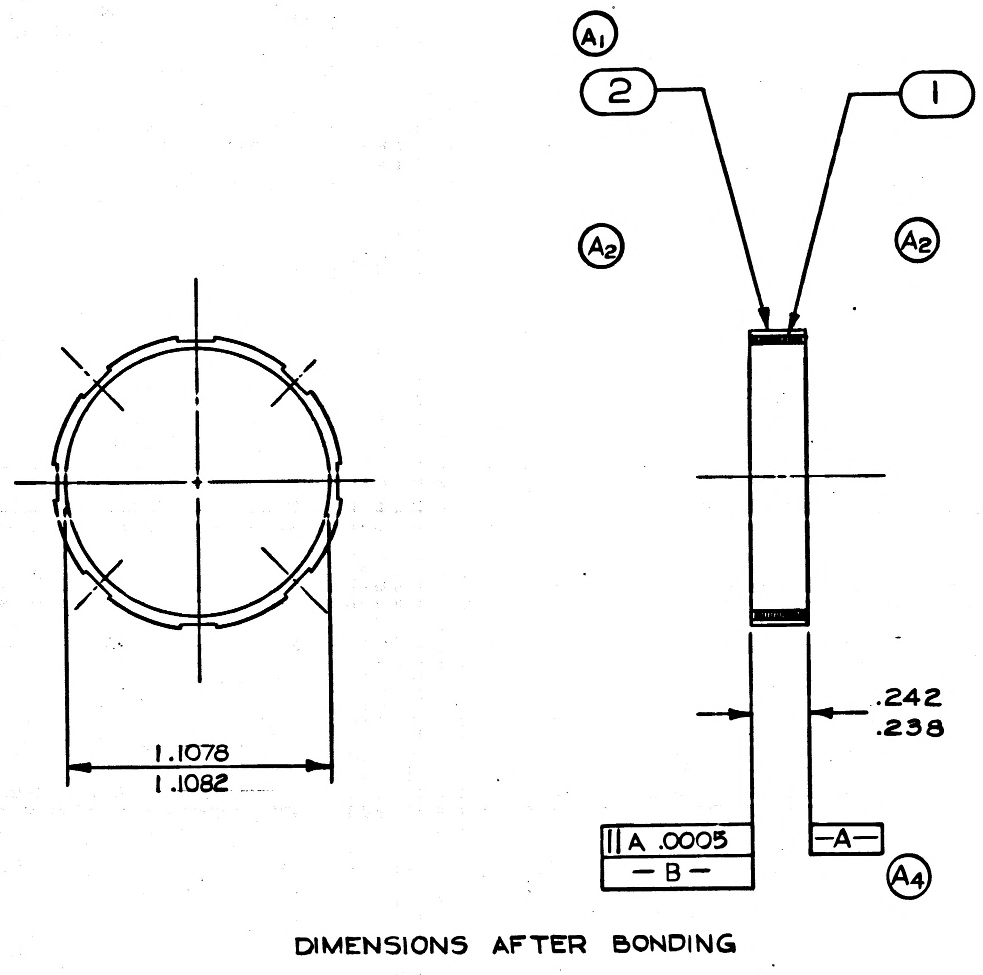
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ROTOR HOLDER
APOLLO II IRIG

SIZE D
CODE IDENT NO
DRAWING NO. 2021691
SCALE 4/1
SHEET 1 OF 1

MASTER

			REVISIONS			11062	
	ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
(M)		A_4	REVISED PER TDRR 11790	P.D.		8-24-64	WR



DIMENSIONS AFTER BONDING

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BOND PER ATP 2021500, MC 25-300
3. MAGNETIC TEST LIMITS PER ATP 2021500, MC 25-110 UTILIZING:
   - A. AREA = .0593 CM^2
   - B. MEAN LENGTH = 7.62 CM
4. SURFACE -B- MAY BE LAPPED A MAXIMUM OF .0005 TO ACHIEVE PARALLELISM TO -A-
5. MARK AND IDENTIFY PER ND1002019

(A3)

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
2	2		2021538	ADHESIVE, PHENOLIC RESIN		
1	APPROX 38		2021693	ROTOR LAMINATION		

LIST OF MATERIALS

MASTER

2021637	2021500
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C R Grasso 29 June 64
CHECKED L W Keating 20 July 64
APPROVED D Freeman 7-21-64
APPROVED R A Booth 7-21-64
MIT APPROVED DATE 21 July 64
NASA APPROVED
W J Rhine 7-21-64

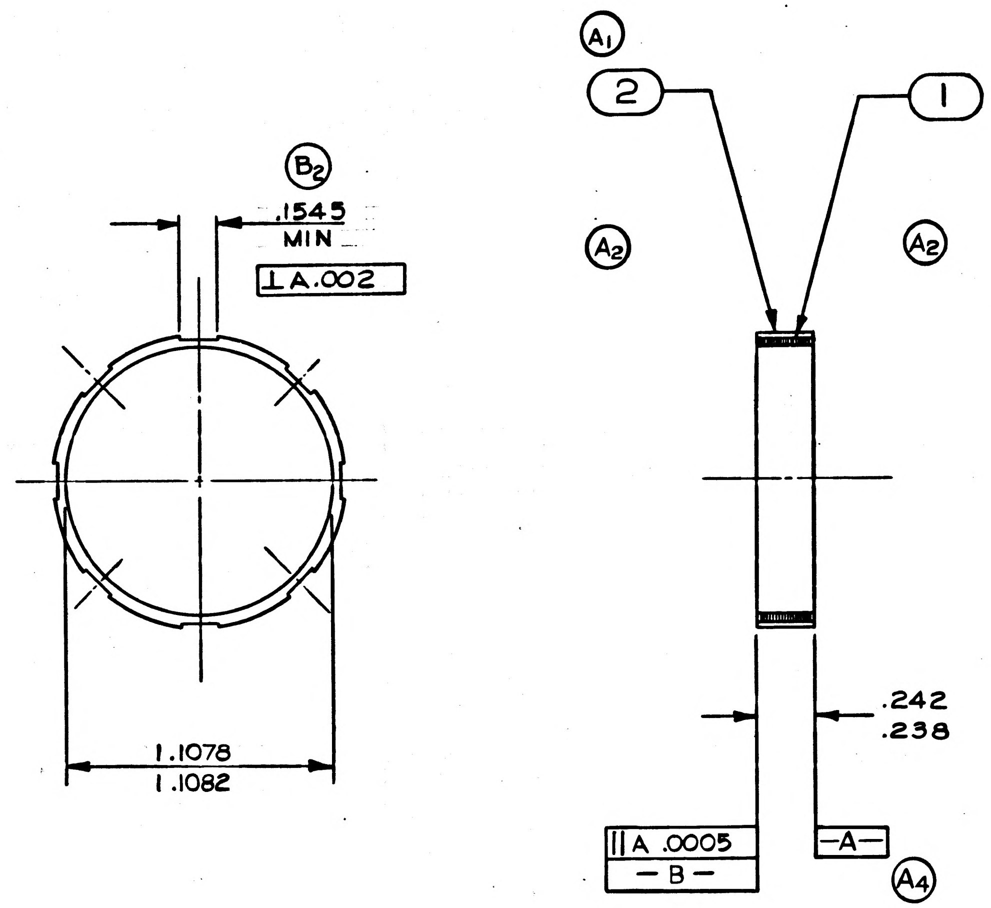
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ROTOR CORE
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021692
SCALE 2/1
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS						11062
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A_4	REVISED PER TDRR 11790	P.D.		8-24-64	WR
	B_2	REVISED PER TDRR 13267	CRG		9-22-64	10/27



DIMENSIONS AFTER BONDING

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BOND PER ATP 2021500, MC 25-300
3. MAGNETIC TEST LIMITS PER ATP 2021500, MC 25-110 UTILIZING:
   - A. AREA = .0593 CM^2
   - B. MEAN LENGTH = 7.62 CM
4. SURFACE $\boxed{-B-}$ MAY BE LAPPED A MAXIMUM OF .0005 TO ACHIEVE PARALLELISM TO $\boxed{-A-}$
5. MARK AND IDENTIFY PER ND1002019

MASTER

(B_1) (A_3)

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
2	AR		2021538	ADHESIVE, PHENOLIC RESIN		
1	APPROX 38		2021693	ROTOR LAMINATION		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021637	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C R Grasso	23 Jun 64
CHECKED	L W Keating	20 July 64
APPROVED	D Freeman	7-21-64
APPROVED	RA Booth	7-21-64

MIT APPROVED W Kupfer DATE 21 July 64
NASA APPROVED W J Rhine 7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

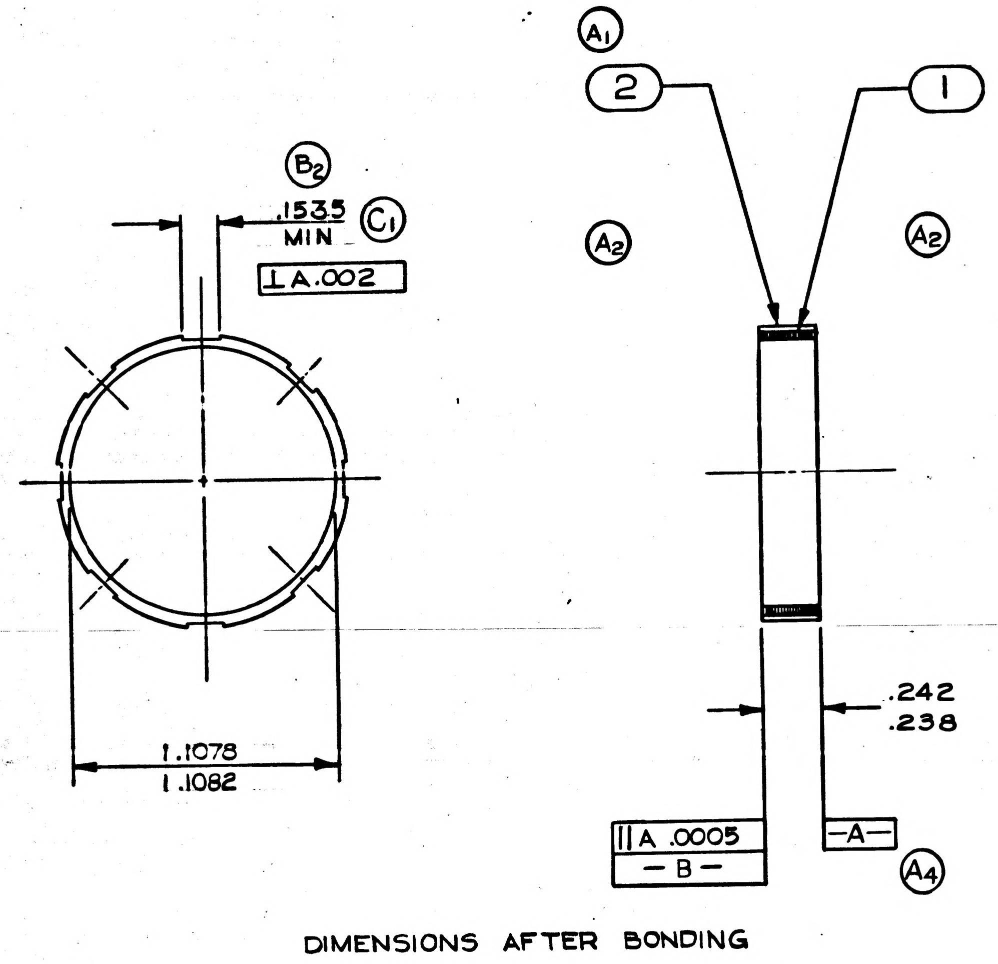
ROTOR CORE
APOLLO II IRIG

SIZE	CODE IDENT NO.	DRAWING NO.
C		2021692

SCALE 2/1 SHEET 1 OF 1

INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

REVISIONS						11062
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A_4	REVISED PER TDRR 11790	P.D.		8-24-64	WK
	B_2	REVISED PER TDRR 13267	CRG		9-22-64	10/27
	C_1	REVISED PER TDRR 16574	P.D.		2-12-65	WK



DIMENSIONS AFTER BONDING

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BOND PER ATP 2021500, MC 25-300
3. MAGNETIC TEST LIMITS PER ATP 2021500, MC 25-110 UTILIZING:
   - A. AREA = .0593 CM^2
   - B. MEAN LENGTH = 7.62 CM
4. SURFACE $\boxed{-B-}$ MAY BE LAPPED A MAXIMUM OF .0005 TO ACHIEVE PARALLELISM TO $\boxed{-A-}$
5. MARK AND IDENTIFY PER ND1002019

(B1) (A3)

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
2	AR		2021538	ADHESIVE, PHENOLIC RESIN		
1	APPROX 38		2021693	ROTOR LAMINATION		

LIST OF MATERIALS

2021637	2021500
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS

CONTRACT NO.

DRAWN	C R Grasso	29 Jun 64
CHECKED	L W Keating	20 July 64
APPROVED	D Freeman	7-21-64
APPROVED	R A Booth	7-21-64

MIT APPROVED DATE
21 July 64

NASA APPROVED
W J Rhine 7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ROTOR CORE
APOLLO II IRIG

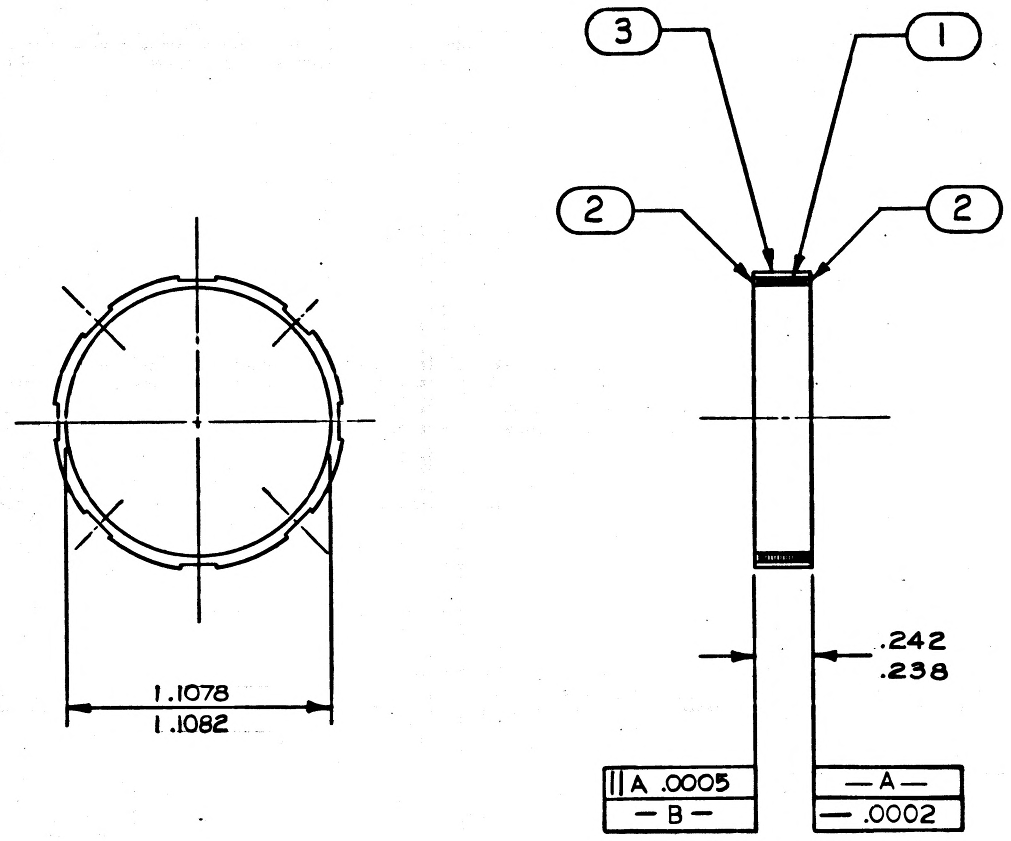
SIZE	CODE IDENT NO.	DRAWING NO.
C		2021692

SCALE 2/1 SHEET 1 OF 1

MASTER

11062

REVISIONS						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



DIMENSIONS AFTER BONDING

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. BOND PER ATP 2021500, MC 25-300
3. MAGNETIC TEST LIMITS PER ATP 2021500, MC 25-110 UTILIZING:
   A. AREA = .0593 CM^2
   B. MEAN LENGTH = 7.62 CM
4. SURFACE -B- MAY BE LAPPED A MAXIMUM OF .0005 TO ACHIEVE PARALLELISM TO -A-
5. MARK AND IDENTIFY PER ND1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
3	AS REQD		2021538	BONDING MATERIAL, CYCLEWELD 55-9		
2	2		2021693-2	ROTOR LAMINATION, .010 THICK		
1	35		2021693-1	ROTOR LAMINATION, .006 THICK		

LIST OF MATERIALS

MASTER

NEXT ASSY	USED ON
2021637	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN C R Grasso 23 June
CHECKED L. W. Keating 20 July 64
APPROVED D. Freeman 7-21-64
APPROVED RA Booth 7-21-64

MIT APPROVED W Kupfer DATE 21 July 64
NASA APPROVED W J Rhine 7-21-64

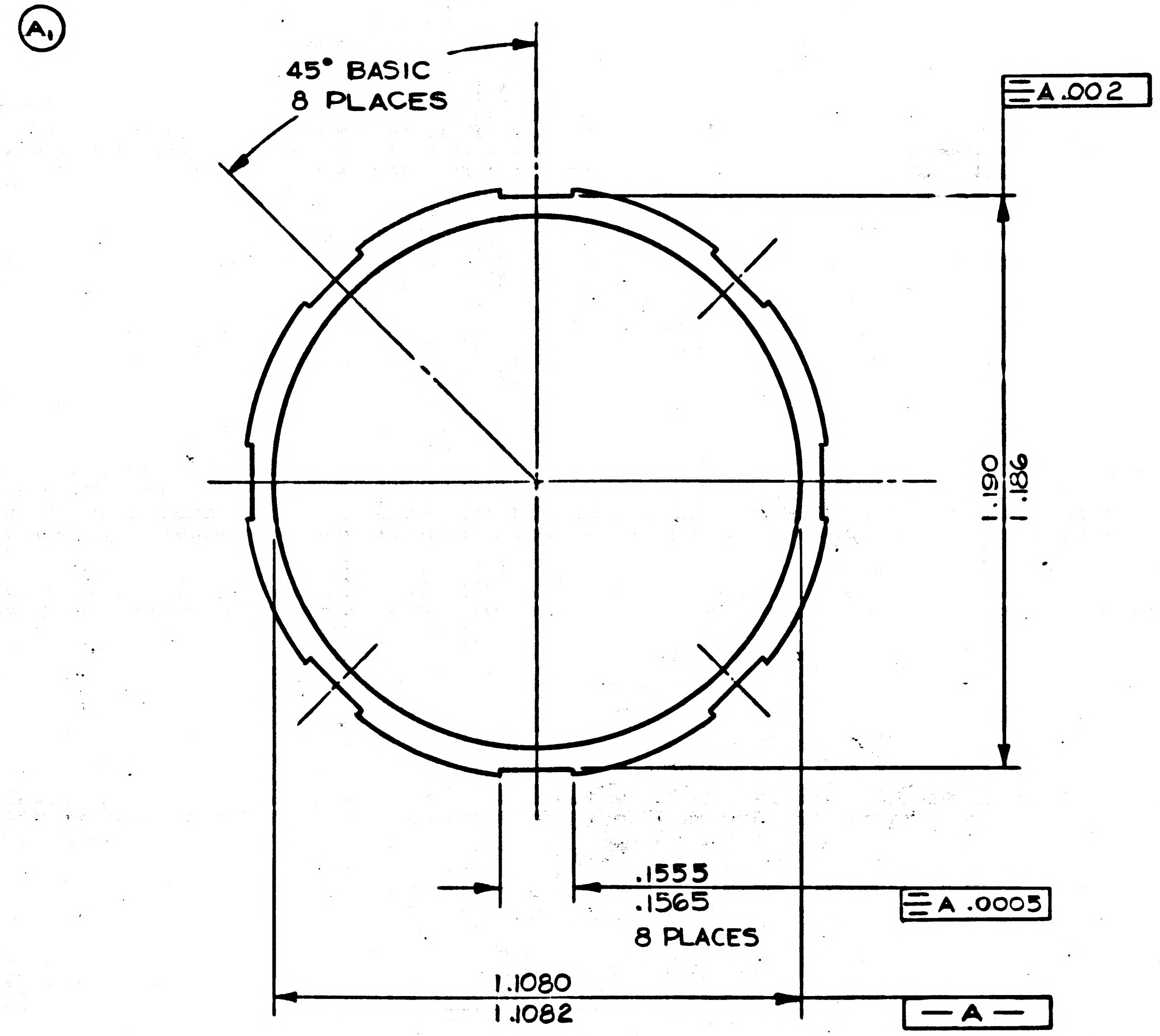
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

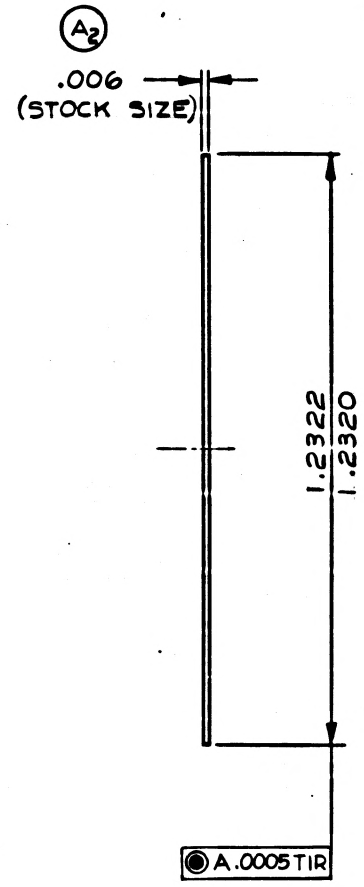
ROTOR CORE
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021692
SCALE 2/1
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS						11060
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A₂	REVISED PER TDRR 11791	CRG		8·24·64	





NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE ALL BURRS VISIBLE UNDER 10X MAXIMUM MAGNIFICATION. THE EDGE RADII AFTER DEBURRING SHALL NOT EXCEED .002
3. HEAT TREAT PER ATP 2021500, MC 25-104
4. TAKE A SAMPLING OF LAMINATIONS FROM EACH HEAT TREAT AND CHECK MAGNETIC TEST LIMITS PER ATP 2021500, MC 25-110 UTILIZING:
   - A. AREA = .260 x NUMBER OF LAM. x LAM. THICKNESS (INCHES) = SQ. CM.
   - B. MINIMUM LENGTH = 7.62 CM.
5. BAG AND IDENTIFY PER ND1002019

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021692	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO.
2021554-2

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C R Grasso	19June64
CHECKED	L.W. Keating	16JULY64
APPROVED	D Freeman	7-21-64
APPROVED	RA Booth	7-21-64

MIT APPROVED W Kupfer 21 July 64 DATE
NASA APPROVED W. J. Rhine 7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ROTOR LAMINATION
APOLLO II IRIG

SIZE	CODE IDENT NO.	DRAWING NO.
C		2021693

SCALE 4/1 SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS						11060
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
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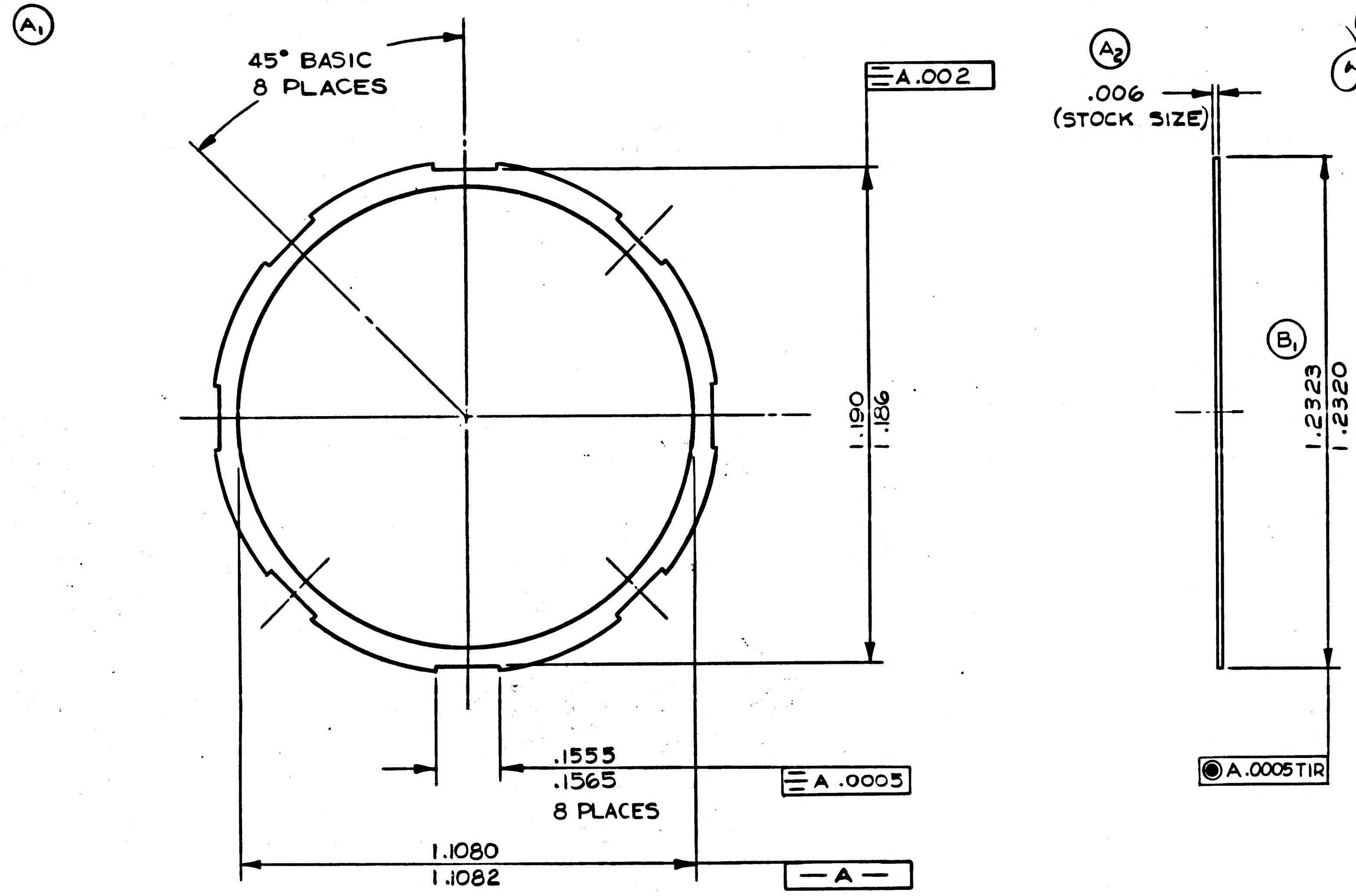
	B_1	REVISED PER TDRR 13270	CRG		10·6·64	10/27



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE ALL BURRS VISIBLE UNDER 10X MAXIMUM MAGNIFICATION. THE EDGE RADII AFTER DEBURRING SHALL NOT EXCEED .002
3. HEAT TREAT PER ATP 2021500, MC 25-104
4. TAKE A SAMPLING OF LAMINATIONS FROM EACH HEAT TREAT AND CHECK MAGNETIC TEST LIMITS PER ATP 2021500, MC 25-110 UTILIZING:
   - A. AREA = .260 x NUMBER OF LAM. x LAM. THICKNESS (INCHES) = SQ. CM.
   - B. MINIMUM LENGTH = 7.62 CM.
5. BAG AND IDENTIFY PER ND1002019

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021692	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO.
2021554-2

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C R Grasso	19 June 64
CHECKED	L.W. Keating	16 JULY 64
APPROVED	D Freeman	7-21-64
APPROVED	RA Booth	7-21-64

MIT APPROVED DATE
W Kupfer 21 July 64
NASA APPROVED
W. J. Rhine 7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

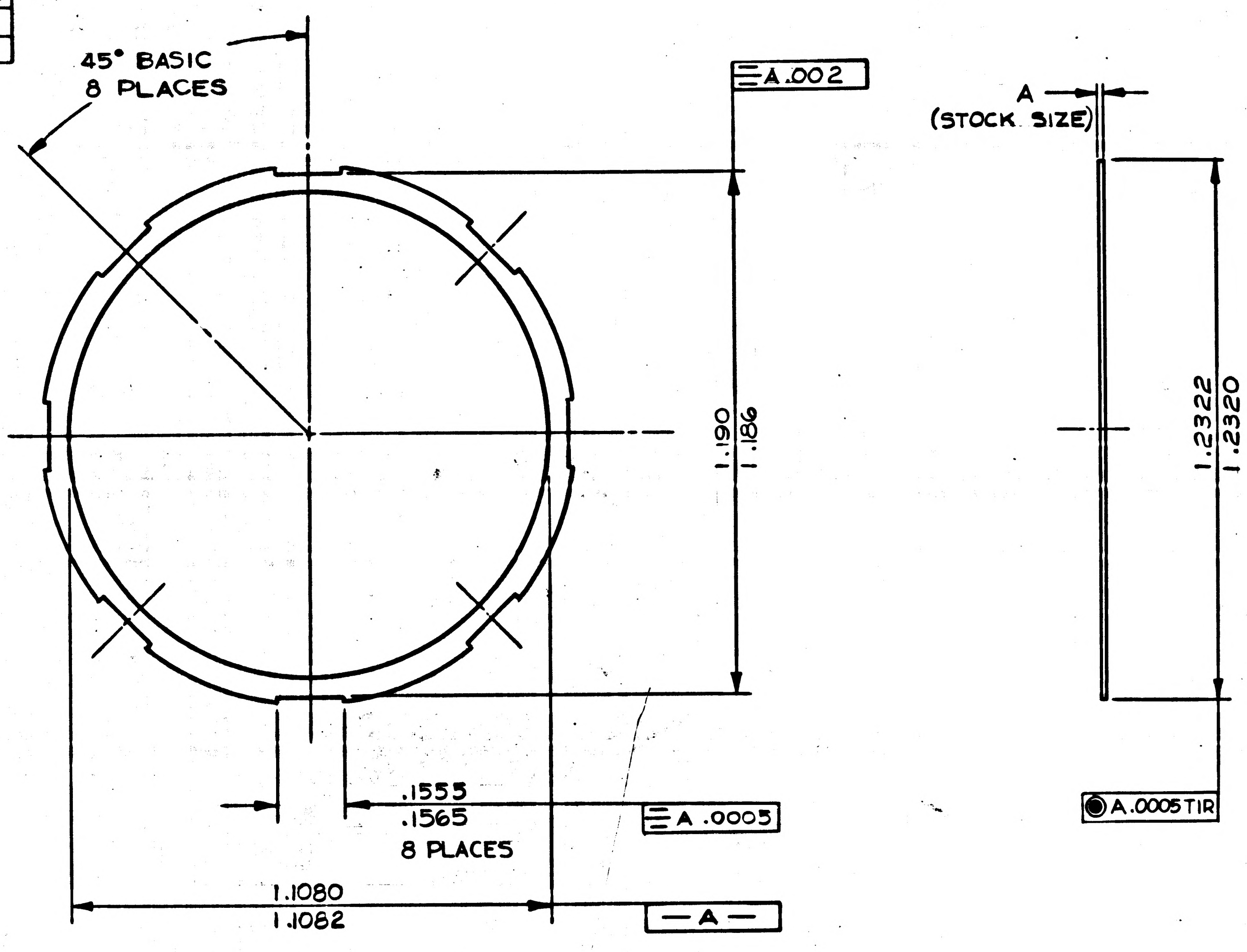
ROTOR LAMINATION
APOLLO II IRIG

SIZE	CODE IDENT NO.	DRAWING NO.
C		2021693

SCALE 4/1
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

PART NO.	DIM A
2021693-1	.006
2021693-2	.010



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. REMOVE ALL BURRS VISIBLE UNDER 10X MAXIMUM MAGNIFICATION. THE EDGE RADII AFTER DEBURRING SHALL NOT EXCEED .002
3. HEAT TREAT PER ATP 2021500, MC 25-104
4. TAKE A SAMPLING OF LAMINATIONS FROM EACH HEAT TREAT AND CHECK MAGNETIC TEST LIMITS PER ATP 2021500, MC 25-110 UTILIZING:
    - A. AREA = .260 x NUMBER OF LAM. x LAM. THICKNESS (INCHES) = SQ. CM.
    - B. MINIMUM LENGTH = 7.62 CM.
5. BAG AND IDENTIFY PER ND1002019

MASTER

2021692	2021500
NEXT ASSY	USED ON
APPLICATION	

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO.
2021554-2

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C R Grasso	19June64
CHECKED	L.W. Keating	16JULY64
APPROVED	D Freedman	7-21-64
APPROVED	RA Booth	7-21-64

MIT APPROVED DATE
W Kupfer 21 July 64
NASA APPROVED
W. J. Rhine 7-21-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ROTOR LAMINATION
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021693
SCALE 4/1
SHEET 1 OF 1

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED

REVISIONS 11060

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS TDRR 12345						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
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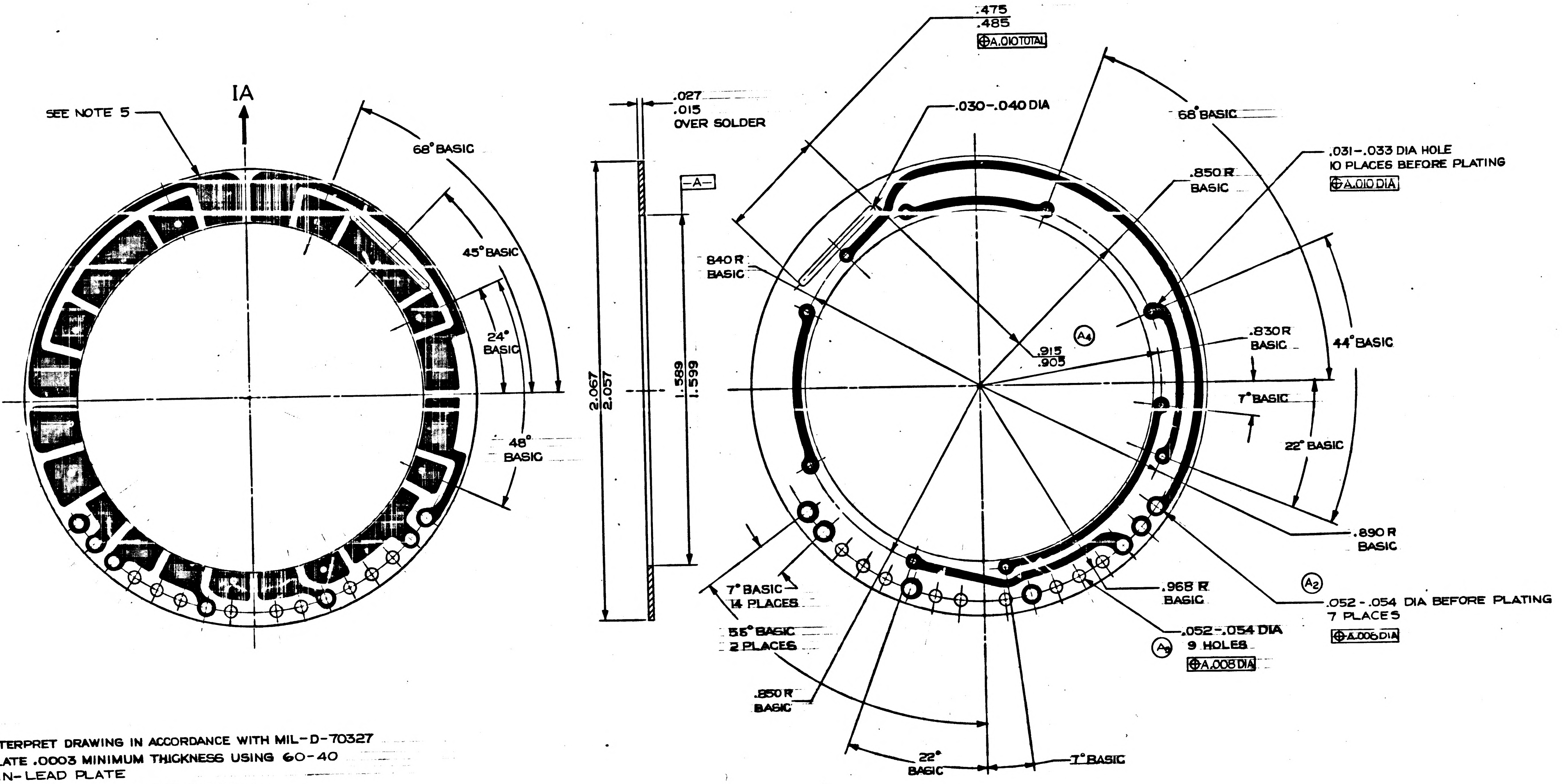

IA
SEE NOTE 5
68° BASIC
45° BASIC
24° BASIC
48° BASIC
.027
.015
OVER SOLDER
-A-
2.067
2.057
1.589
1.599
.475
.485
⊕A.010 TOTAL
.030-.040 DIA
68° BASIC
.850 R BASIC
.031-.033 DIA HOLE
10 PLACES BEFORE PLATING
⊕A.010 DIA
840 R BASIC
.915
.905
A4
.830 R BASIC
44° BASIC
7° BASIC
22° BASIC
.890 R BASIC
A2
.052-.054 DIA BEFORE PLATING
7 PLACES
⊕A.006 DIA
.968 R BASIC
.052-.054 DIA
9 HOLES
A3
⊕A.008 DIA
7° BASIC
14 PLACES
56° BASIC
2 PLACES
.850 R BASIC
22° BASIC
7° BASIC

A1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. PLATE .0003 MINIMUM THICKNESS USING 60-40 TIN-LEAD PLATE
3. LACQUER COAT TO PREVENT OXIDATION
4. HOLES TO BE THRU PLATED TO A MINIMUM WALL THICKNESS OF .0015
5. ART WORK PER PRINTED CIRCUIT MASTER 2021696
6. BAG AND IDENTIFY PER ND 1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021664	2021500

APPLICATION

A5

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO. 2021557-3

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	P. DIETRICH	28AUG64
CHECKED	L. W. Keating	9-8-64
APPROVED		9/8/64
APPROVED	RA Booth	9-8-64
MIT APPROVED	W Kupfer	DATE 8 Sep 64
NASA APPROVED	W J Rhine	DATE 9-8-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

S.G. MICROSYN PRINTED CIRCUIT
APOLLO II IRIG

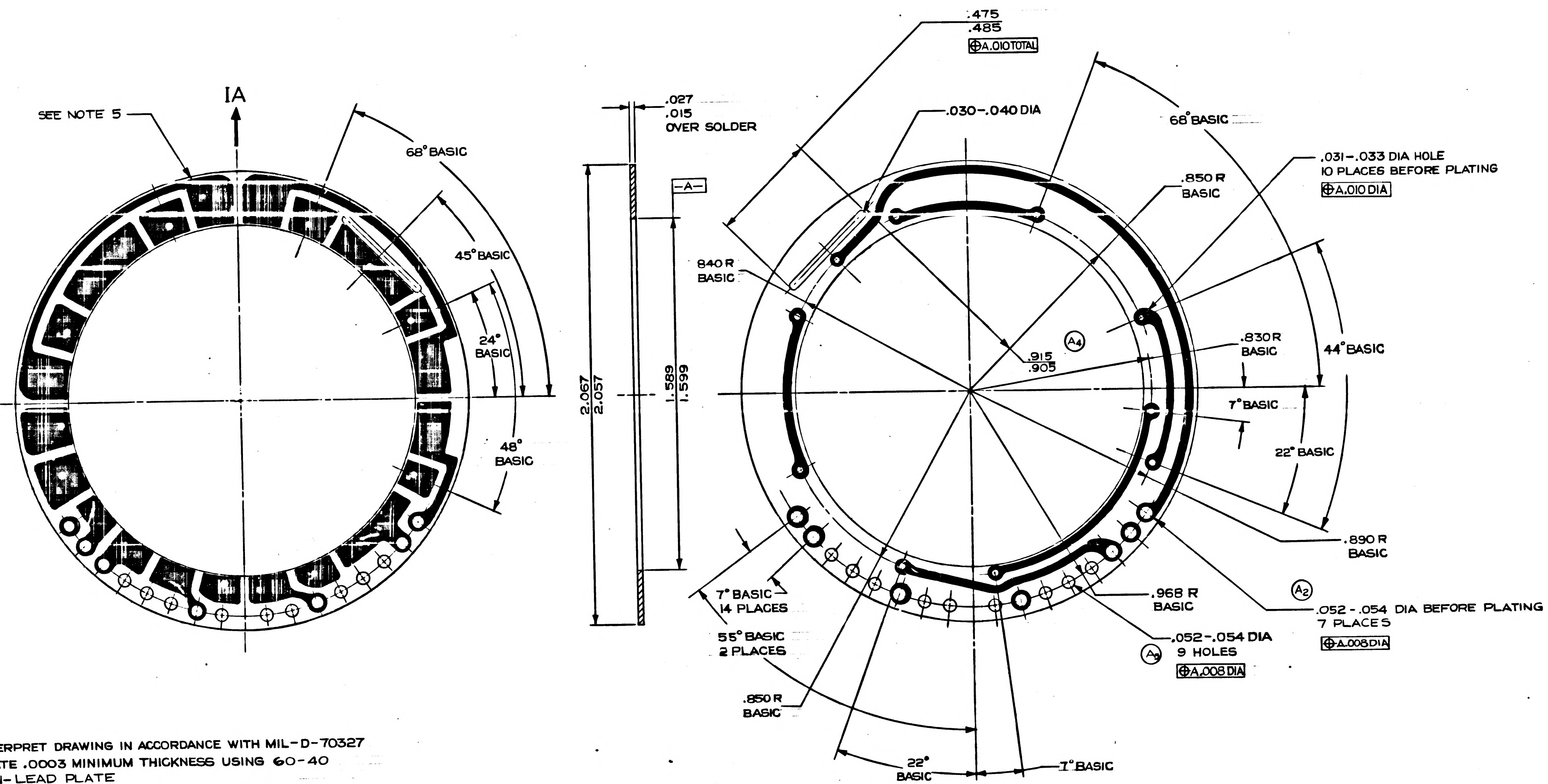
SIZE	CODE IDENT NO	DRAWING NO.
D		2021695

SCALE 4/1 SHEET 1 OF 1

INCHES
0 1

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A5	REVISED PER TDRR 13277	CRG		9-29-64	10/27
	B1	REVISED PER TDRR 15218	P.D.		12,29,64	

REVISIONS TDRR 12385



IA
SEE NOTE 5
68° BASIC
45° BASIC
24° BASIC
48° BASIC
.027
.015
OVER SOLDER
-A-
2.067
2.057
1.589
1.599
.475
.485
⊕A.010 TOTAL
.030-.040 DIA
68° BASIC
.850 R BASIC
.031-.033 DIA HOLE
10 PLACES BEFORE PLATING
⊕A.010 DIA
840 R BASIC
.915
.905
A4
.830 R BASIC
44° BASIC
7° BASIC
22° BASIC
.890 R BASIC
A2
.052-.054 DIA BEFORE PLATING
7 PLACES
⊕A.008 DIA
.968 R BASIC
.052-.054 DIA
9 HOLES
A4
⊕A.008 DIA
7° BASIC
14 PLACES
55° BASIC
2 PLACES
.850 R BASIC
22° BASIC
7° BASIC

(A1)

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. PLATE .0003 MINIMUM THICKNESS USING 60-40 TIN-LEAD PLATE
3. (B1) LACQUER COAT TO PREVENT OXIDATION (OPTIONAL)
4. HOLES TO BE THRU PLATED TO A MINIMUM WALL THICKNESS OF .0015
5. ART WORK PER PRINTED CIRCUIT MASTER 2021696
6. BAG AND IDENTIFY PER ND 1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021664	2021500

APPLICATION

(A5)

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO. 2021557-3

FINISH

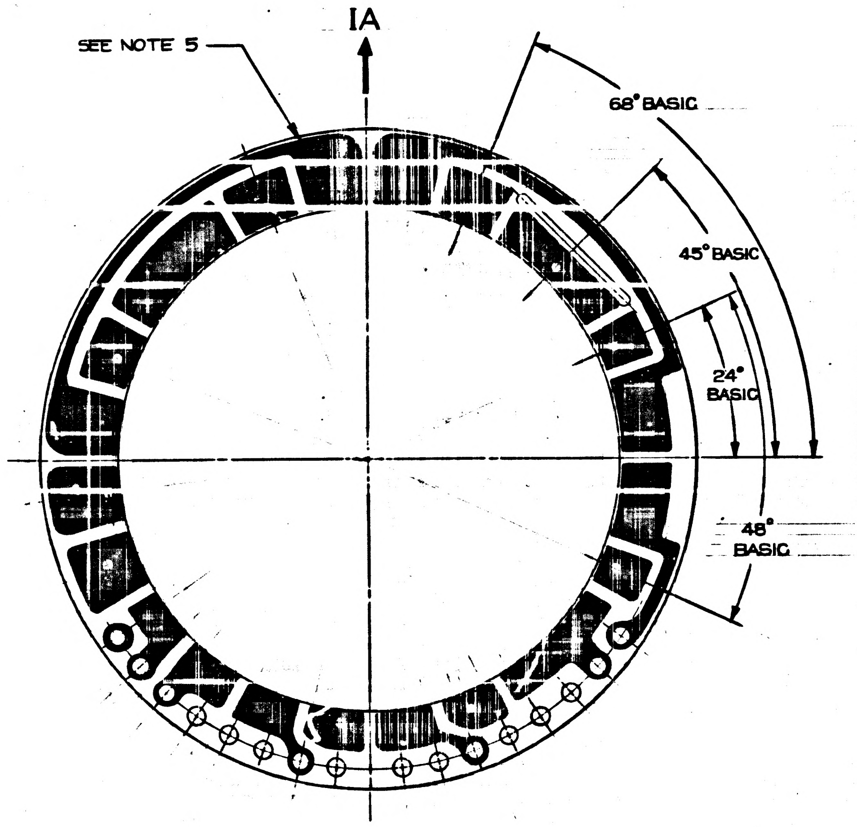
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN P. DIETRICH 28AUG64
CHECKED L. L. Keating 9-8-64
APPROVED 9/8/64
APPROVED RA Booth 9-8-64
MIT APPROVED W. Kupfer 8 Sep 64 DATE
NASA APPROVED W. J. Rhine 9-8-64 DATE

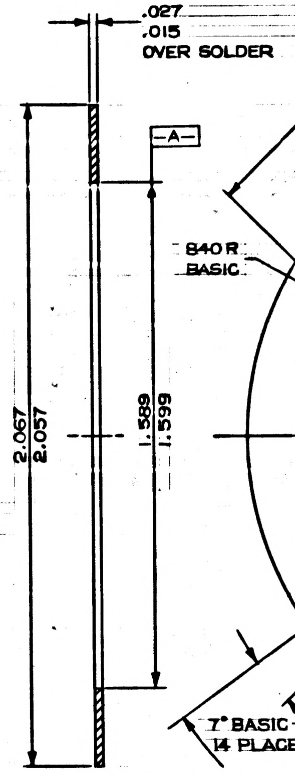
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

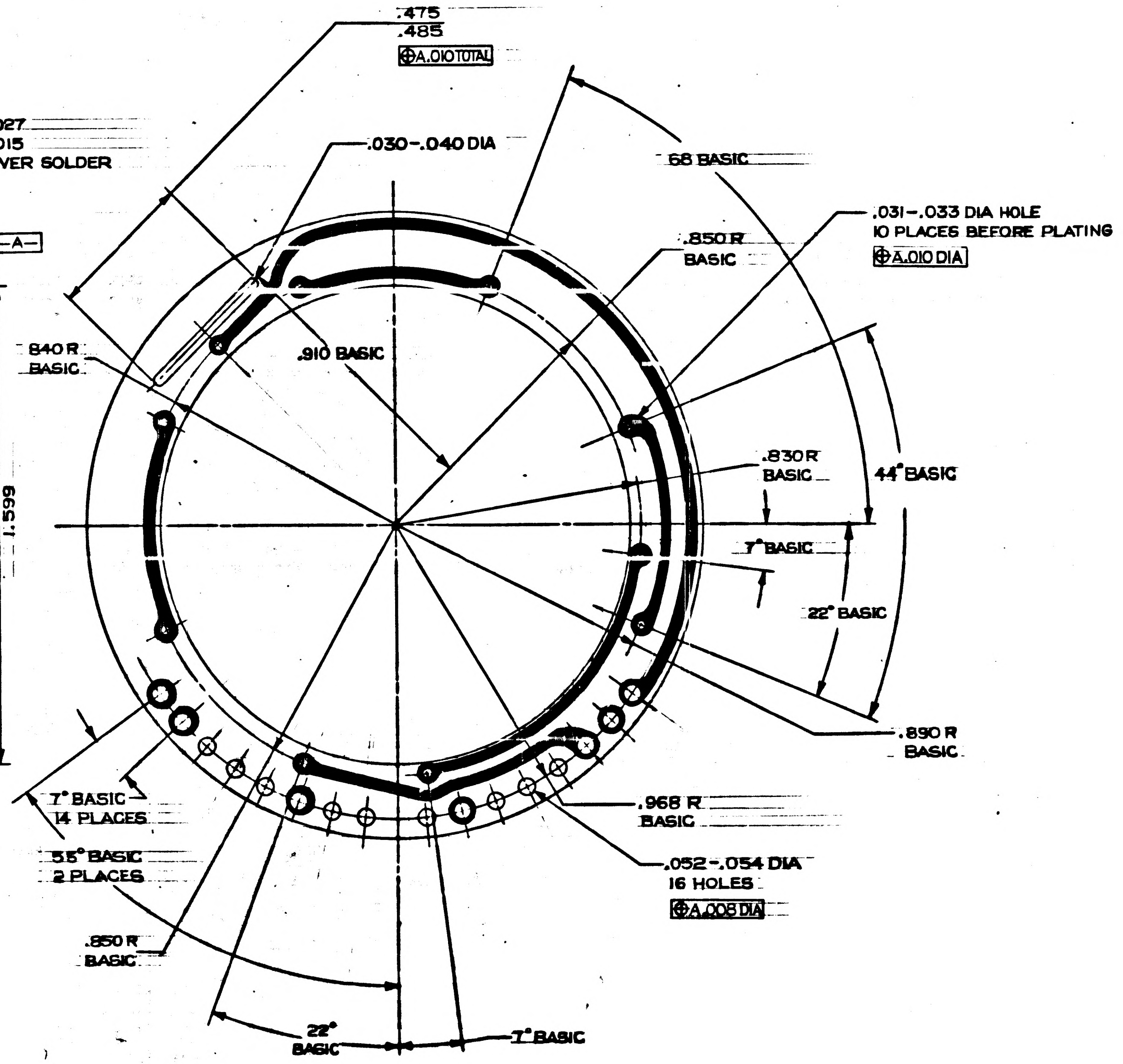
S.G. MICROSYN PRINTED CIRCUIT
APOLLO II IRIG

SIZE D
CODE IDENT NO
DRAWING NO. 2021695
SCALE 4/1
SHEET 1 OF 1

REVISIONS — TDRR 12345						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED


IA
SEE NOTE 5
68° BASIC
45° BASIC
24° BASIC
48° BASIC


.027
.015
OVER SOLDER
-A-
2.067
2.057
1.589
1.599


.475
.485
⊕A.010 TOTAL
.030-.040 DIA
68 BASIC
.850 R BASIC
.031-.033 DIA HOLE
10 PLACES BEFORE PLATING
⊕A.010 DIA
.840 R BASIC
.910 BASIC
.830 R BASIC
44° BASIC
7° BASIC
22° BASIC
.890 R BASIC
.968 R BASIC
.052-.054 DIA
16 HOLES
⊕A.008 DIA
7° BASIC
14 PLACES
55° BASIC
2 PLACES
.850 R BASIC
22° BASIC
7° BASIC

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. PLATE .0003 MINIMUM THICKNESS USING SOLDER SN 60WS, QQ-S-571 PER ND1002071
3. LACQUER COAT TO PREVENT OXIDATION
4. HOLES TO BE THRU PLATED TO A MINIMUM WALL THICKNESS OF .0015
5. ART WORK PER PRINTED CIRCUIT MASTER 2021696
6. BAG AND IDENTIFY PER ND1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021664	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO. 2021557

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	P. DIETRICH	28AUG64
CHECKED	L. E. Keating	9-8-64
APPROVED		9/8/64
APPROVED	R A Booth	9-8-64
MIT APPROVED	W Kupfer	DATE 8 Sep 64
NASA APPROVED	W J Rhine	DATE 9-8-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

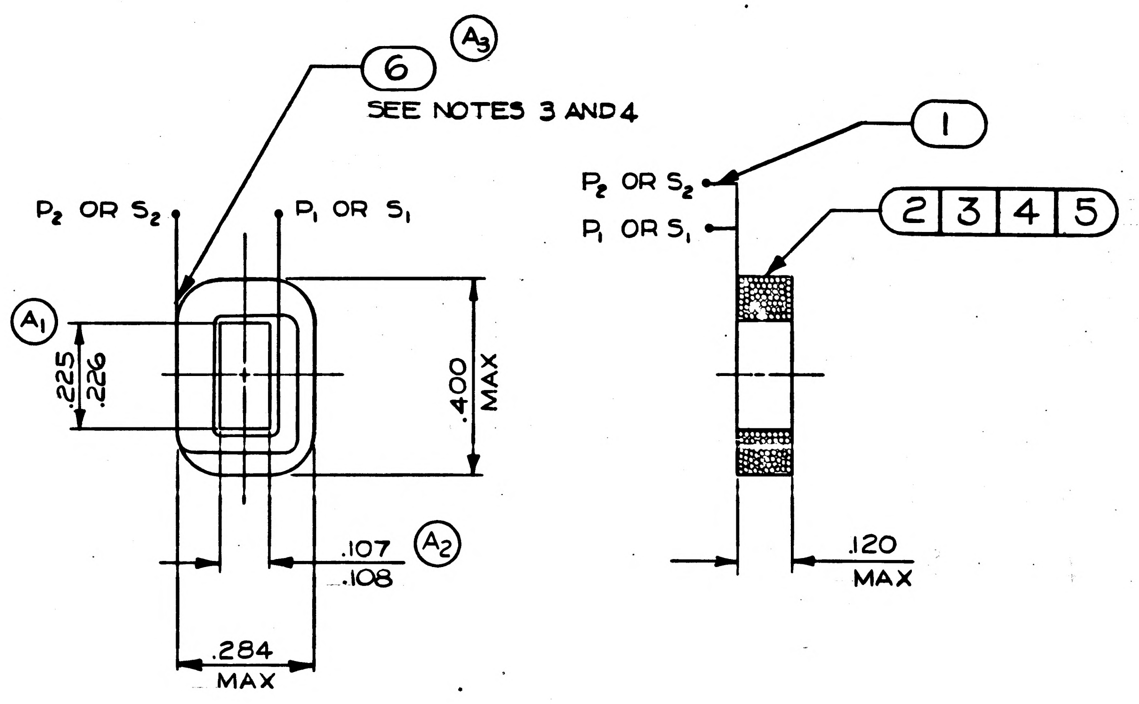
S.G. MICROSYN PRINTED CIRCUIT
APOLLO II IRIG

SIZE	CODE IDENT NO	DRAWING NO.
D		2021695

SCALE 4/1 SHEET 1 OF 1

INCHES 0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS						11521
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A5	REVISED PER TDRR 13274	CRG		9-22-64	10/27



A5

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. COIL TO HAVE 200 TURNS OF ①
3. SECURE LAST TURN WITH ⑥
4. MIX AND CURE ⑥ PER ATP 2021500, MC 25-302
5. IMPREGNATE PER ATP 2021500, MC 25-501
6. BAG AND IDENTIFY PER ND 1002019

A4

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
6	AR		2021529	ADHESIVE, EPOXY		
5	AS REQ'D		1010722	ANTI FOAM AGENT		
4	AS REQ'D		1010721	CURING AGENT (ACCELERATOR)		
3	AS REQ'D		1010720	CURING AGENT		
2	AS REQ'D		1010719	EPOXY RESIN		
1	AS REQ'D		2021542	WIRE MAGNET, ELECTRICAL-SINGLE POLYSTER		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021664	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C.R. Grasso 22 July 64
CHECKED L.W. Keating - C.R.G. 8-10-64
APPROVED N.R. Chambers 8-11-64
APPROVED R.A. Booth 8-7-64
MIT APPROVED W Kupfer DATE 17 Aug 64
NASA APPROVED DATE 8/14/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

S. G. COIL ASSEMBLY
12 MY 1.750
APOLLO II IRIG

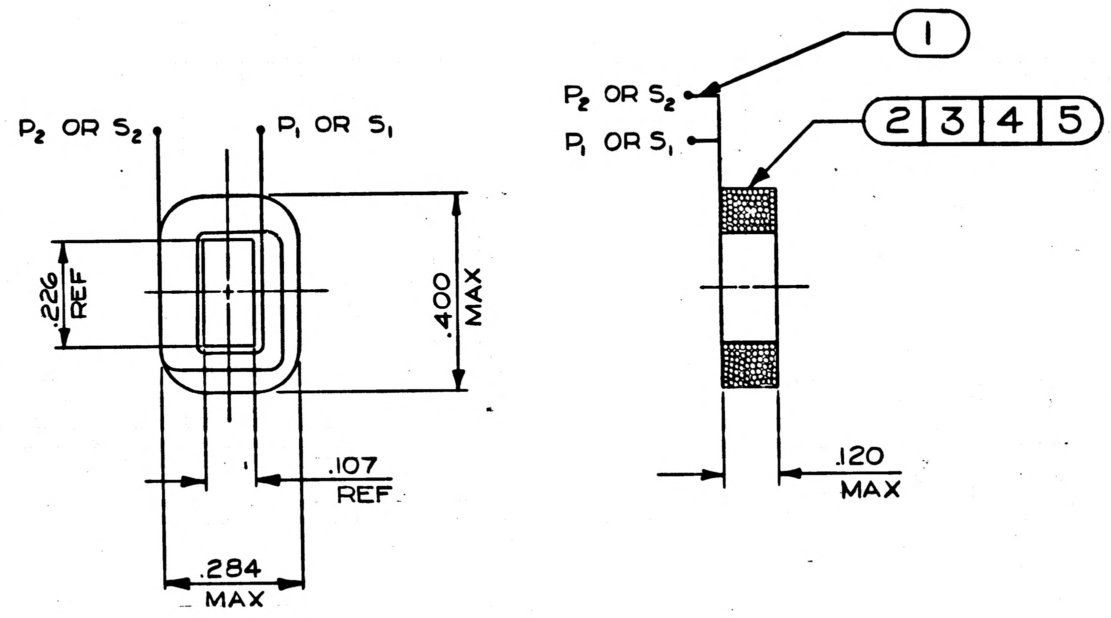
SIZE C
CODE IDENT NO.
DRAWING NO. 2021697
SCALE 4/1
SHEET 1 OF 1

MASTER

INCHES
0 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS 11521

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. COIL TO HAVE 200 TURNS OF NO. 35 COPPER WIRE (ITEM NO. 1)
3. BAG AND IDENTIFY PER ND 1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
5	AS REQ'D		1010722	DOW CORNING ANTI-FOAM AGENT A		
4	AS REQ'D		1010721	BENZYL DIMETHYLAMINE		
3	AS REQ'D		1010720	METHYL NADIC ANHYDRIDE		
2	AS REQ'D		1010719	DOW 332 IMPREGNANT		
1	AS REQ'D		2021542-1	NO. 35 AWG SINGLE POLYTHERMALEZE COATED WIRE		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021664	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C R Grasso	22 July 64
CHECKED	L. W. Keating - CRG	8-10-64
APPROVED	N. R. Chambers	8-11-64
APPROVED	R A Booth	8-7-64

MIT APPROVED W Kupfer DATE 17 Aug 64

NASA APPROVED DATE 8/14/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

S. G. COIL ASSEMBLY
12 MY 1.750
APOLLO II IRIG

SIZE C

CODE IDENT NO.

DRAWING NO. 2021697

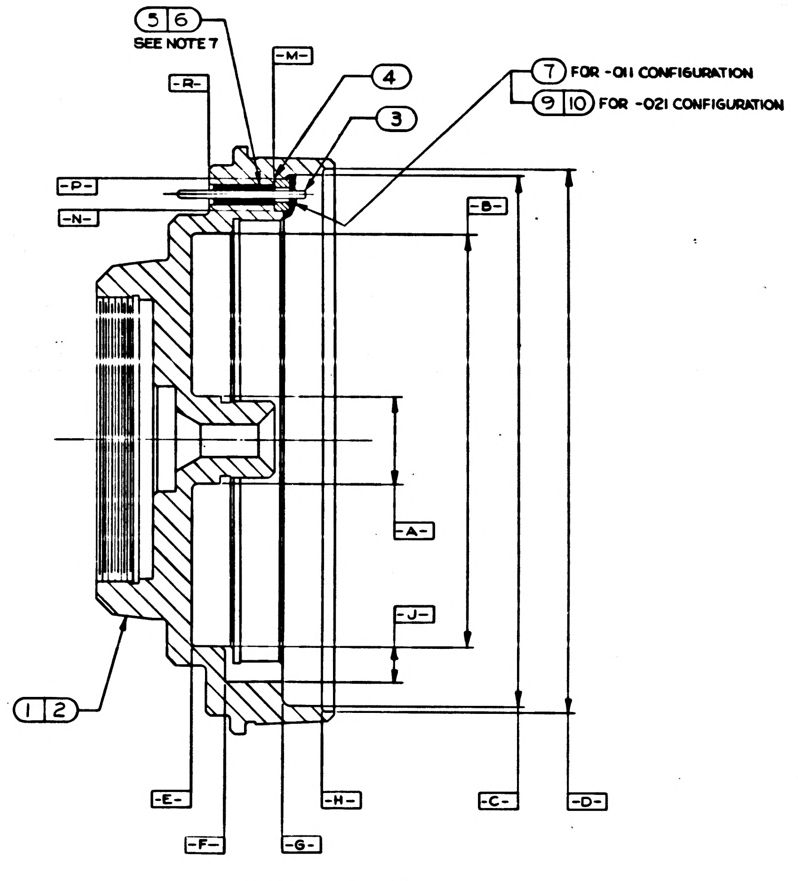
SCALE 4/1

SHEET 1 OF 1

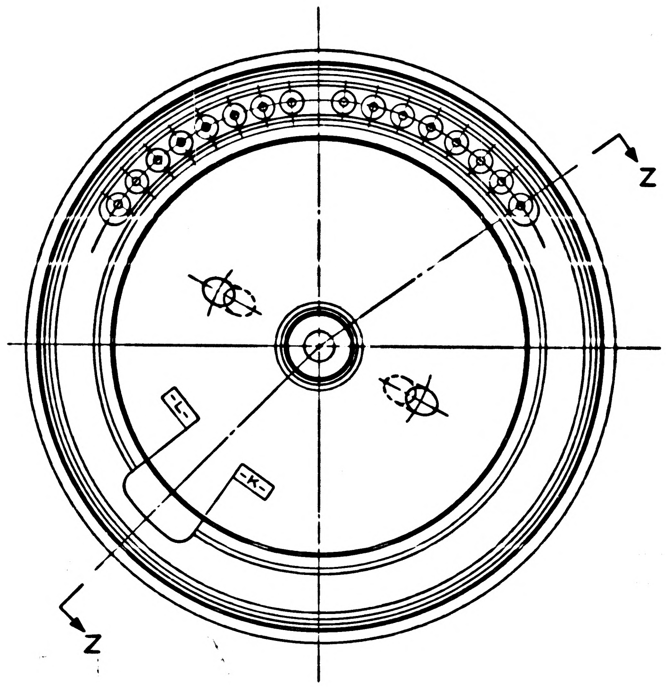
MASTER

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A	REVISED PER TDRR 35844	WTY			



SECTION Z-Z



NOTES APPLICABLE ONLY TO 2021698-011

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE PER ATP 2021500, MC25-857
3. BAG AND IDENTIFY PER ND 1002019

NOTES APPLICABLE ONLY TO 2021698-021

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. COAT ITEM ① SURFACES -A- -B- -C- -D- -E- -F- -G- -H- -J- -K- -L- ONLY WITH ⑧ (.001 TO .002 THICK). DO NOT COAT SURFACES -M- -N- -P-. CURE ① FOR 1 HOUR AT 290° F TO 310° F
3. CEMENT ③ TO ② WITH ④ USING MIT C-127576 FIXTURE OR EQUIVALENT. HEAT ②③ TO 160°F TO 180° F. MIX ④ PER ATP 2021500, MC25-302. CURE ④ FOR 2 HOURS AT 190°F TO 210° F
4. TEMPERATURE CYCLE PER ATP 2021500, MC25-857
5. THE INSULATION RESISTANCE OF ALL PINS OF ③ TO ② SHALL BE GREATER THAN 5000 MEGOHMS AT A TEST VOLTAGE OF 500 VOLTS DC AT 70°F TO 80°F AND A RELATIVE HUMIDITY OF 50 PER CENT OR LESS
6. LEAK RATE AT 134°F TO 140°F SHALL NOT EXCEED 0.005 $\times 10^{-6}$ ATM CC OF HELIUM / SEC / ATM AFTER TEMPERATURE CYCLING
7. FILL 16 HOLES IN ② WITH ⑤⑥ .005 TO .020 BELOW -R-. PINS SHALL BE FREE OF ⑤⑥ ABOVE -R-. MIX AND CURE ⑤⑥ PER ATP 2021500, MC25-301
8. COVER ③ WITH ⑨⑩. CURE PER ATP 2021500, MC25-303.
9. BAG AND IDENTIFY PER ND 1002019

QUANTITY REQUIRED						LIST OF MATERIALS		
041	031	021	011	ITEM NO.	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
		AR	-	10		2021531	DIETHYLENETRIAMINE		
		AR	-	9		1010748	EPOXY RESIN		
		AR	-	8		2021539	ENAMEL - ACRYLIC RESIN		
		-	AR	7		2021534	SILICONE RUBBER, ROOM TEMP VULCANIZING		
		AR	AR	6		2021547	ACTIVATOR, ADHESIVE		
		AR	AR	5		1010661	RESIN, EPOXY		
		AR	AR	4		2021529	ADHESIVE, EPOXY		
		1	1	3		2021516	TERMINAL SEAL		
		1	-	2		2021650-2	END HOUSING		
		-	1	1		2021650-1	END HOUSING		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

NEXT ASSY	USED ON
2021649 2021663	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

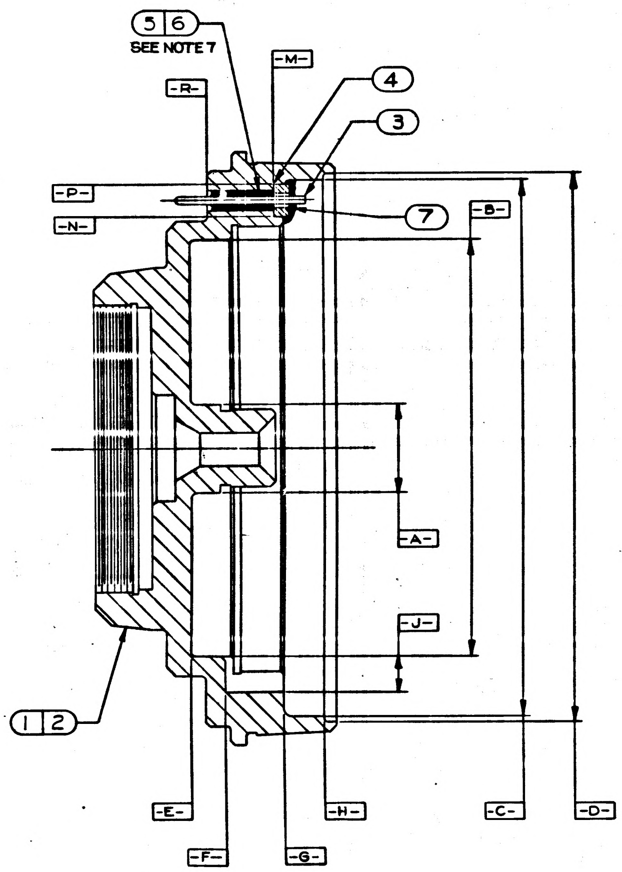
DRAWN	C.R. Grasso	25 Sept 64
CHECKED	L. W. Keating	10-16-64
APPROVED		
APPROVED	R.A. Booth	11-4-64
MIT APPROVED	W. Kupfer	4 Nov 64
NASA APPROVED	W. J. Rhine	11-4-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

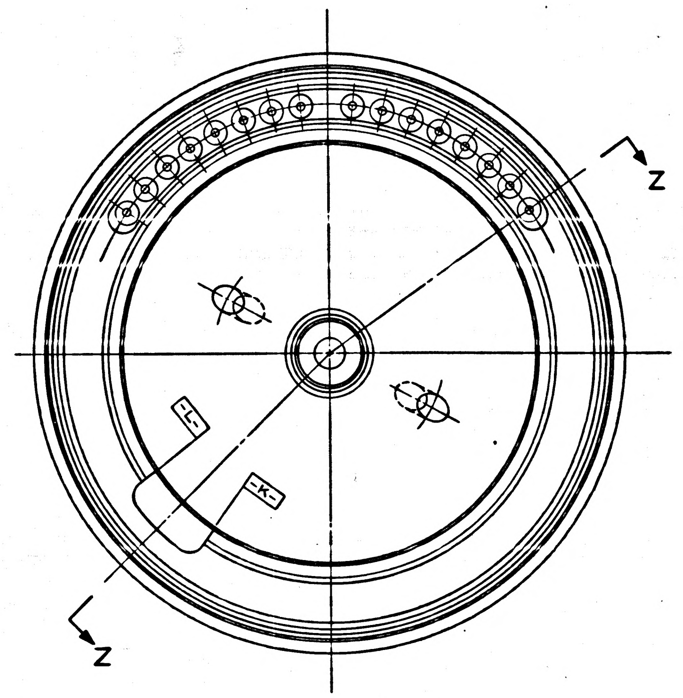
END HOUSING AND
TERMINAL SEAL ASSY
APOLLO II IRIG

SIZE E
CODE IDENT NO 80230
DRAWING NO. 2021698
SCALE 4/1
SHEET 1 OF 1

REVISIONS						14076
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



SECTION Z-Z



NOTES APPLICABLE ONLY TO 2021698-011

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE PER ATP 2021500, MC25-857
3. BAG AND IDENTIFY PER ND 1002019

NOTES APPLICABLE ONLY TO 2021698-021

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. COAT ITEM ① SURFACES -A- -B- -C- -D- -E- -F- -G- -H- -J- -K- -L- ONLY WITH ⑧ (.001 TO .002 THICK). DO NOT COAT SURFACES -M- -N- -P-. CURE ① FOR 1 HOUR AT 290° F TO 310° F
3. CEMENT ③ TO ② WITH ④ USING MIT C-127576 FIXTURE OR EQUIVALENT. HEAT ②③ TO 160°F TO 180° F. MIX ④ PER ATP 2021500, MC25-302. CURE ④ FOR 2 HOURS AT 190°F TO 210° F
4. TEMPERATURE CYCLE PER ATP 2021500, MC25-857
5. THE INSULATION RESISTANCE OF ALL PINS OF ③ TO ② SHALL BE GREATER THAN 5000 MEGOHMS AT A TEST VOLTAGE OF 500 VOLTS DC AT 70°F TO 80°F AND A RELATIVE HUMIDITY OF 50 PER CENT OR LESS
6. LEAK RATE AT 134°F TO 140°F SHALL NOT EXCEED 0.005 $\times 10^{-6}$ ATM CC OF HELIUM / SEC / ATM AFTER TEMPERATURE CYCLING
7. FILL 16 HOLES IN ② WITH ⑤⑥ .005 TO .020 BELOW -R-. PINS SHALL BE FREE OF ⑤⑥ ABOVE -R-. MIX AND CURE ⑤⑥ PER ATP 2021500, MC25-301
8. COVER ③ WITH ⑦. CURE PER ATP 2021500, MC25-857
9. BAG AND IDENTIFY PER ND 1002019

041	031	021	011	ITEM NO.	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
		AR		8		2021539	ENAMEL - ACRYLIC RESIN		
		AR	AR	7		2021534	SILICONE RUBBER, ROOM TEMP VULCANIZING		
		AR	AR	6		2021547	ACTIVATOR, ADHESIVE		
		AR	AR	5		1010661	RESIN, EPOXY		
		AR	AR	4		2021529	ADHESIVE, EPOXY		
		1	1	3		2021516	TERMINAL SEAL		
		1		2		2021650-2	END HOUSING		
			1	1		2021650-1	END HOUSING		

QUANTITY REQUIRED

LIST OF MATERIALS

MASTER

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

NEXT ASSY	USED ON
2021649	
2021663	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C.R. Grasso 25 Sep 64
CHECKED L.W. Keating 10-16-64
APPROVED 4 Nov 64
APPROVED R.A. Booth 11-4-64
MIT APPROVED W. Kupfer DATE 4 Nov 64
NASA APPROVED W.J. Rhine DATE 11-4-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

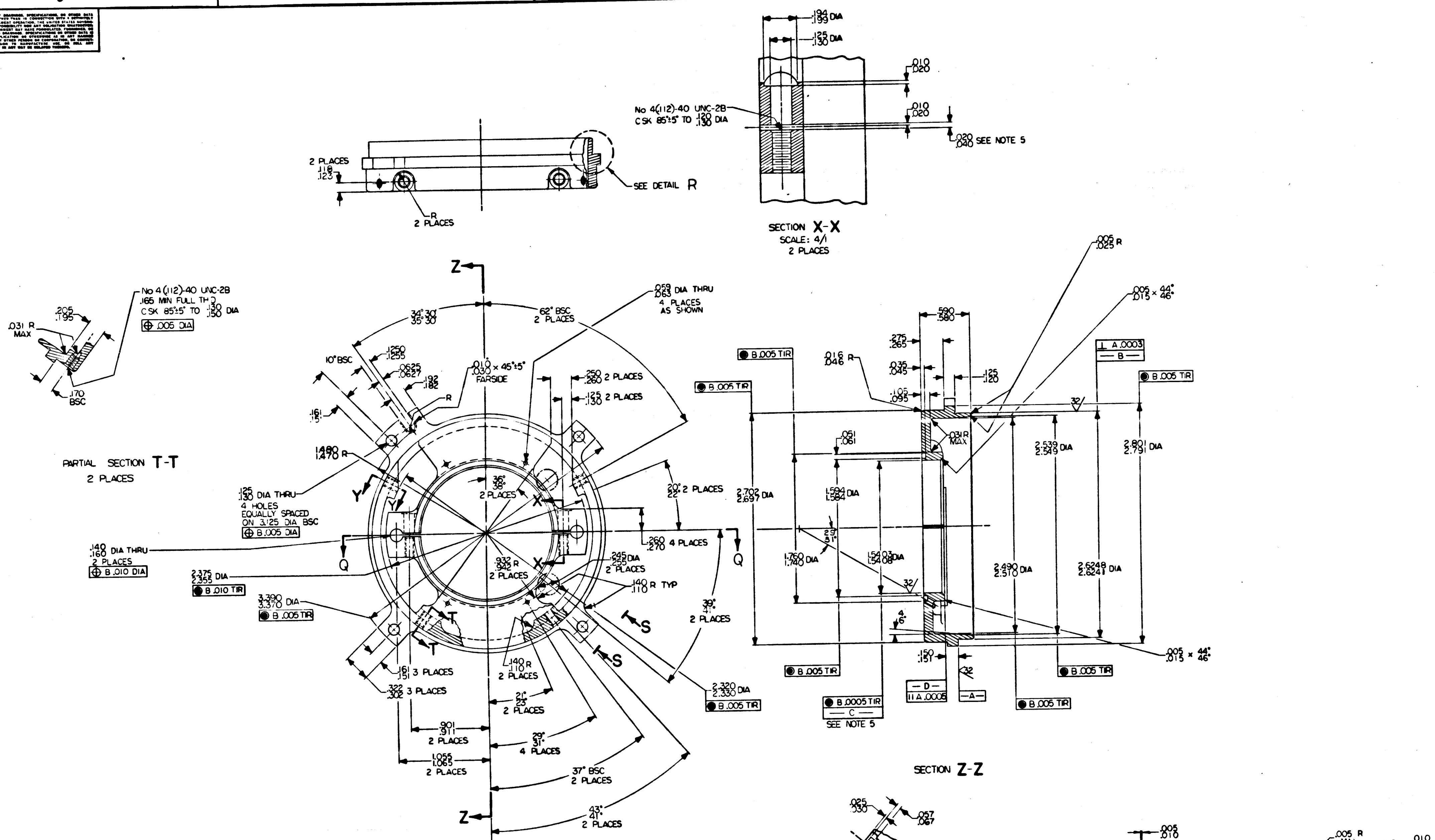
END HOUSING AND
TERMINAL SEAL ASSY
APOLLO II IRIG

SIZE E
CODE IDENT NO
DRAWING NO. 2021698
SCALE 4/1
SHEET 1 OF

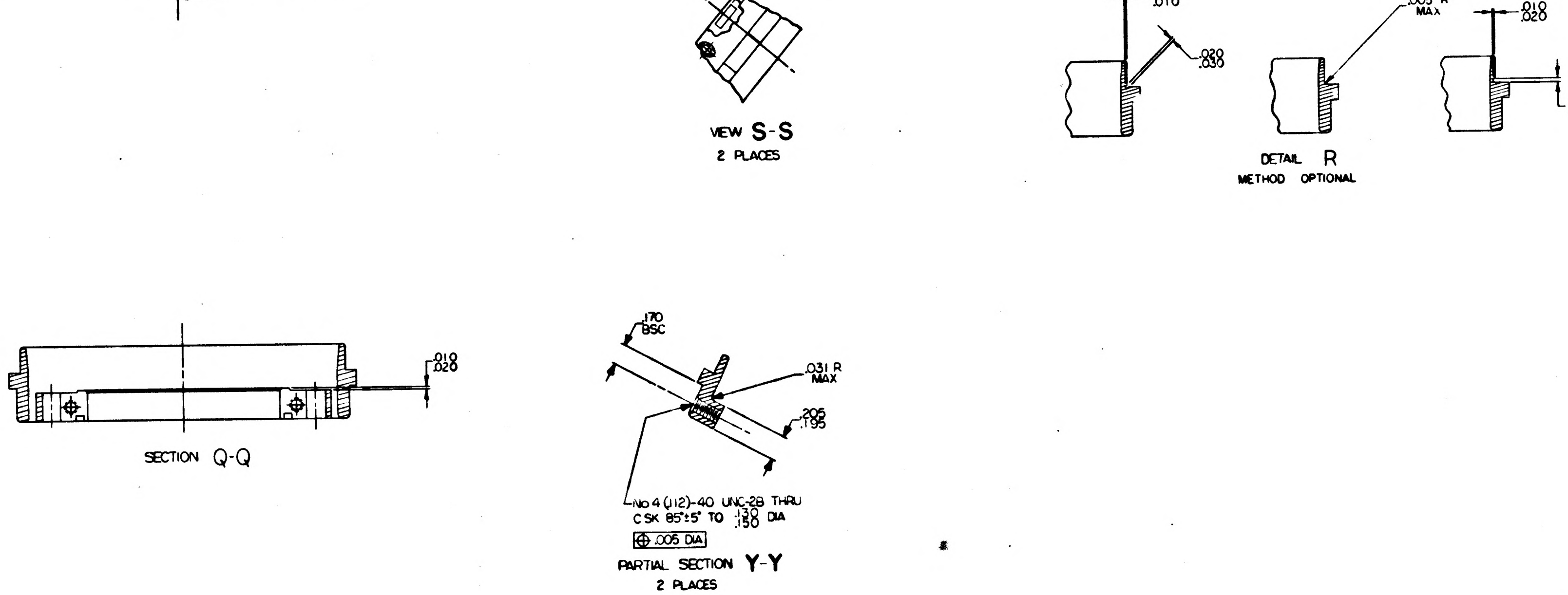
NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

14364

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
	A	REVISED PER TDRR 19246	L.M.		[illegible]	


2 PLACES
.118
.123
R
2 PLACES
SEE DETAIL R
.194
.199 DIA
.126
.130 DIA
No 4(.112)-40 UNC-2B
CSK 85°±5° TO .120 .130 DIA
.010
.020
.010
.020
.030
.040 SEE NOTE 5
SECTION X-X
SCALE: 4/1
2 PLACES
No 4(.112)-40 UNC-2B
.165 MIN FULL THD
CSK 85°±5° TO .130 .150 DIA
⊕ .005 DIA
.205
.195
.031 R MAX
.170 BSC
PARTIAL SECTION T-T
2 PLACES
Z
Z
34°30'
35°30'
62° BSC
2 PLACES
.059
.063 DIA THRU
4 PLACES
AS SHOWN
10° BSC
.250
.255
.0625
.0627
.192
.182
R
.010
.030 × 45°±5°
FARSIDE
.250
.260 2 PLACES
.125
.130 2 PLACES
.161
.151
1.480
1.470 R
36°
38°
2 PLACES
20°
22° 2 PLACES
.125
.130 DIA THRU
4 HOLES
EQUALLY SPACED
ON 3.125 DIA BSC
⊕ B .005 DIA
.140
.160 DIA THRU
2 PLACES
⊕ B .010 DIA
Q
Q
.260
.270 4 PLACES
2.375
2.355 DIA
● B .010 TIR
3.390
3.370 DIA
● B .005 TIR
.932
.942 R
2 PLACES
.245
.255
2 PLACES
.140
.110 R TYP
39°
41°
2 PLACES
S
S
.161
.151 3 PLACES
.140 R
.110
2 PLACES
.322
.302 3 PLACES
21°
23°
2 PLACES
2.320
2.330 DIA
● B .005 TIR
.901
.911
2 PLACES
29°
31°
4 PLACES
1.055
1.065
2 PLACES
37° BSC
2 PLACES
43°
41°
2 PLACES
X
Y
T
● B .005 TIR
● B .005 TIR
.016
.046 R
.275
.265
.590
.580
.035
.045
.105
.095
.125
.120
.005
.025 R
.005 × 44°
.015 × 46°
⊥ A .0003
— B —
● B .005 TIR
.031 R MAX
32°
.051
.061
2.702
2.697 DIA
1.594
1.584 DIA
2.539
2.549 DIA
2.801
2.791 DIA
1.760
1.740 DIA
29°
31°
1.5403
1.5408 DIA
2.490
2.510 DIA
2.6248
2.6241 DIA
32°
4°
6°
.150
.151
.005 × 44°
.015 × 46°
● B .005 TIR
● B .005 TIR
— D —
// A .0005
— A —
● B .0005 TIR
— C —
SEE NOTE 5
● B .005 TIR
SECTION Z-Z
.025
.030
.057
.067
VIEW S-S
2 PLACES
.005
.010
.020
.030
.005 R MAX
.010
.020
.030
.040
DETAIL R
METHOD OPTIONAL

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 125/ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
3. REMOVE ALL BURRS & BREAK SHARP EDGES .005 .015
4. INSIDE CORNERS .010 R MAX UNLESS OTHERWISE SPECIFIED
5. PART TO BE INSPECTED WHEN DIA —C— IS RESTRAINED AROUND A 1.54002 1.53998 DIA MANDREL WITH THE EQUIVALENT OF 75 80 IN. OZ TORQUE AT EACH OF TWO SCREWS, APPLIED IN ALTERNATE PROGRESSIVE INCREMENTS OF 5 IN OZ
6. SURFACE A SHALL BE PERPENDICULAR TO SURFACE —C— WITHIN .0001 WHEN CLAMPED ON MANDREL AS SPECIFIED IN NOTE 5
7. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
8. IDENTIFY USING DRAWING NO REVISION LETTER & MFG'RS. SYMBOL PER ND1002019


.010
.020
SECTION Q-Q
.170 BSC
.031 R MAX
.205
.195
No 4(.112)-40 UNC-2B THRU
CSK 85°±5° TO .130 .150 DIA
⊕ .005 DIA
PARTIAL SECTION Y-Y
2 PLACES

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2021501	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING

MATERIAL
AL ALY 6061 TEMP T6
ALT SPEC: QQ-A-225/8
TEMP T6 OR T651

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	L.Morse	11-10-64
CHECKED	G. Quinn	11/17/64
APPROVED		11/19/64
APPROVED	R.A.	11-?-64
APPROVED MIT	W. Kupfer	18 Nov 64
APPROVED MSC	W.J.	11-18-64
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

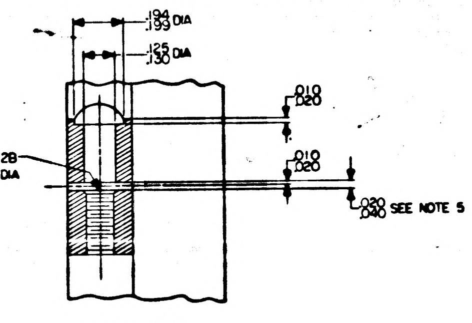
END MOUNT
APOLLO II IRIG

CODE IDENT NO.	SIZE	DRAWING NO.
	E	2021700

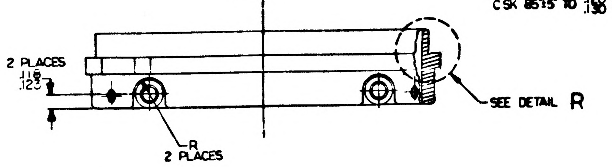
SCALE 2/1 SHEET 1 OF 1

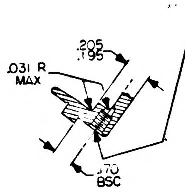
NOTICE: WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS		14364				
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
	A	REVISED PER TDRR 19246	L.M.		5/[illegible]	[illegible]
B	D5	REVISED PER TDRR 2428	P.D.		11-22-65	[illegible]

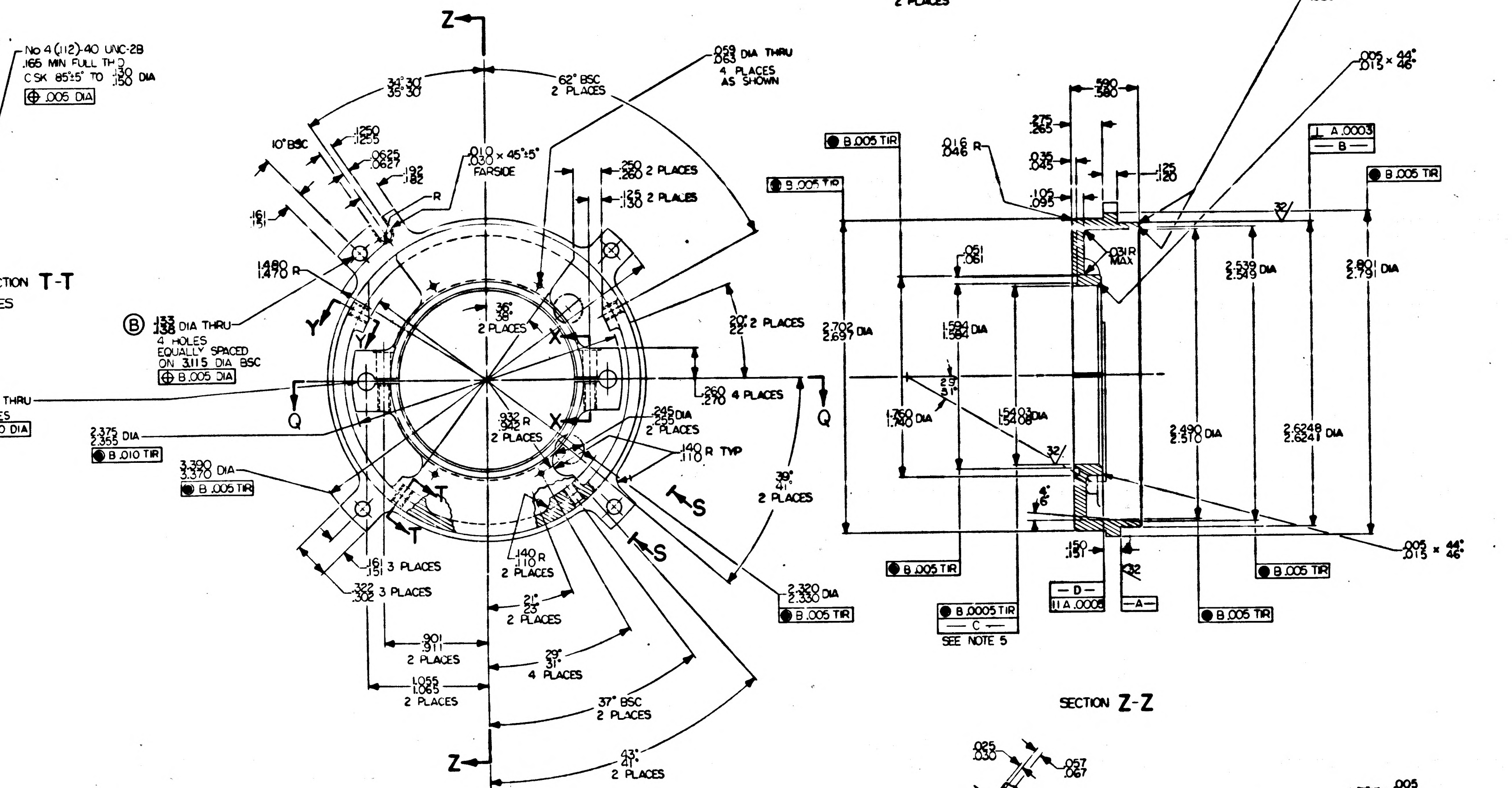

.134 .139 DIA
.120 .130 DIA
.010 .020
.010 .020
No 4 (.112)-40 UNC-2B
CSK 85°±5° TO .130 .150 DIA
.030 .040 SEE NOTE 5

SECTION X-X
SCALE: 4/1
2 PLACES


2 PLACES
.118 .123
R
2 PLACES
SEE DETAIL R


No 4 (.112)-40 UNC-2B
.165 MIN FULL THD
CSK 85°±5° TO .130 .150 DIA
⊕ .005 DIA
.031 R MAX
.205 .195
.170 BSC

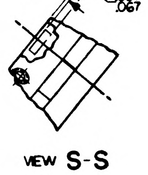
PARTIAL SECTION T-T
2 PLACES


Z
34°30' 35°30'
62° BSC 2 PLACES
.059 .063 DIA THRU
4 PLACES AS SHOWN
10° BSC
.1250 .1255
.0625 .0627
.192 .182
.010 .030 × 45°±5° FARSIDE
R
.161 .151
.250 .260 2 PLACES
.125 .130 2 PLACES
1.480 1.470 R
B .133 .138 DIA THRU
4 HOLES EQUALLY SPACED ON 3.115 DIA BSC
⊕ B .005 DIA
36° 38° 2 PLACES
X
Y
20° 22° 2 PLACES
.140 .160 DIA THRU
2 PLACES
⊕ B .010 DIA
Q
.260 .270 4 PLACES
2.375 2.355 DIA
● B .010 TIR
.932 .942 R 2 PLACES
.245 .255 DIA 2 PLACES
.140 .110 R TYP
3.390 3.370 DIA
● B .005 TIR
T
S
39° 41° 2 PLACES
.161 .151 3 PLACES
.322 .302 3 PLACES
.140 .110 R 2 PLACES
2.320 2.330 DIA
● B .005 TIR
21° 23° 2 PLACES
.901 .911 2 PLACES
29° 31° 4 PLACES
1.055 1.065 2 PLACES
37° BSC 2 PLACES
43° 41° 2 PLACES
.005 .025 R
.005 .015 × 44° 46°
.590 .580
.275 .265
.035 .045
.105 .095
.016 .046 R
.125 .120
● B .005 TIR
⊥ A .0003
— B —
32
.051 .061
.031 R MAX
2.539 2.549 DIA
2.801 2.791 DIA
2.702 2.697 DIA
1.594 1.584 DIA
29° 31°
1.760 1.740 DIA
1.5403 1.5408 DIA
2.490 2.510 DIA
2.6248 2.6241 DIA
4° 6°
.150 .151
32
— D —
// A .0005
— A —
● B .0005 TIR
— C —
SEE NOTE 5
.005 .015 × 44° 46°

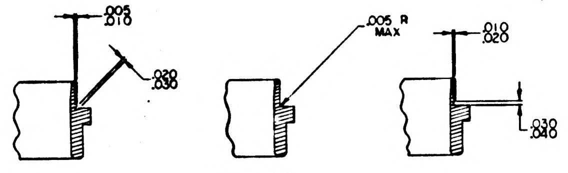
SECTION Z-Z

NOTES

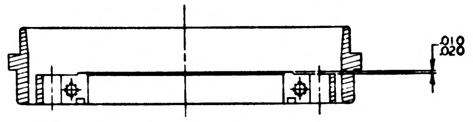
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 125/ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
3. REMOVE ALL BURRS & BREAK SHARP EDGES $^{.005}_{.015}$
4. INSIDE CORNERS .010 R MAX UNLESS OTHERWISE SPECIFIED
5. PART TO BE INSPECTED WHEN DIA $\boxed{-C-}$ IS RESTRAINED AROUND A $^{1.54002}_{1.53998}$ DIA MANDREL WITH THE EQUIVALENT OF $^{75}_{80}$ IN. OZ TORQUE AT EACH OF TWO SCREWS, APPLIED IN ALTERNATE PROGRESSIVE INCREMENTS OF 5 IN OZ
6. SURFACE $\boxed{A}$ SHALL BE PERPENDICULAR TO SURFACE $\boxed{-C-}$ WITHIN .0001 WHEN CLAMPED ON MANDREL AS SPECIFIED IN NOTE 5
7. ANODIC COAT PER MIL-A-8625 TYPE I CLEAR
8. IDENTIFY USING DRAWING NO REVISION LETTER & MFG'RS. SYMBOL PER ND1002019


.025 .030
.057 .067

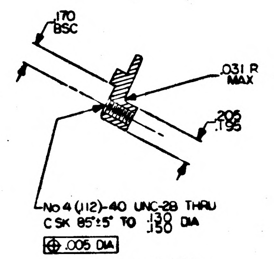
VIEW S-S
2 PLACES


.005 .010
.020 .030
.005 R MAX
.010 .020
.030 .040

DETAIL R
METHOD OPTIONAL



SECTION Q-Q


.170 BSC
.031 R MAX
.205 .195
No 4 (.112)-40 UNC-2B THRU
CSK 85°±5° TO .130 .150 DIA
⊕ .005 DIA

PARTIAL SECTION Y-Y
2 PLACES

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
2021501	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING

MATERIAL
AL ALY 6061 TEMP T6
ALT SPEC: QQ-A-225/8
TEMP T6 OR T651

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	L.Morse	11-10-64
CHECKED	G.Quinn	11/17/64
APPROVED	[illegible]	[illegible]
APPROVED	[illegible]	11-19-64
APPROVED MIT	W Kupfer	18 Nov 64
APPROVED MSC	W.J. [illegible]	[illegible]
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

END MOUNT
APOLLO II IRIG

CODE IDENT NO.	SIZE	DRAWING NO.
	E	2021700

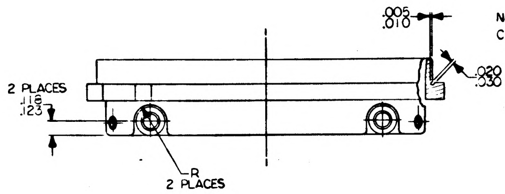
SCALE 2/1 SHEET 1 OF 1

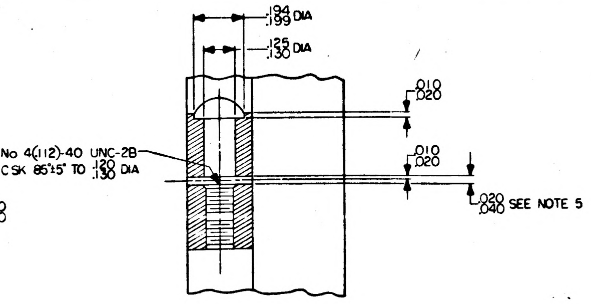
MASTER

Zimmerman

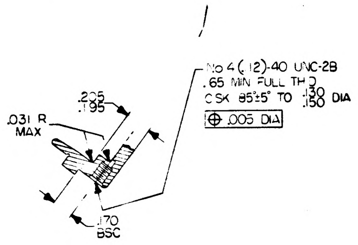
TICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA
USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY
ATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERN-
T THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER;
THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR
ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS
TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER
ENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEY-
ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY
ENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS			,4364			
SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED

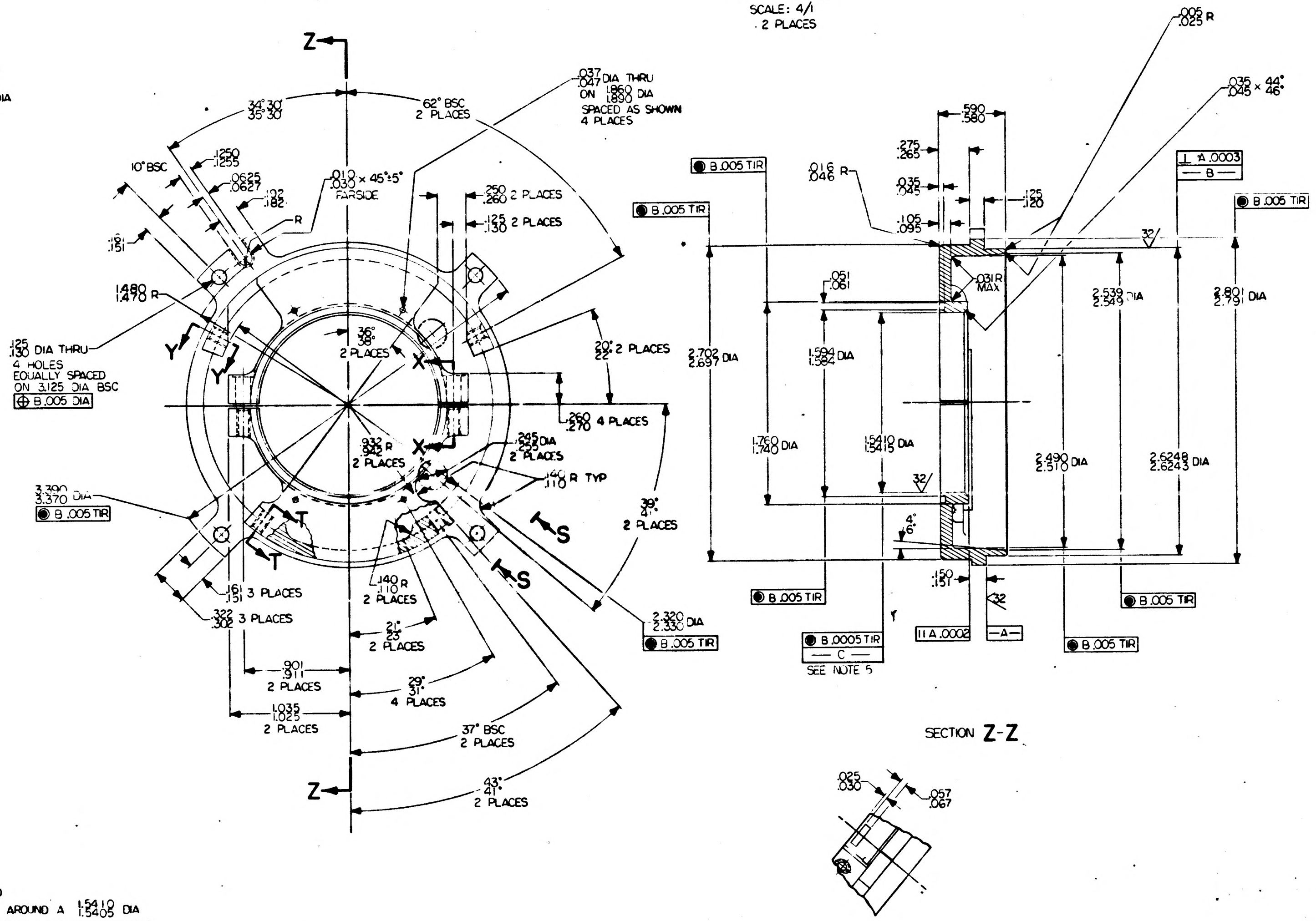

.005
.010
.020
.030
2 PLACES
.118
.123
R
2 PLACES


.194
.199 DIA
.125
.130 DIA
.010
.020
No 4(.112)-40 UNC-2B
CSK 85°±5° TO .120
.130 DIA
.010
.020
.020
.040 SEE NOTE 5

SECTION X-X
SCALE: 4/1
2 PLACES


No 4(.112)-40 UNC-2B
.65 MIN FULL THD
CSK 85°±5° TO .130
.150 DIA
⊕ .005 DIA
.205
.195
.031 R
MAX
.170
BSC

PARTIAL SECTION T-T
2 PLACES


Z
Z
34°30'
35°30'
62° BSC
2 PLACES
.037
.047 DIA THRU
ON 1.860
1.890 DIA
SPACED AS SHOWN
4 PLACES
10° BSC
.1250
.1255
.0625
.0627
.192
.182
.010
.030 × 45°±5°
FARSIDE
R
.161
.151
.250
.260 2 PLACES
.125
.130 2 PLACES
1.480
1.470 R
.125
.130 DIA THRU
4 HOLES
EQUALLY SPACED
ON 3.125 DIA BSC
⊕ B .005 DIA
Y
Y
36°
38°
2 PLACES
X
X
20°
22° 2 PLACES
.260
.270 4 PLACES
.932
.942 R
2 PLACES
.245
.255 DIA
2 PLACES
.140
.110 R TYP
3.390
3.370 DIA
● B .005 TIR
T
T
S
S
39°
41°
2 PLACES
.161
.151 3 PLACES
.322
.302 3 PLACES
.140
.110 R
2 PLACES
21°
23°
2 PLACES
.901
.911
2 PLACES
29°
31°
4 PLACES
1.035
1.025
2 PLACES
37° BSC
2 PLACES
43°
41°
2 PLACES
2.320
2.330 DIA
● B .005 TIR
.005
.025 R
.035
.045 × 44°
46°
.590
.580
.275
.265
.016
.046 R
.035
.045
.105
.095
.125
.120
● B .005 TIR
● B .005 TIR
⊥ A .0003
— B —
● B .005 TIR
32
.051
.061
.031 R
MAX
2.539
2.549 DIA
2.801
2.791 DIA
2.702
2.697 DIA
1.594
1.584 DIA
1.760
1.740 DIA
1.5410
1.5415 DIA
2.490
2.510 DIA
2.6248
2.6243 DIA
32
4°
6°
.150
.151
32
● B .005 TIR
● B .0005 TIR
— C —
SEE NOTE 5
// A .0002
— A —
● B .005 TIR
● B .005 TIR

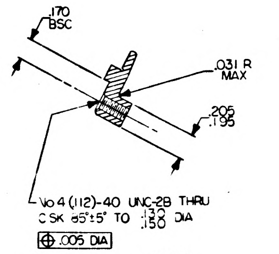
SECTION Z-Z

.025
.030
.057
.067

VIEW S-S
2 PLACES

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 63 FINISH ALL OVER UNLESS OTHERWISE SPECIFIED
3. REMOVE ALL BURRS & BREAK SHARP EDGES $\frac{.005}{.015}$
4. INSIDE CORNERS .010 R MAX UNLESS OTHERWISE SPECIFIED
5. PART TO BE INSPECTED WHEN DIA $\boxed{-C-}$ IS RESTRAINED AROUND A $\frac{1.5410}{1.5405}$ DIA MANDREL WITH THE EQUIVALENT OF $\frac{4.5}{5.5}$ IN. LB. TORQUE AT EACH OF TWO SCREWS
6. ANODIC COAT PER MIL-A-8625, TYPE I, CLEAR
7. IDENTIFY USING DRAWING NO, REVISION LETTER & MANUFACTURERS SYMBOL PER ND1002019


.170
BSC
.031 R
MAX
.205
.195
No 4 (.112)-40 UNC-2B THRU
CSK 85°±5° TO .130
.150 DIA
⊕ .005 DIA

PARTIAL SECTION Y-Y
2 PLACES

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NC

LIST OF MATERIALS

2021501	2021500
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± ~ DECIMALS ± ~ ANGLES ± ~
DO NOT SCALE THIS DRAWING

MATERIAL
AL ALY 6061 TEMP T6
ALT SPEC: QQ-A-225/8
TEMP T6 OR T651

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

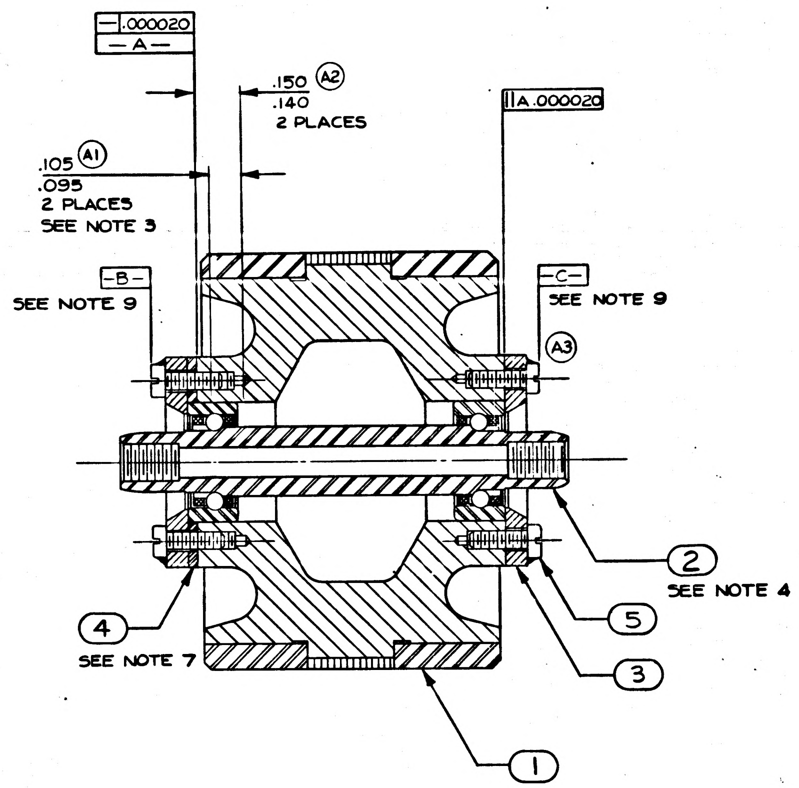
DRAWN	L.Morse	11-10-64
CHECKED	G.QUINN	11/17/64
APPROVED		11/18/64
APPROVED	R A Boot	11-19-64
APPROVED MIT	W Kupfer	18 Nov 64
APPROVED MSC	W J Rhine	11-18-64
		DATE

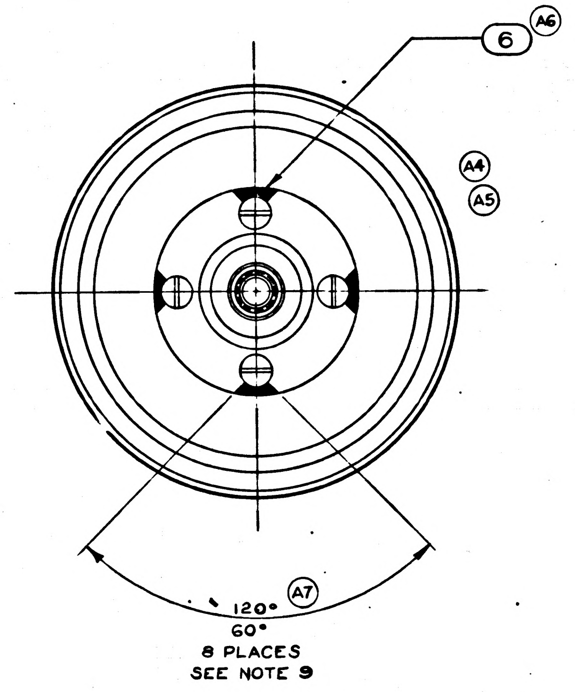
END MOUNT
APOLLO II IRIG

CODE IDENT NO.	SIZE	DRAWING NO.
	E	2021700
SCALE 2/1		SHEET 1 OF 1

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A7	REVISED PER TDRR 14054	SJW	RAB	8 DEC 1964	WK

REVISIONS 13132





NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE PER ATP 2021500, MC25-803
3. THIS PORTION OF BORES SHALL MEET THE FOLLOWING REQUIREMENTS:
   - A. BORE SHALL BE ROUND WITHIN .000010 ON DIA
   - B. BORE TAPER SHALL BE .000010 TIR MAX
   - C. BORE SIZE AT 73° F TO 77°F SHALL BE ITS MATCHED BEARING OUTER RACE OUTSIDE DIA MEASURED AT 73° F TO 77° F -.000003 +.000017
4. ITEM ② TO MEET THE ASSEMBLY FIT REQUIREMENTS OF NOTE 3. SELECT ONE OF ITEM ②
5. VACUUM BAKE ① ONE HOUR AT 145° F TO 155° F AND A VACUUM OF 27 TO 29 INCHES OF HG AFTER FINISH SIZING OF BORE
6. ITEM ② SHALL BE ASSEMBLED TO ① WITH AN AXIAL FORCE OF 3 TO 8 LBS (REF). MARKED FACES OF BEARING OUTER RACES SHALL BE FACING INWARD IN THE ASSEMBLY
7. SELECT ONE OF ITEM ④
8. TORQUE SCREWS TO 11 TO 13 INCH OZ AFTER TESTING PER ATP 2021500, MC25-838 AND PRIOR TO FINAL BALANCING
9. APPLY ⑥ AS SHOWN. SHALL NOT EXTEND BEYOND SURFACES -B- AND -C-
   MIX ITEM ⑥ PER ATP 2021500, MC25-304
   CURE 150° F TO 165° F FOR ONE HOUR MINIMUM
10. BAG AND IDENTIFY PER ND 1002019

MASTER

ITEM NO.	QTY REQ'D	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
6	AR		2021552	ADHESIVE, EPOXY		
5	8		2021671	CAP CLAMPING SCREW		
4	1		2021670	SPACER		
3	2		2021669	BEARING CAP		
2	1		2021579-041	BEARING AND SHAFT ASSEMBLY		
	1		2021579-031	BEARING AND SHAFT ASSEMBLY		
	1		2021579-021	BEARING AND SHAFT ASSEMBLY		
	1		2021579-011	BEARING AND SHAFT ASSEMBLY		
1	1		2021665	INERTIA ELEMENT ASSEMBLY		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021638	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C R Grasso
CHECKED L.W. KEATING
APPROVED
APPROVED
MIT APPROVED DATE 9/20/64
NASA APPROVED DATE W J Rhine 9-29-64

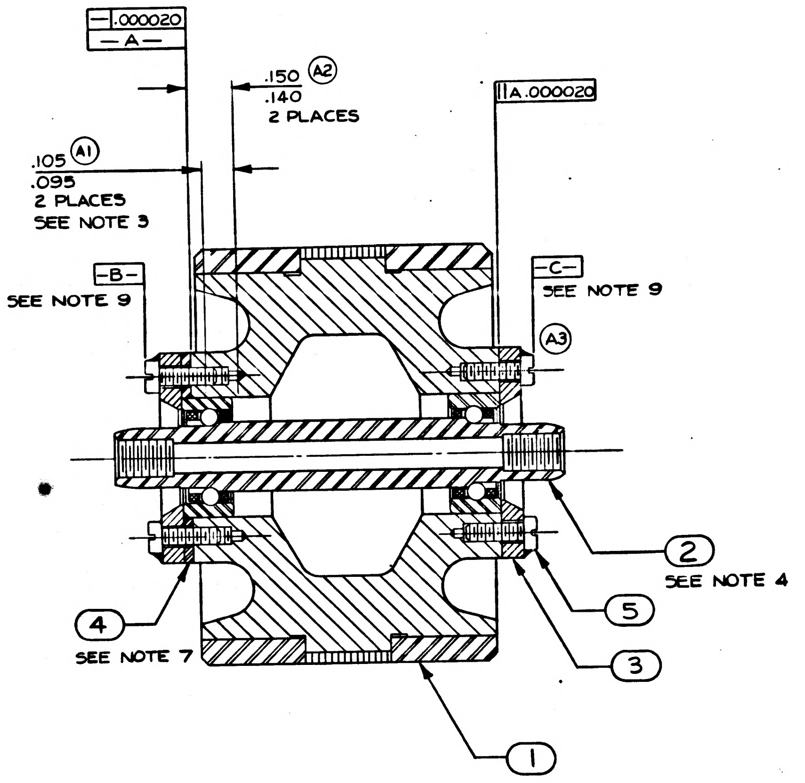
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

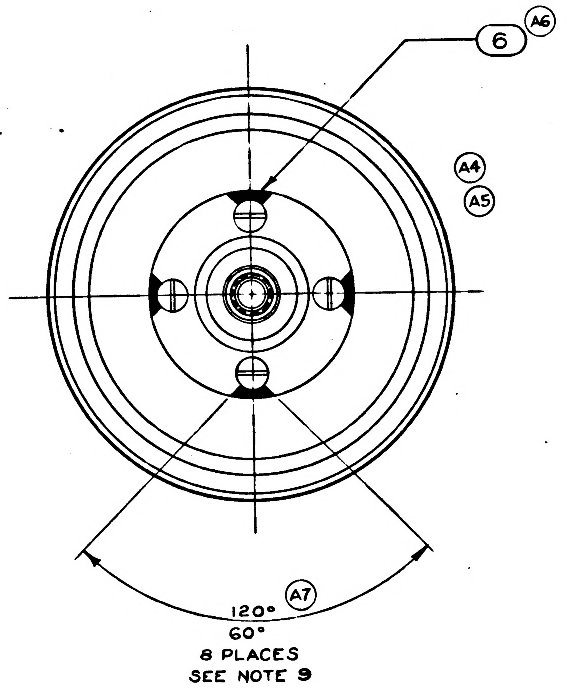
INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

SIZE D
CODE IDENT NO
DRAWING NO. 2021701
SCALE 4/1
SHEET 1 OF 1

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A_7	REVISED PER TDRR 14054	SJW	RAB	8 DEC 1964	WK
	B_2	REVISED PER TDRR 18831	CRG		4·30·65	WK

REVISIONS 13132





NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. (B_1) ASSEMBLE PER ATP 2021500, MC25-869
3. THIS PORTION OF BORES SHALL MEET THE FOLLOWING REQUIREMENTS:
   - A. BORE SHALL BE ROUND WITHIN .000010 ON DIA
   - B. BORE TAPER SHALL BE .000010 TIR MAX
   - C. BORE SIZE AT 73° F TO 77°F SHALL BE ITS MATCHED BEARING OUTER RACE OUTSIDE DIA MEASURED AT 73° F TO 77° F -.000003 +.000017
4. ITEM ② TO MEET THE ASSEMBLY FIT REQUIREMENTS OF NOTE 3. SELECT ONE OF ITEM ②
5. VACUUM BAKE ① ONE HOUR AT 145° F TO 155° F AND A VACUUM OF 27 TO 29 INCHES OF HG AFTER FINISH SIZING OF BORE
6. ITEM ② SHALL BE ASSEMBLED TO ① WITH AN AXIAL FORCE OF 3 TO 8 LBS (REF). MARKED FACES OF BEARING OUTER RACES SHALL BE FACING INWARD IN THE ASSEMBLY
7. SELECT ONE OF ITEM ④
8. (B_2) TORQUE SCREWS TO 11 TO 13 INCH OZ PRIOR TO CEMENTING CAP SCREWS
9. APPLY ⑥ AS SHOWN. SHALL NOT EXTEND BEYOND SURFACES -B- AND -C-
   MIX ITEM ⑥ PER ATP 2021500, MC25-304
   CURE 150° F TO 165° F FOR ONE HOUR MINIMUM
10. BAG AND IDENTIFY PER ND 1002019

ITEM NO.	QTY REQ'D	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
6	AR		2021552	ADHESIVE, EPOXY		
5	8		2021671	CAP CLAMPING SCREW		
4	1		2021670	SPACER		
3	2		2021669	BEARING CAP		
2	1		2021579-041	BEARING AND SHAFT ASSEMBLY		
	1		2021579-031	BEARING AND SHAFT ASSEMBLY		
	1		2021579-021	BEARING AND SHAFT ASSEMBLY		
	1		2021579-011	BEARING AND SHAFT ASSEMBLY		
1	1		2021665	INERTIA ELEMENT ASSEMBLY		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021638	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

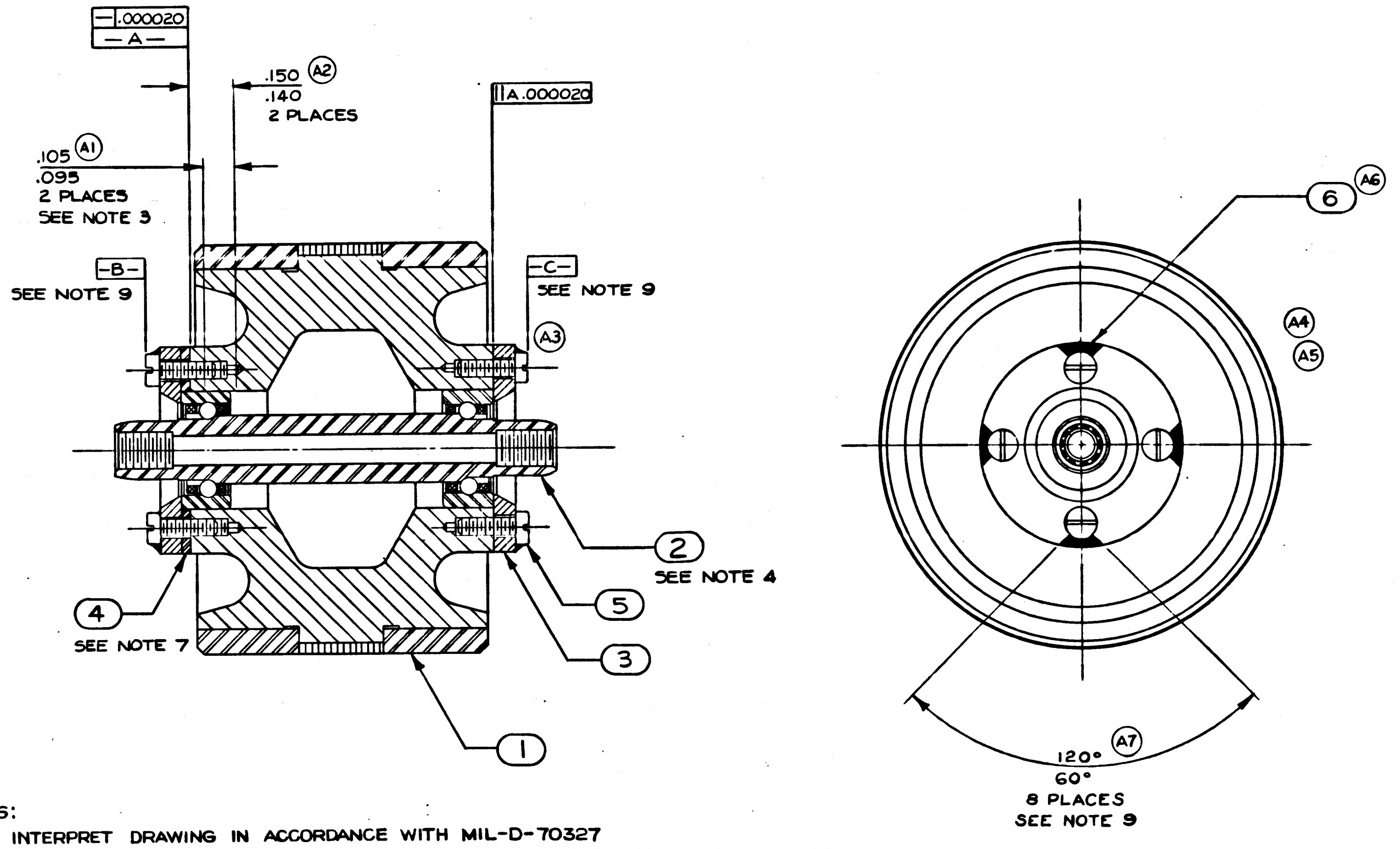
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C R Grasso 9 Sept 64
CHECKED L.W. KEATING 28 Sept 64
APPROVED 29 Sept 64
APPROVED
MIT APPROVED DATE
NASA APPROVED W J Rhine DATE 9-29-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

SIZE D
CODE IDENT NO
DRAWING NO. 2021701
SCALE 4/1
SHEET 1 OF 1

REVISIONS 1313A						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A7	REVISED PER TDRR 14054	SJW	RAB	8 DEC 1964	WK
	B2	REVISED PER TDRR 18831	CRG		4·30·65	WK
	C4	REVISED PER TDRR 20012	P.D.		6-4-65	WK



NOTES:

1. (C1) INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. (B1) ASSEMBLE 2021701-000 PER ATP 2021500, MC 25-803. ASSEMBLE 2021701-011 PER ATP 2021500, MC 25-869. TEST 2021701-000 PER ATP 2021500, MC 25-838
3. THIS PORTION OF BORES SHALL MEET THE FOLLOWING REQUIREMENTS:
   - A. BORE SHALL BE ROUND WITHIN .000010 ON DIA
   - B. BORE TAPER SHALL BE .000010 TIR MAX
   - C. BORE SIZE AT 73° F TO 77°F SHALL BE ITS MATCHED BEARING OUTER RACE OUTSIDE DIA MEASURED AT 73° F TO 77° F -.000003 +.000017
4. ITEM ② TO MEET THE ASSEMBLY FIT REQUIREMENTS OF NOTE 3. SELECT ONE OF ITEM ②
5. VACUUM BAKE ① ONE HOUR AT 145° F TO 155° F AND A VACUUM OF 27 TO 29 INCHES OF HG AFTER FINISH SIZING OF BORE
6. ITEM ② SHALL BE ASSEMBLED TO ① WITH AN AXIAL FORCE OF 3 TO 8 LBS (REF). MARKED FACES OF BEARING OUTER RACES SHALL BE FACING INWARD IN THE ASSEMBLY
7. SELECT ONE OF ITEM ④
8. (B2) TORQUE SCREWS TO 11 TO 13 INCH OZ PRIOR TO CEMENTING CAP SCREWS
9. APPLY ⑥ AS SHOWN. SHALL NOT EXTEND BEYOND SURFACES -B- AND -C- MIX ITEM ⑥ PER ATP 2021500, MC25-304 CURE 150° F TO 165° F FOR ONE HOUR MINIMUM
10. BAG AND IDENTIFY PER ND 1002019

(C4) THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A-000 SUFFIX.

(C3)

QTY REQD	ITEM NO.	QTY REQ'D	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
AR	6	AR		2021552	ADHESIVE, EPOXY		
8	5	8		2021671	CAP CLAMPING SCREW		
1	4	1		2021670	SPACER		
2	3	2		2021669	BEARING CAP		
1	2	1		2021579-041	BEARING AND SHAFT ASSEMBLY		
1		1		2021579-031	BEARING AND SHAFT ASSEMBLY		
1		1		2021579-021	BEARING AND SHAFT ASSEMBLY		
1		1		2021579-011	BEARING AND SHAFT ASSEMBLY		
1	1	1		2021665	INERTIA ELEMENT ASSEMBLY		
011		000	LIST OF MATERIALS				

MASTER

(C2)

NEXT ASSY	USED ON
2021619	2021500
2021638	2021500
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1.000.000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C R Grasso 8 Sept 64
CHECKED L.W. KEATING 28 Sept 64
APPROVED 29 Sept 64
APPROVED J. H. [illegible] Jr
MIT APPROVED DATE
L Wal[illegible] 9/29/64
NASA APPROVED DATE
W J Rhine 9-29-64

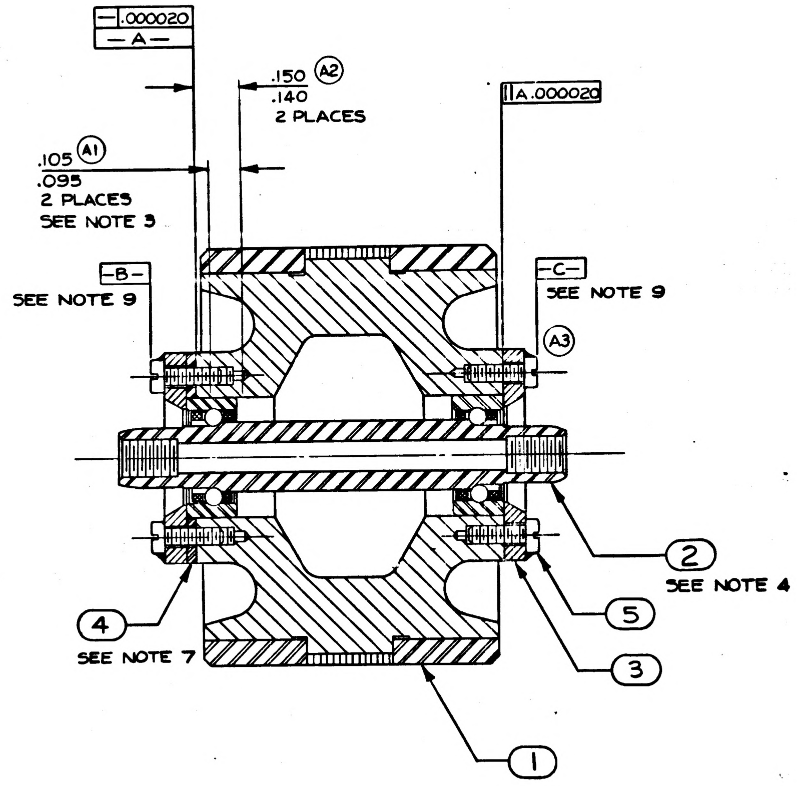
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

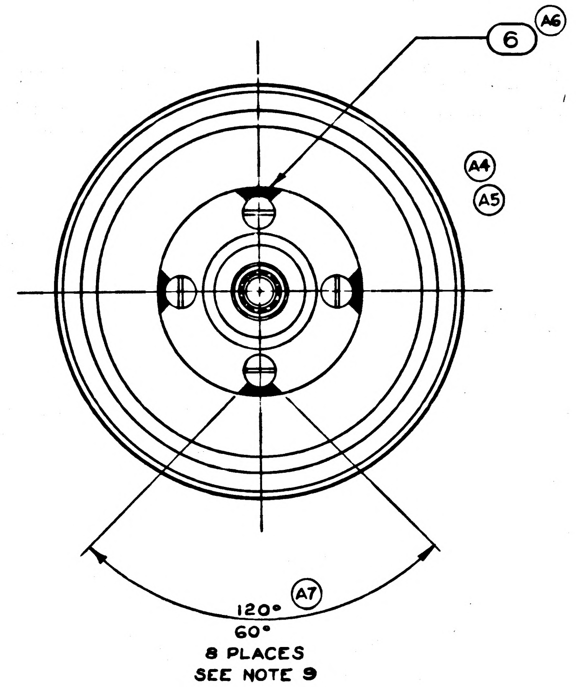
INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

SIZE D
CODE IDENT NO
DRAWING NO. 2021701
SCALE 4/1
SHEET 1 OF 1

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A_7	REVISED PER TDRR 14054	SJW	RAB	8 DEC 1964	WK
	B_2	REVISED PER TDRR 18831	CRG		4-30-65	WK
	C_4	REVISED PER TDRR 20012	P.D.		6-4-65	WK
	D	REVISED PER TDRR 32076	R.WM		11-3-66	

REVISIONS 13132





NOTES:

(C1) 1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327

(E1) 2. ASSEMBLE 2021701-000 PER ATP 2021500, MC 25-803. ASSEMBLE 2021701-011 PER ATP 2021500, MC 25-869. TEST 2021701-000 PER ATP 2021500, MC 25-838

3. THIS PORTION OF BORES SHALL MEET THE FOLLOWING REQUIREMENTS:
   - A. BORE SHALL BE ROUND WITHIN .000010 ON DIA
   - B. BORE TAPER SHALL BE .000010 TIR MAX
   - C. BORE SIZE AT 73° F TO 77°F SHALL BE ITS MATCHED BEARING OUTER RACE OUTSIDE DIA MEASURED AT 73° F TO 77°F -.000003 +.000017

4. ITEM ② TO MEET THE ASSEMBLY FIT REQUIREMENTS OF NOTE 3. SELECT ONE OF ITEM ②

5. VACUUM BAKE ① ONE HOUR AT 145° F TO 155° F AND A VACUUM OF 27 TO 29 INCHES OF HG AFTER FINISH SIZING OF BORE

6. ITEM ② SHALL BE ASSEMBLED TO ① WITH AN AXIAL FORCE OF 3 TO 8 LBS (REF). MARKED FACES OF BEARING OUTER RACES SHALL BE FACING INWARD IN THE ASSEMBLY

7. SELECT ONE OF ITEM ④

(B2) 8. TORQUE SCREWS TO 11 TO 13 INCH OZ PRIOR TO CEMENTING CAP SCREWS

9. APPLY ⑥ AS SHOWN. SHALL NOT EXTEND BEYOND SURFACES -B- AND -C- MIX ITEM ⑥ PER ATP 2021500, MC 25-304 CURE 150° F TO 165° F FOR ONE HOUR MINIMUM

10. BAG AND IDENTIFY PER ND 1002019

(C4) THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A-000 SUFFIX.

(C3) (D1)

QTY REQD	ITEM NO.	QTY REQ'D	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
AR	6	AR		2021552	ADHESIVE, EPOXY		
8	5	8		2021671	CAP CLAMPING SCREW		
1	4	1		2021670	SPACER		
2	3	2		2021669	BEARING CAP		
1	2	1		2021579-081	BEARING AND SHAFT ASSEMBLY		
1		1		2021579-071	BEARING AND SHAFT ASSEMBLY		
1		1		2021579-061	BEARING AND SHAFT ASSEMBLY		
1		1		2021579-051	BEARING AND SHAFT ASSEMBLY		
1		1		2021579-041	BEARING AND SHAFT ASSEMBLY		
1		1		2021579-031	BEARING AND SHAFT ASSEMBLY		
1		1		2021579-021	BEARING AND SHAFT ASSEMBLY		
1		1		2021579-011	BEARING AND SHAFT ASSEMBLY		
1	1	1		2021665	INERTIA ELEMENT ASSEMBLY		
011		000	LIST OF MATERIALS				

A15112

(C2)

NEXT ASSY	USED ON
2021619	2021500
2021638	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C.R.Grasso
CHECKED L.W. KEATING
APPROVED
APPROVED
MIT APPROVED DATE
NASA APPROVED DATE W J Rhine 9-24-64

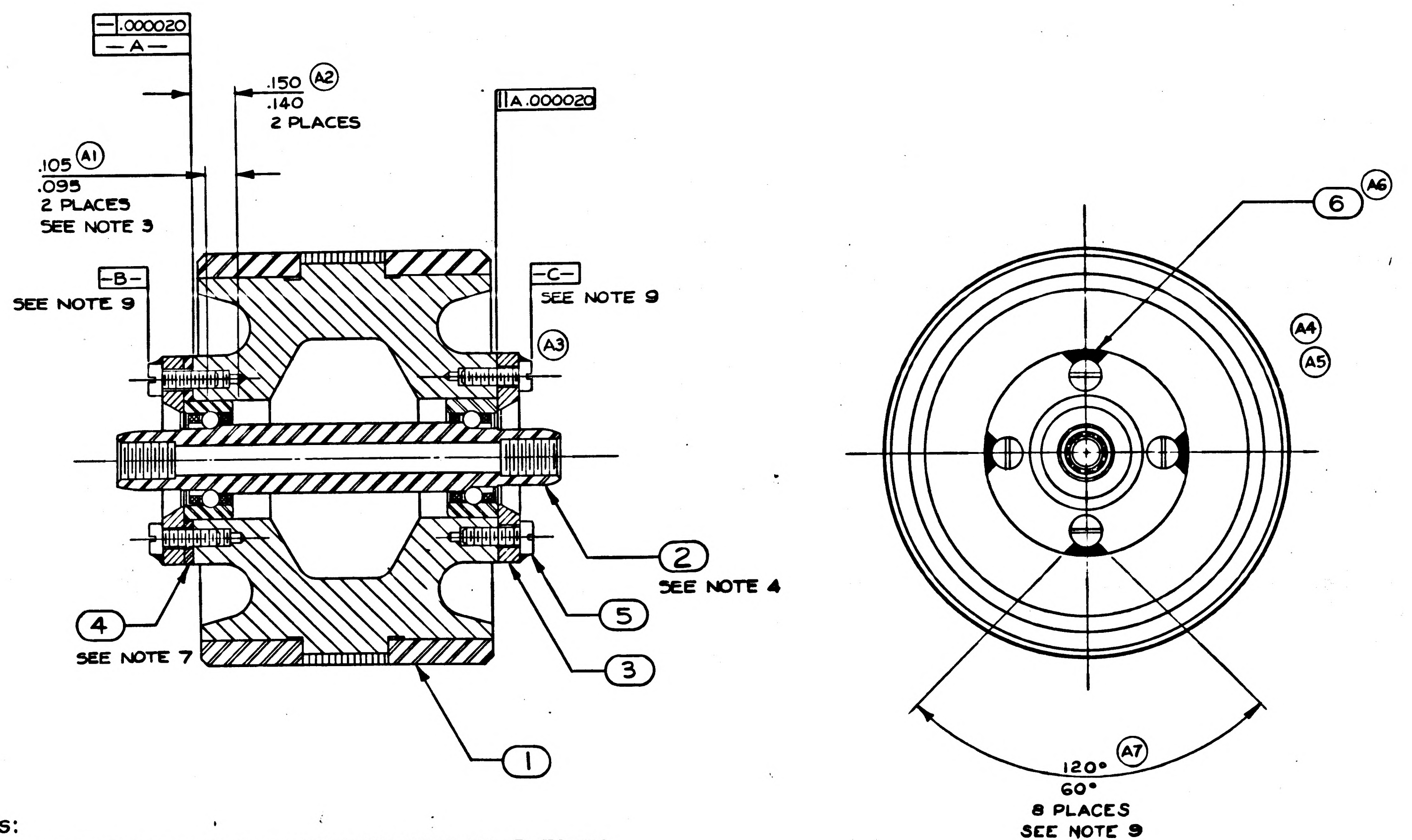
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

SIZE D
CODE IDENT NO
DRAWING NO. 2021701
SCALE 4/1
SHEET 1 OF 1

MASTER

REVISIONS 13132						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A7	REVISED PER TDRR 14054	SJW	RAB	8 DEC 1964	WK
	B2	REVISED PER TDRR 18831	CRG		4-30-65	WK
	C4	REVISED PER TDRR 20012	P.D.		6-4-65	WK
	D	REVISED PER TDRR 32076	R.WM		11-3-66	



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. (C1) (B1) ASSEMBLE 2021701-000 PER ATP 2021500, MC 25-803. ASSEMBLE 2021701-011 PER ATP 2021500, MC 25-869. TEST 2021701-000 PER ATP 2021500, MC 25-838
3. THIS PORTION OF BORES SHALL MEET THE FOLLOWING REQUIREMENTS:
   A. BORE SHALL BE ROUND WITHIN .000010 ON DIA
   B. BORE TAPER SHALL BE .000010 TIR MAX
   C. BORE SIZE AT 73° F TO 77°F SHALL BE ITS MATCHED BEARING OUTER RACE OUTSIDE DIA MEASURED AT 73° F TO 77° F -.000003 +.000017
4. ITEM (2) TO MEET THE ASSEMBLY FIT REQUIREMENTS OF NOTE 3. SELECT ONE OF ITEM (2)
5. VACUUM BAKE (1) ONE HOUR AT 145° F TO 155° F AND A VACUUM OF 27 TO 29 INCHES OF HG AFTER FINISH SIZING OF BORE
6. ITEM (2) SHALL BE ASSEMBLED TO (1) WITH AN AXIAL FORCE OF 3 TO 8 LBS (REF). MARKED FACES OF BEARING OUTER RACES SHALL BE FACING INWARD IN THE ASSEMBLY
7. SELECT ONE OF ITEM (4)
8. (B2) TORQUE SCREWS TO 11 TO 13 INCH OZ PRIOR TO CEMENTING CAP SCREWS
9. APPLY (6) AS SHOWN. SHALL NOT EXTEND BEYOND SURFACES -B- AND -C-
   MIX ITEM (6) PER ATP 2021500, MC 25-304
   CURE 150° F TO 165° F FOR ONE HOUR MINIMUM
10. BAG AND IDENTIFY PER ND 1002019

(C4) THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A-000 SUFFIX.

(C3) (D1)

QTY REQD	ITEM NO.	QTY REQ'D	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
AR	6	AR		2021552	ADHESIVE, EPOXY		
8	5	8		2021671	CAP CLAMPING SCREW		
1	4	1		2021670	SPACER		
2	3	2		2021669	BEARING CAP		
1	2	1		2021579-081	BEARING AND SHAFT ASSEMBLY		
1		1		2021579-071	BEARING AND SHAFT ASSEMBLY		
1		1		2021579-061	BEARING AND SHAFT ASSEMBLY		
1		1		2021579-051	BEARING AND SHAFT ASSEMBLY		
1		1		2021579-041	BEARING AND SHAFT ASSEMBLY		
1		1		2021579-031	BEARING AND SHAFT ASSEMBLY		
1		1		2021579-021	BEARING AND SHAFT ASSEMBLY		
1		1		2021579-011	BEARING AND SHAFT ASSEMBLY		
1	1	1		2021665	INERTIA ELEMENT ASSEMBLY		
011		000		LIST OF MATERIALS			

A 1511

MASTER

APPLICATION	
NEXT ASSY	USED ON
(C2) 2021619	2021500
2021638	2021500

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C.R. Grasso
CHECKED L.W. KEATING
APPROVED
APPROVED J. H. [illegible] Jr.
MIT APPROVED DATE
NASA APPROVED DATE
W J [illegible] 6-29-64

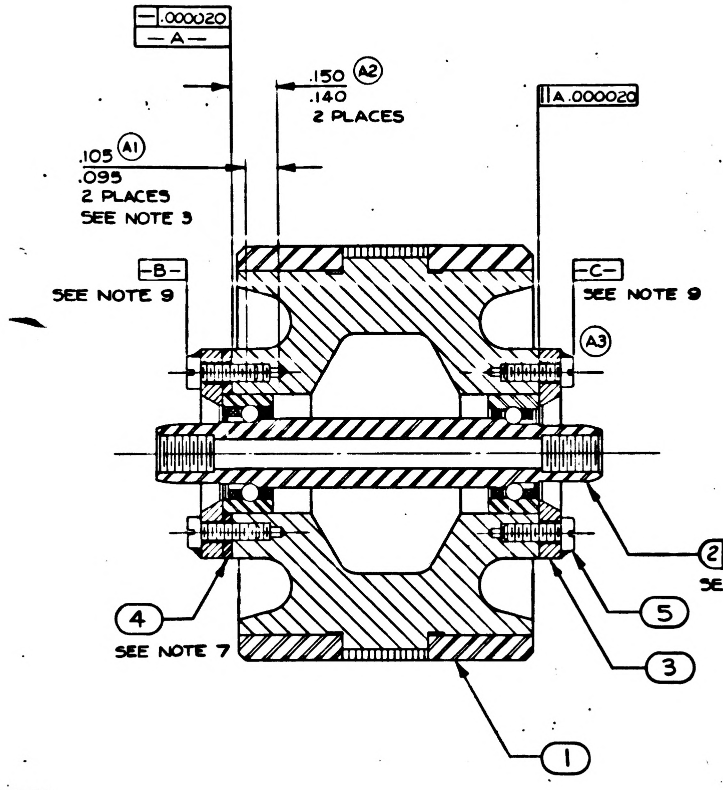
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

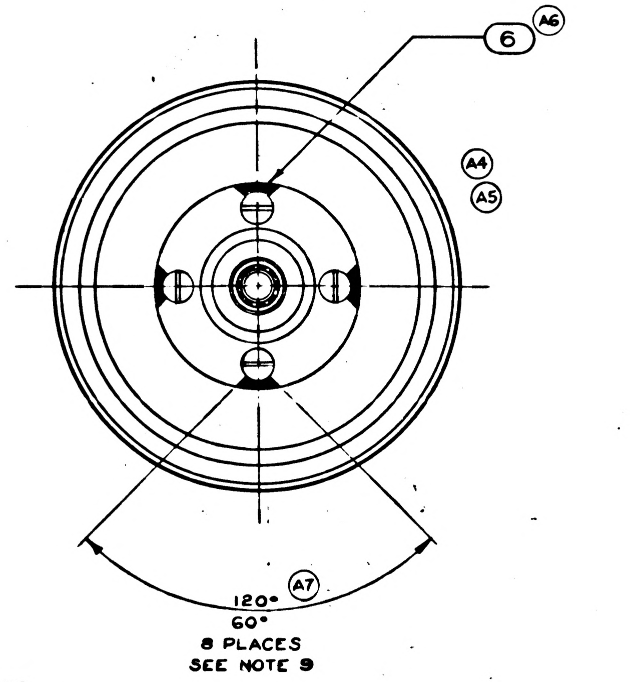
INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

SIZE D
CODE IDENT NO
DRAWING NO. 2021701
SCALE 4/1
SHEET 1 OF 1

ZONE	SYM	DESCRIPTION	BR	CHK	DATE	APPROVED
	A7	REVISED PER TDRR 14054	SJW	RAB	8 DEC 1964	WK
	B2	REVISED PER TDRR 18831	CRG		4 30 65	WK
	C4	REVISED PER TDRR 20012	P.D.		6-4-65	WK
	D	REVISED PER TDRR 32076	RWM		11-3-66	
	E	REVISED PER TDRR 35605	JJ	BHR	20 FEB 68	
	F	REVISED PER TDRR 35618	WRK		MAR 68	

REVISIONS 13132





NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ASSEMBLE *2021701-021 & -031* PER ATP 2021500, MC25-803. ASSEMBLE 2021701-011 PER ATP 2021500, MC25-869. TEST 2021701-000 PER ATP 2021500, MC25-838. ASSEMBLE 2021701-021 PER ATP 2021500, MC25-880 AND TEST PER ATP 2021500, MC25-881.
3. THIS PORTION OF BORES SHALL MEET THE FOLLOWING REQUIREMENTS:
   - A. BORE SHALL BE ROUND WITHIN .000010 ON DIA
   - B. BORE TAPER SHALL BE .000010 TIR MAX
   - C. BORE SIZE AT 73° F TO 77°F SHALL BE ITS MATCHED BEARING OUTER RACE OUTSIDE DIA MEASURED AT 73° F TO 77° F -.000003 +.000017
4. ITEMS ②⑦⑧ TO MEET THE ASSEMBLY FIT REQUIREMENTS OF NOTE 3. SELECT ONE OF ITEM ② FOR -000 OR -011 CONFIGURATION. SELECT ONE OF ⑦ FOR -021 CONFIGURATION. *SELECT ONE OF ⑧ FOR -031 CONFIGURATION.*
5. *VACUUM BAKE ① ONE HOUR AT 145°F TO 155°F AND A VACUUM OF 27 TO 29 INCHES OF HG AFTER FINISH SIZING.*
6. ITEM ②⑦ OR ⑧ SHALL BE ASSEMBLED TO ① WITH AN AXIAL FORCE OF 3 TO 8 LBS (REF). MARKED FACES OF BEARING OUTER RACES SHALL BE FACING INWARD IN THE ASSEMBLY
7. SELECT ONE OF ITEM ④
8. (B2) TORQUE SCREWS TO 11 TO 13 INCH OZ PRIOR TO CEMENTING CAP SCREWS
9. APPLY ⑥ AS SHOWN. SHALL NOT EXTEND BEYOND SURFACES -B- AND -C-
   MIX ITEM ⑥ PER ATP 2021500, MC25-304
   CURE 150° F TO 165° F FOR ONE HOUR MINIMUM
10. BAG AND IDENTIFY PER ND 1002019

(C4) *THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX*

QTY REQD 031	QTY REQD 021	QTY REQD 011	ITEM NO	QTY REQ'D 000	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
1	–	–	8	–		2021431-081	BEARING AND SHAFT ASSEMBLY		
1	–	–		–		-071			
1	–	–		–		-061			
1	–	–		–		-051			
1	–	–		–		-041			
1	–	–		–		-031			
1	–	–		–		-021			
1	–	–		–		2021431-011	BEARING AND SHAFT ASSEMBLY		
–	1	–	7	–		2021811-081	BEARING AND SHAFT ASSEMBLY		
–	1	–		–		2021811-071			
–	1	–		–		2021811-061			
–	1	–		–		2021811-051			
–	1	–		–		2021811-041			
–	1	–		–		2021811-031			
–	1	–		–		2021811-021			
–	1	–		–		2021811-011	BEARING AND SHAFT ASSEMBLY		
AR	AR	AR	6	AR		2021552	ADHESIVE, EPOXY		
8	8	8	5	8		2021671	CAP CLAMPING SCREW		
1	1	1	4	1		2021670	SPACER		
2	2	2	3	2		2021669	BEARING CAP		
–	–	1	2	1		2021579-081	BEARING AND SHAFT ASSEMBLY		
–	–	1		1		2021579-071	BEARING AND SHAFT ASSEMBLY		
–	–	1		1		2021579-061	BEARING AND SHAFT ASSEMBLY		
–	–	1		1		2021579-051	BEARING AND SHAFT ASSEMBLY		
–	–	1		1		2021579-041	BEARING AND SHAFT ASSEMBLY		
–	–	1		1		2021579-031	BEARING AND SHAFT ASSEMBLY		
–	–	1		1		2021579-021	BEARING AND SHAFT ASSEMBLY		
–	–	1		1		2021579-011	BEARING AND SHAFT ASSEMBLY		
1	1	1	1	1		2021665	INERTIA ELEMENT ASSEMBLY		

(C3) (D1)

LIST OF MATERIALS

NEXT ASSY	USED ON
2021619	2021500
2021638	2021500

(C2)

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

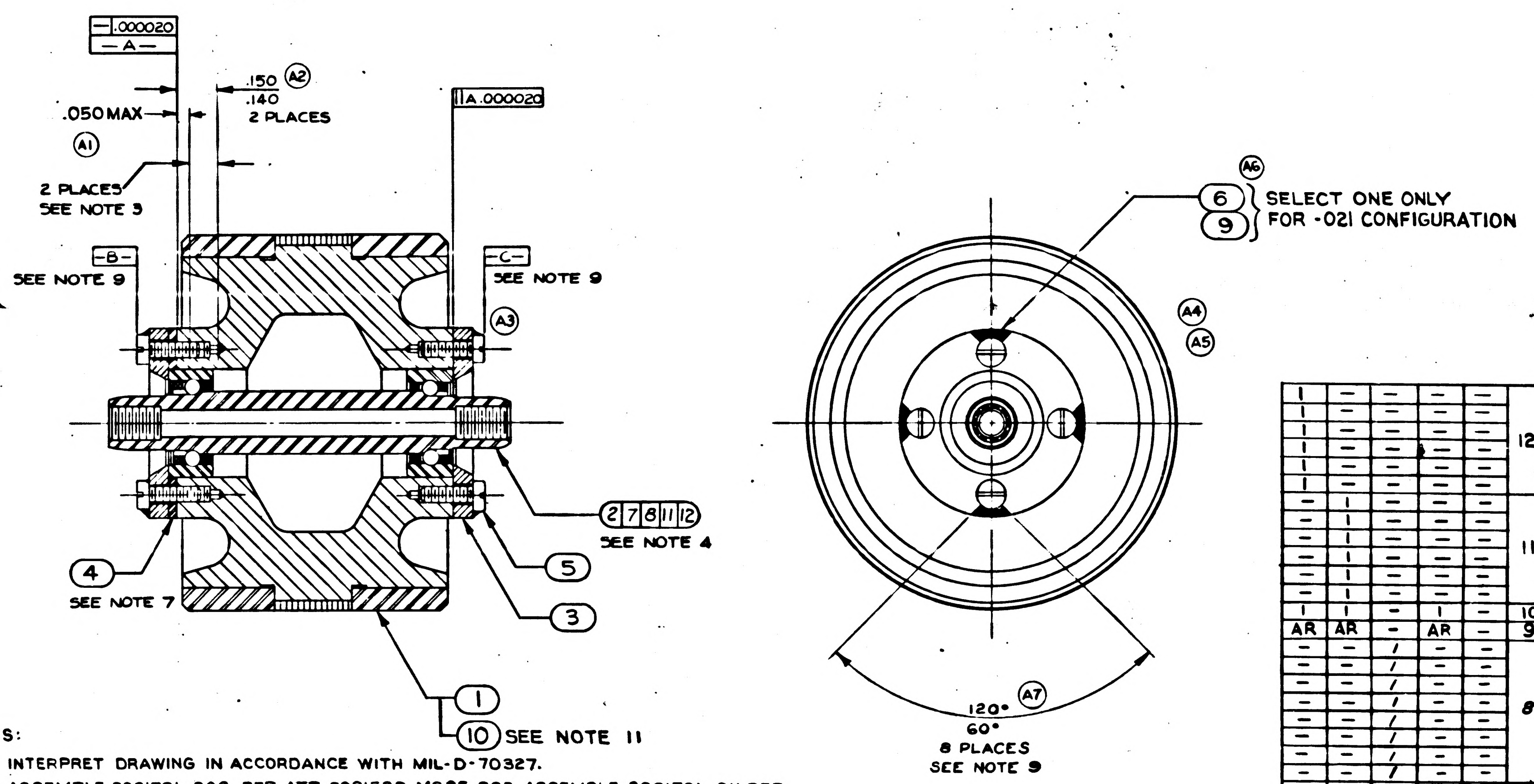
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C R Grasso
CHECKED L.K. KEATING
APPROVED
APPROVED J. H. [illegible] Jr
MIT APPROVED L Nafel DATE 8/24/64
NASA APPROVED W J Rhine DATE 9-29-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

SIZE D
CODE IDENT NO 80230
DRAWING NO. 2021701
SCALE 4/1
SHEET 1 OF 1

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
REVISIONS 13132						
	A_7	REVISED PER TDRR 14054	SJW	RAR	8 DEC 1964	WK
	B_2	REVISED PER TDRR 18831	CRG		4 30 65	WK
	C_4	REVISED PER TDRR 20012	P.D.		6-4-65	WK
	D	REVISED PER TDRR 32076	RWM		11-3-66	
	E	REVISED PER TDRR 35605	JJ	RAR	25 FEB 68	
	F	REVISED PER TDRR 35612	JRK		1 MAR 68	
	G	REVISED PER TDRR 36615	JJ	CP	22 AUG 68	
	H	REVISED PER TDRR 36616	JJ	RWH	26 AUG 68	



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ASSEMBLE 2021701-000 PER ATP 2021500, MC25-803. ASSEMBLE 2021701-011 PER ATP 2021500, MC 25-869. TEST 2021701-000 PER ATP 2021500, MC 25-838. ASSEMBLE 2021701-021 & 031 PER ATP 2021500, MC 25-880 AND TEST PER ATP 2021500, MC 25-881.
3. THIS PORTION OF BORES SHALL MEET THE FOLLOWING REQUIREMENTS:
   - A. BORE SHALL BE ROUND WITHIN .000010 ON DIA
   - B. BORE TAPER SHALL BE .000010 TIR MAX
   - C. BORE SIZE AT 73° F TO 77°F SHALL BE ITS MATCHED BEARING OUTER RACE OUTSIDE DIA MEASURED AT 73° F TO 77° F -.000003 +.000017
4. ITEMS ②⑦⑧ TO MEET THE ASSEMBLY FIT REQUIREMENTS OF NOTE 3. SELECT ONE OF ITEM ② FOR -000 OR -011 CONFIGURATION. SELECT ONE OF ⑦ FOR -021 CONFIGURATION. *SELECT ONE OF ⑧ FOR -031 CONFIGURATION.*
5. *VACUUM BAKE ① ONE HOUR AT 145°F TO 155°F AND A VACUUM OF 27 TO 29 INCHES OF HG. AFTER FINISH SIZING.*
6. ITEM ② SHALL BE ASSEMBLED TO ① WITH AN AXIAL FORCE OF 3 TO 8 LBS (REF). MARKED FACES OF BEARING OUTER RACES SHALL BE FACING INWARD IN THE ASSEMBLY. ITEM ⑦ OR ⑧ SHALL BE ASSEMBLE TO ① WITH AN AXIAL FORCE OF 2 TO 5 LBS. (REF)
7. SELECT ONE OF ITEM ④
8. TORQUE SCREWS TO 11 TO 13 INCH OZ PRIOR TO CEMENTING CAP SCREWS
9. APPLY ⑥ AS SHOWN. SHALL NOT EXTEND BEYOND SURFACES -B- AND -C-
   MIX ITEM ⑥ PER ATP 2021500, MC 25-304
   CURE 150° F TO 165° F FOR ONE HOUR MINIMUM
10. BAG AND IDENTIFY PER ND 1002019
11. SELECT ONE OF ITEMS ① OR ⑩ FOR 2021701-021 CONFIGURATION ONLY.

C_1 THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

QTY REQD 051	QTY REQD 041	QTY REQD 031	QTY REQD 021	QTY REQD 011	ITEM NO.	QTY REQ'D 000	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
1	—	—	—	—	12	—		2021824-061	BEARING AND SHAFT ASSEMBLY		
1	—	—	—	—		—		-051			
1	—	—	—	—		—		-041			
1	—	—	—	—		—		-031			
1	—	—	—	—		—		-021			
1	—	—	—	—		—		2021824-011	BEARING AND SHAFT ASSEMBLY		
—	1	—	—	—	11	—		2021823-061	BEARING AND SHAFT ASSEMBLY		
—	1	—	—	—		—		-051			
—	1	—	—	—		—		-041			
—	1	—	—	—		—		-031			
—	1	—	—	—		—		-021			
—	1	—	—	—		—		2021823-011	BEARING AND SHAFT ASSEMBLY		
1	1	—	1	—	10	—		2021665-021	INERTIA ELEMENT ASSEMBLY		
AR	AR	—	AR	—	9	—		COML	SEALING COMPOUND, RETAINING, GRADE A		MIL-S-22473
—	—	1	—	—	8	—		2021431-081	BEARING AND SHAFT ASSEMBLY		
—	—	1	—	—		—		-071			
—	—	1	—	—		—		-061			
—	—	1	—	—		—		-051			
—	—	1	—	—		—		-041			
—	—	1	—	—		—		-031			
—	—	1	—	—		—		-021			
—	—	1	—	—		—		2021431-011	BEARING AND SHAFT ASSEMBLY		
—	—	—	1	—	7	—		2021811-081	BEARING AND SHAFT ASSEMBLY		
—	—	—	1	—		—		2021811-071			
—	—	—	1	—		—		2021811-061			
—	—	—	1	—		—		2021811-051			
—	—	—	1	—		—		2021811-041			
—	—	—	1	—		—		2021811-031			
—	—	—	1	—		—		2021811-021			
—	—	—	1	—		—		2021811-011	BEARING AND SHAFT ASSEMBLY		
AR	AR	AR	AR	AR	6	AR		2021552	ADHESIVE, EPOXY		
8	8	8	8	8	5	8		2021671	CAP CLAMPING SCREW		
1	1	1	1	1	4	1		2021670	SPACER		
2	2	2	2	2	3	2		2021669	BEARING CAP		
—	—	—	—	1	2	1		2021579-081	BEARING AND SHAFT ASSEMBLY		
—	—	—	—	1		1		2021579-071	BEARING AND SHAFT ASSEMBLY		
—	—	—	—	1		1		2021579-061	BEARING AND SHAFT ASSEMBLY		
—	—	—	—	1		1		2021579-051	BEARING AND SHAFT ASSEMBLY		
—	—	—	—	1		1		2021579-041	BEARING AND SHAFT ASSEMBLY		
—	—	—	—	1		1		2021579-031	BEARING AND SHAFT ASSEMBLY		
—	—	—	—	1		1		2021579-021	BEARING AND SHAFT ASSEMBLY		
—	—	—	—	1		1		2021579-011	BEARING AND SHAFT ASSEMBLY		
—	—	1	1	1	1	1		2021665-011	INERTIA ELEMENT ASSEMBLY		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021619	2021500
2021638	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1.000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

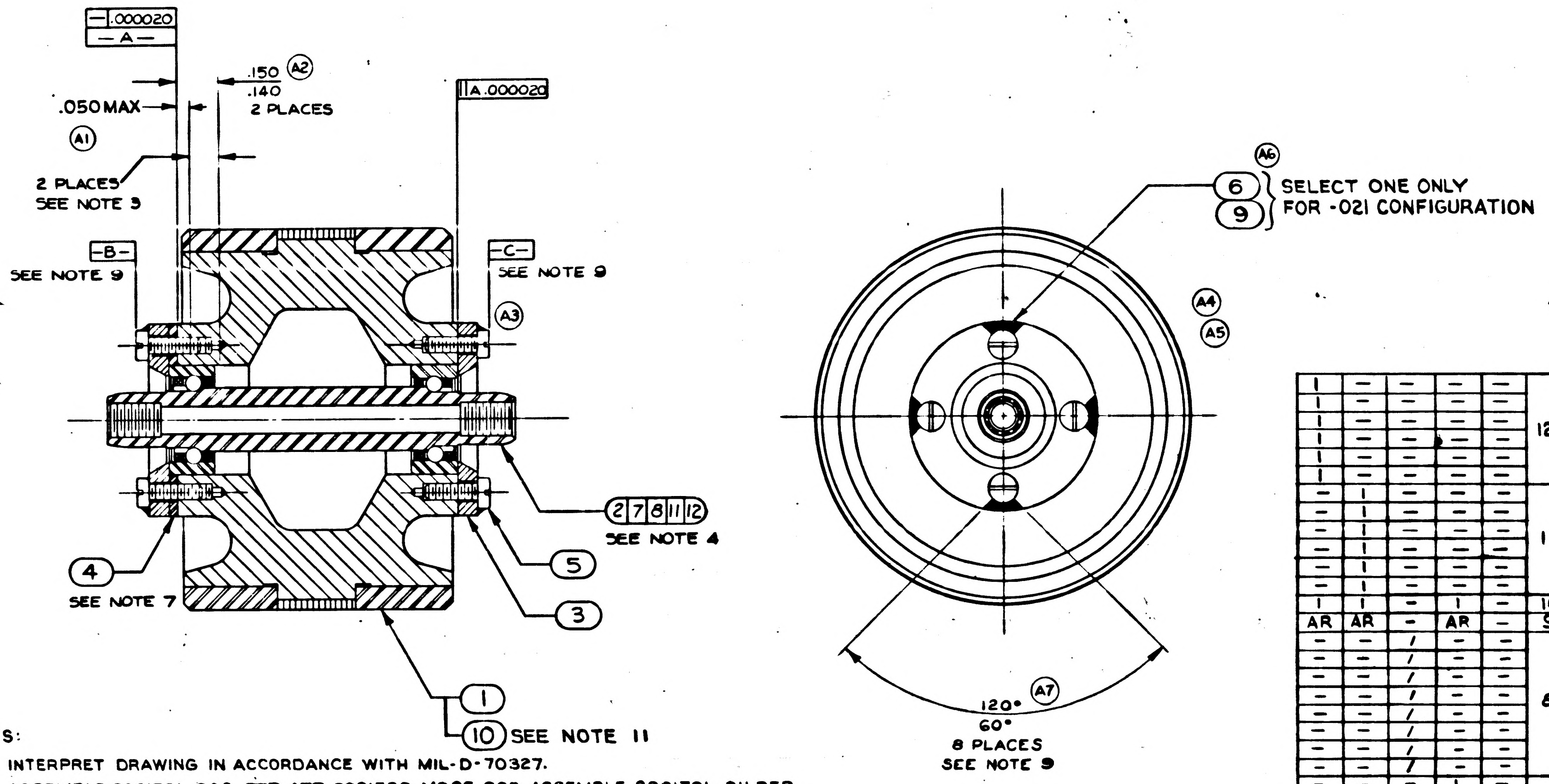
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C.R. GRASSO
CHECKED L.W. KEATING
APPROVED
APPROVED
MIT APPROVED DATE
NASA APPROVED DATE W J Rhine 5-28-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

SIZE D
CODE IDENT NO 80230
DRAWING NO. 2021701
SCALE 4/1
SHEET 1 OF 1

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A7	REVISED PER TDRR 14054	SJW	[illegible]	8 DEC 1964	WK
	B2	REVISED PER TDRR 18831	CRG	[illegible]	4-30-65	WK
	C4	REVISED PER TDRR 20012	P.D.	[illegible]	6-4-65	WK
	D	REVISED PER TDRR 32076	RWM		11-3-66	
	E	REVISED PER TDRR 35605	JJ	[illegible]	20 FEB 68	
	F	REVISED PER TDRR 35612	URK	[illegible]	1 MAR 68	
	G	REVISED PER TDRR 36615	JJJ	CP	22 AUG 68	
	H	REVISED PER TDRR 36616	JJ	RWH	26 AUG 68	
	J	REVISED PER TDRR 36769	[illegible]	[illegible]	10 SEP 68	



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ASSEMBLE 2021701-000 PER ATP 2021500, MC25-803. ASSEMBLE 2021701-011 PER ATP 2021500, MC25-869. TEST 2021701-000 PER ATP 2021500, MC25-838. ASSEMBLE 2021701-021 & 031 PER ATP 2021500, MC 25-880 AND TEST PER ATP 2021500, MC25-881.
3. THIS PORTION OF BORES SHALL MEET THE FOLLOWING REQUIREMENTS:
   - A. BORE SHALL BE ROUND WITHIN .000010 ON DIA
   - B. BORE TAPER SHALL BE .000010 TIR MAX
   - C. BORE SIZE AT 73° F TO 77° F SHALL BE ITS MATCHED BEARING OUTER RACE OUTSIDE DIA MEASURED AT 73° F TO 77° F -.000003 +.000017
4. ITEMS ② ⑦ ⑧ TO MEET THE ASSEMBLY FIT REQUIREMENTS OF NOTE 3. SELECT ONE OF ITEM ② FOR -000 OR -011 CONFIGURATION. SELECT ONE OF ⑦ FOR -021 CONFIGURATION. *SELECT ONE OF ⑧ FOR -031 CONFIGURATION.*
5. *VACUUM BAKE ① ONE HOUR AT 145°F TO 155°F AND A VACUUM OF 27 TO 29 INCHES OF HG AFTER FINISH SIZING.*
6. ITEM ② SHALL BE ASSEMBLED TO ① WITH AN AXIAL FORCE OF 3 TO 8 LBS (REF). MARKED FACES OF BEARING OUTER RACES SHALL BE FACING INWARD IN THE ASSEMBLY. ITEM ⑦ OR ⑧ SHALL BE ASSEMBLE TO ① WITH AN AXIAL FORCE OF 2 TO 5 LBS. (REF)
7. SELECT ONE OF ITEM ④
8. TORQUE SCREWS TO 11 TO 13 INCH OZ PRIOR TO CEMENTING CAP SCREWS (B2)
9. APPLY ⑥ AS SHOWN. SHALL NOT EXTEND BEYOND SURFACES -B- AND -C-
   MIX ITEM ⑥ PER ATP 2021500, MC25-304
   CURE 150° F TO 165° F FOR ONE HOUR MINIMUM
10. BAG AND IDENTIFY PER ND 1002019
11. SELECT ONE OF ITEMS ① OR ⑩ FOR 2021701-021 CONFIGURATION ONLY.

(C1) THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

LIST OF MATERIALS

QTY REQD 051	QTY REQD 041	QTY REQD 031	QTY REQD 021	QTY REQD 011	ITEM NO	QTY REQ'D 000	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
1	–	–	–	–	12	–		2021824-061	BEARING AND SHAFT ASSEMBLY		
1	–	–	–	–		–		-051			
1	–	–	–	–		–		-041			
1	–	–	–	–		–		-031			
1	–	–	–	–		–		-021			
1	–	–	–	–		–		2021824-011	BEARING AND SHAFT ASSEMBLY		
–	1	–	–	–	11	–		2021823-061	BEARING AND SHAFT ASSEMBLY		
–	1	–	–	–		–		-051			
–	1	–	–	–		–		-041			
–	1	–	–	–		–		-031			
–	1	–	–	–		–		-021			
–	1	–	–	–		–		2021823-011	BEARING AND SHAFT ASSEMBLY		
1	1	–	1	–	10	–		2021665-021	INERTIA ELEMENT ASSEMBLY		
AR	AR	–	AR	–	9	–		COML	SEALING COMPOUND, RETAINING, GRADE A		MIL-S-22473
–	–	1	–	–	8	–		*2021431-081*	*BEARING AND SHAFT ASSEMBLY*		
–	–	1	–	–		–		*-071*			
–	–	1	–	–		–		*-061*			
–	–	1	–	–		–		*-051*			
–	–	1	–	–		–		*-041*			
–	–	1	–	–		–		*-031*			
–	–	1	–	–		–		*-021*			
–	–	1	–	–		–		*2021431-011*	*BEARING AND SHAFT ASSEMBLY*		
–	–	–	1	–	7	–		2021811-081	BEARING AND SHAFT ASSEMBLY		
–	–	–	1	–		–		2021811-071			
–	–	–	1	–		–		2021811-061			
–	–	–	1	–		–		2021811-051			
–	–	–	1	–		–		2021811-041			
–	–	–	1	–		–		2021811-031			
–	–	–	1	–		–		2021811-021			
–	–	–	1	–		–		2021811-011	BEARING AND SHAFT ASSEMBLY		
AR	AR	AR	AR	AR	6	AR		2021552	ADHESIVE, EPOXY		
8	8	8	8	8	5	8		2021671	CAP CLAMPING SCREW		
1	1	1	1	1	4	1		2021670	SPACER		
2	2	2	2	2	3	2		2021669	BEARING CAP		
–	–	–	–	1	2	1		2021579-081	BEARING AND SHAFT ASSEMBLY		
–	–	–	–	1		1		2021579-071	BEARING AND SHAFT ASSEMBLY		
–	–	–	–	1		1		2021579-061	BEARING AND SHAFT ASSEMBLY		
–	–	–	–	1		1		2021579-051	BEARING AND SHAFT ASSEMBLY		
–	–	–	–	1		1		2021579-041	BEARING AND SHAFT ASSEMBLY		
–	–	–	–	1		1		2021579-031	BEARING AND SHAFT ASSEMBLY		
–	–	–	–	1		1		2021579-021	BEARING AND SHAFT ASSEMBLY		
–	–	–	–	1		1		2021579-011	BEARING AND SHAFT ASSEMBLY		
–	–	1	1	1	1	1		2021665-000	INERTIA ELEMENT ASSEMBLY		

(C3) (D1)

NEXT ASSY	USED ON
2021619	2021500
2021638	2021500

APPLICATION (C2)

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING
MATERIAL
FINISH

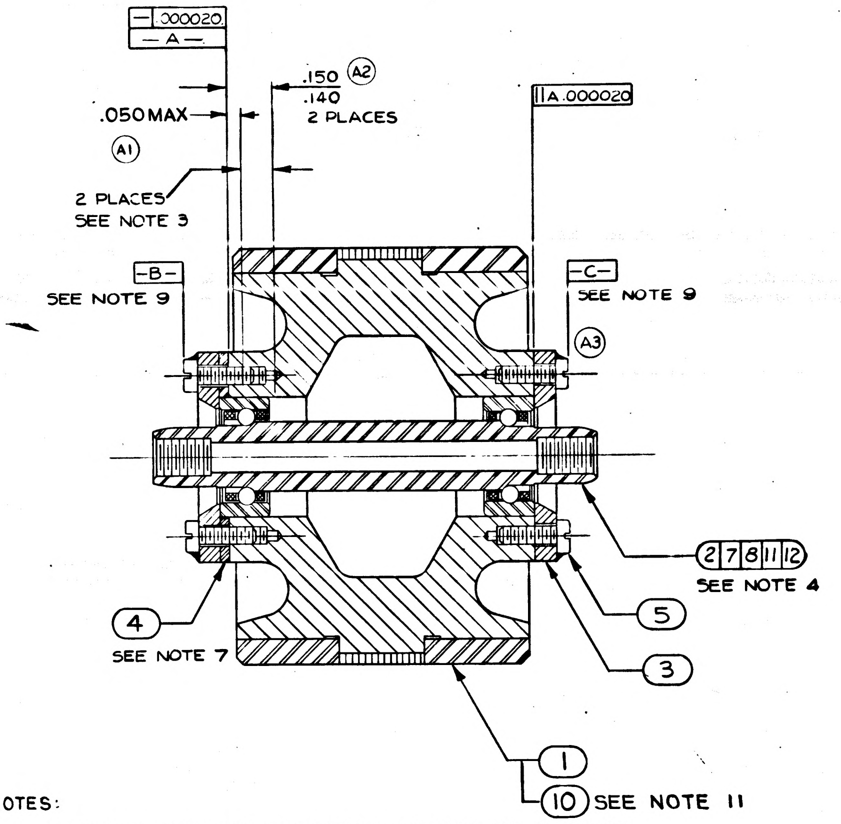
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C R GROSSO
CHECKED L.H. KEATING
APPROVED
APPROVED
MIT APPROVED DATE 9/2/64
NASA APPROVED DATE 9-28-64

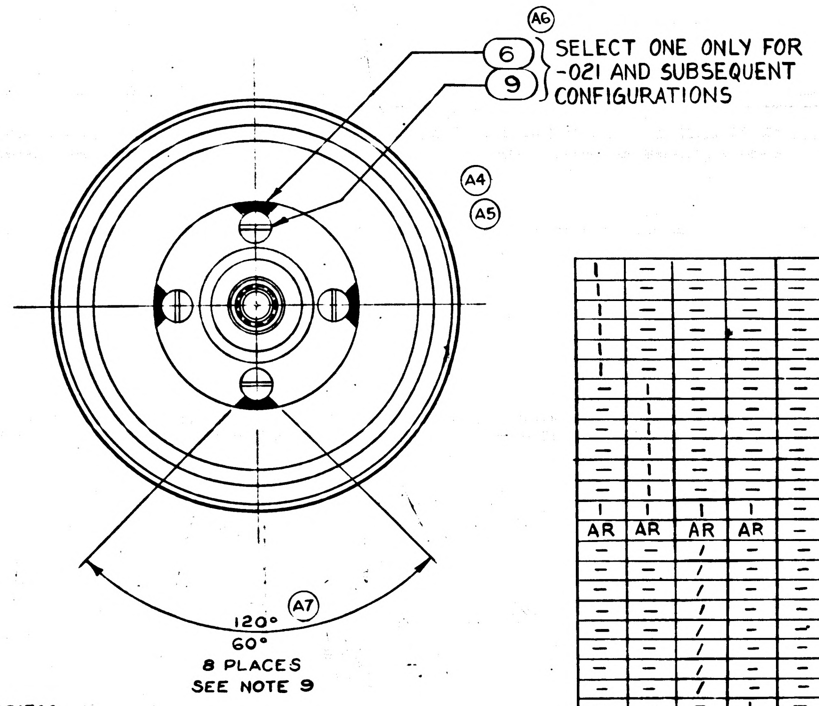
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

SIZE D CODE IDENT NO 80230 DRAWING NO. 2021701
SCALE 4/1 SHEET 1 OF 1

REVISIONS 13132						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A7	REVISED PER TDRR 14054	SJW	RAR	8 DEC 1964	WK
	B2	REVISED PER TDRR 18831	CRG			WK
	C4	REVISED PER TDRR 20012	P.D.		6 65	WK
	D	REVISED PER TDRR 32076	R.WM		11-3-66	
	E	REVISED PER TDRR 35605	JJJ		20 FEB 68	
	F	REVISED PER TDRR 35612	JRK		1 MAR 68	
	G	REVISED PER TDRR 36615	JJJ	CP	22 AUG 68	
	H	REVISED PER TDRR 36616	JJJ	RWH	26 AUG 68	
	J	REVISED PER TDRR 36769	FAIR		10 SEP 68	
	K	REVISED PER TDRR 37112	LK	AFS	17 OCT 68	





NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ASSEMBLE 2021701-000 PER ATP 2021500, MC25-803. ASSEMBLE 2021701-011 PER ATP 2021500, MC25-869. TEST 2021701-000 PER ATP 2021500, MC 25-838. ASSEMBLE 2021701-021 AND SUBSEQUENT CONFIGURATIONS PER ATP 2021500, MC25-880 AND TEST PER ATP 2021500, MC25-881.
3. THIS PORTION OF BORES SHALL MEET THE FOLLOWING REQUIREMENTS:
   A. BORE SHALL BE ROUND WITHIN .000010 ON DIA
   B. BORE TAPER SHALL BE .000010 TIR MAX
   C. BORE SIZE AT 73° F TO 77°F SHALL BE ITS MATCHED BEARING OUTER RACE OUTSIDE DIA MEASURED AT 73° F TO 77° F -.000003 +.000017
4. FOR APPLICABLE CONFIGURATION SELECT ONE OF ITEMS (2|7|8|11|12) TO MEET THE ASSEMBLY FIT REQUIREMENTS OF NOTE 3.
5. *VACUUM BAKE ① ONE HOUR AT 145°F TO 155°F AND A VACUUM OF 27 TO 29 INCHES OF HG AFTER FINISH SIZING.*
6. ITEM ② SHALL BE ASSEMBLED TO ① WITH AN AXIAL FORCE OF 3 TO 8 LBS(REF). MARKED FACES OF BEARING OUTER RACES SHALL BE FACING INWARD IN THE ASSEMBLY. ITEM (7|8|11|12) SHALL BE ASSEMBLE TO ① OR ⑩ WITH AN AXIAL FORCE OF 2 TO 5 LBS (REF).
7. SELECT ONE OF ITEM ④
8. (B2) TORQUE SCREWS TO 11 TO 13 INCH OZ PRIOR TO CEMENTING CAP SCREWS
9. APPLY ⑥ AS SHOWN. SHALL NOT EXTEND BEYOND SURFACES -B- AND -C-
   MIX ITEM ⑥ PER ATP 2021500, MC25-304
   CURE 150° F TO 165° F FOR ONE HOUR MINIMUM
10. BAG AND IDENTIFY PER ND 1002019
11. SELECT ONE OF ITEMS ① OR ⑩ FOR 2021701-021 AND SUBSEQUENT CONFIGURATIONS.

(C1) THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

LIST OF MATERIALS

QTY REQD 051	QTY REQD 041	QTY REQD 031	QTY REQD 021	QTY REQD 011	ITEM NO.	QTY REQ'D 000	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
1	—	—	—	—	12	—		2021824-061	BEARING AND SHAFT ASSEMBLY		
1	—	—	—	—		—		-051			
1	—	—	—	—		—		-041			
1	—	—	—	—		—		-031			
1	—	—	—	—		—		-021			
1	—	—	—	—		—		2021824-011	BEARING AND SHAFT ASSEMBLY		
—	1	—	—	—	11	—		2021823-061	BEARING AND SHAFT ASSEMBLY		
—	1	—	—	—		—		-051			
—	1	—	—	—		—		-041			
—	1	—	—	—		—		-031			
—	1	—	—	—		—		-021			
—	1	—	—	—		—		2021823-011	BEARING AND SHAFT ASSEMBLY		
1	1	1	1	—	10	—		2021665-021	INERTIA ELEMENT ASSEMBLY		
AR	AR	AR	AR	—	9	—		COML	SEALING COMPOUND, RETAINING, GRADE A		MIL-S-22473
—	—	1	—	—	8	—		*2021431-081*	*BEARING AND SHAFT ASSEMBLY*		
—	—	1	—	—		—		*-071*			
—	—	1	—	—		—		*-061*			
—	—	1	—	—		—		*-051*			
—	—	1	—	—		—		*-041*			
—	—	1	—	—		—		*-031*			
—	—	1	—	—		—		*-021*			
—	—	1	—	—		—		*2021431-011*	*BEARING AND SHAFT ASSEMBLY*		
—	—	—	1	—	7	—		2021811-081	BEARING AND SHAFT ASSEMBLY		
—	—	—	1	—		—		2021811-071			
—	—	—	1	—		—		2021811-061			
—	—	—	1	—		—		2021811-051			
—	—	—	1	—		—		2021811-041			
—	—	—	1	—		—		2021811-031			
—	—	—	1	—		—		2021811-021			
—	—	—	1	—		—		2021811-011	BEARING AND SHAFT ASSEMBLY		
AR	AR	AR	AR	AR	6	AR		2021552	ADHESIVE, EPOXY		
8	8	8	8	8	5	8		2021671	CAP CLAMPING SCREW		
1	1	1	1	1	4	1		2021670	SPACER		
2	2	2	2	2	3	2		2021669	BEARING CAP		
—	—	—	—	1	2	1		2021579-081	BEARING AND SHAFT ASSEMBLY		
—	—	—	—	1		1		2021579-071	BEARING AND SHAFT ASSEMBLY		
—	—	—	—	1		1		2021579-061	BEARING AND SHAFT ASSEMBLY		
—	—	—	—	1		1		2021579-051	BEARING AND SHAFT ASSEMBLY		
—	—	—	—	1		1		2021579-041	BEARING AND SHAFT ASSEMBLY		
—	—	—	—	1		1		2021579-031	BEARING AND SHAFT ASSEMBLY		
—	—	—	—	1		1		2021579-021	BEARING AND SHAFT ASSEMBLY		
—	—	—	—	1		1		2021579-011	BEARING AND SHAFT ASSEMBLY		
1	1	1	1	1	1	1		2021665-000	INERTIA ELEMENT ASSEMBLY		

(C3) (D1)

(C2)

NEXT ASSY	USED ON
2021619	2021500
2021638	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

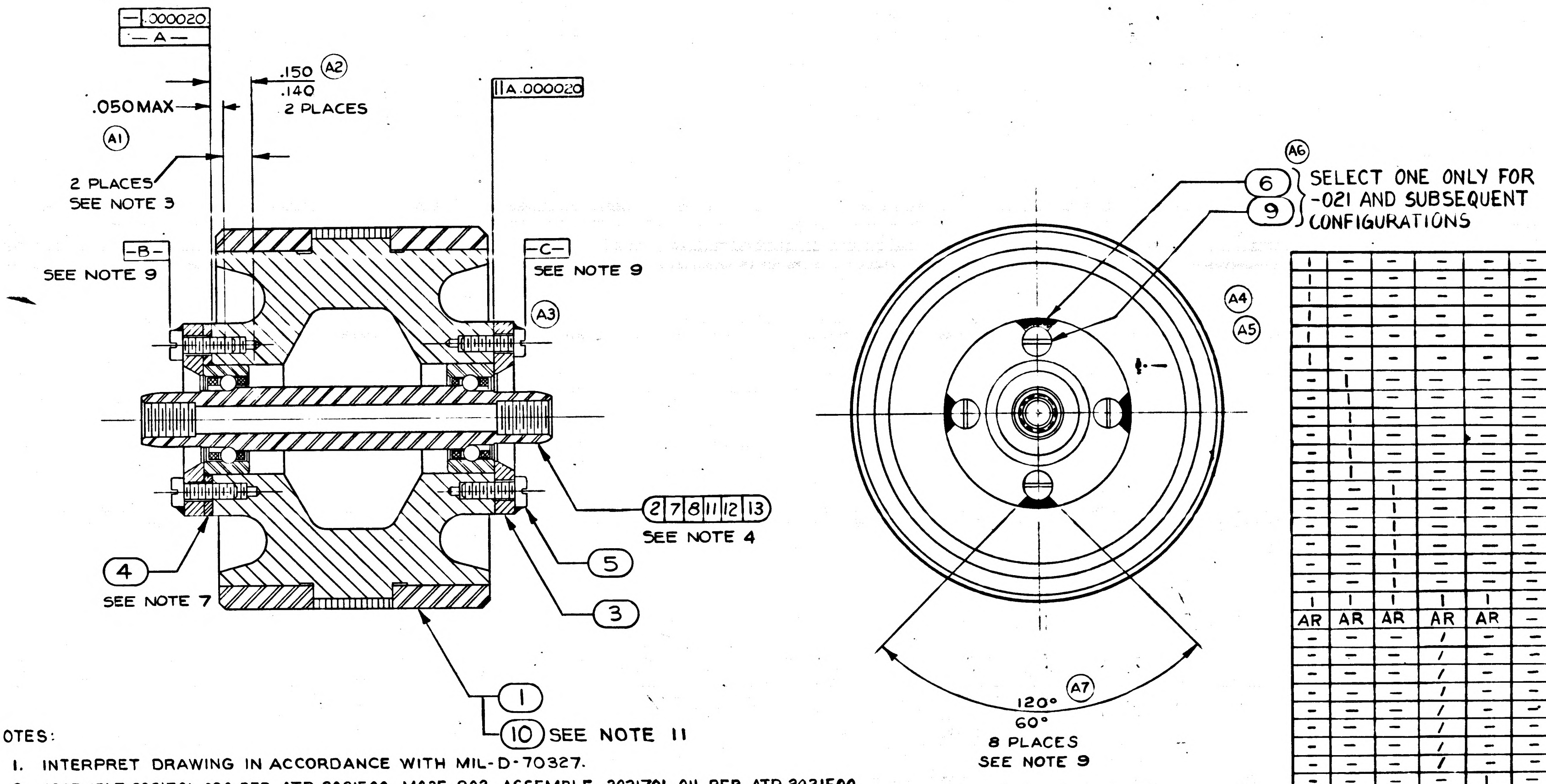
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C R Grasso 9 Sept 64
CHECKED L.W. KEATING 20 Sept 64
APPROVED Sep 64
APPROVED J.H. 28 Sept 64
MIT APPROVED DATE 9/28/64
NASA APPROVED DATE 9-29-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

SIZE D
CODE IDENT NO 80230
DRAWING NO. 2021701
SCALE 4/1
SHEET 1 OF 1

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A7	REVISED PER TDR[illegible] 1054	SJW	[illegible]	8 DEC 1964	WK
	B2	REVISED PER TDH [illegible]831	CRG	[illegible]	4-30-65	WK
	C4	REVISED PER TDRR 20012	P.D.	[illegible]	6-4-65	WK
	D	REVISED PER TDRR 32076	R.WM		11-3-66	
	E	REVISED PER TDRR 35605	JJJ	[illegible]	20 FEB 68	
	F	REVISED PER TDRR 35612	JRK	[illegible]	1 MAR 68	
	G	REVISED PER TDRR 36615	JJJ	CP	22 AUG 68	
	H	REVISED PER TDRR 36616	JJJ	RWH	26 AUG 68	
	J	REVISED PER TDRR 36769	JHR	[illegible]	10 SEP 68	
	K	REVISED PER TDRR 37112	LK	AES	17 DEC 68	
	L	REVISED PER TDRR 37211	A.N.	RWH	24 JAN 69	



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ASSEMBLE 2021701-000 PER ATP 2021500, MC25-803. ASSEMBLE 2021701-011 PER ATP 2021500, MC25-869. TEST 2021701-000 PER ATP 2021500, MC 25-838. ASSEMBLE 2021701-021 AND SUBSEQUENT CONFIGURATIONS PER ATP 2021500, MC 25-880 AND TEST PER ATP 2021500, MC 25-881.
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   - A. BORE SHALL BE ROUND WITHIN .000010 ON DIA
   - B. BORE TAPER SHALL BE .000010 TIR MAX
   - C. BORE SIZE AT 73° F TO 77°F SHALL BE ITS MATCHED BEARING OUTER RACE OUTSIDE DIA MEASURED AT 73° F TO 77° F $^{-.000003}_{+.000017}$
4. FOR APPLICABLE CONFIGURATION SELECT ONE OF ITEMS (2|7|8|11|12|13) TO MEET THE ASSEMBLY FIT REQUIREMENTS OF NOTE 3.
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7. SELECT ONE OF ITEM ④
8. (B2) TORQUE SCREWS TO 11 TO 13 INCH OZ PRIOR TO CEMENTING CAP SCREWS
9. APPLY ⑥ AS SHOWN. SHALL NOT EXTEND BEYOND SURFACES -B- AND -C-
   MIX ITEM ⑥ PER ATP 2021500, MC 25-304
   CURE 150° F TO 165° F FOR ONE HOUR MINIMUM
10. BAG AND IDENTIFY PER ND 1002019
11. SELECT ONE OF ITEMS ① OR ⑩ FOR 2021701-021 AND SUBSEQUENT CONFIGURATIONS.

(C1) THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A -000 SUFFIX.

QTY REQD 061	QTY REQD 051	QTY REQD 041	QTY REQD 031	QTY REQD 021	QTY REQD 011	ITEM NO.	QTY REQ'D 000	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
1	-	-	-	-	-	13	-		2021493-061	BEARING AND SHAFT ASSEMBLY		
1	-	-	-	-	-		-		-051			
1	-	-	-	-	-		-		-041			
1	-	-	-	-	-		-		-031			
1	-	-	-	-	-		-		-021			
1	-	-	-	-	-		-		2021493-011	BEARING AND SHAFT ASSEMBLY		
-	1	-	-	-	-	12	-		2021824-061	BEARING AND SHAFT ASSEMBLY		
-	1	-	-	-	-		-		-051			
-	1	-	-	-	-		-		-041			
-	1	-	-	-	-		-		-031			
-	1	-	-	-	-		-		-021			
-	1	-	-	-	-		-		2021824-011	BEARING AND SHAFT ASSEMBLY		
-	-	1	-	-	-	11	-		2021823-061	BEARING AND SHAFT ASSEMBLY		
-	-	1	-	-	-		-		-051			
-	-	1	-	-	-		-		-041			
-	-	1	-	-	-		-		-031			
-	-	1	-	-	-		-		-021			
-	-	1	-	-	-		-		2021823-011	BEARING AND SHAFT ASSEMBLY		
1	1	1	1	1	-	10	-		2021665-021	INERTIA ELEMENT ASSEMBLY		
AR	AR	AR	AR	AR	-	9	-		COML	SEALING COMPOUND, RETAINING, GRADE A		MIL-S-22473
-	-	-	1	-	-	8	-		2021431-081	BEARING AND SHAFT ASSEMBLY		
-	-	-	1	-	-		-		-071			
-	-	-	1	-	-		-		-061			
-	-	-	1	-	-		-		-051			
-	-	-	1	-	-		-		-041			
-	-	-	1	-	-		-		-031			
-	-	-	1	-	-		-		-021			
-	-	-	1	-	-		-		2021431-011	BEARING AND SHAFT ASSEMBLY		
-	-	-	-	1	-	7	-		2021811-081	BEARING AND SHAFT ASSEMBLY		
-	-	-	-	1	-		-		2021811-071			
-	-	-	-	1	-		-		2021811-061			
-	-	-	-	1	-		-		2021811-051			
-	-	-	-	1	-		-		2021811-041			
-	-	-	-	1	-		-		2021811-031			
-	-	-	-	1	-		-		2021811-021			
-	-	-	-	1	-		-		2021811-011	BEARING AND SHAFT ASSEMBLY		
AR	AR	AR	AR	AR	AR	6	AR		2021552	ADHESIVE, EPOXY		
8	8	8	8	8	8	5	8		2021671	CAP CLAMPING SCREW		
1	1	1	1	1	1	4	1		2021670	SPACER		
2	2	2	2	2	2	3	2		2021669	BEARING CAP		
-	-	-	-	-	1	2	1		2021579-081	BEARING AND SHAFT ASSEMBLY		
-	-	-	-	-	1		1		2021579-071	BEARING AND SHAFT ASSEMBLY		
-	-	-	-	-	1		1		2021579-061	BEARING AND SHAFT ASSEMBLY		
-	-	-	-	-	1		1		2021579-051	BEARING AND SHAFT ASSEMBLY		
-	-	-	-	-	1		1		2021579-041	BEARING AND SHAFT ASSEMBLY		
-	-	-	-	-	1		1		2021579-031	BEARING AND SHAFT ASSEMBLY		
-	-	-	-	-	1		1		2021579-021	BEARING AND SHAFT ASSEMBLY		
-	-	-	-	-	1		1		2021579-011	BEARING AND SHAFT ASSEMBLY		
1	1	1	1	1	1	1	1		2021665-000	INERTIA ELEMENT ASSEMBLY		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021619	2021500
2021638	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C R Grasso 8 Sept 64
CHECKED L.W. KEATING 28 Sept 64
APPROVED [illegible] 5 Sept 64
APPROVED J.H. Aronson Jr 29 Sept 64
MIT APPROVED DATE [illegible] 9/2[illegible]/64
NASA APPROVED DATE W J Rhine 9-29-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

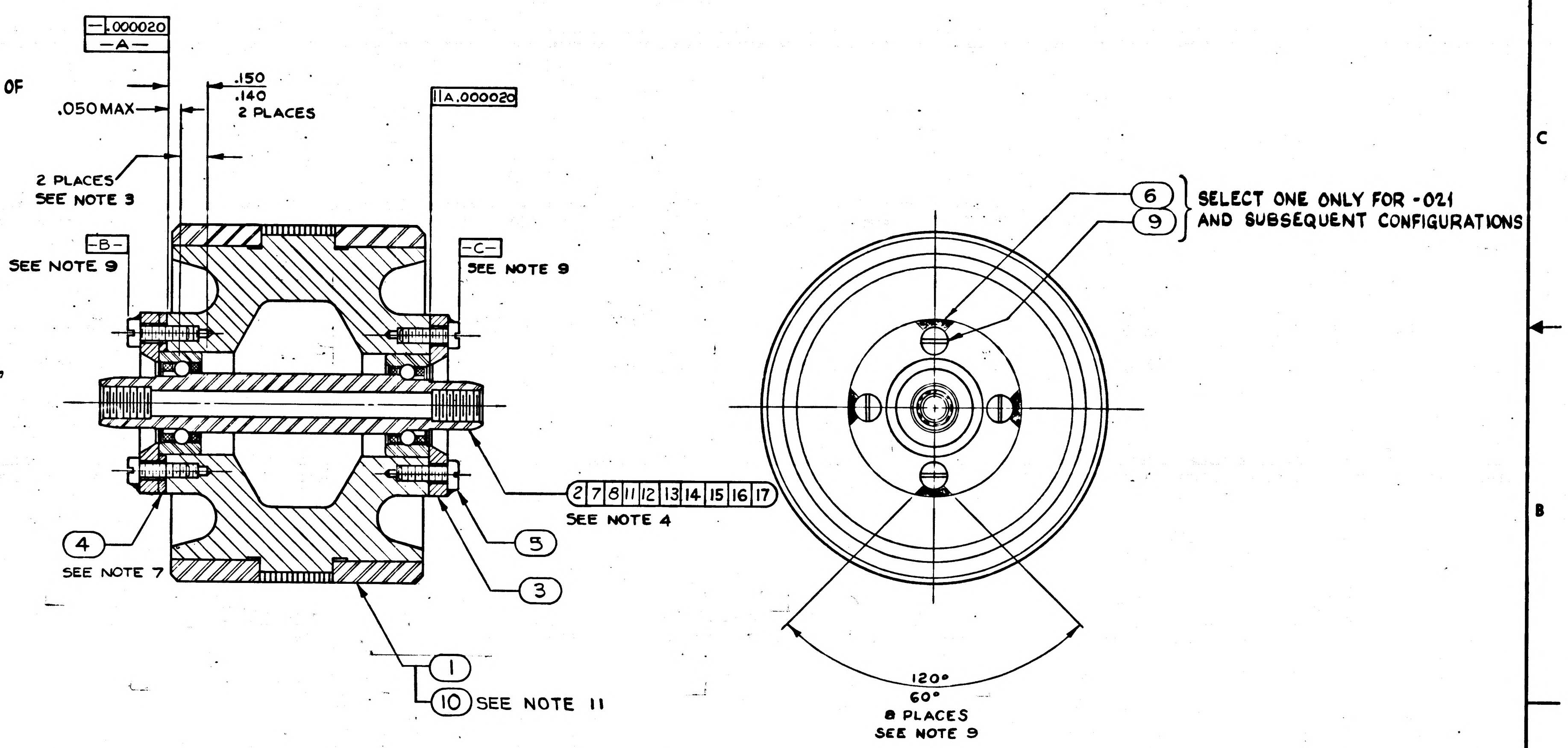
SIZE D
CODE IDENT NO 80230
DRAWING NO. 2021701
SCALE 4/1
SHEET 1 OF 1

N | 1021202 | 2

REVISIONS						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
—	M	REPLACES REV L WITH CHANGE PER TDRR 37480	K	J. E. G.	17 APR 69	
	N	REVISED PER TDRR 37735	JB		8-AUG-69	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ASSEMBLE 2021701-000 PER ATP 2021500, MC25-803. ASSEMBLE 2021701-011 PER ATP 2021500, MC25-869. TEST 2021701-000 PER ATP 2021500, MC25-838. ASSEMBLE 2021701-021 AND SUBSEQUENT CONFIGURATIONS PER ATP 2021500, MC25-880 AND TEST PER ATP 2021500, MC25-881.
3. THIS PORTION OF BORES SHALL MEET THE FOLLOWING REQUIREMENTS:
    A. BORE SHALL BE ROUND WITHIN .000010 ON DIA.
    B. BORE TAPER SHALL BE .000010 TIR MAX.
    C. BORE SIZE AT 73° F TO 77° F SHALL BE ITS MATCHED BEARING OUTER RACE OUTSIDE DIA MEASURED AT 73° F TO 77° F -.000003 +.000017.
4. FOR APPLICABLE CONFIGURATION SELECT ONE OF ITEMS ②⑦⑧⑪⑫⑬⑭⑮⑯⑰ TO MEET THE ASSEMBLY FIT REQUIREMENTS OF NOTE 3.
5. VACUUM BAKE ① ONE HOUR AT 145° F TO 155° F AND A VACUUM OF 27 TO 29 INCHES OF HG AFTER FINISH SIZING.
6. ITEM ② SHALL BE ASSEMBLED TO ① WITH AN AXIAL FORCE OF 3 TO 8 LBS (REF). MARKED FACES OF BEARING OUTER RACES SHALL BE FACING INWARD IN THE ASSEMBLY. ITEM ⑦⑧⑪⑫⑬⑭⑮⑯⑰ SHALL BE ASSEMBLED TO ① OR ⑩ WITH AN AXIAL FORCE OF 2 TO 5 LBS (REF).
7. SELECT ONE OF ITEM ④.
8. TORQUE SCREWS TO 11 TO 13 INCH OZ PRIOR TO CEMENTING CAP SCREWS.
9. APPLY ⑥ AS SHOWN. SHALL NOT EXTEND BEYOND SURFACES -B- AND -C-. MIX ITEM ⑥ PER ATP 2021500, MC25-304. CURE 150° F TO 165° F FOR ONE HOUR MINIMUM.
10. BAG AND IDENTIFY PER ND1002019.
11. SELECT ONE OF ITEMS ① OR ⑩ FOR 2021701-021 AND SUBSEQUENT CONFIGURATIONS.



NEXT ASSY	USED ON	APPLICABLE DASH NO.
2021619	2021500	
2021638	2021500	

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C.R. GRASSO 18 Sep 64
CHECKED L.W. KEATING 28 Sep 64
APPROVED J. PUBLICORN 29 SEP 64
APPROVED J.H. ARONSON JR 29 Sep 64
MIT APPROVED I. HOYET DATE 29 Sep 64
NASA APPROVED W. J. RHINE DATE 29 Sep 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

SIZE D
CODE IDENT NO 80230
DRAWING NO. 2021701
SCALE 4/1
SHEET 1 OF 2

N 2021701 2

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
M	—	REPLACES REV L WITH CHANGE PER TDRR 37480	—	18 APR 69	T. / J. E. G.
N		REVISED PER TDRR 37735		8-AUG 69	B.

QTY REQD 071	QTY REQD 061	QTY REQD 051	QTY REQD 041	QTY REQD 031	QTY REQD 021	QTY REQD 011	ITEM NO.	QTY REQD 000	SYMBOL	PART OR IDENT NO.	DESCRIPTION	MATERIAL	SPECIFICATION
-	1	-	-	-	-	-	17	-		2021579-201	BEARING AND SHAFT ASSEMBLY		
-	1	-	-	-	-	-		-		-191			
-	1	-	-	-	-	-		-		-181			
-	1	-	-	-	-	-		-		-171			
-	1	-	-	-	-	-		-		-161			
-	1	-	-	-	-	-		-		-151			
-	1	-	-	-	-	-	16	-		-141			
-	1	-	-	-	-	-		-		-131			
-	1	-	-	-	-	-		-		-121			
-	1	-	-	-	-	-		-		-111			
-	1	-	-	-	-	-		-		-101			
-	1	-	-	-	-	-		-		2021579-091			
-	1	-	-	-	-	-	15	-		2021493-121			
-	1	-	-	-	-	-		-		-111			
-	1	-	-	-	-	-		-		-101			
-	1	-	-	-	-	-		-		-091			
-	1	-	-	-	-	-		-		-081			
-	1	-	-	-	-	-		-		2021493-071			
1	-	-	-	-	-	-	14	-		2021823-121	BEARING AND SHAFT ASSEMBLY		
1	-	-	-	-	-	-		-		-111			
1	-	-	-	-	-	-		-		-101			
1	-	-	-	-	-	-		-		-091			
1	-	-	-	-	-	-		-		-081			
1	-	-	-	-	-	-		-		2021823-071	BEARING AND SHAFT ASSEMBLY		
-	1	-	-	-	-	-	13	-		2021493-061	BEARING AND SHAFT ASSEMBLY		
-	1	-	-	-	-	-		-		-051			
-	1	-	-	-	-	-		-		-041			
-	1	-	-	-	-	-		-		-031			
-	1	-	-	-	-	-		-		-021			
-	1	-	-	-	-	-		-		2021493-011	BEARING AND SHAFT ASSEMBLY		
-	-	1	-	-	-	-	12	-		2021824-061	BEARING AND SHAFT ASSEMBLY		
-	-	1	-	-	-	-		-		-051			
-	-	1	-	-	-	-		-		-041			
-	-	1	-	-	-	-		-		-031			
-	-	1	-	-	-	-		-		-021			
-	-	1	-	-	-	-		-		2021824-011	BEARING AND SHAFT ASSEMBLY		
-	-	-	1	-	-	-	11	-		2021823-061	BEARING AND SHAFT ASSEMBLY		
-	-	-	1	-	-	-		-		-051			
-	-	-	1	-	-	-		-		-041			
-	-	-	1	-	-	-		-		-031			
-	-	-	1	-	-	-		-		-021			
-	-	-	1	-	-	-		-		2021823-011	BEARING AND SHAFT ASSEMBLY		

LIST OF MATERIALS

QTY REQD 071	QTY REQD 061	QTY REQD 051	QTY REQD 041	QTY REQD 031	QTY REQD 021	QTY REQD 011	ITEM NO.	QTY REQD 000	SYMBOL	PART OR IDENT NO.	DESCRIPTION	MATERIAL	SPECIFICATION
1	1	1	1	1	1	-	10	-		2021665-021	INERTIAL ELEMENT ASSEMBLY		
AR	AR	AR	AR	AR	AR	-	9	-		COML	SEALING COMPOUND, RETAINING, GRADE A		MIL-S-22473
-	-	-	-	1	-	-	8	-		2021431-081	BEARING AND SHAFT ASSEMBLY		
-	-	-	-	1	-	-		-		-071			
-	-	-	-	1	-	-		-		-061			
-	-	-	-	1	-	-		-		-051			
-	-	-	-	1	-	-		-		-041			
-	-	-	-	1	-	-		-		-031			
-	-	-	-	1	-	-		-		-021			
-	-	-	-	1	-	-		-		2021431-011	BEARING AND SHAFT ASSEMBLY		
-	-	-	-	-	1	-	7	-		2021811-081	BEARING AND SHAFT ASSEMBLY		
-	-	-	-	-	1	-		-		-071			
-	-	-	-	-	1	-		-		-061			
-	-	-	-	-	1	-		-		-051			
-	-	-	-	-	1	-		-		-041			
-	-	-	-	-	1	-		-		-031			
-	-	-	-	-	1	-		-		-021			
-	-	-	-	-	1	-		-		2021811-011	BEARING AND SHAFT ASSEMBLY		
AR	AR	AR	AR	AR	AR	AR	6	AR		2021552	ADHESIVE, EPOXY		
8	8	8	8	8	8	8	5	8		2021671	CAP CLAMPING SCREW		
1	1	1	1	1	1	1	4	1		2021670	SPACER		
2	2	2	2	2	2	2	3	2		2021669	BEARING CAP		
-	-	-	-	-	-	1	2	1		2021579-081	BEARING AND SHAFT ASSEMBLY		
-	-	-	-	-	-	1		1		-071			
-	-	-	-	-	-	1		1		-061			
-	-	-	-	-	-	1		1		-051			
-	-	-	-	-	-	1		1		-041			
-	-	-	-	-	-	1		1		-031			
-	-	-	-	-	-	1		1		-021			
-	-	-	-	-	-	1		1		2021579-011	BEARING AND SHAFT ASSEMBLY		
1	1	1	1	1	1	1	1	1		2021665-000	INERTIA ELEMENT ASSEMBLY		

LIST OF MATERIALS

THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER & A -000 SUFFIX.

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2021619	2021500	
2021638	2021500	

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS + — − | 3 PLACE DECIMALS + — − | ANGLES + — −
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT

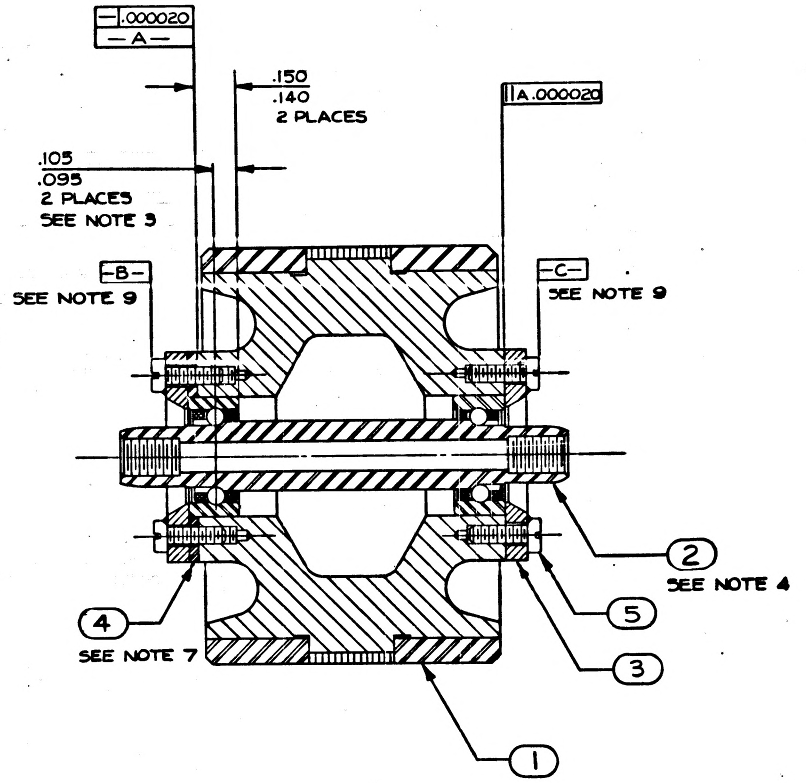
	NAME	DATE
DRAWN	C.R. GRASSO	18 SEP 64
CHECKED	L.W. KEATING	28 SEP 64
APPROVAL	J. PUBLICOVEN	29 SEP 64
CONTRACT	J.H. ARONSON JR.	29 SEP 64
NASA APPROVAL	W.J. RHINE	29 SEP 64
MIT APPROVAL	T. HOYT	29 SEP 64

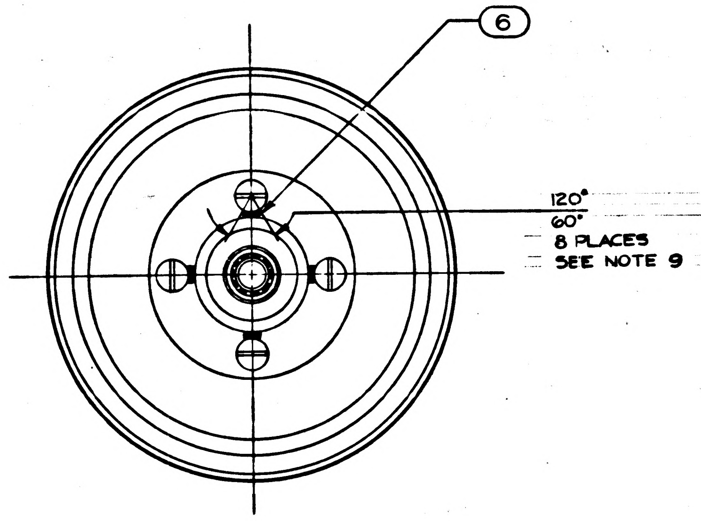
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

SIZE D | CODE IDENT NO. 80230 | 2021701
SCALE 4/1 | SHEET 2 OF 2

REVISIONS 13132						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED





NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE PER ATP 2021500, MC25-803
3. THIS PORTION OF BORES SHALL MEET THE FOLLOWING REQUIREMENTS:
   A. BORE SHALL BE ROUND WITHIN .000010 ON DIA
   B. BORE TAPER SHALL BE .000010 TIR MAX
   C. BORE SIZE AT 73° F TO 77°F SHALL BE ITS MATCHED BEARING OUTER RACE OUTSIDE DIA MEASURED AT 73° F TO 77° F -.000003 +.000017
4. ITEM ② TO MEET THE ASSEMBLY FIT REQUIREMENTS OF NOTE 3. SELECT ONE OF ITEM ②
5. VACUUM BAKE ① ONE HOUR AT 145° F TO 155° F AND A VACUUM OF 27 TO 29 INCHES OF HG AFTER FINISH SIZING OF BORE
6. ITEM ② SHALL BE ASSEMBLED TO ① WITH AN AXIAL FORCE OF 3 TO 8 LBS (REF). MARKED FACES OF BEARING OUTER RACES SHALL BE FACING INWARD IN THE ASSEMBLY
7. SELECT ONE OF ITEM ④
8. TORQUE SCREWS TO 11 TO 13 INCH OZ AFTER TESTING PER ATP 2021500, MC25-838 AND PRIOR TO FINAL BALANCING
9. APPLY ⑥ AS SHOWN. SHALL NOT EXTEND BEYOND SURFACES -B- AND -C-
   MIX ITEM ⑥ PER ATP 2021500, MC25-304
   CURE 150° F TO 165° F FOR ONE HOUR MINIMUM
10. BAG AND IDENTIFY PER ND 1002019

MASTER

ITEM NO.	QTY REQ'D	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
6	AR		2021552	ADHESIVE, EPOXY		
5	8		2021671	CAP CLAMPING SCREW		
4	1		2021670	SPACER		
3	2		2021669	BEARING CAP		
2	1		2021579-041	BEARING AND SHAFT ASSEMBLY		
	1		2021579-031	BEARING AND SHAFT ASSEMBLY		
	1		2021579-021	BEARING AND SHAFT ASSEMBLY		
	1		2021579-011	BEARING AND SHAFT ASSEMBLY		
1	1		2021665	INERTIA ELEMENT ASSEMBLY		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021638	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C R Grasso	8 Sept 64
CHECKED	L. W. KEATING	28 Sept 64
APPROVED	[illegible]	28 Sept 64
APPROVED	J. H. [illegible] Jr	28 Sept 64

MIT APPROVED DATE
[illegible] 9/29/64

NASA APPROVED DATE
W J Rhine 9-29-64

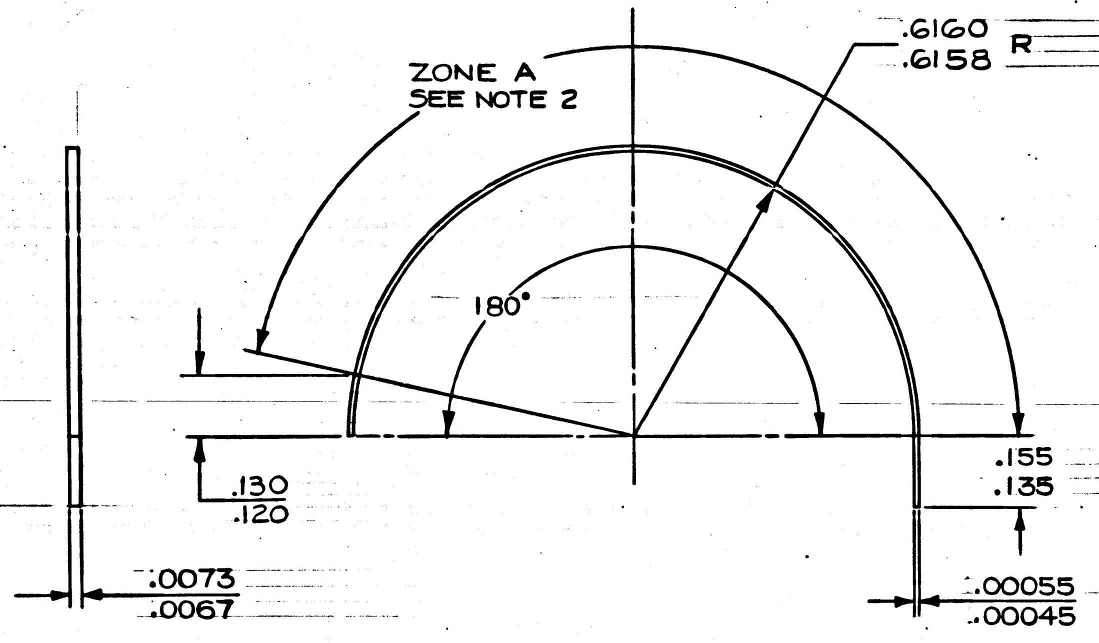
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

SIZE	CODE IDENT NO	DRAWING NO.
D		2021701

SCALE 4/1 SHEET 1 OF 1

REVISIONS						14076
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A1	REVISED PER TDRR 16572	P.D.		2-12-65	WK.



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. PORTION OF LEAD IN "ZONE A" MUST LIE FLAT WITHIN .0005
3. Ⓐ1 HEAT TREAT PER ATP 2021500, MC-106
4. IDENTIFY PER ND 1002019

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021611	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO.
2021530

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	P. DIETRICH	30SEP6
CHECKED	L.W. Keating	10-16-64
APPROVED		4 Nov 64
APPROVED	RA Booth	11-4-64

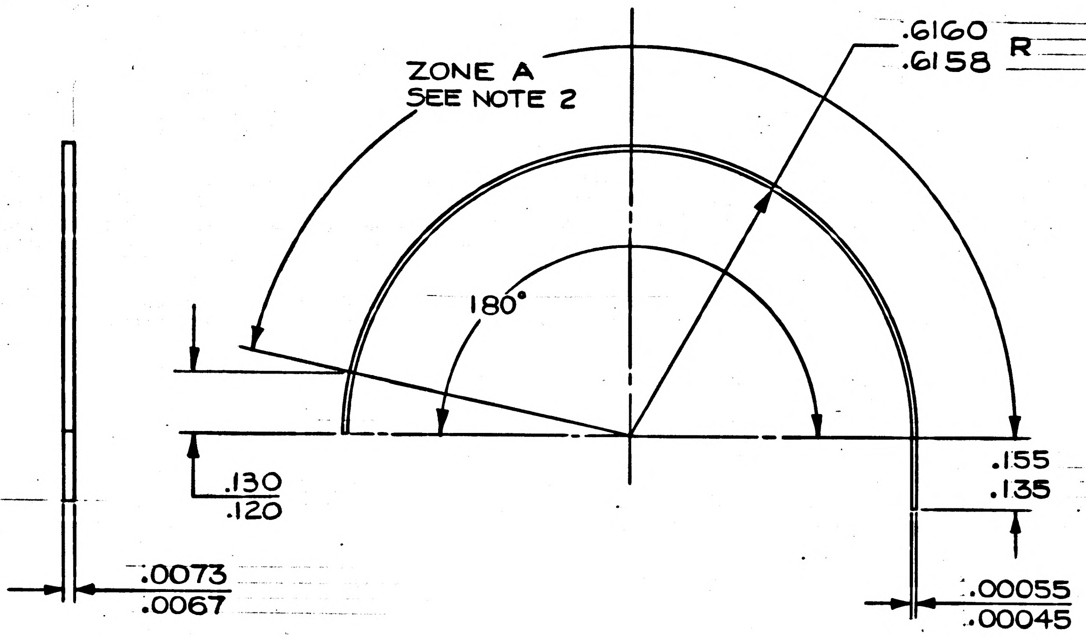
MIT APPROVED DATE
WKupfer 4Nov64
NASA APPROVED
W J Rhine 11-4-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

FLEX LEAD
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021702
SCALE 4/1
SHEET 1 OF 1

REVISIONS						14076
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. PORTION OF LEAD IN "ZONE A" MUST LIE FLAT WITHIN .0005
3. HEAT TREAT PER ATP 2021500, MC 25-106
4. IDENTIFY PER ND 1002019

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021611	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD NO.
2021530

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS

CONTRACT NO.

DRAWN P. DIETRICH 30SEP64
CHECKED L. W. Keating 10-16-64
APPROVED 4 Nov 64
APPROVED 11-4-64

MIT APPROVED DATE 4 Nov 64

NASA APPROVED W J Rhine 11-4-64

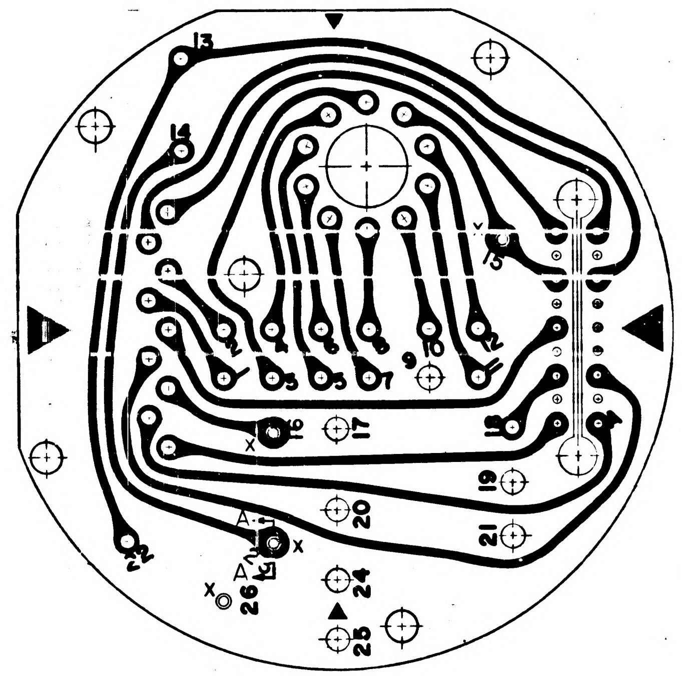
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

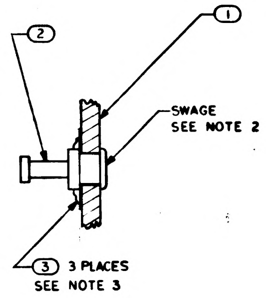
FLEX LEAD
APOLLO II IRIG

SIZE C
CODE IDENT NO.
DRAWING NO. 2021702
SCALE 4/1
SHEET 1 OF 1

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS		TDRR 16311				
ZONE	SYM	DESCRIPTION	BY	CHK	DATE	APPROVED





SECTION A-A
SCALE 10/1
4 PLACES MARKED X

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE PER ATP2021500 MC25-847
3. SOLDER PER ND1002071 USING ITEM ③
4. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT NO	DESCRIPTION	MATERIAL	SPECIFICATION
3	A/R		SN35	SOLDER		QQ-S-571
2	4		1021516-002	TERMINAL, STUD, SINGLE TURRET		
1	1		2021746	PRINTED CIRCUIT BOARD		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021788	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μF
RESISTOR VALUES ARE IN OHMS
K = ×1000 M = ×1 000 000
DO NOT SCALE THIS DRAWING

MATERIAL ______

FINISH ______

MIT INSTRUMENTATION LAB
CONTRACT NO
DRAWN J. Falzone 2/4/65
CHECKED G. QUINN 2/4/65
APPROVED
APPROVED R A Booth 2-8-65
MIT APPROVED W Hoag 9 Feb 65 DATE
NASA W J Klein 2-5-65

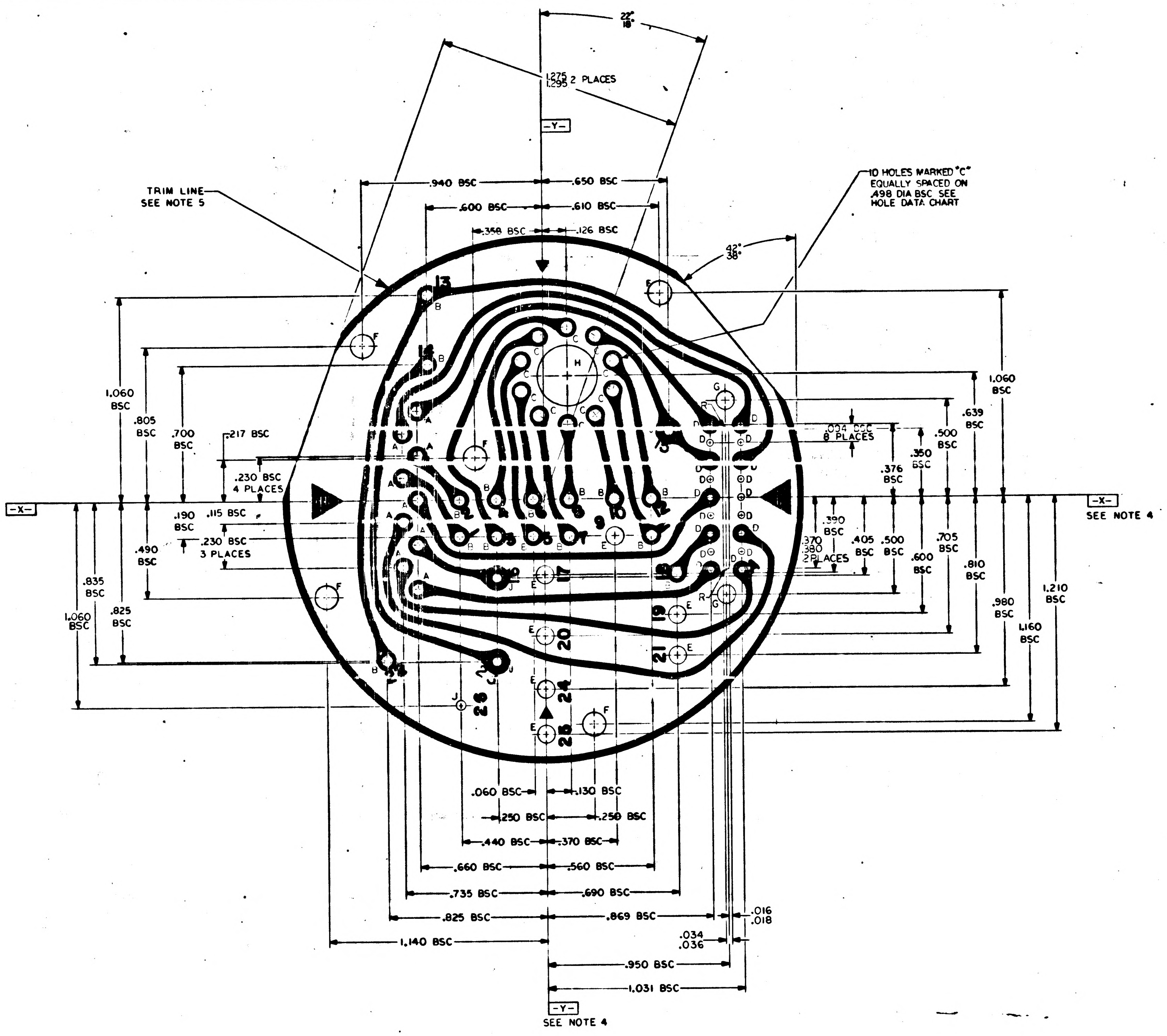
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CIRCUIT BOARD ASSEMBLY
APOLLO II IRIG

SIZE E
CODE IDENT NO
DRAWING NO 2021743
SCALE 4/1
SHEET 1 OF 1

2021743

REVISIONS		TDRR 16311				
ZONE	SYM	DESCRIPTION	BR	CHK	DATE	APPROVED
	A	REVISED TDRR 17151			3-3-65	W



22°
18°
1.275
1.295 2 PLACES
-Y-
.940 BSC
.650 BSC
.600 BSC
.610 BSC
.358 BSC
.126 BSC
TRIM LINE
SEE NOTE 5
10 HOLES MARKED "C"
EQUALLY SPACED ON
.498 DIA BSC SEE
HOLE DATA CHART
42°
38°
13
14
H
G
R
1.060
BSC
.805
BSC
.700
BSC
.217 BSC
.230 BSC
4 PLACES
.190
BSC
.115 BSC
.230 BSC
3 PLACES
.490
BSC
.835
BSC
.825
BSC
1.060
BSC
-X-
-X-
SEE NOTE 4
1.060
BSC
.639
BSC
.500
BSC
.350
BSC
.376
BSC
.034 BSC
8 PLACES
.390
BSC
.370
.380
2 PLACES
.405
BSC
.500
BSC
.600
BSC
.705
BSC
.810
BSC
.980
BSC
1.160
BSC
1.210
BSC
2
4
6
8
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20
21
24
25
26
A
B
C
D
E
F
J
.060 BSC
.130 BSC
.250 BSC
.250 BSC
.440 BSC
.370 BSC
.660 BSC
.560 BSC
.735 BSC
.690 BSC
.825 BSC
.869 BSC
.016
.018
1.140 BSC
.034
.036
.950 BSC
1.031 BSC
-Y-
SEE NOTE 4

HOLE DATA			
LETTER	DIA THRU	TOLERANCE ⌖ DIA	QTY
A	.045 .050	.005	9
B	.045 .050	.005	15
C	.045 .050	.005	10
D	.031 .033	.004	18
E	.090 .100	.010	7
F	.119 .124	.010	5
G	.087 .093	.004	2
H	.310 .320	.010	1
J	.050 .053	.010	4

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. PRINTED CIRCUIT BOARD SHALL CONFORM TO SPECIFICATIONS LISTED IN MIL-P-55110
3. MATERIAL: PLASTIC SHEET, LAMINATED, COPPER CLAD PER MIL-P-13949 TYPE FL-GF-031-C-2
4. A LINE PASSING THRU THE APEX OF RESPECTIVE TRIANGLES DEFINES DATUM X AND DATUM Y
5. CUT TO WITHIN ±.010 OF TRIM LINE
6. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019
7. PLATING: TIN LEAD PLATE, 60 TO 70% TIN, .0003 MIN THICK COATING; LACQUER (OPTIONAL)

REF:
DRAWING NO. 2021745 FOR PHOTOGRAPHIC MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021743	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN J. Falzano 1 JAN 65
CHECKED G. QUINN 2/4/65
APPROVED
APPROVED RA Booth
MIT APPROVED W. [illegible] DATE 4 Feb 65
NASA W J Rh[illegible] 2-5-65

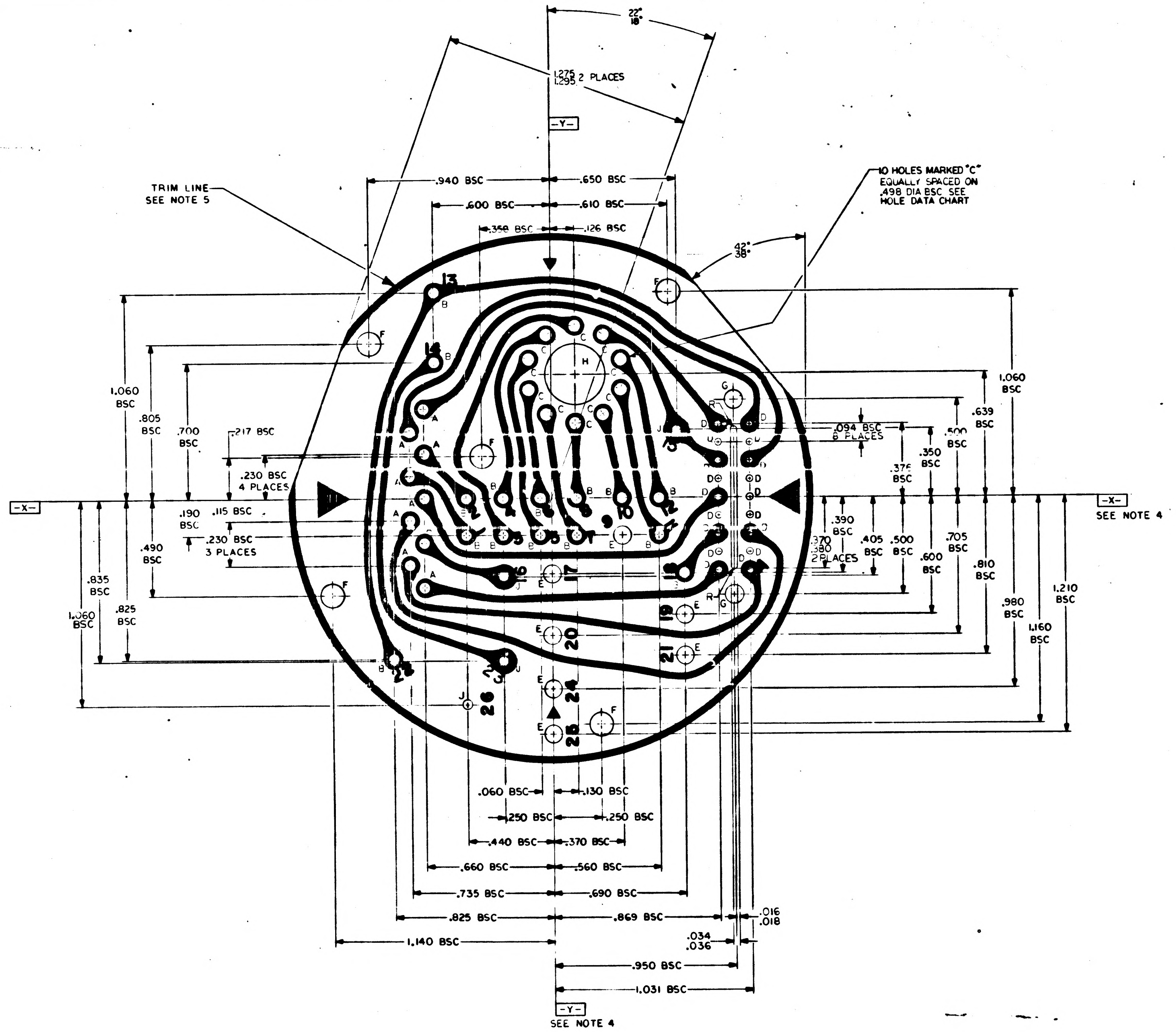
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PRINTED CIRCUIT BOARD
APOLLO II IRIG

SIZE E
CODE IDENT NO
DRAWING NO. 2021746
SCALE 4/1
SHEET 1 OF 1

REVISIONS TDRR 6311

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A	REVISED TDRR 17151			3-9-65	W.
	B	REVISED TDRR 32075	RWM		11-16-	


22°
18°
1.275
1.295 2 PLACES
-Y-
.940 BSC
.650 BSC
.600 BSC
.610 BSC
.358 BSC
.126 BSC
TRIM LINE
SEE NOTE 5
10 HOLES MARKED "C"
EQUALLY SPACED ON
.498 DIA BSC SEE
HOLE DATA CHART
42°
38°
1.060 BSC
.805 BSC
.700 BSC
.217 BSC
.230 BSC 4 PLACES
-X-
.190 BSC
.115 BSC
.230 BSC 3 PLACES
.490 BSC
.835 BSC
.825 BSC
1.060 BSC
1.060 BSC
.639 BSC
.500 BSC
.094 BSC 6 PLACES
.350 BSC
.376 BSC
.390 BSC
.370
.380 2 PLACES
.405 BSC
.500 BSC
.600 BSC
.705 BSC
.810 BSC
.980 BSC
1.160 BSC
1.210 BSC
-X-
SEE NOTE 4
.060 BSC
.130 BSC
.250 BSC
.250 BSC
.440 BSC
.370 BSC
.660 BSC
.560 BSC
.735 BSC
.690 BSC
.825 BSC
.869 BSC
.016
.018
1.140 BSC
.034
.036
.950 BSC
1.031 BSC
-Y-
SEE NOTE 4
A
B
C
D
E
F
G
H
J
R
1
2
3
4
5
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7
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22
23
24
25
26

HOLE DATA			
LETTER	DIA THRU	TOLERANCE ⊕ DIA	QTY
A	.045 .050	.005	9
B	.045 .050	.005	15
C	.045 .050	.005	10
D	.031 .033	.004	18
E	.090 .100	.010	7
F	.119 .124	.010	5
G	.087 .093	.004	2
H	.310 .320	.010	1
J	.050 .053	.010	4

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2 PRINTED CIRCUIT BOARD SHALL CONFORM TO SPECIFICATIONS LISTED IN MIL-P-55110
3. MATERIAL: PLASTIC SHEET, LAMINATED, COPPER CLAD PER MIL-P-13949 TYPE FL-GE-031-C-2/0
4. A LINE PASSING THRU THE APEX OF RESPECTIVE TRIANGLES DEFINES DATUM X AND DATUM Y
5. CUT TO WITHIN ±.010 OF TRIM LINE
6. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND 1002019
7. PLATING: TIN LEAD PLATE, 60 TO 70% TIN, .0003 MIN THICK COATING; LACQUER (OPTIONAL)

REF:
DRAWING NO. 2021745 FOR PHOTOGRAPHIC MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

2021743	2021500
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K X1000 M X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

FINISH ______

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
CONTRACT NO.
DRAWN J. Falzano
CHECKED G. QUINN 2/4/65
APPROVED
APPROVED RA Booth
MIT APPROVED W Kupfer 9 Feb 65 DATE
NASA Wg Rhine 2-5-65

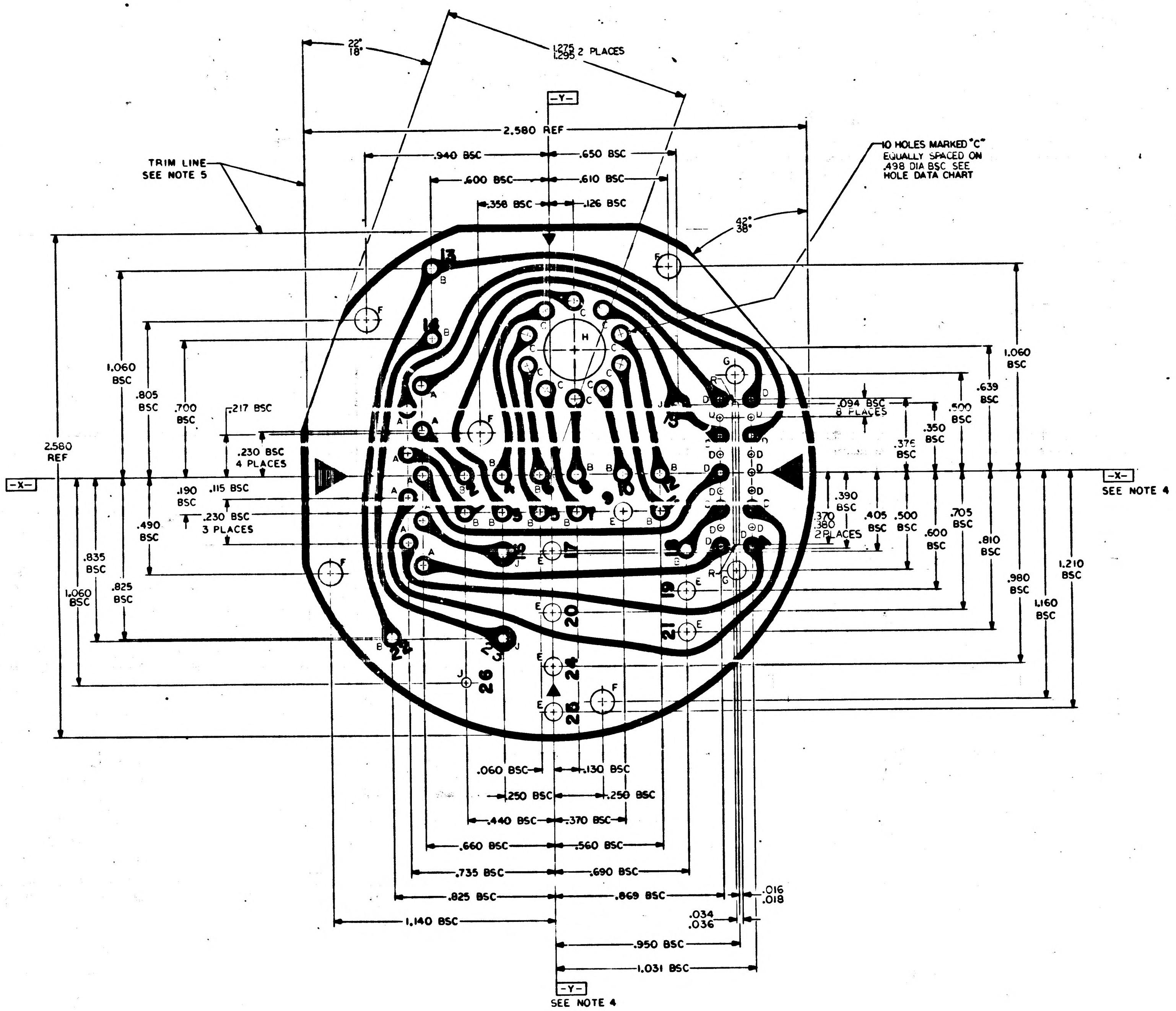
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PRINTED CIRCUIT BOARD
APOLLO II IRIG

SIZE E
CODE IDENT NO
DRAWING NO. 2021746
SCALE 4/1
SHEET

REVISIONS TDRR 16311

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



22°
18°
1.275
1.295 2 PLACES
-Y-
2.580 REF
.940 BSC
.650 BSC
.600 BSC
.610 BSC
.358 BSC
.126 BSC
TRIM LINE
SEE NOTE 5
10 HOLES MARKED "C"
EQUALLY SPACED ON
.498 DIA BSC SEE
HOLE DATA CHART
42°
38°
1.060 BSC
.805 BSC
.700 BSC
.217 BSC
.230 BSC 4 PLACES
2.580 REF
-X-
.190 BSC
.115 BSC
.230 BSC 3 PLACES
.490 BSC
.835 BSC
.825 BSC
1.060 BSC
1.060 BSC
.639 BSC
.094 BSC 8 PLACES
.500 BSC
.350 BSC
.375 BSC
-X-
SEE NOTE 4
.390 BSC
.370
.380 2 PLACES
.405 BSC
.500 BSC
.600 BSC
.705 BSC
.810 BSC
.980 BSC
1.160 BSC
1.210 BSC
H
A
B
C
D
E
F
G
J
13
14
19
21
23
24
25
26
.060 BSC
.130 BSC
.250 BSC
.250 BSC
.440 BSC
.370 BSC
.660 BSC
.560 BSC
.735 BSC
.690 BSC
.825 BSC
.869 BSC
.016
.018
1.140 BSC
.034
.036
.950 BSC
1.031 BSC
-Y-
SEE NOTE 4

HOLE DATA			
LETTER	DIA THRU	TOLERANCE ⌖ DIA	QTY
A	.060 .065	.005	9
B	.055 .060	.005	15
C	.065 .070	.005	10
D	.031 .033	.004	18
E	.090 .100	.010	7
F	.119 .124	.010	5
G	.087 .093	.004	2
H	.310 .320	.010	1
J	.050 .053	.010	4

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. PRINTED CIRCUIT BOARD SHALL CONFORM TO SPECIFICATIONS LISTED IN MIL-P-55110
3. MATERIAL: PLASTIC SHEET, LAMINATED, COPPER CLAD PER MIL-P-13949 TYPE FL-GF-031-C-2
4. A LINE PASSING THRU THE APEX OF RESPECTIVE TRIANGLES DEFINES DATUM X AND DATUM Y
5. CUT TO WITHIN ±.010 OF TRIM LINE
6. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019
7. PLATING: GOLD PLATE PER MIL-G-45204 TYPE II, .00008 MIN. THICK

REF:
DRAWING NO. 2021745 FOR PHOTOGRAPHIC MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021743	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K X1000 M X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3

FINISH ———

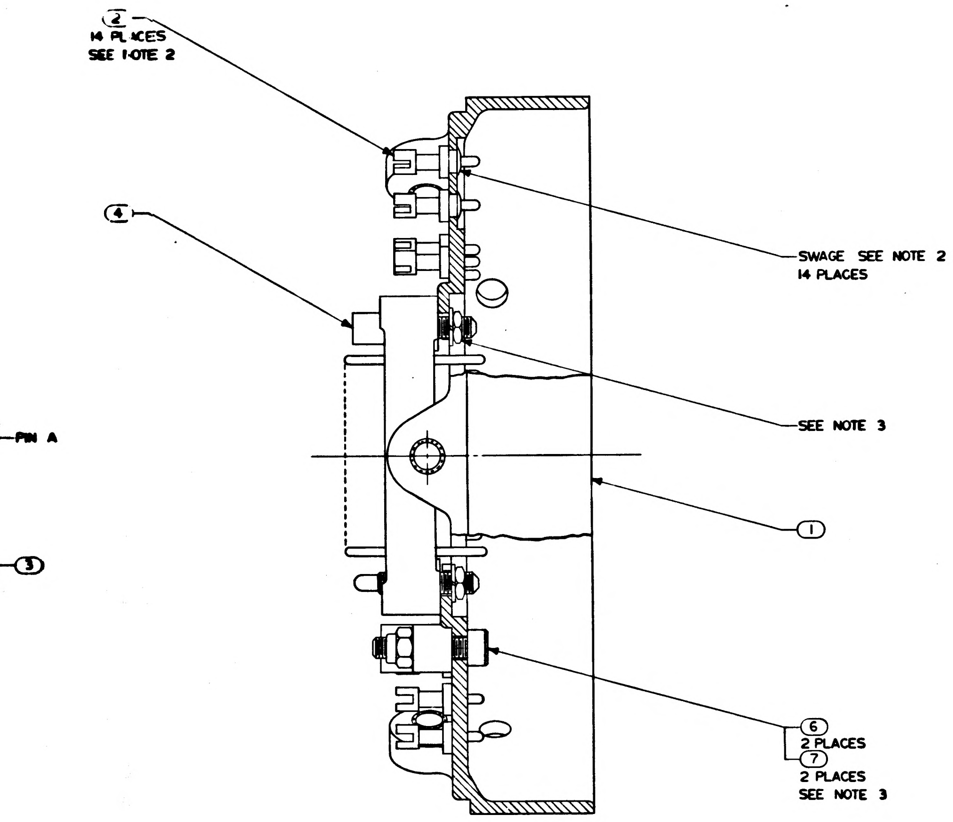
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN J. Falzone [illegible] JAN 65
CHECKED G. QUINN 2/4/65
APPROVED
APPROVED RA Booth [illegible]
MIT APPROVED DATE
[illegible] 9 Feb 65
NASA
[illegible] I-5-65

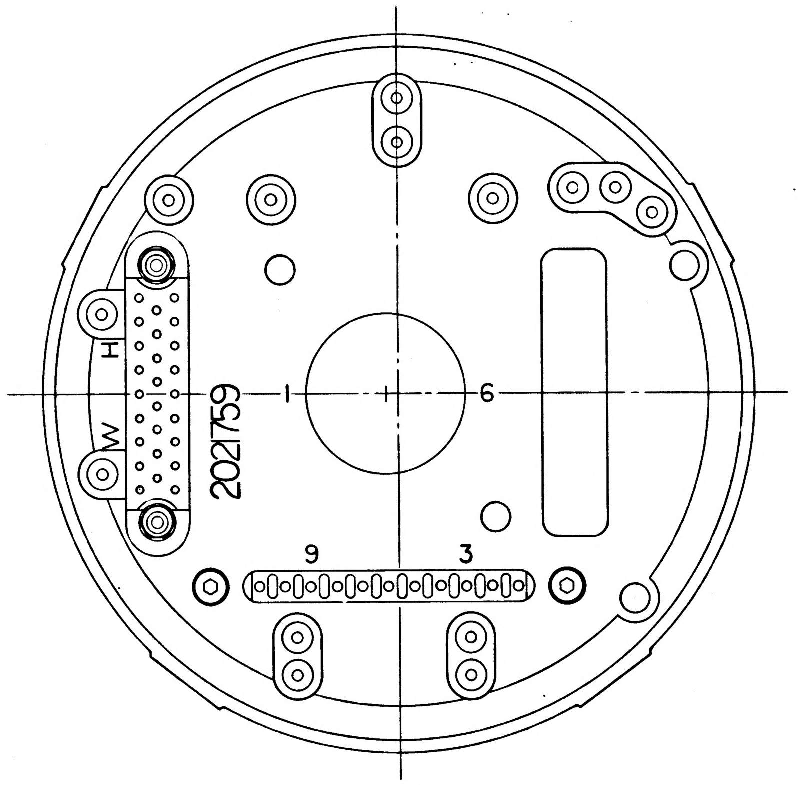
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PRINTED CIRCUIT BOARD
APOLLO II IRIG

SIZE E
CODE IDENT NO
DRAWING NO 2021746
SCALE 4/1
SHEET 1 OF 1

REVISIONS		TDRR 14737				
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A	REVISED PER TDRR 15042		AJB	12-18-64	





7	2		1011750-4	NUT, SELF-LOCKING, HEX		
6	2		1017418-3	SCREW, CAP, SOC. HD., HEX		
5	3		1000115-4	INSERT, THREADED, SELF-LOCKING		
4	1		1010852-26	CONNECTOR, ELECTRICAL, PLUG		
3	1		1010853-114	CONNECTOR, ELECTRICAL, RECEPTACLE		
2	14		1010846-001	TERMINAL, STUD		
1	1		2021759	PLATE, COVER & MOUNTING		
ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

2021601	2021500
NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X100 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN R.G.S. 12-1-64
CHECKED
APPROVED A J Boyce 12-8-64
APPROVED R A Booth 12-8-64
MIT APPROVED W Kupfer 8 Dec 64 DATE
NASA W J Rhine 12-8-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

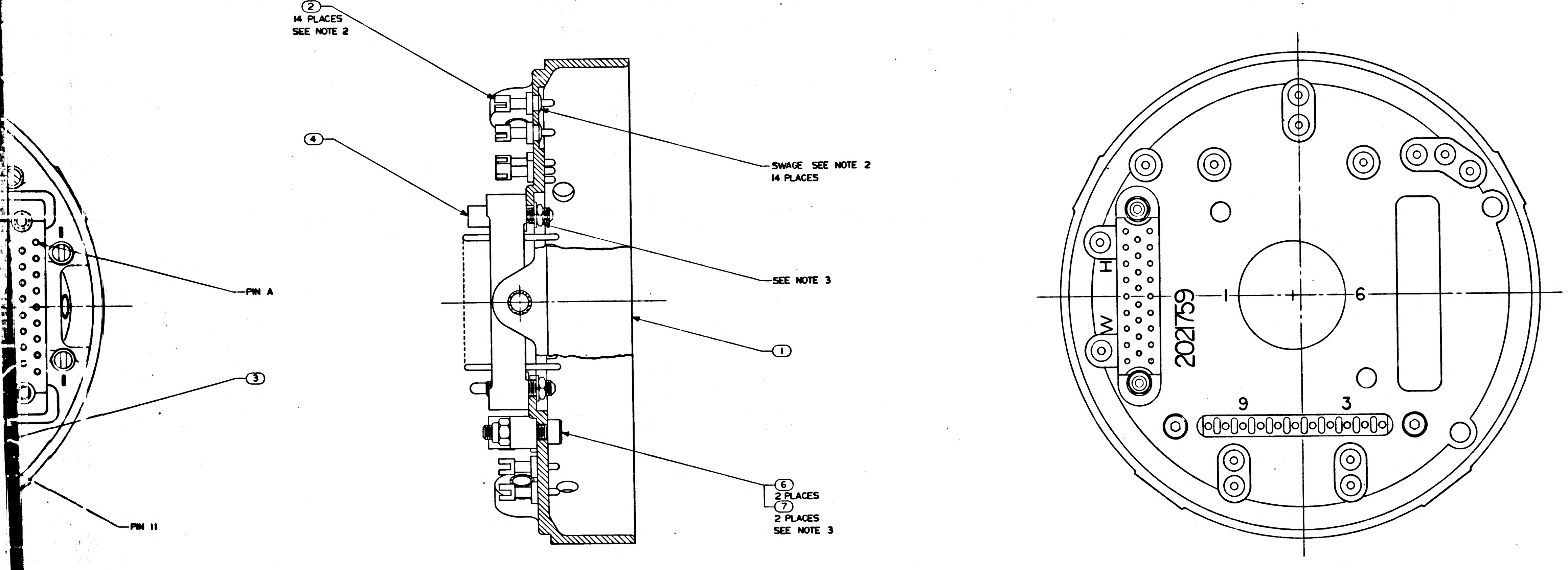
ASSEMBLY,
COVER & MOUNTING PLATE

SIZE J
CODE IDENT NO
DRAWING NO 2021758
SCALE 4/1
SHEET 1 OF 1

2021758

2021758 REV A SHEET 1

REVISIONS	TDRR 14737				
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



② 14 PLACES SEE NOTE 2
④
PIN A
③
PIN 11
SWAGE SEE NOTE 2 14 PLACES
SEE NOTE 3
①
⑥ 2 PLACES
⑦ 2 PLACES SEE NOTE 3
H
W
2021759
1
6
9
3

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION
7	2		1011750-4	NUT, SELF-LOCKING, HEX		
6	2		1017418-3	SCREW, CAP, SOC. HD., HEX		
5	3		1000115-4	INSERT, THREADED, SELF-LOCKING		
4	1		1010852	CONNECTOR, ELECTRICAL, PLUG		
3	1		1010853	CONNECTOR, ELECTRICAL, RECEPTACLE		
2	14		1010846-001	TERMINAL, STUD		
1	1		2021759	PLATE, COVER & MOUNTING		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021601	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

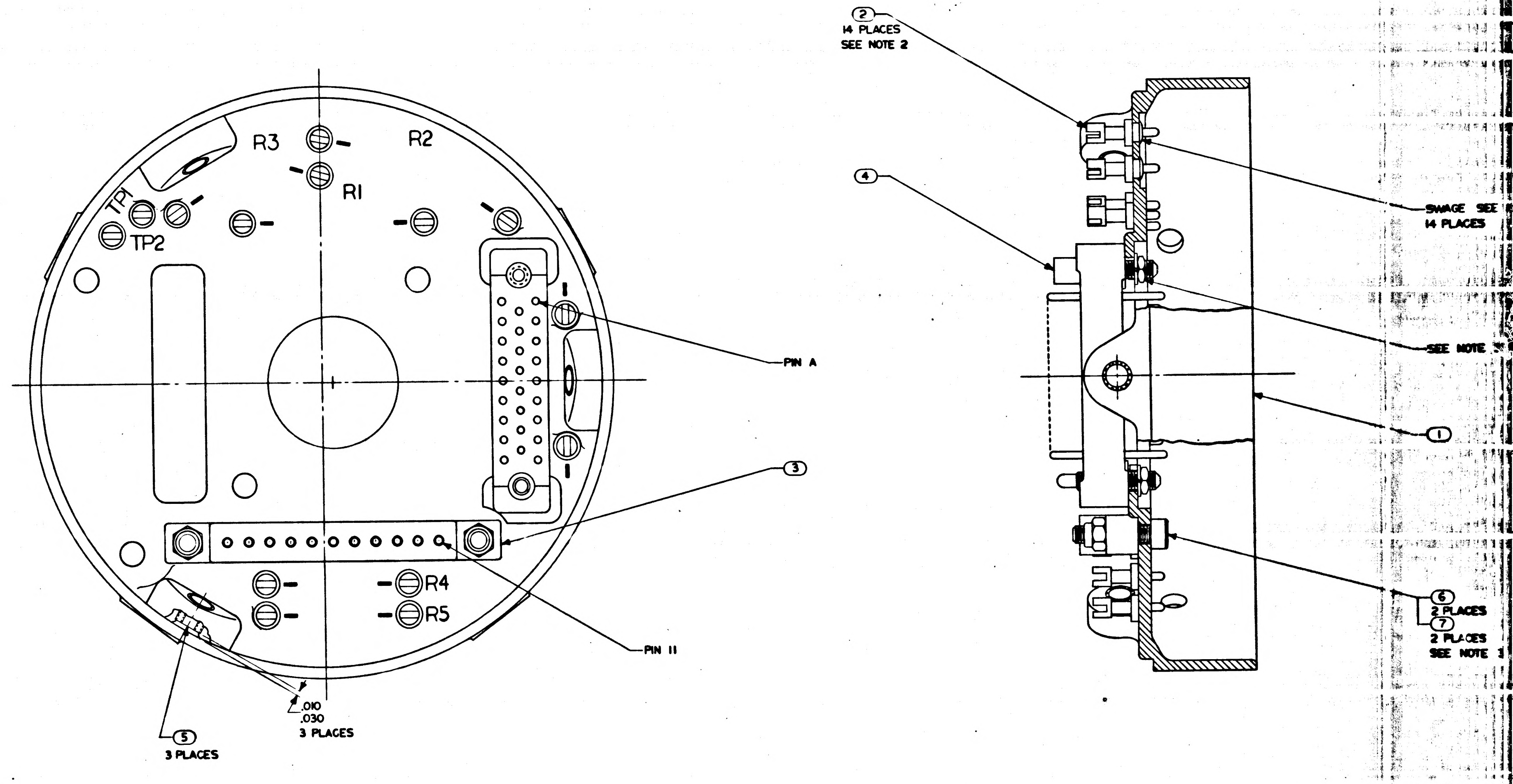
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN R.G.S. 10-1-64
CHECKED
APPROVED A J Boyce 12-2-64
APPROVED R A Booth 12-2-64
MIT APPROVED W Kupfer 8 Dec 64 DATE
NASA W J Rhine 12-8-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ASSEMBLY, COVER & MOUNTING PLATE

SIZE J
CODE IDENT NO
DRAWING NO 2021758
SCALE 4/1
SHEET 1 OF 1

MASTER


R3
R2
R1
TP1
TP2
R4
R5
PIN A
PIN 11
③
⑤
3 PLACES
.010
.030
3 PLACES
②
14 PLACES
SEE NOTE 2
④
SWAGE SEE
14 PLACES
SEE NOTE
①
⑥
2 PLACES
⑦
2 PLACES
SEE NOTE

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE ITEM ② PER ATP2021500, MC - SLOTS IN ITEM ② TO BE ALIGNED WITHIN ± 5° OF RAISED CHARACTERS ON ITEM ①, (12 PLACES)
3. SCREW TORQUE REQUIREMENTS: 3.50 IN-LB ± 0.25 IN-LB
4. IDENTIFY USING DRAWING NO., REVISION LETTER, AND MANUFACTURERS SYMBOL PER ND1002019

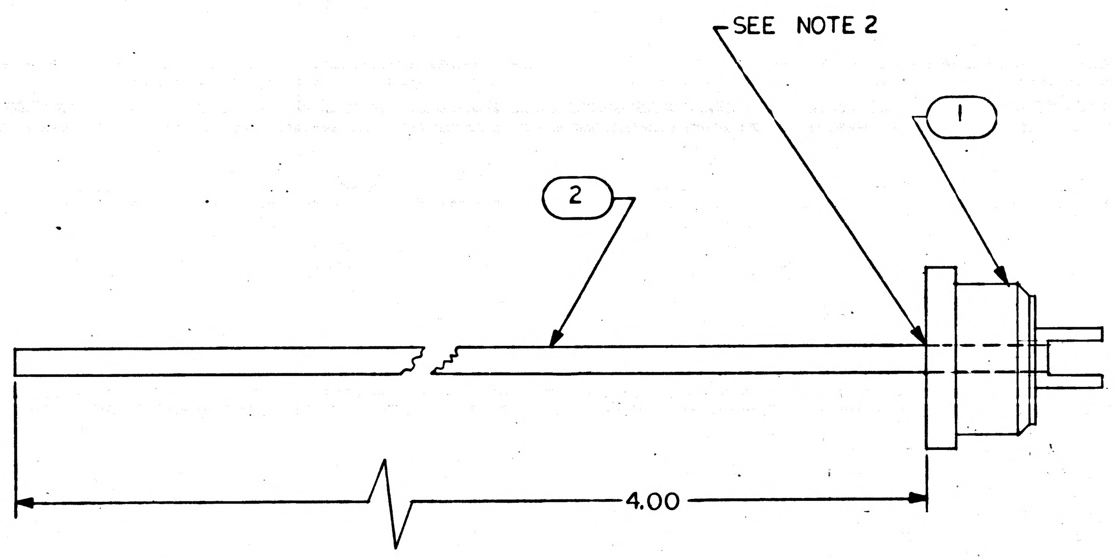
2021758	REV	SHEET
		1

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

B 2021761

REVISIONS 15040

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
Ⓜ A		REVISED PER TDRR 33087	DJC		14 SEP 67	
B		REVISED PER TDRR 37289			4 FEB 69	



NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. SOLDER PER ND 1002071 USING SN5
3. IDENTIFY PER ND 1002019
4. MANUFACTURED BY: SELECTRO CORP.,
   139 HOYT ST.,
   MAMARONECK, NEW YORK

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006757-13		WIRE ELECTRICAL	2
1	1008997-001		TERMINAL FEED THRU PRESS FIT	1

-011 LIST OF MATERIALS

NEXT ASSY	USED ON
2021779	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf -
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL —

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	Louis A Cowie	Dec. 8, 64
CHECKED		15 Dec 64
APPROVED	N Sakelos	12-16-64
APPROVED	S. C. Smith	12-16-64
APPROVED MIT	W Kupfer	22 Dec 64
APPROVED MSC	W J Rhine	12-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL FEED THRU ASSY

CODE IDENT NO.	SIZE	DRAWING NO.
—	C	2021761

SCALE 10/1
SHEET 1 OF 1

2021761 B

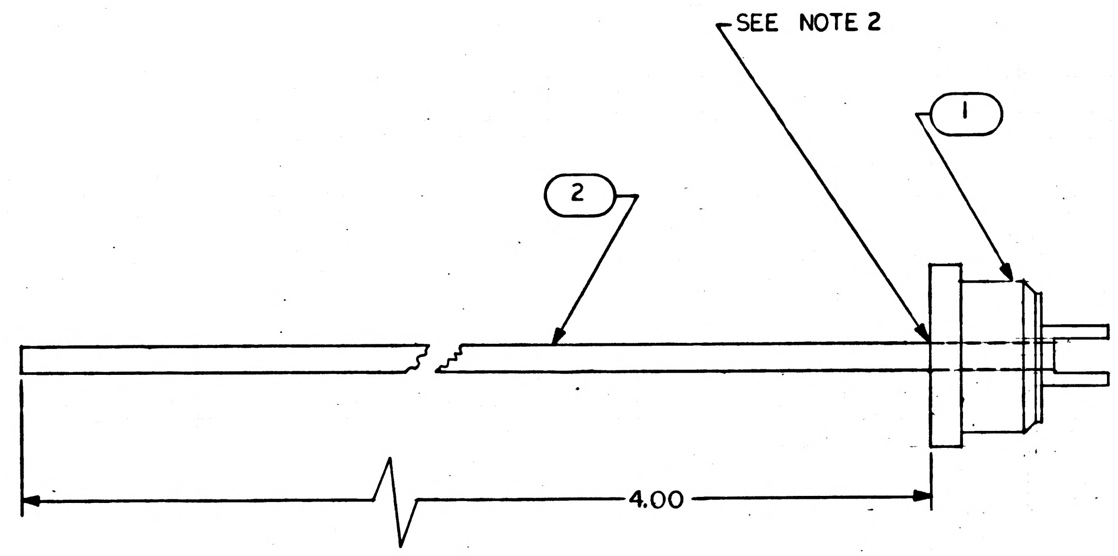
LB

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

2021761

REVISIONS 15040

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL- D-70327
2. SOLDER PER ND 1002071 USING SN5
3. IDENTIFY PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
AR	1006757- 13		WIRE ELECTRICAL	2
1	2021591		TERMINAL	1
-011	LIST OF MATERIALS			

MASTER

NEXT ASSY	USED ON
2021779	
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± DECIMALS ±.03 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL ———

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	Louis A Cowie	Dec. 8, 64
CHECKED	R.P. Kingsbury	15 DEC 64
APPROVED	N Sakelos	12-16-64
APPROVED	S.C. Smith	12-16-64
APPROVED MIT	W Kupfer	22 Dec 64
APPROVED MSC	W J Rhine	12-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL FEED THRU ASSY

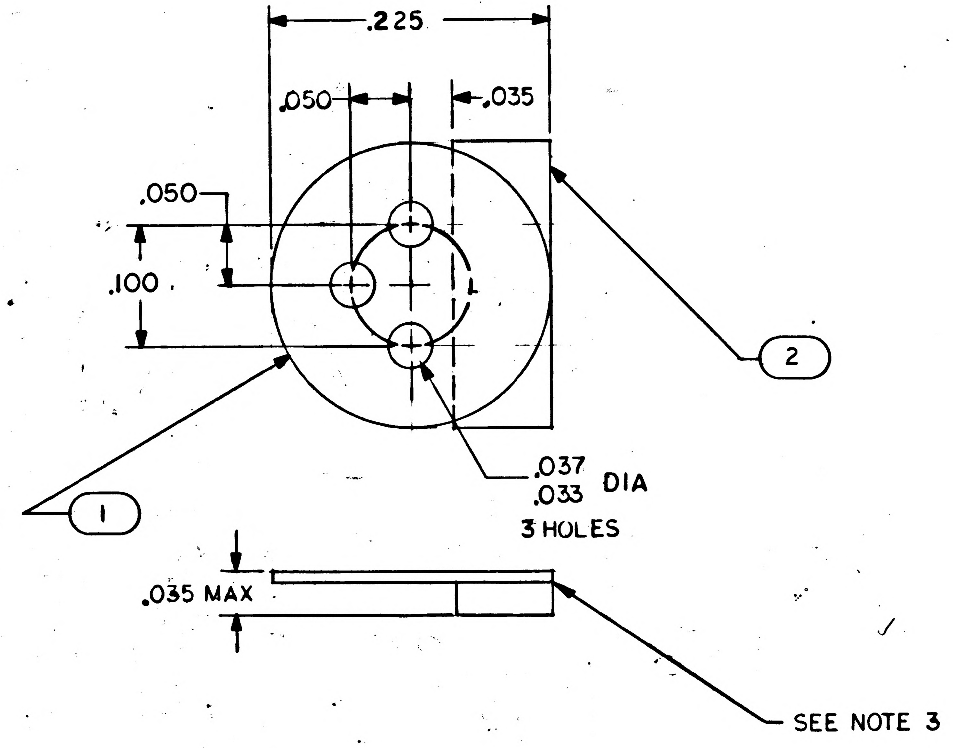
CODE IDENT NO.	SIZE	DRAWING NO.
———	C	2021761
SCALE 10/1		SHEET 1 OF 1

28

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15040

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 19019	LAL		13MAY65	



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FILM .006/.008 THICK PER L-F-340 TYPE IB, CLASS 2, STYLE IA
3. BOND PER ND 1002004, TYPE I
4. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	2021786	SPACER, INSULATOR	2
1	2021762-001	INSULATOR	1
011	LIST OF MATERIALS		

2021785	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN	J. Addario Jr.	9DEC.64
CHECKED		15DEC64
APPROVED	N. Sakelos	12-16-64
APPROVED	S.C. Smith	12-16-64
APPROVED MIT		22Dec64
APPROVED MSC	W J Rhine	12-22-64
		DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, TRANSISTOR
IRIG PREAMP

CODE IDENT NO.	SIZE	DRAWING NO.
80230	C	2021762
SCALE 10/1		SHEET 1 OF 1

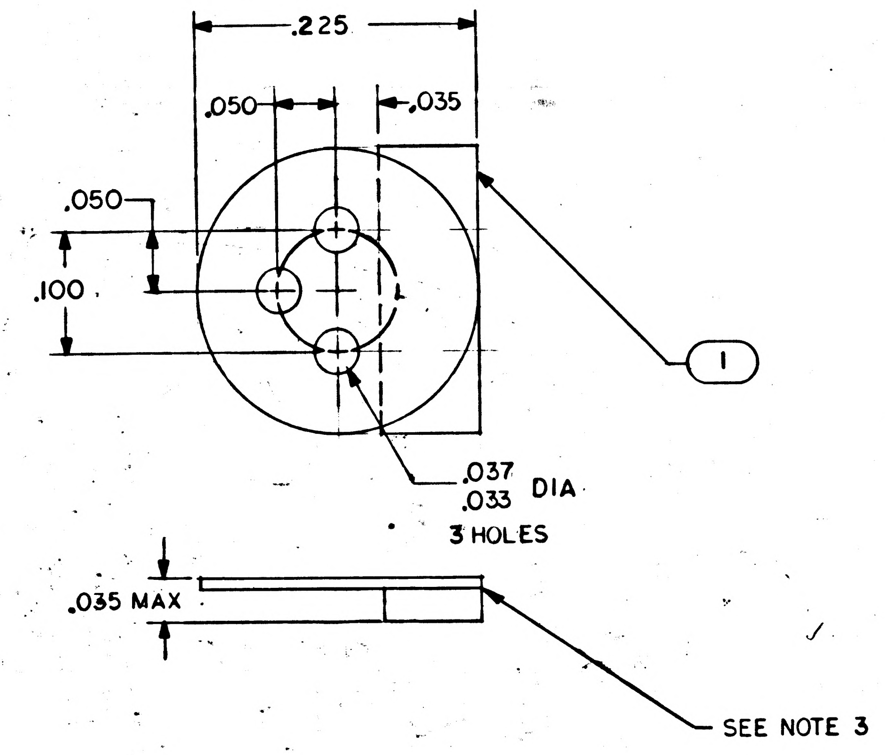
MASTER

LB

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15040

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 19019	LAL		13MAY65	WK
B		REVISED PER TDRR 19795			4JUN65	WK



- NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FILM .006/.008 THICK PER L-F-340 TYPE IB, CLASS 2, STYLE IA
3. BOND PER ND 1002004, TYPE I
4. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	2021786	SPACER, INSULATOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2021785	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	A. Addario Jr.	9DEC.64
CHECKED		15DEC64
APPROVED	N Sakelos	12-16-64
APPROVED	A.C. Smith	12-16-64
APPROVED MIT	W Kupfer	22Dec64
APPROVED MSC	W J	12-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, TRANSISTOR
IRIG PREAMP

CODE IDENT NO.	SIZE	DRAWING NO.
80230	C	2021762

SCALE 10/1 SHEET 1 OF 1

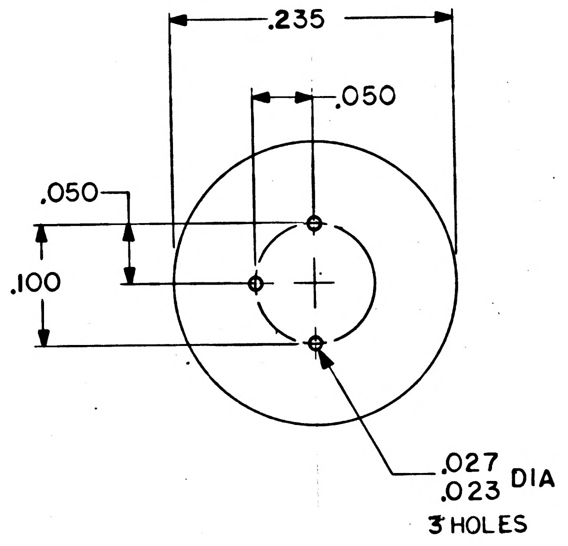
MASTER

LB

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 15040

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FILM .006/.008 THICK PER L-F-340 TYPE IB, CLASS 2, STYLE IA
3. IDENTIFY PER ND 1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

MASTER

NEXT ASSY	USED ON
2021785	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± ——	±.005	± ——

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN	J. Addario Jr.	9 DEC.64
CHECKED	R.P. Kmiecik	15 DEC 64
APPROVED	N. Sakelos	12-16-64
APPROVED	S.C. Smith	12-16-64
APPROVED MIT	W. Kupfer	22 Dec 64
APPROVED MSC	W J Rhine	12-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INSULATOR, TRANSISTOR
IRIG PREAMP

CODE IDENT NO.	SIZE	DRAWING NO.
——	C	2021762

SCALE 10/1

SHEET 1 OF 1

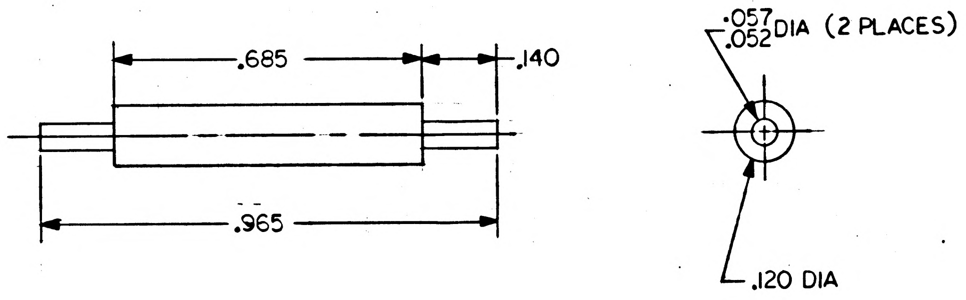
LB

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

2021763

REVISIONS 15040

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ROD GLASS EPOXY PER 1010692-5 TYPE GEE
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
4. IDENTIFY PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	MATERIAL OR NOTES	NOMENCLATURE OR DESCRIPTION	FIND NO.
-011	LIST OF MATERIALS			

2021785	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MASTER

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

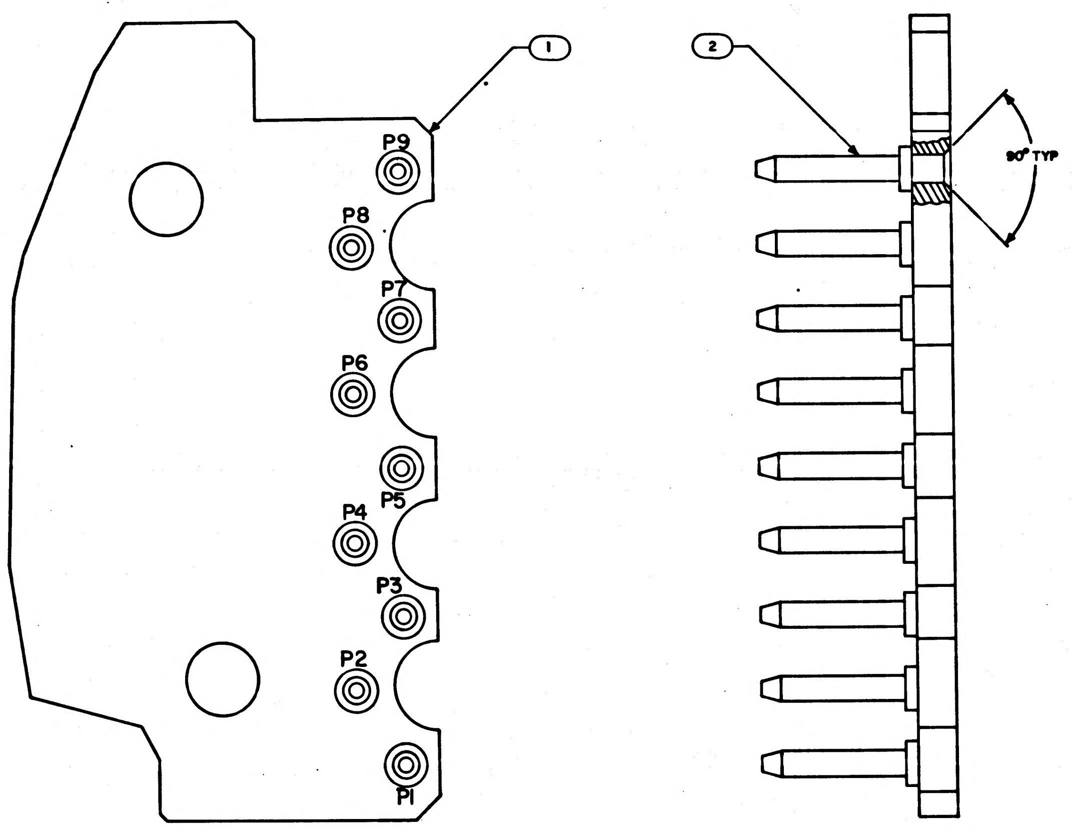
		DATE
DRAWN	Lou S ALowE	DEC. 8, 64
CHECKED		15 DEC 64
APPROVED		12-16-64
APPROVED	L.C. Smith	12-16-64
APPROVED MIT		22 Dec 64
APPROVED MSC	W.J. Rhine	12-22-64

SPACER, INSULATED
IRIG PREAMP

CODE IDENT NO. —
SIZE C
DRAWING NO. 2021763
SCALE 4/1
SHEET 1 OF 1

LB

REVISIONS TDRR 14198						
ZONE	SYM	DESCRIPTION	BY	CHK	DATE	APPROVED



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE ITEM ② PER ATP 2021500, MC 25867
3. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
2	9		2971-2	PLUG, CONNECTOR		
1	1		2021755	WIRING BOARD, BOTTOM		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021750	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

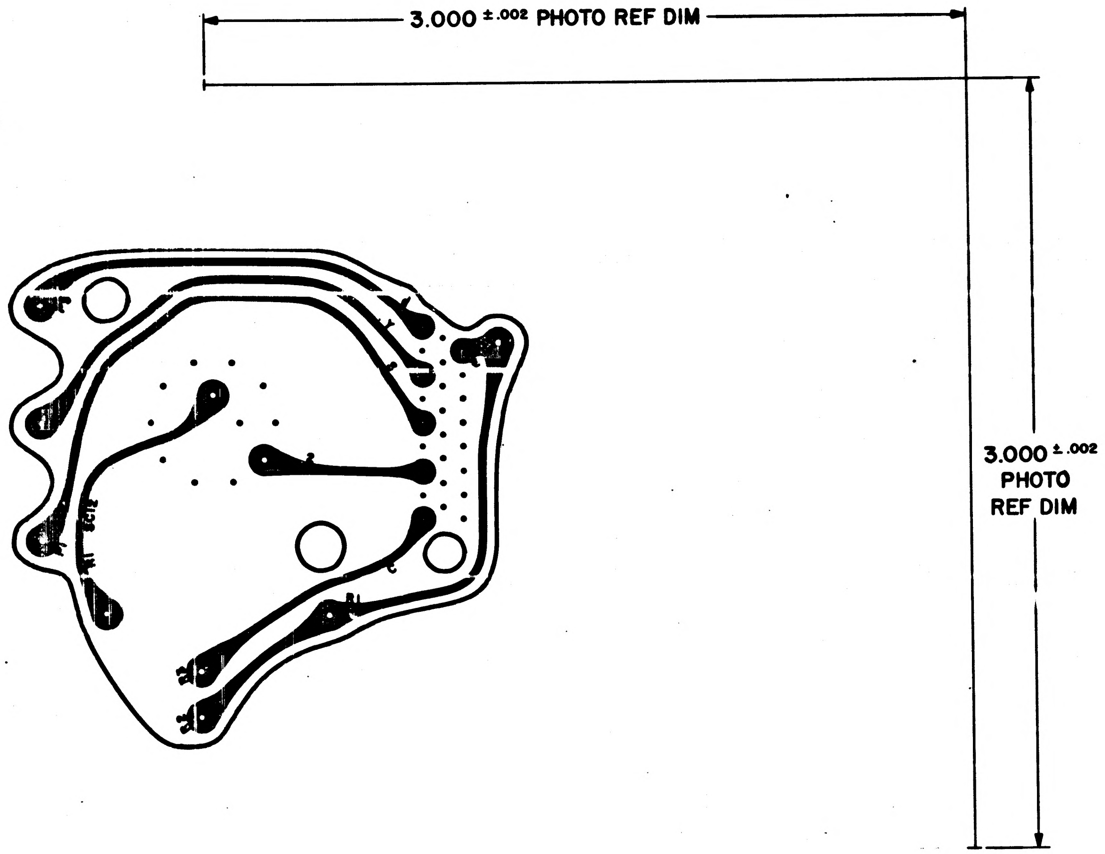
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN R.G.S. 11-23-64
CHECKED
APPROVED J.C. Smith 11-23-64
APPROVED R.A. Booth 11-23-64
MIT APPROVED DATE
W Kupfer 24 Nov 64
NASA
11/4/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD,
BOTTOM ASS'Y.
IRIG PREAMP

SIZE E
CODE IDENT NO
DRAWING NO. 2021764
SCALE 10/1
SHEET 1

TDRR 14499



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL DISTORTION SHALL NOT EXCEED .001 INCHES PER INCH.
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021766	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

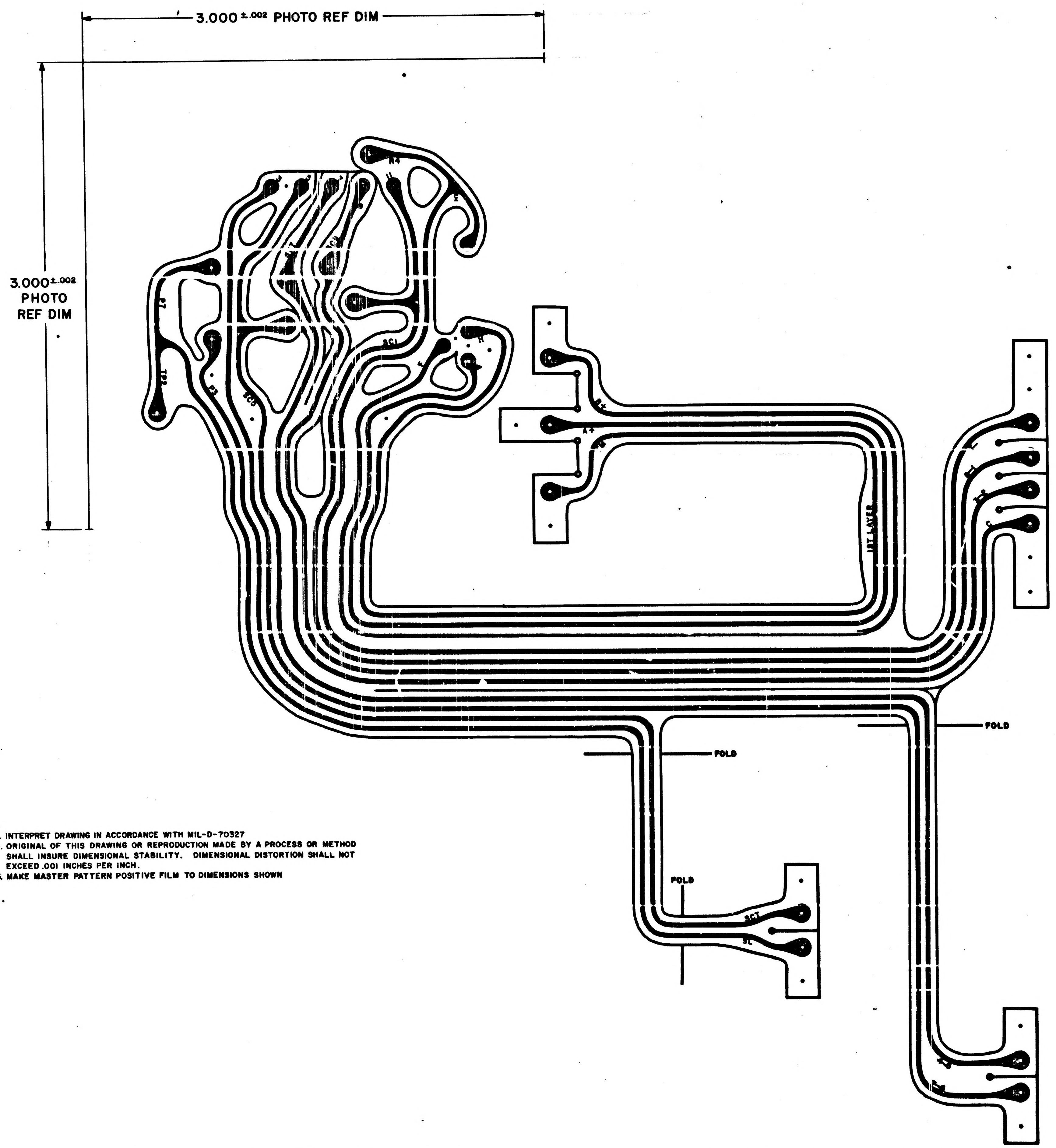
MIT INSTRUMENTATION LAB
CONTRACT NO.
DRAWN Jamie Fabyano 11/18/64
CHECKED
APPROVED J. C. Smith 11-23-64
APPROVED R A Booth 11-23-64
W Kupfer 24 Nov 64
NASA

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
FLEXIBLE PRINTED CIRCUIT
BASE LAYER
APOLLO II IRIG

SIZE E
DRAWING NO. 2021765
SCALE 4/1
SHEET 1 OF 1

REVISIONS	TDRR 14499					
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL DISTORTION SHALL NOT EXCEED .001 INCHES PER INCH.
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

2021768	2021500
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING
MATERIAL
FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
CONTRACT NO.
DRAWN J. Falzone 9/19/64
CHECKED
APPROVED L.C. Smith 11-23-64
APPROVED RA Booth 11-23-64
MIT APPROVED DATE
W. [illegible] 24 Nov 64
NASA
[illegible] 11/24/64

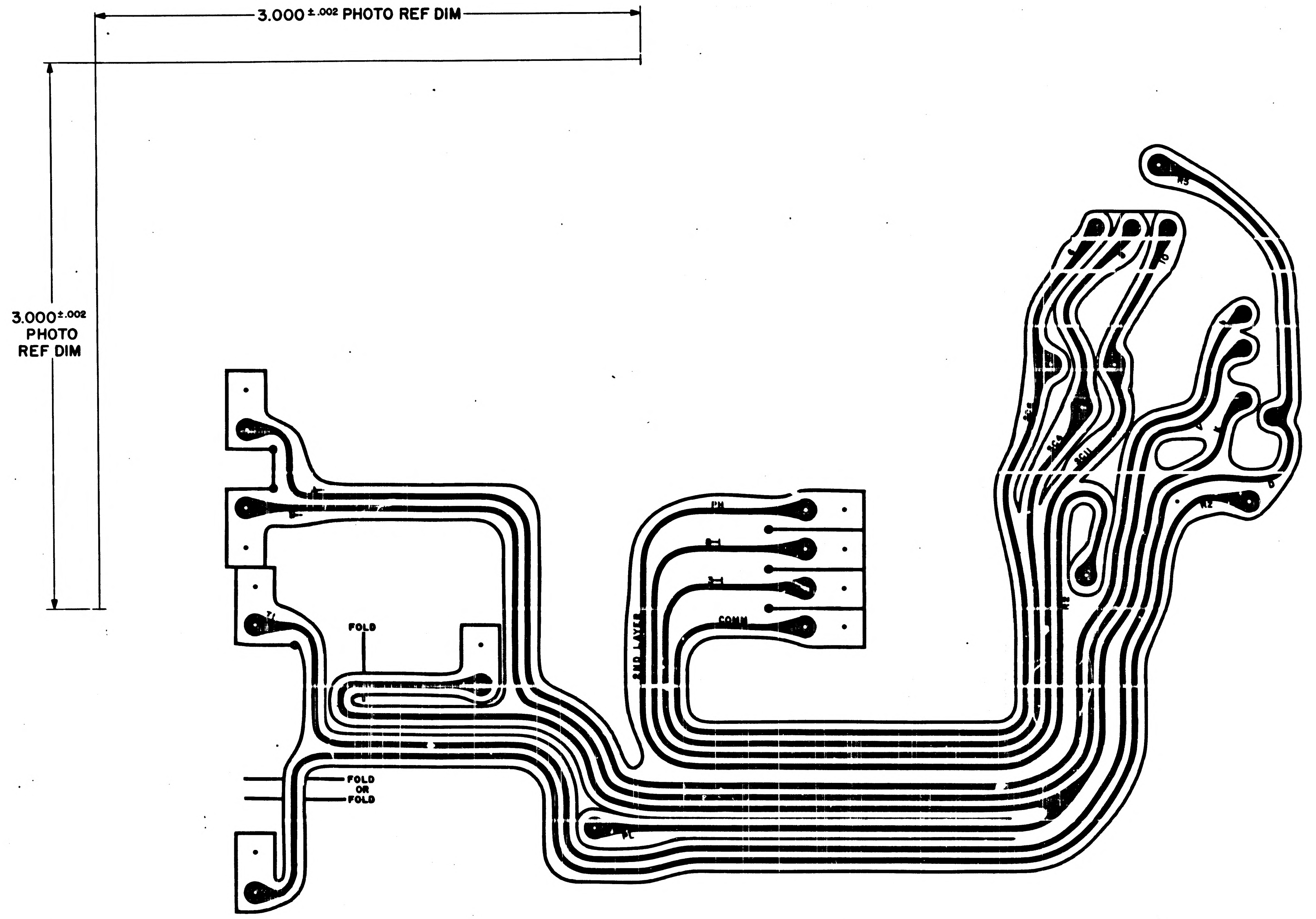
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
FLEXIBLE PRINTED CIRCUIT
1st LAYER
APOLLO II IRIG

SIZE E
CODE IDENT NO
DRAWING NO. 2021767
SCALE 4/1
SHEET 1 OF 1

2021767

REVISIONS TDRR 14499						
ZONE	SYM	DESCRIPTION	BY	CHK	DATE	APPROVED



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL DISTORTION SHALL NOT EXCEED .001 INCHES PER INCH
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

2021770	2021500
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN J. Falzano 4/17/64
CHECKED
APPROVED A. C. Aurelle 4-23-64
APPROVED RA Booth 4-23-64
MIT APPROVED W Kupfer DATE 24 Nov 64
NASA [illegible] 11/24/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

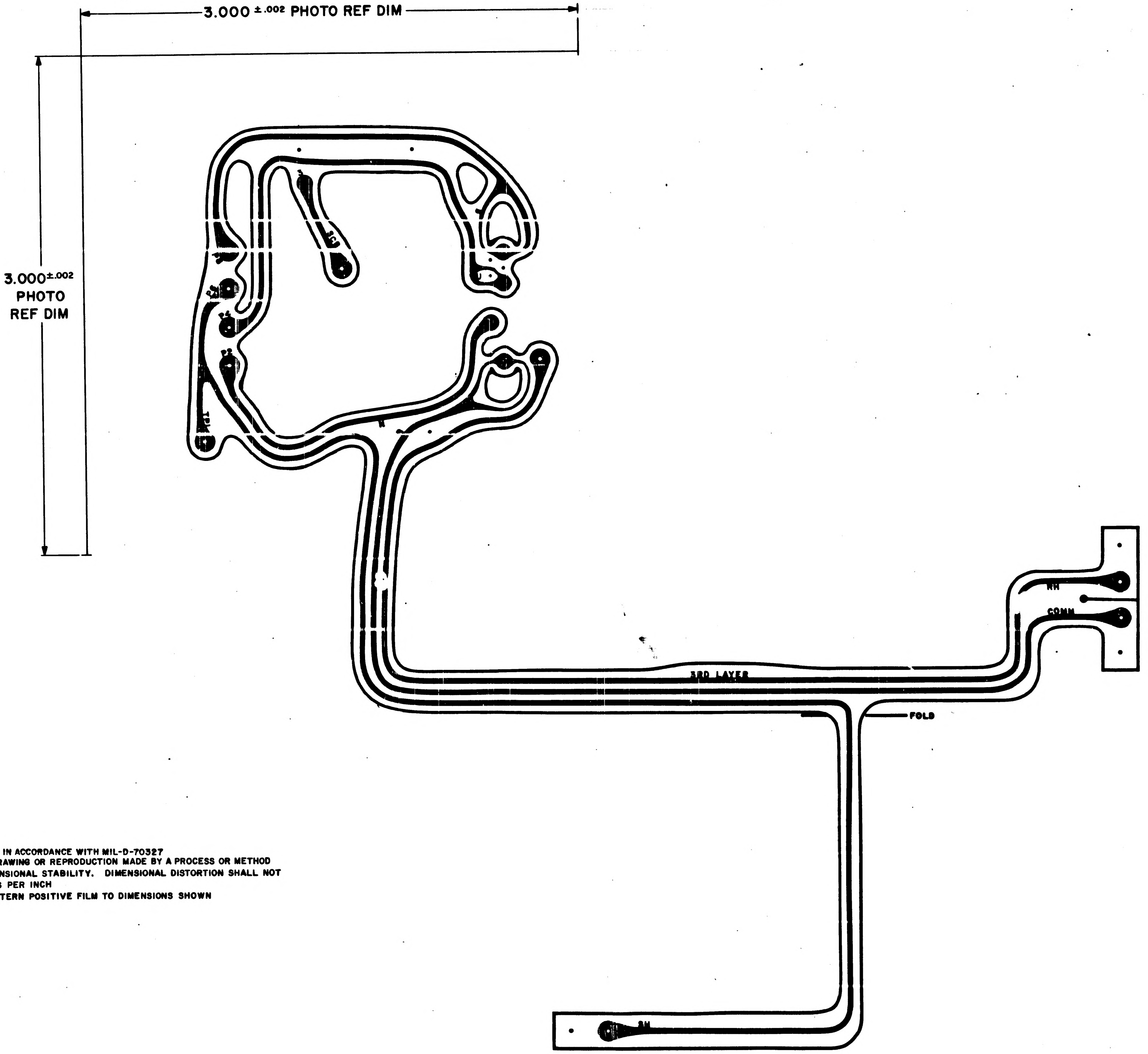
PHOTOGRAPHIC MASTER
FLEXIBLE PRINTED CIRCUIT
2nd LAYER
APOLLO II IRIG

SIZE	CODE IDENT NO	DRAWING NO.
E		2021769

SCALE 4/1 SHEET 1 OF 1

4 3 2 1

REVISIONS		TCRR 14489				
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL DISTORTION SHALL NOT EXCEED .001 INCHES PER INCH
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021772	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL ——

FINISH ——

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN J. Falgano 4/?/64
CHECKED
APPROVED A. C. Amelly 11-23-64
APPROVED RA Booth 11-23-64
MIT APPROVED W Kupfer DATE 24 Nov 64
NASA W Michael 11/24/64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

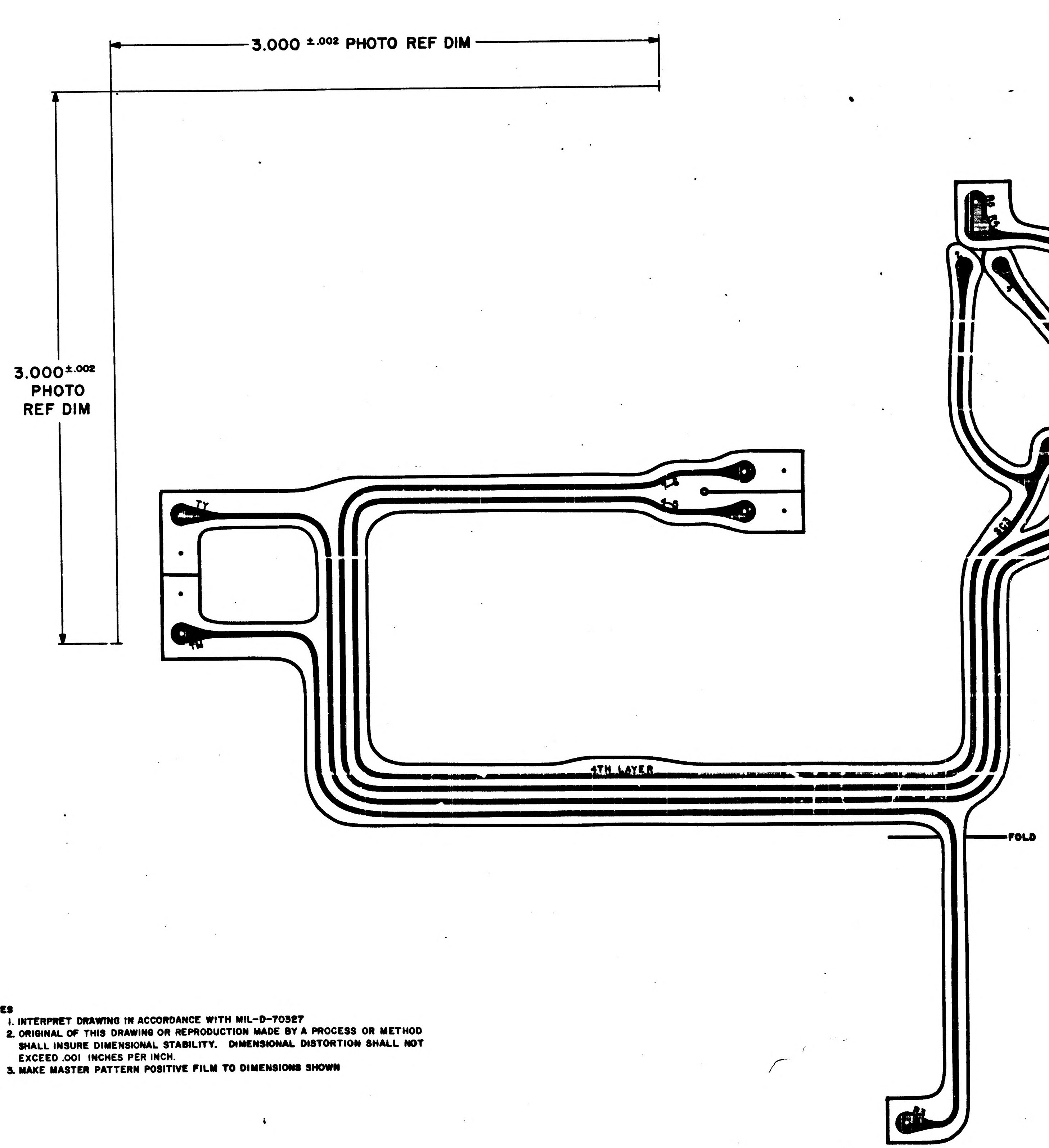
PHOTOGRAPHIC MASTER
FLEXIBLE PRINTED CIRCUIT
3rd LAYER
APOLLO II IRIG

SIZE E
CODE IDENT NO
DRAWING NO. 2021771
SCALE 4/1
SHEET 1 OF 1

4 3 2

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED

REVISIONS TDRR 14499



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL DISTORTION SHALL NOT EXCEED .001 INCHES PER INCH.
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021774	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN J. Falzone 11/10/64
CHECKED
APPROVED A.C. Smith 11-23-64
APPROVED R A Roth 11-23-64
MIT APPROVED W. Cooper DATE 24 NOV 64
NASA K Mihick 11/24/64

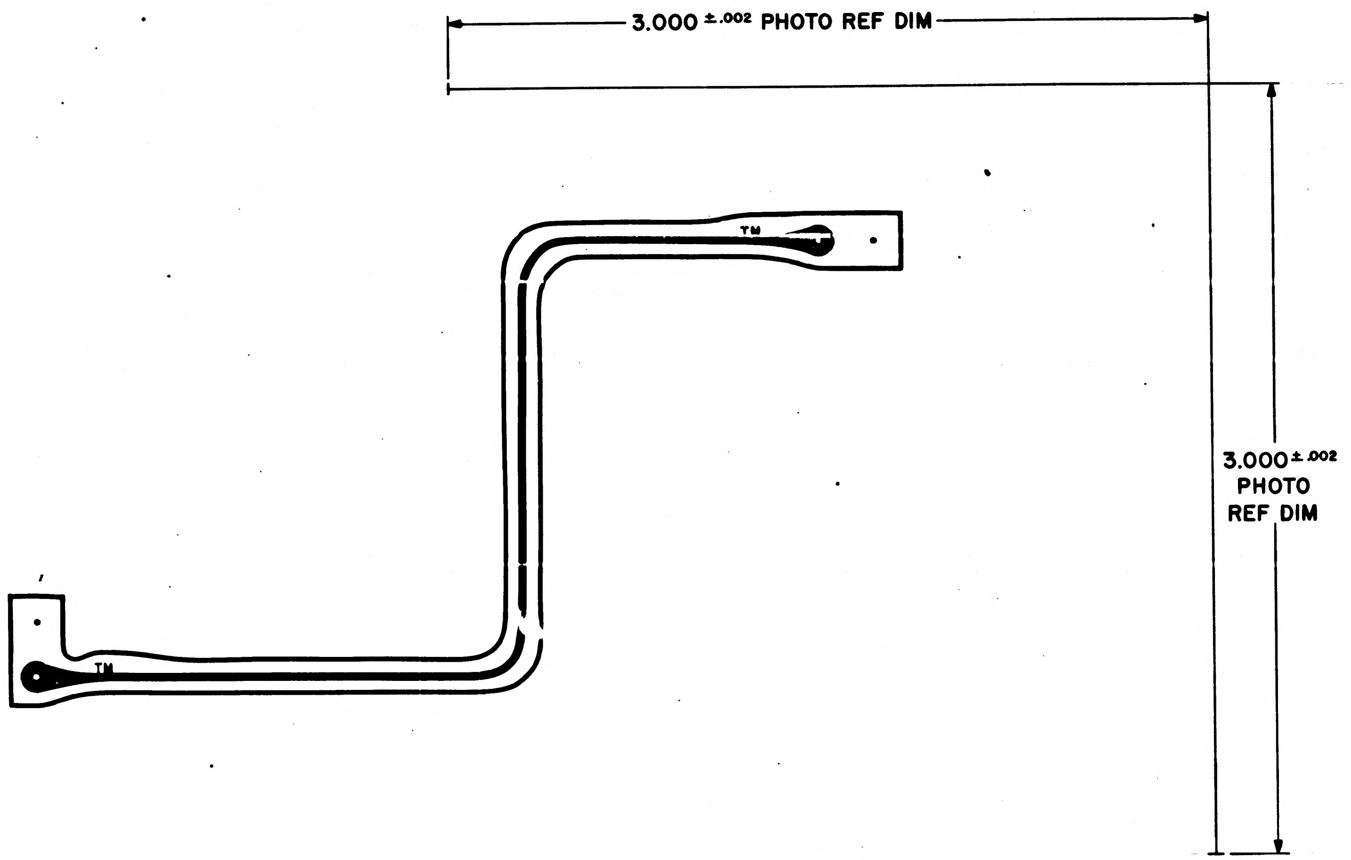
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTE
FLEXIBLE PRINTED CIRCUIT
4th LAYER
APOLLO II IRIG

SIZE E
CODE IDENT NO
DRAWING NO. 2021773
SCALE 4/1
SHEET 1 OF 1

REVISIONS TDRR 14489

ZONE	SYM	DESCRIPTION	BY	CHK	DATE	APPROVED



NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL DISTORTION SHALL NOT EXCEED .001 INCH PER INCH
3. MAKE MASTER PATTERN POSITIVE FILM TO DIMENSIONS SHOWN

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021776	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K X1000 M X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN P. Fayne
CHECKED
APPROVED A. C. Smith 11-23-64
APPROVED C A Booth 11-23-64
MIT APPROVED W Kupfer DATE 24 Nov 64
NASA

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

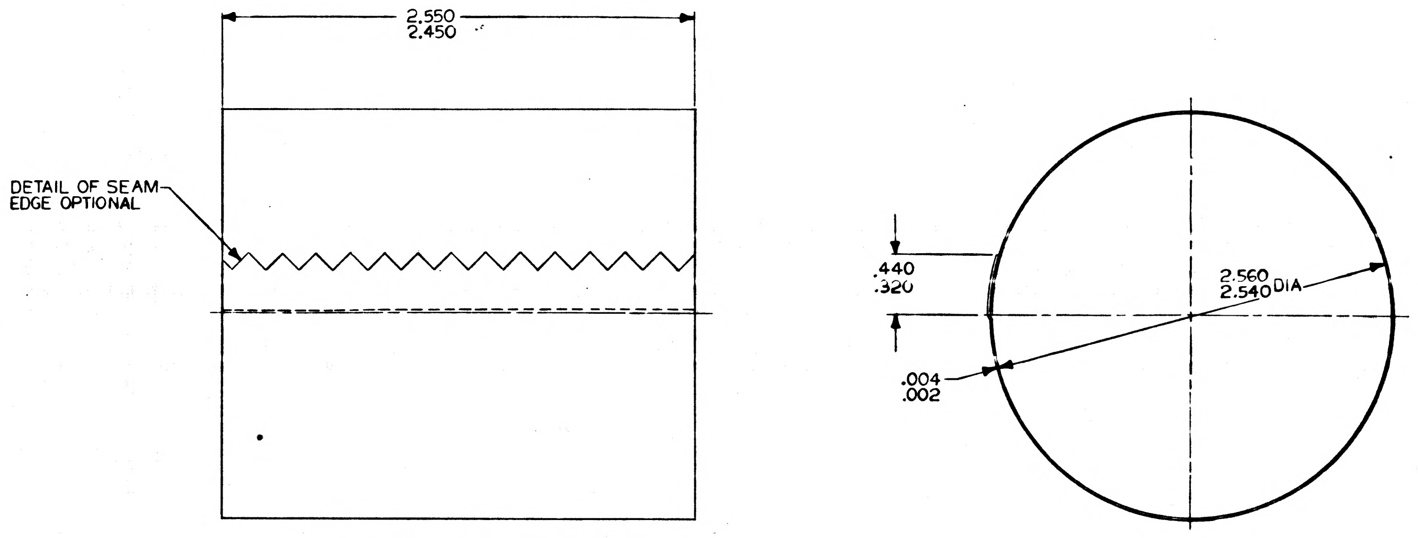
PHOTOGRAPHIC MASTER
FLEXIBLE PRINTED CIRCUIT
JUMPER LAYER
APOLLO II IRIG

SIZE E
CODE IDENT NO
DRAWING NO. 2021775
SCALE 2/1
SHEET 1 OF 1

2021775

REVISIONS TDRR 15041

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



REQUIREMENT:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
   - B. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS OF ND1015404 CLASS 3
   - C. MARK ALL PACKAGES WITH DRAWING NO, REVISION LETTER AND MANUFACTURERS NAME AND OR SYMBOL PER ND 1002019
2. INSPECTION AND ACCEPTANCE:
   - A. DIMENSIONS AS SPECIFIED
3. DESIGN REQUIREMENT:
   - A. DIMENSIONAL RECOVERY: SLEEVE SHALL RECOVER TO AN INSIDE DIAMETER OF 2.490 MAX WITHOUT TEARING OR FRACTURING WHEN HEATED TO 200°F/225°F
   - B. MATERIAL: PLASTIC FILM, POLYETHYLENE TEREPHTALATE PER L-P-377, TYPE I
   - C. SEAM SHEAR STRENGTH TO BE NO LESS THAN TENSILE STRENGTH OF BASE MATERIAL AFTER RECOVERY
4. METHOD OF FABRICATING THE SLEEVE AND BONDING OF SEAM IS A PROPRIETORY PROCESS OF

MINCO PRODUCTS, INC.
740 WASHINGTON AVE. NO.
MINNEAPOLIS 1, MINNESOTA

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021606	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 3A

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	DTB	11/20/64
CHECKED		
APPROVED	A J Boyce	12-18-64
APPROVED	RA	12-11-64

MIT APPROVED W Kupfer DATE 22 Dec 64
NASA W J Rhine 12-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

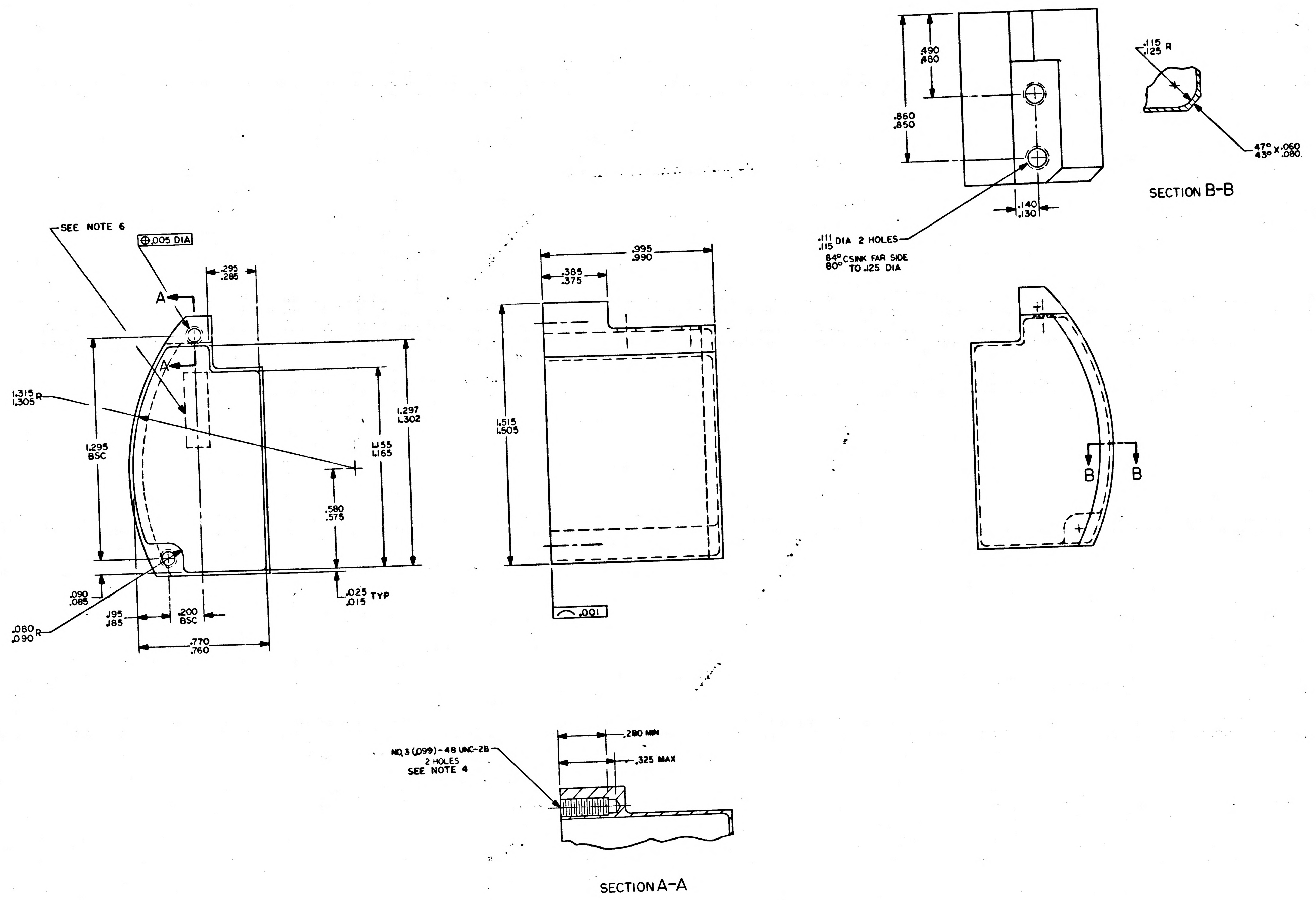
SLEEVE, TAPE RETAINER
SOURCE CONTROL DRAWING

SIZE D
CODE IDENT NO
DRAWING NO. 2021777
SCALE 2/1
SHEET 1 OF 1

2021777

BOYCE

REVISIONS 15040						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 15234	LK		7JAN65	



SEE NOTE 6
⊕.005 DIA
A
A
.295
.285
1.315
1.305 R
1.295
BSC
1.297
1.302
1.155
1.165
.580
.575
.025
.015 TYP
.090
.085
.195
.185
.200
BSC
.770
.760
.080
.090 R
.995
.990
.385
.375
1.515
1.505
⌒.001
.490
.480
.860
.850
.140
.130
.111
.115 DIA 2 HOLES
84°
80° CSINK FAR SIDE TO .125 DIA
.115
.125 R
47°
43° X .060
.080
SECTION B-B
B
B
NO.3 (.099) - 48 UNC-2B
2 HOLES
SEE NOTE 4
.280 MIN
.325 MAX
SECTION A-A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. UNLESS OTHERWISE SPECIFIED ALL INSIDE RADII .030 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. FINISH ANODIZE PER MIL-A-8625, TYPE II, DYED BLACK
6. IDENTIFY PER ND1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021779	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

FINISH
SEE NOTE 5

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN E. Mahoney 7DEC64
CHECKED 15Dec 64
APPROVED N. Sahakian 12-16-64
APPROVED S. C. 12-21-64
MIT APPROVED W Buffum DATE 22Dec64
NASA W. Kline 12-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

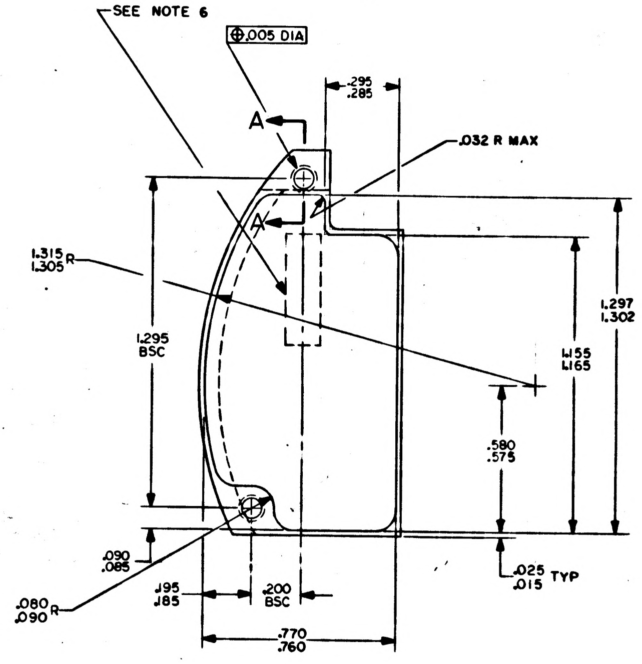
HOUSING MODULE
IRIG PREAMP

SIZE	CODE IDENT NO	DRAWING NO.
E	—	2021778

SCALE 4/1 SHEET 1 OF 1

REVISIONS 15040

ZONE	SYM	DESCRIPTION	BY	CHK	DATE	APPROVED
A		REVISED PER TDRR 15234	LK			
B		REVISED PER TDRR 18097				


SEE NOTE 6
⊕.005 DIA
A
A
.295
.285
.032 R MAX
1.315
1.305 R
1.295
BSC
1.297
1.302
1.155
1.165
.580
.575
.090
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.080
.090 R
.195
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.200
BSC
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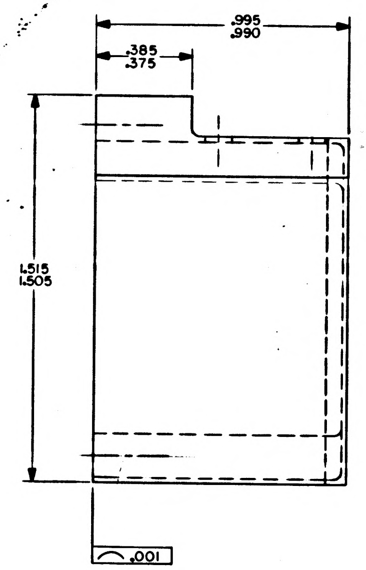
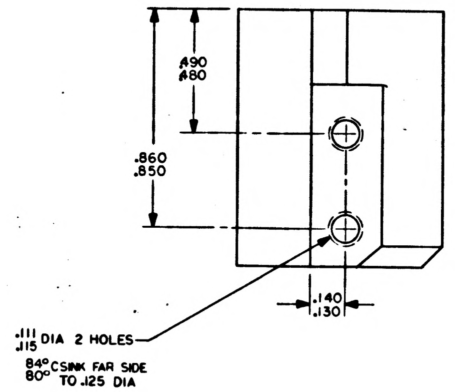
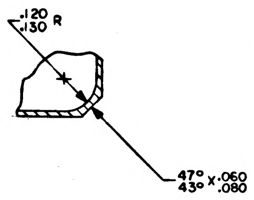
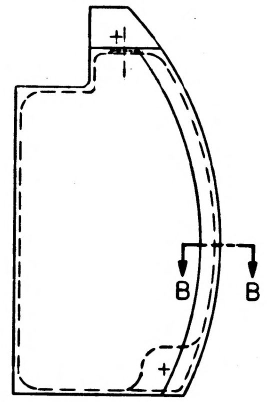
.760
.025
.015 TYP

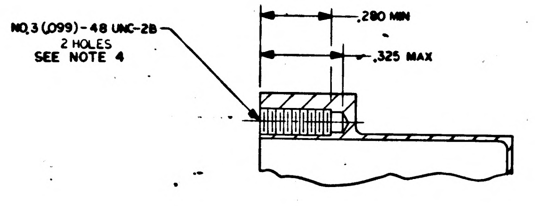

.995
.990
.385
.375
1.515
1.505
⌒.001


.490
.480
.860
.850
.140
.130
.111
.115 DIA 2 HOLES
84°
80° CSINK FAR SIDE
TO .125 DIA


.120
.130 R
47°
43° X .060
.080

SECTION B-B




NO.3 (.099)-48 UNC-2B
2 HOLES
SEE NOTE 4
.280 MIN
.325 MAX

SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. UNLESS OTHERWISE SPECIFIED ALL INSIDE RADII .095 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. FINISH ANODIZE PER MIL-A-8625, TYPE II, DYED BLACK
6. IDENTIFY PER ND 1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021779	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

FINISH SEE NOTE 5

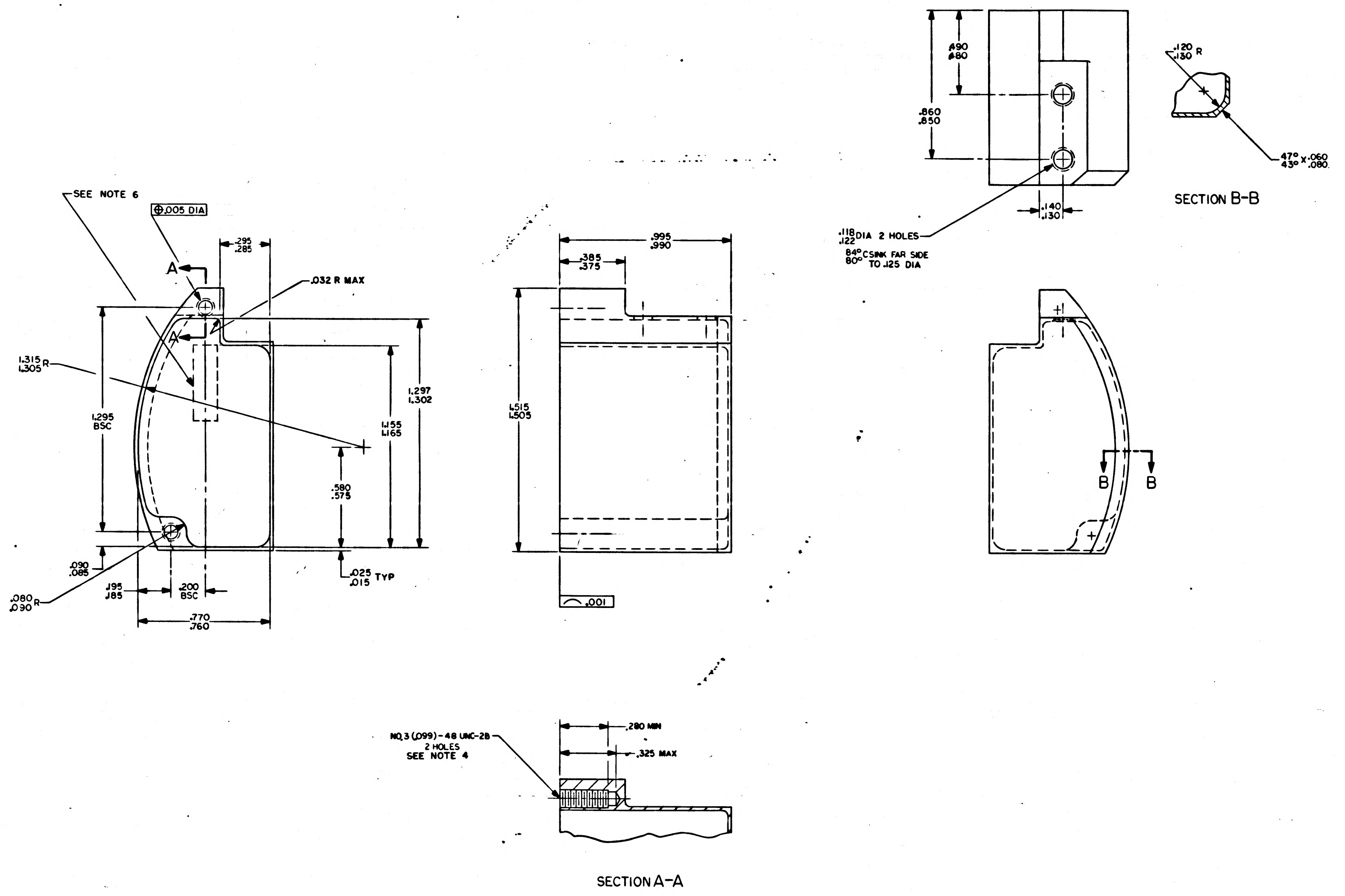
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN E. J. Maloney 7 DEC 64
CHECKED 15 Dec 64
APPROVED N. 12-16-64
APPROVED 12-16-64
MIT APPROVED DATE 22 Dec 64
NASA W. J. Rhine 12-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HOUSING MODULE
IRIG PREAMP

SIZE E
CODE IDENT NO 80230
DRAWING NO. 2021778
SCALE 4/1
SHEET 1 OF 1

REVISIONS 13040						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
A		REVISED PER TDRR 15234	LK			
B		REVISED PER TDRR 18097				
C		REVISED PER TDRR 19223	JFW	L.T.B.		


SEE NOTE 6
⊕.005 DIA
A
A
.295
.285
.032 R MAX
1.315
1.305 R
1.295
BSC
1.297
1.302
1.155
1.165
.580
.575
.090
.085
.025
.015 TYP
.080
.090 R
.195
.185
.200
BSC
.770
.760
.995
.990
.385
.375
1.515
1.505
⌒ .001
.490
.480
.860
.850
.140
.130
.118
.122 DIA 2 HOLES
84°
80° CSINK FAR SIDE
TO .125 DIA
.120
.130 R
47°
43° X .060
.080
SECTION B-B
B
B
NO.3 (.099)-48 UNC-2B
2 HOLES
SEE NOTE 4
.280 MIN
.325 MAX
SECTION A-A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11 OR QQ-A-270
3. UNLESS OTHERWISE SPECFIED ALL INSIDE RADII .095 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. FINISH ANODIZE PER MIL-A-8625, TYPE II, DYED BLACK
6. IDENTIFY PER ND 1002019

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

2021779	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

FINISH
SEE NOTE 5

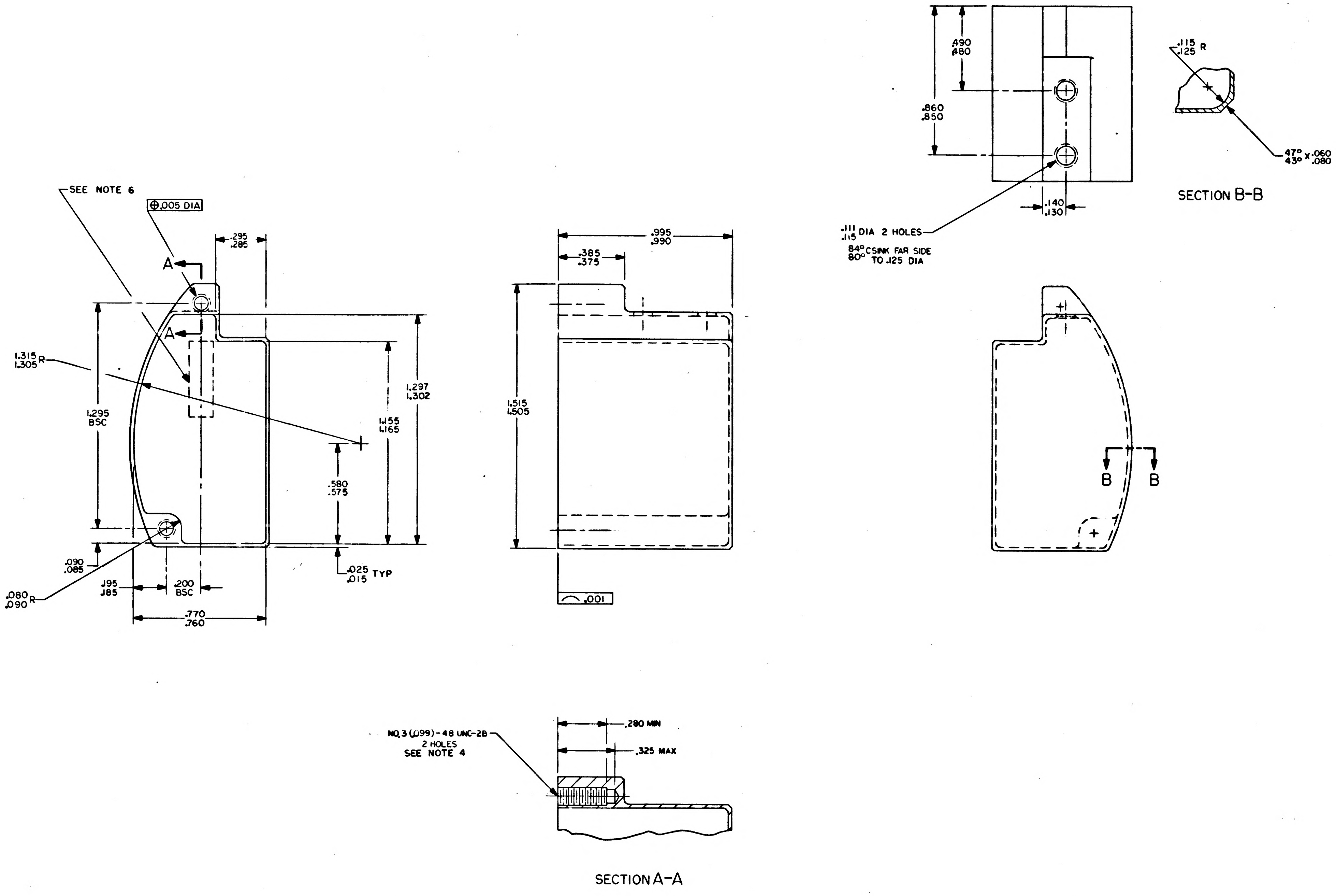
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN E. Mahoney 7 Dec 64
CHECKED 15 Dec 64
APPROVED M. 16 Dec 64
APPROVED 16 Dec 64
MIT APPROVED DATE 22 Dec 64
NASA 12-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HOUSING MODULE
IRIG PREAMP

SIZE E
CODE IDENT NO 80230
DRAWING NO. 2021778
SCALE 4/1
SHEET

REVISIONS 15040						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



SEE NOTE 6
⊕.005 DIA
A
A
.295 .285
1.315 1.305 R
1.295 BSC
1.297 1.302
1.155 1.165
.580 .575
.090 .085
.080 .090 R
.195 .185
.200 BSC
.770 .760
.025 .015 TYP
.995 .990
.385 .375
1.515 1.505
⌒.001
.490 .480
.860 .850
.140 .130
.111 .115 DIA 2 HOLES
84° 80° CSINK FAR SIDE TO .125 DIA
.115 .125 R
47° 43° X .060 .080
B B
NO.3 (.099)-48 UNC-2B 2 HOLES SEE NOTE 4
.280 MIN
.325 MAX

SECTION B-B

SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: ALUMINUM ALLOY 6061-T6 PER QQ-A-250/11
3. UNLESS OTHERWISE SPECIFIED ALL INSIDE RADII .030 MAX
4. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.015
5. FINISH ANODIZE PER MIL-A-8625, TYPE II, DYED BLACK
6. IDENTIFY PER ND1002019

ITEM NO.	QTY REQU	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

2021779	
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

FINISH SEE NOTE 5

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
CONTRACT NO.
DRAWN E. J. Mahoney 7 DEC 64
CHECKED 15 Dec 64
APPROVED N.
APPROVED
MIT APPROVED 22 Dec 64 DATE
NASA W. J. Rhine 12-22-64

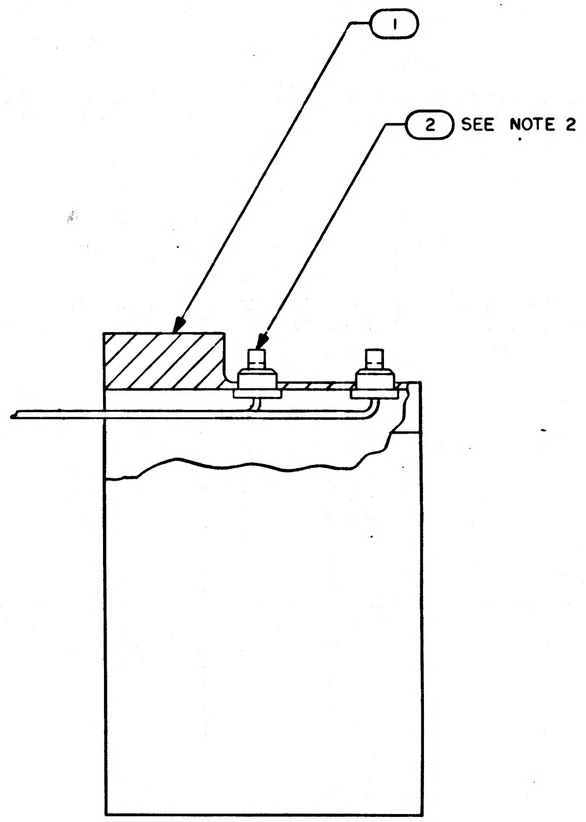
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

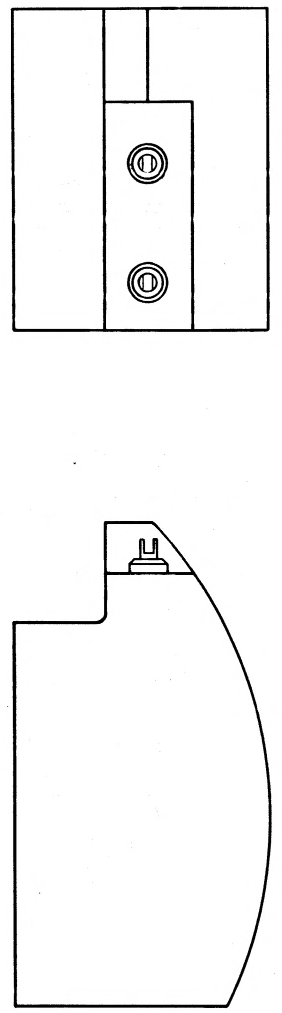
HOUSING MODULE
IRIG PREAMP

SIZE E
CODE IDENT NO —
DRAWING NO. 2021778
SCALE 4/1
SHEET 1 OF 1

REVISIONS 15040

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED





NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE ITEM NO.2 TO ITEM NO.1
3. SPRAY COAT INSIDE OF ITEM NO.1 PER ND 1002035
4. IDENTIFY PER ND 1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
2	2		2021761	TERMINAL FEEDTHRU ASSEMBLY		
1	1		2021778	HOUSING MODULE		
	-011			LIST OF MATERIALS		

NEXT ASSY	USED ON
2021785	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL —

FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN E. Mahoney 7Dec64
CHECKED [illegible] 15Dec64
APPROVED N Sakelos 12-16-64
APPROVED A.C. Smith 12-16-64
MIT APPROVED DATE
W Kupfer 22Dec64
W J Rhine 12-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HOUSING MODULE
ASSEMBLY
IRIG PREAMP

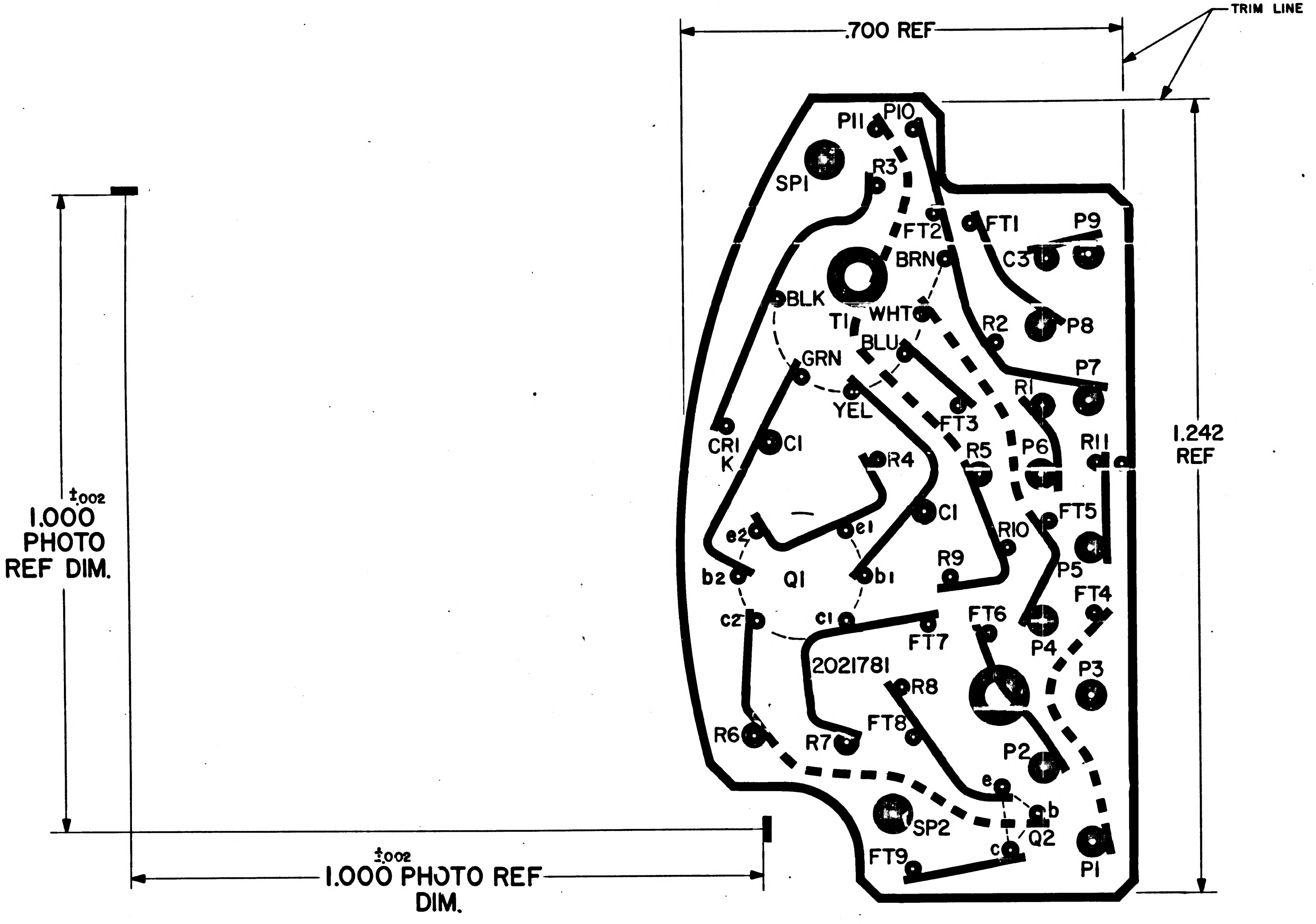
SIZE D
CODE IDENT NO —
DRAWING NO. 2021779
SCALE 4/1
SHEET 1 OF 1

2021779

MASTER

LB

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
		REVISIONS 15040				



TRIM LINE
.700 REF
1.242 REF
±.002 1.000 PHOTO REF DIM.
±.002 1.000 PHOTO REF DIM.
P11
P10
SP1
R3
FT2
FT1
P9
BRN
C3
BLK
T1
WHT
R2
P8
BLU
GRN
R1
P7
YEL
FT3
CR1 K
C1
R4
R5
P6
R11
C1
e2
e1
R10
FT5
b2
Q1
b1
R9
P5
c2
c1
FT6
FT4
FT7
P4
2021781
R8
P3
FT8
R6
R7
P2
e
b
SP2
Q2
c
FT9
P1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL VARIATIONS SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIMLINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL —

FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS

CONTRACT NO.

DRAWN E. Mahony 9 Dec 64
CHECKED R.P. Kingsdum 15 Dec 64
APPROVED N Sakelos 12-16-64
APPROVED S.C. Smith 12-16-64

MIT APPROVED W Kupfer 22 Dec 64 DATE
NASA W.J. Rhine 12-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

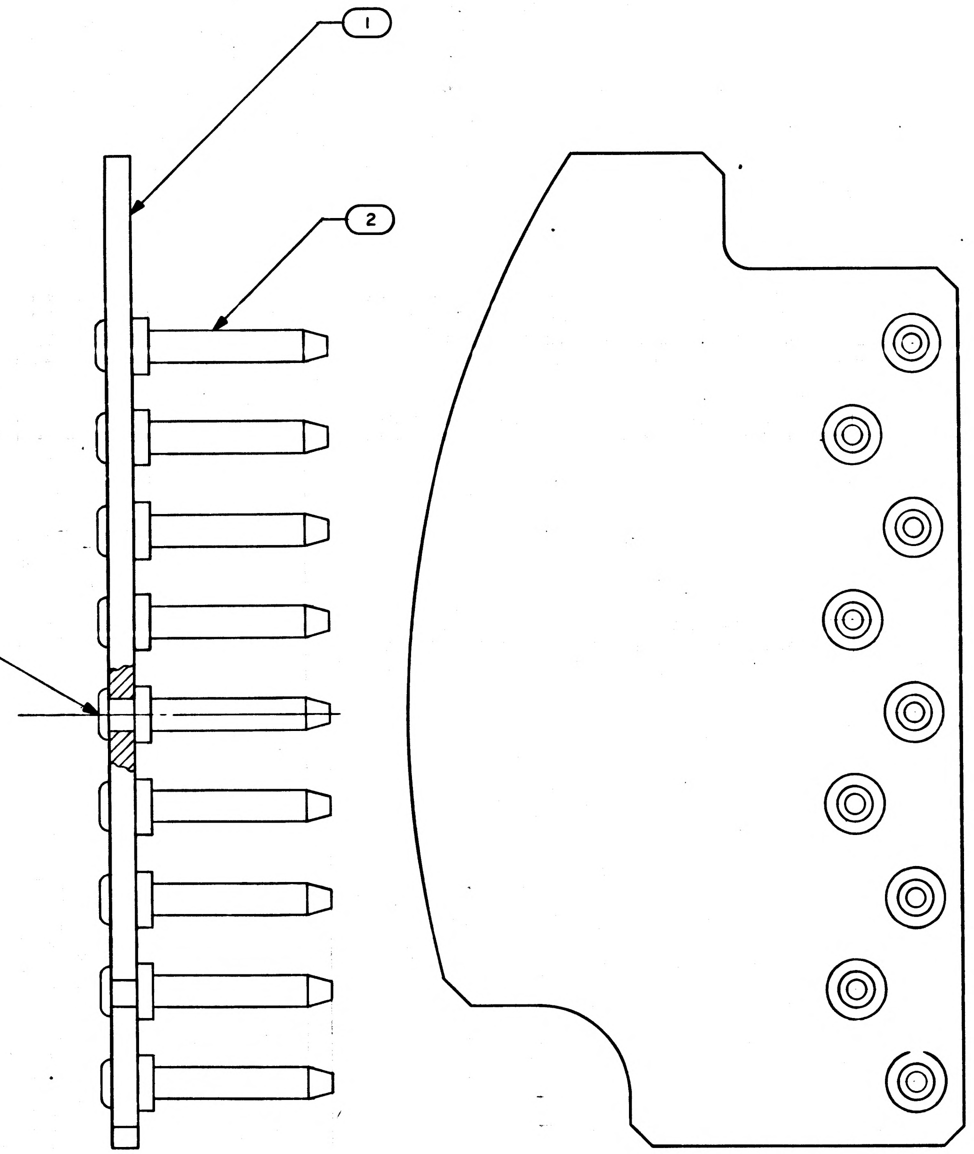
PHOTOGRAPHIC MASTER
WIRING BOARD (BOTTOM)
IRIG PREAMP

SIZE D | CODE IDENT NO — | DRAWING NO. 2021780

SCALE 10/1 | SHEET 1 OF 1

REVISIONS 15040

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



ALL HOLES AND MARKING NOT SHOWN FOR CLARITY

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ASSEMBLE ITEM NO.2 TO ITEM NO.1 SWAGE AS SHOWN
3. IDENTIFY PER ND1002019
4. ASSEMBLE ITEM NO.2 PER ATP 2021500, MC 25867

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
2	9		1010845	TERMINAL		
1	1		2021781	WIRING BOARD(BOTTOM)		
	-011			LIST OF MATERIALS		

NEXT ASSY	USED ON
2021785	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL —

FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN E. Mahony 9Dec64
CHECKED R.P. [illegible] 15Dec64
APPROVED M. Sakelos 12-16-64
APPROVED S.C. Smith 12-16-64
MIT APPROVED W. [illegible] DATE 22Dec64
NASA W J Rhine 12-22-64

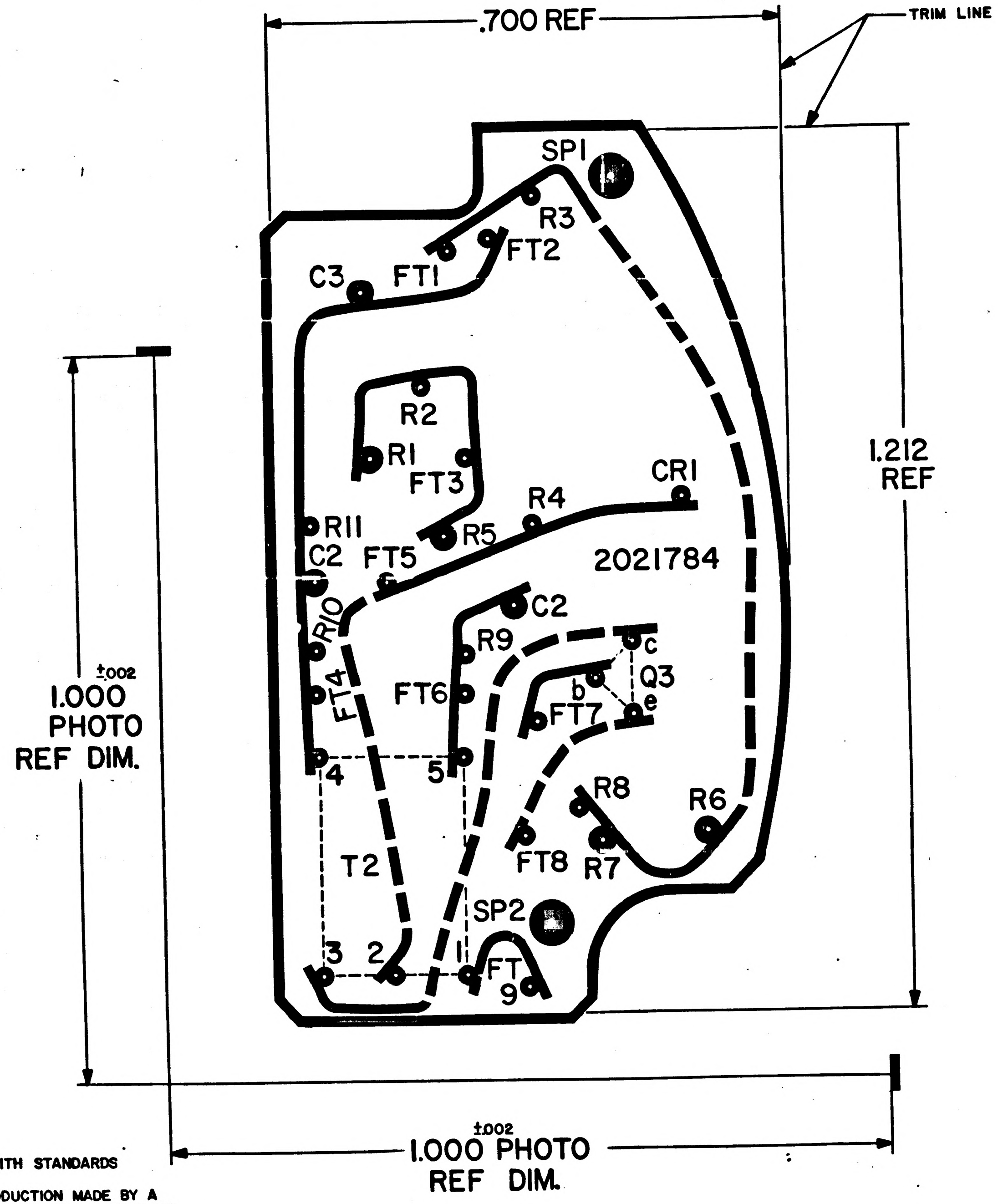
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD ASSEMBLY
(BOTTOM)
IRIG PREAMP

SIZE D
CODE IDENT NO —
DRAWING NO. 2021782
SCALE 10/1
SHEET 1 OF 1

28

REVISIONS 15040						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A	REVISED PER TDRR 15797	RTS		28JAN'65	W



.700 REF
TRIM LINE
SP1
R3
FT2
C3
FT1
R2
R1
FT3
R4
CR1
R11
R5
C2
FT5
2021784
R10
C2
R9
FT4
FT6
b
c
Q3
e
FT7
4
5
R8
R6
FT8
R7
T2
SP2
3
2
1
FT
9
1.212 REF
±.002
1.000 PHOTO REF DIM.
±.002
1.000 PHOTO REF DIM.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL VARIATIONS SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL —

FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	J.F. Walsh	9 Dec 64
CHECKED	R.P. Kingsbury	15 Dec 64
APPROVED	N. Sakelos	12-16-64
APPROVED	L.C. Smith	12-16-64

MIT APPROVED DATE
W Kupfer 22 Dec 64
NASA
W J Rhine 12-22-64

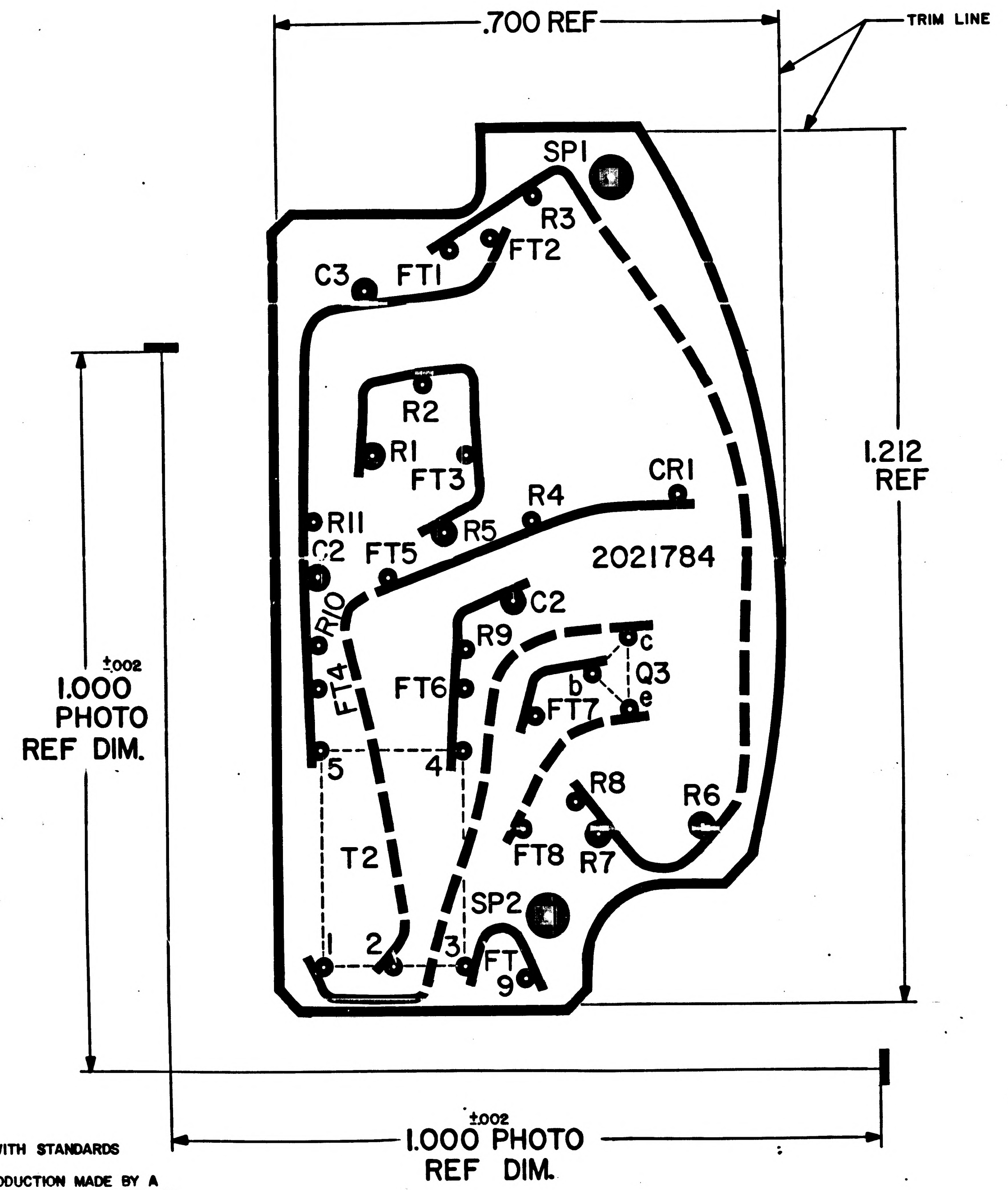
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD (TOP)
IRIG PREAMP

SIZE	CODE IDENT NO	DRAWING NO.
D	—	2021783

SCALE 10/1
SHEET 1 OF 1

REVISIONS 15040						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



.700 REF
TRIM LINE
SP1
R3
FT2
C3
FT1
R2
R1
FT3
CR1
R4
R5
R11
C2
FT5
2021784
R10
C2
R9
FT4
FT6
b
c
Q3
e
FT7
5
4
R8
R6
T2
FT8
R7
SP2
1
2
3
FT
9
1.212 REF
±.002
1.000 PHOTO REF DIM.
±.002
1.000 PHOTO REF DIM.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. ORIGINAL OF THIS DRAWING OR REPRODUCTION MADE BY A PROCESS OR METHOD SHALL INSURE DIMENSIONAL STABILITY. DIMENSIONAL VARIATIONS SHALL NOT EXCEED .001 INCH PER INCH
3. CUT TO WITHIN .010 OF TRIM LINE
4. MAKE MASTER PATTERN POSITIVE FILMS TO DIMENSIONS SHOWN

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL —

FINISH —

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	J. F. Walsh	9 Dec 64
CHECKED	R. P. Kingsbury	15 Dec 64
APPROVED	N. Sabatino	12-16-64
APPROVED	L. C. Smith	12-16-64

MIT APPROVED DATE
W Buffum 22 Dec 64
NASA
W J Rhine 12-22-64

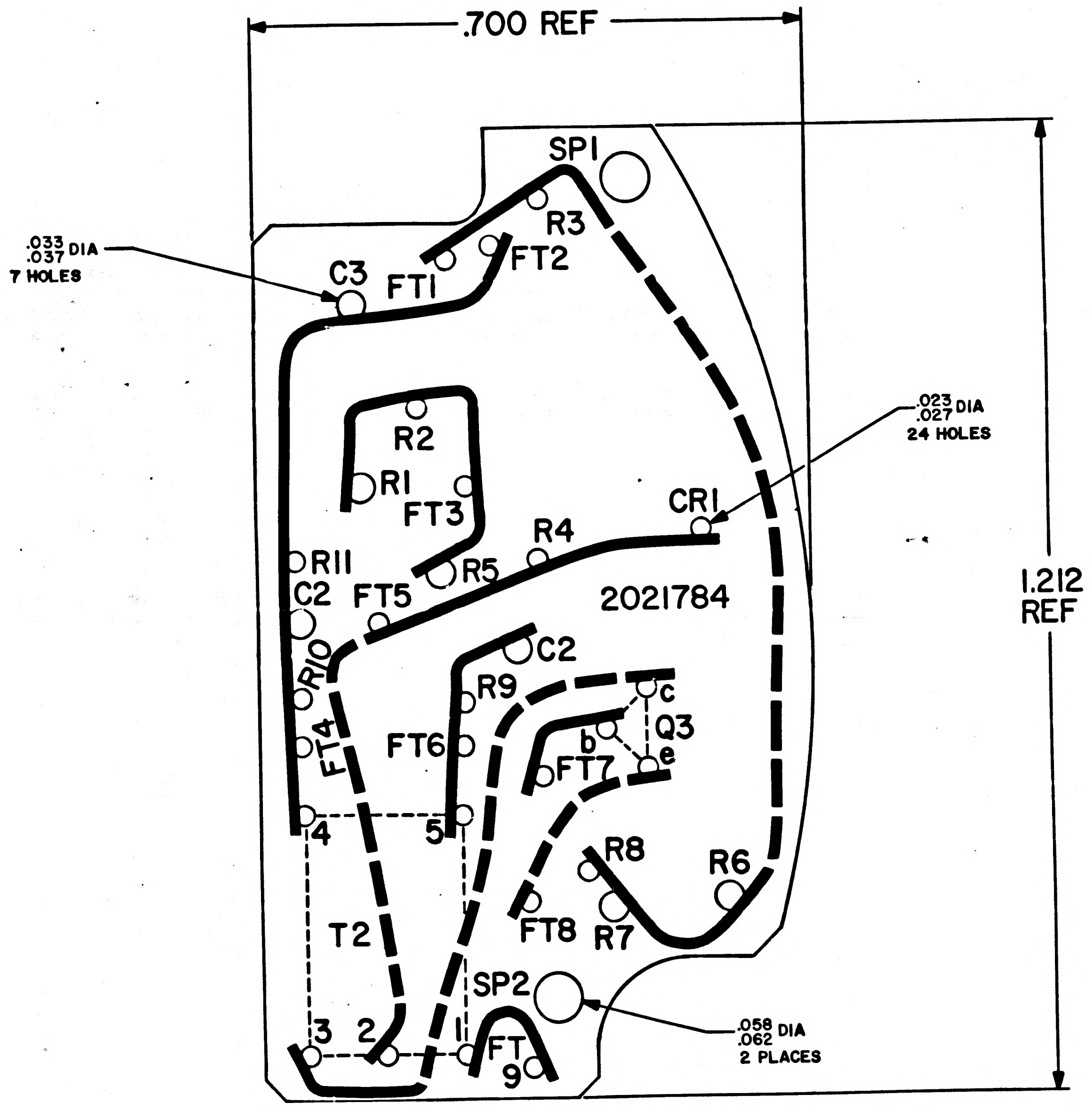
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PHOTOGRAPHIC MASTER
WIRING BOARD (TOP)
IRIG PREAMP

SIZE	CODE IDENT NO	DRAWING NO.
D	—	2021783
SCALE 10/1		SHEET 1 OF 1

REVISIONS 15040

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A	REVISED PER TDRR 15797	RTS	A.W.L.	29 Jan 65	WK


.700 REF
.033
.037 DIA
7 HOLES
.023
.027 DIA
24 HOLES
.058
.062 DIA
2 PLACES
1.212
REF
SP1
R3
FT1
FT2
C3
R2
R1
FT3
CR1
R4
R5
R11
C2
FT5
2021784
R10
C2
R9
c
Q3
b
e
FT4
FT6
FT7
4
5
R8
R6
T2
FT8
R7
SP2
3
2
1
FT
9

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: 031 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019

REF DWG:
NO. 2021783 FOR PHOTOGRAPHIC MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021785	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN J.F. Walsh 9 Dec 64
CHECKED R.P. Kingsbury 15 Dec 64
APPROVED N. Sakellis 12-16-64
APPROVED S.C. Smith 12-16-64
MIT APPROVED W Kupfer DATE 22 Dec 64
NASA W.J. Rhine 12-22-64

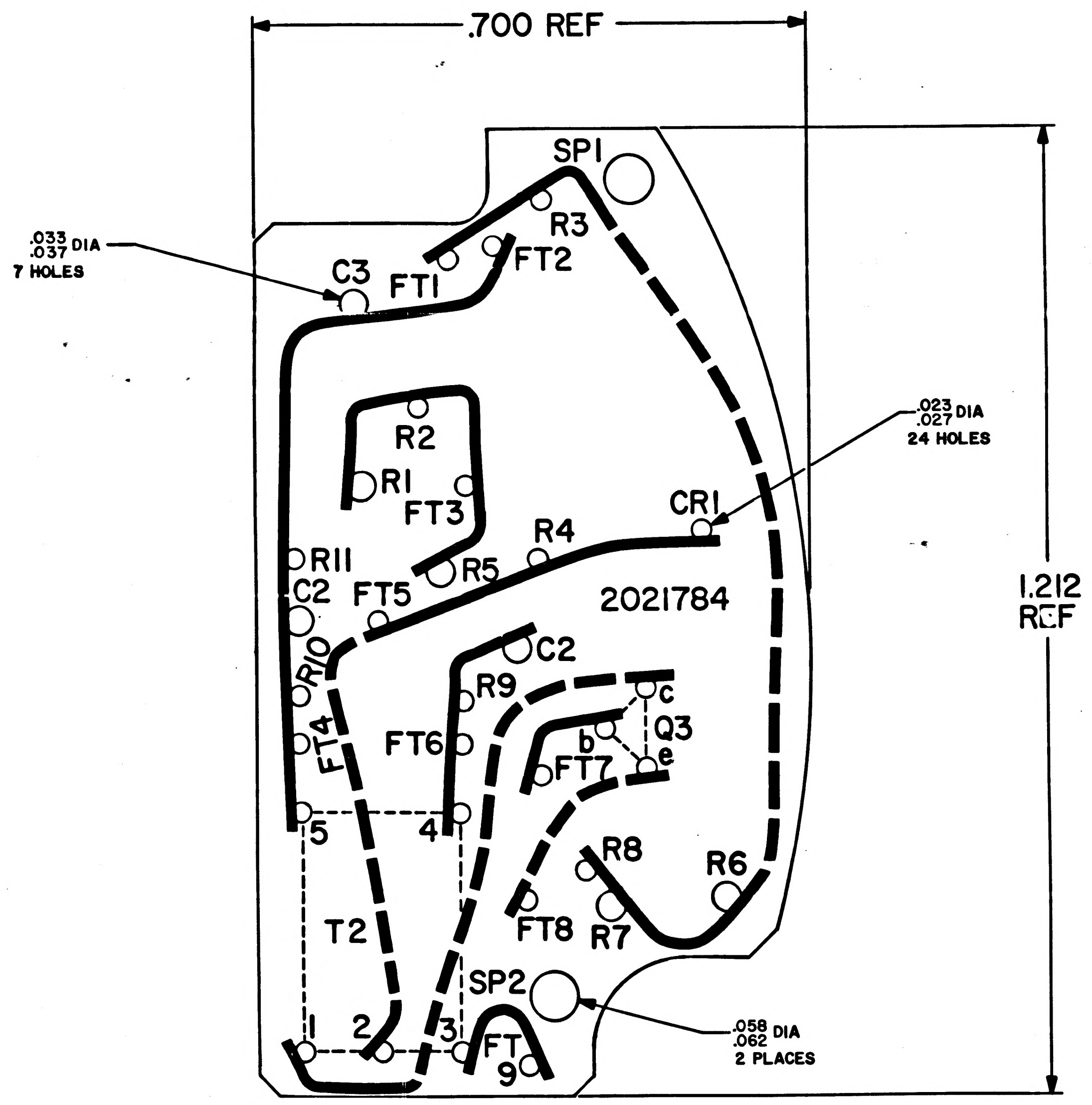
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD
(TOP)
IRIG PREAMP

SIZE D
CODE IDENT NO —
DRAWING NO. 2021784
SCALE 10/1
SHEET 1 OF 1

REVISIONS *15040*

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED


.700 REF
1.212 REF
.033 .037 DIA 7 HOLES
.023 .027 DIA 24 HOLES
.058 .062 DIA 2 PLACES
SP1
SP2
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
C2
C3
CR1
Q3
b
c
e
FT1
FT2
FT3
FT4
FT5
FT6
FT7
FT8
FT 9
T2
1
2
3
4
5
2021784

REF DWG:
NO. 2021783 FOR PHOTOGRAPHIC MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: 031 THICK PLASTIC SHEET PER MIL-P-18177 TYPE GEE
3. PREPARE BOARD FOR PHOTOGRAPHY PER ND 1002133
4. MARK BLACK CHARACTERS PER ND 1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021785	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	J. F. Walsh	9 Dec 64
CHECKED	R. P. Kreuzburg	15 Dec 64
APPROVED	N. Sakalas	12-16-64
APPROVED	S. C. Smith	12-16-64

MIT APPROVED DATE
W Kupfer 22 Dec 64
NASA
W J Rhine 12-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING BOARD (TOP)
IRIG PREAMP

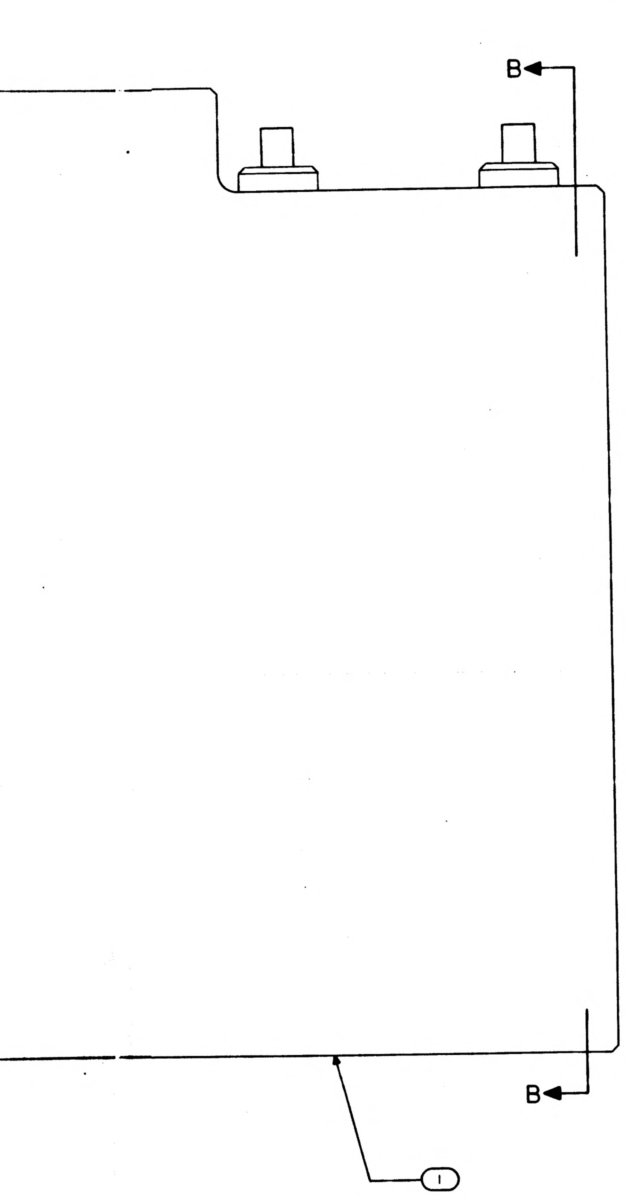
SIZE	CODE IDENT NO	DRAWING NO.
D	—	2021784

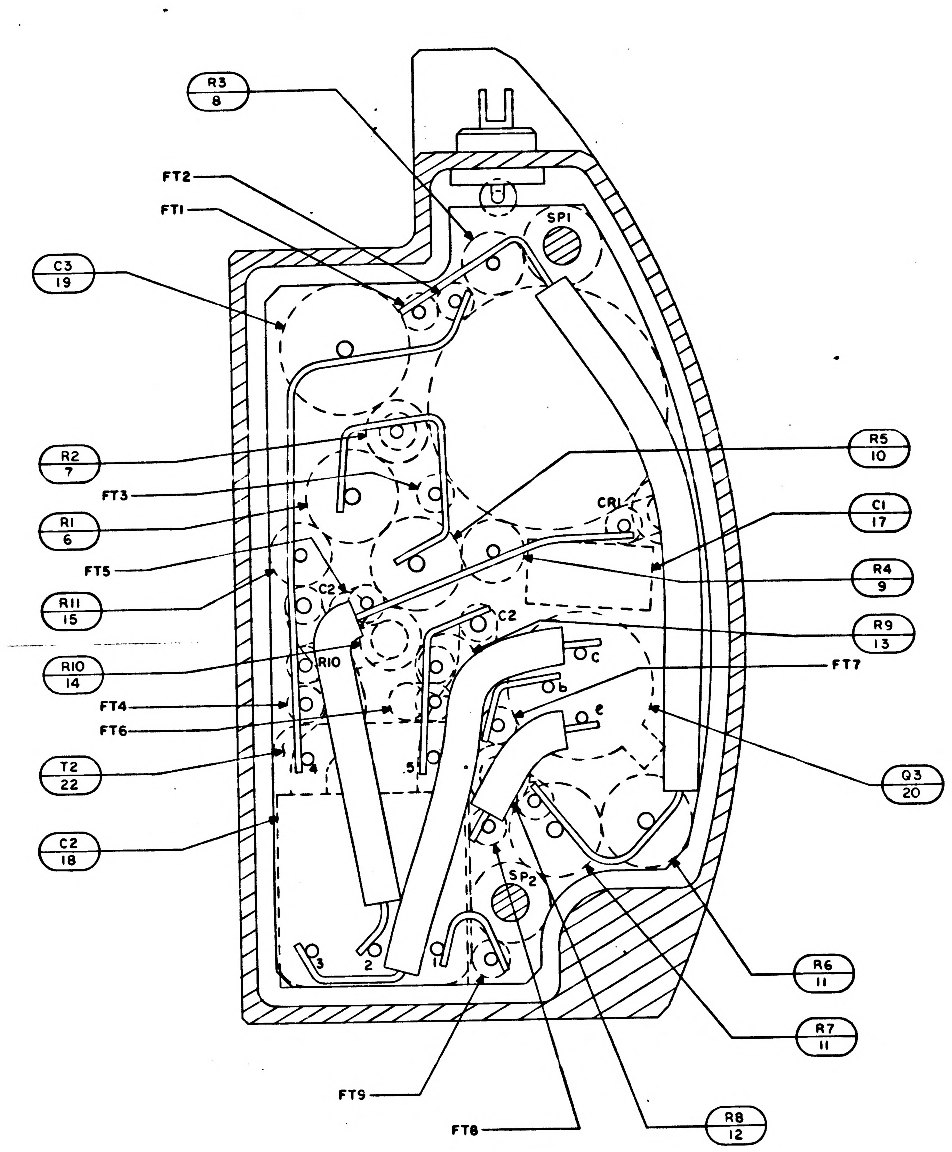
SCALE 10/1 SHEET 1 OF 1

2021784

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15797	Jan '65	

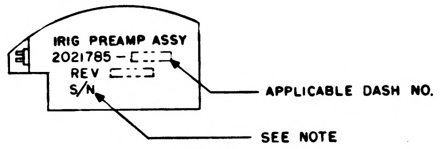
2021785 A





R3 8
FT2
FT1
C3 19
SP1
R2 7
FT3
R1 6
FT5
R11 15
R10 14
FT4
FT6
T2 22
C2 18
R5 10
CR1
C1 17
R4 9
C2
R9 13
FT7
Q3 20
SP2
R6 11
R7 11
R8 12
FT9
FT8
b
c
e

SECTION B-B



IRIG PREAMP ASSY
2021785 -
REV
S/N
APPLICABLE DASH NO.
SEE NOTE

MARKING VIEW
SCALE 2/1

ITEM NO.	QTY REQ'D -011	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION
REF			2010040	SCHEMATIC		
27	AR		1006776-21	INSULATION, SLEEVING		
26	AR		1006757-8	WIRE ELECTRICAL .020DIA		
25	AR		1006757-1	WIRE ELECTRICAL .010X.020 RIBBON		
24	AR		1006776-22	INSULATION, SLEEVING		
23	1	T1	1007080-011	TRANSFORMER		
22	1	T2	1010291-6	TRANSFORMER		
21	1	Q1	1010431-001	TRANSISTOR		
20	1	Q2Q3	1010633-3	TRANSISTOR (MATCHED PAIR)		
19	1	C3	1010264-118	CAPACITOR		
18	1	C2	1010359-28	CAPACITOR		
17	1	C1	1010359-5	CAPACITOR		
16	1	CR1	1010372-15	DIODE		
15	1	R11	1006750-56	RESISTOR		
14	1	R10	1006750-73	RESISTOR		
13	1	R9	1006750-80	RESISTOR		
12	1	R8	1006750-25	RESISTOR		
11	2	R6 R7	1010364-459	RESISTOR		
10	1	R5	1010364-769	RESISTOR		
9	1	R4	1006750-52	RESISTOR		
8	1	R3	1006750-51	RESISTOR		
7	1	R2	SEE NOTE 14	RESISTOR		
6	1	R1	1010364-501	RESISTOR		
5	1		2021762	INSULATOR, TRANSISTOR		
4	2		2021763	SPACER		
3	1		2021782-011	WIRING BOARD ASSY, BOTTOM		
2	1		2021784	WIRING BOARD, TOP		
1	1		2021779-011	HOUSING ASSY		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021500	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1.000.000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
CONTRACT NO.
DRAWN H. Brigham 12/23/64
CHECKED [illegible]
APPROVED
APPROVED A. C. Smith
MIT APPROVED W. Raff 22 Dec 64
NASA W. J. Rhine 12-22-64

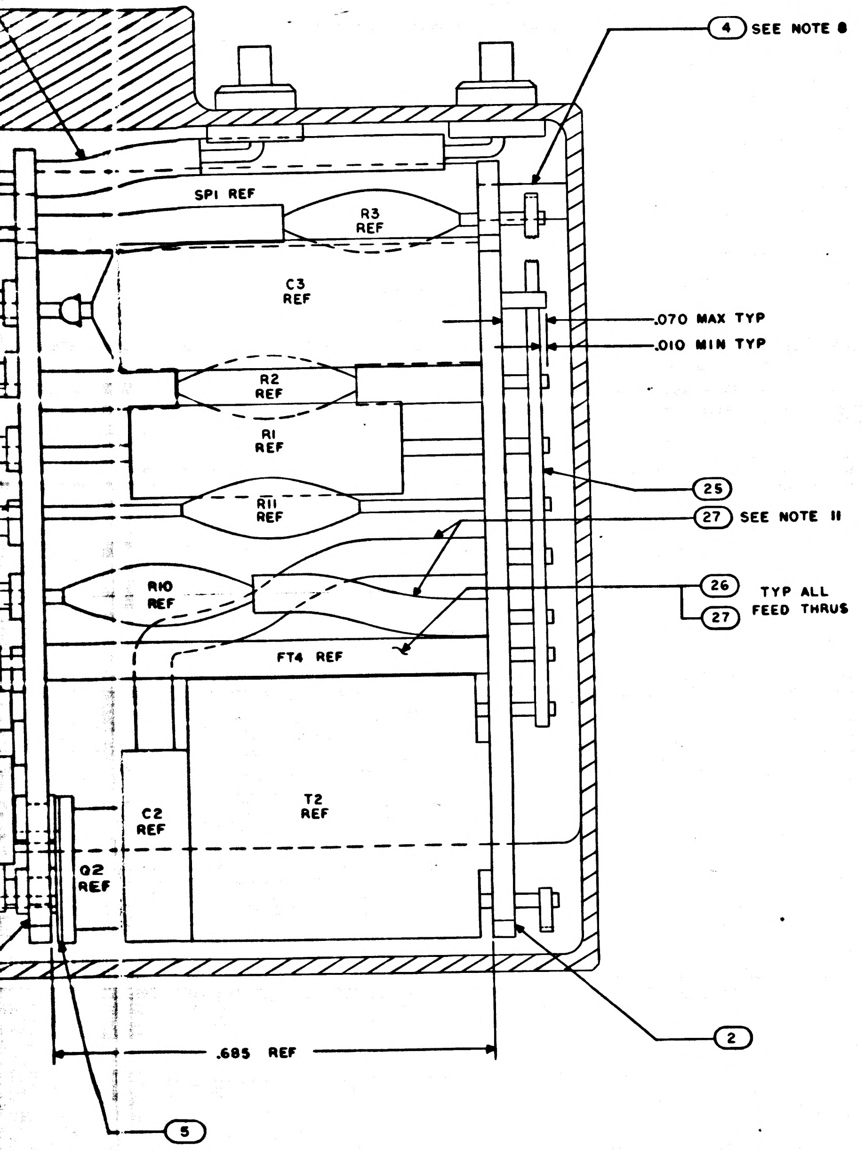
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

IRIG PREAMP ASSY

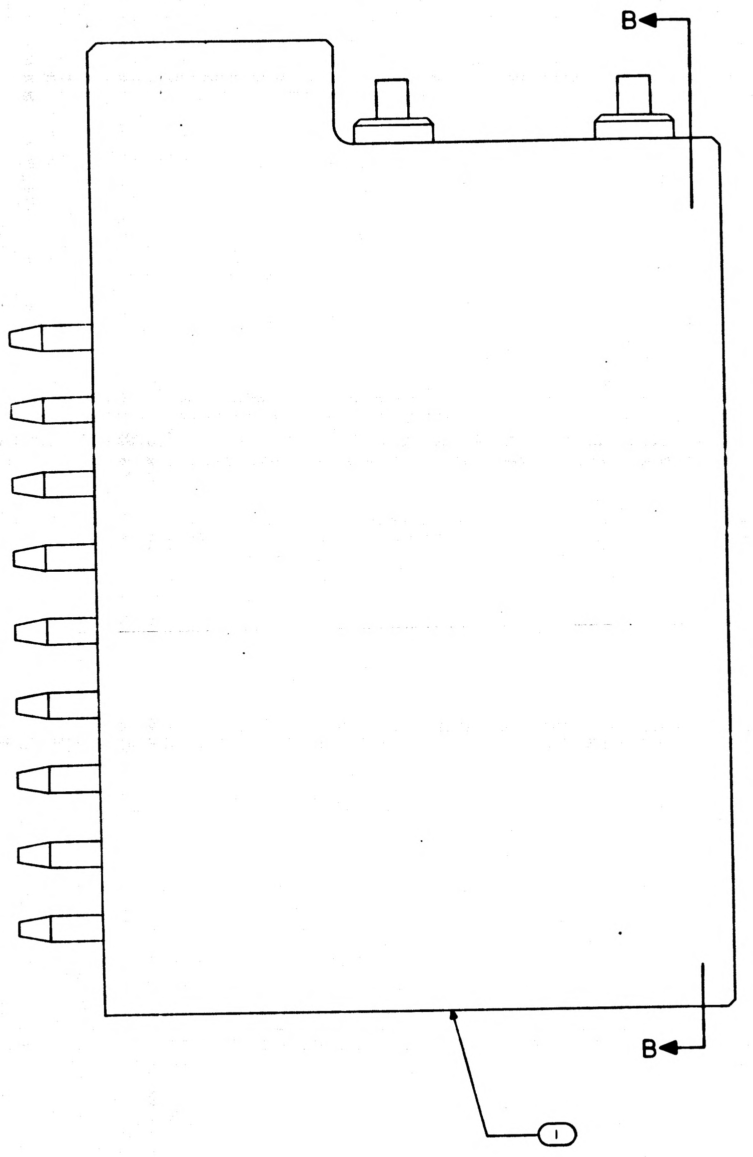
SIZE J | CODE IDENT NO — | DRAWING NO. 2021785
SCALE 10/1 | SHEET 1 OF 1

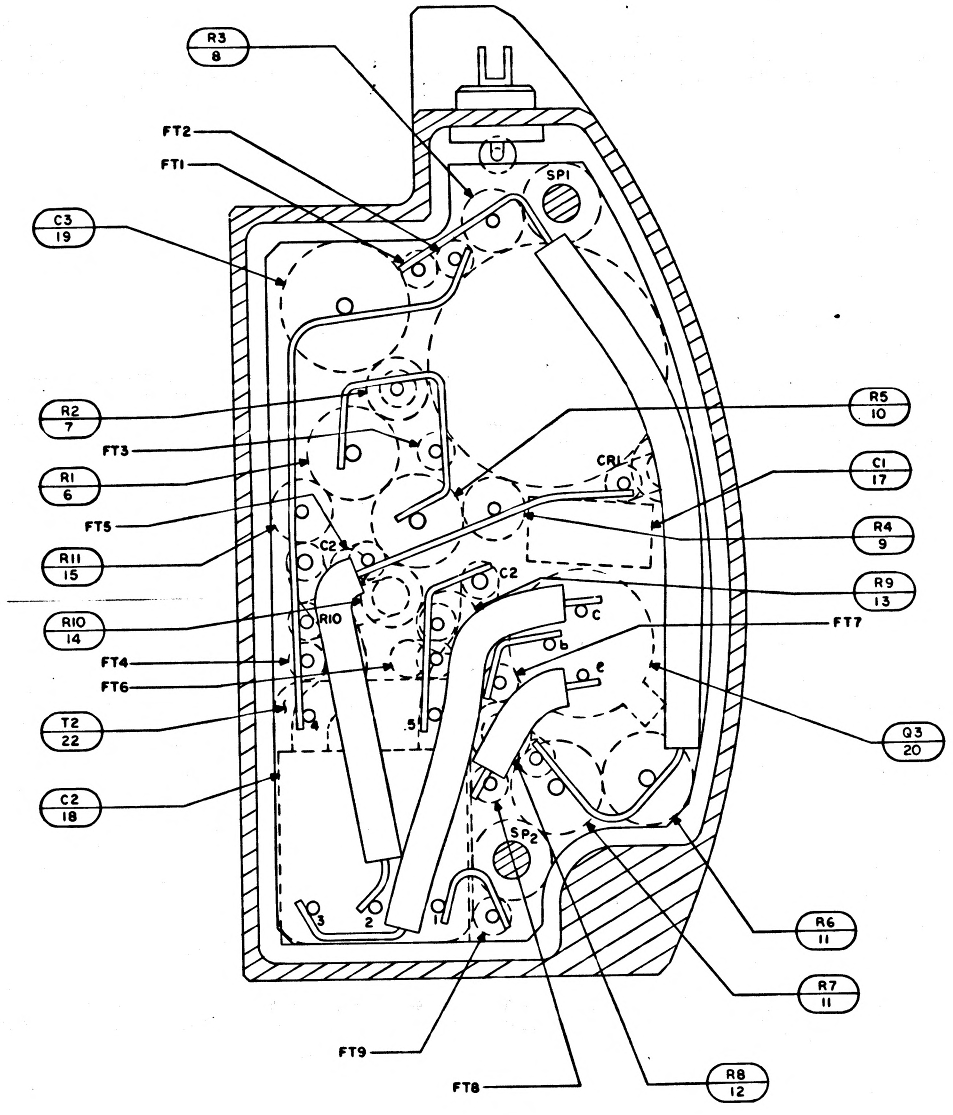
2021785 A

2021785 A

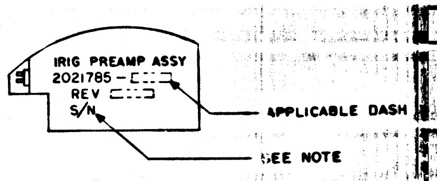

4 SEE NOTE 8
SPI REF
R3 REF
C3 REF
.070 MAX TYP
.010 MIN TYP
R2 REF
R1 REF
R11 REF
25
27 SEE NOTE 11
R10 REF
26 TYP ALL FEED THRUS
27
FT4 REF
C2 REF
T2 REF
Q2 REF
2
.685 REF
5

SECTION A-A




R3 8
FT2
FT1
C3 19
SP1
R2 7
FT3
R1 6
FT5
R11 15
R10 14
FT4
FT6
T2 22
C2 18
R5 10
C1 17
CR1
R4 9
R9 13
FT7
C2
R10
b
c
e
Q3 20
SP2
R6 11
R7 11
R8 12
FT9
FT8
3
2

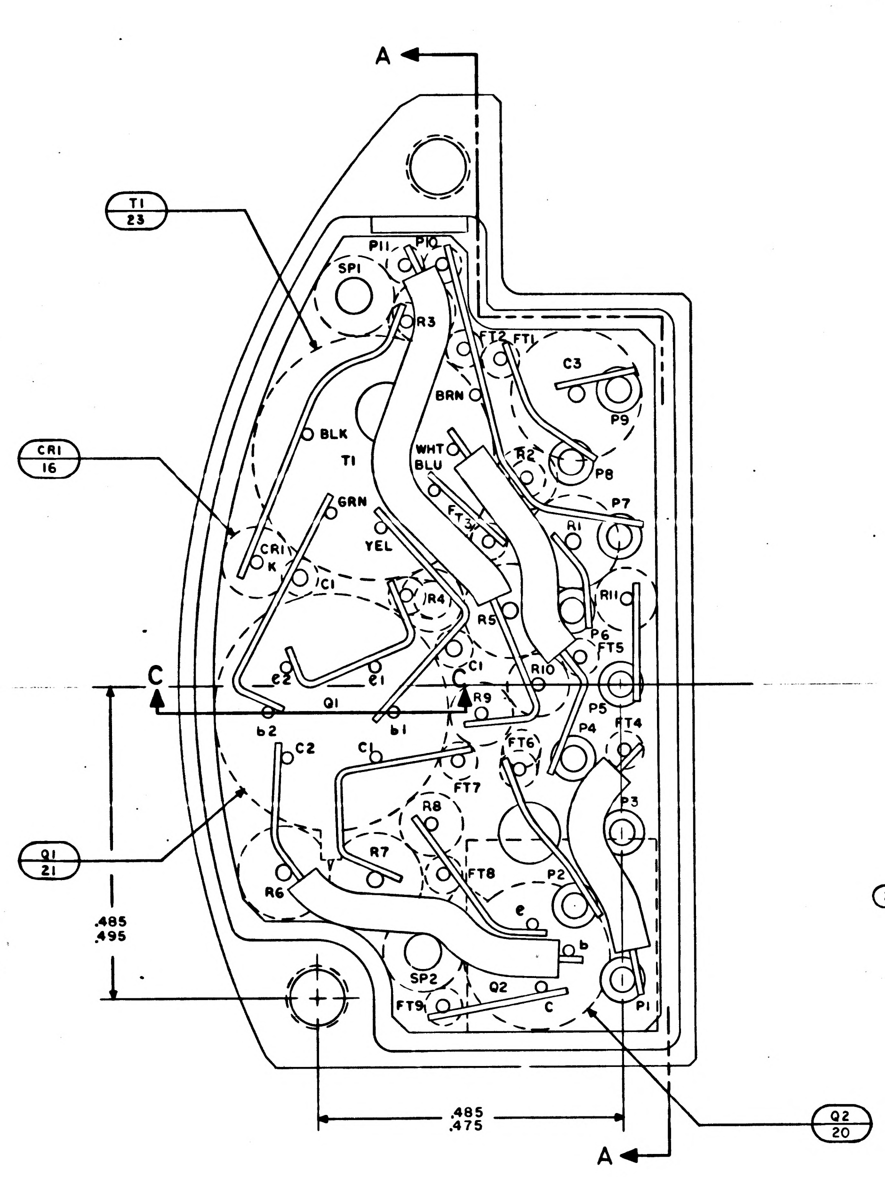
SECTION B-B


IRIG PREAMP ASSY
2021785 -
REV
S/N
APPLICABLE DASH
SEE NOTE

MARKING VIEW
SCALE 2/1

R2	
1006750-84	150K
-154	41 K
-149	25.5K
-62	18 K
-143	14 K
-57	11 K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750-34	1200

2021500
APPLICATION


A
T1
23
CR1
16
Q1
21
Q2
20
SP1
P11
P10
R3
FT2
FT1
C3
P9
BRN
BLK
T1
WHT
BLU
R2
P8
GRN
YEL
FT3
R1
P7
CR1
K
C1
R4
R5
R11
P6
FT5
C
e2
e1
C1
R10
Q1
R9
b2
b1
P5
FT4
C2
C1
FT6
P4
FT7
R8
P3
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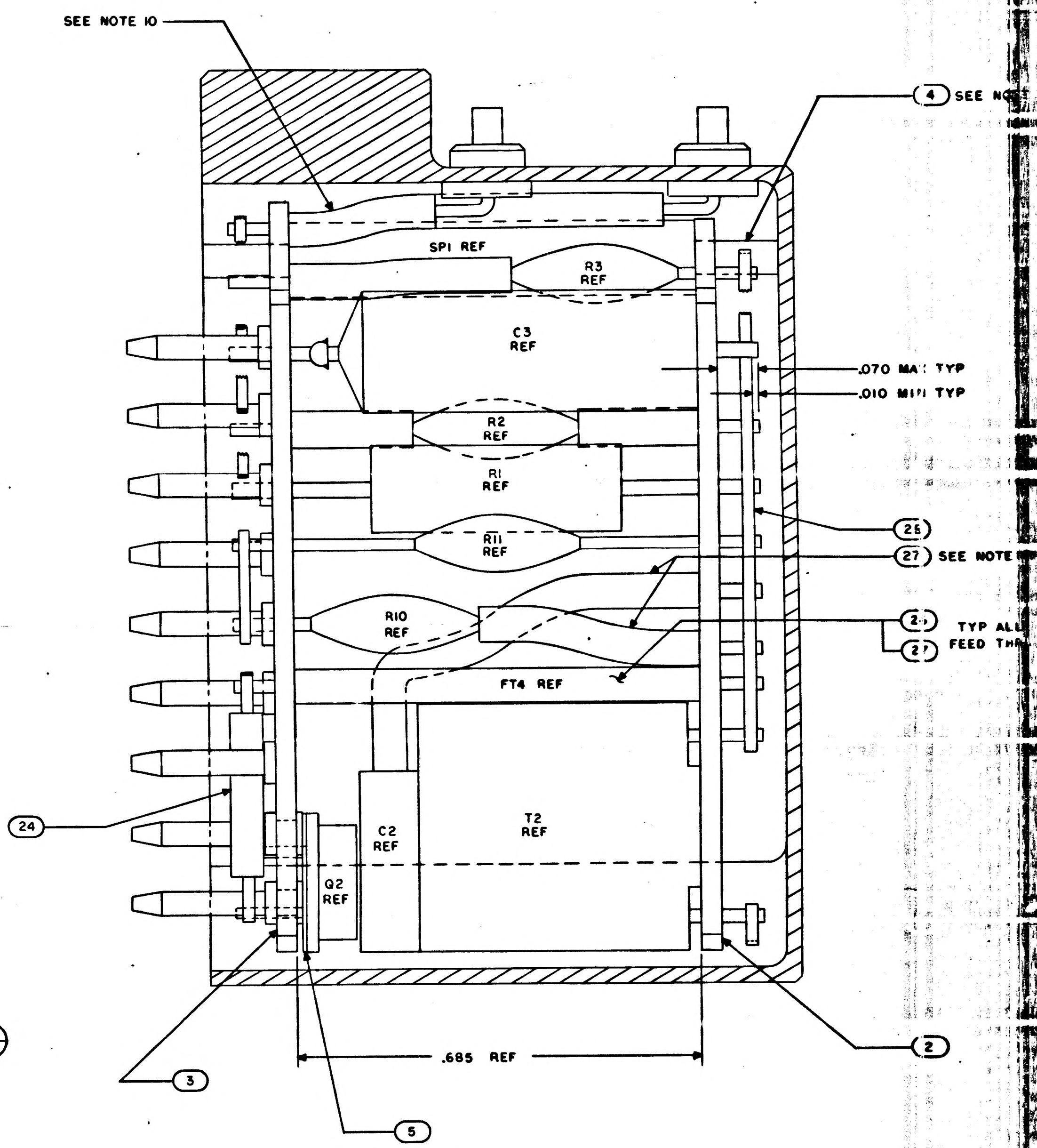
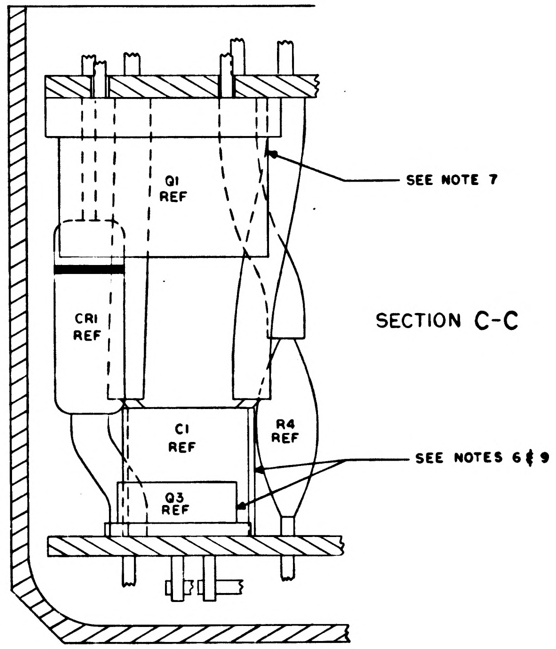
.485
.495
.485
.475
A


SEE NOTE 10
4 SEE NO
SP1 REF
R3
REF
C3
REF
.070 MAX TYP
.010 MIN TYP
R2
REF
R1
REF
R11
REF
25
27 SEE NOTE
R10
REF
2
TYP ALL
FEED THR
27
FT4 REF
24
C2
REF
T2
REF
Q2
REF
2
3
.685 REF
5

SECTION A-A


Q1
REF
SEE NOTE 7
CR1
REF
C1
REF
R4
REF
Q3
REF
SEE NOTES 6 & 9

SECTION C-C

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AR DENOTES AS REQUIRED
3. FT DENOTES FEED THRU
4. WIRE PER ND1002005
5. UNLESS OTHERWISE SPECIFIED ALL WIRING TO BE IN ACCORDANCE WITH ND1002069
6. BOND C1, C3, T1, T2, Q3 TO ITEM NO. 2 PER ND1002004 TYPE I
7. BOND Q1 TO ITEM NO. 3 PER ND1002004 TYPE I
8. BOND ITEM NO. 4 TO ITEM NO'S 2 & 3 PER ND1002004 TYPE I
9. BODIES OF C1, C2, Q3 TO BE SPRAY COATED TO A MIN OF .005 PER ND1002035
10. TERMINAL LEADS TO BE SLEEVED USING ITEM NO. 27
11. LEAD OF R2, R3, R4, R8, R10, CR1, C1, C2 TO BE SLEEVED USING ITEM NO. 27
12. DIPCOAT PER ND1002068 PRIOR TO ENCAPSULATION
13. ENCAPSULATE MODULE PER ND1002036 USING CURING CYCLE "A"
14. R2 TO BE SELECTED FROM CHART PER ATP 2021785
15. MARK .100/.060 HIGH BLACK PER ND1002019 AND SERIALIZE PER ND1002023
16. PROCURE PER PS2021785

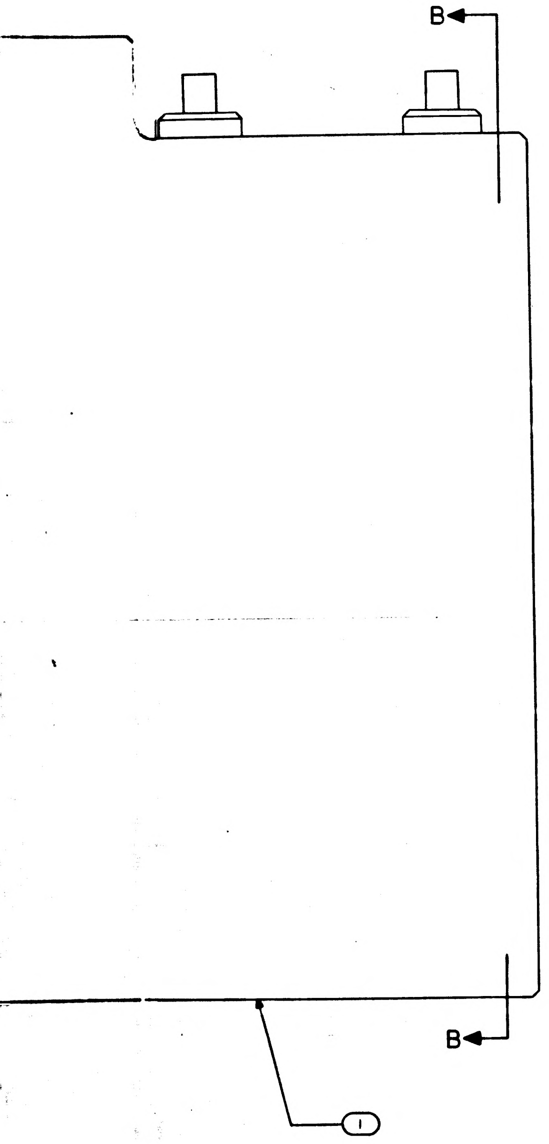
R2	
1006750-84	150K
-154	41 K
-149	25.5K
-62	18 K
-143	14 K
-57	11 K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750-34	1200

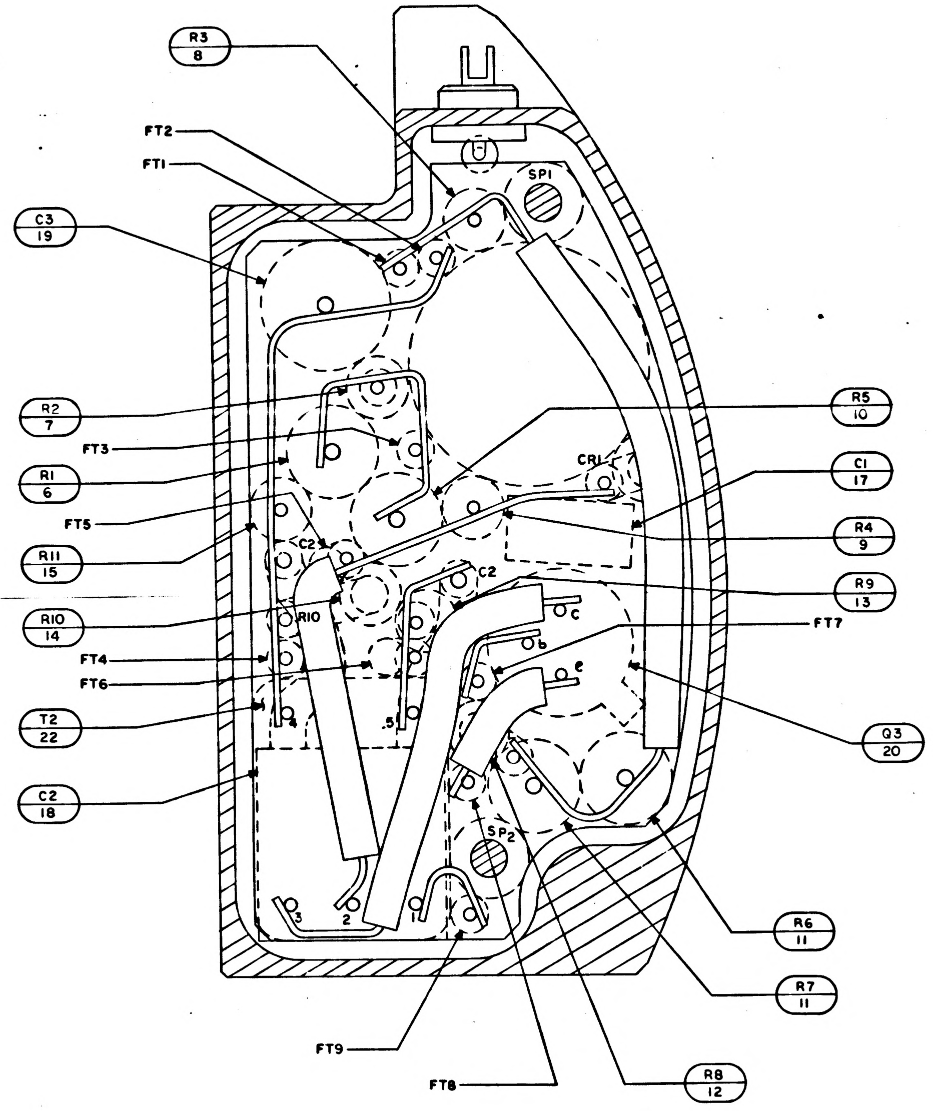
57

2021785 A

SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15797	[illegible]	[illegible]
B	REVISED PER TDRR 18096	APR 65	[illegible]

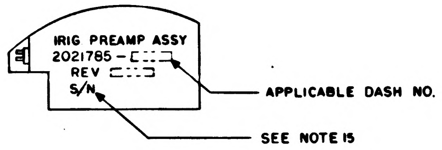
REVISIONS 15000





R3 8
FT2
FT1
SP1
C3 19
R2 7
FT3
R1 6
FT5
R11 15
R10 14
FT4
FT6
T2 22
C2 18
C2
R10
CR1
C2
b
c
e
.5
3
2
SP2
R5 10
C1 17
R4 9
R9 13
FT7
Q3 20
R6 11
R7 11
R8 12
FT9
FT8

SECTION B-B



IRIG PREAMP ASSY
2021785 -
REV
S/N
APPLICABLE DASH NO.
SEE NOTE 15

MARKING VIEW
SCALE 2/1

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION
REF			2010040	SCHEMATIC		
27	AR		1006776-21	INSULATION, SLEEVING		
26	AR		1006757-8	WIRE ELECTRICAL .020DIA		
25	AR		1006757-1	WIRE ELECTRICAL .010X.020 RIBBON		
24	AR		1006776-22	INSULATION, SLEEVING		
23	1	T1	1007080-011	TRANSFORMER		
22	1	T2	1010291-6	TRANSFORMER		
21	1	Q1	1010431-001	TRANSISTOR		
20	1	Q2Q3	1010633-3	TRANSISTOR (MATCHED PAIR)		
19	1	C3	1010264-118	CAPACITOR		
18	1	C2	1010359-28	CAPACITOR		
17	1	C1	1010359-5	CAPACITOR		
16	1	CR1	1010372-15	DIODE		
15	1	R11	1006750-56	RESISTOR		
14	1	R10	1006750-73	RESISTOR		
13	1	R9	1006750-80	RESISTOR		
12	1	R8	1006750-25	RESISTOR		
11	2	R6 R7	1010364-459	RESISTOR		
10	1	R5	1010364-769	RESISTOR		
9	1	R4	1006750-52	RESISTOR		
8	1	R3	1006750-51	RESISTOR		
7	1	R2	SEE NOTE 14	RESISTOR		
6	1	R1	1010364-501	RESISTOR		
5	1		2021762	INSULATOR, TRANSISTOR		
4	2		2021763	SPACER		
3	1		2021782-011	WIRING BOARD ASSY, BOTTOM		
2	1		2021784	WIRING BOARD, TOP		
1	1		2021779-011	HOUSING ASSY		
	-011	LIST OF MATERIALS				

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

2021500
NEXT ASSY | USED ON
APPLICATION

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN J Brighton 12/25/64
CHECKED
APPROVED
APPROVED A.C. Smith
MIT APPROVED W Ruffin 22 Dec 64 DATE
NASA W J Rhine 12-22-64

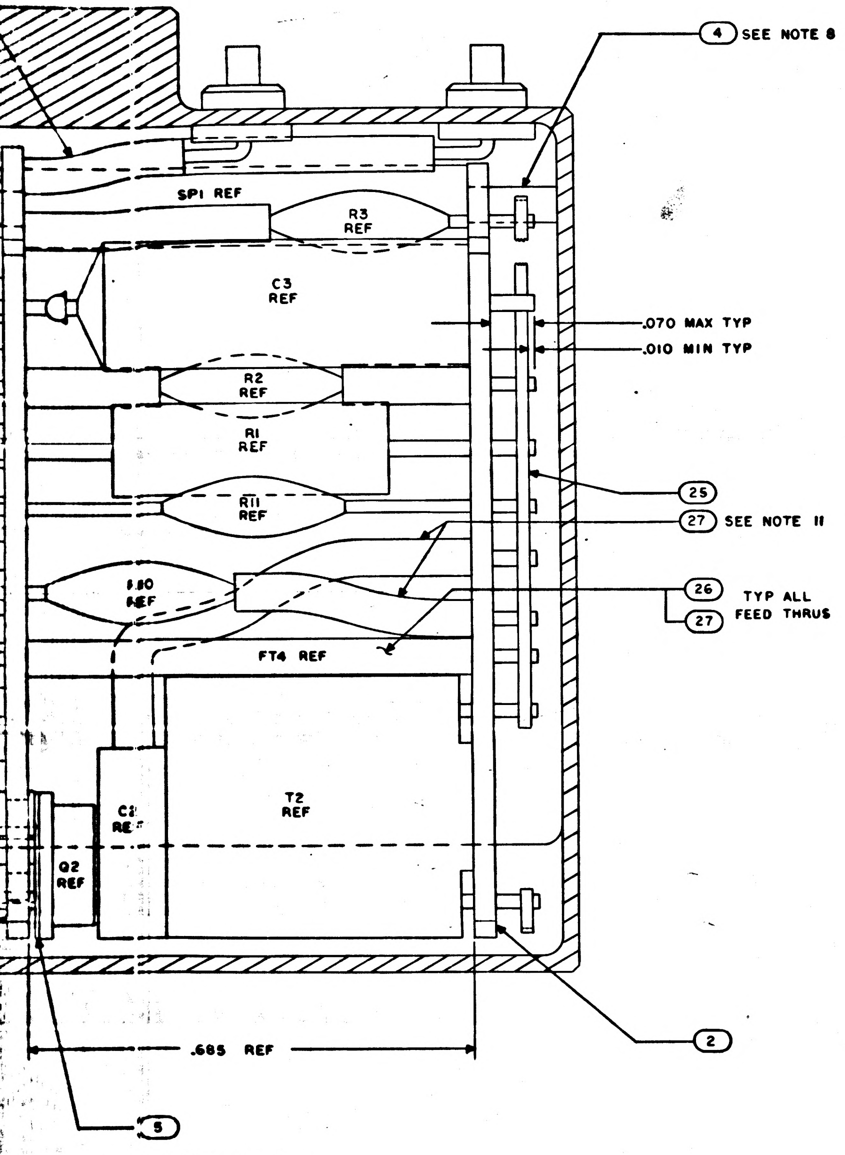
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

IRIG PREAMP ASSY

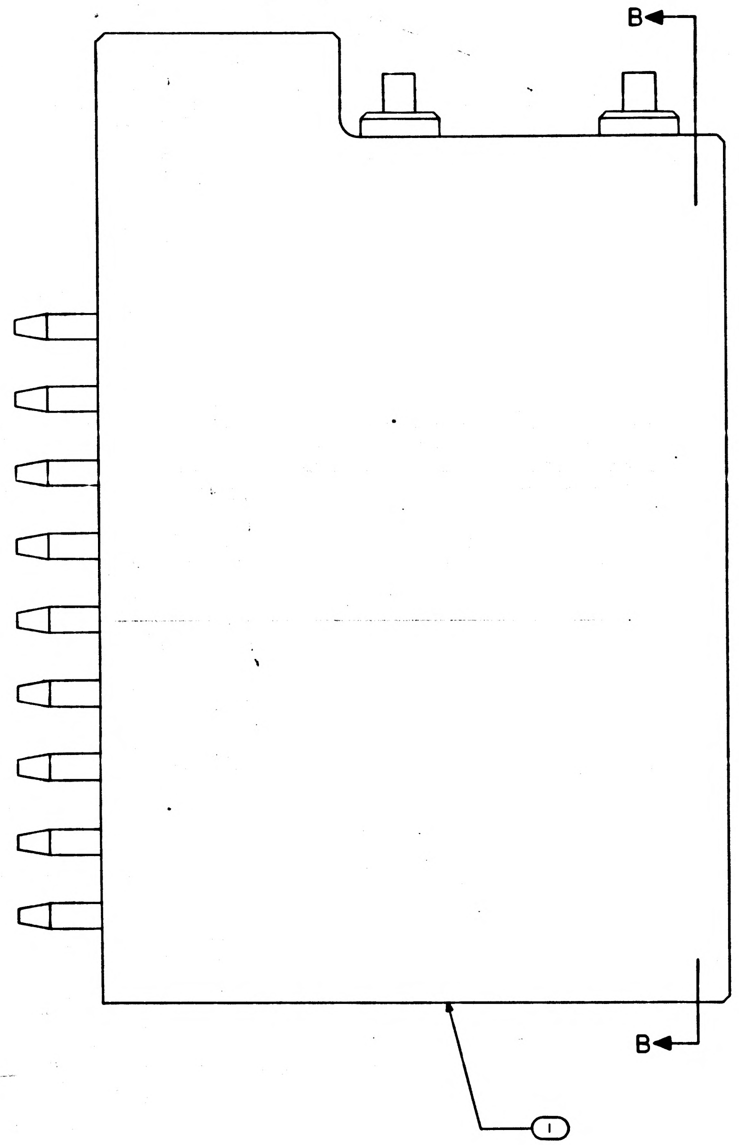
SIZE J | CODE IDENT NO 80230 | DRAWING NO. 2021785
SCALE 10/1 | SHEET 1 OF 1

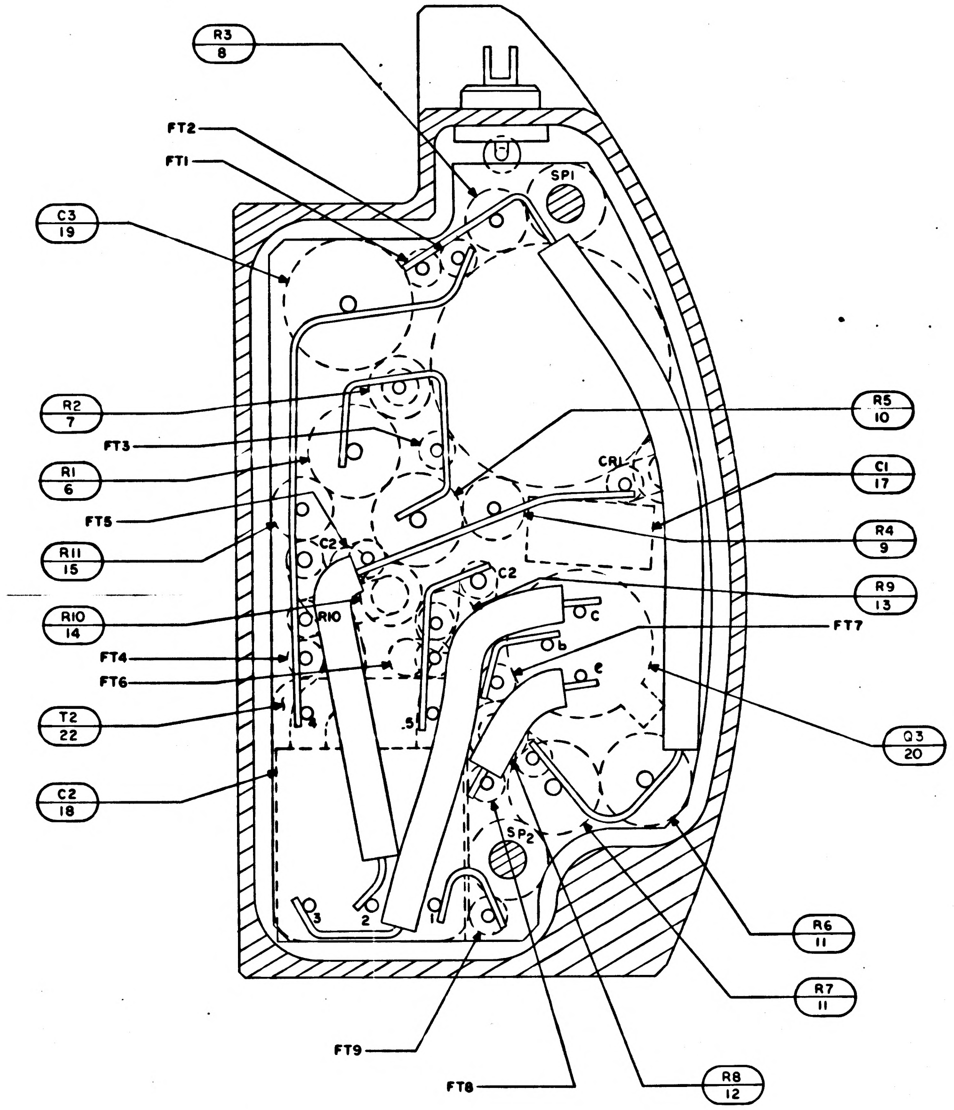
2021785 B

(34)

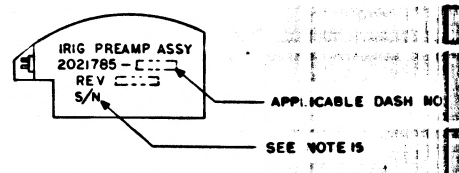

SP1 REF
R3 REF
C3 REF
R2 REF
R1 REF
R11 REF
R10 REF
FT4 REF
T2 REF
C2 REF
Q2 REF
4 SEE NOTE 8
.070 MAX TYP
.010 MIN TYP
25
27 SEE NOTE 11
26
27
TYP ALL FEED THRUS
2
.685 REF
5

SECTION A-A




R3 8
FT2
FT1
C3 19
R2 7
FT3
R1 6
FT5
R11 15
R10 14
FT4
FT6
T2 22
C2 18
SP1
CR1
C2
R10
c
b
e
SP2
3
2
5
R5 10
C1 17
R4 9
R9 13
FT7
Q3 20
R6 11
R7 11
R8 12
FT9
FT8

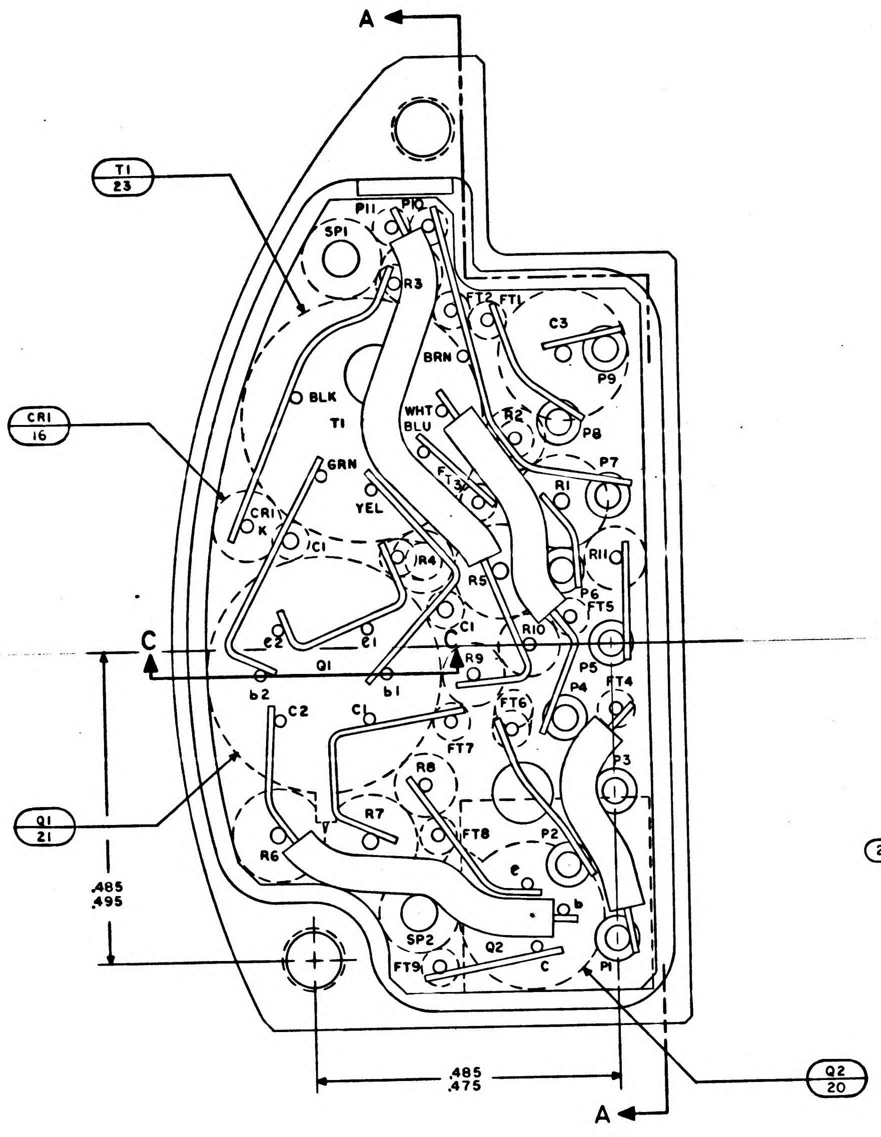
SECTION B-B


IRIG PREAMP ASSY
2021785 -
REV
S/N
APPLICABLE DASH NO
SEE NOTE 15

MARKING VIEW
SCALE 2/1

R2	
1006750-84	150K
-154	41 K
-149	25.5K
-62	18 K
-143	14 K
-57	11 K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750-34	1200

2021785 B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T1
23
CR1
16
Q1
21
Q2
20
C
C
SP1
P11
P10
R3
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FT1
C3
P9
BRN
BLK
T1
WHT
BLU
R2
P8
P7
GRN
YEL
FT3
R1
CR1
K
C1
R4
R5
R11
P6
FT5
e2
e1
C1
R10
R9
P5
Q1
b2
b1
FT4
P4
C2
C1
FT6
FT7
P3
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P1
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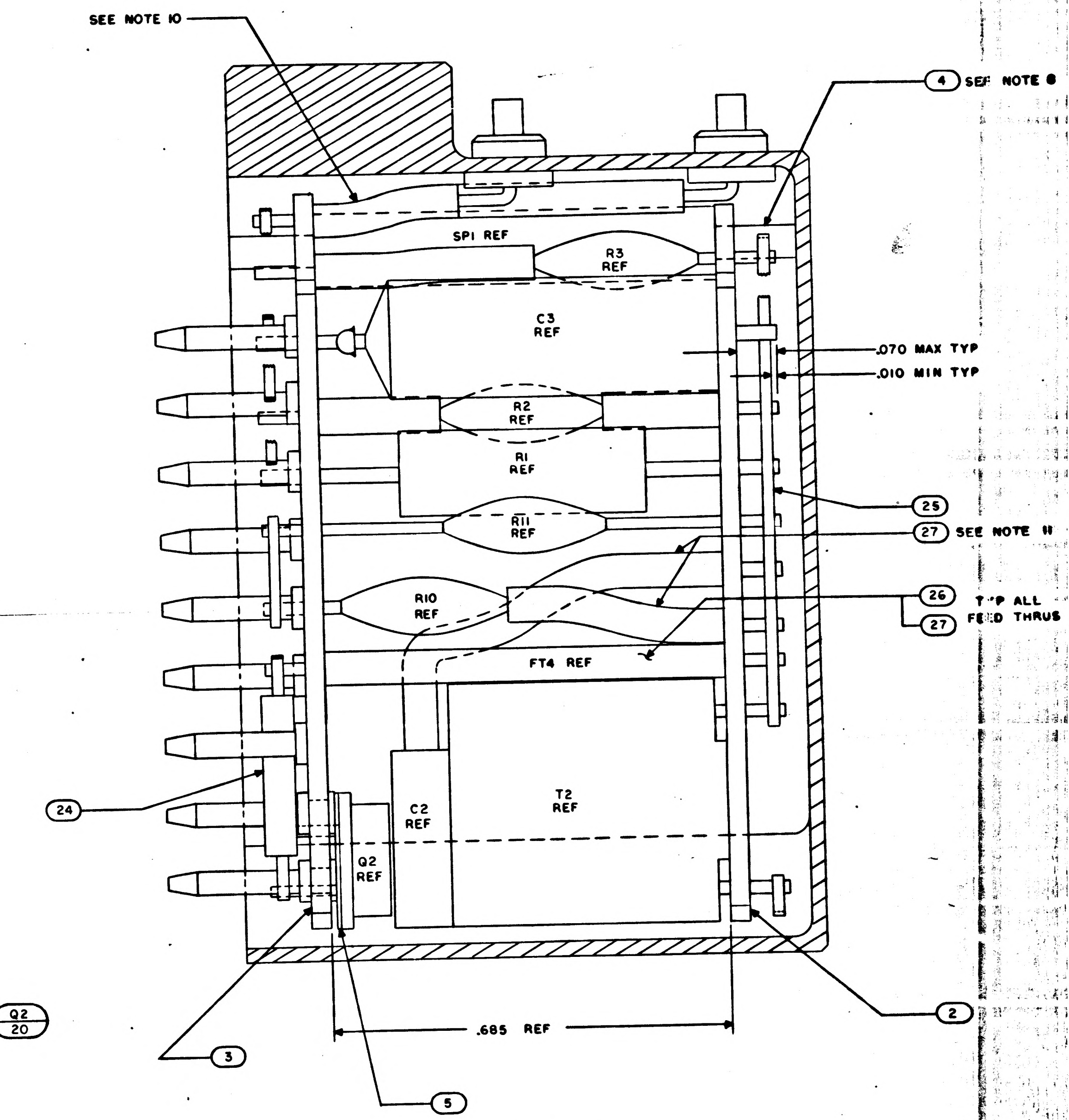
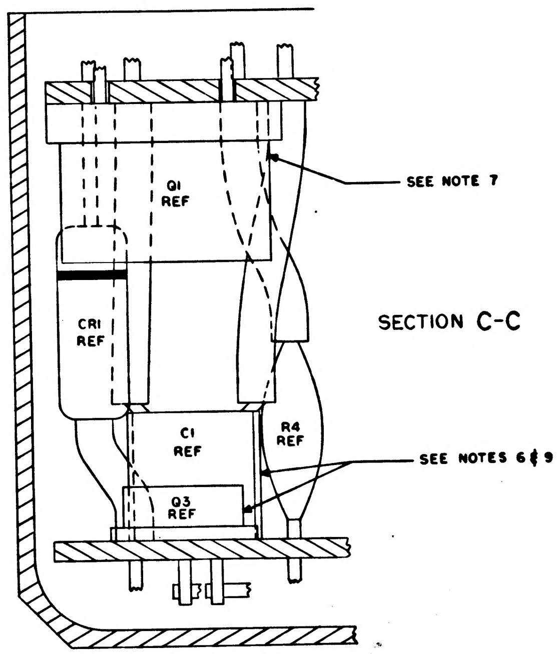
.495
.485
.475


SEE NOTE 10
4 SEE NOTE 8
SP1 REF
R3 REF
C3 REF
.070 MAX TYP
.010 MIN TYP
R2 REF
R1 REF
R11 REF
25
27 SEE NOTE 11
R10 REF
26 TYP ALL
27 FEED THRUS
FT4 REF
24
C2 REF
T2 REF
Q2 REF
2
3
.685 REF
5

SECTION A-A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AR DENOTES AS REQUIRED
3. FT DENOTES FEED THRU
4. WIRE PER ND1002005
5. UNLESS OTHERWISE SPECIFIED ALL WIRING TO BE IN ACCORDANCE WITH ND1002069
6. BOND C1, C3, T1, T2, Q3 TO ITEM NO. 2 PER ND1002004 TYPE I
7. BOND Q1 TO ITEM NO. 3 PER ND1002004 TYPE I
8. BOND ITEM NO. 4 TO ITEM NO'S 2 & 3 PER ND1002004 TYPE I
9. BODIES OF C1, C2, Q3 TO BE SPRAY COATED TO A MIN OF .005 PER ND1002035
10. TERMINAL LEADS TO BE SLEEVED USING ITEM NO. 27
11. LEAD OF R2, R3, R4, R8, R10, CR1, C1, C2 TO BE SLEEVED USING ITEM NO. 27
12. DIPCOAT PER ND1002068 PRIOR TO ENCAPSULATION
13. ENCAPSULATE MODULE PER ND1002036 USING CURING CYCLE "A"
14. R2 TO BE SELECTED FROM CHART PER ATP 2021785
15. MARK .100/.060 HIGH WHITE PER ND1002019 AND SERIALIZE PER ND1002023
16. PROCURE PER PS2021785


SEE NOTE 7
Q1 REF
CR1 REF
C1 REF
R4 REF
Q3 REF
SEE NOTES 6 & 9

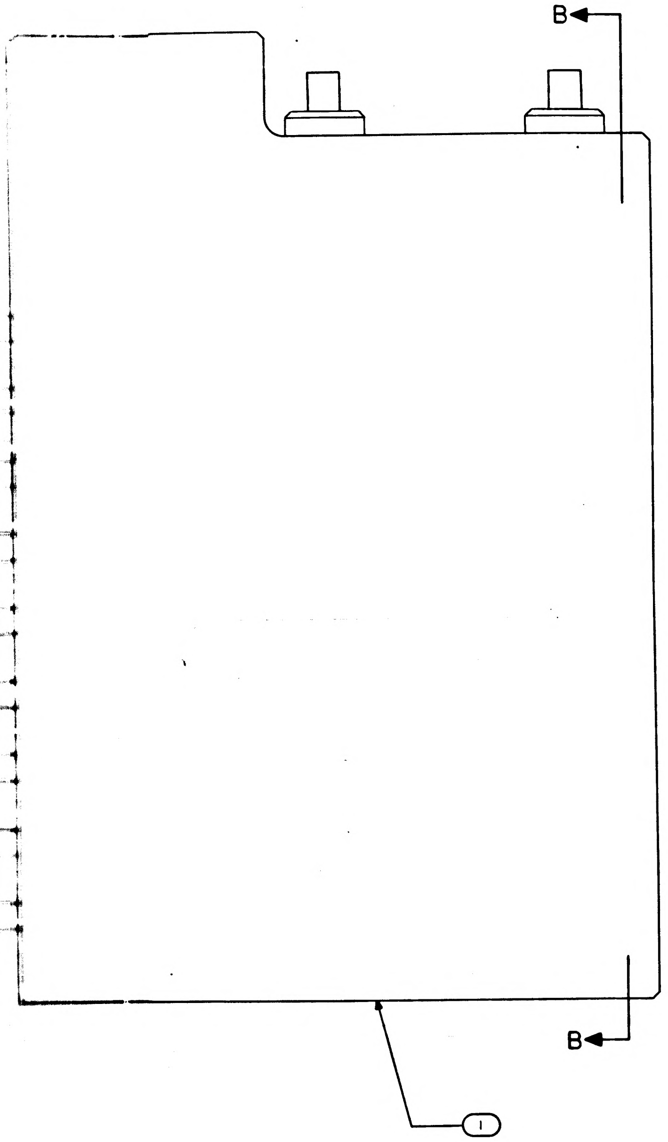
SECTION C-C

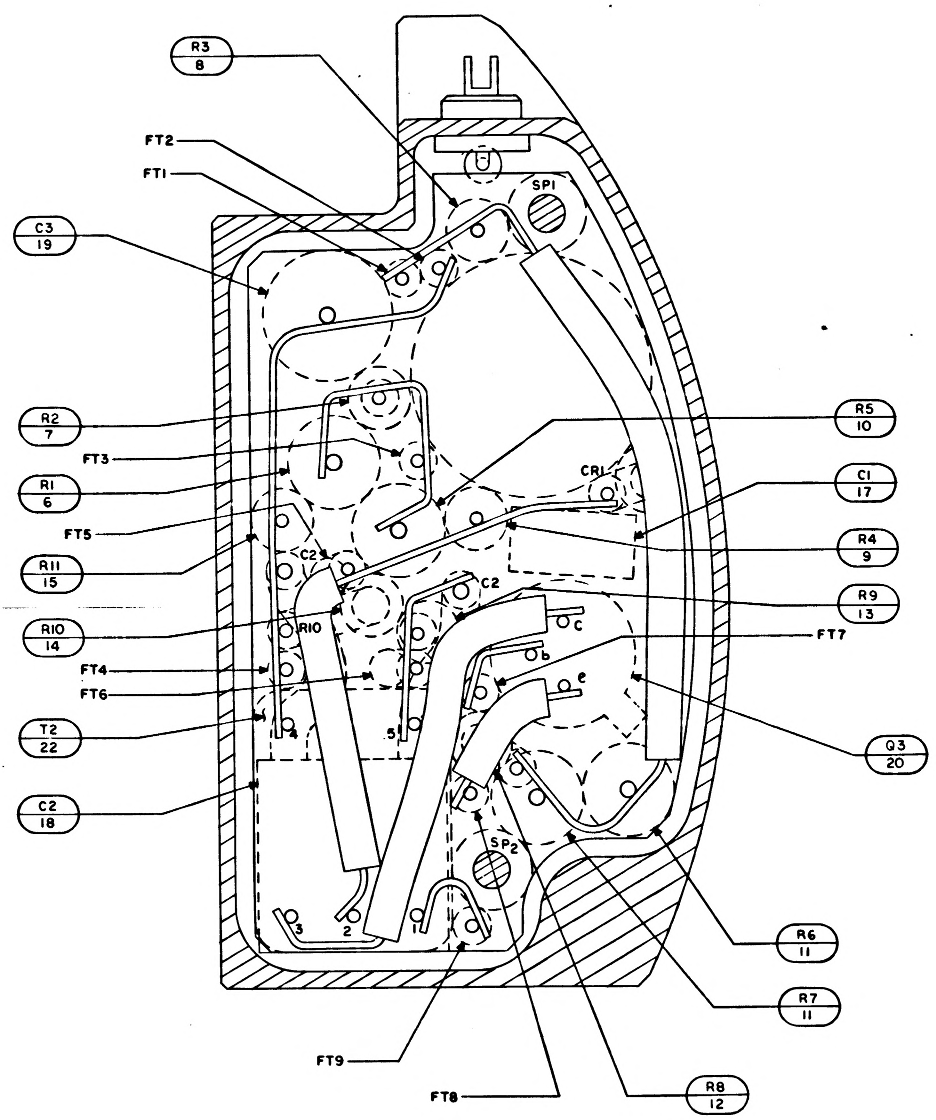
R2	
1006750-84	150K
-154	41 K
-149	25.5K
-62	18 K
-143	14 K
-57	11 K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750-34	1200

57

2021785 C

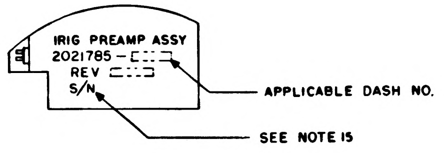
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15797	[illegible] Jan 65	
B	REVISED PER TDRR 18096	6 APR 65	
C	REVISED PER TDRR 19019	12 MAY 65	





R3 8
FT2
FT1
C3 19
R2 7
FT3
R1 6
FT5
R11 15
R10 14
FT4
FT6
T2 22
C2 18
SP1
CR1
C2
R10
C2
c
b
e
5
SP2
3
2
R5 10
C1 17
R4 9
R9 13
FT7
Q3 20
R6 11
R7 11
R8 12
FT9
FT8

SECTION B-B



IRIG PREAMP ASSY
2021785 -
REV
S/N
APPLICABLE DASH NO.
SEE NOTE 15

MARKING VIEW
SCALE 2/1

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION
REF			2010040	SCHEMATIC		
27	AR		1006776-21	INSULATION, SLEEVING		
26	AR		1006757-8	WIRE ELECTRICAL .020DIA		
25	AR		1006757-1	WIRE ELECTRICAL .010X.020 RIBBON		
24	AR		1006776-22	INSULATION, SLEEVING		
23	1	T1	1007080-011	TRANSFORMER, SHIELDED ASSEMBLY		
22	1	T2	1010291-6	TRANSFORMER		
21	1	Q1	1010431-001	TRANSISTOR		
20	1	Q2Q3	1010950-2	TRANSISTOR (MATCHED PAIR)		
19	1	C3	1010264-118	CAPACITOR		
18	1	C2	1010359-28	CAPACITOR		
17	1	C1	1010359-5	CAPACITOR		
16	1	CR1	1010372-15	DIODE		
15	1	R11	1006750-56	RESISTOR		
14	1	R10	1006750-73	RESISTOR		
13	1	R9	1006750-80	RESISTOR		
12	1	R8	1006750-25	RESISTOR		
11	2	R6 R7	1010364-459	RESISTOR		
10	1	R5	1010364-769	RESISTOR		
9	1	R4	1006750-52	RESISTOR		
8	1	R3	1006750-51	RESISTOR		
7	1	R2	SEE NOTE 14	RESISTOR		
6	1	R1	1010364-501	RESISTOR		
5	1		2021762-011	INSULATOR, TRANSISTOR		
4	2		2021763	SPACER		
3	1		2021782-011	WIRING BOARD ASSY, BOTTOM		
2	1		2021784	WIRING BOARD, TOP		
1	1		2021779-011	HOUSING ASSY		
	-011	LIST OF MATERIALS				

NEXT ASSY	USED ON
2021500	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1,000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

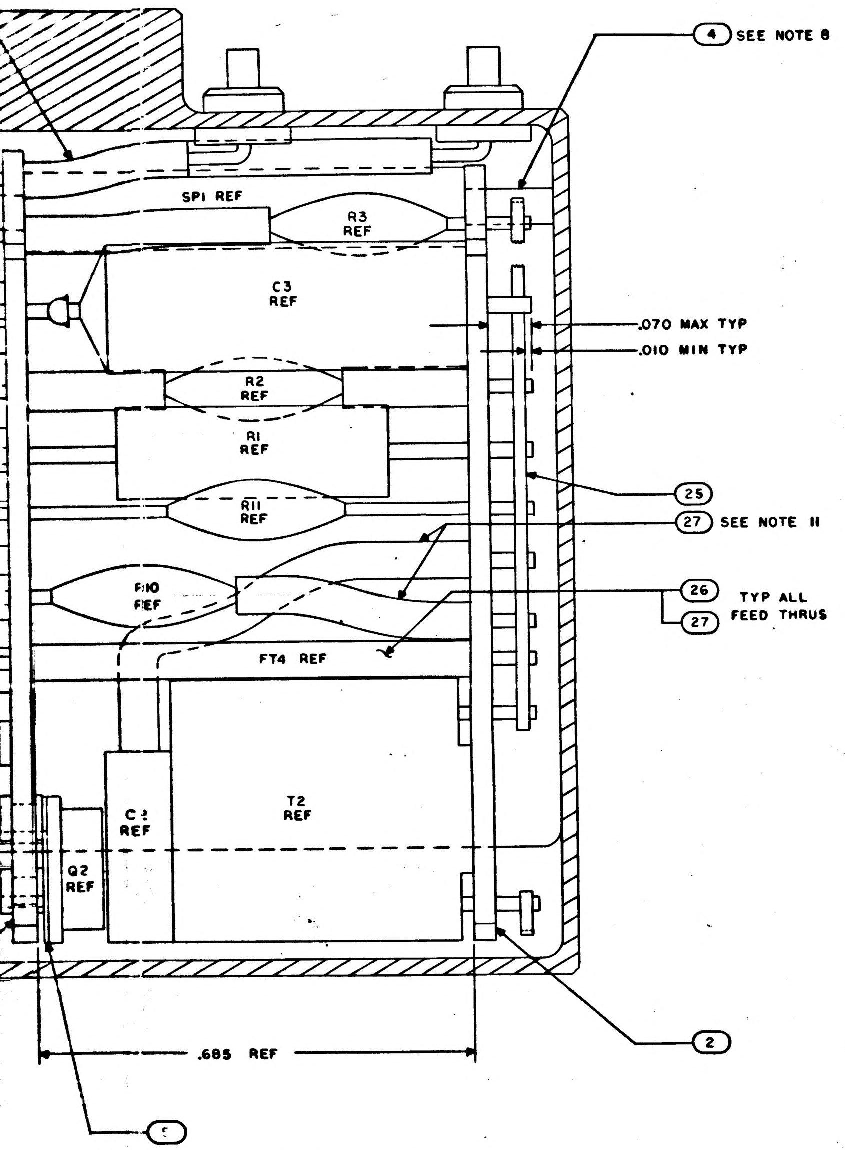
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN J Brigham 12/25/64
CHECKED [illegible]
APPROVED N Sakelos 12/25/64
APPROVED A. C. [illegible]
MIT APPROVED W Ruff 22 Dec 64 DATE
NASA W J Rhine 12-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

IRIG PREAMP ASSY

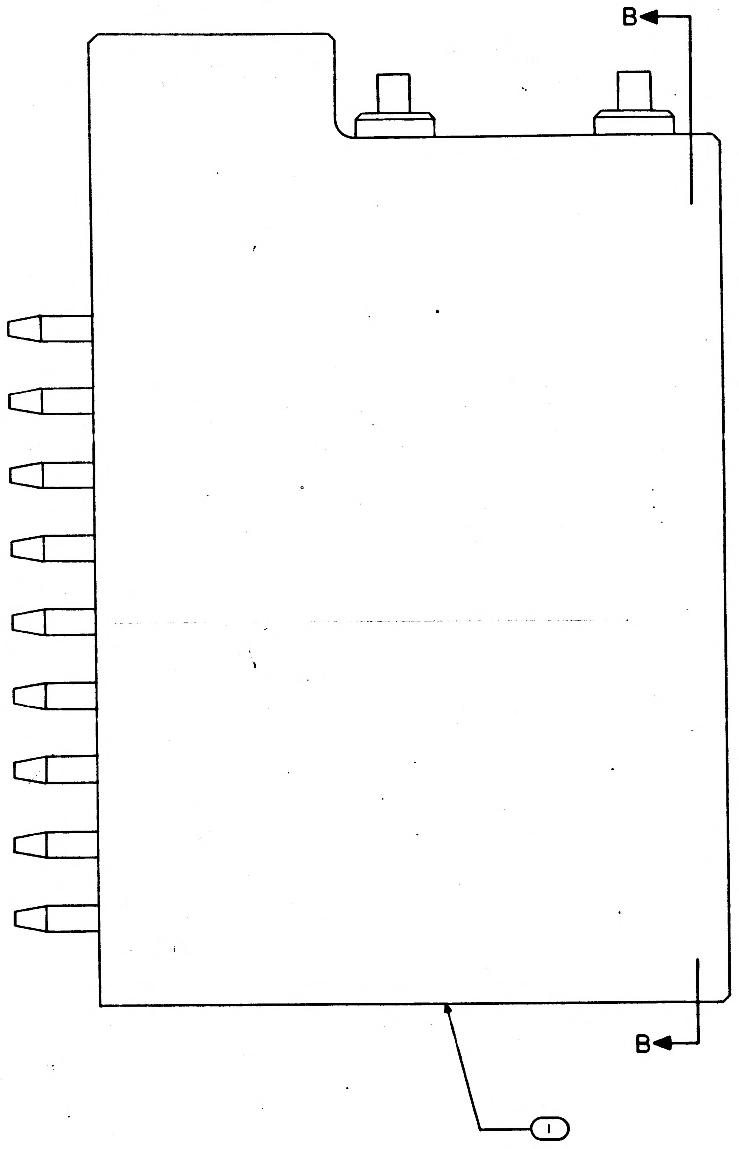
SIZE J CODE IDENT NO 80230 DRAWING NO. 2021785
SCALE 10/1 SHEET 1 OF 1

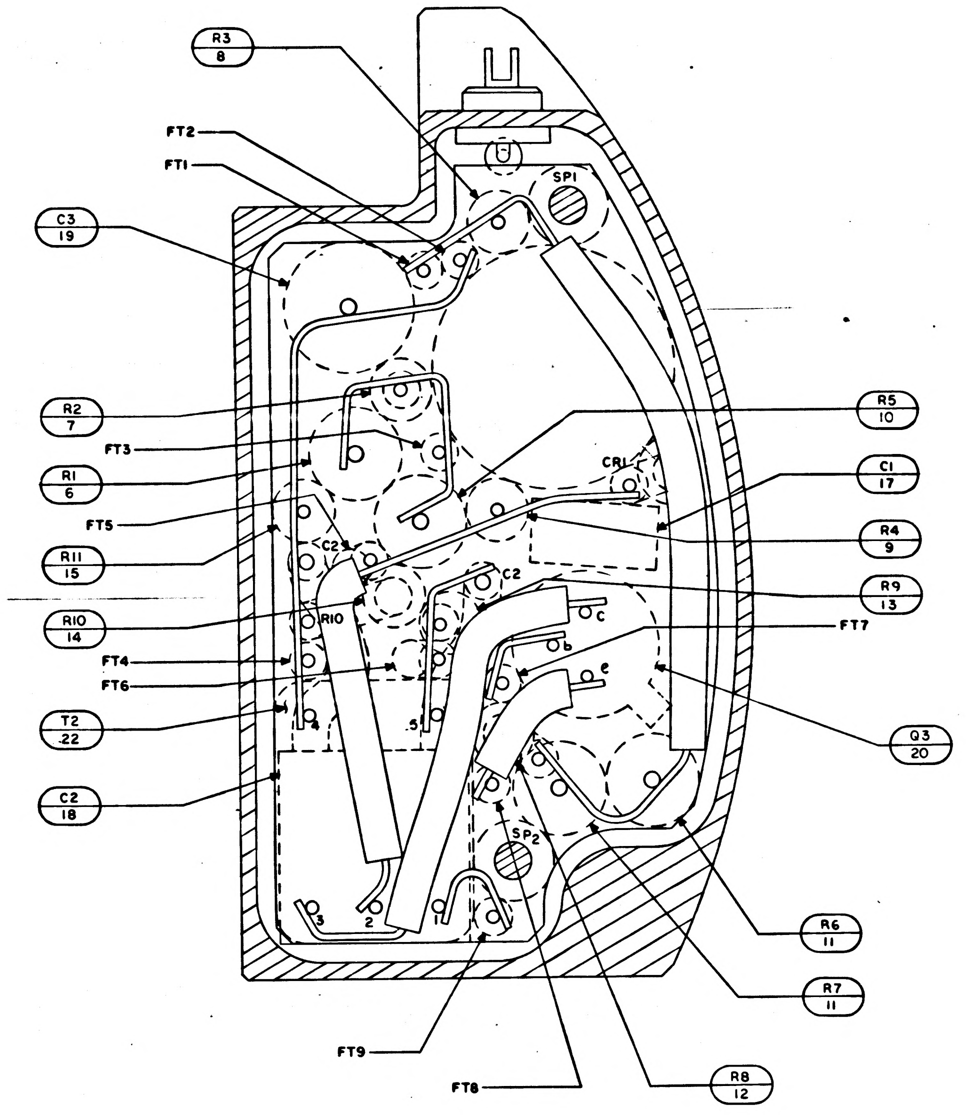
2021785 C



④ SEE NOTE 8
SP1 REF
R3 REF
C3 REF
.070 MAX TYP
.010 MIN TYP
R2 REF
R1 REF
R11 REF
R10 REF
FT4 REF
C2 REF
T2 REF
Q2 REF
㉕
㉗ SEE NOTE 11
㉖ ㉗ TYP ALL FEED THRUS
②
.685 REF

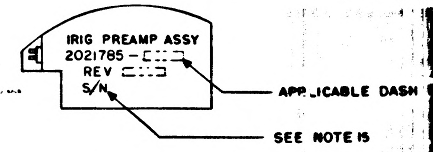
SECTION A-A





R3 8
FT2
FT1
C3 19
SP1
R2 7
FT3
R1 6
FT5
R11 15
R10 14
FT4
FT6
T2 22
C2 18
R5 10
C1 17
CR1
R4 9
R9 13
FT7
Q3 20
C2
C2
R10
SP2
R6 11
R7 11
R8 12
FT9
FT8

SECTION B-B



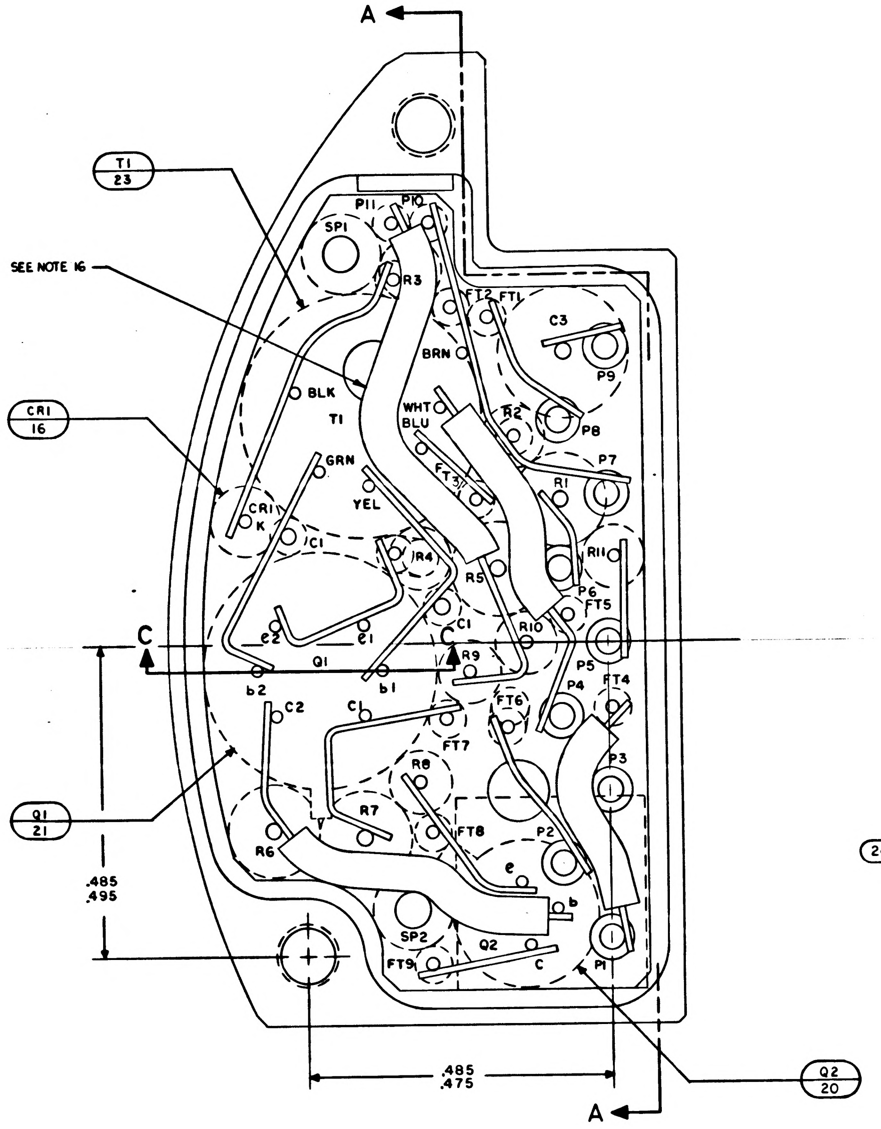
IRIG PREAMP ASSY
2021785 -
REV
S/N
APPLICABLE DASH
SEE NOTE 15

MARKING VIEW
SCALE 2/1

R2	
1006750-84	150K
-154	41 K
-149	25.5K
-62	18 K
-143	14 K
-57	11 K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750-34	1200

2021500

2021785 C


A
T1
23
SEE NOTE 16
CR1
16
Q1
21
Q2
20
SP1
P11
P10
R3
FT2
FT1
C3
P9
BRN
BLK
T1
WHT
BLU
R2
P8
GRN
P7
FT3
R1
YEL
CR1
K
C1
R4
R5
R11
P6
FT5
C
e2
e1
Q1
C1
R10
R9
P5
b2
b1
FT4
C2
C1
FT6
P4
FT7
P3
R8
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R6
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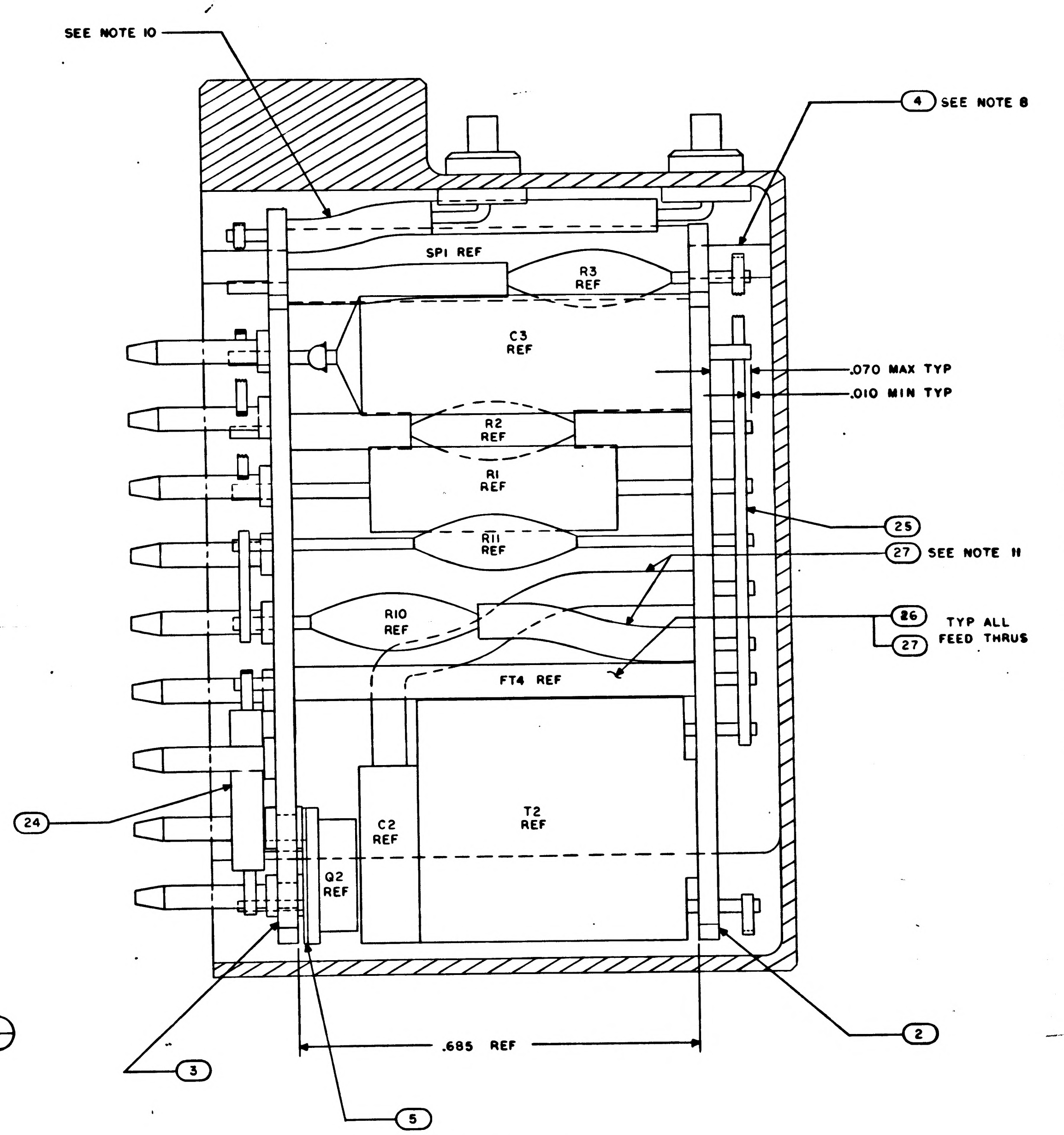
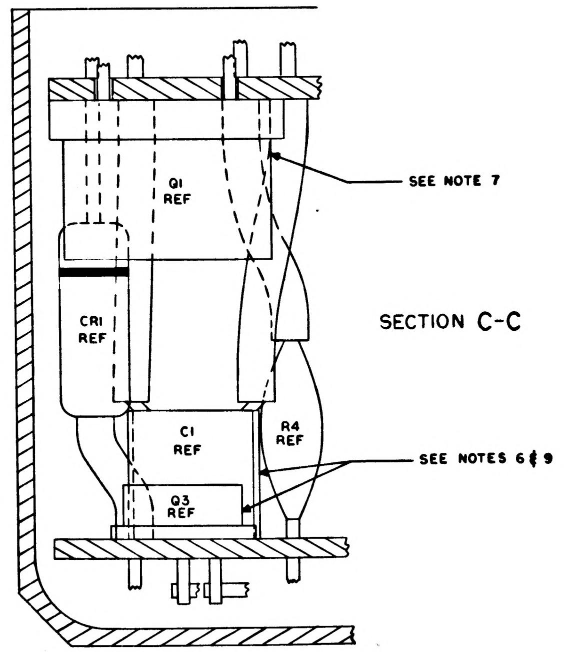
.485
.495
.485
.475
A


SEE NOTE 10
4 SEE NOTE 8
SP1 REF
R3
REF
C3
REF
.070 MAX TYP
.010 MIN TYP
R2
REF
R1
REF
R11
REF
25
27 SEE NOTE 11
R10
REF
26 TYP ALL
27 FEED THRUS
FT4 REF
24
C2
REF
T2
REF
Q2
REF
2
3
5
.685 REF

SECTION A-A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AR DENOTES AS REQUIRED
3. FT DENOTES FEED THRU
4. WIRE PER ND1002005
5. UNLESS OTHERWISE SPECIFIED ALL WIRING TO BE IN ACCORDANCE WITH ND1002069
6. BOND C1, C3, T1, T2, Q3 TO ITEM NO. 2 PER ND1002004 TYPE I
7. BOND Q1 TO ITEM NO. 3 PER ND1002004 TYPE I
8. BOND ITEM NO. 4 TO ITEM NO'S 2 & 3 PER ND1002004 TYPE I
9. BODIES OF C1, C2, Q3 TO BE SPRAY COATED TO A MIN OF .005 PER ND1002035
10. TERMINAL LEADS TO BE SLEEVED USING ITEM NO. 27
11. LEAD OF R2, R3, R4, R8, R10, CR1, C1, C2 TO BE SLEEVED USING ITEM NO. 27
12. DIPCOAT PER ND1002068 PRIOR TO ENCAPSULATION
13. ENCAPSULATE MODULE PER ND1002036 USING CURING CYCLE 'A'
14. R2 TO BE SELECTED FROM CHART PER ATP 2021500, MC 25-868
15. MARK .100/.060 HIGH WHITE PER ND1002019 AND SERIALIZE PER ND1002023
16. UPON COMPLETION OF ELECTRICAL TEST (PER MC 25-868) FOR SELECTION OF R2, INSTALL NICKEL RIBBON CIRCUIT RUN, WELDING P11, R5, R10 AND R9 TOGETHER AS SHOWN
17. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF ATP 2021500, MC25-867

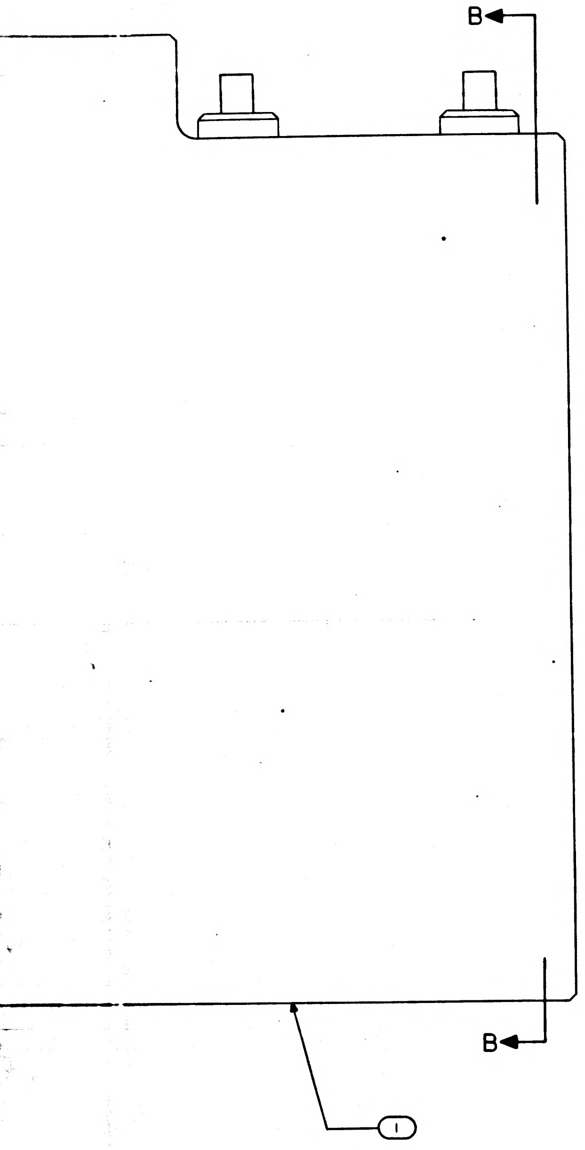

SEE NOTE 7
Q1
REF
CR1
REF
C1
REF
R4
REF
Q3
REF
SEE NOTES 6 & 9

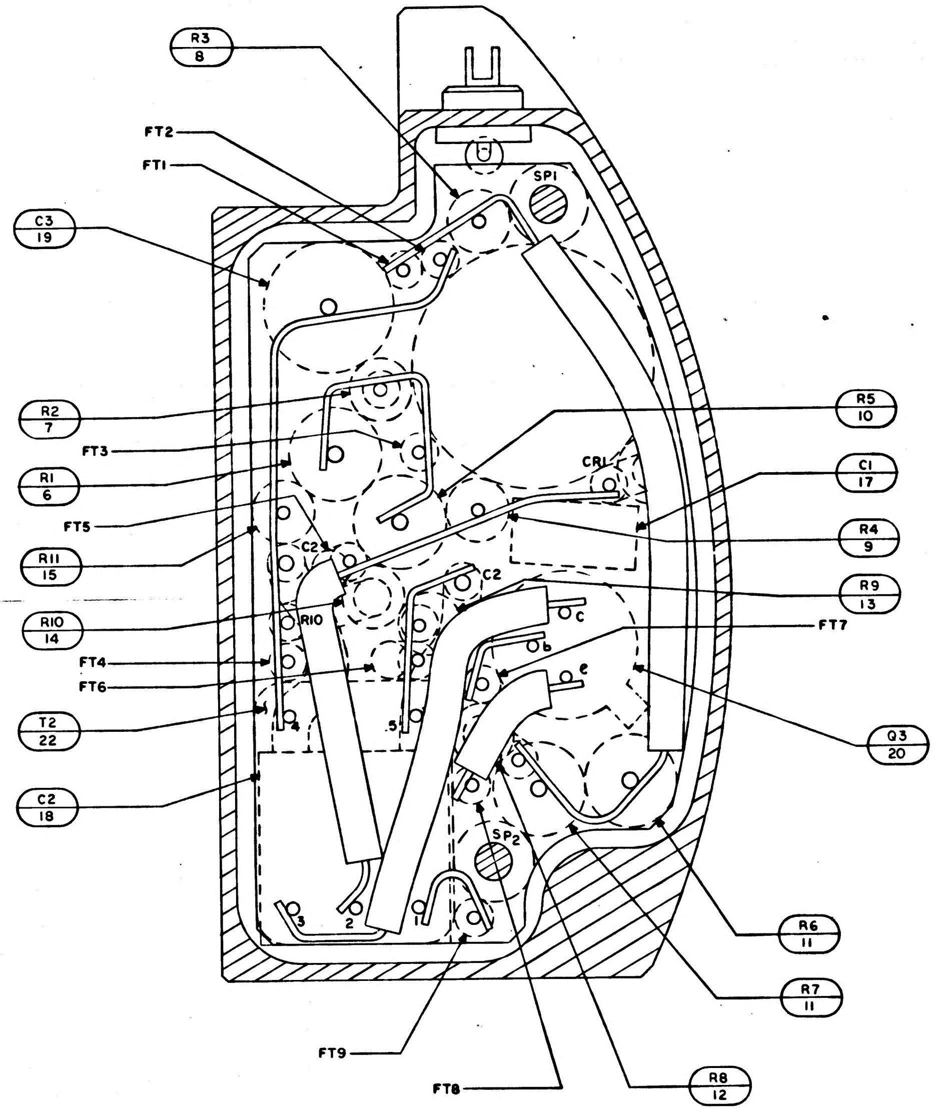
SECTION C-C

R2	
1006750-84	150K
-154	41 K
-149	25.5K
-62	18 K
-143	14 K
-57	11 K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750-34	1200

2021785 D

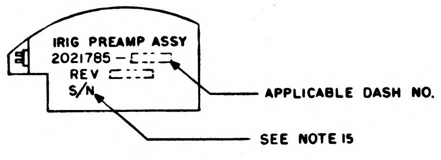
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15797	[illegible]	
B	REVISED PER TDRR 18096	8 APR 65	
C	REVISED PER TDRR 19019	12 MAY 65	
D	REVISED PER TDRR 19796	[illegible]	





R3 8
FT2
FT1
C3 19
SP1
R2 7
FT3
R1 6
FT5
R11 15
R10 14
FT4
FT6
T2 22
C2 18
R5 10
C1 17
CR1
R4 9
C2
R9 13
FT7
Q3 20
R10
C
b
e
SP2
R6 11
R7 11
R8 12
FT9
FT8

SECTION B-B



IRIG PREAMP ASSY
2021785 -
REV
S/N
APPLICABLE DASH NO.
SEE NOTE 15

MARKING VIEW
SCALE 2/1

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION
REF			2010040	SCHEMATIC		
27	AR		1006776-21	INSULATION, SLEEVING		
26	AR		1006757-8	WIRE ELECTRICAL .020DIA		
25	AR		1006757-1	WIRE ELECTRICAL .010X.020 RIBBON		
24	AR		1006776-22	INSULATION, SLEEVING		
23	1	T1	1007080-011	TRANSFORMER, SHIELDED ASSEMBLY		
22	1	T2	1010291-6	TRANSFORMER		
21	1	Q1	1010431-001	TRANSISTOR		
20	1	Q2Q3	1010950-2	TRANSISTOR (MATCHED PAIR)		
19	1	C3	1010264-118	CAPACITOR		
18	1	C2	1010359-28	CAPACITOR		
17	1	C1	1010359-5	CAPACITOR		
16	1	CR1	1010372-15	DIODE		
15	1	R11	1006750-56	RESISTOR		
14	1	R10	1006750-73	RESISTOR		
13	1	R9	1006750-80	RESISTOR		
12	1	R8	1006750-25	RESISTOR		
11	2	R6 R7	1010364-459	RESISTOR		
10	1	R5	1010364-769	RESISTOR		
9	1	R4	1006750-52	RESISTOR		
8	1	R3	1006750-51	RESISTOR		
7	1	R2	SEE NOTE 14	RESISTOR		
6	1	R1	1010364-501	RESISTOR		
5	1		2021762	INSULATOR, TRANSISTOR		
4	2		2021763	SPACER		
3	1		2021782-011	WIRING BOARD ASSY, BOTTOM		
2	1		2021784	WIRING BOARD, TOP		
1	1		2021779-011	HOUSING ASSY		
	-011	LIST OF MATERIALS				

2021785 D

NEXT ASSY	USED ON
2021500	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN 12/23/64
CHECKED
APPROVED 12/23/64
APPROVED
MIT APPROVED DATE
W Rupp 22 Dec 64
NASA
W J Rhine 12-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

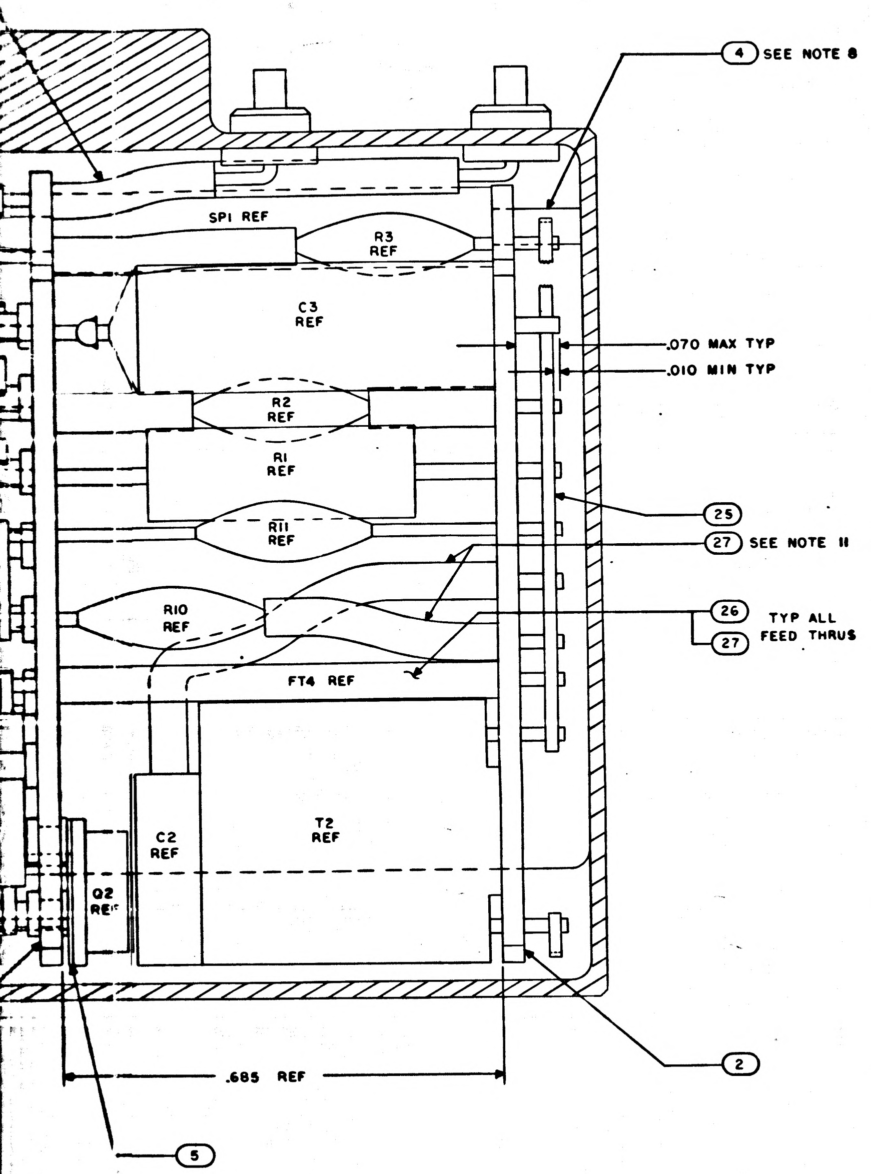
IRIG PREAMP ASSY

SIZE J CODE IDENT NO 80230 DRAWING NO. 2021785
SCALE 10/1 SHEET 1 OF 1

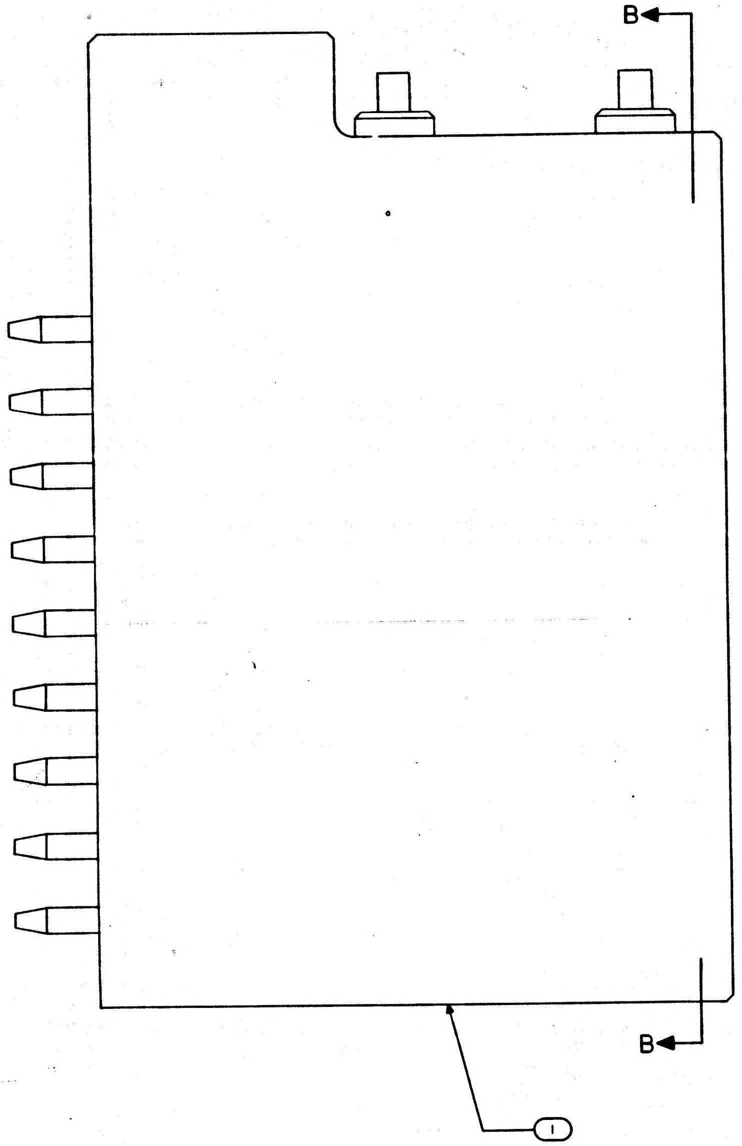
2021785

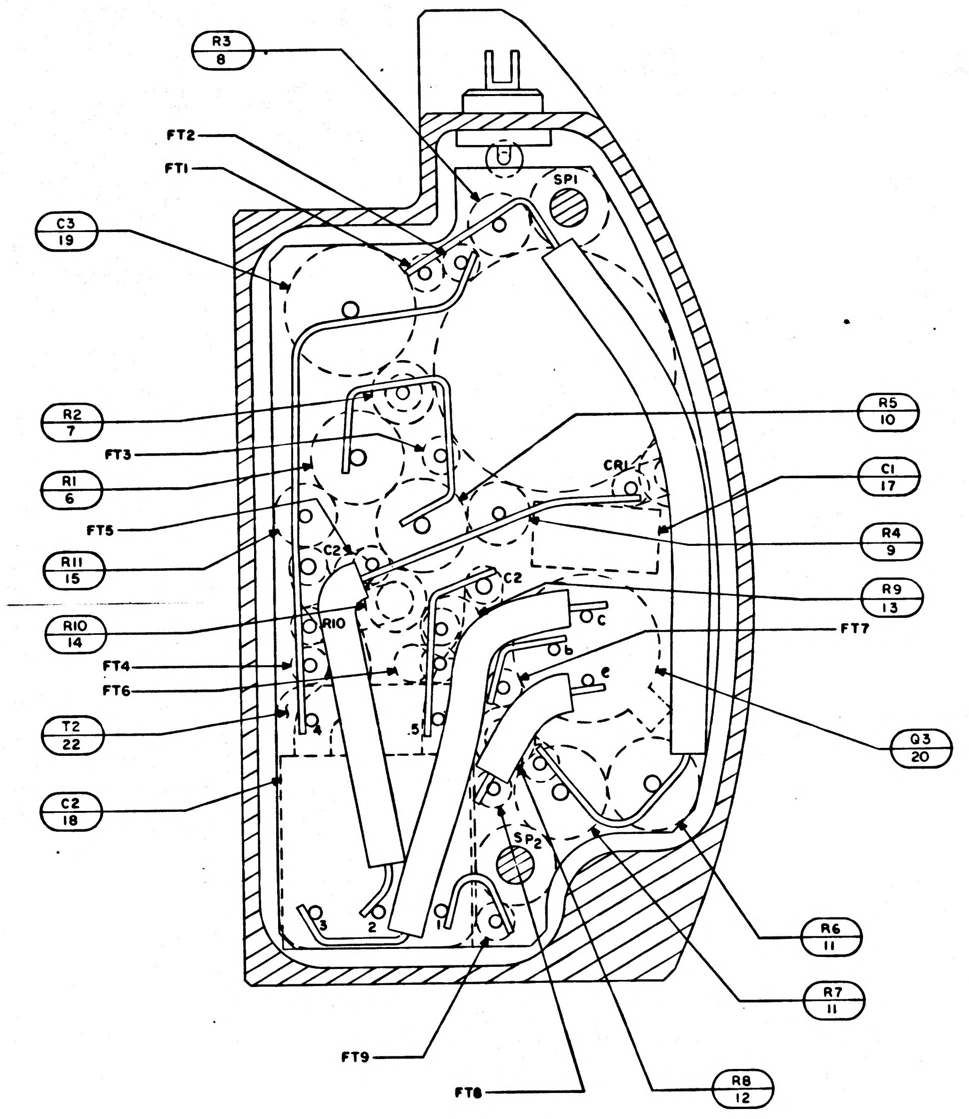
MASTER

F3

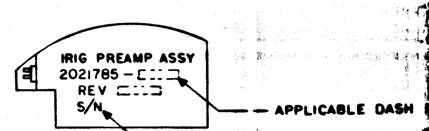

4 SEE NOTE 8
SP1 REF
R3 REF
C3 REF
.070 MAX TYP
.010 MIN TYP
R2 REF
R1 REF
R11 REF
25
27 SEE NOTE 11
R10 REF
26
27
TYP ALL FEED THRUS
FT4 REF
C2 REF
T2 REF
Q2 REF
2
.685 REF
5

SECTION A-A




R3 8
FT2
FT1
SP1
C3 19
R2 7
FT3
R1 6
FT5
R11 15
R10 14
FT4
FT6
T2 22
C2 18
R5 10
CR1
C1 17
R4 9
R9 13
FT7
C2
C2
R10
c
b
e
SP2
Q3 20
R6 11
R7 11
R8 12
FT9
FT8

SECTION B-B

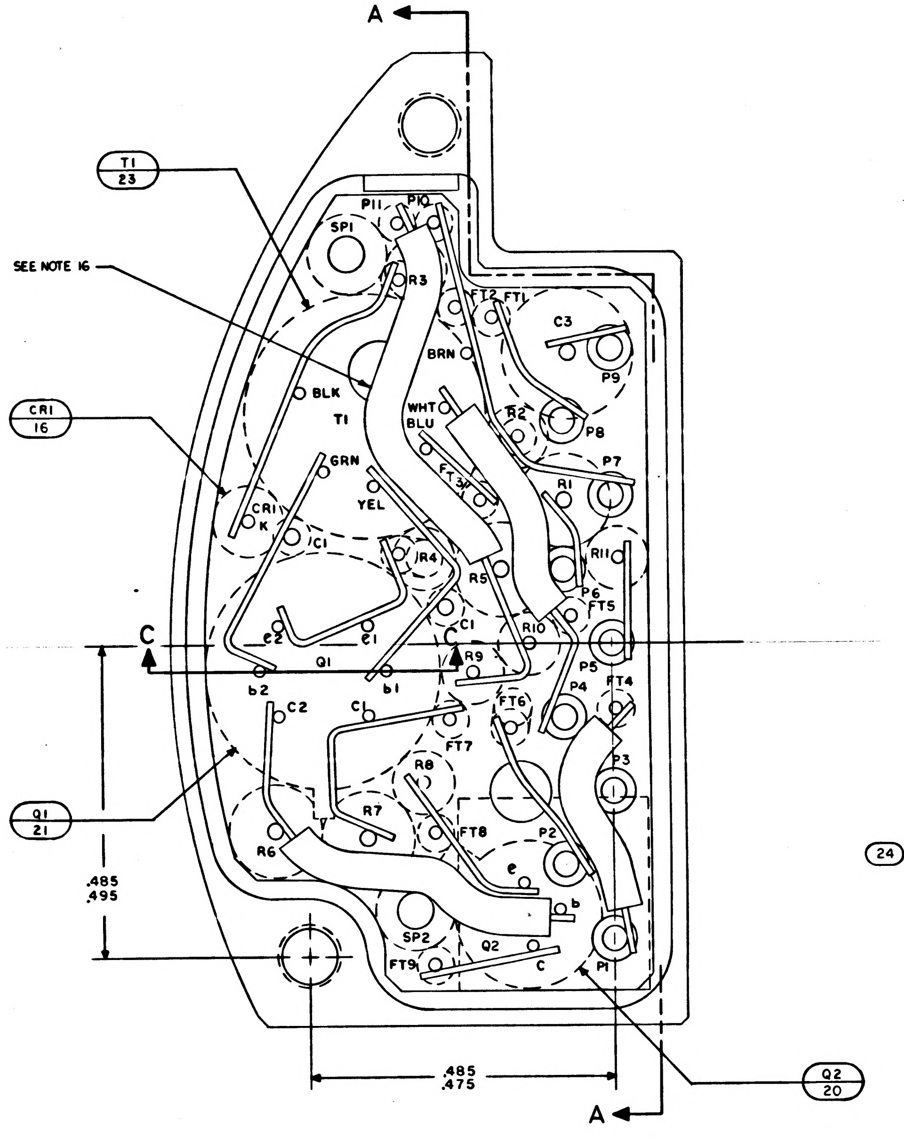

IRIG PREAMP ASSY
2021785 -
REV
S/N
APPLICABLE DASH
SEE NOTE 15

MARKING VIEW
SCALE 2/1

R2	
1006750-84	150K
-154	41 K
-149	25.5K
-62	18 K
-143	14 K
-57	11 K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750-34	1200

MASTER

2021500
NEXT ASSY
APPLICATION


A
A
C
T1
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CR1
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Q1
21
Q2
20
SEE NOTE 16
SP1
P11
P10
R3
FT2
FTL
C3
P9
BRN
BLK
T1
WHT
BLU
R2
P8
GRN
FT3
R1
P7
CR1
K
YEL
C1
R4
R5
R11
P6
FT5
e2
C1
R9
R10
P5
Q1
b2
b1
FT6
P4
FT4
C2
C1
FT7
R8
P3
R7
FT8
P2
R6
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b
SP2
Q2
FT9
C
P1
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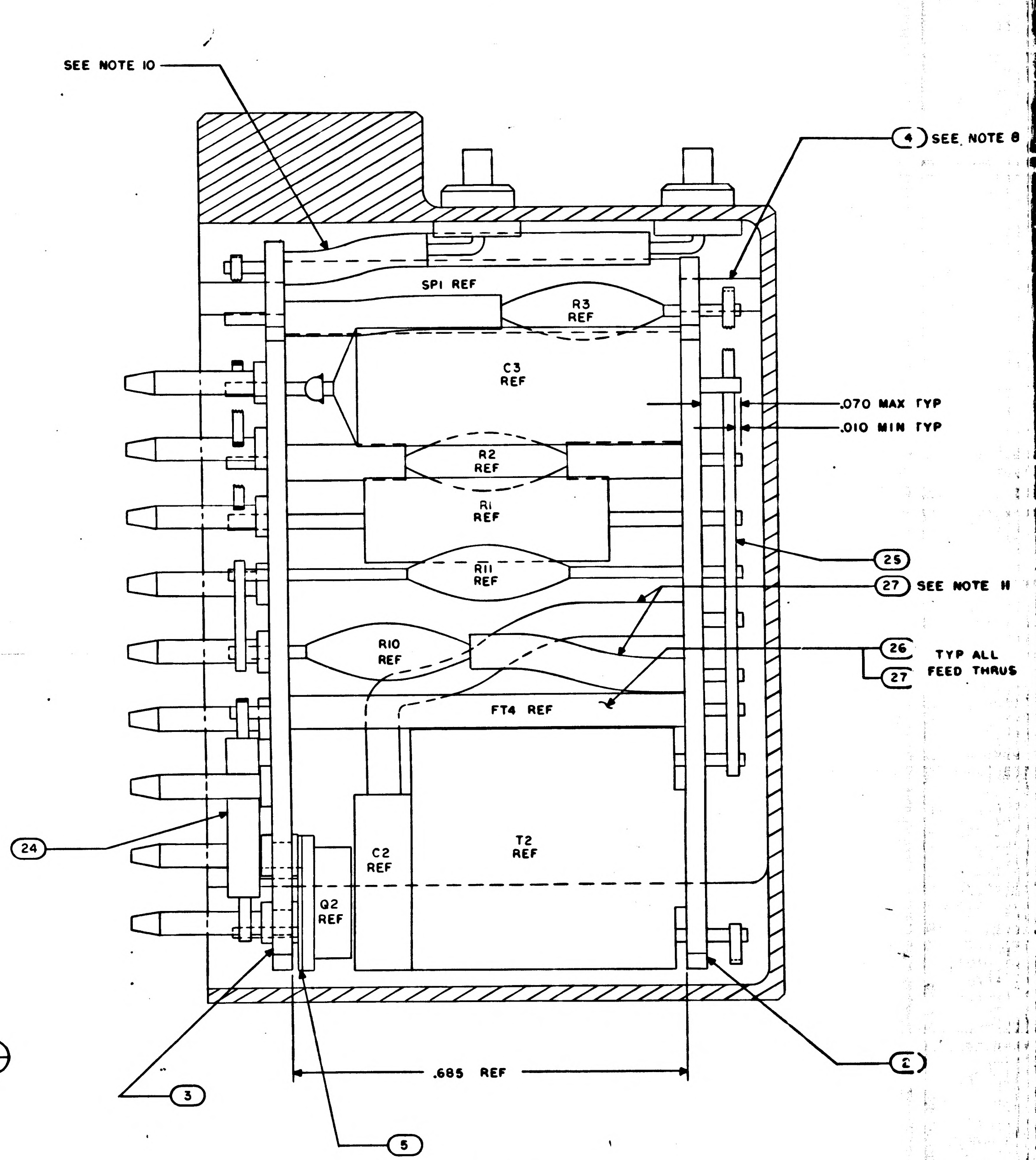
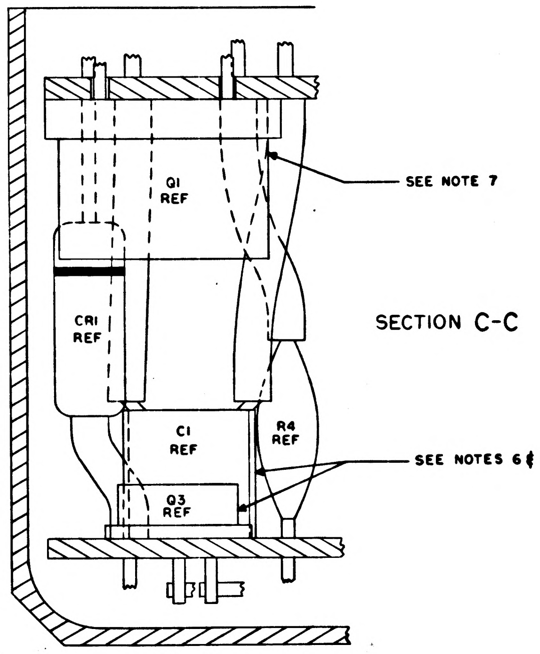
.495
.485
.475


SEE NOTE 10
4 SEE NOTE 8
SP1 REF
R3 REF
C3 REF
.070 MAX TYP
.010 MIN TYP
R2 REF
R1 REF
R11 REF
25
27 SEE NOTE 11
R10 REF
26
27
TYP ALL FEED THRUS
FT4 REF
T2 REF
C2 REF
Q2 REF
24
2
3
.685 REF
5

SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AR DENOTES AS REQUIRED
3. FT DENOTES FEED THRU
4. WIRE PER ND1002005
5. UNLESS OTHERWISE SPECIFIED ALL WIRING TO BE IN ACCORDANCE WITH ND1002069
6. BOND C1,C3,T1,T2,Q3 TO ITEM NO.2 PER ND1002004 TYPE I
7. BOND Q1 TO ITEM NO.3 PER ND1002004 TYPE I
8. BOND ITEM NO.4 TO ITEM NO'S 2 & 3 PER ND1002004 TYPE I
9. BODIES OF C1,C2,Q3 TO BE SPRAY COATED TO A MIN OF .005 PER ND1002035
10. TERMINAL LEADS TO BE SLEEVED USING ITEM NO.27
11. LEAD OF R2,R3,R4,R8,R10,CR1,C1,C2 TO BE SLEEVED USING ITEM NO.27
12. DIPCOAT PER ND1002068 PRIOR TO ENCAPSULATION
13. ENCAPSULATE MODULE PER ND1002036 USING CURING CYCLE 'A'
14. R2 TO BE SELECTED FROM CHART PER ATP 2021500, MC 25-868
15. MARK .100/.060 HIGH WHITE PER ND1002019 AND SERIALIZE PER ND1002023
16. UPON COMPLETION OF ELECTRICAL TEST (PER MC 25-868) FOR SELECTION OF R2, INSTALL NICKEL RIBBON CIRCUIT RUN, WELDING P11,R5,R10 AND R9 TOGETHER AS SHOWN
17. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF ATP 2021500, MC25-867

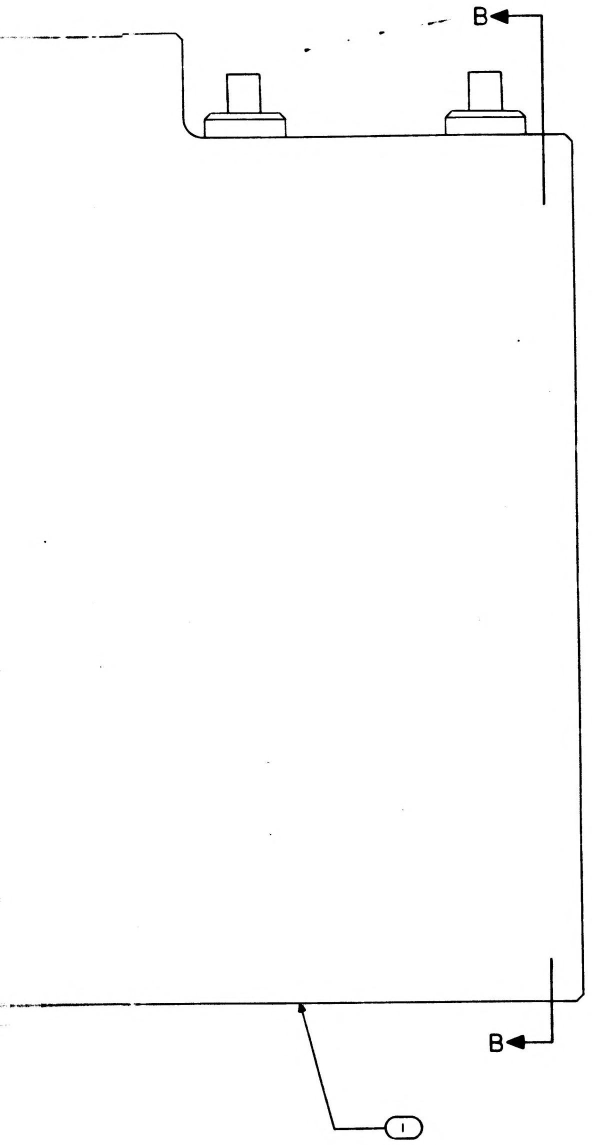

SEE NOTE 7
Q1 REF
CR1 REF
C1 REF
R4 REF
Q3 REF
SEE NOTES 6 & 9

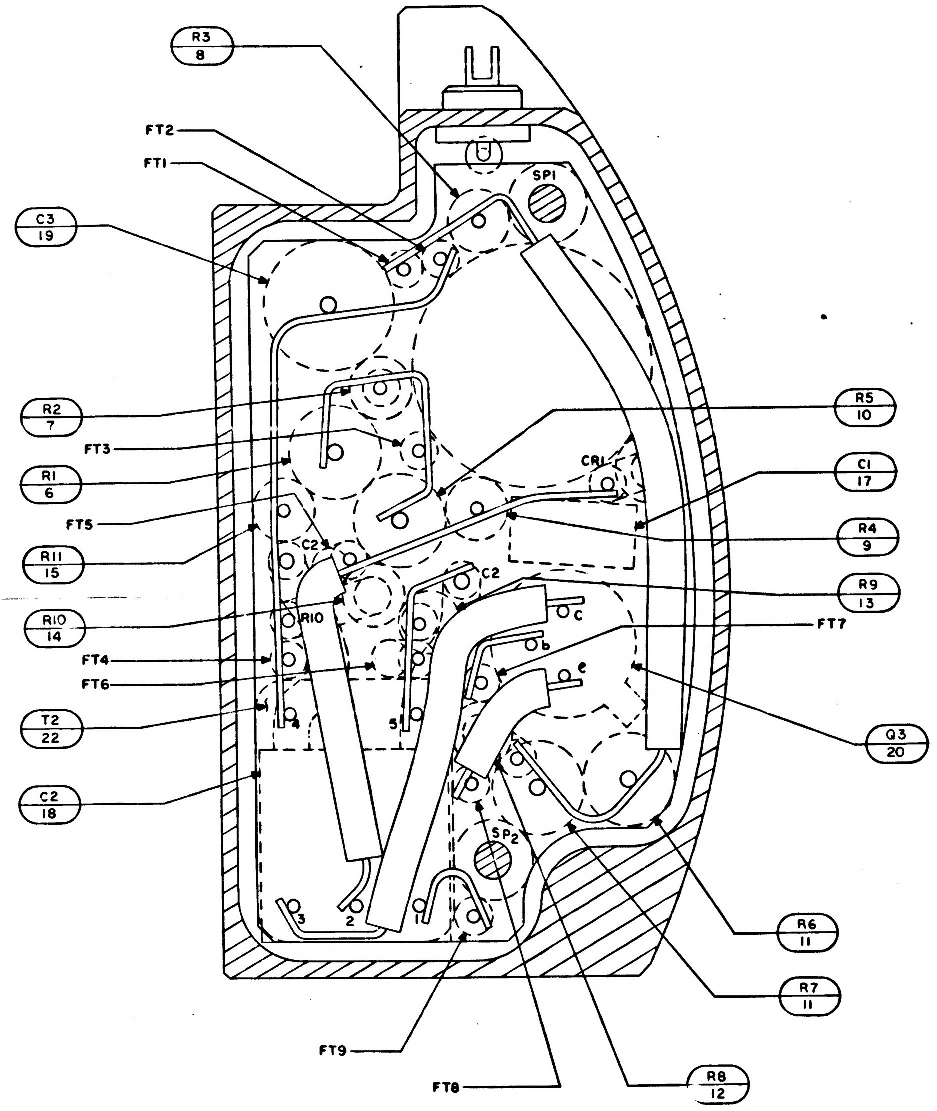
SECTION C-C

R2	
1006750-84	150K
-154	41 K
-149	25.5K
-62	18 K
-143	14 K
-57	11 K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750-34	1200

2021785 D

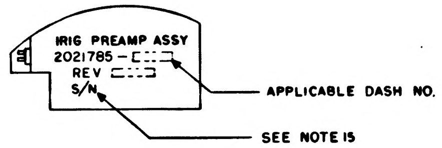
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15797		
B	REVISED PER TDRR 18096	APR 65	
C	REVISED PER TDRR 19019	12 MAY 65	
D	REVISED PER TDRR 19796	JUN 65	
E	REVISED PER TDRR 22336	9-1-65	





R3 8
FT2
FT1
C3 19
SP1
R2 7
FT3
R1 6
FT5
R11 15
R10 14
FT4
FT6
T2 22
C2 18
CR1
C2
R10
C2
R5 10
C1 17
R4 9
R9 13
FT7
Q3 20
SP2
R6 11
R7 11
FT9
FT8
R8 12

SECTION B-B



IRIG PREAMP ASSY
2021785 -
REV
S/N
APPLICABLE DASH NO.
SEE NOTE 15

MARKING VIEW
SCALE 2/1

ITEM NO.	QTY REQD -011	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION
REF			2010040	SCHEMATIC		
27	AR		1006776-21	INSULATION, SLEEVING		
26	AR		1006757-8	WIRE ELECTRICAL .020DIA		
25	AR		1006757-1	WIRE ELECTRICAL .010X.020 RIBBON		
24	AR		1006776-22	INSULATION, SLEEVING		
23	1	T1	1007080-011	TRANSFORMER, SHIELDED ASSEMBLY		
22	1	T2	1010291-6	TRANSFORMER		
21	1	Q1	1010431-001	TRANSISTOR		
20	1	Q2Q3	1010950-2	TRANSISTOR (MATCHED PAIR)		
19	1	C3	1010264-118	CAPACITOR		
18	1	C2	1010359-28	CAPACITOR		
17	1	C1	1010359-5	CAPACITOR		
16	1	CR1	1010372-15	DIODE		
15	1	R11	1006750-56	RESISTOR		
14	1	R10	1006750-73	RESISTOR		
13	1	R9	1006750-80	RESISTOR		
12	1	R8	1006750-25	RESISTOR		
11	2	R6 R7	1010364-459	RESISTOR		
10	1	R5	1010364-769	RESISTOR		
9	1	R4	1006750-52	RESISTOR		
8	1	R3	1006750-51	RESISTOR		
7	1	R2	SEE NOTE 14	RESISTOR		
6	1	R1	1010364-501	RESISTOR		
Ⓔ 5	1		2021800	TRANSISTOR INSULATOR ASSY.		
4	2		2021763	SPACER		
3	1		2021782-011	WIRING BOARD ASSY, BOTTOM		
2	1		2021784	WIRING BOARD, TOP		
1	1		2021779-011	HOUSING ASSY		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021500	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN J. Brigham 12/25/64
CHECKED 2 Dec 64
APPROVED 12/25/64
APPROVED A. C. Smith
MIT APPROVED W. Kupfer 22 Dec 64 DATE
NASA W. J. Rhine 12-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

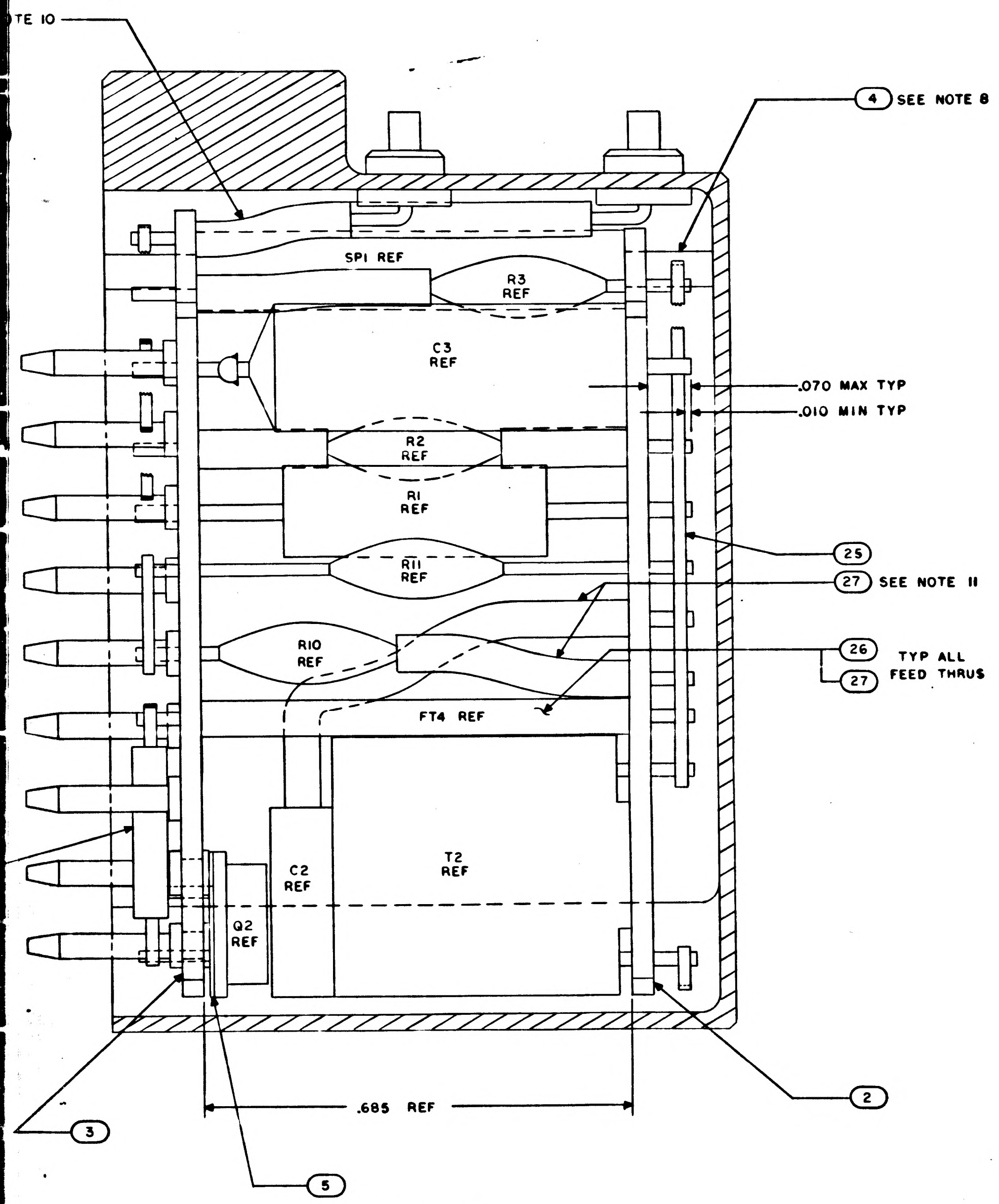
IRIG PREAMP ASSY

SIZE J
CODE IDENT NO 80230
DRAWING NO. 2021785
SCALE 10/1
SHEET 1 OF 1

2021785 D

202 785

MASTER


TE 10
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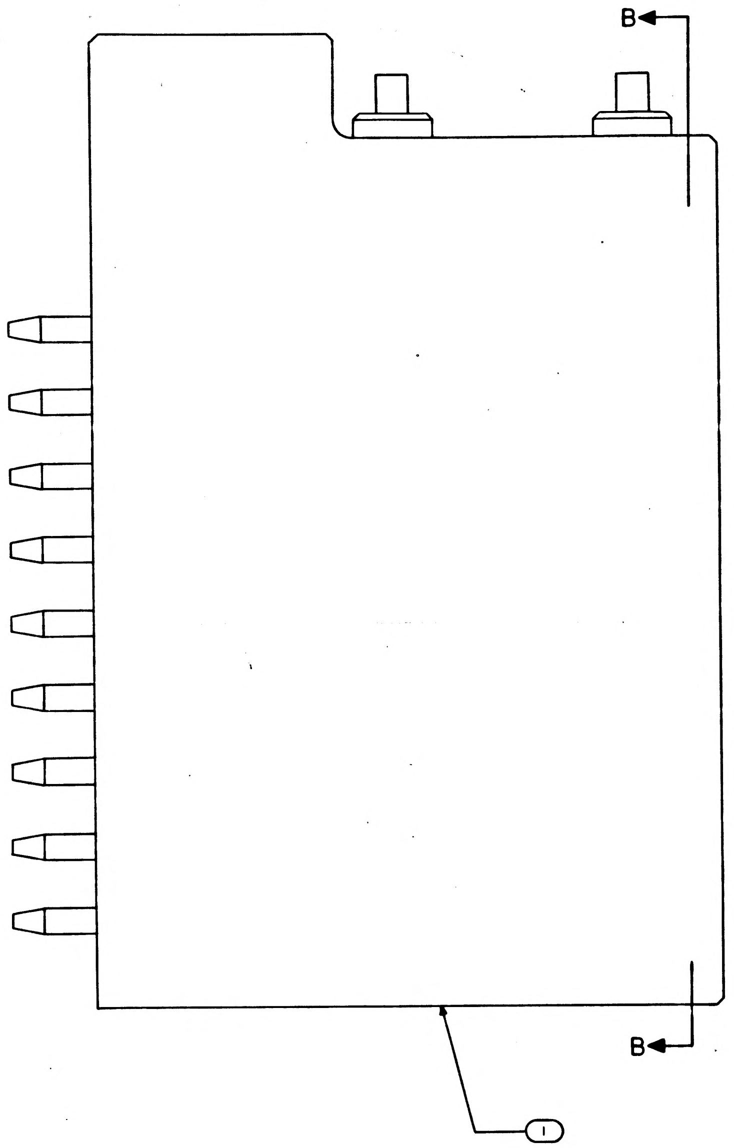
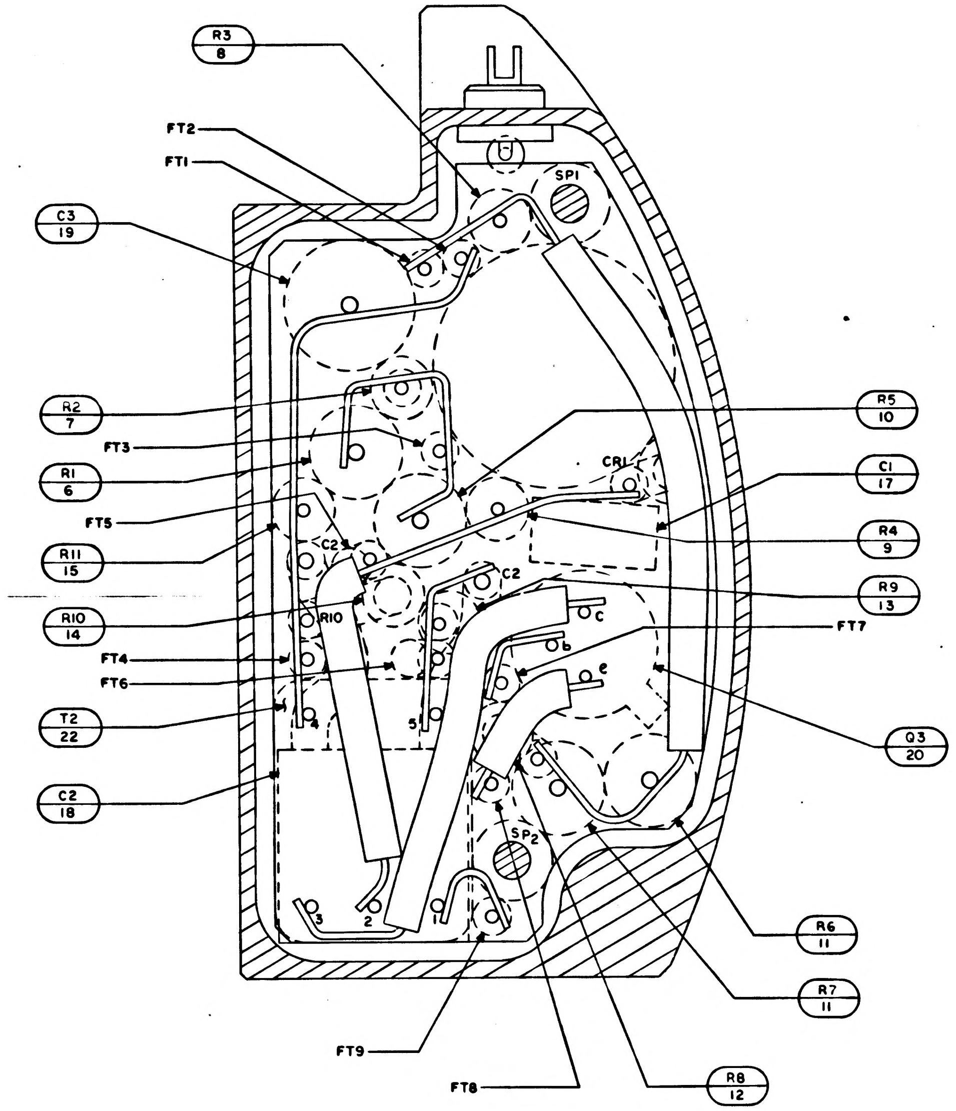
SP1 REF
R3 REF
C3 REF
.070 MAX TYP
.010 MIN TYP
R2 REF
R1 REF
R11 REF
25
27 SEE NOTE 11
R10 REF
26
27
TYP ALL FEED THRUS
FT4 REF
C2 REF
T2 REF
Q2 REF
2
3
.685 REF
5

SECTION A-A

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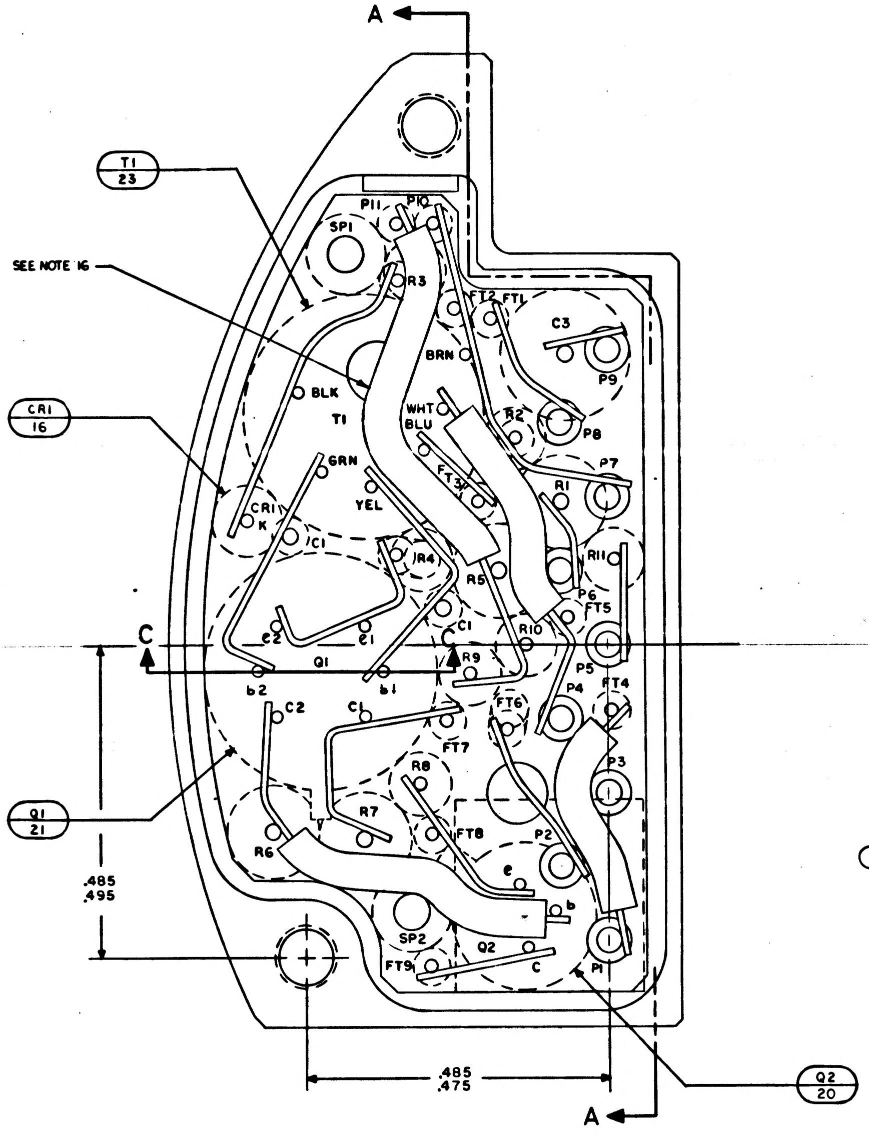
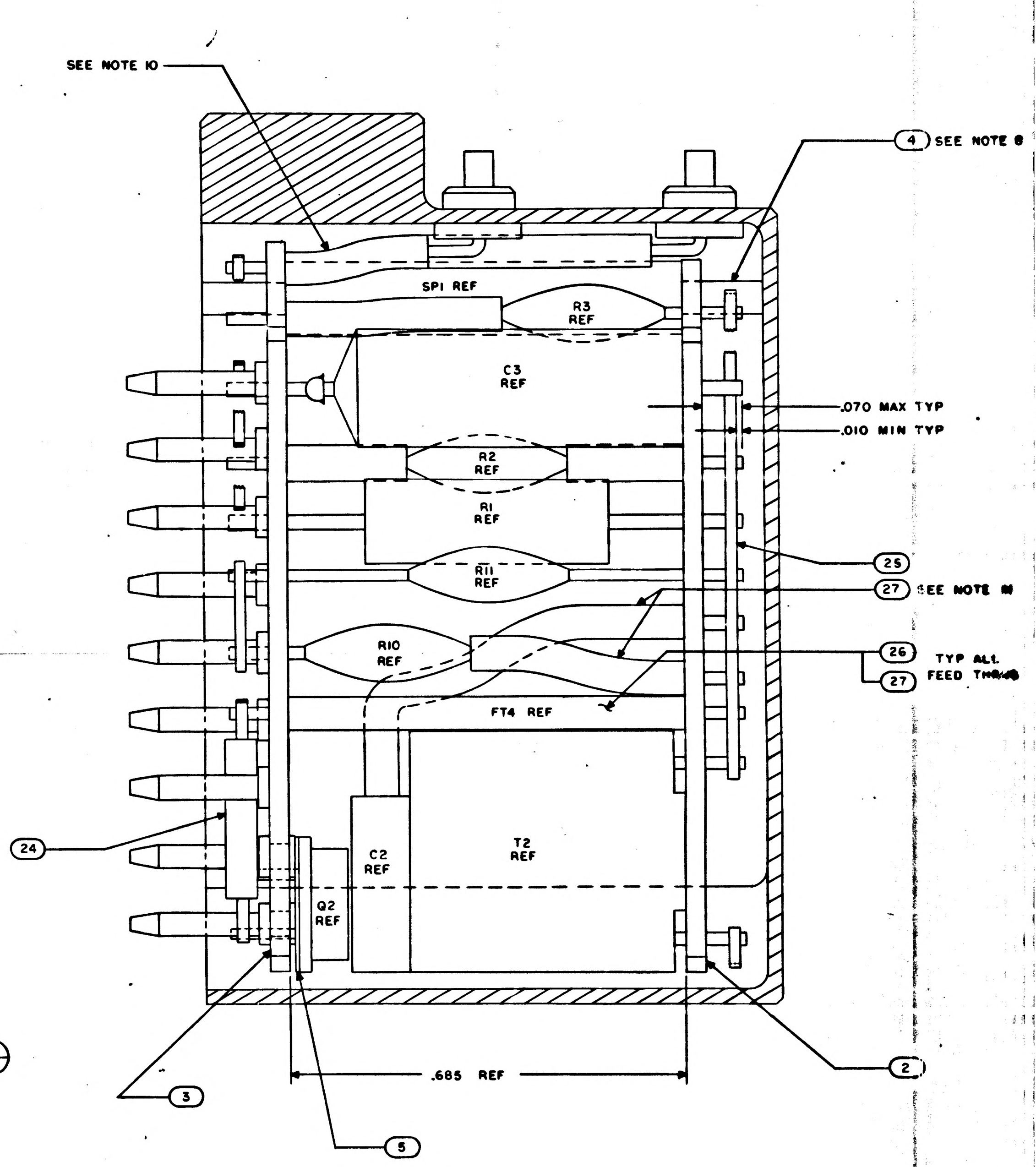
FT2
FT1
C3 19
SP1
R2 7
FT3
R1 6
FT5
R11 15
R10 14
FT4
FT6
T2 22
C2 18
R5 10
C1 17
CR1
R4 9
R9 13
FT7
Q3 20
R6 11
R7 11
R8 12
FT8
FT9
SP2
C2
R10
c
b
e

SECTION B-B

R2	
1006750-84	150K
-154	41 K
-149	25.5K
-62	18 K
-143	14 K
-57	11 K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750-34	1200

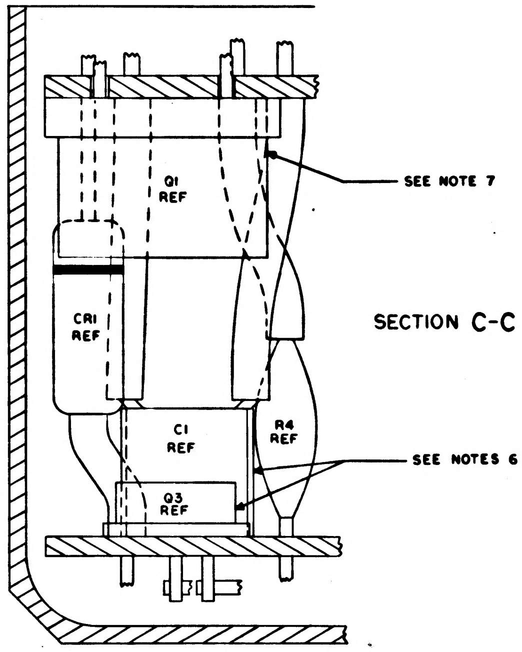

A
T1
23
SEE NOTE 16
CR1
16
Q1
21
C
.485
.495
.485
.475
Q2
20
A
P11
P10
SP1
R3
FT2
FT1
C3
P9
BRN
BLK
T1
WHT
BLU
R2
P8
P7
GRN
YEL
FT3
R1
CR1
K
C1
R4
R5
R11
P6
FT5
C1
R10
e2
e1
Q1
R9
P5
b2
b1
C2
C
FT6
P4
FT4
FT7
R8
P3
R7
FT8
P2
R6
e
b
SP2
Q2
C
FT9
P1


SEE NOTE 10
4
SEE NOTE 8
SP1 REF
R3 REF
C3 REF
.070 MAX TYP
.010 MIN TYP
R2 REF
R1 REF
R11 REF
25
27
SEE NOTE 11
R10 REF
26
27
TYP ALL FEED THRU
FT4 REF
24
C2 REF
T2 REF
Q2 REF
3
.685 REF
2
5

SECTION A-A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AR DENOTES AS REQUIRED
3. FT DENOTES FEED THRU
4. WIRE PER ND1002005
5. UNLESS OTHERWISE SPECIFIED ALL WIRING TO BE IN ACCORDANCE WITH ND1002069
6. BOND C1, C3, T1, T2, Q3 TO ITEM NO. 2 PER ND1002004 TYPE I
7. BOND Q1 TO ITEM NO. 3 PER ND1002004 TYPE I
8. BOND ITEM NO. 4 TO ITEM NO.'S 2 & 3 PER ND1002004 TYPE I
9. BODIES OF C1, C2, Q3 TO BE SPRAY COATED TO A MIN OF .005 PER ND1002035
10. TERMINAL LEADS TO BE SLEEVED USING ITEM NO. 27
11. LEAD OF R2, R3, R4, R8, R10, CR1, C1, C2 TO BE SLEEVED USING ITEM NO. 27
12. DIPCOAT PER ND1002068 PRIOR TO ENCAPSULATION
13. ENCAPSULATE MODULE PER ND1002036 USING CURING CYCLE 'A'
14. R2 TO BE SELECTED FROM CHART PER ATP 2021500, MC 25-868
15. MARK .100/.060 HIGH WHITE PER ND1002019 AND SERIALIZE PER ND1002023
16. UPON COMPLETION OF ELECTRICAL TEST (PER MC 25-868) FOR SELECTION OF R2, INSTALL NICKEL RIBBON CIRCUIT RUN, WELDING P11, R5, R10 AND R9 TOGETHER AS SHOWN
17. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF ATP 2021500, MC25-867


Q1
REF
SEE NOTE 7
CR1
REF
C1
REF
R4
REF
Q3
REF
SEE NOTES 6 & 9

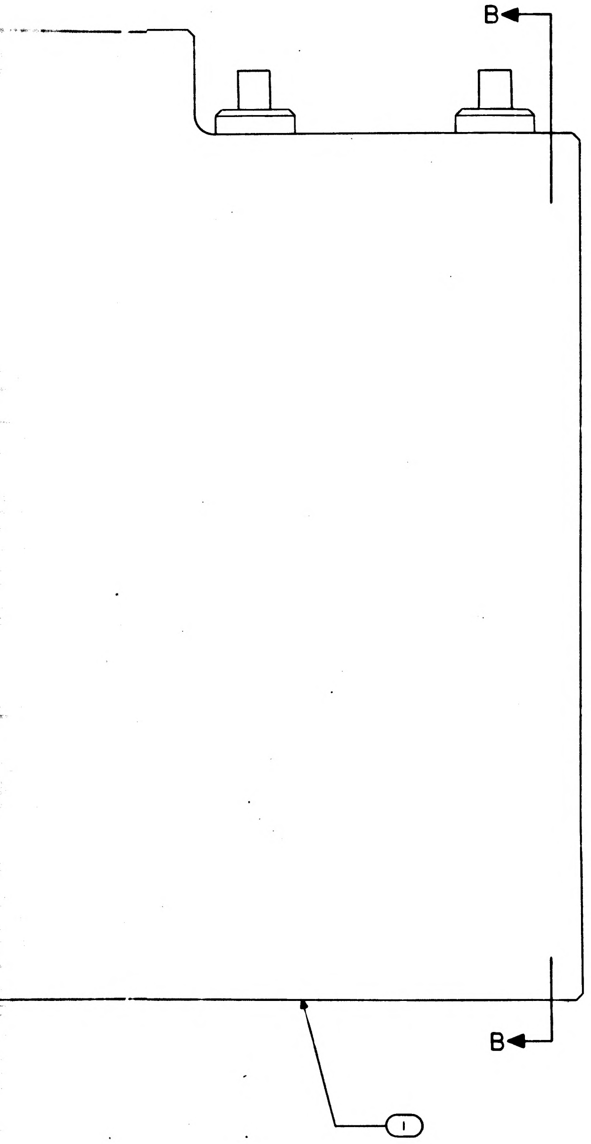
SECTION C-C

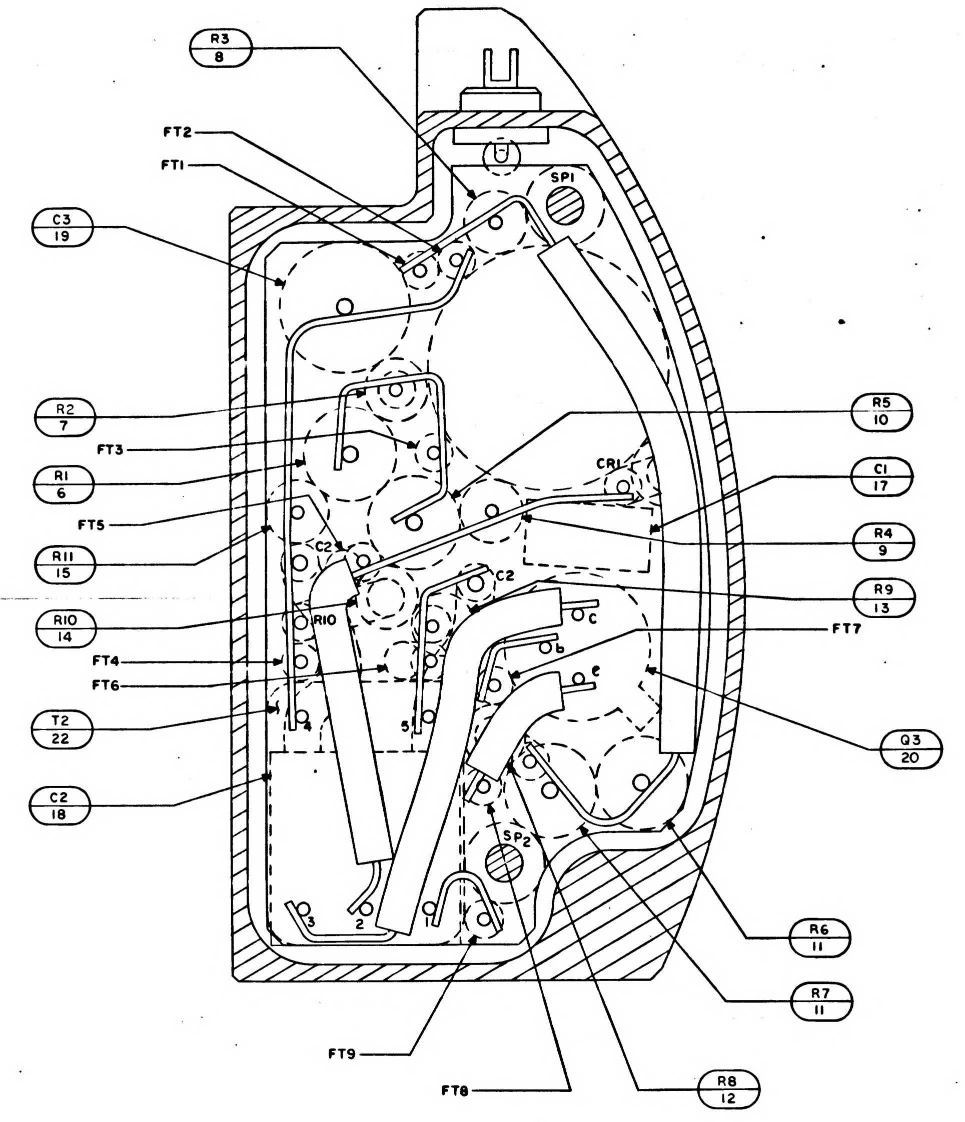
R2	
1006750-84	150K
-154	41 K
-149	25.5K
-62	18 K
-143	14 K
-57	11 K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750-34	1200

2021785

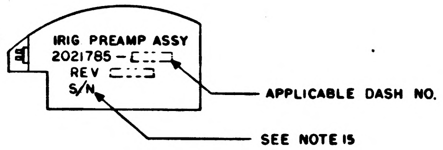
2021785

REVISIONS 15040			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER TDRR 15797	[illegible]	
B	REVISED PER TDRR 18096	8 APR 65	
C	REVISED PER TDRR 19019	12 MAY 65	
D	REVISED PER TDRR 19796	2 JUN 65	
E	REVISED PER TDRR 22336	9 1-65	
F	REVISED PER TDRR 22184	9 21-65	




R3 8
FT2
FT1
C3 19
SP1
R2 7
FT3
R1 6
FT5
R11 15
R10 14
FT4
FT6
T2 22
C2 18
R5 10
C1 17
CR1
R4 9
R9 13
FT7
Q3 20
C2
C2
R10
c
b
e
SP2
R6 11
R7 11
FT9
FT8
R8 12

SECTION B-B


IRIG PREAMP ASSY
2021785 -
REV
S/N
APPLICABLE DASH NO.
SEE NOTE 15

MARKING VIEW
SCALE 2/1

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION
REF			2010040	SCHEMATIC		
27	AR		1006776-21	INSULATION, SLEEVING		
26	AR		1006757-8	WIRE ELECTRICAL .020DIA		
25	AR		1006757-1	WIRE ELECTRICAL .010X.020 RIBBON		
24	AR		1006776-22	INSULATION, SLEEVING		
23	1	T1	1007080-011	TRANSFORMER, SHIELDED ASSEMBLY		
22	1	T2	1010291-6	TRANSFORMER		
21	1	Q1	1010431-001	TRANSISTOR		
20	1	Q2Q3	1010950-2	TRANSISTOR (MATCHED PAIR)		
19	1	C3	1010264-118	CAPACITOR		
18	1	C2	1010359-28	CAPACITOR		
17	1	C1	1010359-5	CAPACITOR		
16	1	CR1	1010372-15	DIODE		
15	1	R11	1006750-56	RESISTOR		
14	1	R10	1006750-73	RESISTOR		
13	1	R9	1006750-80	RESISTOR		
12	1	R8	1006750-25	RESISTOR		
11	2	R6 R7	1010364-459	RESISTOR		
10	1	R5	1010364-769	RESISTOR		
9	1	R4	1006750-52	RESISTOR		
8	1	R3	1006750-51	RESISTOR		
7	1	R2	SEE NOTE 14	RESISTOR		
6	1	R1	1010364-501	RESISTOR		
ⓔ 5	1		2021800	TRANSISTOR INSULATOR ASSY.		
4	2		2021763	SPACER		
3	1		2021782-011	WIRING BOARD ASSY, BOTTOM		
2	1		2021784	WIRING BOARD, TOP		
1	1		2021779-011	HOUSING ASSY		
	-011	LIST OF MATERIALS				

NEXT ASSY	USED ON
2021500	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS

CONTRACT NO.

DRAWN J Brigham 12/23/64
CHECKED
APPROVED
APPROVED A. C. Surette

MIT APPROVED DATE 22 Dec 64
NASA
W. J. Rhine 12-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

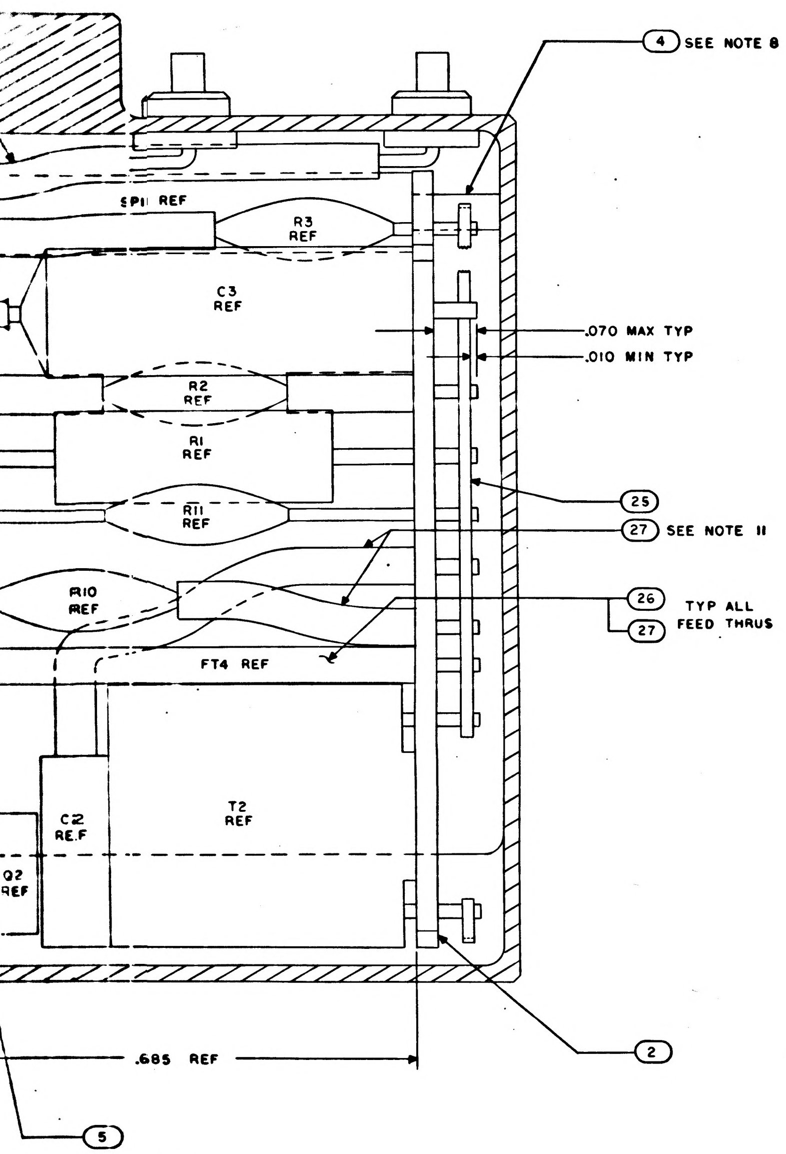
IRIG PREAMP ASSY

SIZE J
CODE IDENT NO 80230
DRAWING NO 2021785
SCALE 10/1
SHEET 1 OF 1

MASTER

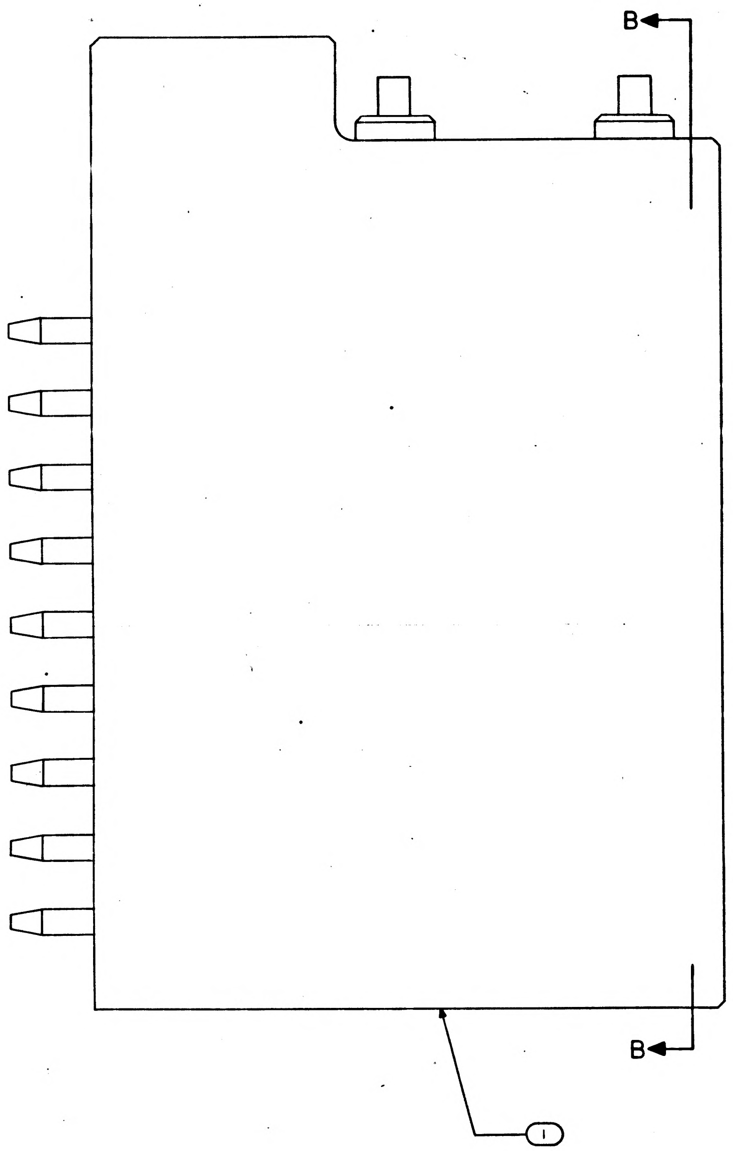
2021785

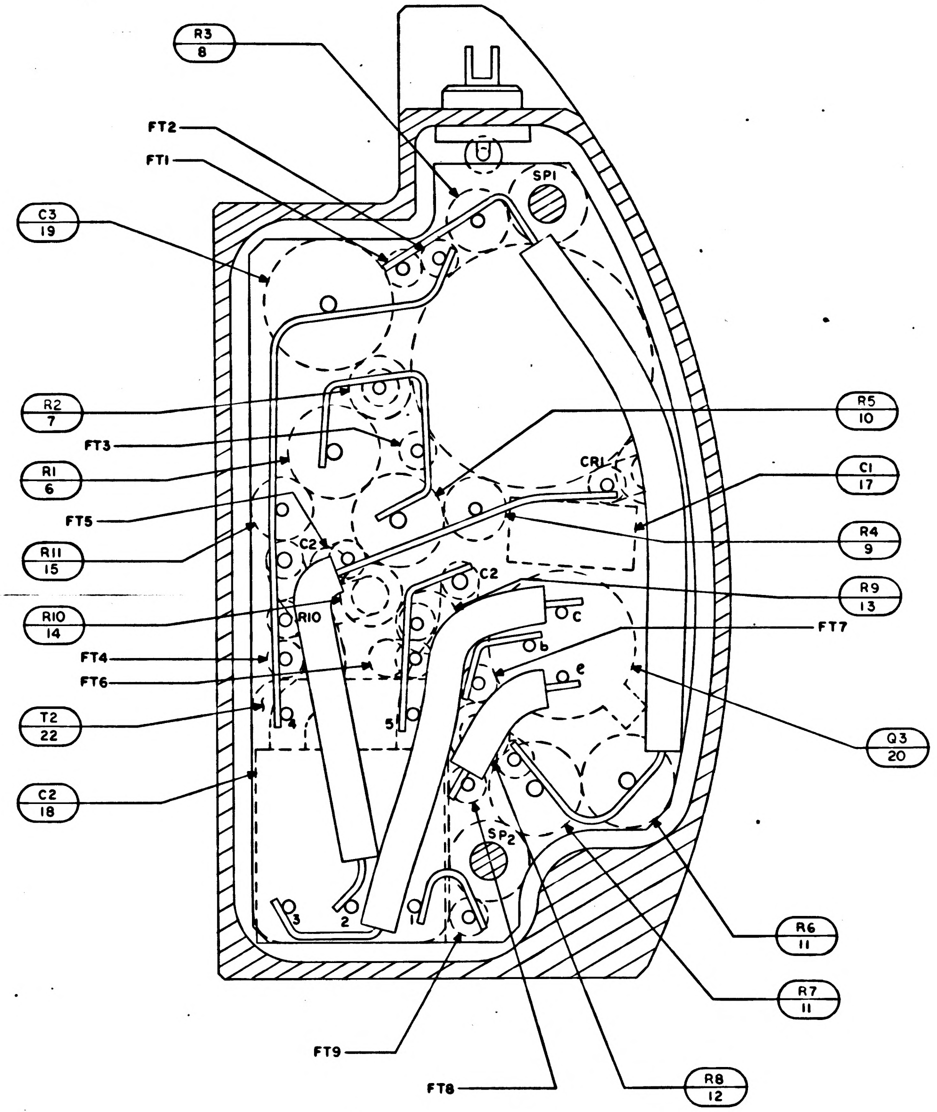
3H



④ SEE NOTE 8
SPII REF
R3 REF
C3 REF
.070 MAX TYP
.010 MIN TYP
R2 REF
R1 REF
R11 REF
25
27 SEE NOTE 11
R10 REF
26
27
TYP ALL FEED THRUS
FT4 REF
T2 REF
C2 REF
Q2 REF
.685 REF
2
5

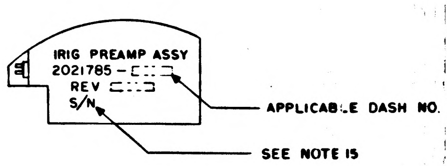
SECTION A-A





R3 8
FT2
FT1
C3 19
SP1
R2 7
FT3
R1 6
FT5
R11 15
R10 14
FT4
FT6
T2 22
C2 18
CR1
C2
R10
R5 10
C1 17
R4 9
R9 13
FT7
Q3 20
c
b
e
SP2
R6 11
R7 11
R8 12
FT9
FT8

SECTION B-B



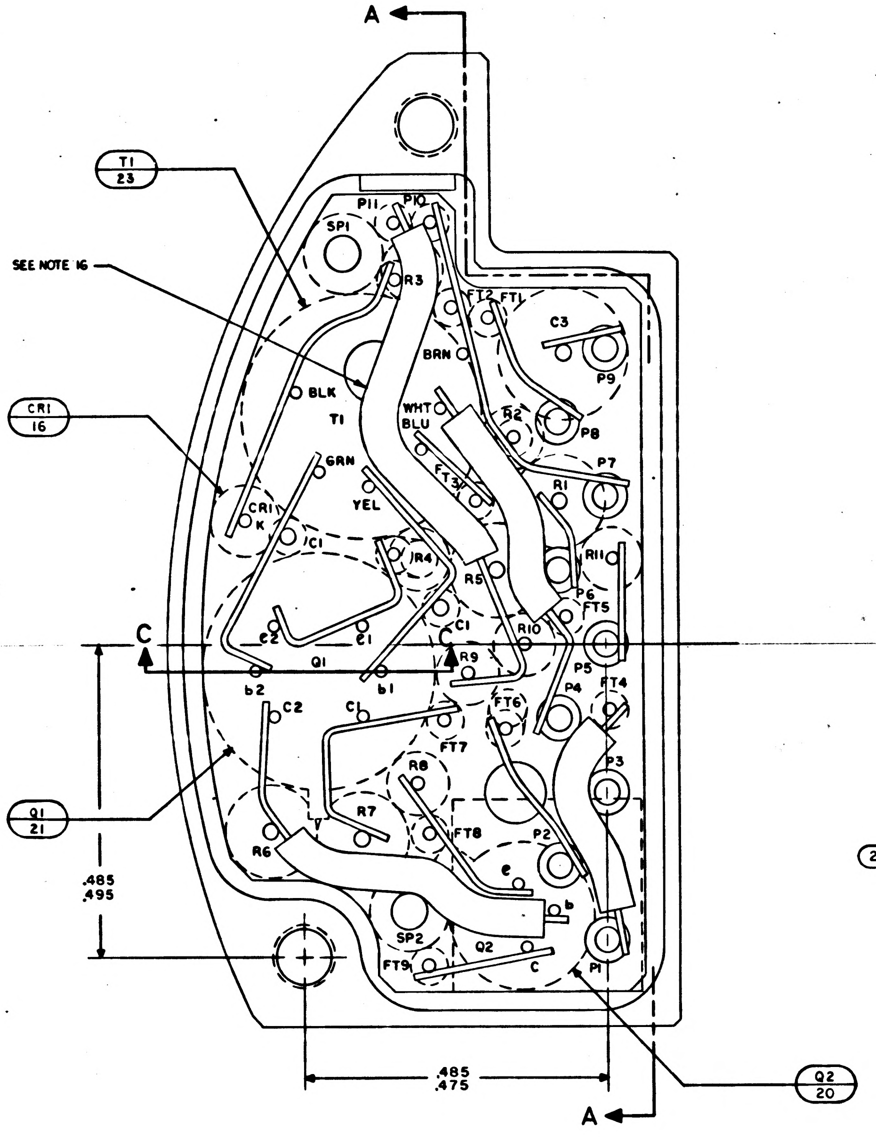
IRIG PREAMP ASSY
2021785 -
REV
S/N
APPLICABLE DASH NO.
SEE NOTE 15

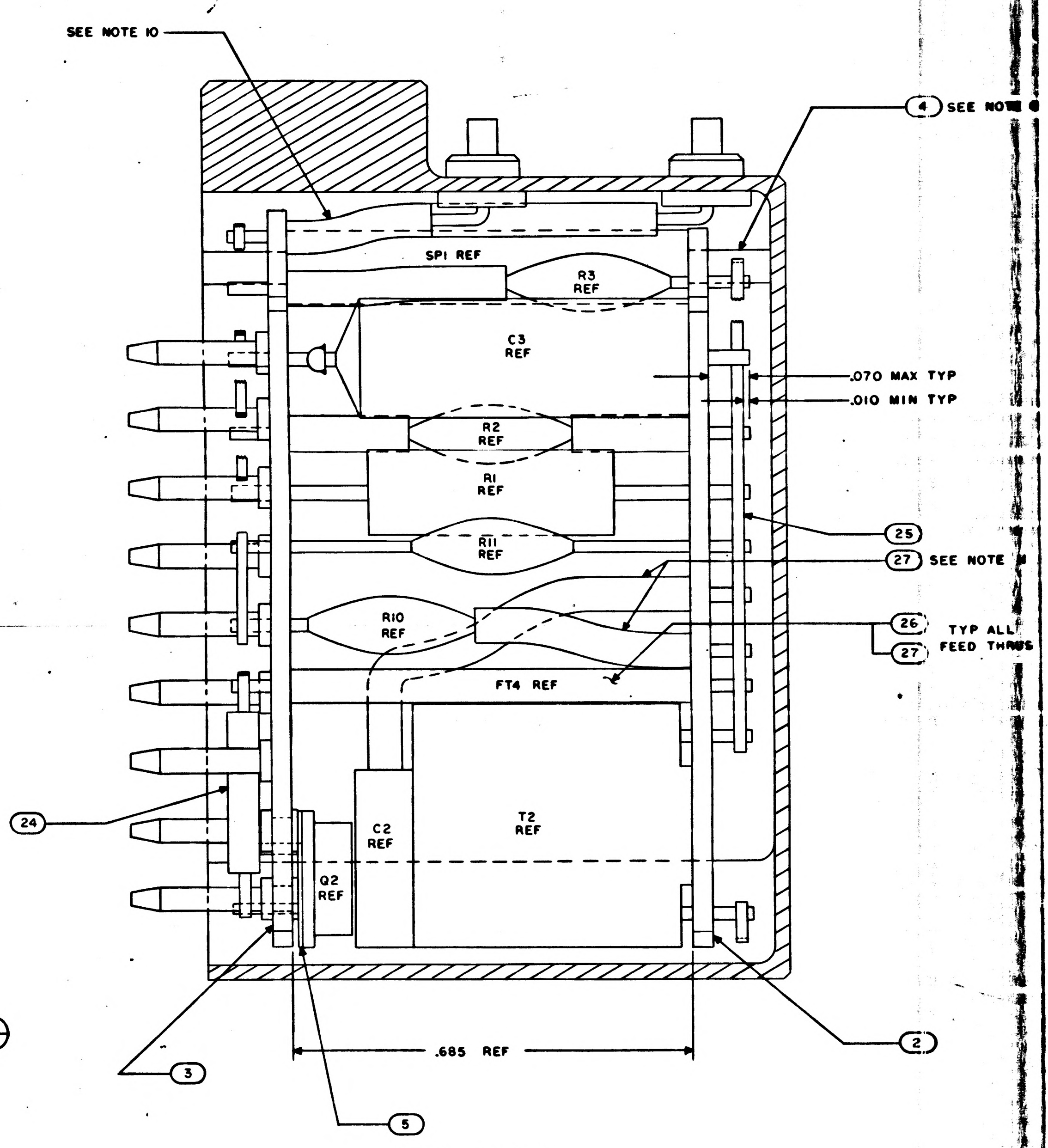
MARKING VIEW
SCALE 2/1

R2	
1006750-84	150K
-154	41 K
-149	25.5K
-62	18 K
-143	14 K
-57	11 K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750-34	1200

③

2021500	
NEXT ASSY	USED ON
APPLICATION	

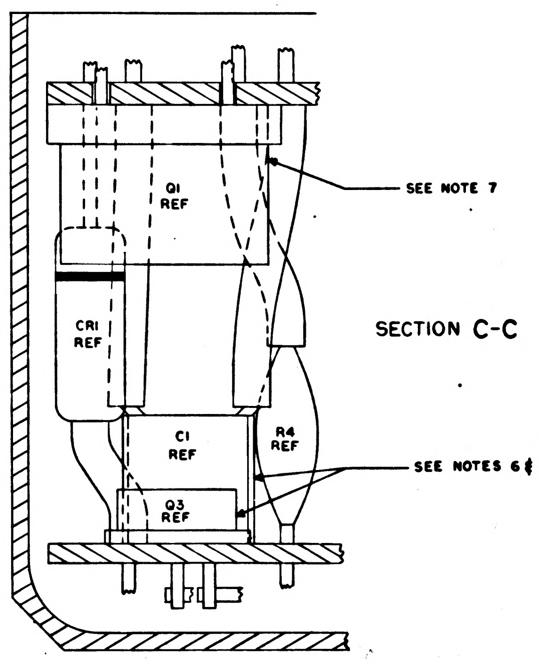

A
T1
23
SEE NOTE 16
CR1
16
Q1
21
SP1
P11
P10
R3
FT2
FT1
C3
P9
BRN
BLK
T1
WHT
BLU
R2
P8
GRN
YEL
FT3
R1
P7
CR1
K
C1
R4
R11
R5
P6
FT5
C
e2
c2
C1
R10
Q1
R9
b2
b1
P5
C2
C
FT6
P4
FT4
FT7
P3
R8
R7
FT8
P2
R6
e
b
SP2
Q2
FT9
C
P1
.485
.495
.485
.475
Q2
20
A


SEE NOTE 10
4
SEE NOTE
SP1 REF
R3
REF
C3
REF
.070 MAX TYP
.010 MIN TYP
R2
REF
R1
REF
R11
REF
25
27
SEE NOTE
R10
REF
26
27
TYP ALL
FEED THRUS
FT4 REF
24
C2
REF
T2
REF
Q2
REF
2
3
.685 REF
5

SECTION A-A

NOTES:

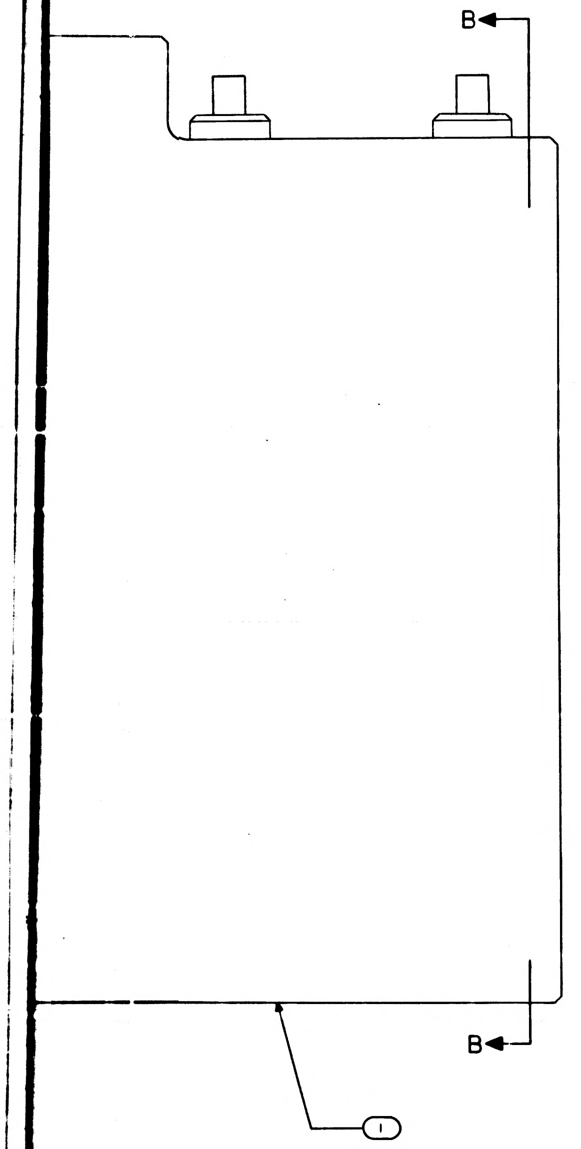
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AR DENOTES AS REQUIRED
3. FT DENOTES FEED THRU
4. WIRE PER ND1002005
5. UNLESS OTHERWISE SPECIFIED ALL WIRING TO BE IN ACCORDANCE WITH ND1002069
6. BOND C1, C3, T1, T2, Q3 TO ITEM NO. 2 PER ND1002004 TYPE I
7. BOND Q1 TO ITEM NO. 3 PER ND1002004 TYPE I
8. BOND ITEM NO. 4 TO ITEM NO'S 2 & 3 PER ND1002004 TYPE I
9. BODIES OF C1, C2, Q3 TO BE SPRAY COATED TO A MIN OF .005 PER ND1002035
10. TERMINAL LEADS TO BE SLEEVED USING ITEM NO. 27
11. LEAD OF R2, R3, R4, R8, R10, CR1, C1, C2 TO BE SLEEVED USING ITEM NO. 27
12. DIPCOAT PER ND1002068 PRIOR TO ENCAPSULATION
Ⓕ 13. ENCAPSULATE MODULE PER ND1002036 USING CURING CYCLE "B"
14. R2 TO BE SELECTED FROM CHART PER ATP 2021500, MC 25-868
15. MARK .100/.060 HIGH WHITE PER ND1002019 AND SERIALIZE PER ND1002023
16. UPON COMPLETION OF ELECTRICAL TEST (PER MC 25-868) FOR SELECTION OF R2, INSTALL NICKEL RIBBON CIRCUIT RUN, WELDING P11, R5, R10 AND R9 TOGETHER AS SHOWN
17. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF ATP 2021500, MC25-867

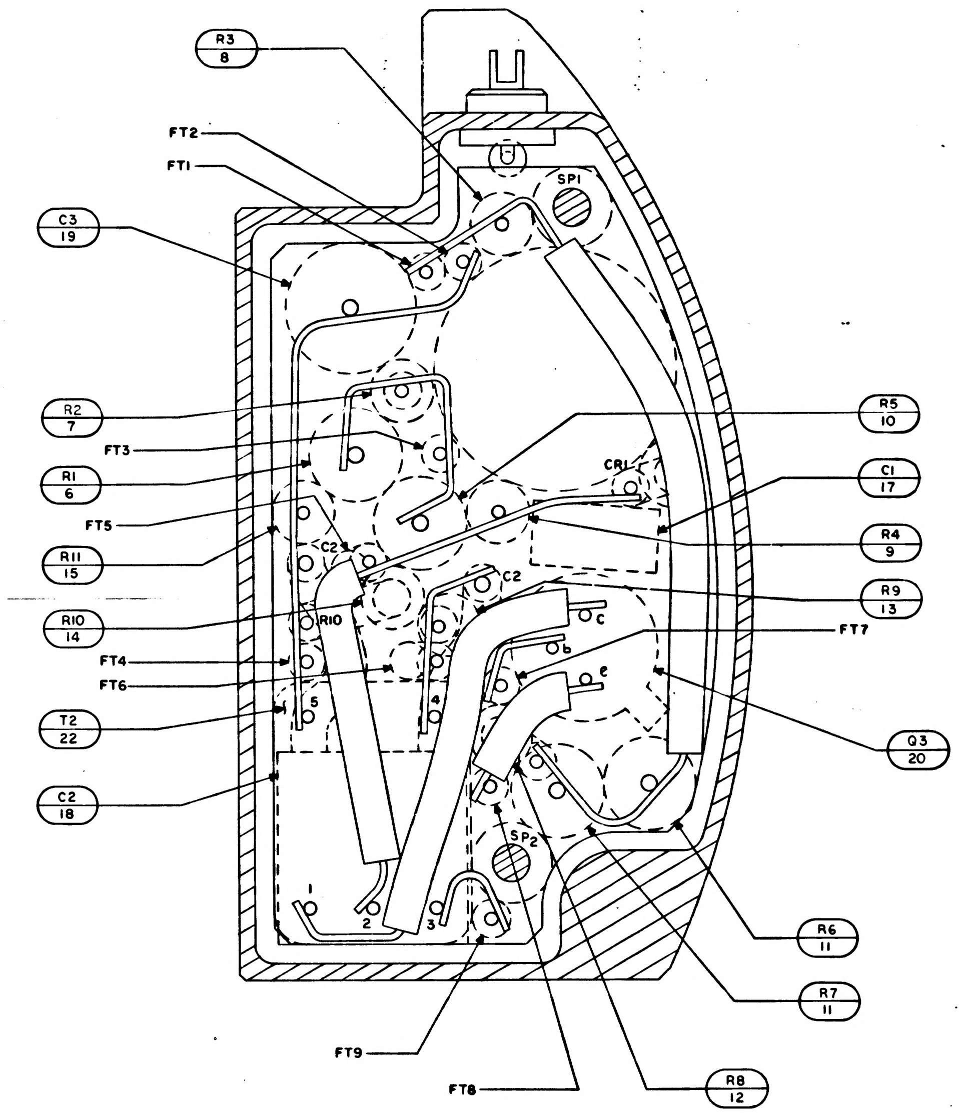

Q1
REF
SEE NOTE 7
CR1
REF
C1
REF
R4
REF
SEE NOTES 6 & 9
Q3
REF

SECTION C-C

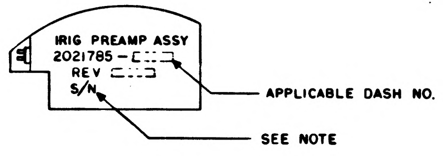
R2	
1006750-84	150K
-154	41 K
-149	25.5K
-62	18 K
-143	14 K
-57	11 K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750-34	1200

		REVISIONS		
2021785	SYM	DESCRIPTION	DATE	APPROVAL




R3 8
FT2
FT1
C3 19
SP1
R2 7
FT3
R1 6
FT5
R11 15
R10 14
FT4
FT6
T2 22
C2 18
C2
R10
CR1
C2
R5 10
C1 17
R4 9
R9 13
FT7
Q3 20
c
b
e
1
2
3
4
5
SP2
R6 11
R7 11
R8 12
FT9
FT8

SECTION B-B


IRIG PREAMP ASSY
2021785 –
REV
S/N
APPLICABLE DASH NO.
SEE NOTE

MARKING VIEW
SCALE 2/1

ITEM NO.	QTY REQU	SYMBOL	PART OR IDENT NO	DESCRIPTION	MATERIAL	SPECIFICATION
REF	☒		2010040	SCHEMATIC		
27	AR		1006776-21	INSULATION, SLEEVING		
26	AR		1006757-8	WIRE ELECTRICAL .020DIA		
25	AR		1006757-1	WIRE ELECTRICAL .010X.020 RIBBON		
24	AR		1006776-22	INSULATION, SLEEVING		
23	1	T1	1007080-011	TRANSFORMER		
22	1	T2	1010291-6	TRANSFORMER		
21	1	Q1	1010431	TRANSISTOR		
20	1	Q2Q3	1010633-2	TRANSISTOR (MATCHED PAIR)		
19	1	C3	1010264-118	CAPACITOR		
18	1	C2	1010359-28	CAPACITOR		
17	1	C1	1010359-5	CAPACITOR		
16	1	CR1	1010372-15	DIODE		
15	1	R11	1006750-56	RESISTOR		
14	1	R10	1006750-73	RESISTOR		
13	1	R9	1006750-80	RESISTOR		
12	1	R8	1006750-25	RESISTOR		
11	2	R6 R7	1010364-459	RESISTOR		
10	1	R5	1010364-769	RESISTOR		
9	1	R4	1006750-52	RESISTOR		
8	1	R3	1006750-51	RESISTOR		
7	1	R2	SEE NOTE 14	RESISTOR		
6	1	R1	1010364-501	RESISTOR		
5	1		2021762	INSULATOR, TRANSISTOR		
4	2		2021763	SPACER		
3	1		2021782-011	WIRING BOARD ASSY, BOTTOM		
2	1		2021784	WIRING BOARD, TOP		
1	1		2021779-011	HOUSING ASSY		
	-011	LIST OF MATERIALS				

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

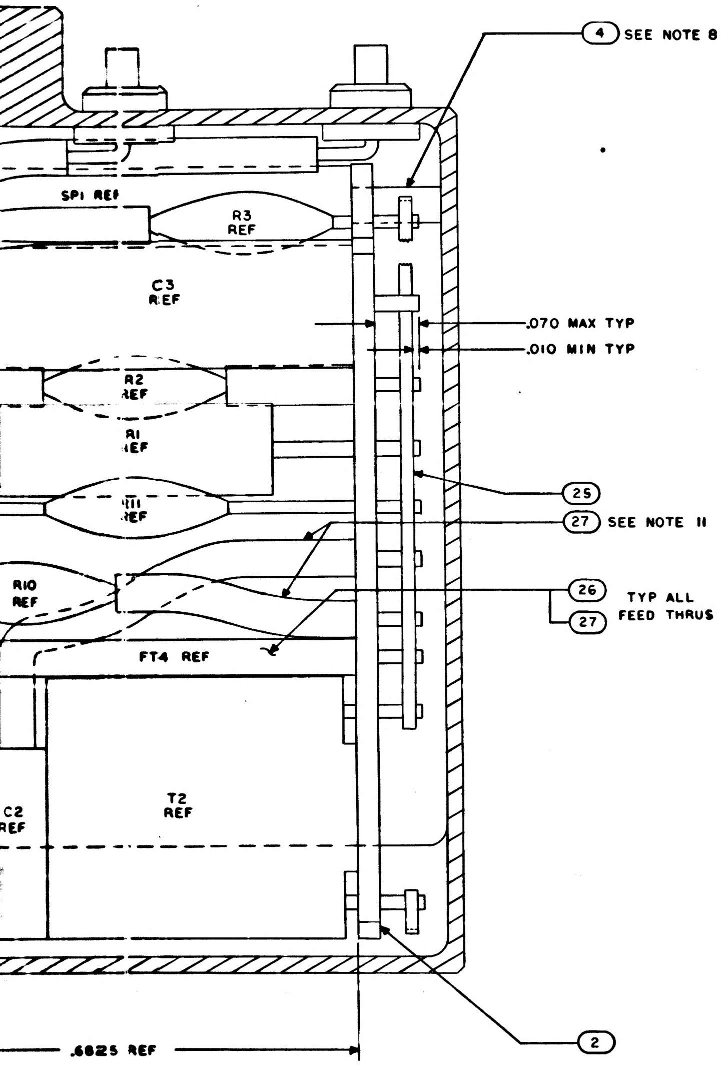
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN J. Brigham 12/25/64
CHECKED
APPROVED
APPROVED A. C. Smith
MIT APPROVED DATE
W. Kupfer 22 Dec 64
NASA
W. J. Rhine 12-22-64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

IRIG PREAMP ASSY

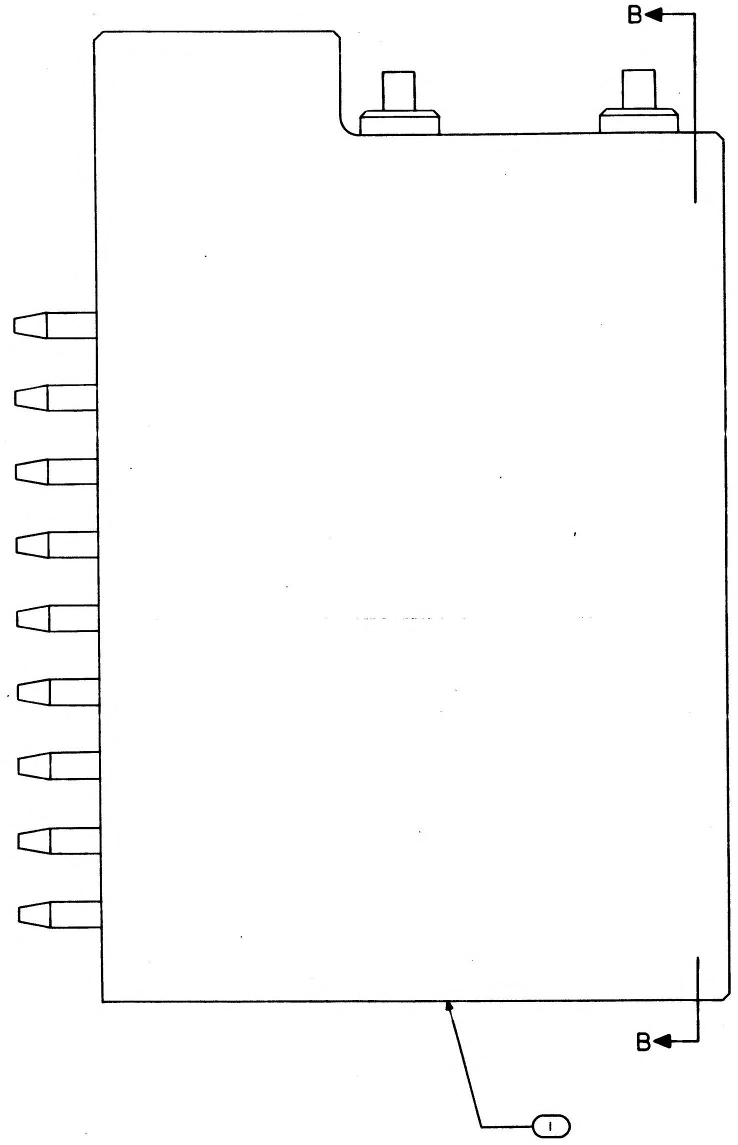
SIZE J
CODE IDENT NO —
DRAWING NO. 2021785
SCALE 10/1
SHEET 1 OF 1

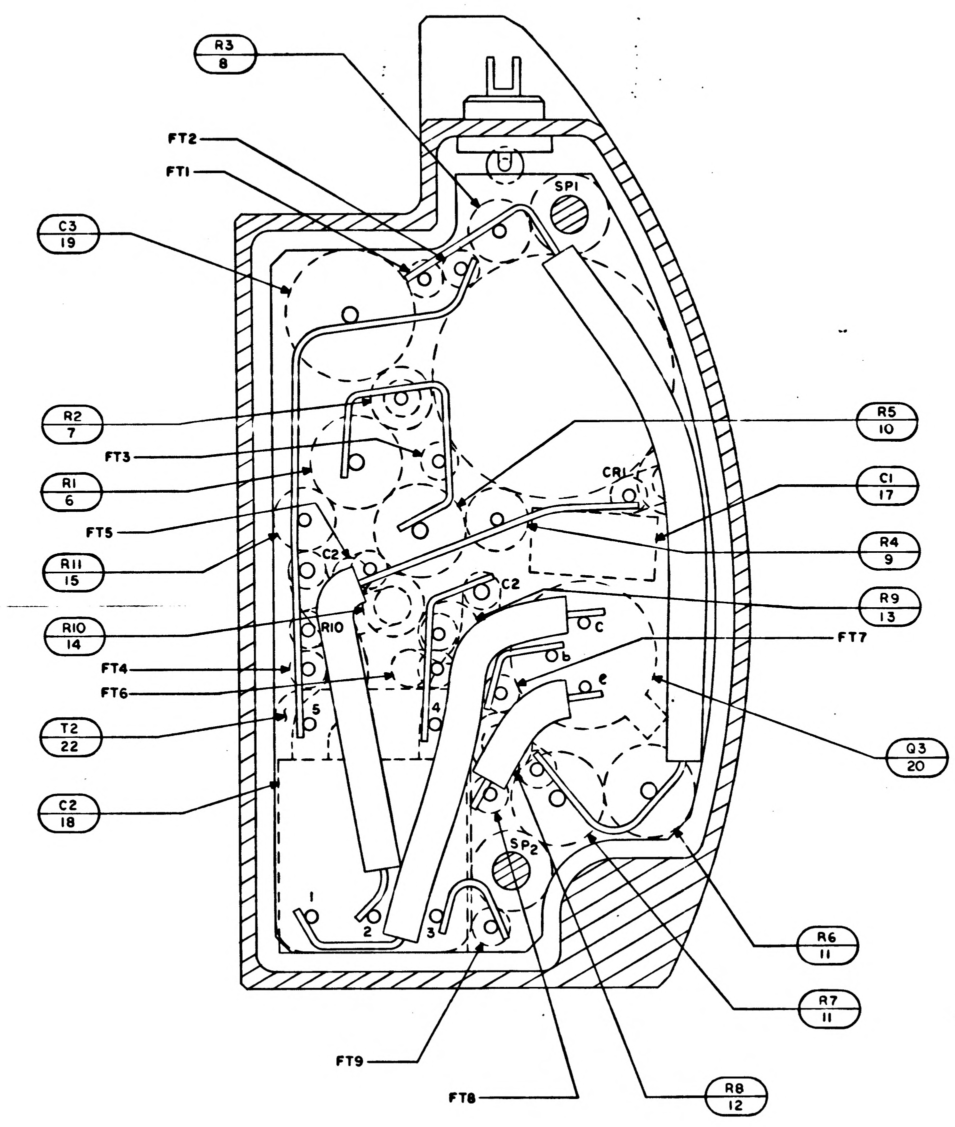
2021785



4 SEE NOTE 8
SPI REF
R3 REF
C3 REF
.070 MAX TYP
.010 MIN TYP
R2 REF
RI REF
25
RII REF
27 SEE NOTE 11
RIO REF
26
27
TYP ALL FEED THRUS
FT4 REF
C2 REF
T2 REF
2
.6825 REF
5

SECTION A-A





R3 8
FT2
FTI
C3 19
SPI
R2 7
FT3
RI 6
FT5
RII 15
C2
RIO 14
RIO
FT4
FT6
T2 22
C2 18
CRI
R5 10
CI 17
R4 9
C2
R9 13
FT7
c
b
e
Q3 20
SP2
1
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3
4
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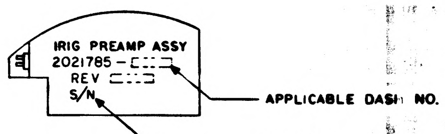
R6 11
R7 11
FT9
FT8
R8 12

SECTION B-B



IRIG PREAMP ASSY
2021785 -
REV
S/N
APPLICABLE DASH NO.
SEE NOTE

MARKING VIEW
SCALE 2/1

R2	
1006750 - 84	150K
—15	41 K
—14	25.5K
—62	18 K
—14	14 K
—57	11 K
—13	8650
—13	7150
—13	5900
—4	5100
—13	4500
—12	3750
—	3300
—12	2850
—41	2400
—3	2000
—3	1600
1006750 —3	1200

REF	
27	AR
26	AR
25	AR
24	AR
23	1
22	1
21	1
20	1
19	1
18	1
17	1
16	1
15	1
14	1
13	1
12	1
11	2
10	1
9	1
8	1
7	1
6	1
5	1
4	2
3	1
2	1
1	1
ITEM NO.	QTY REQD
	-01.

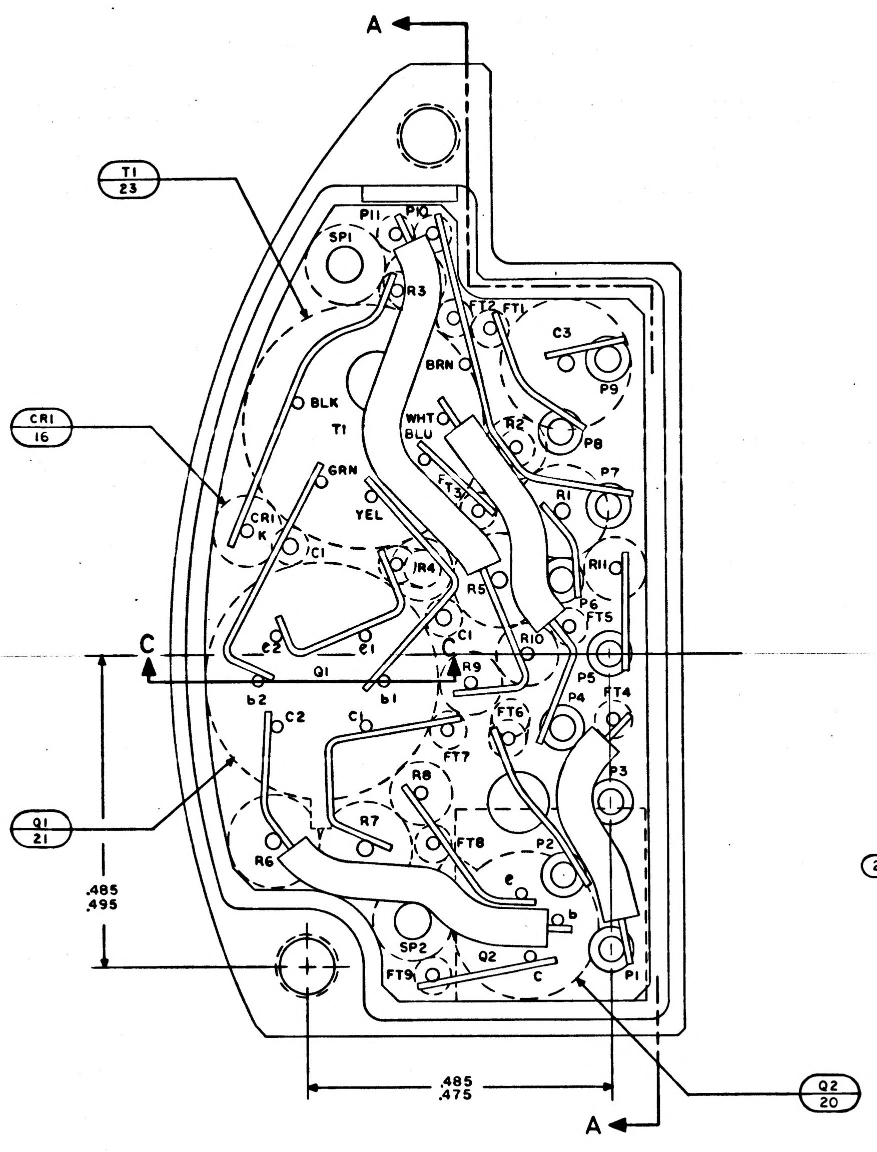
UNLESS OTH
DIMENSIONS
CAPACITOR VA
RESISTOR VALUE
K - X1000
DO NOT SCA

MATERIAL

FINISH

NEXT ASSY	USED ON
APPLICATION	

MASTER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T1
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CR1
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Q1
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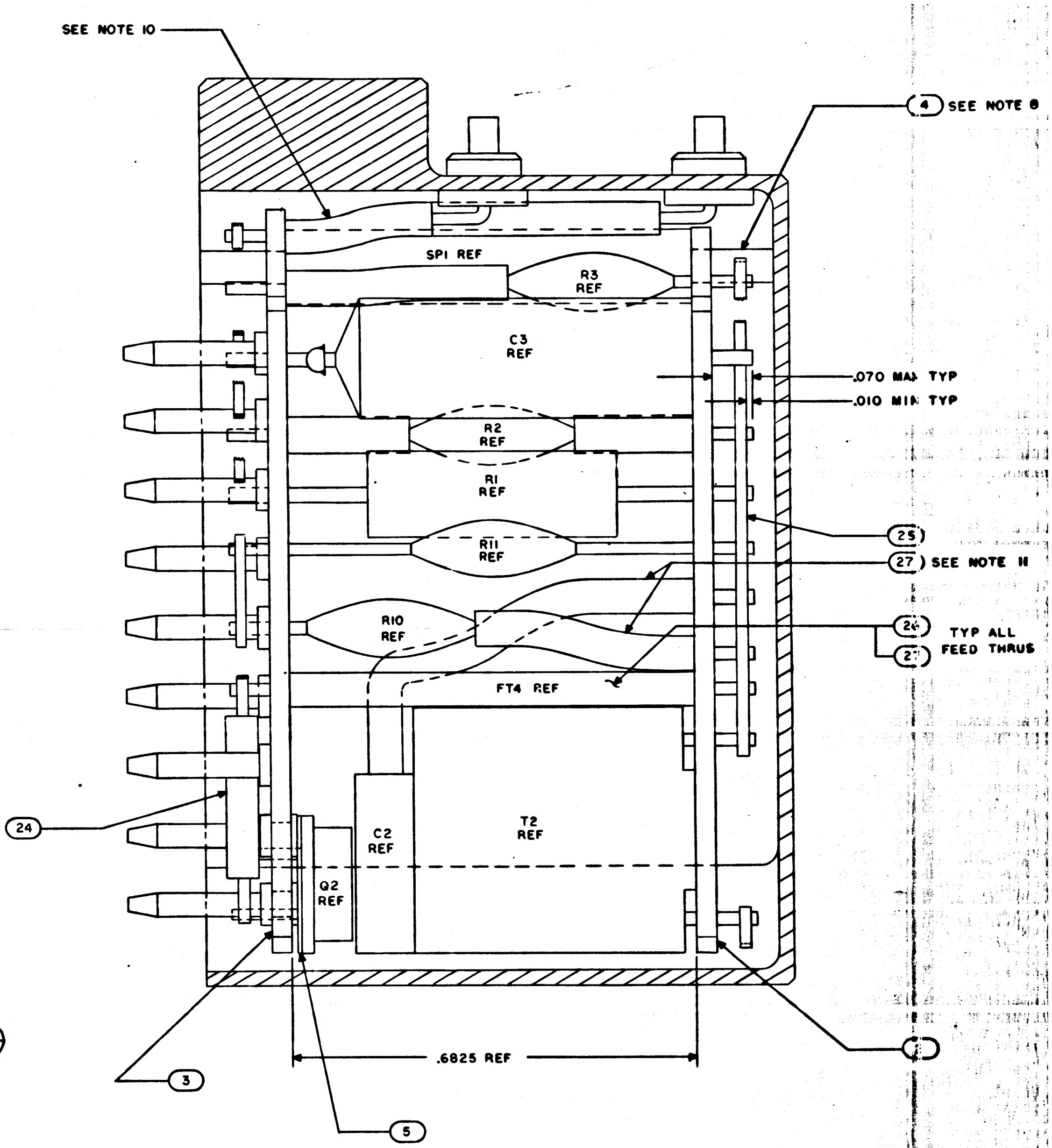
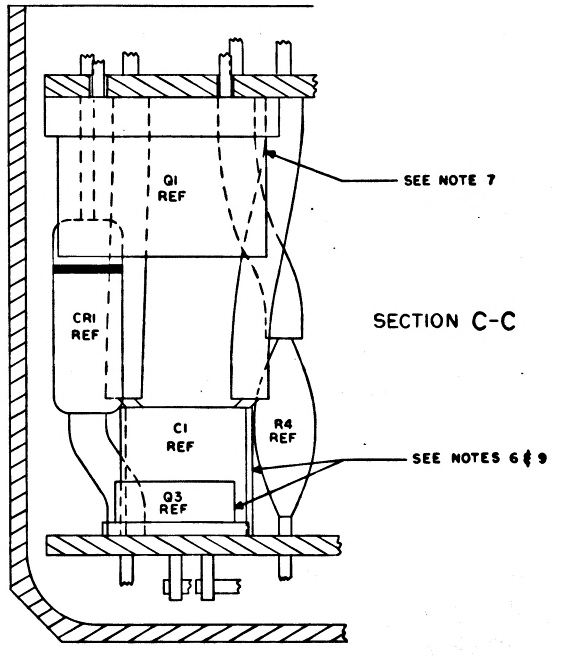
Q2
20
SP1
P11
P10
R3
FT2
FT1
C3
P9
BRN
WHT
BLU
R2
P8
BLK
T1
GRN
YEL
CR1
K
C1
R4
FT3
R1
P7
R11
R5
P6
FT5
C1
R10
C
e2
e1
Q1
b2
b1
R9
P5
FT4
P4
C2
c
FT6
FT7
R8
P3
R7
R6
FT8
P2
e
b
SP2
Q2
c
FT9
P1
.485
.495
.485
.475
A


SEE NOTE 10
4 SEE NOTE 8
SP1 REF
R3 REF
C3 REF
.070 MAX TYP
.010 MIN TYP
R2 REF
R1 REF
R11 REF
25
27 SEE NOTE 11
R10 REF
26
27
TYP ALL FEED THRUS
FT4 REF
24
C2 REF
T2 REF
Q2 REF
.6825 REF
3
5

SECTION A-A

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AR DENOTES AS REQUIRED
3. FT DENOTES FEED THRU
4. WIRE PER ND1002005
5. UNLESS OTHERWISE SPECIFIED ALL WIRING TO BE IN ACCORDANCE WITH ND1002069
6. BOND C1, C3, T1, T2, Q3 TO ITEM NO. 2 PER ND1002004 TYPE I
7. BOND Q1 TO ITEM NO. 3 PER ND1002004 TYPE I
8. BOND ITEM NO. 4 TO ITEM NO'S 2 & 3 PER ND1002004 TYPE I
9. BODIES OF C1, C2, Q3 TO BE SPRAY COATED TO A MIN OF .005 PER ND1002035
10. TERMINAL LEADS TO BE SLEEVED USING ITEM NO. 27
11. LEAD OF R2, R3, R4. R8. R10, CR1, C1, C2 TO BE SLEEVED USING ITEM NO. 27
12. DIPCOAT PER ND1002068 PRIOR TO ENCAPSULATION
13. ENCAPSLATE MODULE PER ND1002036
14. R2 TO BE SELECTED FROM CHART PER ATP 2021785
15. MARK .100/.060 HIGH BLACK PER ND1002019 AND SERIALIZE PER ND1002023
16. PROCURE PER PS2021785

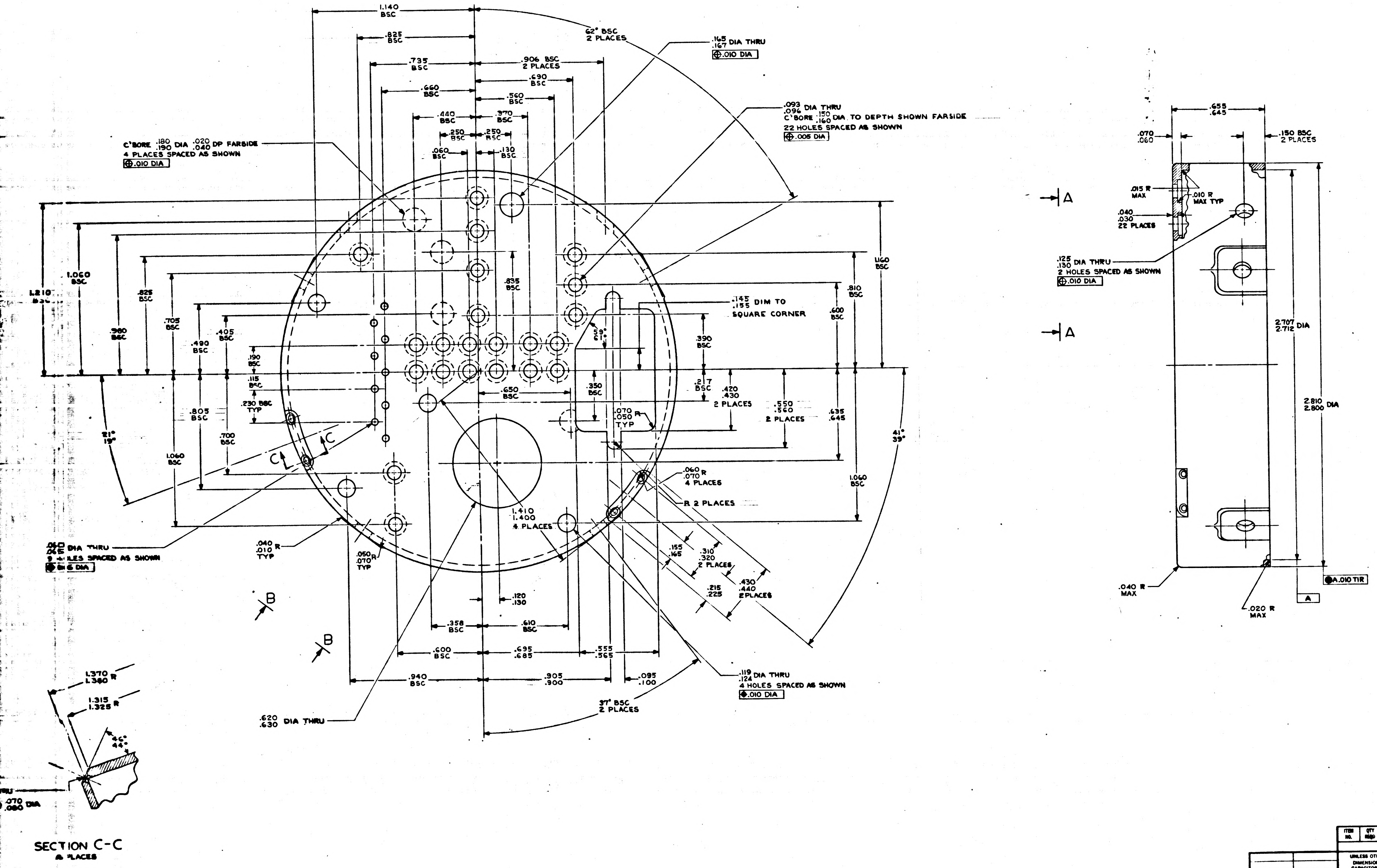

SEE NOTE 7
Q1 REF
CR1 REF
C1 REF
R4 REF
Q3 REF
SEE NOTES 6 & 9

SECTION C-C

R2	
1006750-84	150K
-154	41 K
-149	25.5K
-62	18 K
-143	14 K
-57	11 K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750-34	1200

(54)

REVISIONS	TDRR 16311		
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED TDRR 16648	2-8-65	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.825 BSC
.735 BSC
.660 BSC
.440 BSC
.250 BSC
.250 BSC
.060 BSC
.130 BSC
.370 BSC
.560 BSC
.690 BSC
.906 BSC 2 PLACES
62° BSC 2 PLACES
.165 .167 DIA THRU
⊕.010 DIA
.093 .096 DIA THRU
C'BORE .150 .160 DIA TO DEPTH SHOWN FARSIDE
22 HOLES SPACED AS SHOWN
⊕.005 DIA
C'BORE .180 .190 DIA .020 .040 DP FARSIDE
4 PLACES SPACED AS SHOWN
⊕.010 DIA
1.210 BSC
1.060 BSC
.980 BSC
.825 BSC
.705 BSC
.490 BSC
.405 BSC
.190 BSC
.115 BSC
.230 BSC TYP
.805 BSC
.700 BSC
1.060 BSC
21° 19°
.835 BSC
.650 BSC
.145 .155 DIM TO SQUARE CORNER
59° 61°
.390 BSC
.350 BSC
.217 BSC
.070 .050 R TYP
.420 .430 2 PLACES
.550 .560 2 PLACES
.600 BSC
.810 BSC
1.160 BSC
.635 .645
1.060 BSC
41° 39°
.060 .070 R 4 PLACES
R 2 PLACES
1.410 1.400 4 PLACES
.155 .165
.310 .320 2 PLACES
.215 .225
.430 .440 2 PLACES
.120 .130
.358 BSC
.610 BSC
.600 BSC
.695 .685
.555 .565
.940 BSC
.905 .900
.095 .100
37° BSC 2 PLACES
.119 .124 DIA THRU
4 HOLES SPACED AS SHOWN
⊕.010 DIA
.620 .630 DIA THRU
.040 .010 R TYP
.050 .070 R TYP
.060 .065 DIA THRU
9 HOLES SPACED AS SHOWN
DIA
C
C
B
B
1.370 1.380 R
1.315 1.325 R
46° 44°
.070 .080 DIA
A
A
.655 .645
.070 .060
.150 BSC 2 PLACES
.015 R MAX
.010 R MAX TYP
.040 .030 22 PLACES
.125 .130 DIA THRU
2 HOLES SPACED AS SHOWN
⊕.010 DIA
2.707 2.712 DIA
2.810 2.800 DIA
.040 R MAX
.020 R MAX
A .010 TIR
A

SECTION C-C
6 PLACES

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

FINISH
———

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN RES 2-4-65
CHECKED G. QUINN 2/5/65
APPROVED
APPROVED RA Bantle 2-8-65
MIT APPROVED DATE W Kupfer 2/8/65
NASA Wj Rhine 2-4-65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE
MOUNTING
APOLLO II IRIG

SIZE	CODE IDENT NO	DRAWING NO.
J		2021787

SCALE 4/1 SHEET 1 OF 1

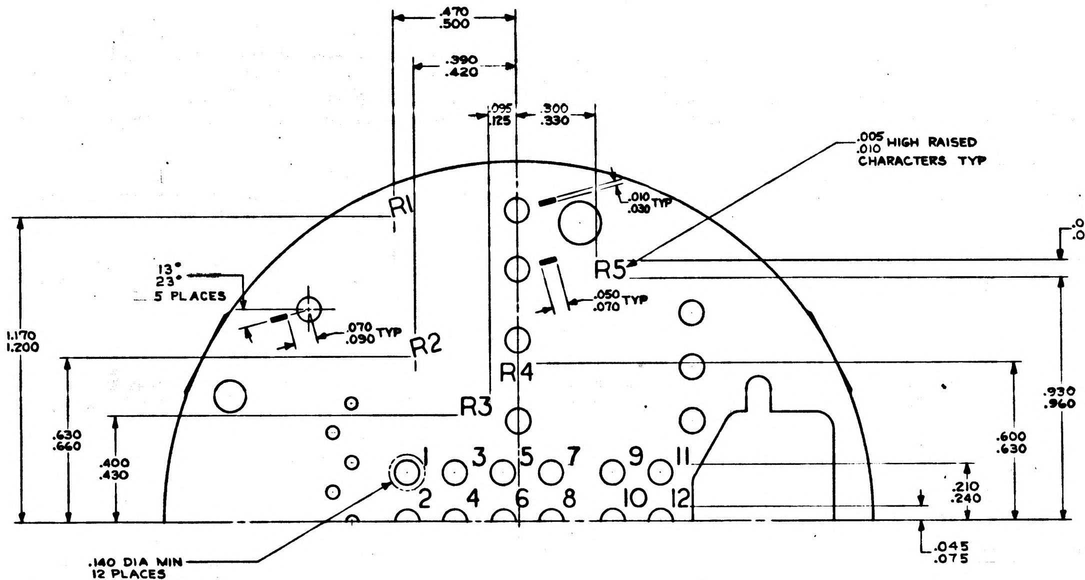
NEXT ASSY	USED ON
2021788	2021500

APPLICATION

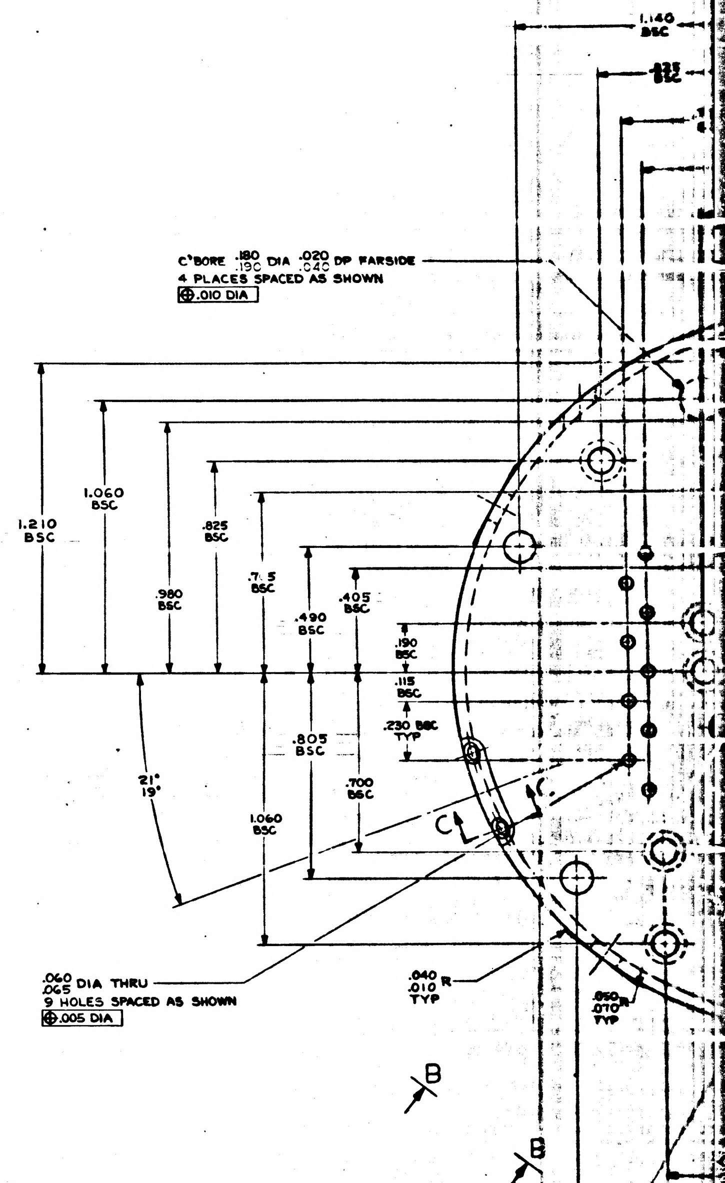
2021787

SHT	REV
1	A

24

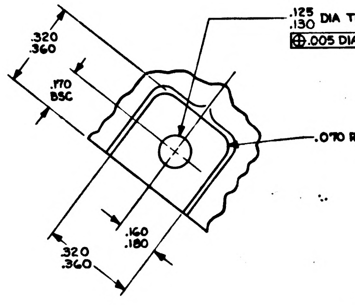

.470
.500
.390
.420
.095
.125
.300
.330
.005
.010 HIGH RAISED
CHARACTERS TYP
.010
.030 TYP
.050
.070 TYP
R1
R2
R3
R4
R5
13°
23°
5 PLACES
.070
.090 TYP
.050
.070 TYP
1.170
1.200
.630
.660
.400
.430
.930
.960
.600
.630
.210
.240
.045
.075
1 2 3 4 5 6 7 8 9 10 11 12
.140 DIA MIN
12 PLACES
SEE NOTE 5

VIEW A-A
ENGRAVING DETAIL

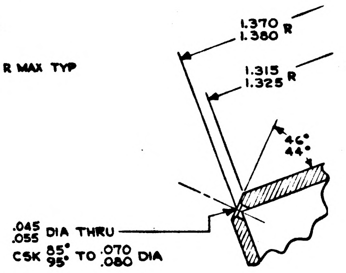

1.140
BSC
.825
BSC
C'BORE .180
.190 DIA .020
.040 DP FARSIDE
4 PLACES SPACED AS SHOWN
⊕ .010 DIA
1.210
BSC
1.060
BSC
.980
BSC
.825
BSC
.765
BSC
.490
BSC
.405
BSC
.190
BSC
.115
BSC
.230 BSC
TYP
.805
BSC
.700
BSC
1.060
BSC
21°
19°
C
C
.060
.065 DIA THRU
9 HOLES SPACED AS SHOWN
⊕ .005 DIA
.040
.010 R
TYP
.050
.070 R
TYP
B
B
.620
.630 DIA THRU

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL: DIALLYL PHTHALATE RESIN, GLASS FIBER FILLED, PER MIL-P-19833 TYPE GDI-30
3. REMOVE ALL BURRS & BREAK SHARP EDGES .005-.015
4. 32/ FINISH ON MOLDED SURFACES, 63/ FINISH ON MACHINED SURFACES
5. NO ENGRAVING PERMITTED WITHIN THIS DIAMETER
6. IDENTIFY USING DRAWING NO, REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019


.125
.130 DIA THRU
⊕ .005 DIA
.320
.360
.170
BSC
.070 R MAX TYP
.160
.180
.320
.360

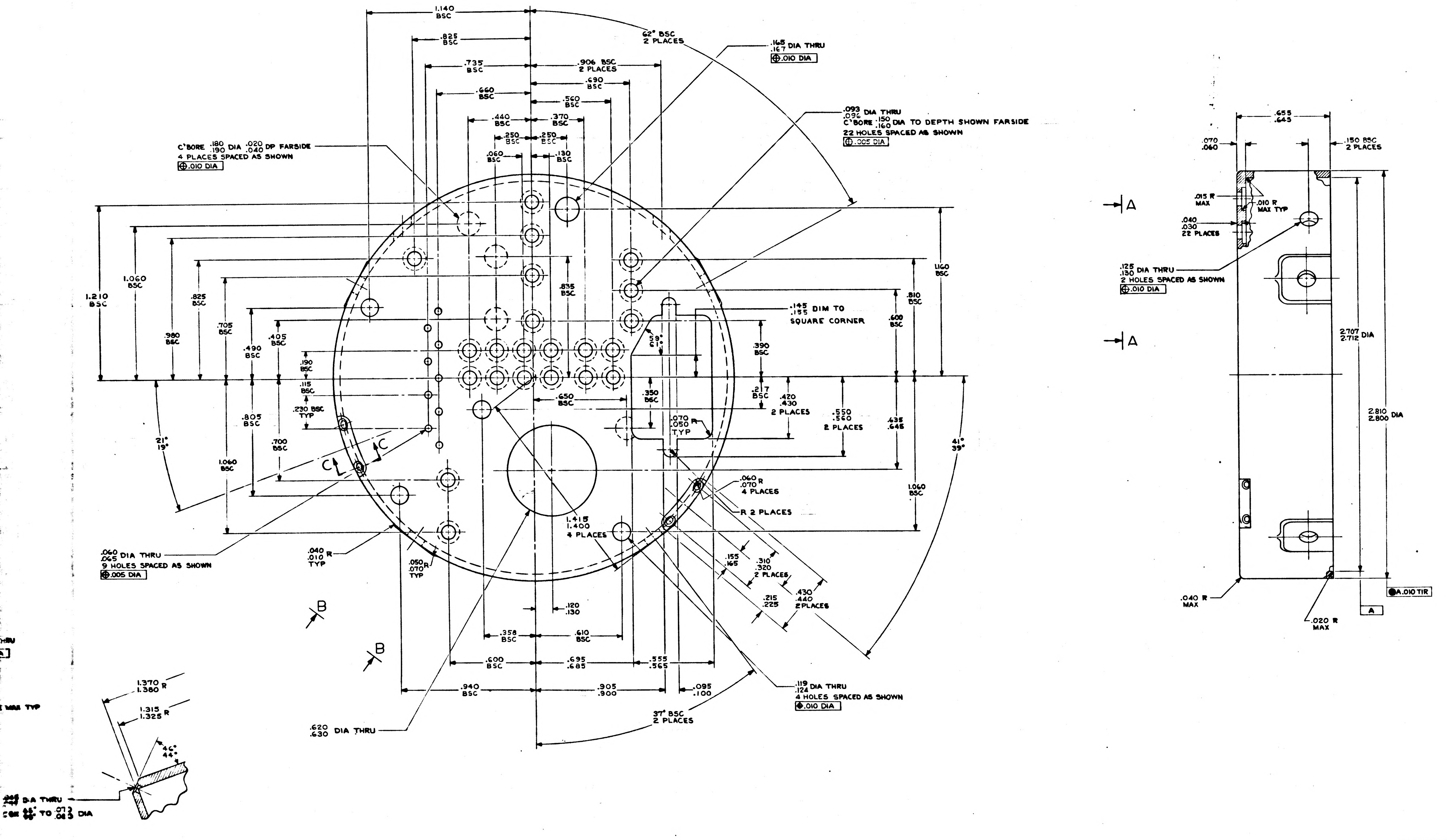
VIEW B-B
4 PLACES


1.370
1.380 R
1.315
1.325 R
46°
44°
.045
.055 DIA THRU
CSK 85°
95° TO .070
.080 DIA

SECTION C-C
4 PLACES

	SHT	REV
2021787	1	A

REVISIONS TDRR 16311			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED TDRR 16648	2-18-65	ajs
B	REVISED TDRR 19282	5-25-65	ajs


1.140 BSC
.825 BSC
.735 BSC
.660 BSC
.440 BSC
.250 BSC
.060 BSC
.906 BSC 2 PLACES
.690 BSC
.560 BSC
.370 BSC
.250 BSC
.130 BSC
62° BSC 2 PLACES
.165 .167 DIA THRU
⊕.010 DIA
.093 .096 DIA THRU
C'BORE .150 .160 DIA TO DEPTH SHOWN FARSIDE
22 HOLES SPACED AS SHOWN
⊕.005 DIA
C'BORE .180 .190 DIA .020 .040 DP FARSIDE
4 PLACES SPACED AS SHOWN
⊕.010 DIA
1.210 BSC
1.060 BSC
.980 BSC
.825 BSC
.705 BSC
.490 BSC
.405 BSC
.190 BSC
.115 BSC
.230 BSC TYP
.805 BSC
.700 BSC
1.060 BSC
21° 19°
.835 BSC
.145 .155 DIM TO SQUARE CORNER
59° 61°
.390 BSC
.350 BSC
.650 BSC
.217 BSC
.420 .430 2 PLACES
.550 .560 2 PLACES
.070 .050 R TYP
1160 BSC
.810 BSC
.600 BSC
.635 .645
1.060 BSC
41° 39°
.060 .070 R 4 PLACES
R 2 PLACES
1.415 1.400 4 PLACES
.155 .165
.310 .320 2 PLACES
.215 .225
.430 .440 2PLACES
C
C
.060 .065 DIA THRU
9 HOLES SPACED AS SHOWN
⊕.005 DIA
.040 .010 R TYP
.050 .070 R TYP
B
B
.120 .130
.358 BSC
.610 BSC
.600 BSC
.695 .685
.555 .565
.940 BSC
.905 .900
.095 .100
37° BSC 2 PLACES
.620 .630 DIA THRU
.119 .124 DIA THRU
4 HOLES SPACED AS SHOWN
⊕.010 DIA
A
A
.655 .645
.070 .060
.150 BSC 2 PLACES
.015 R MAX
.010 R MAX TYP
.040 .030 22 PLACES
.125 .130 DIA THRU
2 HOLES SPACED AS SHOWN
⊕.010 DIA
2.707 2.712 DIA
2.810 2.800 DIA
.040 R MAX
.020 R MAX
●A.010 TIR
A
1.370 1.380 R
1.315 1.325 R
46° 44°
DIA THRU
TO .073 .083 DIA

SECTION C-C
4 PLACES

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

FINISH ———

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN RES 2-4-65
CHECKED G. Quinn 2/9/65
APPROVED
APPROVED RA Booth 2-8-65
MIT APPROVED W Kupfer 9 Feb 65 DATE
NASA WJ Rhine 2-9-65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE
MOUNTING
APOLLO II IRIG

SIZE J
CODE IDENT NO
DRAWING NO. 2021787
SCALE 4/1
SHEET 1 OF 1

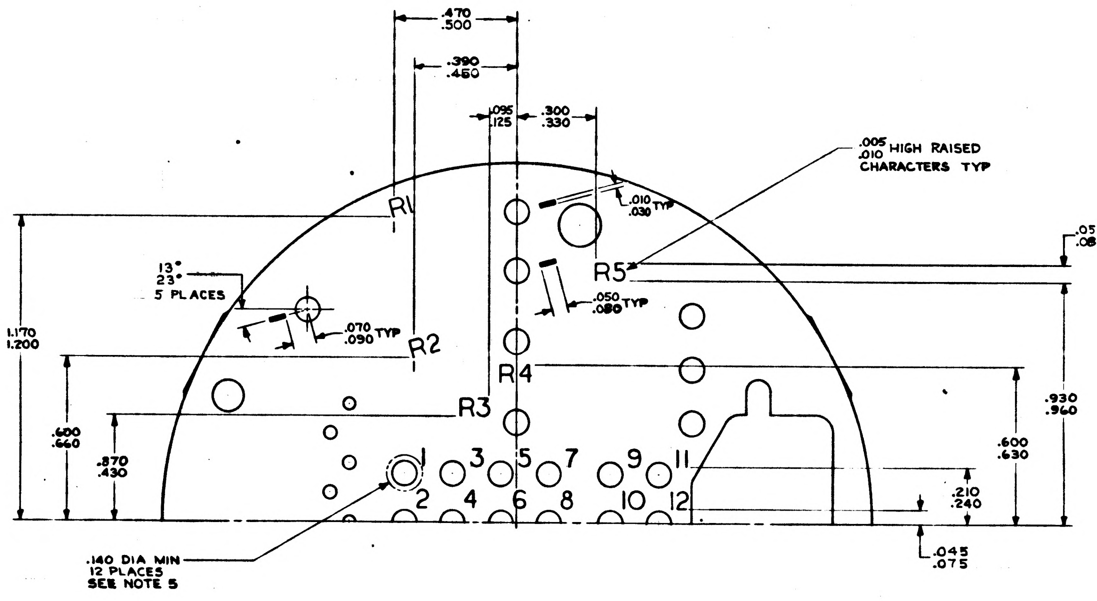
2021788	2021500
NEXT ASSY	USED ON
APPLICATION	

2021787	SHT 1	REV B

2021787 B

2A

F-2

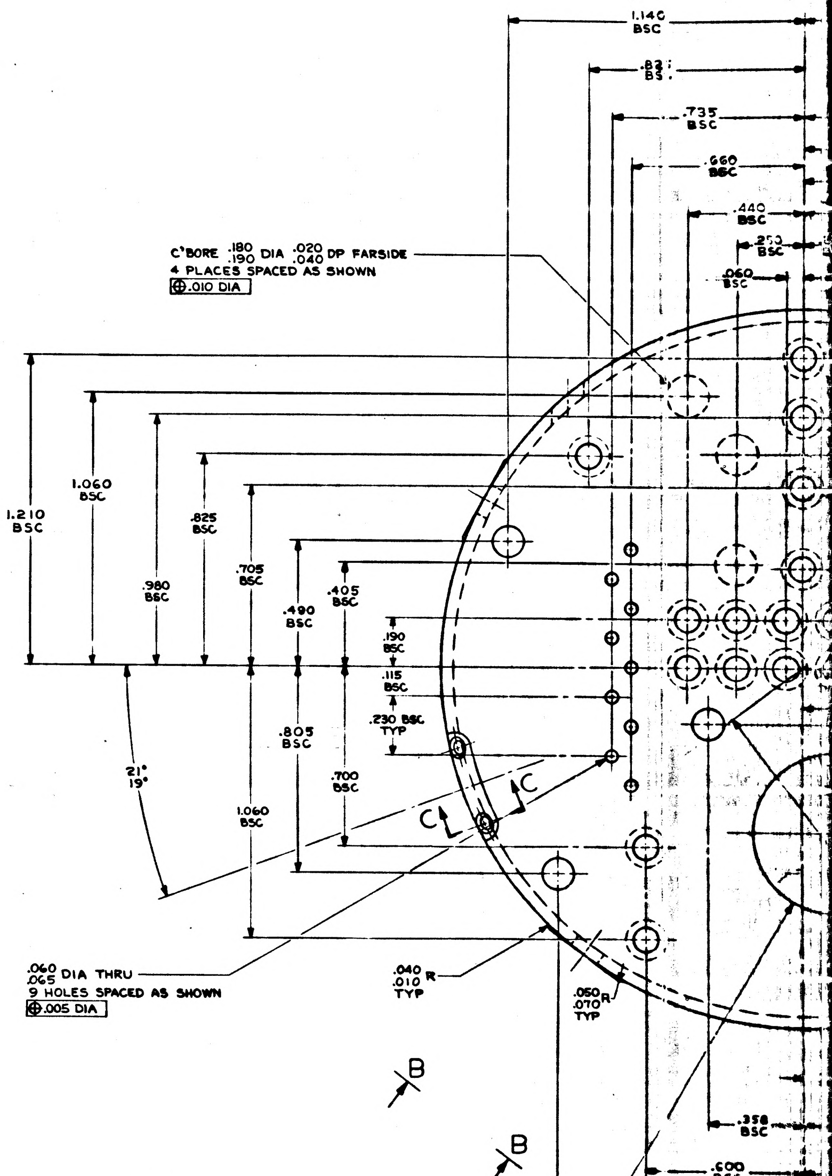


.470
.500
.390
.450
.095
.125
.300
.330
.005
.010 HIGH RAISED CHARACTERS TYP
.010
.030 TYP
.050
.085 TYP
R1
R2
R3
R4
R5
13°
23°
5 PLACES
.070
.090 TYP
.050
.080 TYP
1.170
1.200
.600
.660
.370
.430
.930
.960
.600
.630
.210
.240
.045
.075
1 2 3 4 5 6 7 8 9 10 11 12
.140 DIA MIN
12 PLACES
SEE NOTE 5

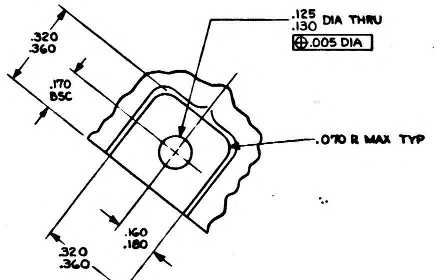
VIEW A-A
ENGRAVING DETAIL

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL: DIALLYL PHTHALATE RESIN, GLASS FIBER FILLED, PER MIL-P-19833 TYPE GDI-30
3. REMOVE ALL BURRS & BREAK SHARP EDGES .005-.015
4. 32√ FINISH ON MOLDED SURFACES, 63√ FINISH ON MACHINED SURFACES
5. NO ENGRAVING PERMITTED WITHIN THIS DIAMETER
6. IDENTIFY USING DRAWING NO, REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019

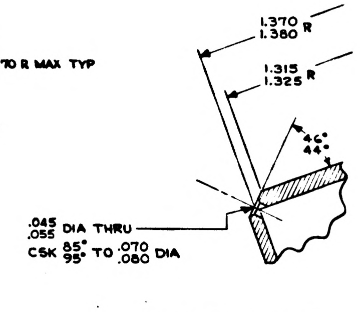


1.140 BSC
.82 BS
.735 BSC
.660 BSC
.440 BSC
.275 BSC
.060 BSC
C'BORE .180 .190 DIA .020 .040 DP FARSIDE
4 PLACES SPACED AS SHOWN
⊕ .010 DIA
1.210 BSC
1.060 BSC
.980 BSC
.825 BSC
.705 BSC
.490 BSC
.405 BSC
.190 BSC
.115 BSC
.230 BSC TYP
.805 BSC
.700 BSC
1.060 BSC
21°
19°
C
C
.060
.065 DIA THRU
9 HOLES SPACED AS SHOWN
⊕ .005 DIA
.040
.010 R TYP
.050
.070 R TYP
B
B
.358 BSC
.600 BSC
.940 BSC
.620
.630 DIA THRU



.125
.130 DIA THRU
⊕ .005 DIA
.320
.360
.170 BSC
.070 R MAX TYP
.160
.180
.320
.360

VIEW B-B
4 PLACES

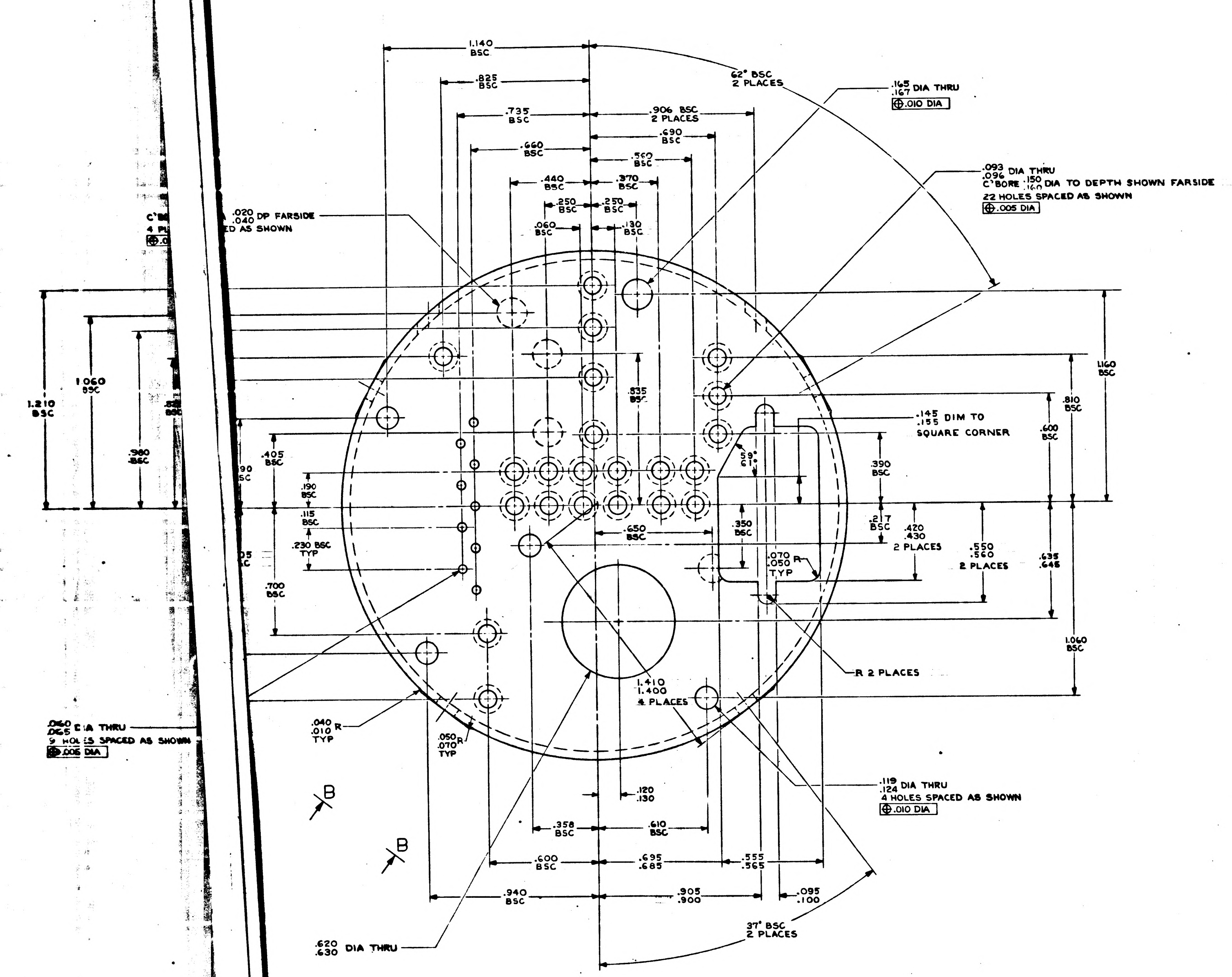


1.370
1.380 R
1.315
1.325 R
46°
44°
.045
.055 DIA THRU
CSK 85° 95° TO .070 .080 DIA

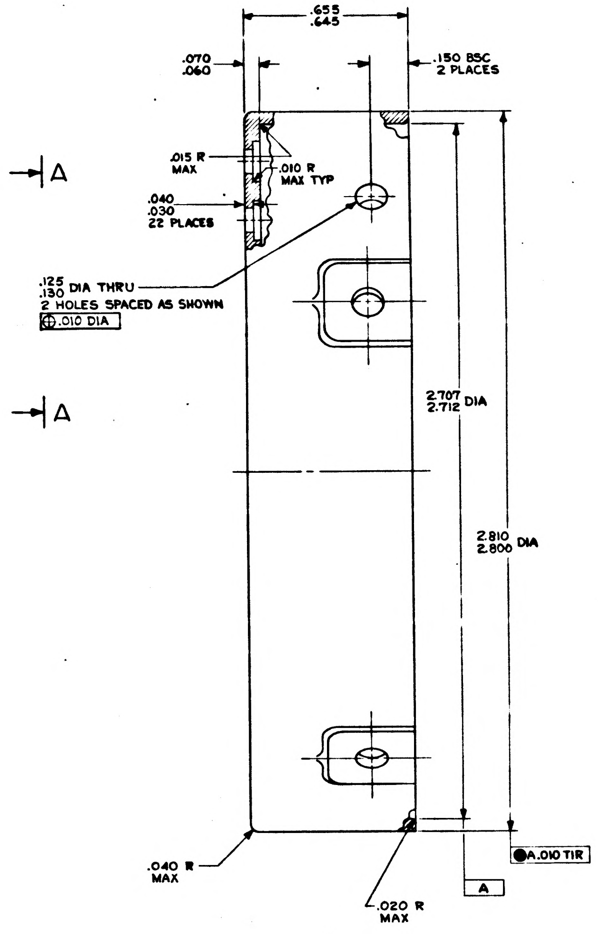
SECTION C-C
4 PLACES

2021787	SHT	REV
	1	B

REVISIONS	TDRR 16311		
SYM	DESCRIPTION	DATE	APPROVAL



1.140 BSC
.825 BSC
.735 BSC
.660 BSC
.440 BSC
.250 BSC
.060 BSC
.906 BSC 2 PLACES
.690 BSC
.560 BSC
.370 BSC
.250 BSC
.130 BSC
62° BSC 2 PLACES
.165 .167 DIA THRU
⊕.010 DIA
.093 .096 DIA THRU
C'BORE .150 .160 DIA TO DEPTH SHOWN FARSIDE
22 HOLES SPACED AS SHOWN
⊕.005 DIA
C'B
4 P
.020 .040 DP FARSIDE
ED AS SHOWN
⊕.0
1.210 BSC
1.060 BSC
.980 BSC
.835 BSC
.405 BSC
.190 BSC
.115 BSC
.230 BSC TYP
.700 BSC
.145 .155 DIM TO SQUARE CORNER
59° 61°
.390 BSC
.217 BSC
.350 BSC
.650 BSC
.420 .430 2 PLACES
.550 .560 2 PLACES
.600 BSC
.810 BSC
1.160 BSC
.635 .645
1.060 BSC
.070 .050 R TYP
R 2 PLACES
1.410 1.400 4 PLACES
.060 .065 DIA THRU
9 HOLES SPACED AS SHOWN
⊕.005 DIA
.040 .010 R TYP
.050 .070 R TYP
.119 .124 DIA THRU
4 HOLES SPACED AS SHOWN
⊕.010 DIA
.120 .130
.358 BSC
.610 BSC
.600 BSC
.695 .685
.555 .565
.940 BSC
.905 .900
.095 .100
37° BSC 2 PLACES
.620 .630 DIA THRU
B
B



.655 .645
.070 .060
.150 BSC 2 PLACES
A
A
.015 R MAX
.010 R MAX TYP
.040 .030 22 PLACES
.125 .130 DIA THRU
2 HOLES SPACED AS SHOWN
⊕.010 DIA
2.707 2.712 DIA
2.810 2.800 DIA
.040 R MAX
.020 R MAX
●A.010 TIR
A

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS K - X1000 M - X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

FINISH ———

NEXT ASSY	USED ON
2021788	2021500

APPLICATION

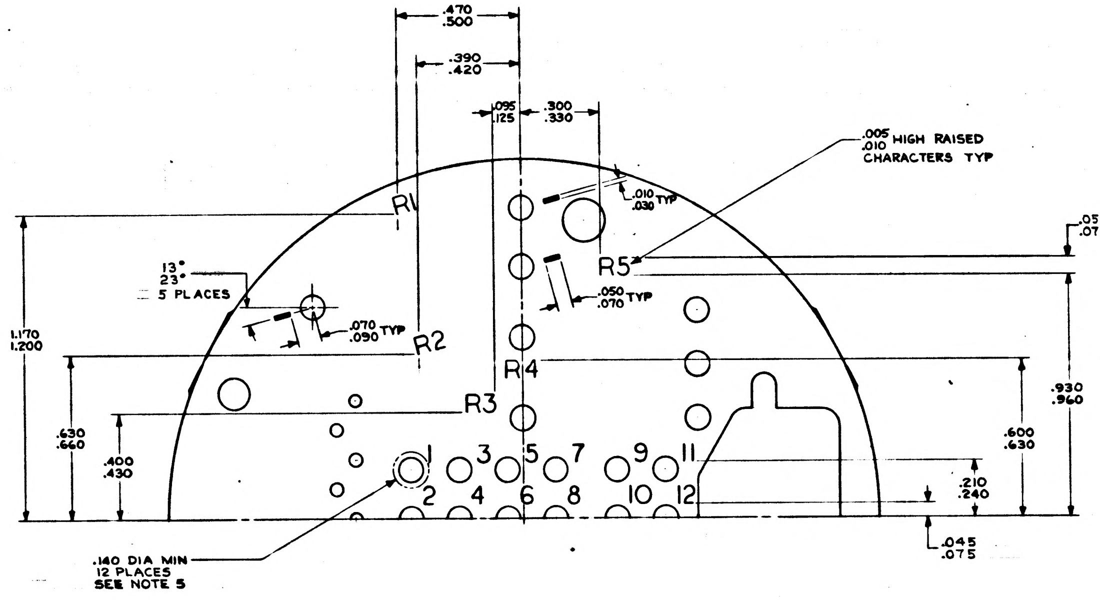
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN RES 2-4-65
CHECKED G. Quinn 2/5/65
APPROVED
APPROVED R A Booth 2-8-65
MIT APPROVED W Kupfer 2/8/65 DATE
NASA W J Dehlin 2-9-65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE
MOUNTING
APOLLO II IRIG

SIZE J
CODE IDENT NO
DRAWING NO. 2021787
SCALE 4/1
SHEET 1 OF 1

2021787	SHT	REV
	1	

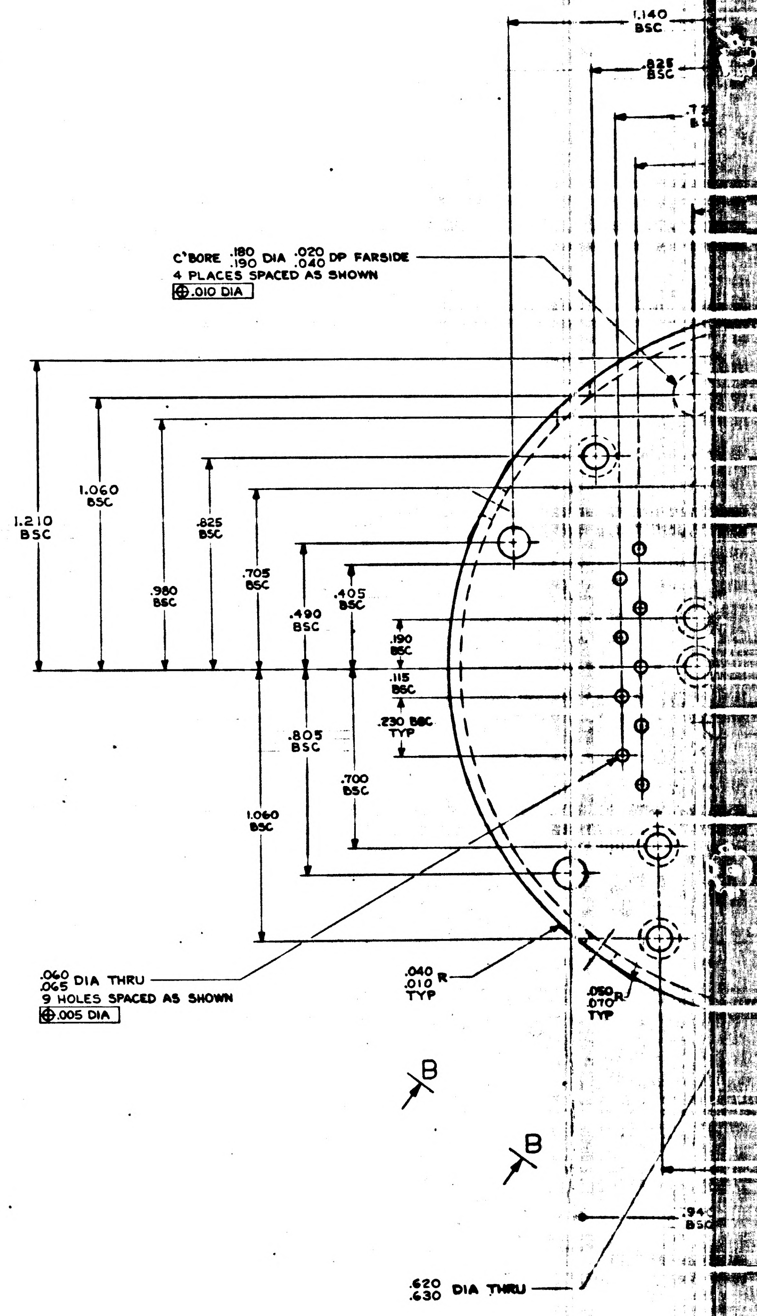

.470
.500
.390
.420
.095
.125
.300
.330
.005
.010 HIGH RAISED
CHARACTERS TYP
.010
.030 TYP
.050
.070 TYP
R1
R2
R3
R4
R5
13°
23°
5 PLACES
.070
.090 TYP
.050
.070 TYP
1.170
1.200
.630
.660
.400
.430
.930
.960
.600
.630
.210
.240
.045
.075
1 2 3 4 5 6 7 8 9 10 11 12
.140 DIA MIN
12 PLACES
SEE NOTE 5

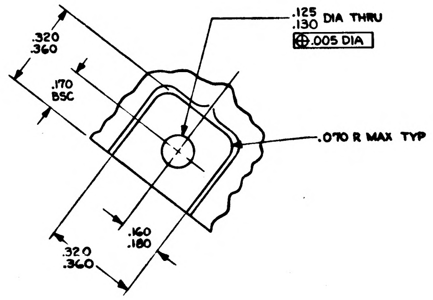
VIEW A-A

ENGRAVING DETAIL

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL: DIALLYL PHTHALATE RESIN, GLASS FIBER FILLED, PER MIL-P-19833 TYPE GDI-30
3. REMOVE ALL BURRS & BREAK SHARP EDGES .005-.015
4. 32/ FINISH ON MOLDED SURFACES, 63/ FINISH ON MACHINED SURFACES
5. NO ENGRAVING PERMITTED WITHIN THIS DIAMETER
6. IDENTIFY USING DRAWING NO, REVISION LETTER & MANUFACTURERS SYMBOL PER ND 1002019


1.140
BSC
.825
BSC
C'BORE .180
.190 DIA .020
.040 DP FARSIDE
4 PLACES SPACED AS SHOWN
⊕ .010 DIA
1.210
BSC
1.060
BSC
.980
BSC
.825
BSC
.705
BSC
.490
BSC
.405
BSC
.190
BSC
.115
BSC
.230 BSC
TYP
.805
BSC
.700
BSC
1.060
BSC
.060
.065 DIA THRU
9 HOLES SPACED AS SHOWN
⊕ .005 DIA
.040
.010 R
TYP
.050
.070 R
TYP
B
B
.620
.630 DIA THRU

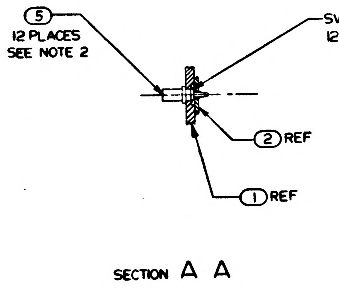

.125
.130 DIA THRU
⊕ .005 DIA
.320
.360
.170
BSC
.070 R MAX TYP
.160
.180
.320
.360

VIEW B-B

4 PLACES

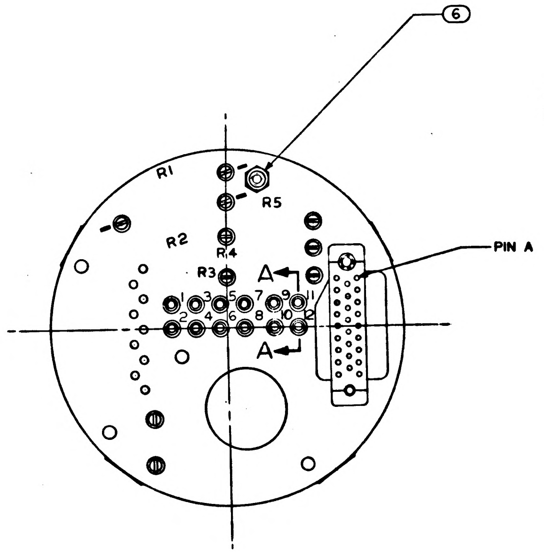
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A	PEVISED PER TDRR 18745	L.M.		5-17-65	[illegible]

REVISIONS TDRR 16311

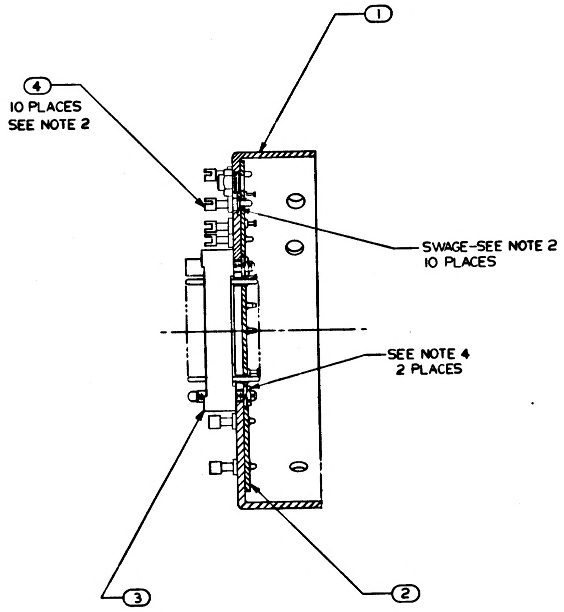


5
12 PLACES
SEE NOTE 2
SWAGE-SEE NOTE 2
12 PLACES
2 REF
1 REF

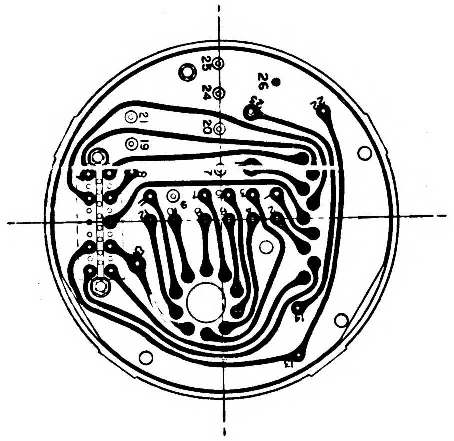
SECTION A A



6
R1
R5
R2
R4
R3
A
A
PIN A
1
2
3
4
5
6
7
8
9
10
11
12



1
4
10 PLACES
SEE NOTE 2
SWAGE-SEE NOTE 2
10 PLACES
SEE NOTE 4
2 PLACES
3
2



25
26
24
20
21
19
6
7

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE PER ATP2021500 MC25-847. SLOTS IN ITEM ④ TO BE ALIGNED WITHIN ± 5° OF RAISED CHARACTERS ON ITEM ① (3 PLACES) AND WITHIN ± 5° OF POSITION SHOWN (7 PLACES)
3.
4. SCREW TORQUE REQUIREMENTS 1.75 IN-LB ± 0.25 IN-LB
5. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
6	1		1011766-6	NUT, SELF-LOCKING CLINCH		
5	12		1010919-1	CONNECTOR PLUG JACK		
4	10		1010846-006	TERMINAL, STUD		
3	1		1010852-26	CONNECTOR PLUG ELEC PRINTED CIRCUIT		
2	1		2021743	CIRCUIT BOARD ASS'Y		
1	1		2021787	PLATE, MOUNTING		

LIST OF MATERIALS

NEXT ASSY	USED ON
MX-114376	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL ———

FINISH ———

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN R.W. Contant 2-3-65
CHECKED G. QUINN 2/4/65
APPROVED
APPROVED RA Booth 2-8-65
MIT APPROVED DATE 9 Feb 65
NASA 2-9-65

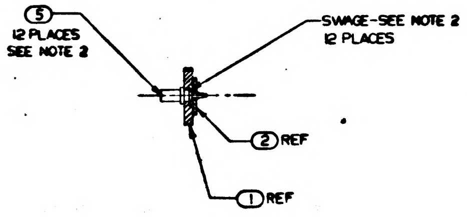
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE MOUNTING
ASSEMBLY
APOLLO II IRIG

SIZE E
CODE IDENT NO
DRAWING NO. 2021788
SCALE 2/1
SHEET 1 OF 1

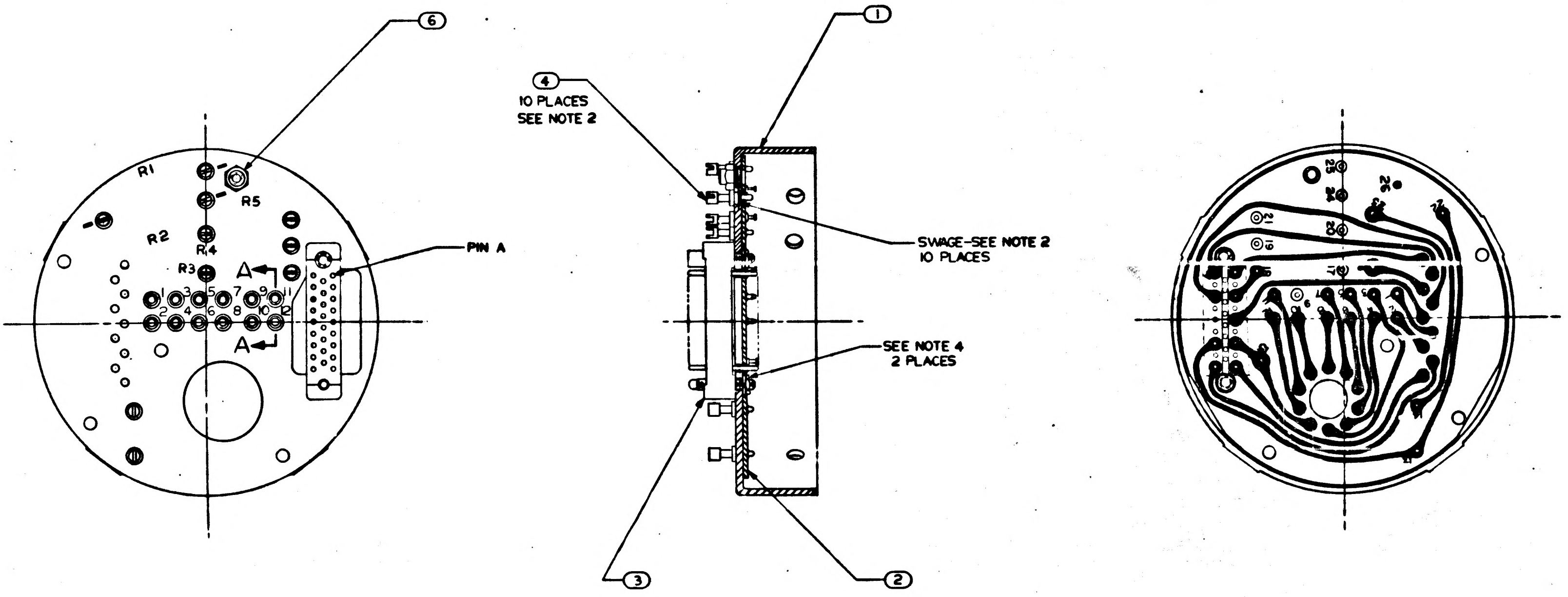
2021788

REVISIONS		TDRR 16311				
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A	REVISED PER TDRR 18745			5-17-65	
	B	REVISED PER TDRR 24280	P.D.		11-22-65	



5
12 PLACES
SEE NOTE 2
SWAGE-SEE NOTE 2
12 PLACES
2 REF
1 REF

SECTION A A



6
R1
R5
R2
R4
R3
A
A
PIN A
4
10 PLACES
SEE NOTE 2
1
SWAGE-SEE NOTE 2
10 PLACES
SEE NOTE 4
2 PLACES
3
2

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
Ⓑ 2. ASSEMBLE PER ATP 2021500 MC 25-847

3.
4. SCREW TORQUE REQUIREMENTS 1.75 IN-LB ± 0.25 IN-LB
5. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
6	1		1011766-6	NUT, SELF-LOCKING CLINCH		
5	12		1010919-1	CONNECTOR PLUG JACK		
4	10		1010846-006	TERMINAL, STUD		
3	1		1010852-26	CONNECTOR PLUG ELEC PRINTED CIRCUIT		
2	1		2021743	CIRCUIT BOARD ASS'Y		
1	1		2021787	PLATE, MOUNTING		

LIST OF MATERIALS

NEXT ASSY	USED ON
MX-114376	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN Bill Coulombe 2-3-65
CHECKED G. QUINN 2/4/65
APPROVED
APPROVED R A 2-8-65
MIT APPROVED DATE 9Feb65
NASA 2-9-65

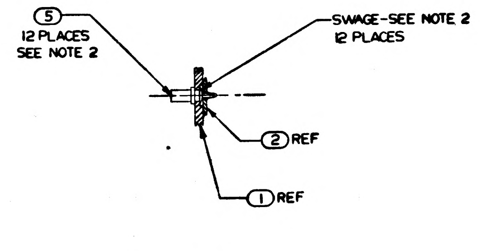
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE MOUNTING ASSEMBLY
APOLLO II IRIG

SIZE E
CODE IDENT NO
DRAWING NO. 2021788
SCALE 2/1
SHEET 1 OF 1

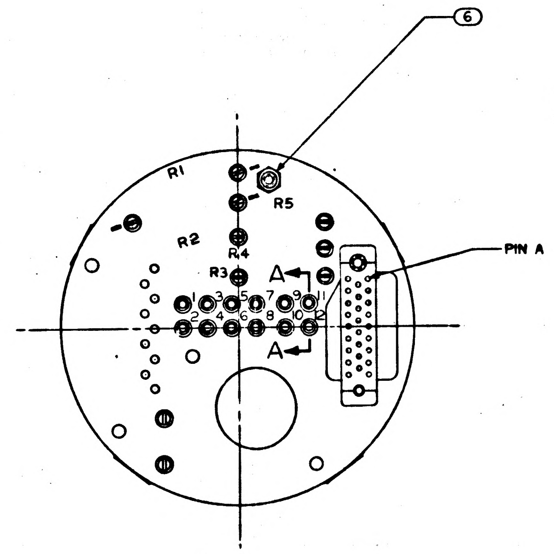
MASTER

REVISIONS		~~7 22 63~~				
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED

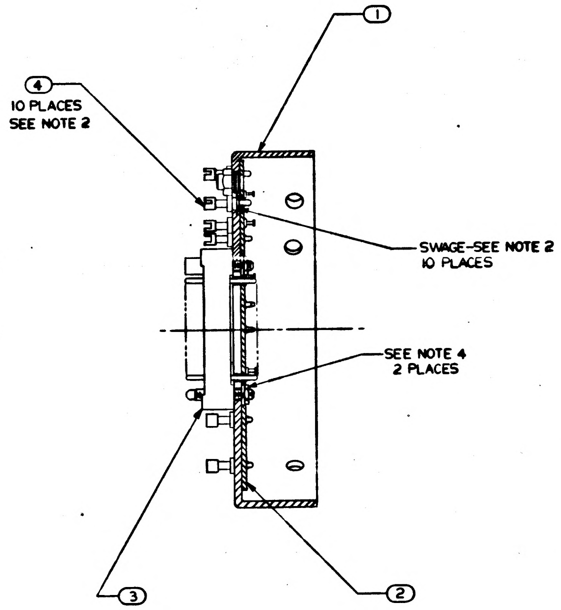


5
12 PLACES
SEE NOTE 2
SWAGE-SEE NOTE 2
12 PLACES
2 REF
1 REF

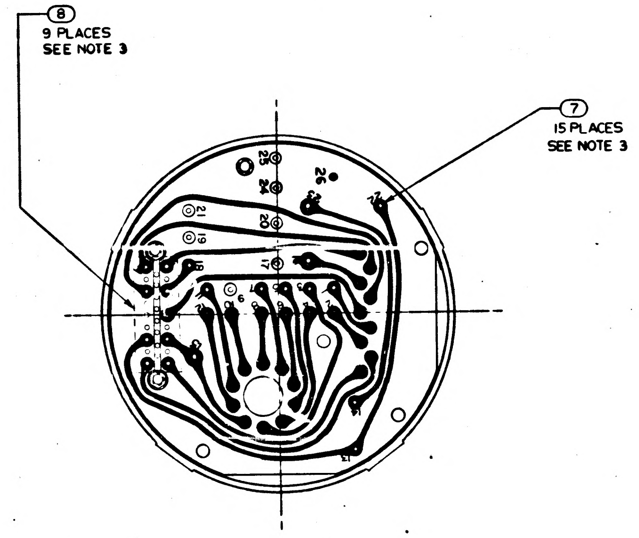
SECTION A A



6
R1
R5
R2
R4
R3
A
A
1
3
5
7
9
11
2
4
6
8
10
12
PIN A



1
4
10 PLACES
SEE NOTE 2
SWAGE-SEE NOTE 2
10 PLACES
SEE NOTE 4
2 PLACES
3
2



8
9 PLACES
SEE NOTE 3
7
15 PLACES
SEE NOTE 3

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE PER ATP2021500 MC25-847. SLOTS IN ITEM ④ TO BE ALIGNED WITHIN ± 5° OF RAISED CHARACTERS ON ITEM ① (3 PLACES) AND WITHIN ± 5° OF POSITION SHOWN (7 PLACES)
3. SOLDER PER ND1002071 USING ITEM ⑦ OR ⑧
4. SCREW TORQUE REQUIREMENTS 3.50 IN-LB ± 0.25 IN-LB
5. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL PER ND1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
8	A/R		SN60	SOLDER		QQ-S-571
7	A/R		SN 35	SOLDER		QQ-S-571
6	1		1011766-6	NUT, SELF-LOCKING CLINCH		
5	12		1010919-1	CONNECTOR PLUG JACK		
4	10		1010846-006	TERMINAL, STUD		
3	1		1010852-26	CONNECTOR PLUG ELEC PRINTED CIRCUIT		
2	1		2021743	CIRCUIT BOARD ASS'Y		
1	1		2021787	PLATE, MOUNTING		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021500	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL ______

FINISH ______

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	Bill Contant	2-3-65
CHECKED	G. QUINN	2/4/65
APPROVED		
APPROVED	RA Booth	2-8-65

MIT APPROVED W. Kupfer DATE 9 Feb 65
NASA W. J. Rhine 2-9-65

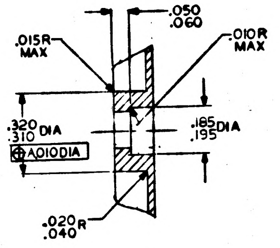
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE MOUNTING ASSEMBLY
APOLLO II IRIG

SIZE	CODE IDENT NO	DRAWING NO.
E		2021788

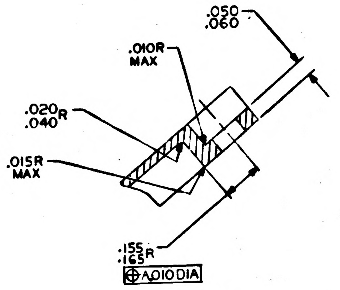
SCALE 2/1 SHEET 1 OF 1

REVISIONS		TDRR 16311				
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A	REVISED TDRR 16609			2-12-65	



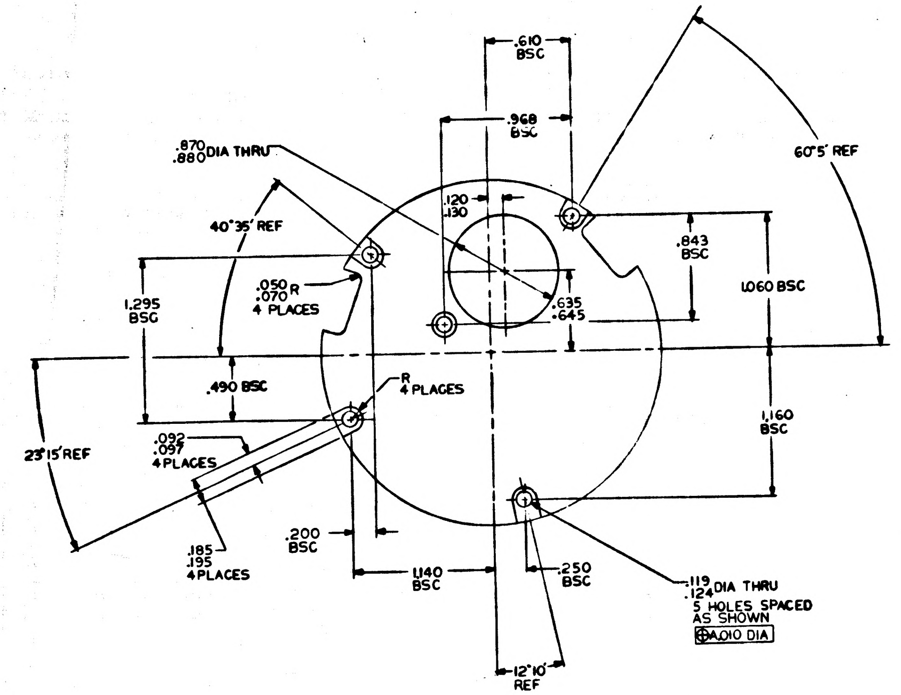
.015R MAX
.050
.060
.010R MAX
.320
.310 DIA
Ⓐ.010 DIA
.185
.195 DIA
.020R
.040

SECTION A-A
SCALE 4/1

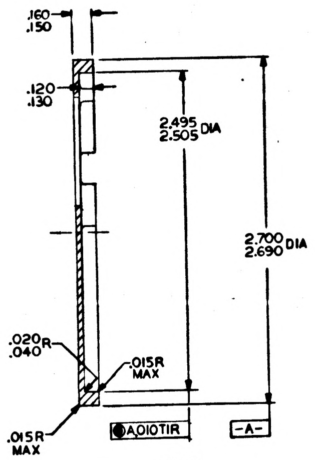


.050
.060
.010R MAX
.020R
.040
.015R MAX
.155R
.165
Ⓐ.010 DIA

SECTION B-B
SCALE 4/1
4 PLACES

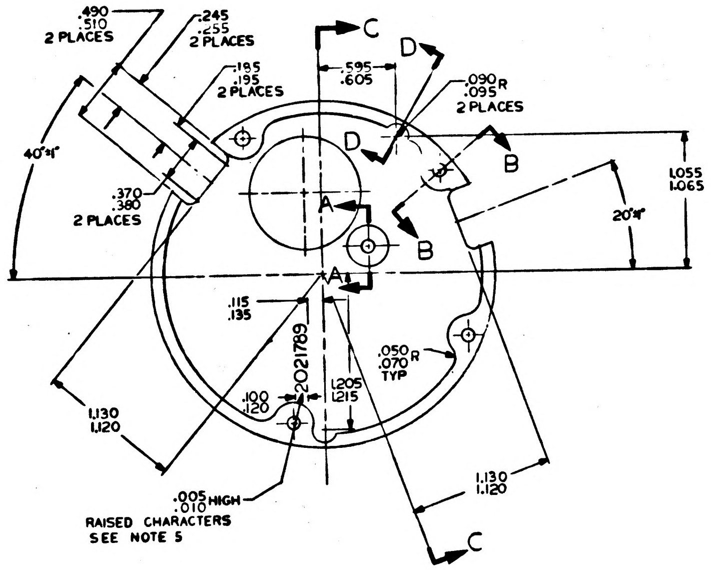


.610 BSC
.968 BSC
60°5' REF
.870
.880 DIA THRU
.120
.130
.843 BSC
40°35' REF
.050R
.070
4 PLACES
.635
.645
1.060 BSC
1.295 BSC
.490 BSC
R
4 PLACES
.092
.097
4 PLACES
1.160 BSC
23°15' REF
.185
.195
4 PLACES
.200 BSC
1.140 BSC
.250 BSC
.119
.124 DIA THRU
5 HOLES SPACED AS SHOWN
Ⓐ.010 DIA
12°10' REF

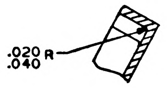


.160
.150
.120
.130
2.495
2.505 DIA
2.700
2.690 DIA
.020R
.040
.015R MAX
.015R MAX
Ⓐ.010 TIR
-A-

SECTION C-C



.490
.510
2 PLACES
.245
.255
2 PLACES
C
D
.185
.195
2 PLACES
.595
.605
.090R
.095
2 PLACES
40°±1°
D
B
.370
.380
2 PLACES
A
1.055
1.065
20°±1°
B
.115
.135
A
2021789
.100
.120
1.205
1.215
.050R
.070
TYP
1.130
1.120
1.130
1.120
.005
.010 HIGH
RAISED CHARACTERS
SEE NOTE 5
C



SECTION D-D
SCALE 4/1
2 PLACES

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL: MOLDED POLYCARBONATE RESIN PER ND 1002134
3. REMOVE ALL BURRS AND BREAK SHARP EDGES $^{.005}_{.015}$
4. 32√ FINISH ON MOLDED SURFACES 63√ FINISH ON MACHINED SURFACES
5. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER ND 1002019

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021500	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN DTB 2/1/65
CHECKED G. QUINN 2/3/65
APPROVED
APPROVED RA 2-8-65
MIT APPROVED W. 9 Feb 65 DATE
NASA WJ 2-9-65

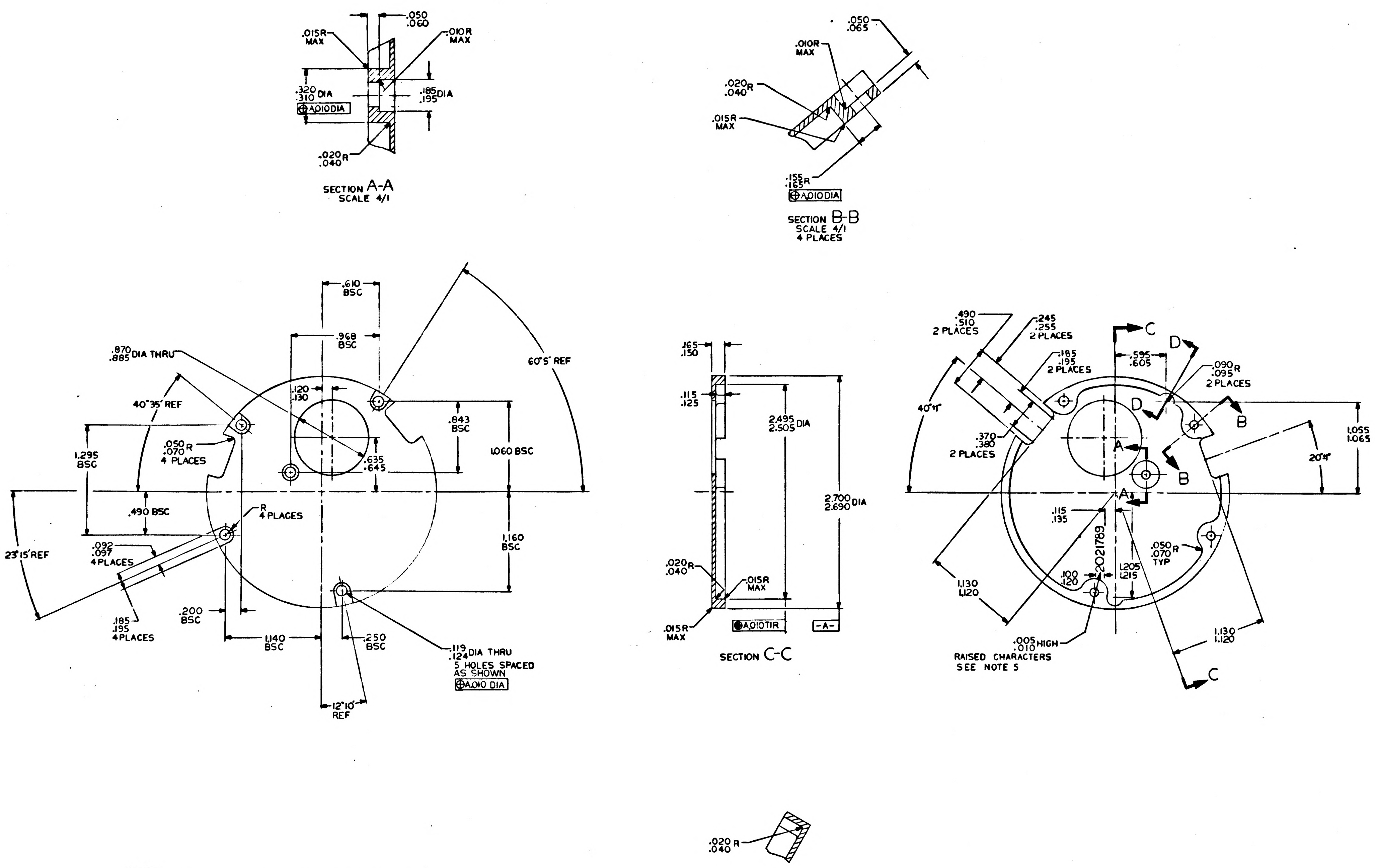
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER, WIRE
APOLLO II IRIG

SIZE E
CODE IDENT NO
DRAWING NO. 2021789
SCALE 2/1
SHEET 1 OF 1

Boyce

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED	
REVISIONS TDRR 16311							
	A	REVISED TDRR 16609			2-17-65	[illegible]	[illegible]
	B	REVISED TDRR 9262			[illegible]	[illegible]	[illegible]



.015R MAX
.050
.060
.010R MAX
.320
.310 DIA
⊕ A .010 DIA
.185
.195 DIA
.020
.040 R
SECTION A-A
SCALE 4/1
.050
.065
.010R MAX
.020
.040 R
.015R MAX
.155
.165 R
⊕ A .010 DIA
SECTION B-B
SCALE 4/1
4 PLACES
.610 BSC
.968 BSC
60°5' REF
.870
.885 DIA THRU
40°35' REF
.120
.130
.843 BSC
1.060 BSC
.050
.070 R
4 PLACES
.635
.645
1.295 BSC
.490 BSC
R
4 PLACES
1.160 BSC
23°15' REF
.092
.097
4 PLACES
.185
.195
4 PLACES
.200 BSC
1.140 BSC
.250 BSC
.119
.124 DIA THRU
5 HOLES SPACED AS SHOWN
⊕ A .010 DIA
12°10' REF
.165
.150
.115
.125
2.495
2.505 DIA
2.700
2.690 DIA
.020
.040 R
.015R MAX
.015R MAX
◎ A .010 TIR
-A-
SECTION C-C
.490
.510
2 PLACES
.245
.255
2 PLACES
.185
.195
2 PLACES
C
D
.595
.605
.090
.095 R
2 PLACES
40°4'
.370
.380
2 PLACES
D
A
B
B
20°4'
1.055
1.065
A
.115
.135
2021789
.100
.120
1.205
1.215
.050
.070 R
TYP
1.130
1.120
1.130
1.120
.005
.010 HIGH
RAISED CHARACTERS
SEE NOTE 5
C
.020
.040 R

SECTION D-D
SCALE 4/1
2 PLACES

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL: MOLDED POLYCARBONATE RESIN PER ND 1002134
3. REMOVE ALL BURRS AND BREAK SHARP EDGES $^{.005}_{.015}$
4. 32/ FINISH ON MOLDED SURFACES 63/ FINISH ON MACHINED SURFACES
5. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER ND 1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021500	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	DTB	2/1/65
CHECKED	G. QUINN	2/3/65
APPROVED		
APPROVED	R A [illegible]	2-8-65

MIT APPROVED W [illegible] DATE 9 Feb 65
NASA W J [illegible] 2-9-65

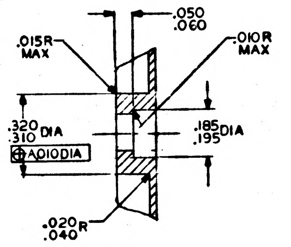
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER , WIRE
APOLLO II IRIG

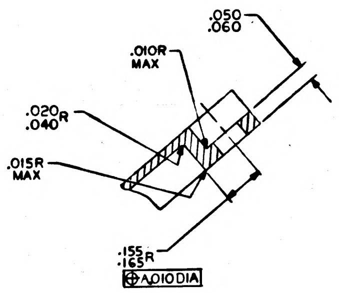
SIZE E
CODE IDENT NO
DRAWING NO. 2021789
SCALE 2/1
SHEET OF 1

ZONE	SYM	DESCRIPTION	BY	CHK	DATE	APPROVED

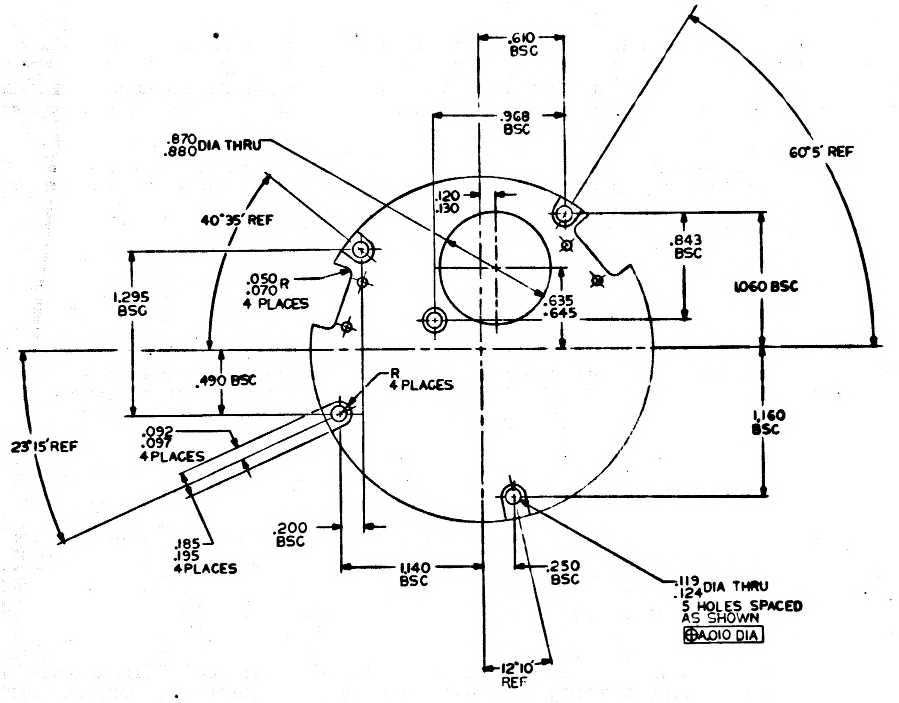
REVISIONS TDRR 16311

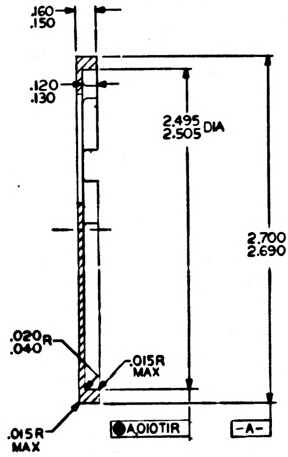

.015R MAX
.050
.060
.010R MAX
.320
.310 DIA
⊕ A .010 DIA
.185
.195 DIA
.020
.040 R

SECTION A-A
SCALE 4/1

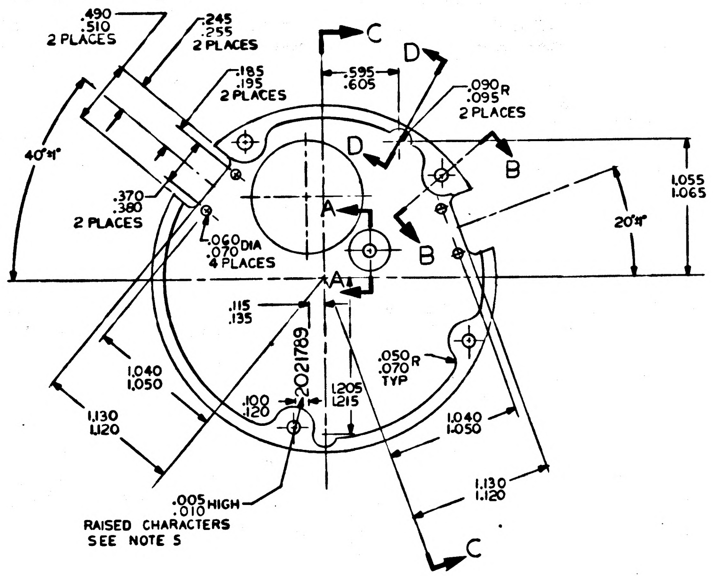

.050
.060
.010R MAX
.020
.040 R
.015R MAX
.155
.165
⊕ A .010 DIA

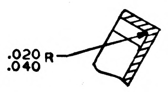
SECTION B-B
SCALE 4/1
4 PLACES


.610 BSC
.968 BSC
.870
.880 DIA THRU
60°5' REF
40°35' REF
.120
.130
.843 BSC
1.295 BSC
.050
.070 R
4 PLACES
.635
.645
1.060 BSC
.490 BSC
R
4 PLACES
1.160 BSC
23°15' REF
.092
.097
4 PLACES
.200 BSC
.185
.195
4 PLACES
1.140 BSC
.250 BSC
.119
.124 DIA THRU
5 HOLES SPACED AS SHOWN
⊕ A .010 DIA
12°10' REF


.160
.150
.120
.130
2.495
2.505 DIA
2.700
2.690 DIA
.020
.040 R
.015R MAX
.015R MAX
⊕ A .010 TIR
-A-

SECTION C-C


.490
.510
2 PLACES
.245
.255
2 PLACES
.185
.195
2 PLACES
C
D
.595
.605
.090
.095 R
2 PLACES
40°4'
.370
.380
2 PLACES
D
B
1.055
1.065
A
.060
.070 DIA
4 PLACES
B
20°4'
A
.115
.135
1.040
1.050
2021789
.050
.070 R TYP
1.130
1.120
.100
.120
1.205
1.215
1.040
1.050
1.130
1.120
.005
.010 HIGH
RAISED CHARACTERS
SEE NOTE 5
C



SECTION D-D
SCALE 4/1
2 PLACES

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. MATERIAL: DIALLYL PHTHALATE RESIN, GLASS FIBER FILLED, PER MIL-P-19833 TYPE GDI-30
3. REMOVE ALL BURRS AND BREAK SHARP EDGES $^{.005}_{.015}$
4. $\sqrt{32}$ FINISH ON MOLDED SURFACES $\sqrt{63}$ FINISH ON MACHINED SURFACES
5. IDENTIFY USING DRAWING NO., REVISION LETTER AND MANUFACTURERS SYMBOL AT THE INDICATED LOCATION PER ND 1002019

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021500	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN DTB 2/1/65
CHECKED G. QUINN 2/3/65
APPROVED
APPROVED RARust 2-8-65
MIT APPROVED DATE W. Clayton 9 Feb 65
NASA WJ Rhine 2-9-65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER, WIRE
APOLLO II IRIG

SIZE E
CODE IDENT NO
DRAWING NO. 2021789
SCALE 2/1
SHEET OF 1

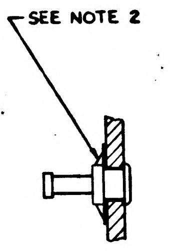
Boyce

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
D4	A	REVISED PER TDRR 24932		11-18-65	JK

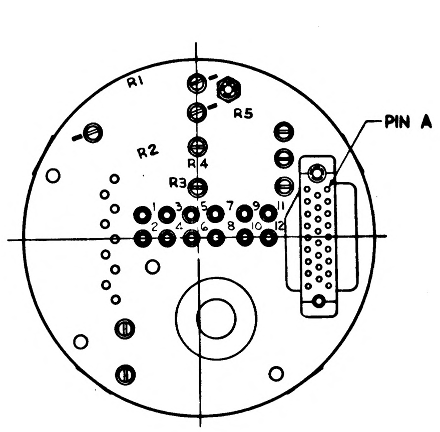
REVISIONS TDRR 18839

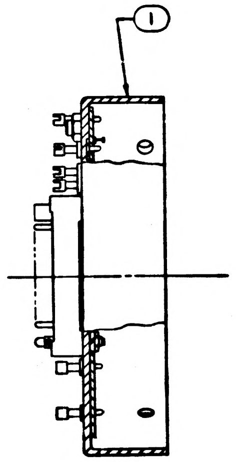
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER ND1002071 USING ITEMS ③ AND ⑦.
3. VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.
4. NUMBERED DESIGNATIONS ON PRINTED CIRCUIT BOARD ARE PARTIAL DESIGNATIONS. NUMBER SHOULD BE PRECEDED BY THE LETTER "E" TO CONFORM WITH SCHEMATIC NASA DRAWING NO. 2021610.
5. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NO. AND REVISION LETTER PER MIL-STD-130(ES-267).



PARTIAL SECTION A-A
TYPICAL FOR TERMINALS
15, 16 AND 23
SCALE-10:1





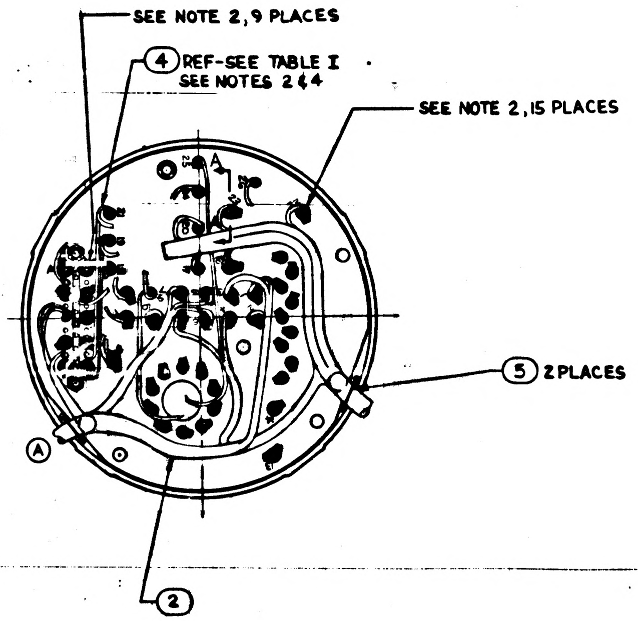


TABLE I

CONDUCTOR CHART

COND NO	FROM			TO			ITEM NO
	CIR PT	STRIP	TIN	CIR PT	STRIP	TIN	
1	E19	.20	Y	J1-a	.20	Y	4
2	E21	.20	Y	J1-b	.20	Y	4
3	E25	.20	Y	-	.20	Y	4
4	E9	.20	Y	-	.20	Y	6

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	AR		7	2021527	FLUX, SOLDERING
SEE NOTE 3	AR		6	1010416-6	WIRE, 28E AWG GRN
SEE NOTE 3	AR		5	MIL-T-713	LACING TAPE, TYPE P
SEE NOTE 3	AR		4	1010416-10	WIRE, 28E AWG WHT
	AR		3	SN60	SOLDER QQ-S-571
	1		2	2021791	WIRING HARNESS A
	1		1	2021788	PLATE MOUNTING ASSEVBLY

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2021500	2021500	

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — — —
DECIMALS ±.02 — —
ANGLES + — — —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-3426

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN E. Moller DATE 16 MAR 65
CHECKED
APPROVAL A J Boyne 30 Am 65
APPROVAL
NASA APPROVAL W J Rhine 5-4-65
MIT APPROVAL W Kupfer 4 May 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE, MOUNTING, AND HARNESS ASSEMBLY

CODE IDENT NO.
SIZE E
2021790
SCALE 2:1
SHEET 1 OF 1

RETURN TO L. ZIMMERMAN

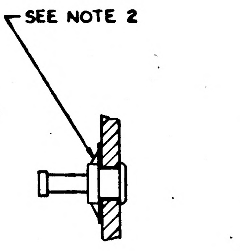
MASTER

REVISIONS TDRR 2839					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.
Ⓐ D4	A	REVISED PER TDRR 24932		11-18-65	WK
B.	G8	REVISED PER TDRR 25211		1-11-66	WK

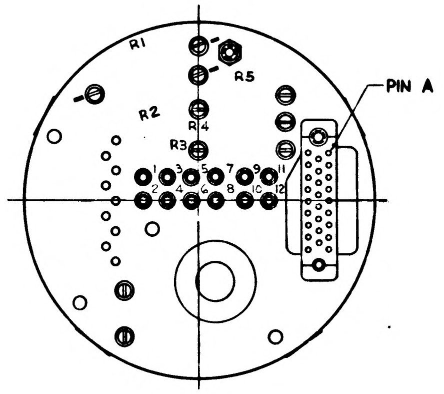
NOTES:

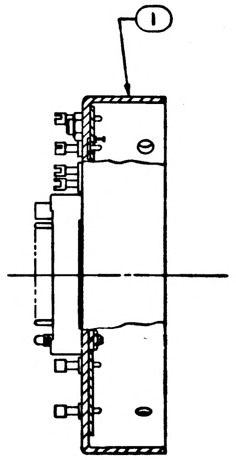
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER ND1002071 USING ITEMS ③ AND ⑦.
3. VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.
4. NUMBERED DESIGNATIONS ON PRINTED CIRCUIT BOARD ARE PARTIAL DESIGNATIONS. NUMBER SHOULD BE PRECEDED BY THE LETTER "E" TO CONFORM WITH SCHEMATIC NASA DRAWING NO. 2021640.
5. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NO. AND REVISION LETTER PER MIL-STD-130(ES-267).

Ⓑ 6. WICKING SHALL NOT EXCEED A POINT WHERE WIRE FLEXIBILITY IS LOST 1/16 INCH FROM END OF INSULATION



PARTIAL SECTION A-A
TYPICAL FOR TERMINALS
15, 16 AND 23
SCALE-10:1





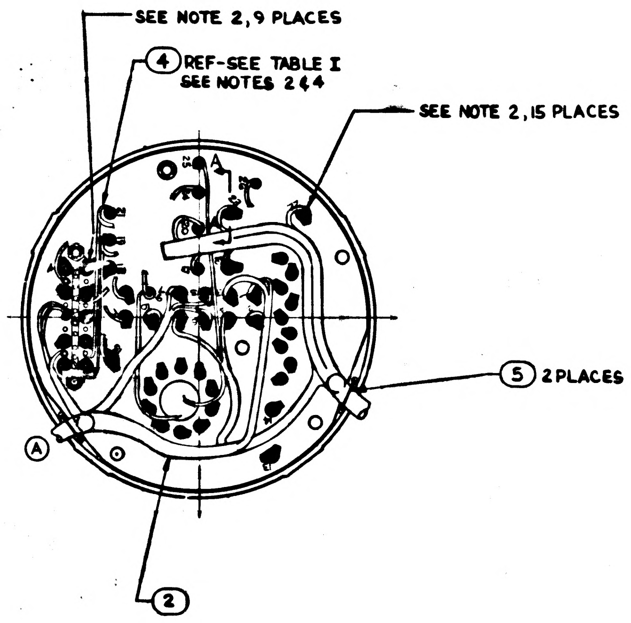


TABLE I

CONDUCTOR CHART							
	FROM			TO			
COND NO	CIR PT	STRIP	TIN	CIR PT	STRIP	TIN	ITEM NO
1	E19	.20	Y	J1-a	.20	Y	4
2	E21	.20	Y	J1-b	.20	Y	4
3	E25	.20	Y	-	.20	Y	4
4	E9	.20	Y	-	.20	Y	6

SEE NOTE 3
SEE NOTE 3
SEE NOTE 3

QUANTITY REQUIRED						LIST OF PARTS AND MATERIALS
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			AR		7	2021527	FLUX, SOLDERING
			AR		6	1010416-6	WIRE, 28E AWG GRN
			AR		5	MIL-T-713	LACING TAPE, TYPE P
			AR		4	1010416-10	WIRE, 28E AWG WHT
			AR		3	SN60	SOLDER QQ-S-571
			1		2	2021791	WIRING HARNESS A
			1		1	2021788	PLATE MOUNTING ASSEMBLY

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2021500	2021500	

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — DECIMALS ±.02 ANGLES + —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-3426

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN E. McLellan DATE 16 MAR 65
CHECKED
APPROVAL A.J. Bogue 30 Mar 65
APPROVAL
NASA APPROVAL A.J. Rhine 5-6-65
MIT APPROVAL W. Kupfer 4 May 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE, MOUNTING, AND
HARNESS ASSEMBLY

CODE IDENT NO
SIZE E
2021790
SCALE 2:1
SHEET 1 OF 1

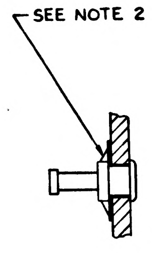
2021790

RETURN TO
L. ZIMMERMAN

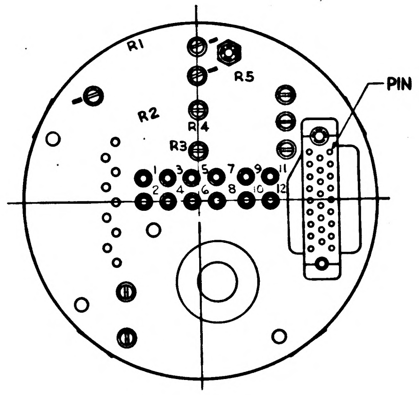
REVISIONS TDRR 6839				
SYM	ZONE	DESCRIPTION	DATE	APPD.
		CHG NO.		

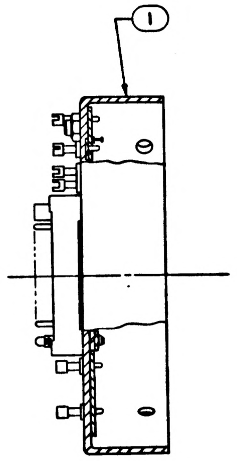
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER ND1002071 USING ITEMS ③ AND ⑦.
3. VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.
4. NUMBERED DESIGNATIONS ON PRINTED CIRCUIT BOARD ARE PARTIAL DESIGNATIONS. NUMBER SHOULD BE PRECEDED BY THE LETTER "E" TO CONFORM WITH SCHEMATIC NASA DRAWING NO. 2021610.
5. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NO. AND REVISION LETTER PER MIL-STD-130(ES-267).



PARTIAL SECTION A-A
TYPICAL FOR TERMINALS 15, 16 AND 23
SCALE - 10:1





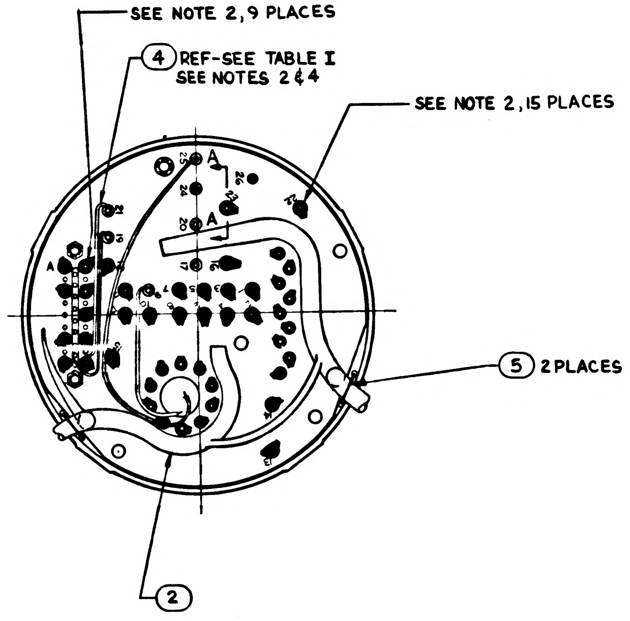


TABLE I

CONDUCTOR CHART							
	FROM			TO			
COND NO	CIR PT	STRIP	TIN	CIR PT	STRIP	TIN	ITEM NO
1	E19	.20	Y	J1-a	.20	Y	4
2	E21	.20	Y	J1-b	.20	Y	4
3	E25	.20	Y	-	.20	Y	4
4	E9	.20	Y	-	.20	Y	6

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	AR		7	2021527	FLUX SOLDERING
SEE NOTE 3	AR		6	1010416-6	WIRE, 28E AWG GRN
SEE NOTE 3	AR		5	MIL-T-713	LACING TAPE, TYPE P
SEE NOTE 3	AR		4	1010416-10	WIRE, 28E AWG WHT
	AR		3	SN60	SOLDER QQ-S-571
	1		2	2021791	WIRING HARNESS A
	1		1	2021788	PLATE MOUNTING ASSEMBLY

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2021500	2021500	

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — - —
DECIMALS ±.02
ANGLES + — - —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-3426

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN E. Miller DATE 16 MAR 65
CHECKED
APPROVAL A.J. Boyer 30 APR 65
APPROVAL
NASA APPROVAL A.J. Rhine 5-4-65
MIT APPROVAL W Kupfer 4 May 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE, MOUNTING, AND HARNESS ASSEMBLY

CODE IDENT NO. | SIZE E | 2021790
SCALE 2:1 | SHEET 1 OF 1

2021790

APPLICATION	
NEXT ASS'Y.	USED ON
2021790	2021500

REVISIONS TDRR 18839

SYM	DESCRIPTION	CHK	DATE	APP'D.
A	REVISED PER TDRR 22844		9-28-65	

REPLACES REV ⌐
WITH CHANGE

MIT INSTRUMENTATION LAB.
CAMBRIDGE, MASS.
CONTRACT NO.
DRAWN L. Zimmerman 9-15-65
CHECKED L. Zimmerman 9-21-65
APPROVED
APPROVED R A Boot 9-22-65
MIT APPROVED DATE
W Kupfer 28 Sep 65
NASA APPROVED
NOT REQUIRED PER LETTER
NASA PP7-65-612

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS A

SIZE A | CODE IDENT NO. | DRAWING NO. 2021791
SCALE: —— | SHEET 1 OF 8

WIRING HARNESS A

GENERAL NOTES

NOTE NUMBER	DESCRIPTION
1	NOTE 1 DOES NOT APPLY.
2	INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
3	LACE HARNESS USING ITEM 30.
4	UNLESS OTHERWISE SPECIFIED - FEATURE CENTERLINES AT TRUE POSITION WITHIN + OR - . 25 INCH RELATIVE TO GRID. ENDS OF CONDUCTORS OR ACCESSORIES AT TRUE POSITION WITHIN + OR - . 12 INCH RELATIVE TO GRID. TRUE POSITION DIMENSIONS ARE REGARDLESS LESS OF FEATURE SIZE.
5	VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
6	VENDOR ITEM - SEE SOURCE CONTROL DRAWING.
7	TO TERMINATION OF CONDUCTORS A1 AND A2 (E15, E24) ARE DETERMINED BY PREALIGNMENT PROCEDURE MC 25-847.
8	FABRICATE HARNESS PER ND 1002032.
9	TOLERANCE ON STRIP LENGTHS + . 020, - . 020.
10	SOLDER PER ND1002071 USING ITEM 31 AND 32.
11	GRID IS SHOWN FOR DIMENSIONING PURPOSES.
12	GRID MODULE IS 1 INCH BASIC.
13	LACES AND TIES TO BE LOCATED WITHIN 1/16 IN. OF POSITION SHOWN.
14	KNOTS TO BE LOCATED AS SHOWN (•).
15	MAX. THICKNESS OF HARNESS SHALL NOT EXCEED . 120.
16	WIRE LENGTHS ARE FOR REFERENCE ONLY.

REVISION STATUS: SEE SHEET 1 | MIT INSTRUMENTATION LAB. CAMBRIDGE, MASS. | SCALE: —— | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | SHEET 2 OF 8 | DRAWING NO. 2021791

WIRING HARNESS A

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY.	PART NO.	DESCRIPTION
5	1	1	1010416- 1	WIRE, ELECTRICAL 28AWG BLK 8. 88 IN. TOTAL LENGTH
5	2	1	1010416- 2	WIRE, ELECTRICAL 28AWG BRN 7. 88 IN. TOTAL LENGTH
5	3	1	1010416- 3	WIRE, ELECTRICAL 28AWG RED 10. 25 IN. TOTAL LENGTH
5	4	1	1010416- 4	WIRE, ELECTRICAL 28AWG ORN 8. 62 IN. TOTAL LENGTH
5	5	1	1010416- 5	WIRE, ELECTRICAL 28AWG YEL 10. 50 IN. TOTAL LENGTH
5	6	1	1010416- 6	WIRE, ELECTRICAL 28AWG GRN 10. 38 IN. TOTAL LENGTH
5	7	1	1010416- 7	WIRE, ELECTRICAL 28AWG BLU 19. 00 IN. TOTAL LENGTH
5	8	1	1010416- 8	WIRE, ELECTRICAL 28AWG VIO 10. 62 IN. TOTAL LENGTH
5	9	1	1010416- 9	WIRE, ELECTRICAL 28AWG GY 10. 12 IN. TOTAL LENGTH
5	10	1	1010416- 10	WIRE, ELECTRICAL 28AWG WHT 9. 12 IN. TOTAL LENGTH
5	11	1	1010416- 300	WIRE, ELECTRICAL 28AWG WHT/BLK 10. 75 IN. TOTL LG.
5	12	1	1010416- 301	WIRE, ELECTRICAL 28AWG WHT/BRN 8. 38 IN. TOT. LG.
5	13	1	1010416- 302	WIRE, ELECTRICAL 28AWG WHT/RED 8. 50 IN. TOT. LG.
5	14	1	1010416- 308	WIRE, ELECTRICAL 28AWG WHT/ORN 8. 62 IN. TOT. LG.
5	15	1	1010416- 304	WIRE, ELECTRICAL 28AWG WHT/YEL 8. 25 IN. TOT. LG.
5	16	1	1010416- 305	WIRE, ELECTRICAL 28AWG WHT/GRN 10. 75 IN. TOT. LG.
5	17	1	1010416- 306	WIRE, ELECTRICAL 28AWG WHT/BLU 6. 62 IN. TOT. LG.
5	18	1	1010416-307	WIRE, ELECTRICAL 28AWG WHT/VIO 7. 12 IN. TOT. LG.
5	19	1	1010416-308	WIRE, ELECTRICAL 28AWG WHT/GY 9. 62 IN. TOTL LG.
5	20	1	1010416-309	WIRE, ELECT. 28AWG WHT/BLK/BRN 7. 25 IN. TOT. LG.
5	21	1	1010416-310	WIRE, ELECT. 28AWG WHT/BLK/RED 7. 75 IN. TOT. LG.
5	22	1	1010416-311	WIRE, ELECT. 28AWG WHT/BLK/ORN 8. 38 IN. TOT. LG.

REVISION STATUS: SEE SHEET 1 | MIT INSTRUMENTATION LAB. CAMBRIDGE, MASS. | SCALE: —— | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | SHEET 3 OF 8 | DRAWING NO. 2021791

WIRING HARNESS A

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY.	PART NO.	DESCRIPTION
5	23	1	1010416-312	WIRE, ELECT. 28AWG WHT/BLK/YEL 12. 62 IN. TOT. LG.
5	24	1	1010416-313	WIRE, ELECT. 28AWG WHT/BLK/GRN 9. 25 IN. TOT. LG.
5	25	1	1010416-314	WIRE, ELECT. 28AWG WHT/BLK/BLU 9. 00 IN. TOT. LG.
5	26	1	1010416-315	WIRE, ELECT. 28AWG WHT/BLK/VIO 9. 62 IN. TOT. LG.
5	27	1	1010416-316	WIRE, ELECT. 28AWG WHT/BLK/GY 11. 38 IN. TOT. LG.
5	28	1	1010416-318	WIRE, ELECT. 28AWG WHT/BRN/ORN 7. 38 IN. TOTL LG.
5	29	1	1010416-319	WIRE, ELECT. 28AWG WHT/BRN/YEL 8. 38 IN. TOT. LG.
6	30	AR	1012507-002	TAPE, LACING
	31	AR	SN60 [illegible]	SOLDER QQ-S-571
5	32	AR	2021527	FLUX

REVISION STATUS: SEE SHEET 1 | MIT INSTRUMENTATION LAB. CAMBRIDGE, MASS. | SCALE: —— | MANNED SPACECRAFT CENTER HOUSTON, TEXAS | SHEET 4 OF 8 | DRAWING NO. 2021791

MIT INSTRUMENTATION LAB.
CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
REVISION STATUS: SEE SHEET 1
SCALE: —
DRAWING NO. 2021791
SHEET 5 OF 8

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A	1	11 10.75	TB-BC2	60				.15	YES			CHANNEL B
			SEE-NOTE-7	37				.15	YES			
A	2	16 10.75	TG-BC1	59				.15	YES			CHANNEL B
			SEE-NOTE-7	36				.15	YES			
A	3	9 10.12	TG-T (+)	58				.15	YES			CHANNEL B
			E21	40				.15	YES			
A	4	8 10.62	TG-TH	57				.15	YES			CHANNEL A
			J1-D	38				.10	YES			
A	5	7 9.25	TG-TH	56				.15	YES			CHANNEL B
			E26	44				.15	YES			
A	6	5 10.50	TG-B(-)	55				.15	YES			CHANNEL A
			J1-J	34				.15	YES			
A	7	26 9.62	TG-TY	54				.15	YES			CHANNEL B
			E20	41				.15	YES			
A	8	6 10.38	TG-A(-)	53				.15	YES			CHANNEL A
			J1-B	35				.10	YES			
A	9	13 8.50	SG-M7	52				.15	YES			
			E4	24				.15	YES			
A	10	24 9.25	SG-M4	51				.15	YES			CHANNEL A
			E12	32				.15	YES			
A	11	28 7.38	SG-PH	50				.15	YES			
			E22	45				.15	YES			
A	12	15 8.25	SG-M8	49				.15	YES			CHANNEL A
			E9	30				.15	YES			
A	13	22 8.38	SG-M3	48				.15	YES			CHANNEL A
			E11	31				.15	YES			

WIRING HARNESS A

MIT INSTRUMENTATION LAB.
CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
REVISION STATUS: SEE SHEET 1
SCALE: —
DRAWING NO. 2021791
SHEET 6 OF 8

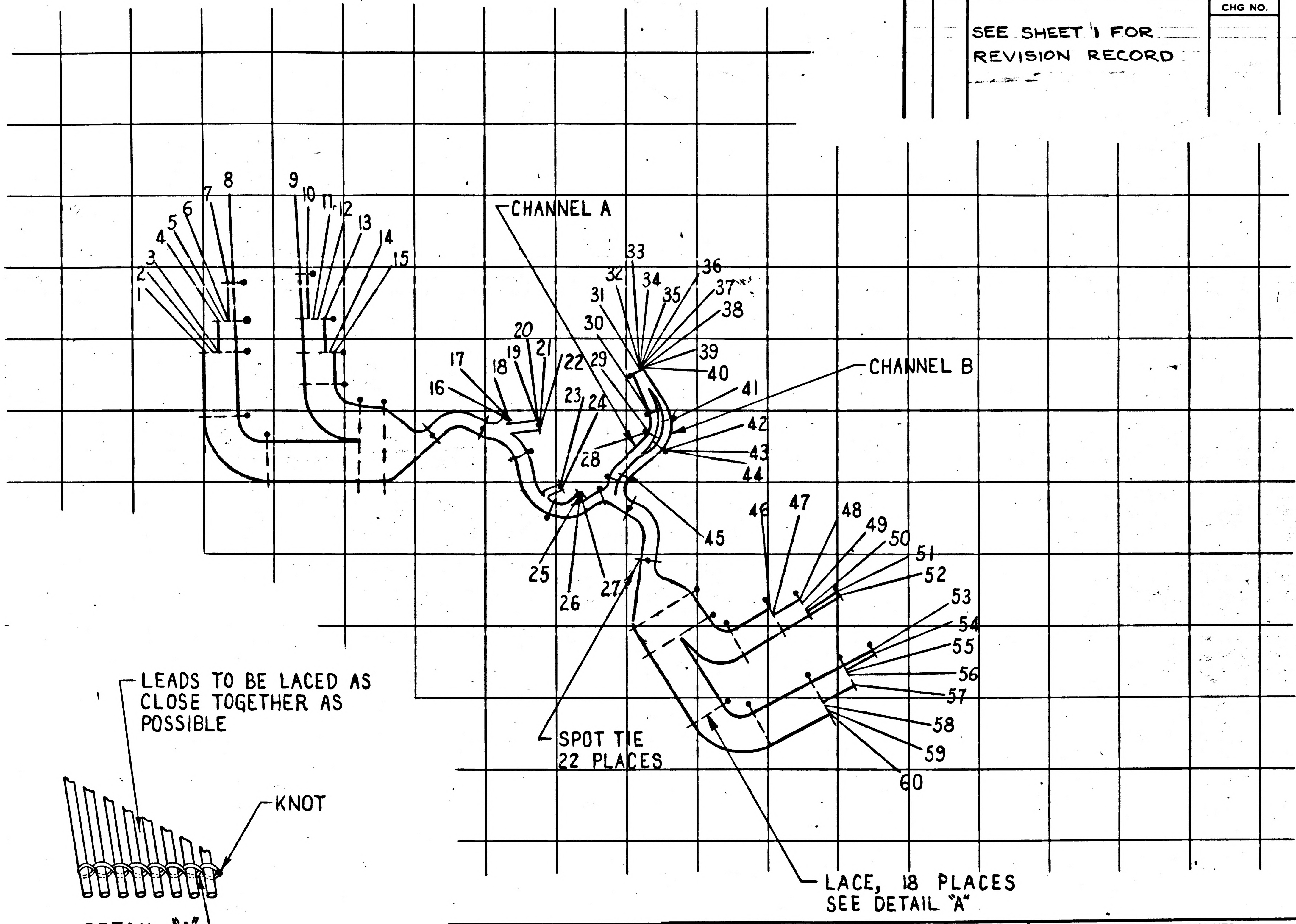
LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A	14	20 7.25	SG-MC	47				.15	YES			
			E8	23				.15	YES			
A	15	29 8.38	SG-PL	46				.15	YES			CHANNEL A
			E15	33				.15	YES			
A	16	2 7.88	TG-TC	1				.15	YES			
			J1-Z	18				.10	YES			
A	17	27 11.38	TG-RH	2				.15	YES			CHANNEL B
			E23	42				.15	YES			
A	18	4 8.62	TG-MC	3				.15	YES			
			E7	21				.15	YES			
A	19	10 9.12	TG-M3	4				.15	YES			
			E5	22				.15	YES			
A	20	3 10.25	TG-M8	5				.15	YES			
			E3	26				.15	YES			
A	21	23 12.62	TG-T(-)	6				.15	YES			CHANNEL B
			E19	39				.15	YES			
A	22	12 8.38	TG-M4	7				.15	YES			
			E10	19				.15	YES			
A	23	1 8.88	TG-M7	8				.15	YES			
			E6	20				.15	YES			
A	24	18 7.12	SG-B(+)	9				.15	YES			
			J1-R	17				.10	YES			
A	25	14 8.62	SG-SH	10				.15	YES			
			E1	27				.15	YES			
A	26	17 6.62	SG-A(+)	11				.15	YES			
			J1-P	16				.10	YES			

WIRING HARNESS A

MIT INSTRUMENTATION LAB.
CAMBRIDGE, MASS.
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
REVISION STATUS: SEE SHEET 1
SCALE: —
DRAWING NO. 2021791
SHEET 7 OF 8

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A	27	7 9.75	SG-TH	12				.15	YES			CHANNEL B
			E26	43				.15	YES			
A	28	19 9.62	SG-TH	13				.15	YES			CHANNEL A
			E17	29				.15	YES			
A	29	21 7.75	SG-SL	14				.15	YES			
			E2	25				.15	YES			
A	30	25 9.00	SG-SCT	15				.15	YES			CHANNEL A
			E16	28				.15	YES			

REVISIONS					18839
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
		SEE SHEET 1 FOR REVISION RECORD			



2021791 A
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CHANNEL A
CHANNEL B
SPOT TIE 22 PLACES
LACE, 18 PLACES SEE DETAIL "A"
LEADS TO BE LACED AS CLOSE TOGETHER AS POSSIBLE
KNOT
DETAIL "A"
CROSS LACING AS SHOWN BETWEEN LEADS

MASTER

2021790	2021500
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ — + — + —
- — - — - —
THIS DRAWING MAY BE SCALED
MATERIAL
CONTRACT NAS9-3426

MIT
INSTRUMENTATION LAB
CAMBRIDGE. MASS
DRAWN E. MILLER DATE 25 MAR 65
M.E. MANNING 6 APR 65
CHECKED
APPROVAL
APPROVAL R A Booth 9-27-65
NOT REQUIRED PER LETTER
NASA APPROVAL
MIT APPROVAL W Kupfer 28 Sep 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS A

CODE IDENT NO. 80230
SIZE C
2021791
SCALE FULL
SHEET 8 OF 8

MIL 1077C-P

APPLICATION		REVISIONS TPRR 18839.			
NEXT ASSY	USED ON	SYM	DESCRIPTION	DATE	APPROVAL

Charleston
6APR.65

	REV								
	SHEET								
REV STATUS	REV	+	+	+	+	+	+	+	+
OF SHEETS	SHEET	1	2	3	4	5	6	7	8

AC SPARK PLUG DIVISION , GMC
MILWAUKEE, WISCONSIN

ACSP PN

~~DRAWN~~ E. Miller DATE 25 MAR65
CHECKED M. Manning 6APR65
APPROVAL AJ Boyce 30APR65
APPROVAL

NASA APPROVAL 5-4-65
MIT APPROVAL

CONTRACT NAS9-3426

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS A

CODE IDENT NO.
SIZE
2021791
REV

SCALE
SHEET 1 OF 8

WIRING HARNESS A [redacted]

NOTE NUMBER	GENERAL NOTES DESCRIPTION
1	NOTE 1 DOES NOT APPLY
2	INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
3	LACE HARNESS USING ITEM 30.
4	UNLESS OTHERWISE SPECIFIED - FEATURE CENTERLINES AT TRUE POSITION WITHIN + OR - .25 INCH RELATIVE TO GRID. ENDS OF CONDUCTORS OR ACCESSORIES AT TRUE POSITION WITHIN + OR - .12 INCH RELATIVE TO GRID. TRUE POSITION DIMENSIONS ARE REGARDLESS LESS OF FEATURE SIZE.
5	VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
6	VENDOR ITEM - SEE SOURCE CONTROL DRAWING.
7	TO TERMINATION OF CONDUCTORS A1 AND A2 (J1-Y, E24) ARE DETERMINED BY PREALIGNMENT PROCEDURE MC 25-847
8	FABRICATE HARNESS PER ND1002032
9	TOLERANCE ON STRIP LENGTHS +.020,-.020.
10	SOLDER PER ND1002071 USING ITEM 31 AND 32.
11	GRID IS SHOWN FOR DIMENSIONING PURPOSES.
12	GRID MODULE IS 1 INCH BASIC.
~~13~~	~~MARK CONDUCTOR IDENTIFICATION PER ND1002019.~~
~~14~~	~~SPIRALLING OF THE MARKING IS ALLOWED.~~

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A
2021791
SCALE-NONE
REV LTR +
SHEET 2 OF 8

MIL 2084 4-63

WIRING HARNESS A [redacted]

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
5	1	1	1010416- 1	WIRE, ELECTRICAL 28AWG BLK 15 IN. TOTAL LENGTH
5	2	1	1010416- 2	WIRE, ELECTRICAL 28AWG BRN 15 IN. TOTAL LENGTH
5	3	1	1010416- 3	WIRE, ELECTRICAL 28AWG RED 15 IN. TOTAL LENGTH
5	4	1	1010416- 4	WIRE, ELECTRICAL 28AWG ORN 15 IN. TOTAL LENGTH
5	5	1	1010416- 5	WIRE, ELECTRICAL 28AWG YEL 15 IN. TOTAL LENGTH
5	6	1	1010416- 6	WIRE, ELECTRICAL 28AWG GRN 15 IN. TOTAL LENGTH
5	7	1	1010416- 7	WIRE, ELECTRICAL 28AWG BLU 30 IN. TOTAL LENGTH
5	8	1	1010416- 8	WIRE, ELECTRICAL 28AWG VIO 15 IN. TOTAL LENGTH
5	9	1	1010416- 9	WIRE, ELECTRICAL 28AWG GY 15 IN. TOTAL LENGTH
5	10	1	1010416- 10	WIRE, ELECTRICAL 28AWG WHT 15 IN. TOTAL LENGTH
5	11	1	1010416-300	WIRE, ELECTRICAL 28AWG WHT/BLK 15 IN. TOT. LG
5	12	1	1010416-301	WIRE, ELECTRICAL 28AWG WHT/BRN 15 IN. TOT. LG
5	13	1	1010416-302	WIRE, ELECTRICAL 28AWG WHT/RED 15 IN. TOT. LG
5	14	1	1010416-303	WIRE, ELECTRICAL 28AWG WHT/ORN 15 IN. TOT. LG
5	15	1	1010416-304	WIRE, ELECTRICAL 28AWG WHT/YEL 15 IN. TOT. LG
5	16	1	1010416-305	WIRE, ELECTRICAL 28AWG WHT/GRN 15 IN. TOT. LG
5	17	1	1010416-306	WIRE, ELECTRICAL 28AWG WHT/BLU 15 IN. TOT. LG
5	18	1	1010416-307	WIRE, ELECTRICAL 28AWG WHT/VIO 15 IN. TOT. LG

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A
2021791
SCALE-NONE
REV LTR +
SHEET 3 OF 8

MIL 2084 4-63

WIRING HARNESS A [redacted]

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
5	19	1	1010416-308	WIRE, ELECTRICAL 28AWG WHT/GY 15 IN. TOT. LG
5	20	1	1010416-309	WIRE, ELECT. 28AWG WHT/BLK/BRN 15 IN. TOT. LG
5	21	1	1010416-310	WIRE, ELECT. 28AWG WHT/BLK/RED 15 IN. TOT. LG
5	22	1	1010416-311	WIRE, ELECT. 28AWG WHT/BLK/ORN 15 IN. TOT. LG
5	23	1	1010416-312	WIRE, ELECT. 28AWG WHT/BLK/YEL 15 IN. TOT. LG
5	24	1	1010416-313	WIRE, ELECT. 28AWG WHT/BLK/GRN 15 IN. TOT. LG
5	25	1	1010416-314	WIRE, ELECT. 28AWG WHT/BLK/BLU 15 IN. TOT. LG
5	26	1	1010416-315	WIRE, ELECT. 28AWG WHT/BLK/VIO 15 IN. TOT. LG
5	27	1	1010416-316	WIRE, ELECT. 28AWG WHT/BLK/GY 15 IN. TOT. LG
5	28	1	1010416-318	WIRE, ELECT. 28AWG WHT/BRN/ORN 15 IN. TOT. LG
5	29	1	1010416-319	WIRE, ELECT. 28AWG WHT/BRN/YEL 15 IN. TOT. LG
6	30	AR	1012507-002	TAPE, LACING
	31	AR	SN60	SOLDER QQ-S-571
5	32	AR	2021527	FLUX

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A
2021791
SCALE-NONE
REV LTR +
SHEET 4 OF 8

MIL 2084 4-63

WIRING HARNESS A [redacted]

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 1	11	15.00	TB-BC2 SEE-NOTE-7	29 18				.10 .10	YES YES			
A 2	16	15.00	TG-BC1 SEE-NOTE-7	28 18				.10 .10	YES YES			
A 3	9	15.00	TG-T(+) E21	27 17				.10 .10	YES YES			
A 4	8	15.00	TG-TH J1-D	26 18				.10 .10	YES YES			
A 5	7	15.00	TG-TH E26	25 20				.10 .10	YES YES			
A 6	5	15.00	TG-B(-) J1-J	24 18				.10 .10	YES YES			
A 7	26	15.00	TG-TY E20	23 19				.10 .10	YES YES			
A 8	6	15.00	TG-A(-) J1-B	22 18				.10 .10	YES YES			
A 9	13	15.00	SG-M7 E4	21 15				.10 .10	YES YES			
A 10	24	15.00	SG-M4 E12	21 18				.10 .10	YES YES			
A 11	28	15.00	SG-PH E22	21 20				.10 .10	YES YES			
A 12	15	15.00	SG-M8 E9	21 17				.10 .10	YES YES			

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A
2021791
SCALE-NONE
REV LTR +
SHEET 5 OF 8

MIL 2084 4-63

WIRING HARNESS A

[redacted] [redacted]

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 13	22	15.00	SG-M3 E11	21 17				.10 .10	YES YES			
A 14	20	15.00	SG-MC E8	21 17				.10 .10	YES YES			
A 15	29	15.00	SG-PL E15	21 18				.10 .10	YES YES			
A 16	2	15.00	TG-TC J1-Z	1 12				.10 .10	YES YES			
A 17	27	15.00	TG-RH E23	2 20				.10 .10	YES YES			
A 18	4	15.00	TG-MC E7	3 13				.10 .10	YES YES			
A 19	10	15.00	TG-M3 E5	4 13				.10 .10	YES YES			
A 20	3	15.00	TG-M8 E3	5 13				.10 .10	YES YES			
A 21	23	15.00	TG-T(-) E19	6 17				.10 .10	YES YES			
A 22	12	15.00	TG-M4 E10	7 13				.10 .10	YES YES			
A 23	1	15.00	TG-M7 E6	8 14				.10 .10	YES YES			
A 24	18	15.00	SG-B(+) J1-R	9 11				.10 .10	YES YES			

MANNED SPACECRAFT CENTER HOUSTON, TEXAS	SIZE A	2021791
SCALE-NONE	REV LTR +	SHEET 6 OF 8

MIL 2084 4-63

WIRING HARNESS A

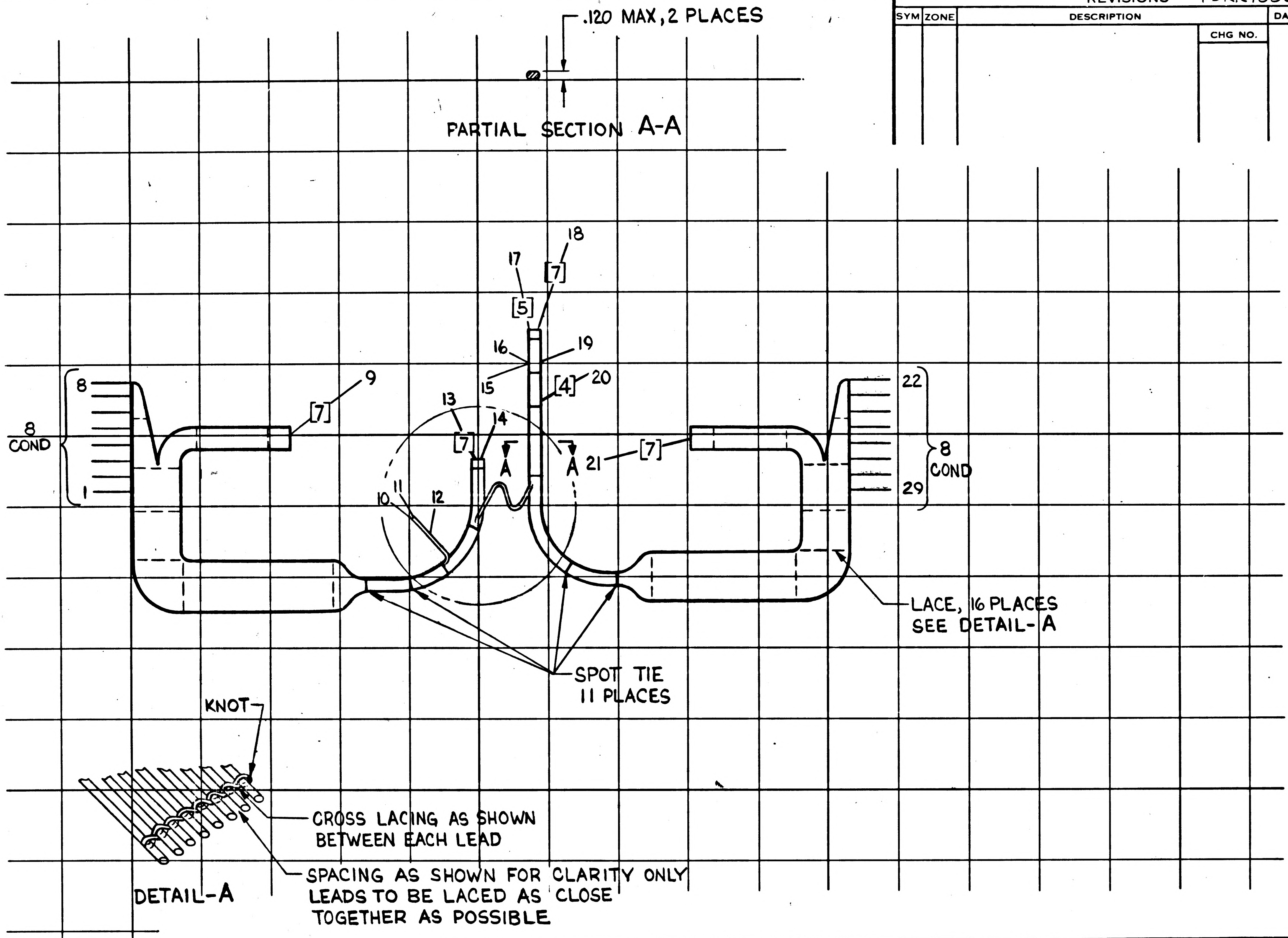
[redacted] [redacted]

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 25	14	15.00	SG-SH E1	9 13				.10 .10	YES YES			
A 26	17	15.00	SG-A(+) J1-P	9 10				.10 .10	YES YES			
A 27	7	15.00	SG-TH E26	9 20				.10 .10	YES YES			
A 28	19	15.00	SG-TH E17	9 13				.10 .10	YES YES			
A 29	21	15.00	SG-SL E2	9 13				.10 .10	YES YES			
A 30	25	15.00	SG-SCT E16	9 16				.10 .10	YES YES			

MANNED SPACECRAFT CENTER HOUSTON, TEXAS	SIZE A	2021791
SCALE-NONE	REV LTR +	SHEET 7 OF 8

MIL 2084 4-63

REVISIONS	TDRR 18839			
SYM	ZONE	DESCRIPTION	DATE	APPD.
		CHG NO.		


.120 MAX, 2 PLACES
PARTIAL SECTION A-A
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COND
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LACE, 16 PLACES
SEE DETAIL-A
SPOT TIE
11 PLACES
KNOT
CROSS LACING AS SHOWN
BETWEEN EACH LEAD
SPACING AS SHOWN FOR CLARITY ONLY
LEADS TO BE LACED AS CLOSE
TOGETHER AS POSSIBLE
DETAIL-A

2021790	2021500
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+—	+—	+—
— —	— —	— —

THIS DWG MAY BE SCALED
MATERIAL —
CONTRACT NAS9-3426

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN E. Miller 23 MAR 65
DATE
CHECKED M. Manning 6 APR 65
APPROVAL A J Boyce 30 APR 65
APPROVAL
NASA APPROVAL W J Rhine 5-4-65
MIT APPROVAL W Kupfer 4 May 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS A

CODE IDENT NO.	SIZE	
	C	2021791
SCALE FULL		SHEET 8 OF 8

MASTER

MIL 1077C—F

REVISIONS TDRR 18840						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
-		INITIAL RELEASE CLASS B PER TDRR 18840			5-17-65	ajB

NOTES:

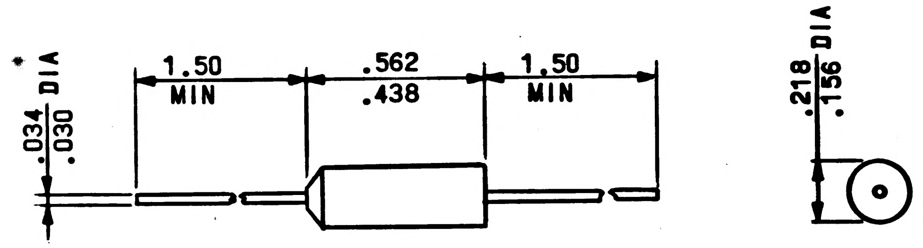
1. GENERAL:
   A. INTERPRET DRAWING IN ACCORDANCE WITH THE STANDARDS PRESCRIBED BY MIL-D-70327

   B. PACKAGING: UNITS SHALL BE PACKAGED PER MIL-R-26 LEVEL A
   C. UNITS SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF MIL-R-26 FOR INSULATED TYPE, CHARACTERISTIC G; EXCEPT AS AND IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN

2. INSPECTION AND ACCEPTANCE:
   A. ELECTRICAL REQUIREMENTS:
      (1) RESISTANCE VALUE: PER TABLE
      (2) RESISTANCE TOLERANCE: ±1%
      (3) DIELECTRIC WITHSTANDING VOLTAGE: 1000 VOLTS RMS
      (4) OPERATING TEMPERATURE RANGE: -55°C TO +275°C
      (5) MAXIMUM VOLTAGE RATING: $E = \sqrt{PXR}$ WHERE E=VOLTS DC OR RMS, P=3 WATTS, R=RESISTANCE, OHMS
   B. MECHANICAL REQUIREMENTS:
      (1) LEADS: THE LEADS SHALL BE TINNED COPPER. THE LEADS SHALL BE UNIFORM IN QUALITY AND TEMPER, CLEAN, SOUND, SMOOTH, AND FREE FROM SCRAPES, COLD SHUTS, LAPS, CRACKS, TWISTS, SCALE, DAMAGED ENDS, WELDS, SCORES, PITS, GALLS, AND OTHER DEFECTS WHICH ARE NOT IN ACCORDANCE WITH THE BEST PRACTICE FOR HIGH QUALITY MATERIAL. THE FINISH OF THE LEAD SHALL BE FREE OF FOREIGN MATERIAL IN THE AREA 1/16 INCH MAXIMUM FROM THE DEVICE BODY TO WITHIN 1/8 INCH OF THE LEAD END. FOREIGN MATERIAL SHALL MEAN ANY MATERIAL NOT COMMON TO THE LEAD FINISH WHICH WOULD REDUCE WELDABILITY AND SOLDERABILITY. LEAD MATERIAL SHALL BE SUITABLE FOR WELDING AND SOLDERING
      (2) MARKING: THE MANUFACTURER'S NAME OR SYMBOL,

      SHALL BE PERMANENTLY AND LEGIBLY MARKED ON THE PART PER MIL-STD-130. ALSO INDICATE RESISTANCE VALUE, TOLERANCE. THE MANUFACTURER'S PART OR TYPE NUMBER MAY APPEAR ON THE PART OR PACKAGE.

      (3) DIMENSIONS: PER FIGURE



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTES

FINISH
SEE NOTES

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	Janowiak	7 Jul 64
CHECKED	Ed Foster	7 Jul 64
APPROVED	RB Julius Feldman	11-2-64
APPROVED	G. C. Smith	11-4-64

MIT APPROVED DATE
W Kupfer 18 May 65
NASA
W J Rhine 5-18-65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESISTOR, FIXED, WIRE WOUND

SPECIFICATION CONTROL DRAWING

SIZE	CODE IDENT NO.	DRAWING NO.
C	80230	2021792

SCALE NONE SHEET 1 of 2

REVISIONS TDRR 18840						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
-		INITIAL RELEASE CLASS B PER TDRR 18840			5-17-65	AJB

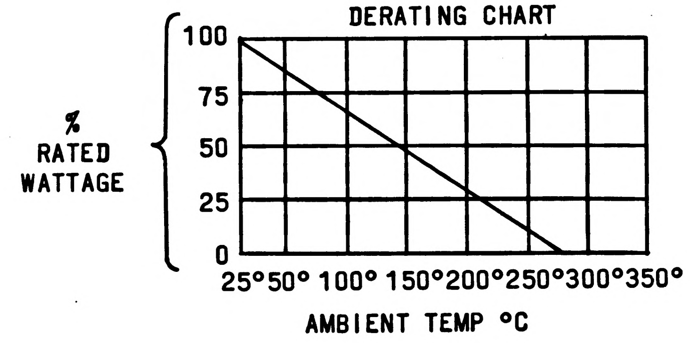
NOTES: (CONTINUED)

3. DESIGN:
   A. PER MIL-R-26 EXCEPT AS MODIFIED BY THIS DRAWING
   B. POWER RATING: 3 WATTS AT +25°C, DERATED PER CHART
   C. TEMPERATURE COEFFICIENT: ±20 PPM/°C OVER OPERATING TEMPERATURE RANGE
   D. STABILITY: RESISTANCE SHALL NOT CHANGE MORE THAN .1% PER YEAR AT 25°C AND 1/4 RATED POWER.
4. SPECIAL CONDITIONING BY SUPPLIER:
   A. BURN-IN: UNITS SHALL BE BURNED-IN FOR 100 HOURS AT 25°C AND 1/2 RATED WATTAGE. THE RESISTANCE CHANGE SHALL NOT EXCEED .5% OR THE VALUE EXCEED THE INITIAL TOLERANCE. UNITS SHALL BE WITHIN SPECIFIED TOLERANCE BEFORE BURN-IN

5. MINIMUM PERMISSABLE RESISTANCE WIRE SIZE .0009

NASA DASH NUMBER	NOM. RESISTANCE OHMS
1	5.0
2	7.0
3	100.0
4	133.0
5	143.0
6	154.0
7	167.0
8	182.0
9	200.0
10	222.0
11	250.0
12	267.0
13	286.0
14	308.0
15	333.0
16	364.0
17	400.0
18	444.0
19	500.0
20	571.0
21	667.0
22	800.0
23	1000.0
24	1333.0
25	2000.0
26	4000.0
27	14.0

DERATING CHART



ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	Janowiak	6/JUL/64
CHECKED	Ed Foster	7 JUL 64
RB APPROVED	Julie Feldman	11-2-64
APPROVED	S. C. Smith	11-4-64

MIT APPROVED W. Kupfer DATE 18 May 65

NASA W J Rhine 5-18-65

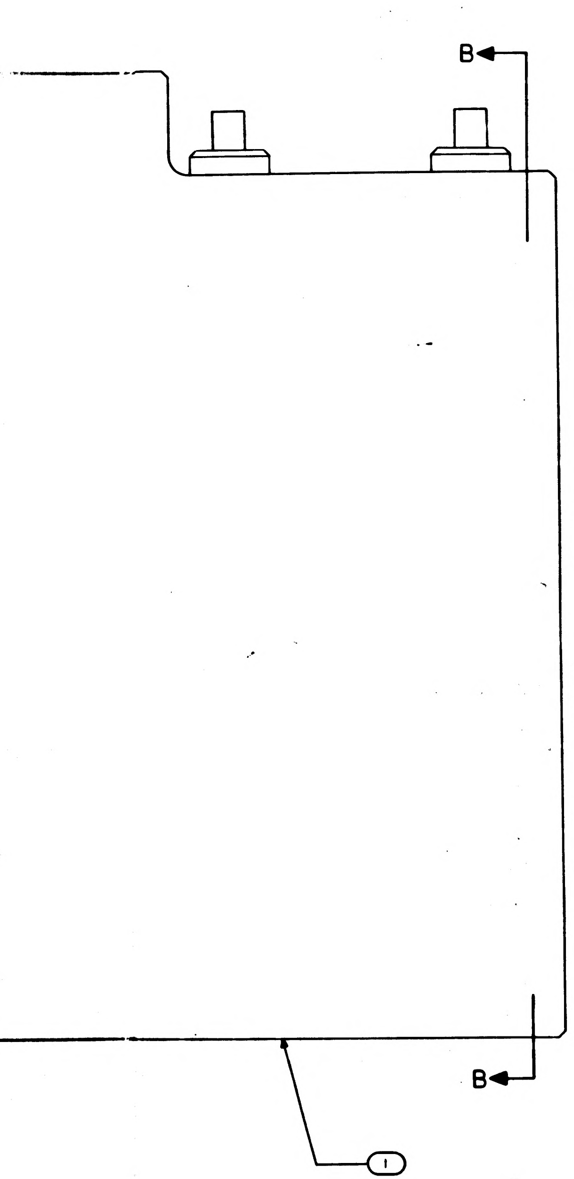
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

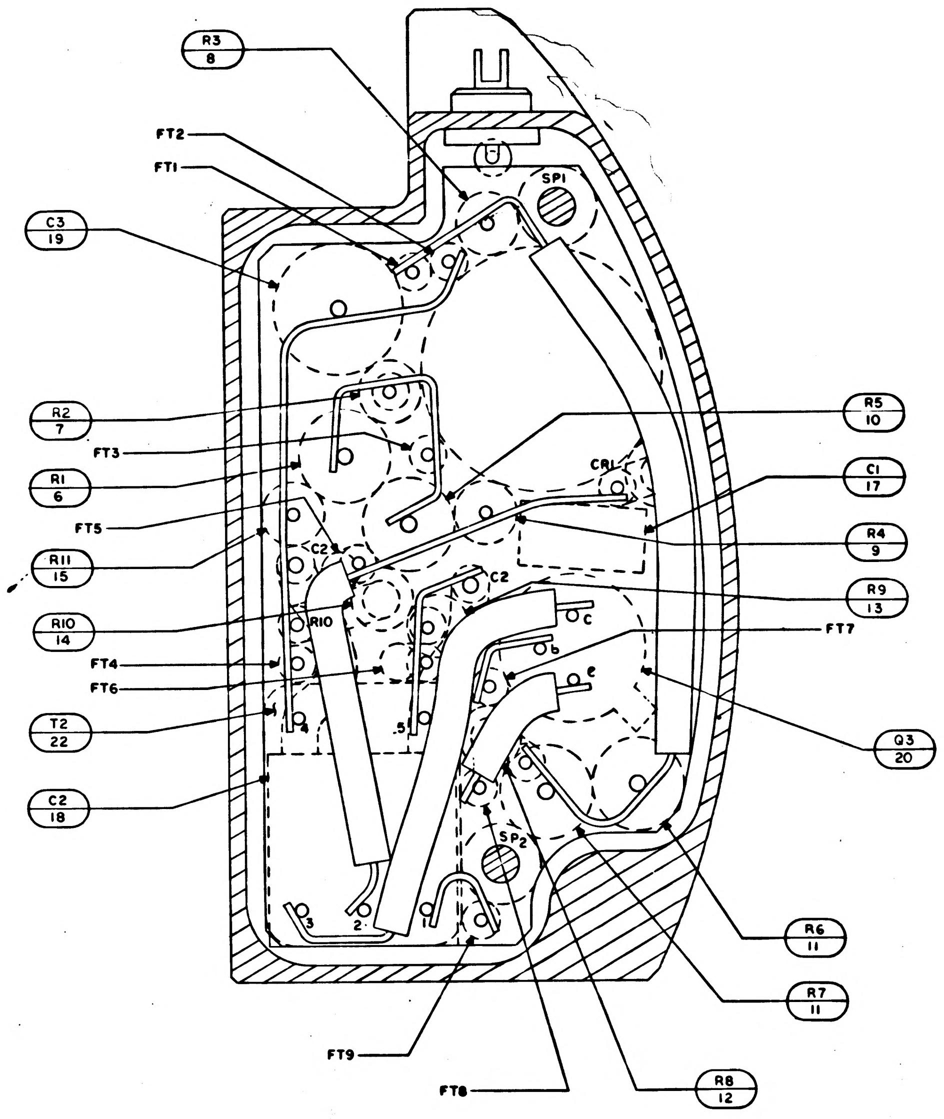
RESISTOR, FIXED, WIRE WOUND

SPECIFICATION CONTROL DRAWING

SIZE	CODE IDENT NO.	DRAWING NO.
C		2021792
SCALE		SHEET 2 of 2

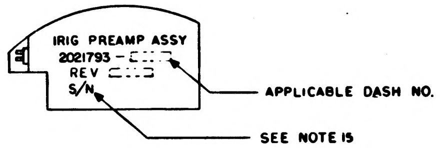
REVISIONS TDRR 18840 6-8"1				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL





R3 8
FT2
FT1
C3 19
R2 7
FT3
R1 6
FT5
R11 15
R10 14
FT4
FT6
T2 22
C2 18
SP1
CR1
C2
R10
SP2
R5 10
C1 17
R4 9
R9 13
FT7
Q3 20
R6 11
R7 11
R8 12
FT9
FT8

SECTION B-B



IRIG PREAMP ASSY
2021793 -
REV
S/N
APPLICABLE DASH NO.
SEE NOTE 15

MARKING VIEW
SCALE 2/1

REF			2010040	SCHEMATIC		
27	AR		1006776-21	INSULATION, SLEEVING		
26	AR		1006757-8	WIRE ELECTRICAL .020DIA		
25	AR		1006757-1	WIRE ELECTRICAL .010X.020 RIBBON		
24	AR		1006776-22	INSULATION, SLEEVING		
23	1	T1	2021798-011	TRANSFORMER, SHIELDED ASSEMBLY		
22	1	T2	2021797-6	TRANSFORMER		
21	1	Q1	2021796-1	TRANSISTOR		
20	1	Q2Q3	2021795-2	TRANSISTOR (MATCHED PAIR)		
19	1	C3	2021794-118	CAPACITOR		
18	1	C2	1010359-28	CAPACITOR		
17	1	C1	1010359-5	CAPACITOR		
16	1	CR1	1010372-15	DIODE		
15	1	R11	1006750-56	RESISTOR		
14	1	R10	1006750-73	RESISTOR		
13	1	R9	1006750-80	RESISTOR		
12	1	R8	1006750-25	RESISTOR		
11	2	R6 R7	1010364-459	RESISTOR		
10	1	R5	1010364-769	RESISTOR		
9	1	R4	1006750-52	RESISTOR		
8	1	R3	1006750-51	RESISTOR		
7	1	R2	SEE NOTE 14	RESISTOR		
6	1	R1	1010364-501	RESISTOR		
5	1		2021762-011	INSULATOR, TRANSISTOR		
4	2		2021763	SPACER		
3	1		2021782-011	WIRING BOARD ASSY, BOTTOM		
2	1		2021784	WIRING BOARD, TOP		
1	1		2021779-011	HOUSING ASSY		
ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO	DESCRIPTION	MATERIAL	SPECIFICATION
	-011	LIST OF MATERIALS				

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 18840 DATE 5/21/65

MASTER

2021500	2021500
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS.
CONTRACT NO.
DRAWN
CHECKED
APPROVED AJ Boyce 5-4-65
APPROVED
MIT APPROVED W Kupfer DATE 21 May 65
NASA APPROVAL DATE 5-21-65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

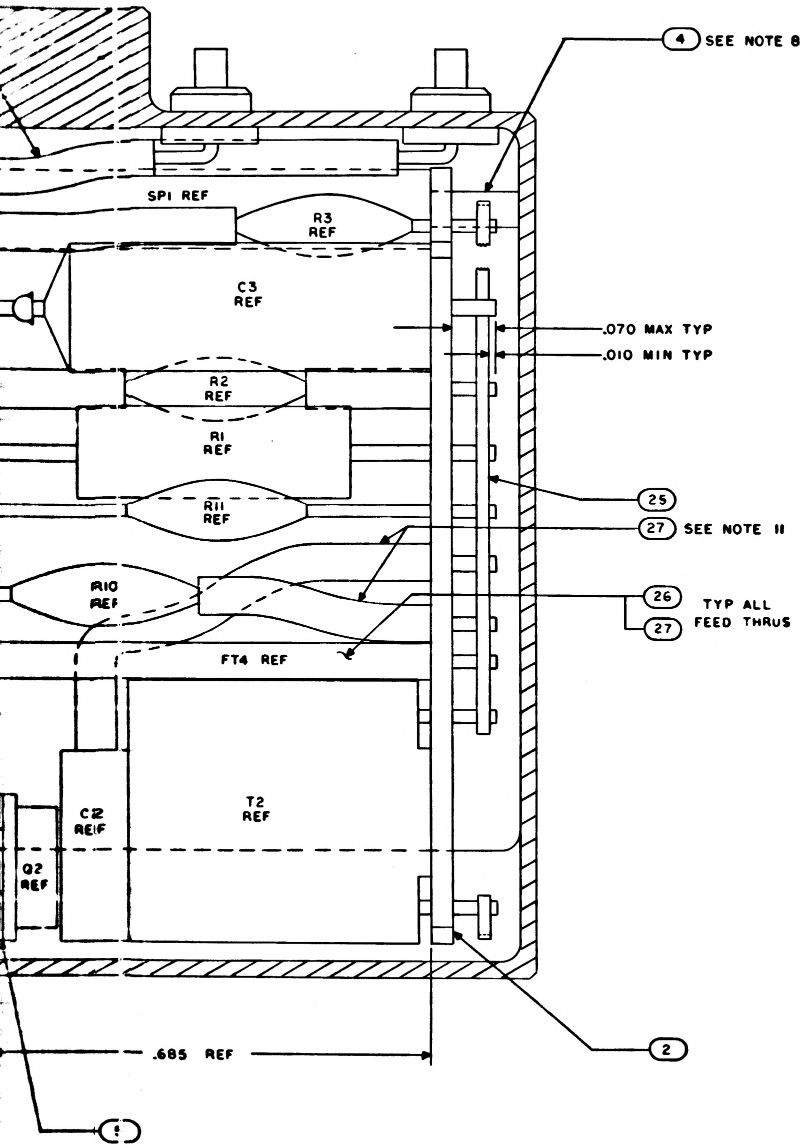
IRIG PREAMP ASSY

SIZE	CODE IDENT NO	DRAWING NO
J	80230	2021793

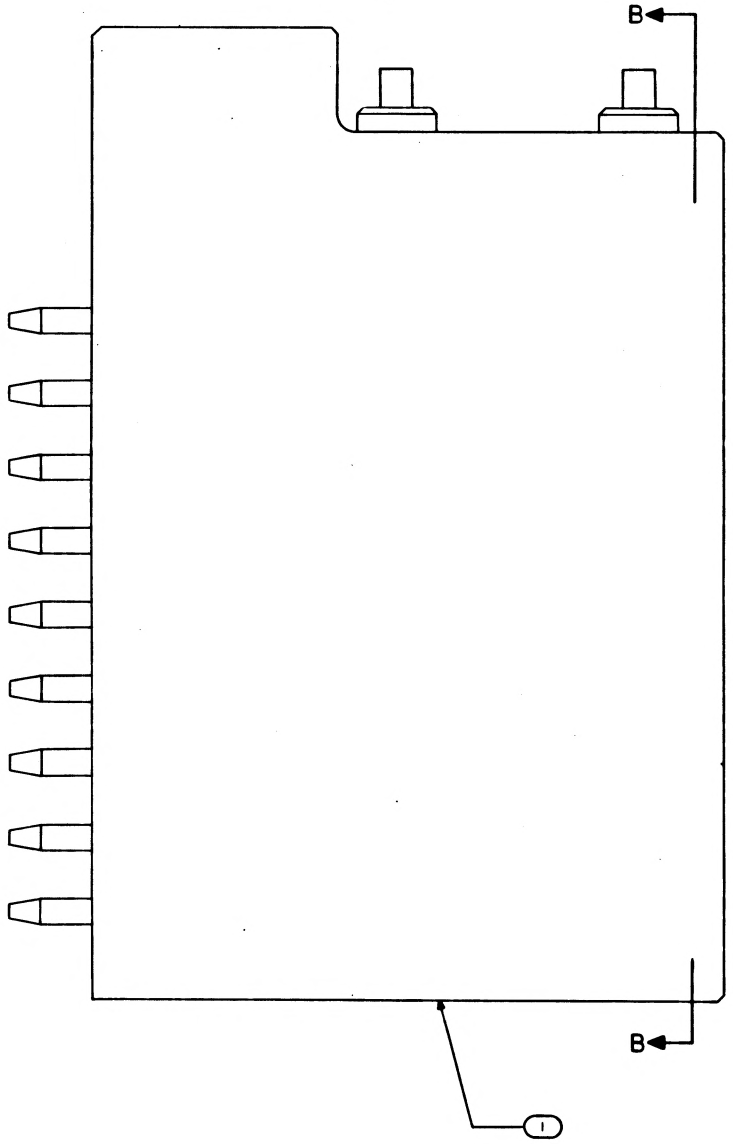
SCALE 10/1 SHEET 1 OF 1

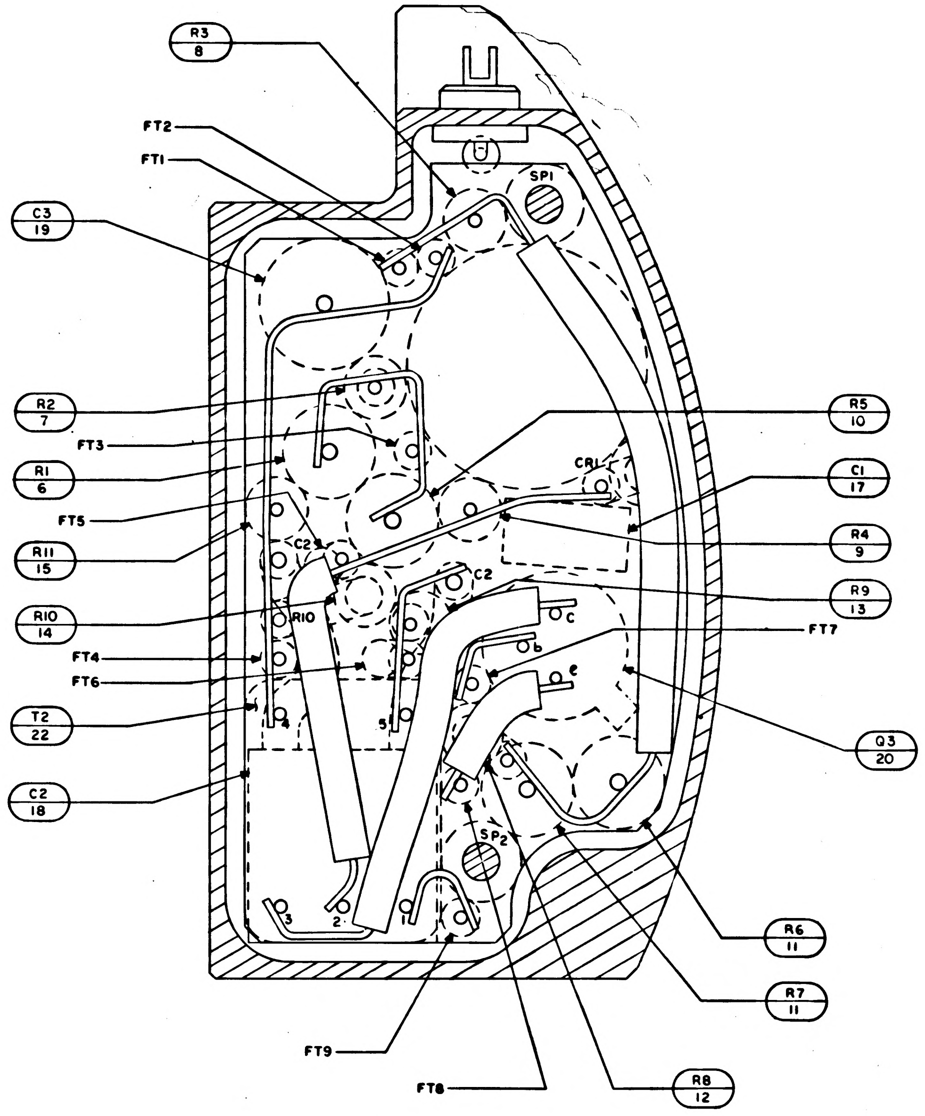
2021793

3H

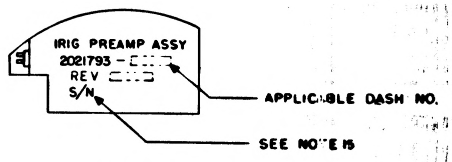

4 SEE NOTE 8
SPI REF
R3 REF
C3 REF
.070 MAX TYP
.010 MIN TYP
R2 REF
R1 REF
R11 REF
25
27 SEE NOTE 11
R10 REF
26
27
TYP ALL FEED THRUS
FT4 REF
C2 REF
T2 REF
Q2 REF
2
.685 REF
5

SECTION A-A




R3 8
FT2
FT1
C3 19
SP1
R2 7
FT3
R1 6
FT5
R11 15
R10 14
FT4
FT6
T2 22
C2 18
R5 10
C1 17
CR1
R4 9
C2
R9 13
FT7
Q3 20
c
b
e
SP2
R6 11
R7 11
FT9
FT8
R8 12

SECTION B-B


IRIG PREAMP ASSY
2021793 -
REV
S/N
APPLICABLE DASH NO.
SEE NOTE 15

MARKING VIEW
SCALE 2/1

R2	
1006750-84	150K
-154	41 K
-149	25.5K
-62	18 K
-143	14 K
-57	11 K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750-34	1200

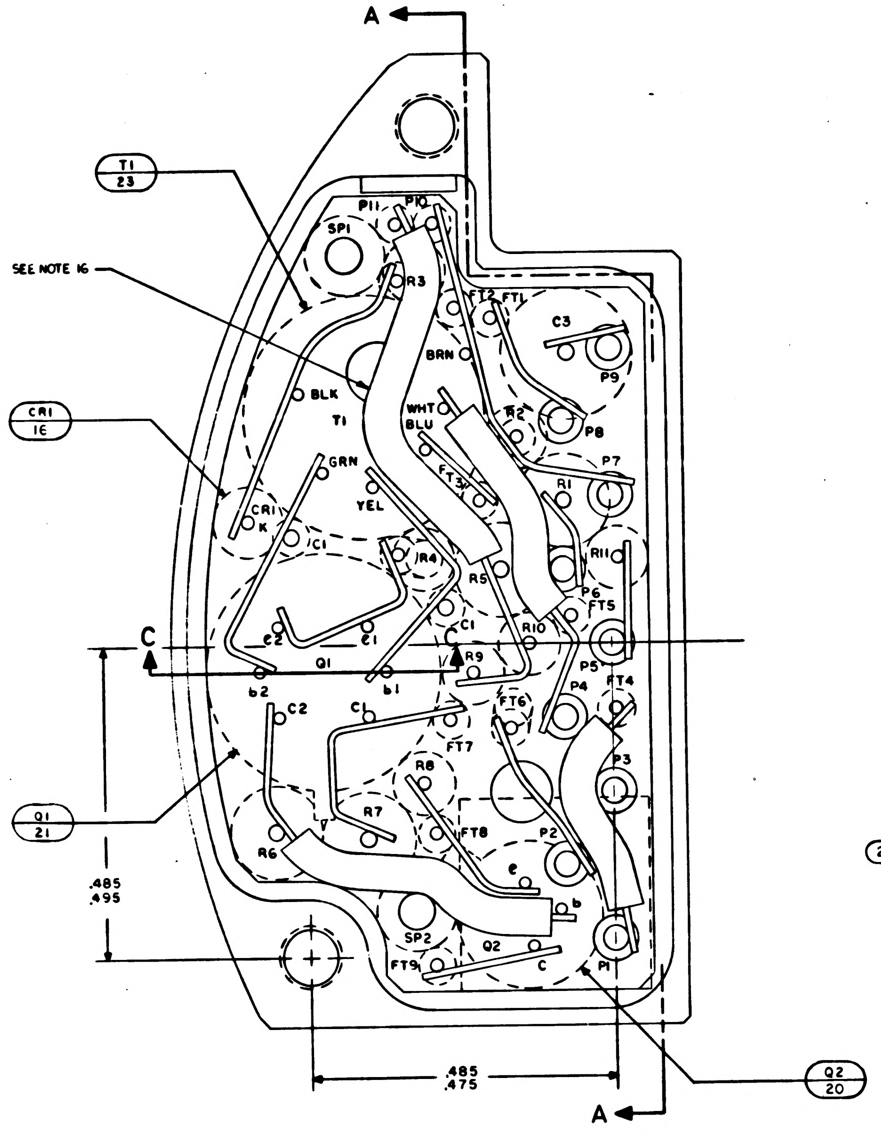
FOR INFORMATION ONLY

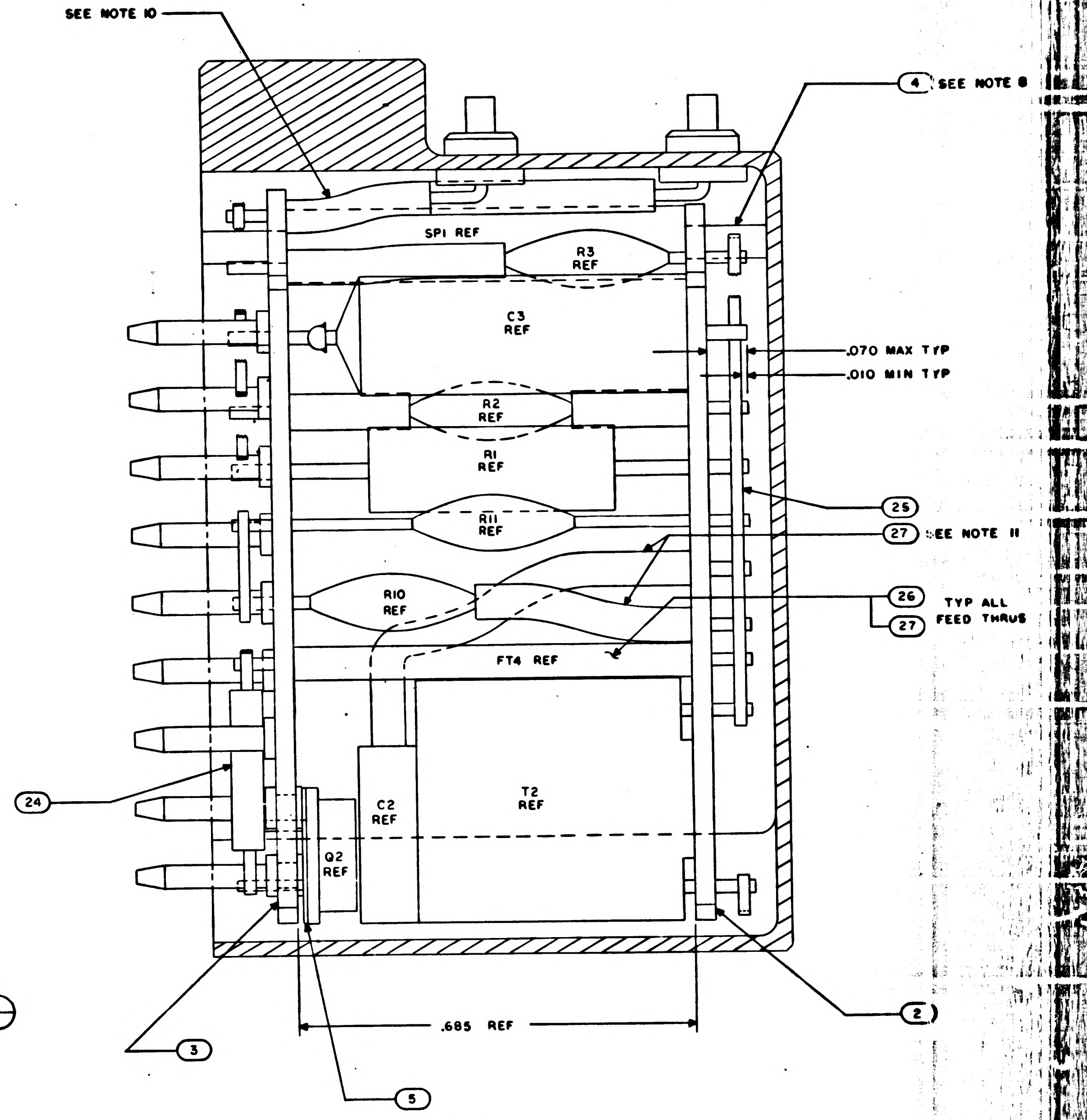
CLASS B RELEASE TDR No. 18840 DATE 5/21/65

MASTER

2021510	202 500
NEXT ASSY	USED ON

APPLICATION

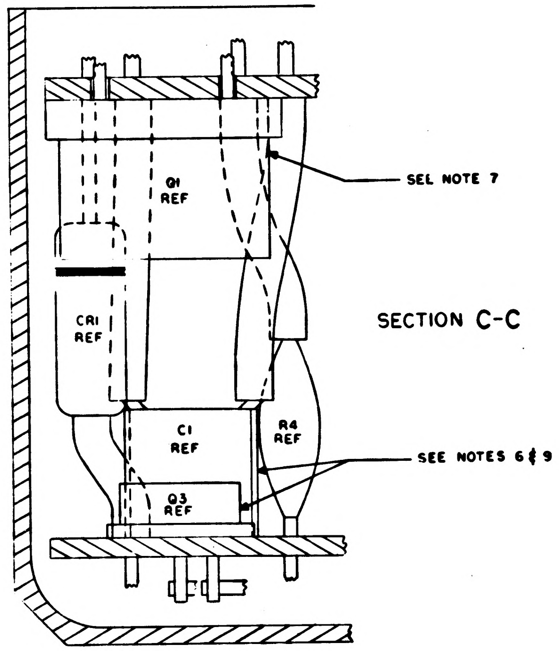

A
A
C
SEE NOTE 16
T1 23
CR1 16
Q1 21
Q2 20
SP1
P11
P10
R3
FT2
FT1
C3
P9
BRN
BLK
T1
WHT
BLU
R2
P8
P7
GRN
YEL
FT3
R1
CR1
K
C1
R4
R11
R5
P6
FT5
c2
c1
C1
R10
Q1
R9
P5
FT4
b2
b1
C2
C1
FT6
P4
FT7
P3
R8
R7
R6
FT8
P2
SP2
FT9
Q2
P1
e
b
c
.485
.495
.485
.475


SEE NOTE 10
4 SEE NOTE 8
SP1 REF
R3 REF
C3 REF
.070 MAX TYP
.010 MIN TYP
R2 REF
R1 REF
R11 REF
25
27 SEE NOTE 11
R10 REF
26
27
TYP ALL FEED THRUS
FT4 REF
24
C2 REF
T2 REF
Q2 REF
2
3
5
.685 REF

SECTION A-A

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. AR DENOTES AS REQUIRED
3. F T DENOTES FEED THRU
4. WIRE PER ND1002005
5. UNLESS OTHERWISE SPECIFIED ALL WIRING TO BE IN ACCORDANCE WITH ND1002069
6. BOND C1,C3,T1,T2,Q3 TO ITEM NO.2 PER ND1002004 TYPE I
7. BOND Q1 TO ITEM NO.3 PER ND1002004 TYPE I
8. BOND ITEM NO.4 TO ITEMS NO.'S 2 & 3 PER ND1002004 TYPE I
9. BODIES OF C1,C2,Q3 TO BE SPRAY COATED TO A MIN OF .005 PER ND1002035
10. TERMINAL LEADS TO BE SLEEVED USING ITEM NO. 27
11. LEAD OF R2,R3,R4,R8,R10,CR1,C1,C2 TO BE SLEEVED USING ITEM NO. 27
12. DIPCOAT PER ND1002068 PRIOR TO ENCAPSULATION
→ 13. ENCASULATE MODULE PER ND1002036
14. R2 TO BE SELECTED FROM CHART PER ATP 2021500, MC 25-868
15. MARK .100/.060 HIGH WHITE PER ND1002019 AND SERIALIZE PER ND 1002023
→ 16. UPON COMPLETION OF ELECTRICAL TEST PER MC 25-868 FOR SELETION OF R2 INSTALL NICKEL RIBBON CIRCUIT RUN WELDING P11,R5,R10 & R9 TOGETHER AS SHOWN
17. COMPLETED ASSEMBLY SHALL BE TESTED IN ACCORDANCE WITH AND SHALL MEET ALL THE REQUIREMENTS OF ATP 2021500, MC 25-867

3H


SEL NOTE 7
Q1 REF
CR1 REF
C1 REF
R4 REF
Q3 REF
SEE NOTES 6 & 9

SECTION C-C

R2	
1006750-84	150K
-154	41 K
-149	25.5K
-62	18 K
-143	14 K
-57	11 K
-138	8650
-136	7150
-134	5900
-49	5100
-131	4500
-129	3750
-44	3300
-126	2850
-41	2400
-39	2000
-37	1600
1006750-34	1200

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2021794

REVISIONS TDRR 18840			
SYM	DESCRIPTION	DATE	APPROVAL

REQUIREMENTS:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - D. PACKAGING AND PACKING: UNITS SHALL BE PACKAGED IN SUCH A MANNER AS TO INSURE THE FOLLOWING:
     - (1) EACH INDIVIDUAL PART SHALL BE SEPARATED FROM ALL OTHERS AND PACKED SECURELY TO PREVENT CONTACT DURING TRANSIT. LEADS SHALL BE SECURED AGAINST WHIPPING OR VIBRATION DURING TRANSIT. BODY MOUNTING SHALL BE SUCH THAT CAPACITORS CAN BE EASILY GRIPPED BY THE BODY AND REMOVED FROM THE PACKAGE. HANDLING OF LEADS IS TO BE HELD TO A MINIMUM.
   - E. UNITS SHALL MEET ALL REQUIREMENTS OF MIL-C-18312 EXCEPT AS SPECIFIED HEREIN.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) DIMENSIONS PER OUTLINE AND TABLE II
     - (2) LEAD DATA: NICKEL PER ND 1015400.
     - (3) MARKING: PER ND1002019 EACH CAPACITOR SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME OR SYMBOL,

       THE MANUFACTURER'S PART OR TYPE NUMBER, CAPACITANCE VALUE, TOLERANCE, AND VOLTAGE RATING MAY APPEAR ON THE PART AND PACKAGE.
   - B. ELECTRICAL REQUIREMENTS:
     - (1) CAPACITANCE: PER TABLE I AT +25°C. AND 1000 ± 100 CPS FOR VALUES UP TO 1.0 MFD AND 60 ± 6 CPS FOR VALUES GREATER THAN 1.0 MFD.
     - (2) CAPACITANCE TOLERANCE: ±5% AT +25°C AND 1000 ± 100 CPS FOR VALUES UP TO 1.0 MFD AND 60 ± 6 CPS FOR VALUES GREATER THAN 1.0 MFD.

3. DESIGN REQUIREMENTS:
   - A. DC WORKING VOLTAGE: PER TABLE AT +125°C.
   - B. OPERATING TEMPERATURE RANGE: -55°C TO +125°C.

FIGURE II

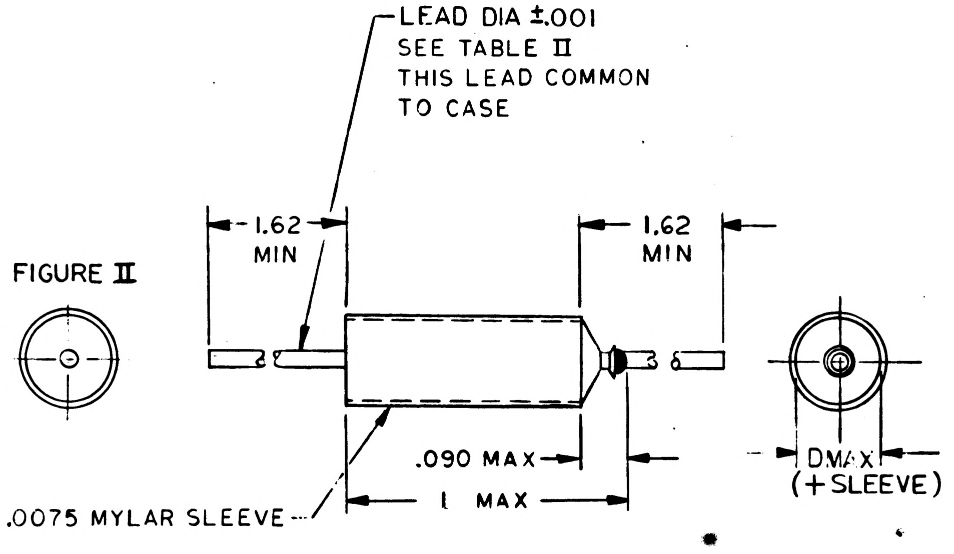
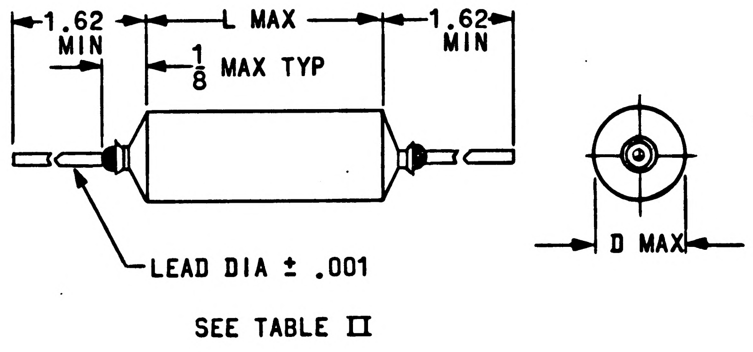


FIGURE I



PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
LIST OF MATERIALS			

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS ±.005 .02
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL: SEE NOTES
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB, CAMBRIDGE, MASS
DWG. NO.
CONTRACT NAS9-497
DRAWN D Dobbert DATE 5 JUL 63
CHECKED C. F. Pioyda 8 JUL 63
APPROVAL D.R. Test 7/24/63
APPROVAL A J Boyce 17 MAY 65
NASA APPROVAL 5-18-65
MIT APPROVAL 18 May 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CAPACITOR, FIXED,
(METALIZED PAPER PLUS MYLAR,
+125°C, ±5% TOL.)
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 2021794
SCALE NONE
WT
SHEET 1 OF 3

2021794

REVISIONS TDRR .8840			
SYM	DESCRIPTION	DATE	APPROVAL

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

DESIGN REQUIREMENTS: (CONTINUED)

C. DISSIPATION FACTOR: 1% MAX FOR CASE SIZES D THRU U (SEE TABLE II) AND 1.5% MAX FOR SIZES A, B, AND C; AT +25°C AND 1000 ± 100 CPS FOR VALUES UP TO 1.0 MFD, AND 60 ± 6 CPS FOR VALUES GREATER THAN 1.0 MFD.

D. INSULATION RESISTANCE:

(1) AT +25°C: 2000 MEGOHM-MICROFARADS MIN. NEED NOT EXCEED 12,000 MEGOHMS. 3000 MEGOHMS MIN. BETWEEN CASE AND EITHER TERMINAL.

(2) AT +125°C:

(a) FOR 200 VDC UNITS:
10 MEGOHM-MICROFARADS MIN. NEED NOT EXCEED 150 MEGOHMS.

(b) FOR 400 AND 600 VDC UNITS:
40 MEGOHM-MICROFARADS MIN. NEED NOT EXCEED 600 MEGOHMS.

E. TEMPERATURE COEFFICIENT: NON LINEAR, REF FIGURE I FOR TYPICAL CAPACITANCE CHANGE VS TEMPERATURE.

F. CONSTRUCTION: PARTS SHALL BE CONSTRUCTED FROM METALIZED PAPER AND A MINERAL WAX IMPREGNATED POLYESTER FILM. THE CASE SHALL BE A METAL AND SEALED. CONNECTIONS SHALL BE SUCH THAT THE PARTS SHALL BE ESSENTIALLY NON-INDUCTIVE.

G. LEAD STRENGTH: LEADS SHALL WITHSTAND A 5 POUND AXIAL PULL FOR 1 MINUTE. THEY SHALL ALSO WITHSTAND THE FOLLOWING TEST TWICE - WITH A 2 POUND LOAD SUSPENDED FROM THE LEAD IN A VERTICAL AXIAL POSITION, BEND THE CAPACITOR BODY IN A PLANE 90°, THEN BACK 180° TO THE OPPOSITE EXTREME, AND THEN BACK 90° TO THE STARTING POSITION. THERE SHALL BE NO PHYSICAL DAMAGE OR LOSS OF ELECTRICAL PERFORMANCE.

H. ENVIRONMENTAL: PER ND 1002045 IN ADDITION TO THE

(1) FOLLOWING:

(a) SEALING TEST: UNITS SHALL GIVE NO INDICATION OF LEAKAGE WHEN TESTED PER METHOD 512, PROCEDURE I OF MIL-STD-810.

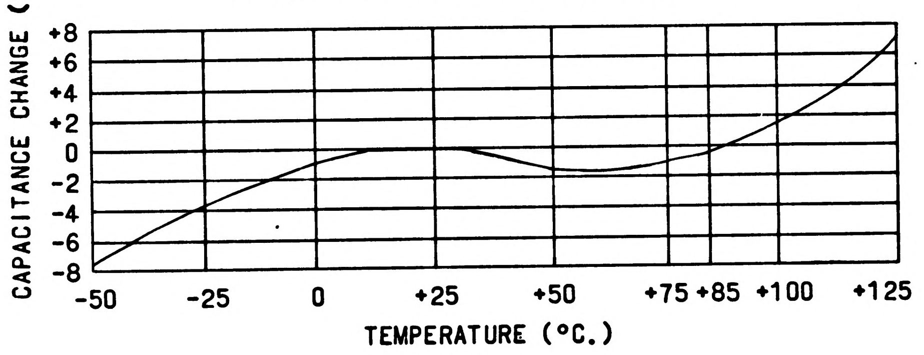
(b) REDUCED PRESSURE: UNITS SHALL BE OPERATIVE DURING AND AFTER AND SHALL SUSTAIN NO DAMAGE AS A RESULT OF EXPOSURE TO 10^{-4} MM OF MERCURY FOR 96 HOURS.

(c) LIFE: MAXIMUM CAPACITANCE CHANGE DURING LIFE TEST PER ND 1002045, PARAGRAPH 4.2.7.1 SHALL BE ± 5%.

4. SPECIAL CONDITIONING BY SUPPLIER:

FIGURE I

TYPICAL TEMPERATURE CHARACTERISTICS



QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG NO
CONTRACT NAS9-497

DRAWN D. Dobbert DATE 5 JUL 63
CHECKED C. F. Pioida 8 JUL 63
APPROVAL
APPROVAL A J Boyce 17 MAY 65
NASA APPROVAL 5-18-65
MIT APPROVAL 18 May 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CAPACITOR, FIXED,
(METALIZED PAPER PLUS MYLAR,
+125°C, ±5% TOL.)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	2021794
SCALE	WT	SHEET 2 OF 3

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTH R DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

2021794

REVISIONS TDRR 18840			
SYM	DESCRIPTION	DATE	APPROVAL

TABLE I

CAPACITANCE MICROFARADS	200 VDC			400 VDC			600 VDC		
	DASH NO.		CASE SIZE SEE NOTE 1	DASH NO.		CASE SIZE SEE NOTE 1	DASH NO.		CASE SIZE SEE NOTE 1
.0010	-1		A				-75		C
.0012	-2		A				-76		C
.0015	-3		A				-77		C
.0018	-4		A				-78		C
.0022	-5		A				-79		C
.0027	-6		A				-80		C
.0033	-7		A				-81		C
.0039	-8		A				-82		D
.0047	-9		A				-83		D
.0056	-10		A				-84		D
.0068	-11		A				-85		D
.0082	-12		A				-86		D
.010	-13		A	-47		D	-87		D
.012	-14		B	-48		D	-88		D
.015	-15		B	-49		D	-89		D
.018	-16		C	-50		D	-90		E
.022	-17		C	-51		D	-91		E
.027	-18		C	-52		E	-92		E
.033	-19		C	-53		E	-93		E
.039	-20		D	-54		G	-94		G
.047	-21		D	-55		G	-95		G
.056	-22		D	-56		G	-96		G
.068	-23		D	-57		G	-97		G
.082	-24		D	-58		H	-98		H
.100	-25		D	-59		H	-99		H
.120	-26		E	-60		H	-100		J
.150	-27		E	-61		H	-101		J
.180	-28		F	-62		K	-102		K
.220	-29		F	-63		K	-103		K
.270	-30		G	-64		L	-104		L
.330	-31		G	-65		L	-105		L
.390	-32		H	-66		M	-106		M
.470	-33		H	-67		M	-107		M
.560	-34		H	-68		N	-108		N
.680	-35		H	-69		N	-109		N
.820	-36		J	-70		P	-110		R
1.0	-37		J	-71		P	-111		R
1.5	-38		L	-72		R	-112		R
2.0	-39		M	-73		R	-113		S
2.5							-114		U
3.0	-40		N	-74		U			
4.0	-41		P						
5.0	-42		R						
6.0	-43		R						
8.0	-44		R						
10.0	-45		T						
12.0	-46		U						
2.7	-115		N						
1.25	-116		L						
0.027	-117		V						
.010	-118	200 VDC	W						

TABLE II

CASE SIZE	D	L	LEAD DIAMETER
A	.191	.781	.020
B	.211	.781	.020
C	.251	.781	.025
D	.328	.875	.025
E	.328	1.093	.025
F	.416	.875	.032
G	.416	1.093	↓
H	.516	1.093	
J	.578	1.093	
K	.578	1.406	
L	.578	1.656	
M	.686	1.656	
N	.686	1.906	
P	.766	1.906	
R	1.016	1.906	
S	1.016	2.156	
T	1.016	2.406	
U	1.016	2.656	.032
V FIGURE II	.250	.531	.025
W FIGURE II	.191	.660	.025

CAPACITANCE MICROFARADS	DASH NO.		CASE SIZE SEE NOTE I
1.2	-122		K
.310	-121		G
.140	-120		E
.360	-119		G
	200 VDC		

NOTES:

1. ALL CASE SIZES AND STYLE IN TABLE II ARE FOR FIGURE I UNLESS OTHERWISE SPECIFIED.

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO.
CONTRACT NAS 9-497

DRAWN D. Dobbert DATE 5 JUL 63
CHECKED C.F. Pinda 8 JUL 63
APPROVAL
APPROVAL A J Boyce 17 MAY 65
NASA APPROVAL W J Rhine 5-18-65
MIT APPROVAL W Kupfer 18 May 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CAPACITOR, FIXED,
(METALIZED PAPER PLUS MYLAR,
+125°C, ±5% TOL.)

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	2021794
SCALE	WT	SHEET 3 OF 3

2021794

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REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
-		INITIAL RELEASE CLASS B PER TDRR 18840			5-4-65	ajB WK

1. REQUIREMENTS:

A. GENERAL:

1) INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

5) UNITS SHALL BE IN ACCORDANCE WITH MIL-S-19500 IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN.

B. INSPECTION AND ACCEPTANCE:

1) MECHANICAL REQUIREMENTS:

(b) LEAD DATA: KOVAR, WITH GOLD PLATING PER ND 1015402.

2. ELECTRICAL REQUIREMENTS: PER TABLE II.

(a) COLLECTOR CUTOFF CURRENT I_{CBO} AT 100°C.

(b) SWITCHBACK VOLTAGE, LV_{CEO}

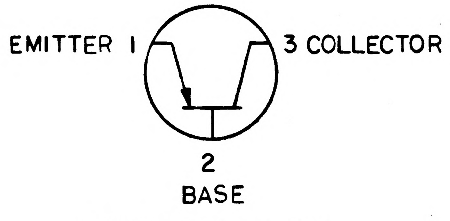
(c) STATIC FORWARD CURRENT TRANSFER RATIO, h_{FE1},

(d) BASE SATURATION VOLTAGE, $V_{BE(SAT)}$

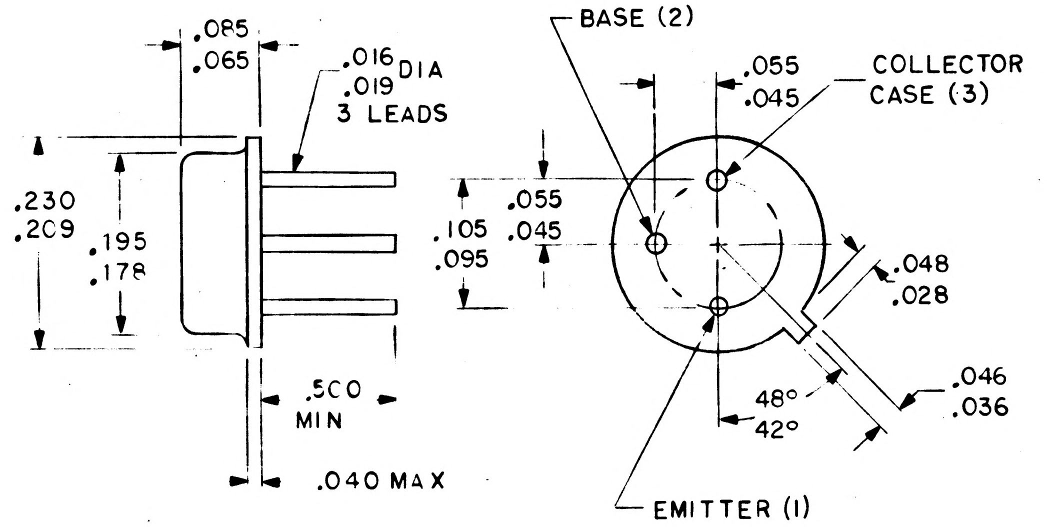
(e) COLLECTOR SATURATION VOLTAGE, $V_{CE(SAT)}$

C. DESIGN REQUIREMENTS:

1) STORAGE TEMPERATURE (Tstg): -65° TO +200°C.
2) JUNCTION OPERATING TEMPERATURE (T_J): 175°C MAXIMUM.
3) ELECTRICAL RATINGS: PER TABLE I.
4) ELECTRICAL CHARACTERISTICS: PER TABLE II.
5) POWER DISSIPATION:
   - (a) AT +25°C CASE TEMPERATURE: 2.0 WATTS. THERMAL RESISTANCE (θ_{JC}): 75° C/WATT
   - (b) AT +25°C AMBIENT TEMPERATURE: 360 MILLIWATTS THERMAL RESISTANCE (θ_{JA}): 417°C/WATT



GRAPHICAL SYMBOL



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CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
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		DATE
DRAWN	J. Murphy	8 APR 65
CHECKED	A. M.	4-20-65
APPROVED	M. Kramer	20 Apr 65
APPROVED	A. J. Boyce	5-4-65
APPROVED MIT	W Kupfer	21 May 65
APPROVED MSC	W J Rhine	5-21-65

TRANSISTOR, PNP, SILICON

CODE IDENT NO. 80230
SIZE C
DRAWING NO. 2021795
SCALE
SHEET 1 OF 3

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REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED
—		INITIAL RELEASE CLASS B PER TDRR 18840			5-21-65	ajB WH

MANUFACTURER'S ABSOLUTE MAXIMUM RATINGS TC = +25°C

COLLECTOR VOLTAGE (V_{CBO})	COLLECTOR VOLTAGE (V_{CER}) ($R_{BE} \leq 100$)	EMITTER VOLTAGE (V_{EBO})	COLLECTOR VOLTAGE (V_{CEO})	COLLECTOR POWER DISSIPATION	
V_{DC}	V_{DC}	V_{DC}	V_{DC}	W	
-50	-50	-5	-35	2.0	

EIA TYPE DESIGNATIONS (FOR REF ONLY)

2N2303
TO - 46

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TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
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DRAWN RWC
CHECKED
APPROVED
APPROVED AJ Boyce 5-21-65
APPROVED MIT W 21 May 65
APPROVED MSC WJ 5-21-65
DATE

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SIZE C
DRAWING NO. 2021795
SCALE
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REVISIONS

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED	
-		INITIAL RELEASE CLASS B PER TDRR 18840			4-21-65	AJB	WK

TABLE II

ELECTRICAL CHARACTERISTICS AT TC = +25°C (UNLESS OTHERWISE SPECIFIED) SEE NOTE 2.

PARAMETER	CONDITION	SYMBOL	SPECIFICATION LIMITS		
			MIN	MAX	UNIT
COLLECTOR CUTOFF CURRENT	$I_E = 0$, $V_{CB} = -30V$	I_{CBO1}	-	1.0	uA
COLLECTOR CUTOFF CURRENT	$I_E = 0$, $V_{CB} = -30V$, $T_C = +150°C$	I_{CBO3}	-	100	uA
SWITCHBACK VOLTAGE	$I_C = -100$ mA, SEE NOTE 1, $I_B = 0$	LV_{CEO}	-35	-	VDC
COLLECTOR TO EMITTER BREAKDOWN VOLTAGE	$I_C = -100$ mA, SEE NOTE 1, $R_{BE} \leq 10\Omega$	LV_{CER}	-50	-	VDC
STATIC FORWARD CURRENT TRANSFER RATIO	$I_C = -5$ mA, $V_{CE} = -10$ V, SEE NOTE 1	h_{FE1}	75	125	-
BASE SATURATION VOLTAGE	$I_C = -150$ mA, $I_B = -15$ mA	$V_{BE(SAT)}$	-	-1.3	VDC
COLLECTOR SATURATION VOLTAGE	$I_C = -150$ mA, $I_B = -15$ mA	$V_{CE(SAT)}$	-	-1.5	VDC
SMALL-SIGNAL, SHORT CIRCUIT FORWARD CURRENT TRANSFER RATIO	$I_C = -50$ mA, $V_{CE} = -10V$, f = 20 mc	h_{fe}	3.0	-	-
OUTPUT CAPACITANCE	$I_E = 0$, $V_{CB} = -10V$ f = 140 kc	C_{ob}	-	45	pf
COLLECTOR CUTOFF CURRENT	$I_E = 0$, $V_{CB} = -30$ V $T_C = 100°C$	I_{CBO2}	-	50	uA

NOTES:

1. PULSE MEASUREMENTS: PULSE LENGTH = 300 uSEC., DUTY CYCLES $\leq$ 1%
2. TC IS CASE TEMPERATURE

NASA NUMBER	REQUIREMENTS
-1	SHALL CONFORM TO SPECIFICATIONS LISTED IN TABLE I AND TABLE II
-2	SHALL BE A MATCHED PAIR OF -1 WITH THE ADDITION THAT h_{FE} SHALL BE MATCHED INITIALLY (AS RECEIVED BY USER) TO WITHIN 10% OF THE LOWER h_{FE} UNIT AT $I_C = -5$ MA, $V_{CE} = -10V$

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HOUSTON, TEXAS

		DATE
DRAWN		8 APR 65
CHECKED	A. Mart	4-20-65
APPROVED	M. Kramer	20 Apr 65
APPROVED		
APPROVED MIT	W Cuyler 24 May 65	21 Apr 65
APPROVED MSC	W J	5-21-65

TRANSISTOR
PNP SILICON

CODE IDENT NO.	SIZE	DRAWING NO.
80230	C	2021795
SCALE		SHEET 3 OF 3

2021796	SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS TDRR 18840

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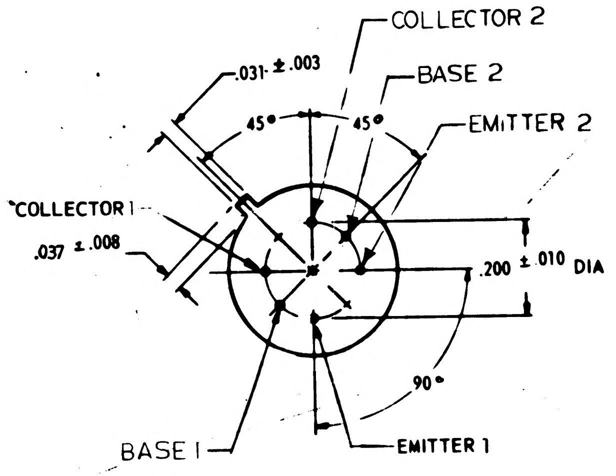
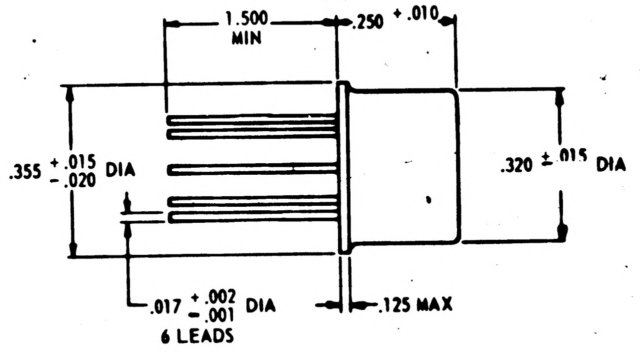
REQUIREMENTS:

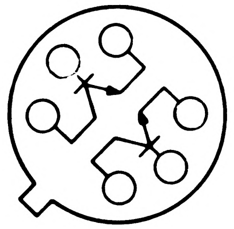
1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B.
   - C.
   - D. PACKAGING AND PACKING: PACKAGE MATCHED PAIRS TOGETHER
   - E. UNIT SHALL BE IN ACCORDANCE WITH MIL-S-19500 IN ADDITION TO THE REQUIREMENTS SPECIFIED HEREIN.

2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - 1. LEAD DATA: KOVAR WITH GOLD PLATING PER ND PS1015402.
     - 2.
     - 3. MECHANICAL DIMENSIONS PER OUTLINE
   - B. ELECTRICAL REQUIREMENTS: PER TABLE II
     - 1. COLLECTOR CUTOFF CURRENT (I_{CBO2}) AT T_C=100°C
     - 2. EMITTER CUTOFF CURRENT (I_{EBO})
     - 3. SWITCHBACK VOLTAGE (LV_{CEO})
     - 4. COLLECTOR SATURATION VOLTAGE ($V_{CE(SAT)}$)
     - 5. STATIC FORWARD CURRENT TRANSFER RATIO h_{FE1}, h_{FE2}, h_{FE3}
     - 6. MATCHING REQUIREMENTS PER TABLE III.

3. DESIGN REQUIREMENTS:
   - A. ELECTRICAL RATING: PER TABLE I
   - B. ELECTRICAL SPECIFICATION: PER TABLE II AND III
   - C. STORAGE AND OPERATING JUNCTION TEMPERATURE −65C TO +175C
   - D. POWER DISSIPATION (EACH ELEMENT)
     - 1. AT 25°C AMBIENT TEMPERATURE: 0.3 WATTS MAX
     - 2. AT 25°C CASE TEMPERATURE: 0.75 WATTS MAX
   - E. POWER DISSIPATION (DUAL DEVICE)
     - 1. AT 25°C AMBIENT TEMPERATURE: 0.4 WATTS MAX
     - 2. AT 25°C CASE TEMPERATURE: 1.5 WATTS MAX







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MATERIAL
SEE NOTES
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APPROVAL
APPROVAL A. J. Boyce 17 MAY 65
NASA APPROVAL W. J. Rhine 5-18-65
MIT APPROVAL W Kupfer 18 May 65

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TRANSISTOR, DUAL ELEMENT
MATCHED, SILICON, N-P-N
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CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	2021796
SCALE —	WT	SHEET 1 OF 3

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SYM	DESCRIPTION	DATE	APPROVAL
REVISIONS TDRR 18840			

SPECIAL CONDITIONING BY SUPPLIER:

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TABLE I

MAXIMUM RATINGS $T_C=25^oC$ (EACH ELEMENT)

COLLECTOR VOLTAGE (V_{CB})	EMITTER VOLTAGE (V_{EB})	COLLECTOR VOLTAGE (V_{CE})	COLLECTOR CURRENT I_C	COLLECTOR POWER DISSIPATION	
V_{DC}	V_{DC}	V_{DC}	MA_{DC}	W	
60	6	60	10	.75	2021796-000
60	6	60	10	.75	2021796-001

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FRACTIONS ± 1/64 DECIMALS ± .005 ANGLES ± 1°
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REVISIONS TDRR 18840			
SYM	DESCRIPTION	DATE	APPROVAL

TABLE II

ELECTRICAL CHARACTERISTICS T_C = 25°C (UNLESS OTHERWISE SPECIFIED)

PARAMETER	CONDITIONS	SYMBOL	SPECIFICATION LIMITS		
			MIN	MAX	UNITS
STATIC FORWARD CURRENT TRANSFER RATIO	V_{CE}=5VDC I_C=10UA	h_{FE1}	150	600	-
	V_{CE}=5VDC I_C=100UA	h_{FE2}	225		-
	V_{CE}=5VDC I_C=1MA	h_{FE3}	300		-
SWITCHBACK VOLTAGE	I_C=10MA I_B=0	LV_{CEO}	60		VOLTS
COLLECTOR CUTOFF CURRENT	V_{CE}=5 VDC, I_B=0	I_{CEO}		2.0	nA
COLLECTOR CUTOFF CURRENT	V_{CB}=45VDC, I_E=0	I_{CBO1}		2.0	nA
	V_{CB}=45VDC, I_E=0, T_C=100°C	I_{CBO2}		1.0	uA
	V_{CB}=45VDC, I_E=0, T_C=150°C	I_{CBO3}		10.0	uA
EMITTER CUTOFF CURRENT	V_{EB}=5VDC I_C=0	I_{EBO}		2	nA
BASE VOLTAGE	V_{CE}=5.0VDC, I_C=100ua	V_{BE}		.7	
COLLECTOR SATURATION VOLTAGE	I_C=1.0MA, I_B=0.1MA	$V_{CE(SAT)}$		.35	VOLTS
$\left\lvert \frac{\Delta(V_{BE1} - V_{BE2})}{\Delta T} \right\rvert$	V_{CE}=5VDC I_C=10UA ΔT=(25°C-(-55°C)) AND ΔT=(125°C -25°C)	-		10	UV/°C
COLLECTOR CAPACITANCE	V_{CB}=5VDC f=1mc	C_{ob}		6	pf
SMALL SIGNAL FORWARD CURRENT TRANSFER RATIO	V_{CE}=5VDC, I_C=500uA f=30MC	h_{fe}	2		
NOISE VOLTAGE	TO BE MEASURED WITH A QUAN TECK MODEL 310 OR 311 NOISE ANALYZER OR EQUIV. V_{CE}=5V I_C=100uA f= 1 KC R_g=1 K			.015	uV/√N

TABLE III

SPECIAL MATCHING REQUIREMENTS AT T_C=25°C

PARAMETER	CONDITIONS	SYMBOL	INDIVIDUAL MATCHING REQUIREMENTS	
BASE VOLTAGE	V_{CE}=5VDC, I_C=10uA TO 1.0mA	V_{BE}	WITHIN 5 MILLIVOLTS	2021796-000
STATIC FORWARD CURRENT TRANSFER RATIO	V_{CE}=5VDC, I_C=100uA	h_{FE}	WITHIN 10% OF LOWEST UNIT	
PER ALL REQUIREMENTS OF 1010431-000 WITH THE FOLLOWING ADDITIONS: FOR: VBE1 = VBE2, V_{CE}=5VDC THEN: AT $I_{C\ LOW}$ = 0.25 MA. $\frac{I_{C\ HIGH} - I_{C\ LOW}}{I_{C\ LOW}} \times 100\% \lesssim 2\%$ AT $I_{C\ LOW}$ = 0.75 MA. $\frac{I_{C\ HIGH} - I_{C\ LOW}}{I_{C\ LOW}} \times 100\% \lesssim 2\%$				2021796-001

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HEAT TREATMENT

FINAL FINISH

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CHECKED Wilson 5 June 63
APPROVAL
APPROVAL A.J. Boyce 17 MAY 65
NASA APPROVAL 5-18-65
MIT APPROVAL 18 May 65

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2021797

REVISIONS TDRR 18840 (L"B")			
SYM	DESCRIPTION	DATE	APPROVAL

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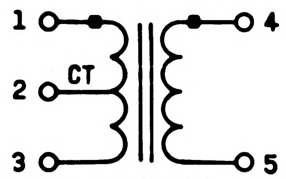
REQUIREMENTS:

1. **GENERAL:**
   - A. **DESIGN TO BE IN CONFORMANCE WITH SPECIFICATION MIL-T-27 AS PROVIDED BELOW.**
   - B. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327.

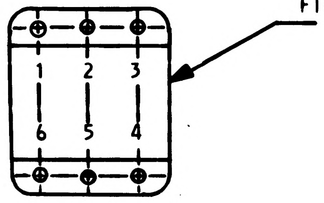
2. **INSPECTION AND ACCEPTANCE:**
   - A. **UNIT SHALL MEET ALL REQUIREMENTS OF TABLE I.**
   - B. **SEALING:** PER MIL-T-27.
   - C. **DIELECTRIC STRENGTH: APPLY 500 VOLTS (RMS) BETWEEN WINDINGS.** PER MIL-T-27.
   - D. **INSULATION RESISTANCE: 10,000 MEGOHMS MINIMUM AT 25°C.** PER MIL-T-27.
   - E. **DC RESISTANCE: SEE TABLE I.** PER **MIL-T-27.**
   - F. **PRIMARY IMPEDANCE: APPLY VOLTAGE AND FREQ SPECIFIED IN TABLE I TO LEADS (1-3). SECONDARY OPEN.**
   - G. FREQUENCY RESPONSE (REFERENCE FREQUENCY 1000 CPS): SEE TEST CIRCUIT I. E_S SHALL BE DETERMINED AT 1 KC, OUTPUT POWER AT 50 MW, AND TEST CONDITIONS SPECIFIED IN TABLE I. (NOTE: IF TRANSFORMER SECONDARY IS CENTER TAPPED, Z_L SHALL BE ACROSS COMPLETE SECONDARY.) E_S SHALL BE HELD CONSTANT OVER THE FREQUENCY RANGE. PER MIL-T-27.
   - H. NO LOAD VOLTAGE RATIO: SEE TABLE 1. MEASURE WITH 2 VOLTS, 1000 CPS (1-3). CENTER TAP LOCATION 1:1 ± 1.5%. PER MIL-T-27.
   - J. LEADS: NICKEL 0.020 ± .001. LEADS SHALL CONFORM TO ND1015400. A CERTIFICATE OF COMPLIANCE WITH THIS REQUIREMENT SHALL ACCOMPANY EACH SHIPMENT.
   - K. POLARITY: LEADS SPECIFIED IN TABLE I SHALL BE LIKE POLARITY. PER MIL-T-27.
   - L. PULL TEST: PER MIL-T-27



SCHEMATIC DIAGRAM NO. II

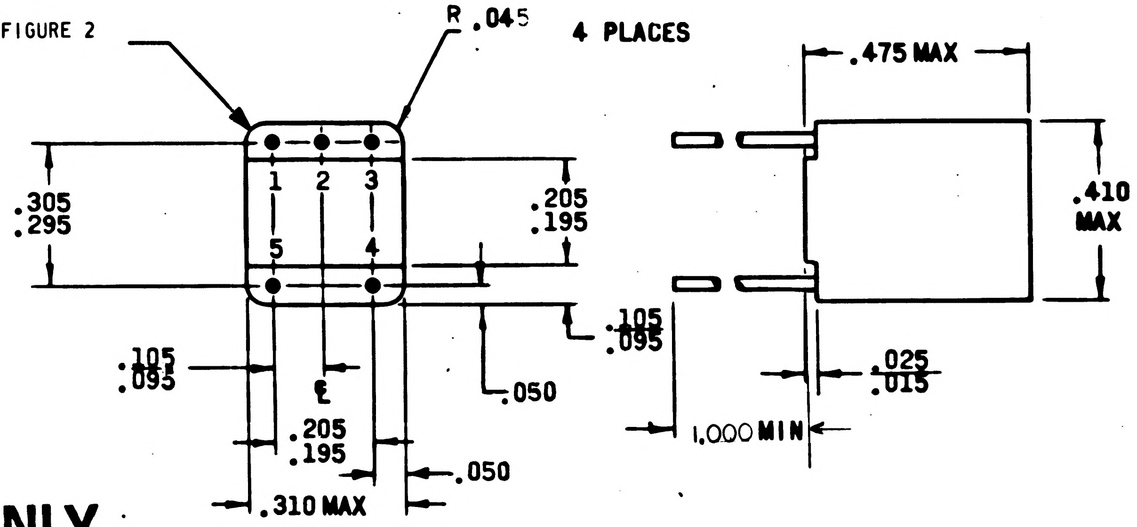
VOLTAGES AND CURRENTS ARE RMS VALUES UNLESS OTHERWISE NOTED

FIGURE 1



BOTTOM VIEW OF TRANSFORMER WITH 6 LEADS.
ALL DIMENSIONS ARE THE SAME AS SHOWN BELOW

FIGURE 2



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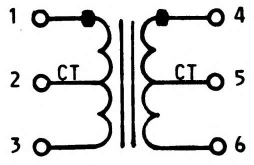
SCHEMATIC DIAGRAM NO. I



VOLTAGES AND CURRENTS ARE RMS VALUES UNLESS OTHERWISE NOTED

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MATERIAL: SEE NOTES
HEAT TREATMENT: NONE
FINAL FINISH: NONE

MIT INSTRUMENTATION LAB
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CONTRACT NAS 9-497
DWG NO

DRAWN Janowak DATE 25 JUNE 63
CHECKED Wilson 26 June 63
APPROVAL A J Boyce 21 MAY 65
APPROVAL

NASA APPROVAL 5-21-65
MIT APPROVAL 21 May 65

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TRANSFORMER, AUDIO

SPECIFICATION CONTROL DRAWING

CODE IDENT NO.	SIZE	NASA DRAWING NO.
80230	C	2021797

SCALE **NONE** WT SHEET **1** OF **2**

2021797

2021797

SYM	DESCRIPTION	DATE	APPROVAL

REVISIONS TDRR 18840 (L.C.)

NOTICE — WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER, AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

3. DESIGN REQUIREMENTS:

A. THE UNIT SHALL BE CAPABLE OF MEETING ALL REQUIREMENTS OF MIL-T-27 FOR GRADE 5, CLASS S LIFE EXPECTANCY X, FAMILY PER TABLE 1, IN AMBIENT TEMPERATURE OF 85°C.

B. THE UNIT SHALL BE CAPABLE OF MEETING ALL ELECTRICAL REQUIREMENTS EXCEPT WHERE NOTED BEFORE, DURING, AND AFTER THE FOLLOWING EXPOSURES.

(1) HIGH TEMPERATURE: 71°C OPERATING
(2) LOW TEMPERATURE: -18°C OPERATING
(3) VIBRATION: 10 TO 2000 CPS, 20 G (PER MIL-STD-202, METHOD 204 A, CONDITION D)
(4) REDUCED PRESSURE: 96 HOURS AT A PRESSURE OF 10^{-4} MM OF MERCURY.
(5) WORKMANSHIP: THE WIRE SHALL BE UNIFORM IN QUALITY AND TEMPER CLEAN; ROUND AND SMOOTH AND FREE FROM FOREIGN MATERIALS, AND OTHER DEFECTS.

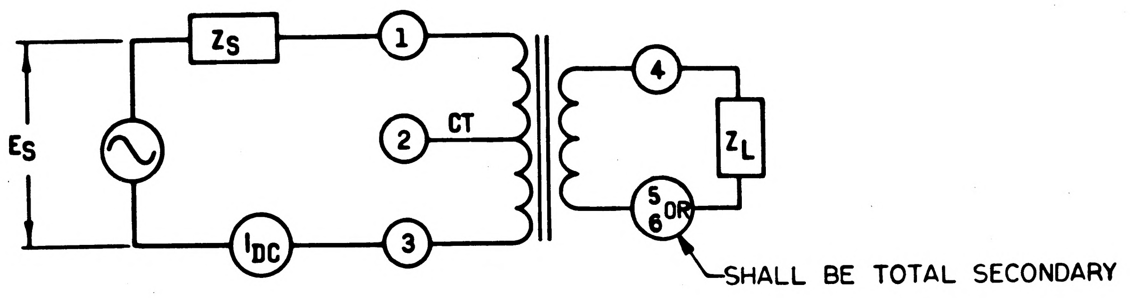
C. DC UNBALANCE IN PRIMARY: PER TABLE I

D. RATED POWER LEVEL: 50 MW

E. WORKING VOLTAGE BETWEEN WINDINGS AND FROM WINDINGS TO CASE: 175 VOLTS MAXIMUM INSTANTANEOUS.

F. BEND TEST(SAMPLE): (THIS IS A DESTRUCTIVE TEST, UNITS SUBJECTED TO THIS TEST SHALL NOT BE SHIPPED) HOLD THE COMPONENT IN SUCH A MANNER THAT A TWO(2) POUND WEIGHT MAY BE SUSPENDED IN AN AXIAL DIRECTION FROM THE LEAD UNDER TEST. THE BEND CYCLE (ONE(1)) REQUIRED, SHALL BE ACCOMPLISHED BY MOVING THE BODY OF THE UNIT WHILE IN THE SAME PLANE, THRU 90° IN ONE DIRECTION THEN BACK 180° IN THE OPPOSITE DIRECTION AND BACK 90° TO THE ORIGINAL POSITION.

TEST CIRCUIT I



FREQUENCY RESPONSE TEST CIRCUIT

TABLE I

NASA PART NUMBER	DC RESISTANCE ±20% PRIMARY	DC RESISTANCE ±20% SECONDARY	PRIMARY IMPEDANCE (MINIMUM) OHMS	PRIMARY IMPEDANCE (MINIMUM) TEST VOLTAGE	FREQ CPS	FREQUENCY RESPONSE TEST CONDITIONS ZS	ZL	IDC MA	BAND WIDTH	RESPONSE	POLARITY	NO LOAD VOLTAGE RATIO ± 3% PRIMARY : SECONDARY	MAX. DC MA UNBALANCE	FAMILY	REFERENCE SCHEMATIC DIAGRAM NUMBER	FIG. NO.
2021797 -1	168ΩCT	92 Ω	1600 (Z)	5 VOLTS	300	1,500	600	3	350 CPS TO 90KC	±1DB	1 AND 4	1.58 : 1	3	13	II	2
-2	77ΩCT	3 Ω	1130 (XL)	1 VOLT	300	600	12	4.5	300 CPS TO 60KC	± 2 DB	1 AND 4	7.06 : 1	4.5	17	II	2
-3	790ΩCT	0.76 Ω	15,000 (XL)	4 VOLTS	300	8,000	3.2	1	300 CPS TO 60KC	± 2 DB	1 AND 4	50 : 1	1	13	II	2
-4	1050ΩCT	200ΩCT	10,000(Z)	4 VOLTS	300	10,000	1200	1	300 CPS TO 60KC	± 2 DB	1 AND 4	2.88 : 1 CT	1	13	I	1
-5	72ΩCT	92ΩCT	800(Z)	2.8 VOLTS	300	600	600	3	300 CPS TO 60KC	± 3 DB	1 AND 4	1:1 CT	3	17	I	[illegible]
2021797 -6	41ΩCT	98Ω	325(Z)	2.1 VOLTS	300	300	600	7	300 CPS TO 60KC	± 3 DB	1 AND 4	1:1.42	7	17	II	2

~~QTY REQD~~	~~PART OR IDENTIFYING NO.~~	~~NOMENCLATURE OR DESCRIPTION~~	~~FIND NO.~~

LIST OF MATERIALS

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 18840 DATE 5/21/65

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034 FOR THIS DRAWING.

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING
MATERIAL
HEAT TREATMENT
FINAL FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN Janowiak DATE 25 JUNE 63
CHECKED Wilson 26 June 63
APPROVAL AJ Boyce 21 MAY 65
APPROVAL
NASA APPROVAL W J Rhine 5-21-65
MIT APPROVAL W Kupfer 21 May 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TRANSFORMER, AUDIO

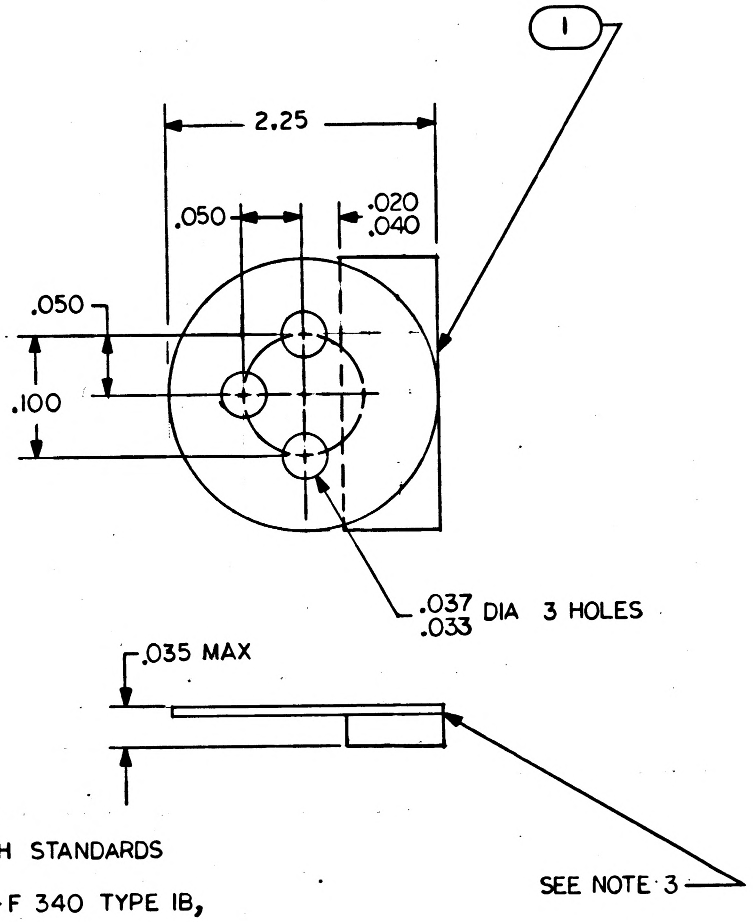
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 80230
SIZE C
NASA DRAWING NO. 2021797
SCALE NONE
WT
SHEET 2 OF 2

NOTICE – WHEN GOVERNMENT DRAWINGS, SPECIFICATIONS, OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION, THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER; AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED, FURNISHED, OR IN ANY WAY SUPPLIED THE SAID DRAWINGS, SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE, USE, OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO.

REVISIONS 21745

SYM	ZONE	DESCRIPTION	DR	CHK	DATE	APPROVED



NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. MATERIAL: FILM .006/.008 THICK PER L-F 340 TYPE IB, CLASS 2, STYLE IA
3. BOND PER ND1002004, TYPE 1
4. IDENTIFY WITH DRAWING NO. AND REVISION PER ND1002019

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	FIND NO.
1	2021786	SPACER, INSULATOR	1

LIST OF MATERIALS

NEXT ASSY	USED ON
2021785	

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

		DATE
DRAWN		7 July 65
CHECKED		8 Jul 65
APPROVED		7-23-65
APPROVED	S.C. Smith	7-23-65
APPROVED MIT		24 Aug 65
APPROVED MSC		8/24/65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

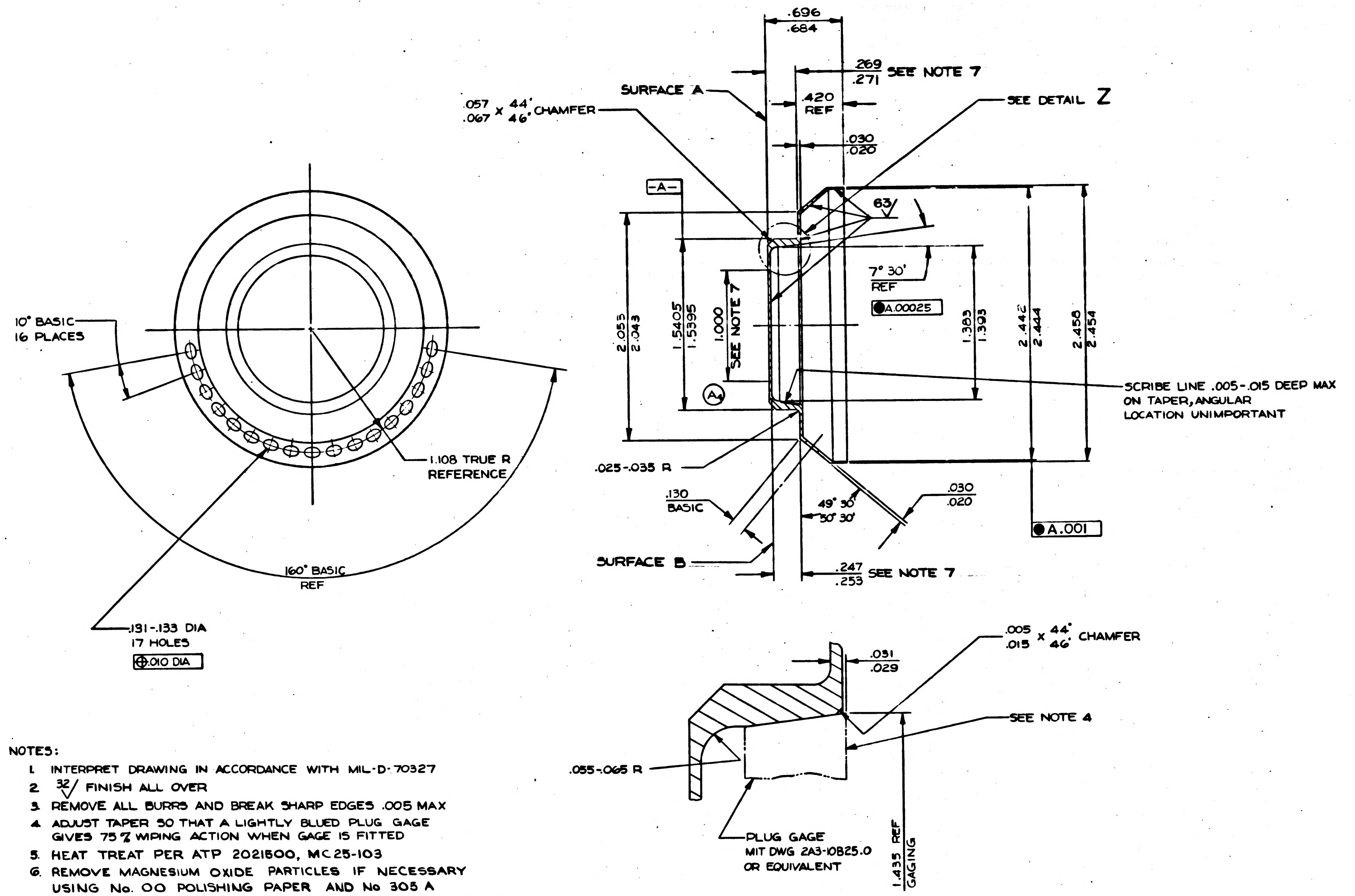
INSULATOR, TRANSISTOR
IRIG PREAMP

CODE IDENT NO.	SIZE	DRAWING NO.
80230	C	2021800

SCALE 10/1
SHEET 1 OF 1

MASTER

REVISIONS						21541
ZONE	SYM	DESCRIPTION	BR	CHK	DATE	APPROVED
	A4	REVISED PER TDRR 23618	CRG		10-29-65	WK



10° BASIC
16 PLACES
1.108 TRUE R
REFERENCE
160° BASIC
REF
.131-.133 DIA
17 HOLES
⊕.010 DIA
.696
.684
.269
.271
SEE NOTE 7
SURFACE A
.057 x 44°
.067 x 46° CHAMFER
.420
REF
.030
.020
SEE DETAIL Z
-A-
63
7° 30'
REF
●A.00025
2.055
2.043
1.5405
1.5395
1.000
SEE NOTE 7
A4
1.383
1.393
2.442
2.444
2.458
2.454
SCRIBE LINE .005-.015 DEEP MAX
ON TAPER, ANGULAR
LOCATION UNIMPORTANT
.025-.035 R
.130
BASIC
49° 30'
50° 30'
.030
.020
●A.001
SURFACE B
.247
.253
SEE NOTE 7
.031
.029
.005 x 44°
.015 x 46° CHAMFER
SEE NOTE 4
.055-.065 R
PLUG GAGE
MIT DWG 2A3-10825.0
OR EQUIVALENT
1.435 REF
GAGING

DETAIL Z
SCALE 10/1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 32/ FINISH ALL OVER
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005 MAX
4. ADJUST TAPER SO THAT A LIGHTLY BLUED PLUG GAGE GIVES 75% WIPING ACTION WHEN GAGE IS FITTED
5. HEAT TREAT PER ATP 2021500, MC25-103
6. REMOVE MAGNESIUM OXIDE PARTICLES IF NECESSARY USING No. 00 POLISHING PAPER AND No 305 A LAPPING COMPOUND.
7. (A2) FLATNESS OF SURFACES A AND B WITHIN A 1.000 DIA MUST NOT EXCEED +.005 TO -.005 FROM THE RESPECTIVE SURFACE BEYOND THE 1.000 DIAMETER. DIMENSIONS .269-.271 AND .247-.253 WILL BE MEASURED TO THE PORTION OF THE RESPECTIVE SURFACE OF A AND B BEYOND THE 1.000 DIAMETER
8. (A3) BAG AND IDENTIFY PER ND 1002019 SERIALIZE PER ND 1002023

MASTER

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021802	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL (A1)
PER SCD No 2021562-3

FINISH
—

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	C.R. Grasso	7 Aug 64
CHECKED	L. W. Keating	9-8-64
APPROVED		8-11-65
APPROVED		8-11-65

MIT APPROVED W Kupfer DATE 12 Aug 65
NASA APPROVED DATE 8/12/65

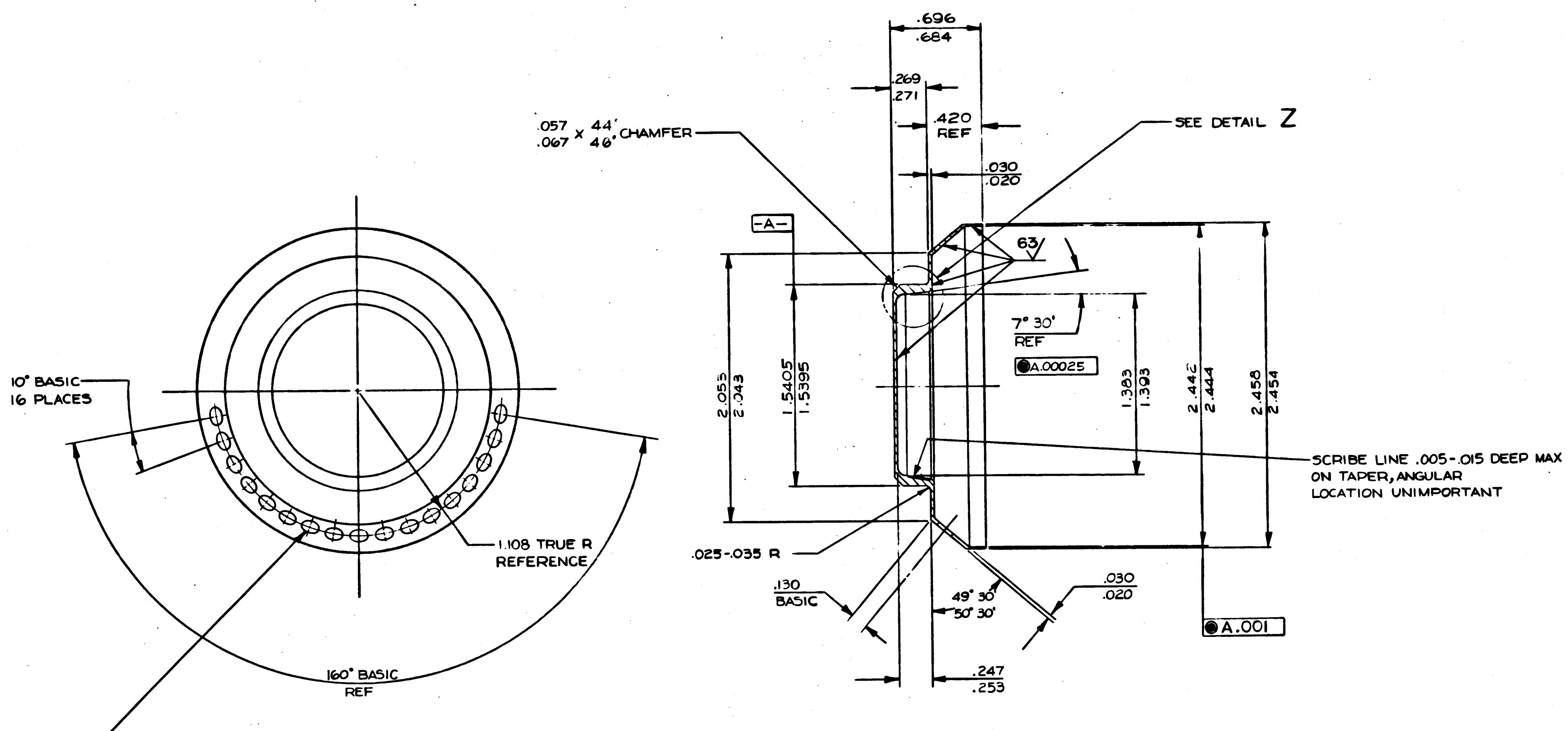
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TG END COVER
APOLLO II IRIG

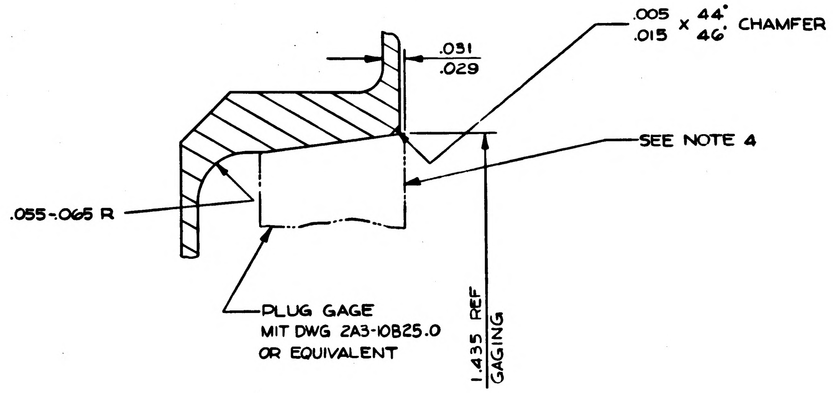
SIZE	CODE IDENT NO	DRAWING NO.
D		2021801

SCALE 2/1
SHEET 1 OF 1

REVISIONS						2,541
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED



.696
.684
.269
.271
.420 REF
.030
.020
.057 x 44°
.067 x 46° CHAMFER
SEE DETAIL Z
-A-
63
7° 30' REF
A.00025
10° BASIC
16 PLACES
2.055
2.043
1.5405
1.5395
1.383
1.393
2.442
2.444
2.458
2.454
SCRIBE LINE .005-.015 DEEP MAX ON TAPER, ANGULAR LOCATION UNIMPORTANT
1.108 TRUE R REFERENCE
.025-.035 R
.130 BASIC
49° 30'
50° 30'
.030
.020
A.001
160° BASIC REF
.247
.253
.131-.133 DIA
17 HOLES
.010 DIA



.005 x 44°
.015 x 46° CHAMFER
.031
.029
SEE NOTE 4
.055-.065 R
PLUG GAGE
MIT DWG 2A3-10B25.0
OR EQUIVALENT
1.435 REF
GAGING

DETAIL Z
SCALE 10/1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. 32/ FINISH ALL OVER
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005 MAX
4. ADJUST TAPER SO THAT A LIGHTLY BLUED PLUG GAGE GIVES 75% WIPING ACTION WHEN GAGE IS FITTED
5. HEAT TREAT PER ATP 2021500, MC25-103
6. REMOVE MAGNESIUM OXIDE PARTICLES IF NECESSARY USING No. 00 POLISHING PAPER AND No 305 A LAPPING COMPOUND.
7. BAG AND IDENTIFY PER ND 1002019
SERIALIZE PER ND 1002023

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021802	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
PER SCD No 2021562

FINISH ___

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN C.R. Grasso 7 Aug 64
CHECKED L. W. Keating 9-8-64
APPROVED 8-11-65
APPROVED IRA 8-11-65
MIT APPROVED W Kupfer DATE 12 Aug 65
NASA APPROVED DATE 8/12/65

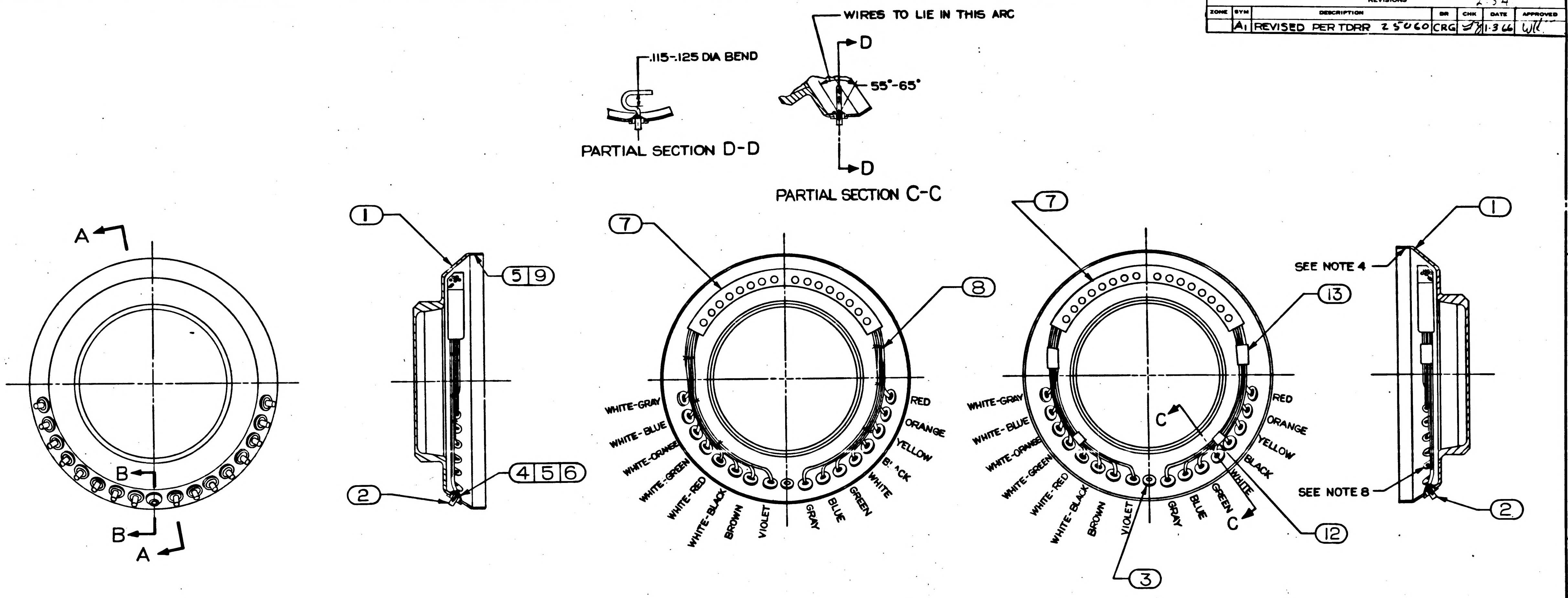
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TG END COVER
APOLLO II IRIG

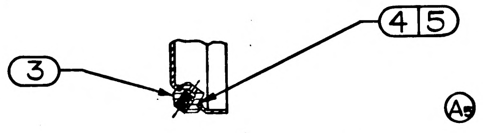
SIZE D
CODE IDENT NO
DRAWING NO. 2021801
SCALE 2/1
SHEET 1 OF 1

REVISIONS						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A1	REVISED PER TDRR 25060	CRG		1·3·66	WK

2541



.115-.125 DIA BEND
PARTIAL SECTION D-D
WIRES TO LIE IN THIS ARC
D
55°-65°
D
PARTIAL SECTION C-C
A
A
B
B
1
5 9
4 5 6
2
7
8
RED
ORANGE
YELLOW
BLACK
WHITE
GREEN
BLUE
GRAY
VIOLET
BROWN
WHITE-BLACK
WHITE-RED
WHITE-GREEN
WHITE-ORANGE
WHITE-BLUE
WHITE-GRAY
7
13
C
C
12
3
1
SEE NOTE 4
SEE NOTE 8
2



PARTIAL SECTION B-B

NOTES APPLICABLE ONLY TO 2021614-000

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE PER ATP 2021500, MC 25-852
3. TEST PER ATP 2021500, MC 25-852
4. BAG AND IDENTIFY PER ND 1002019

NOTES APPLICABLE ONLY TO 2021614-011

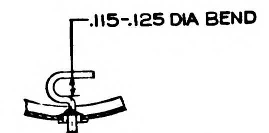
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE PER ATP-2021500, MC-25-852
3. TEST PER ATP-2021500, MC-25-852
4. TIN THIS SURFACE USING ITEMS 5 9
5. TIN THE TERMINAL AREA USING ITEMS 4 5
6. SOLDER ITEMS ② AND ③ TO ITEM ① USING ITEMS 4 10
7. SOLDER CONNECTOR WIRES TO TERMINALS USING ITEMS 4 10 LOOP WIRE AT EACH TERMINAL
8. APPLY ITEM ⑥ TO INSULATE SOLDER
9. BAG AND IDENTIFY PER ND-1002019

(A1) THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A-000 SUFFIX.

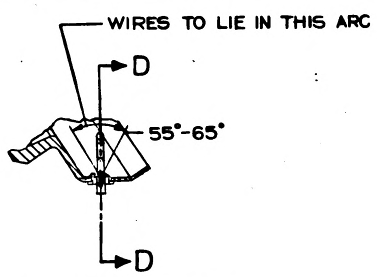
2	13			1010490-052	INSULATION-SLEEVING, ELECT, HEAT SHRINK		
2	12			1010490-026	INSULATION-SLEEVING, ELECT, HEAT SHRINK		
(A1)							
AR	10	AR		2021527	FLUX, SOLDERING		
AR	9	AR		COML	SOLDER, SN 60 WS		QQ-S-571
	8	AR		1011753	TAPE, LACING AND TYING		
1	7	1		2021509-1	CONNECTOR ASSEMBLY		
AR	6	AR		2021529	ADHESIVE, EPOXY		
AR	5	AR		2021544	FLUX, SOLDERING		
AR	4	AR		COML	SOLDER SN96WS		QQ-S-571
1	3	1		2021616	DEGASSING SEAL		
16	2	16		2021508-1	TERMINAL-FEED THRU, INSULATED		
1	1	1		2021801	TG END COVER		
	ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
011		000	LIST OF MATERIALS				

2021602	2021500	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN µf RESISTOR VALUES ARE IN OHMS K - X1000 M - X1,000,000 DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS CONTRACT NO. DRAWN P. DIETRICH OCT.16.64 CHECKED L.W. Keating 10-16-64 APPROVED 8-11-65 APPROVED RACurtis 8-11-65	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
NEXT ASSY	USED ON	MATERIAL	MIT APPROVED W Kupfer DATE 12 Aug 65	TG END COVER ASSEMBLY APOLLO II IRIG
APPLICATION		FINISH	NASA APPROVED DATE 8/12/65	SIZE D CODE IDENT NO DRAWING NO. 2021802
				SCALE 2/1 SHEET 1 OF 1

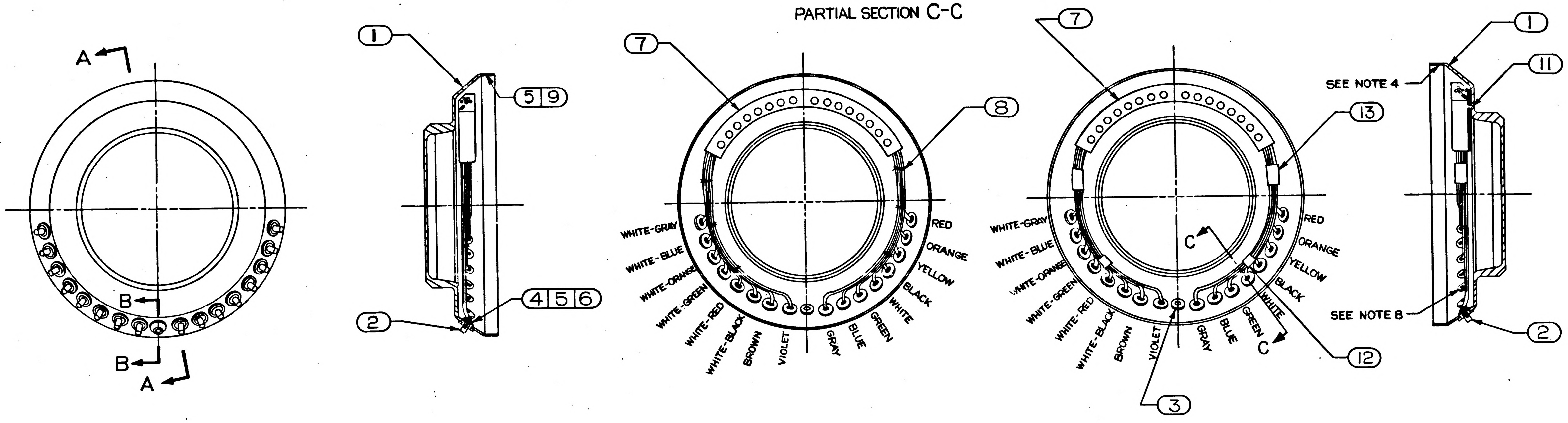
REVISIONS						2541
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED

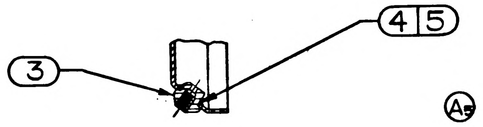

.115-.125 DIA BEND

PARTIAL SECTION D-D


WIRES TO LIE IN THIS ARC
D
55°-65°
D

PARTIAL SECTION C-C


A
B
B
A
1
5 9
4 5 6
2
7
8
RED
ORANGE
YELLOW
BLACK
WHITE
GREEN
BLUE
GRAY
VIOLET
BROWN
WHITE-BLACK
WHITE-RED
WHITE-GREEN
WHITE-ORANGE
WHITE-BLUE
WHITE-GRAY
7
1
11
SEE NOTE 4
13
C
C
12
3
SEE NOTE 8
2



PARTIAL SECTION B-B

NOTES APPLICABLE ONLY TO 2021614-000
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE PER ATP 2021500, MC 25-852
3. TEST PER ATP 2021500, MC25-852
4. BAG AND IDENTIFY PER ND 1002019

NOTES APPLICABLE ONLY TO 2021614-011
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327
2. ASSEMBLE PER ATP-2021500, MC-25-852
3. TEST PER ATP-2021500, MC-25-852
4. TIN THIS SURFACE USING ITEMS ⑤⑨
5. TIN THE TERMINAL AREA USING ITEMS ④⑤
6. SOLDER ITEMS ② AND ③ TO ITEM ① USING ITEMS ④⑩
7. SOLDER CONNECTOR WIRES TO TERMINALS USING ITEMS ④⑩ LOOP WIRE AT EACH TERMINAL
8. APPLY ITEM ⑥ TO INSULATE SOLDER
9. BAG AND IDENTIFY PER ND-1002019

(A5) THE ORIGINAL CONFIGURATION IS IDENTIFIED BY THE DRAWING NUMBER AND A-000 SUFFIX.

2	13			1010490-052	INSULATION-SLEEVING, ELECT, HEAT SHRINK		
2	12			1010490-026	INSULATION-SLEEVING, ELECT, HEAT SHRINK		
AR	11			COML	TAPE, ELECT.-INSULATION		MIL-1-15126 TYPE MF 2.5
AR	10	AR		2021527	FLUX, SOLDERING		
AR	9	AR		COML	SOLDER, SN 60 WS		QQ-S-571
	8	AR		1011753	TAPE, LACING AND TYING		
1	7	1		2021509-1	CONNECTOR ASSEMBLY		
AR	6	AR		2021529	ADHESIVE, EPOXY		
AR	5	AR		2021544	FLUX, SOLDERING		
AR	4	AR		COML	SOLDER SN96WS		QQ-S-571
1	3	1		2021616	DEGASSING SEAL		
16	2	16		2021508-1	TERMINAL-FEED THRU, INSULATED		
1	1	1		2021801	TG END COVER		
	ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
011		000	LIST OF MATERIALS				

NEXT ASSY	USED ON
2021602	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

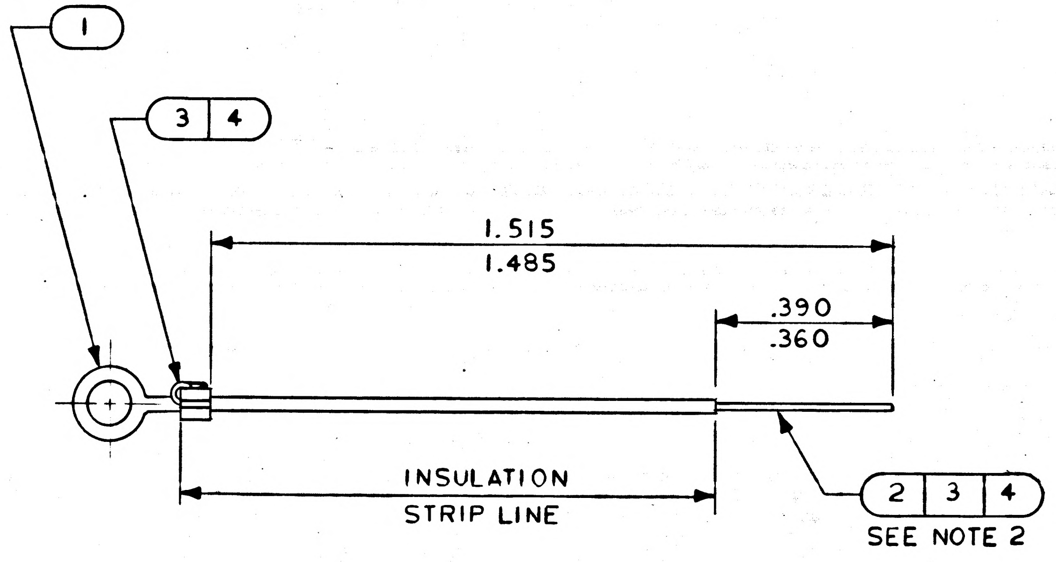
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN P. DIETRICH OCT.16.64
CHECKED L.W. Keating 10-16-64
APPROVED 8-11-65
APPROVED RA Cooth 8-11-65
MIT APPROVED W Kupfer DATE 12 Aug 65
NASA APPROVED DATE 8/12/65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TG END COVER ASSEMBLY
APOLLO II IRIG

SIZE D
CODE IDENT NO
DRAWING NO. 2021802
SCALE 2/1
SHEET 1 OF 1

REVISIONS						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	-	INITIAL RELEASE / TDRR 29308				



NOTES:
1. INTERPRET DRAWING PER MIL-D-70327
2. WIRE ENDS TO BE STRIPPED AND TINNED PER ND1002071
3 BAG AND IDENTIFY PER ND1002019

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
4	AR		2021527	FLUX, SOLDERING		
3	AR		COML	SOLDER, SN60WS		QQ-S-571
2	AR		1010416-1	WIRE, ELEC., 28AWG, BLK		
1	1		1010717-4	TERMINAL, LUG		

LIST OF MATERIALS

MASTER

2021500	2021500
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS

CONTRACT NO.
DRAWN P DUNCAN 5-27-66
CHECKED T. Zimmerman 5-27-66
APPROVED
APPROVED

MIT APPROVED DATE
MGWhirley 6-1-66

NASA A G METZGER

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

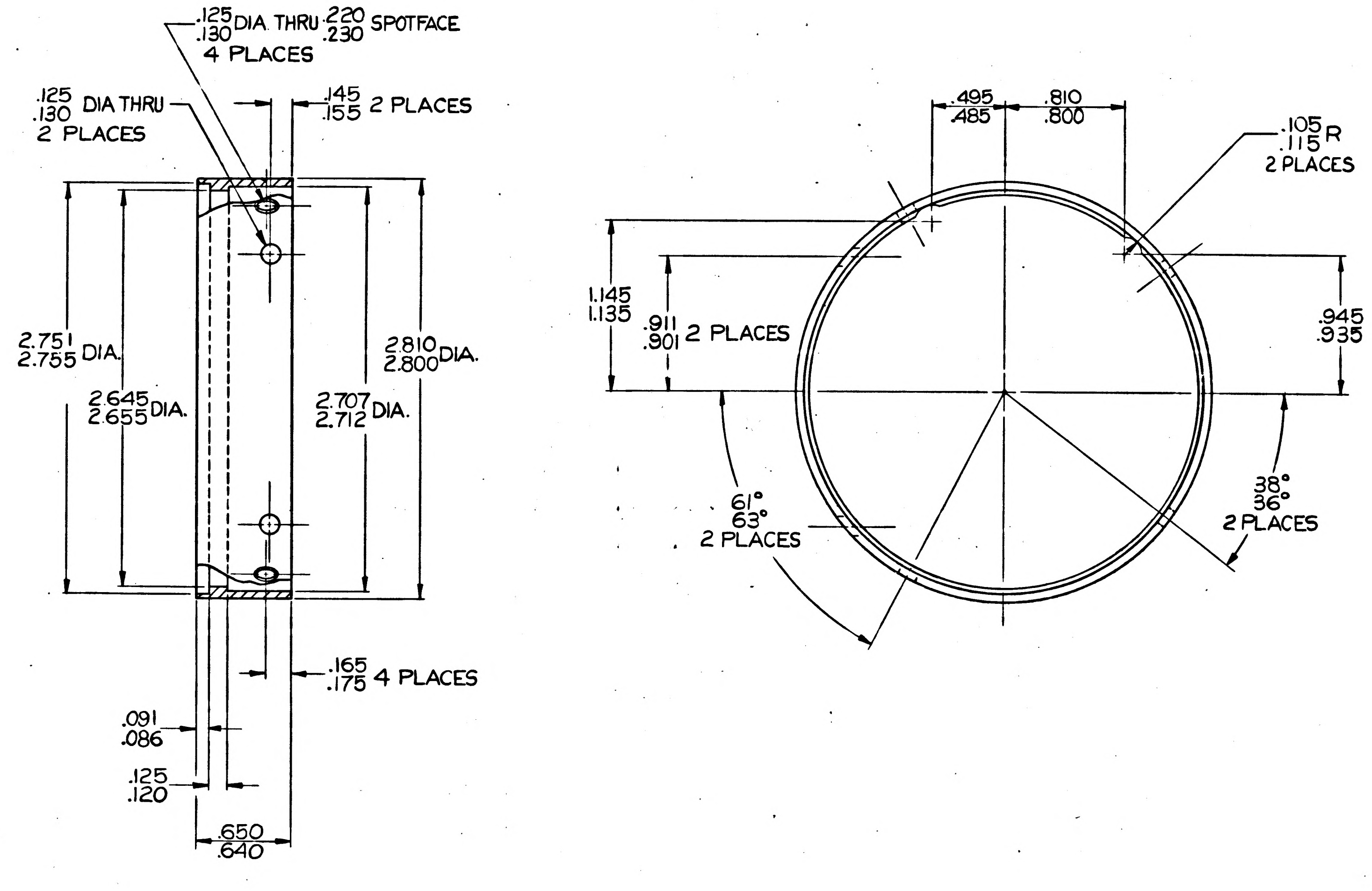
GROUND WIRE

SIZE C
CODE IDENT NO.
DRAWING NO. 2021803
SCALE 4 1
SHEET 1 OF 1

2021804

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. $\overset{62}{\surd}$ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED.
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005 MAX.
4. BAG AND IDENTIFY PER ND 1002019.

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE PER TDRR 33086		28 FEB 67	



.125/.130 DIA THRU .220/.230 SPOTFACE 4 PLACES
.125/.130 DIA THRU 2 PLACES
.145/.155 2 PLACES
2.751/2.755 DIA.
2.645/2.655 DIA.
2.810/2.800 DIA.
2.707/2.712 DIA.
.165/.175 4 PLACES
.091/.086
.125/.120
.650/.640
.495/.485
.810/.800
.105/.115 R 2 PLACES
1.145/1.135
.911/.901 2 PLACES
.945/.935
61°/63° 2 PLACES
38°/36° 2 PLACES

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS + — −— 3 PLACE DECIMALS + — −— ANGLES + — −—
DO NOT SCALE THIS DRAWING
MATERIAL AL. ALY 6061-T6 PER QQ-A-200/8 FINISH MIL-A-8625; TYPE II CLASS I
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG. NO.
DRAWN G.W. WOLF DATE 8-266
CHECKED R. L. Wagner 8/18/66
APPROVAL C. Semerdjian 8/18/66
CONTRACT NAS 9-3426
NASA APPROVAL
MIT APPROVAL McMurtry 1-17-67

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

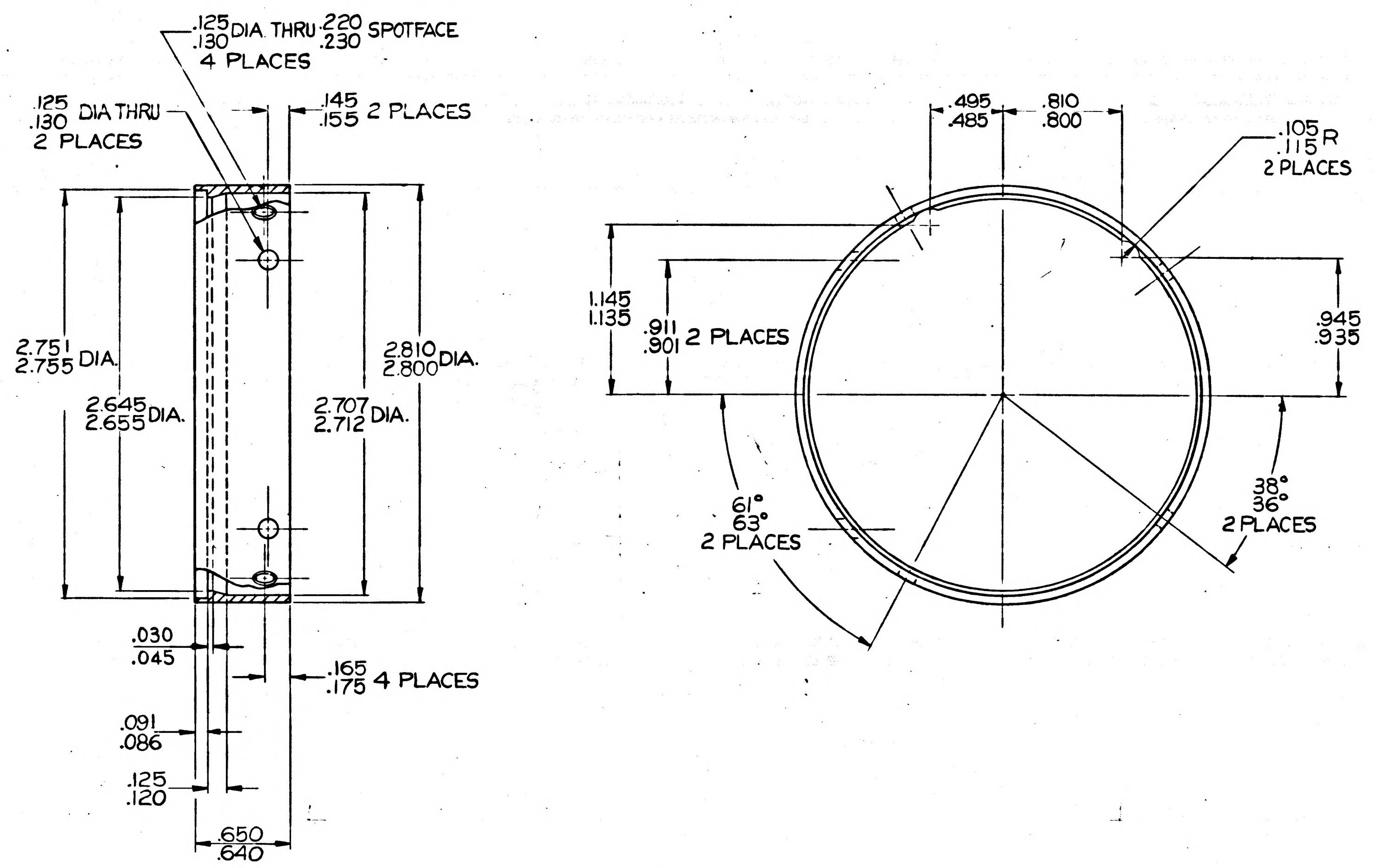
RING, MOUNTING

SIZE D
CODE IDENT NO. 80230
2021804
SCALE 2:1
SHEET 1 OF 1

2021804 B

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. 62√ FINISH ALL OVER UNLESS OTHERWISE SPECIFIED.
3. REMOVE ALL BURRS AND BREAK SHARP EDGES .005 MAX.
4. BAG AND IDENTIFY PER ND 1002019.

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE PER TDRR 33086		28 FEB 67	
B		REVISED PER TDRR 37068	—	4-DEC 68	



.125 .130 DIA THRU .220 .230 SPOTFACE 4 PLACES
.125 .130 DIA THRU 2 PLACES
.145 .155 2 PLACES
2.751 2.755 DIA.
2.645 2.655 DIA.
2.707 2.712 DIA.
2.810 2.800 DIA.
.030 .045
.165 .175 4 PLACES
.091 .086
.125 .120
.650 .640
.495 .485
.810 .800
.105 .115 R 2 PLACES
1.145 1.135
.911 .901 2 PLACES
.945 .935
61° 63° 2 PLACES
38° 36° 2 PLACES

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS +— −— 3 PLACE DECIMALS +— −— ANGLES +— −—
DO NOT SCALE THIS DRAWING
MATERIAL AL. ALY 6061-T6 PER QQ-A-200/8 FINISH MIL-A-8625; TYPE II CLASS 1
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG. NO.
DRAWN G.W. WOLF DATE 8-2-66
CHECKED R.L. Wagner
APPROVAL C. Sommerfeld 8/18/66
CONTRACT NAS 9-3426
NASA APPROVAL
MIT APPROVAL M.G. Morley 2-17-67

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

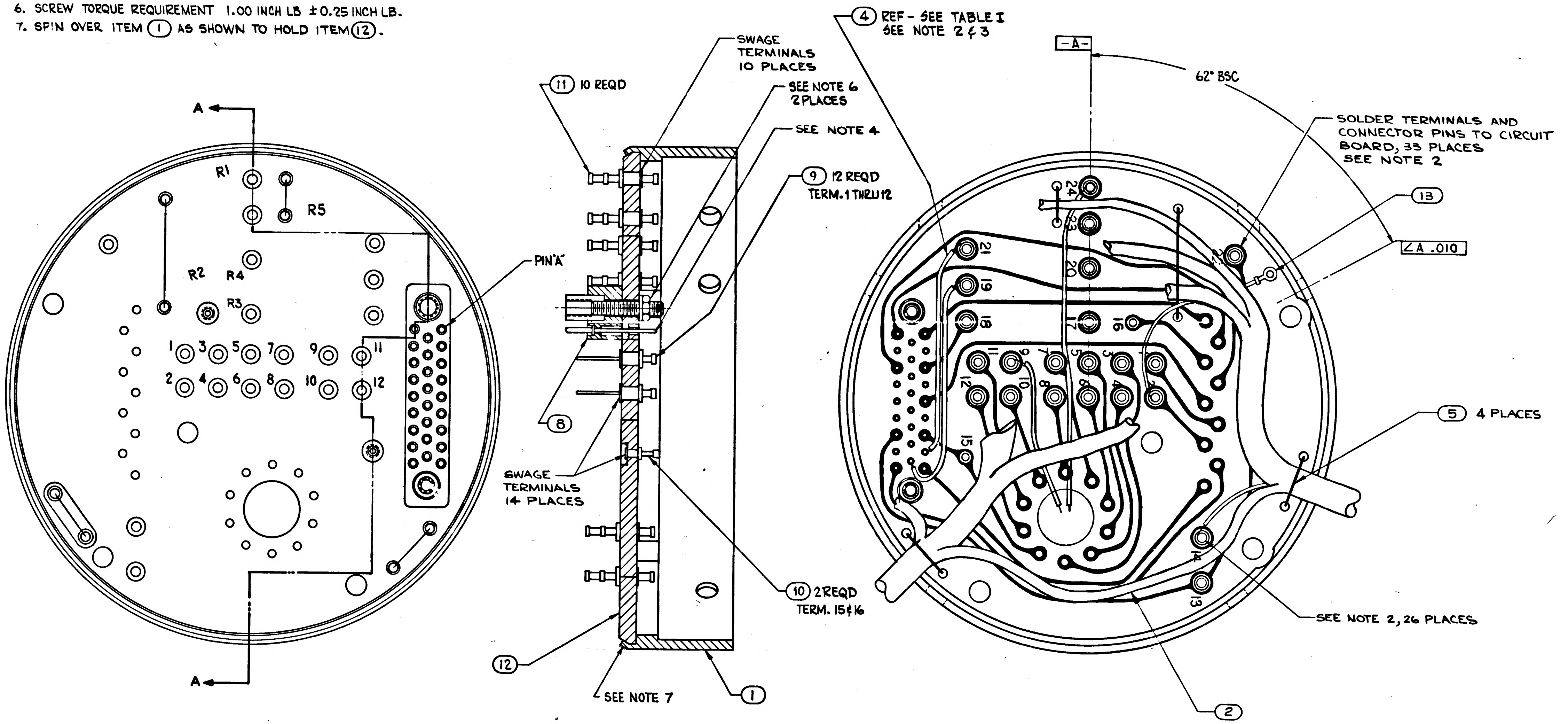
RING, MOUNTING

SIZE D
CODE IDENT NO. 80230
2021804
SCALE 2:1
SHEET 1 OF 1

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE PER TDRR 33086		28 FEB	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER ND1002071 USING ITEMS ③ AND ⑦. PERCHLORETHYLENE MAY BE USED FOR FLUX REMOVAL AND CLEANING.
3. NUMBERED DESIGNATIONS ON PRINTED CIRCUIT BOARD ARE PARTIAL DESIGNATIONS. NUMBER SHOULD BE PRECEDED BY THE LETTER "E" TO CONFORM WITH SCHEMATIC NASA DRAWING NO. 2021806
4. TIN 26 CONNECTOR PINS WITH SN60 PRIOR TO ASSEMBLING AND SOLDERING CONNECTOR TO THE CIRCUIT BOARD.
5. WICKING SHALL NOT EXCEED A POINT WHERE WIRE FLEXIBILITY IS LOST 1/16 INCH FROM END OF INSULATION.
6. SCREW TORQUE REQUIREMENT 1.00 INCH LB ± 0.25 INCH LB.
7. SPIN OVER ITEM ① AS SHOWN TO HOLD ITEM ⑫.


A
A
R1
R5
R2
R4
R3
1
3
5
7
9
11
2
4
6
8
10
12
PIN "A"
⑪ 10 REQD
SWAGE TERMINALS 10 PLACES
SEE NOTE 6 2 PLACES
SEE NOTE 4
⑨ 12 REQD TERM. 1 THRU 12
⑧
SWAGE TERMINALS 14 PLACES
⑩ 2 REQD TERM. 15 & 16
⑫
SEE NOTE 7
①
④ REF - SEE TABLE I SEE NOTE 2 & 3
-A-
62° BSC
SOLDER TERMINALS AND CONNECTOR PINS TO CIRCUIT BOARD, 33 PLACES SEE NOTE 2
⑬
∠ A .010
⑤ 4 PLACES
SEE NOTE 2, 26 PLACES
②
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1

SECTION A-A

TABLE I

CONDUCTOR CHART

COND. NO.	FROM			TO			ITEM NO.
	CIR. PT.	STRIP	TIN	CIR. PT.	STRIP	TIN	
1	E19	.20	Y	J1a	.20	Y	4
2	E21	.20	Y	J1b	.20	Y	4
3	E24	.20	Y	-	.20	Y	4
4	E9	.20	Y	-	.20	Y	6

			1		13	2021803	GROUND WIRE
			1		12	2021808	PRINTED CIRCUIT BOARD
			10		11	1008924-001	TERMINAL
			2		10	1008925-001	TERMINAL
			12		9	1008926-001	TERMINAL
			1		8	1008928-26	CONNECTOR
			AR		7	2021527	FLUX SOLDERING
			AR		6	1010416-6	WIRE, 28E AWG GRN
			AR		5	MIL-T-713	LACING TAPE, TYPE P
			AR		4	1010416-10	WIRE, 28E AWG WHT
			AR		3	SN60	SOLDER QQ-S-571
			1		2	2021810	WIRING HARNESS A
			1		1	2021804	RING, MOUNTING
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS + — − —
3 PLACE DECIMALS + — − —
ANGLES + — − —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN 4 AUG 66 DATE
CHECKED R. Wagner
APPROVAL 8/12/66
CONTRACT NAS 9-3426
NASA APPROVAL
MIT APPROVAL 3-17-67

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE, MOUNTING, AND
HARNESS ASSEMBLY

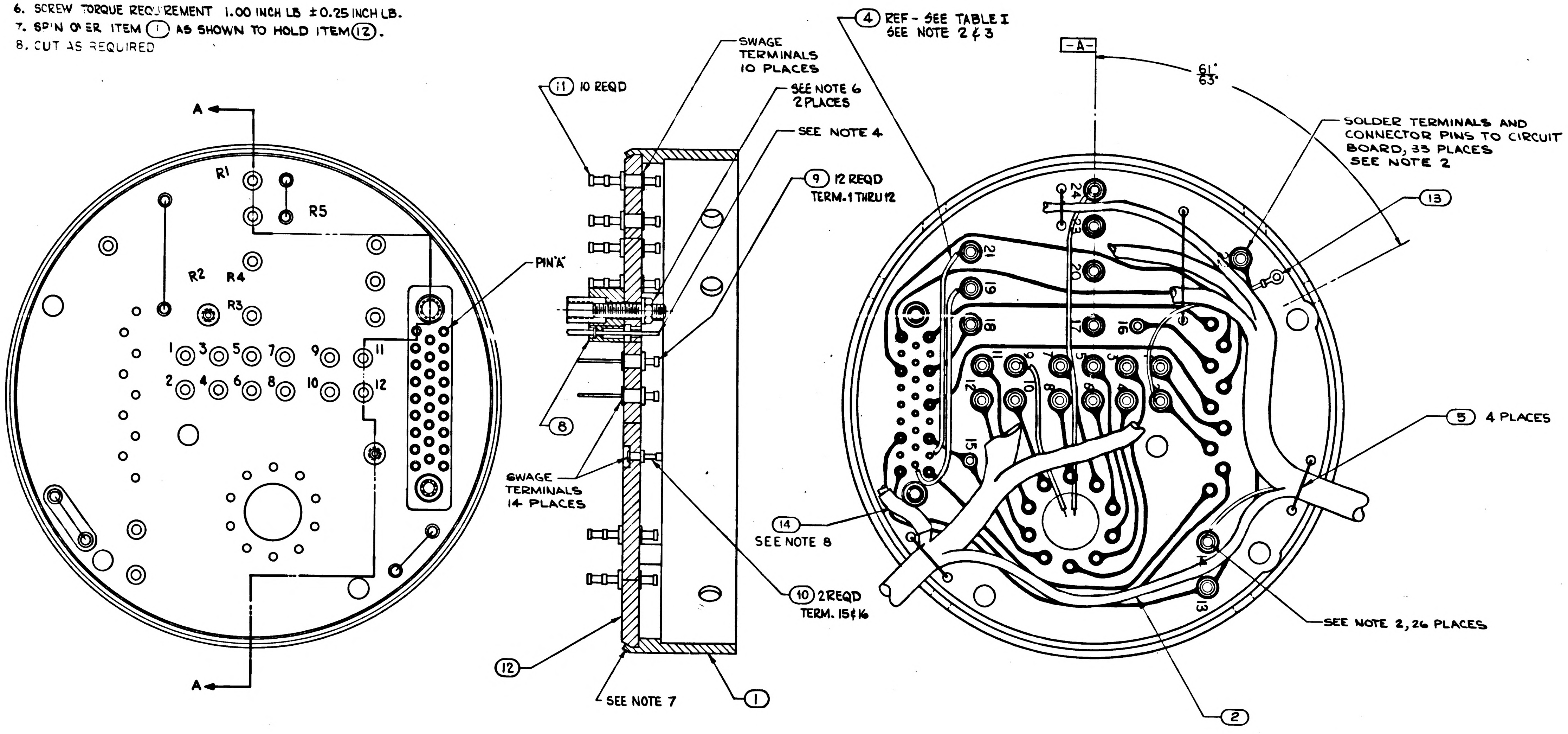
SIZE
CODE IDENT NO. 80230
2021805
SCALE 4:1
SHEET 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER ND1002071 USING ITEMS ③ AND ⑦. PERCHLORETHYLENE MAY BE USED FOR FLUX REMOVAL AND CLEANING.
3. NUMBERED DESIGNATIONS ON PRINTED CIRCUIT BOARD ARE PARTIAL DESIGNATIONS. NUMBER SHOULD BE PRECEDED BY THE LETTER "E" TO CONFORM WITH SCHEMATIC NASA DRAWING NO. 2021806
4. TIN 26 CONNECTOR PINS WITH SN60 PRIOR TO ASSEMBLING AND SOLDERING CONNECTOR TO THE CIRCUIT BOARD.
5. WICKING SHALL NOT EXCEED A POINT WHERE WIRE FLEXIBILITY IS LOST 1/16 INCH FROM END OF INSULATION.
6. SCREW TORQUE REQUIREMENT 1.00 INCH LB ±0.25 INCH LB.
7. SPIN OVER ITEM ① AS SHOWN TO HOLD ITEM ⑫.
8. CUT AS REQUIRED

REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE PER TDRR 33086			
	B	REV SEC PER TDRR 33961		6-6-67	



A
A
R1
R5
R2
R4
R3
1
2
3
4
5
6
7
8
9
10
11
12
PIN "A"
⑪ 10 REQD
SWAGE TERMINALS 10 PLACES
SEE NOTE 6 2 PLACES
SEE NOTE 4
⑨ 12 REQD TERM. 1 THRU 12
⑧
SWAGE TERMINALS 14 PLACES
⑩ 2 REQD TERM. 15 & 16
⑫
SEE NOTE 7
①
SECTION A-A
④ REF - SEE TABLE I SEE NOTE 2 & 3
-A-
61°
63°
SOLDER TERMINALS AND CONNECTOR PINS TO CIRCUIT BOARD, 33 PLACES SEE NOTE 2
⑬
⑤ 4 PLACES
⑭ SEE NOTE 8
SEE NOTE 2, 26 PLACES
②
24
23
22
21
20
19
18
17
16
15
14
13

TABLE I

CONDUCTOR CHART							
COND. NO.	FROM			TO			ITEM NO.
	CIR. PT.	STRIP	TIN	CIR. PT.	STRIP	TIN	
1	E19	.20	Y	J1a	.20	Y	4
2	E21	.20	Y	J1b	.20	Y	4
3	E24	.20	Y	-	.20	Y	4
4	E9	.20	Y	-	.20	Y	6

			AR		14	1006776-13	INSULATION SLEEVING
			1		13	2021803	GROUND WIRE
			1		12	2021808	PRINTED CIRCUIT BOARD
			10		11	1008924-001	TERMINAL
			2		10	1008925-001	TERMINAL
			12		9	1008926-001	TERMINAL
			1		8	008928-26	CONNECTOR
			AR		7	2021527	FLUX SOLDERING
			AR		6	010416-6	WIRE, 28E AWG GRN
			AR		5	MIL-T-713	LACING TAPE, TYPE P
			AR		4	010416-10	WIRE, 28E AWG WHT
			AR		3	SN60	SOLDER QQ-S-571
			1		2	2021810	WIRING HARNESS A
			1		1	2021804	RING, MOUNTING
QUANTITY REQUIRED			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± — 3 PLACE DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN — DATE —
CHECKED R. Wagner
APPROVAL
CONTRACT NAS 9-3426
NASA APPROVAL
MIT APPROVAL

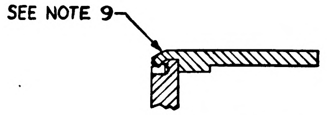
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE, MOUNTING, AND
HARNESS ASSEMBLY

SIZE
CODE IDENT NO. 80230
2021805
SCALE 4:1
SHEET 1 OF 1

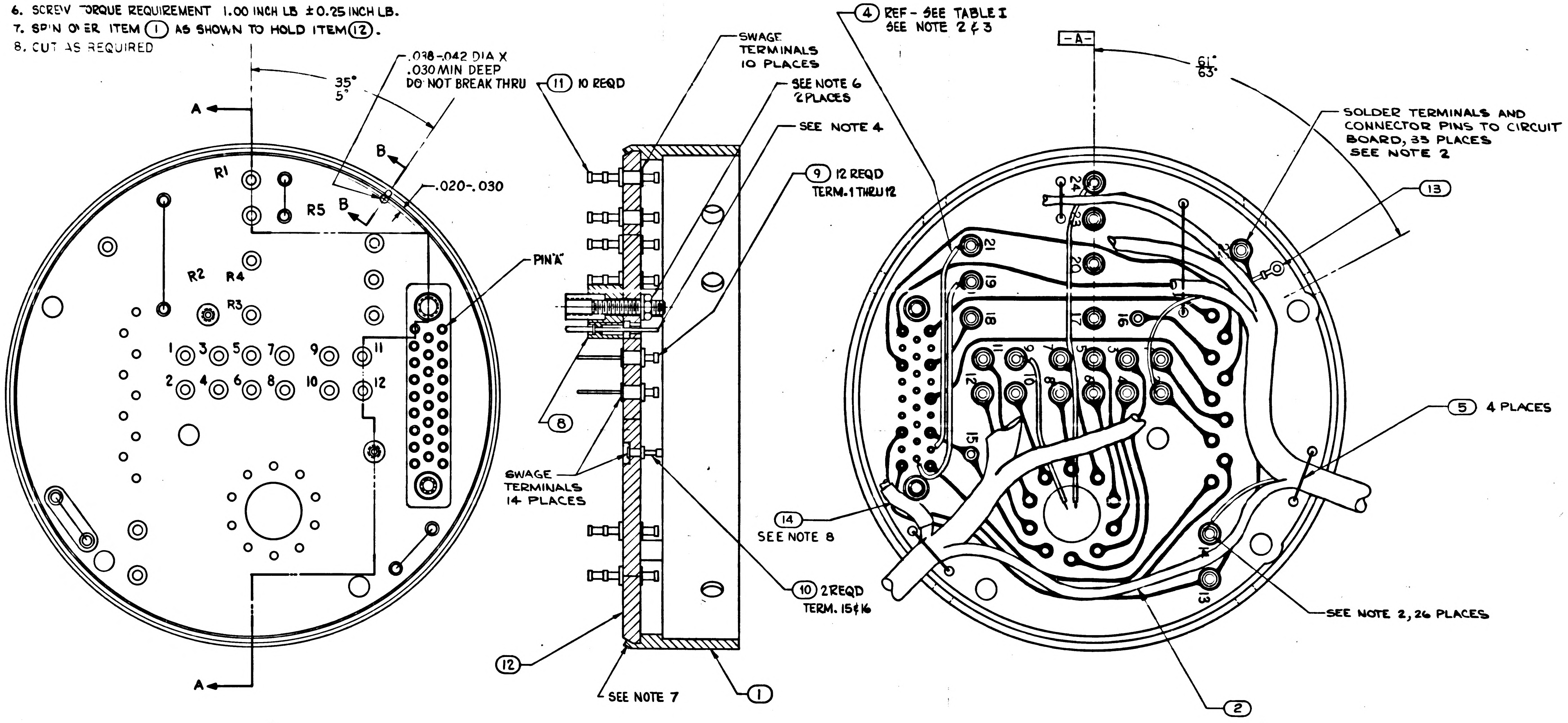
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER ND1002071 USING ITEMS ③ AND ⑦. PERCHLORETHYLENE MAY BE USED FOR FLUX REMOVAL AND CLEANING.
3. NUMBERED DESIGNATIONS ON PRINTED CIRCUIT BOARD ARE PARTIAL DESIGNATIONS. NUMBER SHOULD BE PRECEDED BY THE LETTER E TO CONFORM WITH SCHEMATIC NASA DRAWING NO 2021806
4. TIN 26 CONNECTOR PINS WITH SN60 PRIOR TO ASSEMBLING AND SOLDERING CONNECTOR TO THE CIRCUIT BOARD.
5. WICKING SHALL NOT EXCEED A POINT WHERE WIRE FLEXIBILITY IS LOST 1/16 INCH FROM END OF INSULATION.
6. SCREW TORQUE REQUIREMENT 1.00 INCH LB ± 0.25 INCH LB.
7. SPIN OVER ITEM ① AS SHOWN TO HOLD ITEM ⑫.
8. CUT AS REQUIRED
9. STAKE OVER ITEM ① AS SHOWN TO HOLD ITEM ⑫. FILL .042 DIA HOLE PER ND1002187 WITH ITEMS ⑭ AND ⑮.



SECTION B-B

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE PER TDRR 33C84		28 [illegible]	
	B	REVISED PER TDRR 33C61		6-6-67	
	C	REVISED PER TDRR 34702		29 SEP 67	ENH


A
A
35°
5°
B
B
.038-.042 DIA X
.030 MIN DEEP
DO NOT BREAK THRU
.020-.030
R1
R5
R2
R4
R3
PIN "A"
1
2
3
4
5
6
7
8
9
10
11
12
⑪ 10 REQD
SWAGE TERMINALS 10 PLACES
SEE NOTE 6 2 PLACES
SEE NOTE 4
⑨ 12 REQD TERM. 1 THRU 12
⑧
SWAGE TERMINALS 14 PLACES
⑩ 2 REQD TERM. 15 & 16
⑫
SEE NOTE 7
①
④ REF - SEE TABLE I SEE NOTE 2 & 3
-A-
61°
63°
SOLDER TERMINALS AND CONNECTOR PINS TO CIRCUIT BOARD, 35 PLACES SEE NOTE 2
⑬
⑤ 4 PLACES
⑭ SEE NOTE 8
SEE NOTE 2, 26 PLACES
②
24
22
21
20
19
18
17
16
15
14
13

SECTION A-A

TABLE I

CONDUCTOR CHART							
COND. NO.	FROM			TO			ITEM NO.
	CIR PT.	STRIP	TIN	CIR PT.	STRIP	TIN	
1	E19	.20	Y	J1a	.20	Y	4
2	E21	.20	Y	J1b	.20	Y	4
3	E24	.20	Y	-	.20	Y	4
4	E9	.20	Y	-	.20	Y	6

QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			011				
			AR		16	1010679	ACTIVATOR-W
			AR		15	1010661	C-7 ADHESIVE
			AR		14	1006776-3	INSULATION SLEEVING
			1		13	2021803	GROUND WIRE
			1		12	2021808	PRINTED CIRCUIT BOARD
			10		11	1008924-001	TERMINAL
			2		10	1008925-001	TERMINAL
			12		9	1008926-001	TERMINAL
			1		8	1008928-26	CONNECTOR
			AR		7	2021527	FLUX SOLDERING
			AR		6	1010416-6	WIRE, 28E AWG GRN
			AR		5	MIL-T-713	LACING TAPE, TYPE P
			AR		4	1010416-10	WIRE, 28E AWG WHT
			AR		3	SN60	SOLDER QQ-S-571
			1		2	2021810	WIRING HARNESS A
			1		1	2021804	RING, MOUNTING

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN
DATE
CHECKED K Wagner
APPROVAL
CONTRACT NAS 9-3426
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

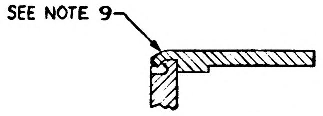
PLATE, MOUNTING, AND
HARNESS ASSEMBLY

SIZE
CODE IDENT NO. 80230
2021805
SCALE
SHEET OF 1

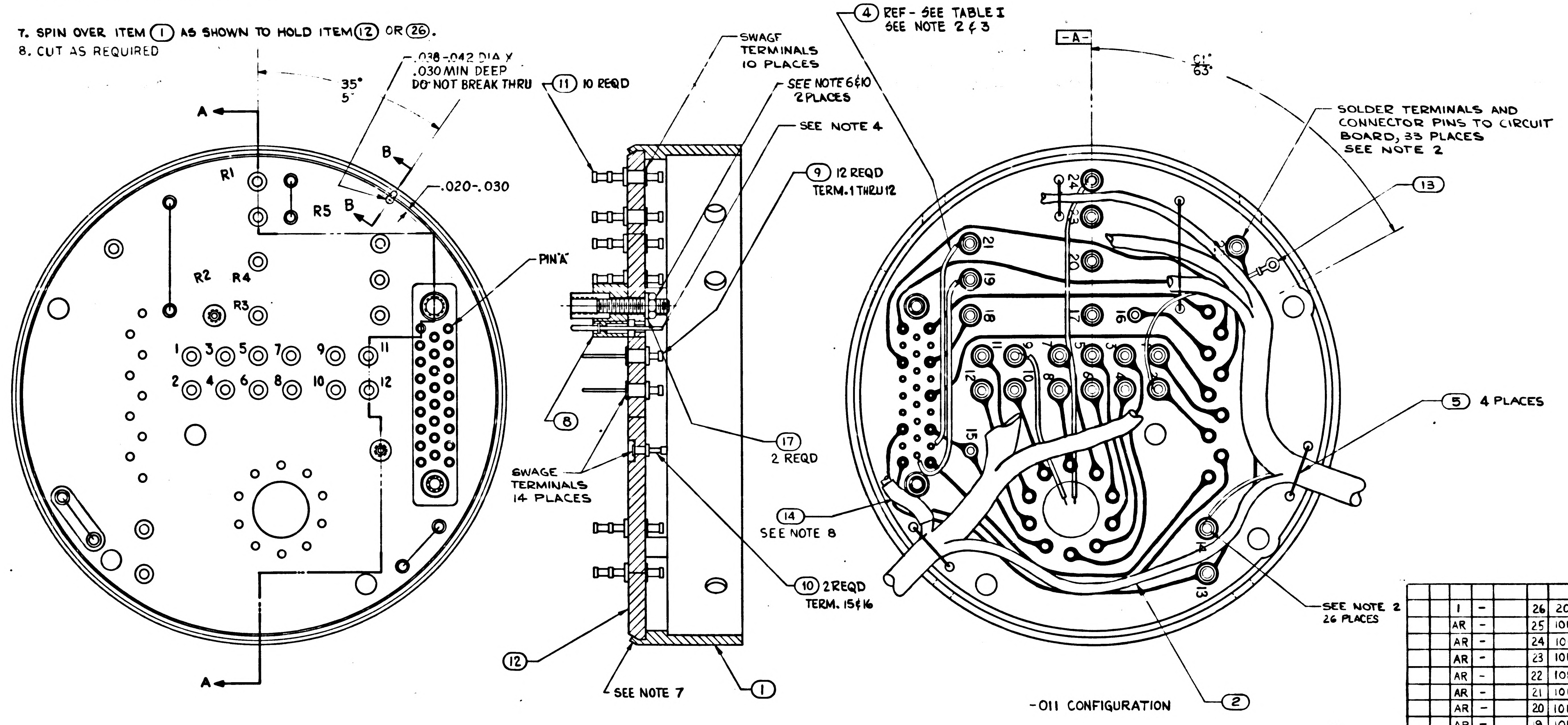
REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO	DATE	APPROVED
	A	INITIAL RELEASE PER TDRR 33286		28 ... 67	
	B	REVISED PER TDRR 33961		6 6 67	
	C	REVISED PER TDRR 34702		29 SEP 67	J.S. RWH
	D	REVISED PER TDRR 35477		3 FEB 68	J.W RWH

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER ND1002071 USING ITEMS (3) AND (7). PERCHLORETHYLENE MAY BE USED FOR FLUX REMOVAL AND CLEANING.
3. NUMBERED DESIGNATIONS ON PRINTED CIRCUIT BOARD ARE PARTIAL DESIGNATIONS. NUMBER SHOULD BE PRECEDED BY THE LETTER "E" TO CONFORM WITH SCHEMATIC NASA DRAWING NO 2021806
4. TIN 26 CONNECTOR PINS WITH SN60 PRIOR TO ASSEMBLING AND SOLDERING CONNECTOR TO THE CIRCUIT BOARD.
5. WICKING SHALL NOT EXCEED A POINT WHERE WIRE FLEXIBILITY IS LOST 1/16 INCH FROM END OF INSULATION.
6. SCREW TORQUE REQUIREMENT 1.00 INCH LB. ± 0.25 INCH LB. FOR -011 CONFIGURATION & 1.75 - 2.00 INCH LB. FOR -021 CONFIGURATION
7. SPIN OVER ITEM (1) AS SHOWN TO HOLD ITEM (12) OR (26).
8. CUT AS REQUIRED
9. STAKE OVER ITEM (1) AS SHOWN TO HOLD ITEM (12). FILL .042 DIA HOLE PER ND1002187 WITH ITEMS (14) AND (15).
10. APPLY ITEMS (15) & (16) PER ND1002187 TYPE I TO THE THREADS OF ITEM (8) FOR -021 CONFIGURATION ONLY.
11. CONDUCTORS 5 THRU 13 NOT APPLICABLE TO THE -011 CONFIGURATION.



SECTION B-B


A
A
35°
5°
B
B
R1
R5
R2
R4
R3
1
2
3
4
5
6
7
8
9
10
11
12
.038-.042 DIA X .030 MIN DEEP DO NOT BREAK THRU
.020-.030
PIN "A"
(11) 10 REQD
SWAGE TERMINALS 10 PLACES
SEE NOTE 6 & 10 2 PLACES
SEE NOTE 4
(9) 12 REQD TERM. 1 THRU 12
(8)
SWAGE TERMINALS 14 PLACES
(17) 2 REQD
(14) SEE NOTE 8
(10) 2 REQD TERM. 15 & 16
(12)
SEE NOTE 7
(1)
(4) REF - SEE TABLE I SEE NOTE 2 & 3
-A-
60° 63°
SOLDER TERMINALS AND CONNECTOR PINS TO CIRCUIT BOARD, 33 PLACES SEE NOTE 2
(13)
(5) 4 PLACES
SEE NOTE 2 26 PLACES
(2)
24
23
22
21
20
19
18
17
16
15
14
13

SECTION A-A

-011 CONFIGURATION

TABLE I (SEE NOTE 11)

CONDUCTOR CHART

COND. NO.	FROM			TO			ITEM NO.
	CIR PT.	STRIP	TIN	CIR PT.	STRIP	TIN	
1	E19	.20	Y	J1a	.20	Y	4
2	E21	.20	Y	J1b	.20	Y	4
3	E24	.20	Y	-	.20	Y	4
4	E9	.20	Y	-	.20	Y	6
5	----	.20	Y	J1H	.20	Y	18
6	----	.20	Y	J1A	.20	Y	19
7	----	.20	Y	J1C	.20	Y	20
8	E18	.20	Y	J1K	.20	Y	21
9	----	.20	Y	J1S	.20	Y	22
10	E15	.20	Y	J1Y	.20	Y	6
11	----	.20	Y	J1d	.20	Y	23
12	----	.20	Y	J1$\overline{c}$	.20	Y	24
13	E13	.20	Y	J1$\overline{W}$	.20	Y	25

QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
		021	011				
		1	-		26	2021410	PRINTED CIRCUIT BOARD
		AR	-		25	1010416-9	WIRE 28E AWG. GRY
		AR	-		24	1010416-8	WIRE, 28E AWG. VIT
		AR	-		23	1010416-7	WIRE, 28E AWG. BLU
		AR	-		22	1010416-5	WIRE, 28E AWG. YEL
		AR	-		21	1010416-4	WIRE, 28E AWG. ORG
		AR	-		20	1010416-3	WIRE, 28E AWG. RED
		AR	-		19	1010416-2	WIRE, 28E AWG. BWN
		AR	-		18	1010416-1	WIRE, 28E AWG. BLK
		2	-		17	NAS 620C2	WASHER, FLAT
		AR	AR		16	1010679	ACTIVATOR-W
		AR	AR		15	1010661	C-7 ADHESIVE
		AR	AR		14	1006776-13	INSULATION SLEEVING
		1	1		13	2021803	GROUND WIRE
		-	1		12	2021808	PRINTED CIRCUIT BOARD
		10	10		11	1008924-001	TERMINAL
		2	2		10	1008925-001	TERMINAL
		12	12		9	1008926-001	TERMINAL
		1	1		8	1008928-26	CONNECTOR
		AR	AR		7	2021527	FLUX SOLDERING
		AR	AR		6	1010416-6	WIRE, 28E AWG GRN
		AR	AR		5	MIL-T-713	LACING TAPE, TYPE P
		AR	AR		4	1010416-10	WIRE, 28E AWG WHT
		AR	AR		3	SN60	SOLDER QQ-S-571
		1	1		2	2021810	WIRING HARNESS A
		1	1		1	2021804	RING, MOUNTING

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

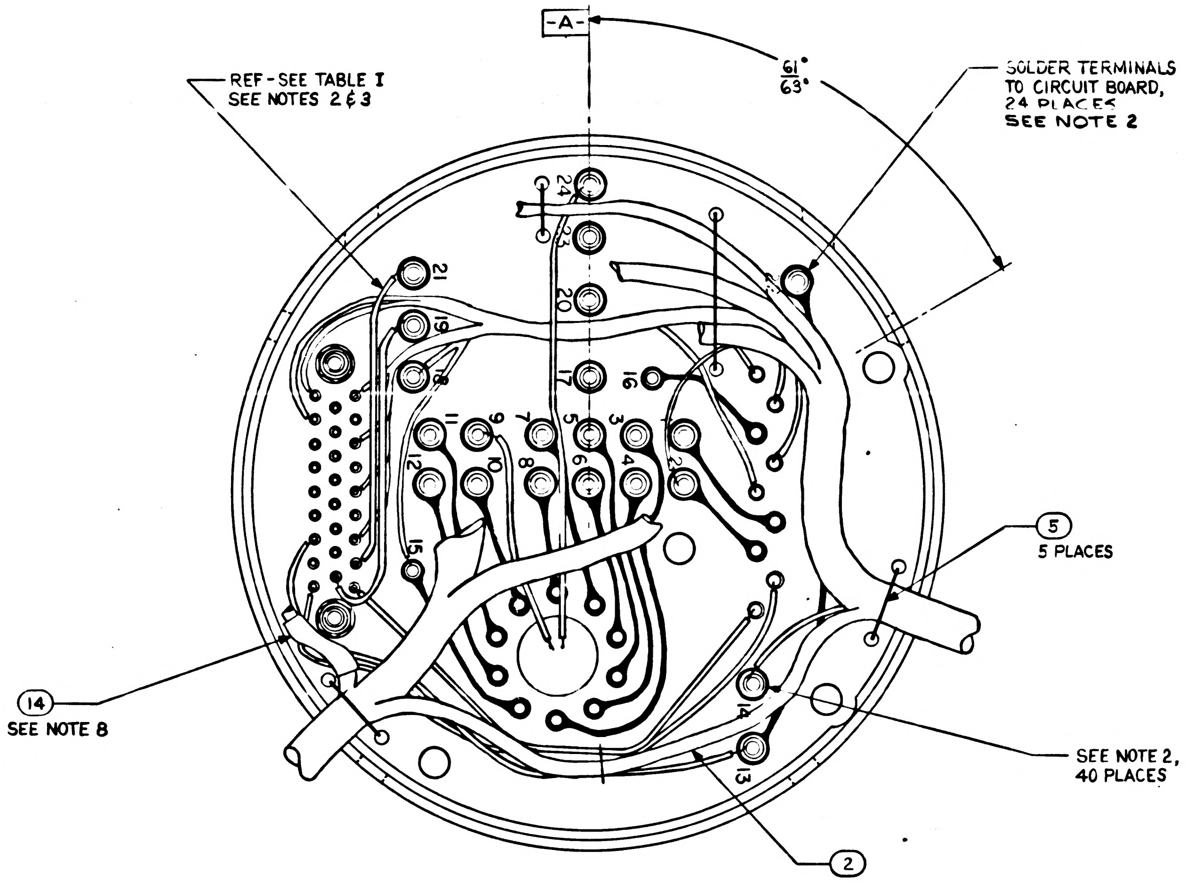
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN DATE
CHECKED
APPROVAL
CONTRACT NAS 9-3426
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE, MOUNTING, AND
HARNESS ASSEMBLY

SIZE
CODE IDENT NO. 80230
2021805
SCALE 4:1
SHEET 1 OF 2

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPD
	D	REVISED PER TDRR 35477 NEW SHEET ADDED		8 FEB 68	J.W.



-A-
$\frac{61°}{63°}$
REF-SEE TABLE I
SEE NOTES 2 & 3
SOLDER TERMINALS
TO CIRCUIT BOARD,
24 PLACES
SEE NOTE 2
⑤
5 PLACES
⑭
SEE NOTE 8
SEE NOTE 2,
40 PLACES
②
24
23
22
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1

BOTTOM VIEW
-021 CONFIGURATION

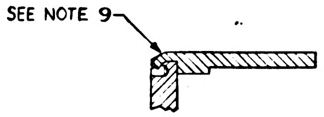
D THIS SHEET ADDED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE DECIMALS + — − 3 PLACE DECIMALS + — − ANGLES + — −	MIT INSTRUMENTATION LAB CAMBRIDGE MASS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Wal. siewicz DATE 2-8-68 CHECKED R. HEISEL 14 FEB 68 APPROVAL CONTRACT	PLATE, MOUNTING, AND HARNESS ASSEMBLY
MATERIAL —	NASA APPROVAL	SIZE CODE IDENT NO. 80230 2021805
APPROVAL	MIT APPROVAL	SCALE 4:1 SHEET 2 OF 2

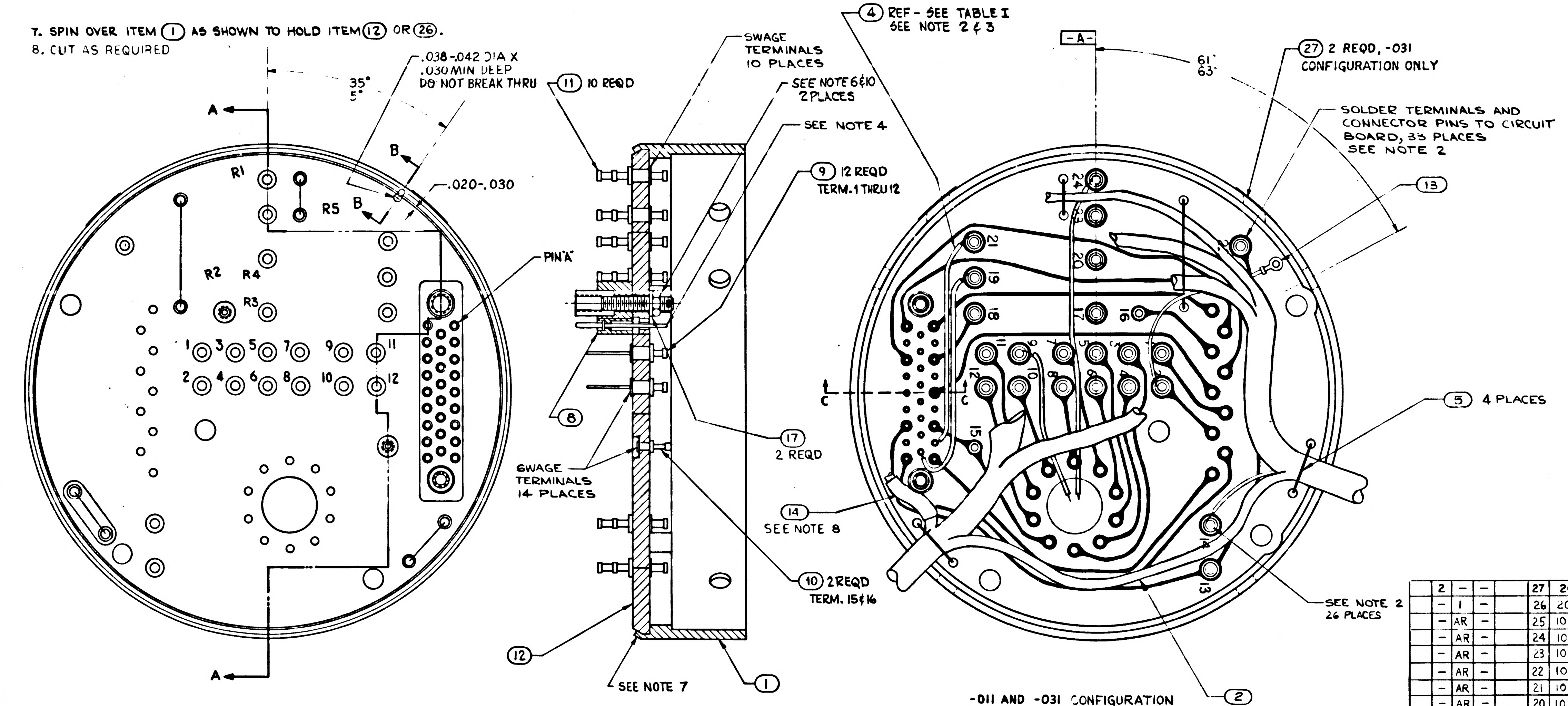
REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO	DATE	APPROVED
	A	INITIAL RELEASE PER TDRR 33086		28 [illegible] 67	
	B	REVISED PER TDRR 33961		6-6-67	
	C	REVISED PER TDRR 34702		29 SEP 67	J.S. RWH
	D	REVISED PER TDRR 35477		8 FEB 68	J.W. RWH
	E	REVISED PER TDRR 35479		20 FEB 68	B.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER ND1002071 USING ITEMS ③ AND ⑦. PERCHLORETHYLENE MAY BE USED FOR FLUX REMOVAL AND CLEANING.
3. NUMBERED DESIGNATIONS ON PRINTED CIRCUIT BOARD ARE PARTIAL DESIGNATIONS. NUMBER SHOULD BE PRECEDED BY THE LETTER "E" TO CONFORM WITH SCHEMATIC NASA DRAWING NO 2021806
4. TIN 26 CONNECTOR PINS WITH SN60 PRIOR TO ASSEMBLING AND SOLDERING CONNECTOR TO THE CIRCUIT BOARD.
5. WICKING SHALL NOT EXCEED A POINT WHERE WIRE FLEXIBILITY IS LOST 1/16 INCH FROM END OF INSULATION.
6. SCREW TORQUE REQUIREMENT 1.00 INCH LB. ± 0.25 INCH LB. FOR -011 & -031 CONFIGURATION & 1.75 - 2.00 INCH LB. FOR -021 CONFIGURATION
7. SPIN OVER ITEM ① AS SHOWN TO HOLD ITEM ⑫ OR (26).
8. CUT AS REQUIRED
9. STAKE OVER ITEM ① AS SHOWN TO HOLD ITEM ⑫. FILL .042 DIA HOLE PER ND1002187 WITH ITEMS ⑭ AND ⑮.
10. APPLY ITEMS ⑮ & ⑯ PER ND1002187 TYPE I TO THE THREADS OF ITEM ⑧ FOR -021 CONFIGURATION ONLY.
11. CONDUCTORS 5 THRU 13 NOT APPLICABLE TO THE -011 AND -031 CONFIGURATION.
12. FILL AREA ABOVE CONNECTOR TERMINATIONS WITH ITEMS 15 AND 16 PER ND1002187 TYPE IV.



SECTION B-B


A
A
35°
5°
.038-.042 DIA X
.030 MIN DEEP
DO NOT BREAK THRU
⑪ 10 REQD
B
B
.020-.030
R1
R5
R2
R4
R3
PIN 'A'
1
2
3
4
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11
12
SWAGE TERMINALS 10 PLACES
SEE NOTE 6&10 2 PLACES
SEE NOTE 4
⑨ 12 REQD TERM. 1 THRU 12
⑧
⑰ 2 REQD
SWAGE TERMINALS 14 PLACES
⑭ SEE NOTE 8
⑩ 2 REQD TERM. 15&16
⑫
SEE NOTE 7
①
④ REF - SEE TABLE I SEE NOTE 2 & 3
-A-
61°
63°
㉗ 2 REQD, -031 CONFIGURATION ONLY
SOLDER TERMINALS AND CONNECTOR PINS TO CIRCUIT BOARD, 35 PLACES SEE NOTE 2
⑬
⑤ 4 PLACES
C
C
SEE NOTE 2 26 PLACES
②
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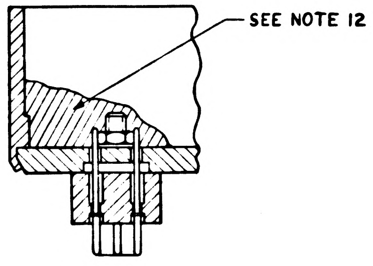
13

-011 AND -031 CONFIGURATION

SECTION A-A



PARTIAL SECTION C-C
-031 CONFIGURATION ONLY

TABLE I (SEE NOTE 11)

CONDUCTOR CHART							
COND. NO.	FROM			TO			ITEM NO.
	CIR. PT.	STRIP	TIN	CIR. PT.	STRIP	TIN	
1	E19	.20	Y	J1a	.20	Y	4
2	E21	.20	Y	J1b	.20	Y	4
3	E24	.20	Y	-	.20	Y	4
4	E9	.20	Y	-	.20	Y	6
5	----	.20	Y	J1H	.20	Y	18
6	----	.20	Y	J1A	.20	Y	19
7	----	.20	Y	J1C	.20	Y	20
8	E18	.20	Y	J1K	.20	Y	21
9	----	.20	Y	J1S	.20	Y	22
10	E15	.20	Y	J1Y	.20	Y	6
11	----	.20	Y	J1d	.20	Y	23
12	----	.20	Y	J1c̄	.20	Y	24
13	E13	.20	Y	J1W	.20	Y	25

2	-	-		27	2021405	COVER PLATE, ACCESS
-	1	-		26	2021410	PRINTED CIRCUIT BOARD
-	AR	-		25	1010416-9	WIRE, 28E AWG. GRY
-	AR	-		24	1010416-8	WIRE, 28E AWG. VIT
-	AR	-		23	1010416-7	WIRE, 28E AWG. BLU
-	AR	-		22	1010416-5	WIRE, 28E AWG. YEL
-	AR	-		21	1010416-4	WIRE, 28E AWG. ORG
-	AR	-		20	1010416-3	WIRE, 28E AWG. RED
-	AR	-		19	1010416-2	WIRE, 28E AWG. BWN
-	AR	-		18	1010416-1	WIRE, 28E AWG. BLK
-	2	-		17	NAS 620C2	WASHER, FLAT
AR	AR	AR		16	1010679	ACTIVATOR-W
AR	AR	AR		15	1010661	C-7 ADHESIVE
AR	AR	AR		14	1006776-13	INSULATION SLEEVING
1	1	1		13	2021803	GROUND WIRE
1	-	1		12	2021808	PRINTED CIRCUIT BOARD
10	10	10		11	1008924-001	TERMINAL
2	2	2		10	1008925-001	TERMINAL
12	12	12		9	1008926-001	TERMINAL
1	1	1		8	1008928-26	CONNECTOR
AR	AR	AR		7	2021527	FLUX SOLDERING
AR	AR	AR		6	1010416-6	WIRE, 28E AWG GRN
AR	AR	AR		5	MIL-T-713	LACING TAPE, TYPE P
AR	AR	AR		4	1010416-10	WIRE, 28E AWG WHT
AR	AR	AR		3	SN60	SOLDER QQ-S-571
1	1	1		2	2021810	WIRING HARNESS A
1	1	1		1	20[illegible]04	RING, MOUNTING
031	021	011	EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED				LIST OF PARTS AND MATERIALS		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

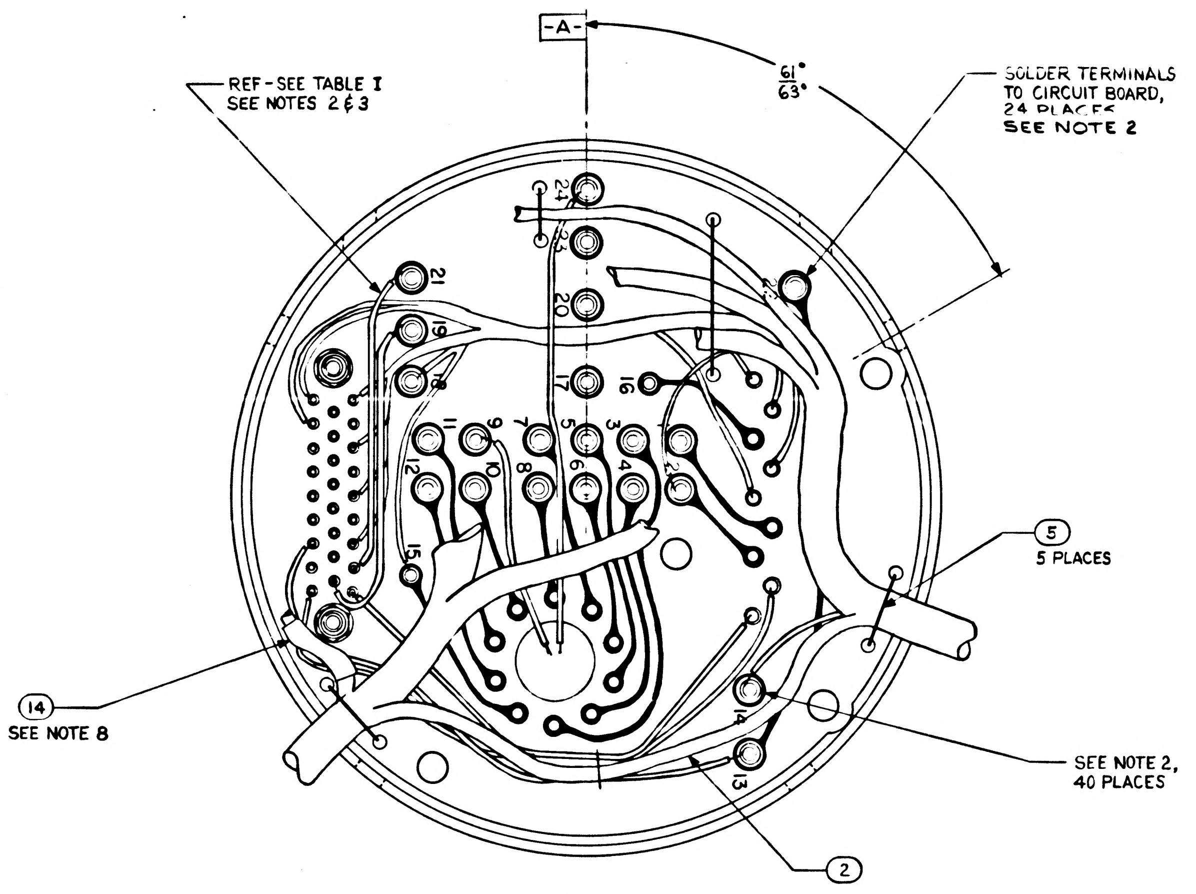
M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN
DATE
CHECKED
APPROVAL [illegible] 8 Feb '68
CONTRACT NAS 9-3426
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE, MOUNTING, AND
HARNESS ASSEMBLY

SIZE
CODE IDENT NO. 80230
2021805
SCALE 4:1
SHEET 1 of 2

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPD
	D	REVISED PER TDRR 35477 NEW SHEET ADDED		8 FEB 68	J.W
	E	REV STATUS CHANGED		20 FEB 68	J.


-A-
61°
63°
REF-SEE TABLE I
SEE NOTES 2 & 3
SOLDER TERMINALS
TO CIRCUIT BOARD,
24 PLACES
SEE NOTE 2
24
23
22
21
20
19
18
17
16
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7
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9
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12
13
14
15
5
5 PLACES
14
SEE NOTE 8
SEE NOTE 2,
40 PLACES
2

BOTTOM VIEW
-021 CONFIGURATION

D THIS SHEET ADDED

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± — 3 PLACE DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

M I T
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN Walisiewicz DATE 2-8-68
CHECKED R HEISEL 4 FEB 68
APPROVAL
CONTRACT
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

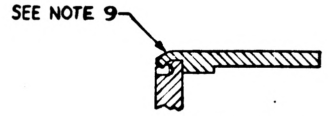
PLATE, MOUNTING, AND
HARNESS ASSEMBLY

SIZE
CODE IDENT NO 80230
2021805
SCALE 4:1
SHEET 2 OF 2

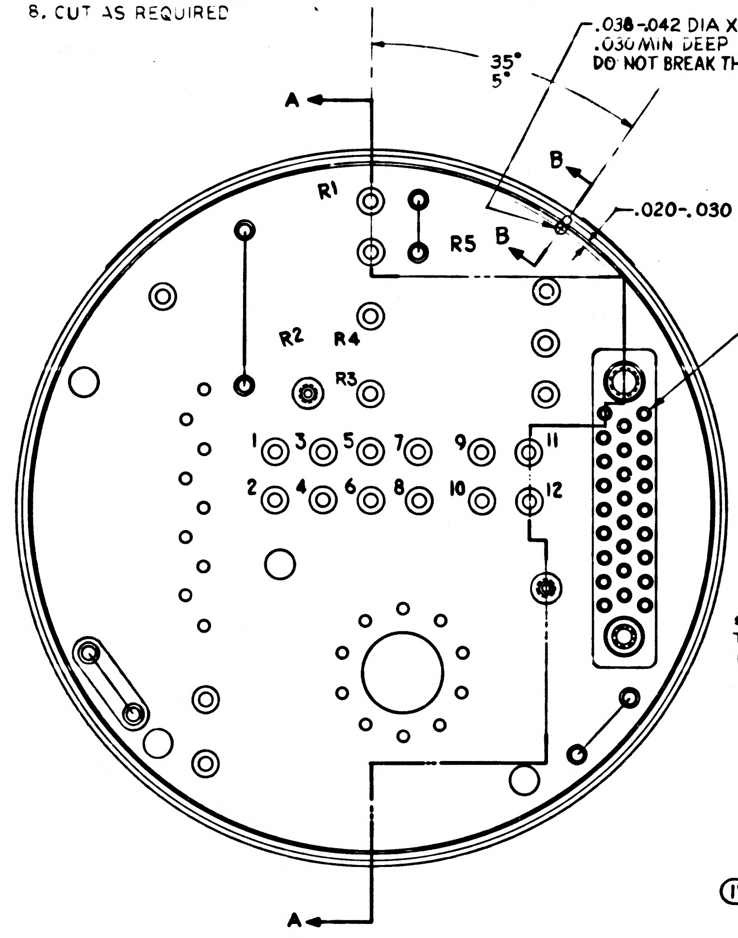
NOTES:

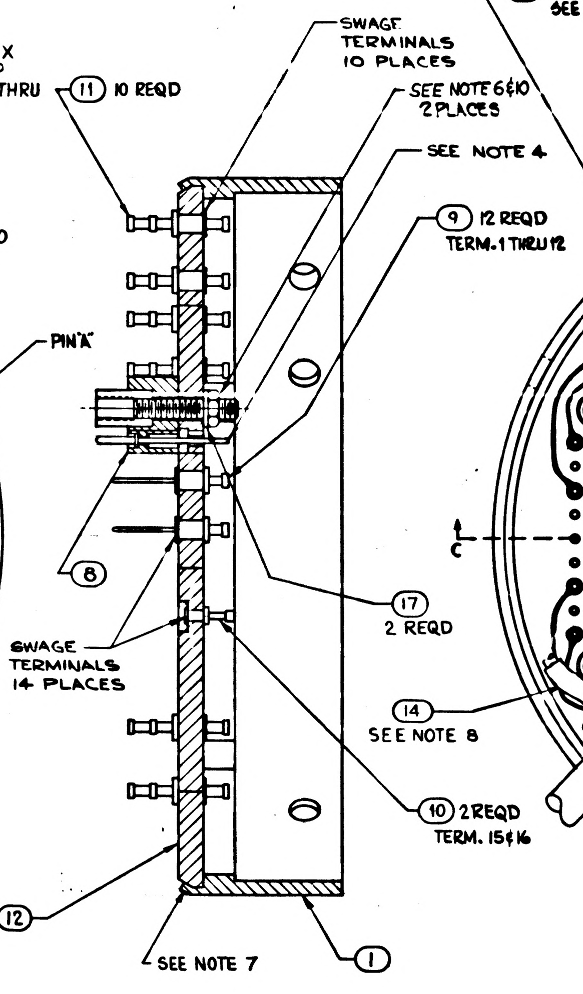
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER ND1002071 USING ITEMS ③ AND ⑦. PERCHLORETHYLENE MAY BE USED FOR FLUX REMOVAL AND CLEANING.
3. NUMBERED DESIGNATIONS ON PRINTED CIRCUIT BOARD ARE PARTIAL DESIGNATIONS. NUMBER SHOULD BE PRECEDED BY THE LETTER "E" TO CONFORM WITH SCHEMATIC NASA DRAWING NO 2021806
4. TIN 26 CONNECTOR PINS WITH SN60 PRIOR TO ASSEMBLING AND SOLDERING CONNECTOR TO THE CIRCUIT BOARD.
5. WICKING SHALL NOT EXCEED A POINT WHERE WIRE FLEXIBILITY IS LOST 1/16 INCH FROM END OF INSULATION.
6. SCREW TORQUE REQUIREMENT 1.00 INCH LB. ± 0.25 INCH LB. FOR -011 & -031 CONFIGURATION & 1.75 - 2.00 INCH LB. FOR -021, -041 AND SUBSEQUENT CONFIGURATIONS.
7. SPIN OVER ITEM ① AS SHOWN TO HOLD ITEM ⑫ OR (26).
8. CUT AS REQUIRED
9. STAKE OVER ITEM ① AS SHOWN TO HOLD ITEM ⑫. FILL .042 DIA HOLE PER ND 1002187 WITH ITEMS ⑭ AND ⑮.
10. APPLY ITEMS ⑮ & ⑯ PER ND 1002187 TYPE I TO THE THREADS OF ITEM ⑧ FOR -021 CONFIGURATION ONLY.
11. CONDUCTORS 5 THRU 13 NOT APPLICABLE TO THE -011 AND -031 CONFIGURATION.
12. FILL AREA ABOVE CONNECTOR TERMINATIONS WITH ITEMS 15 AND 16 PER ND 1002187 TYPE IV.

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE PER TDRR 33086		28 Feb 67	
	B	REVISED PER TDRR 33961		6 ... 67	
	C	REVISED PER TDRR 34702		29 SEP 67	
	D	REVISED PER TDRR 35477		8 FEB 68	
	E	REVISED PER TDRR 35478		20 FEB 68	
	F	REVISED PER TDRR 35553		28 FEB 68	DL

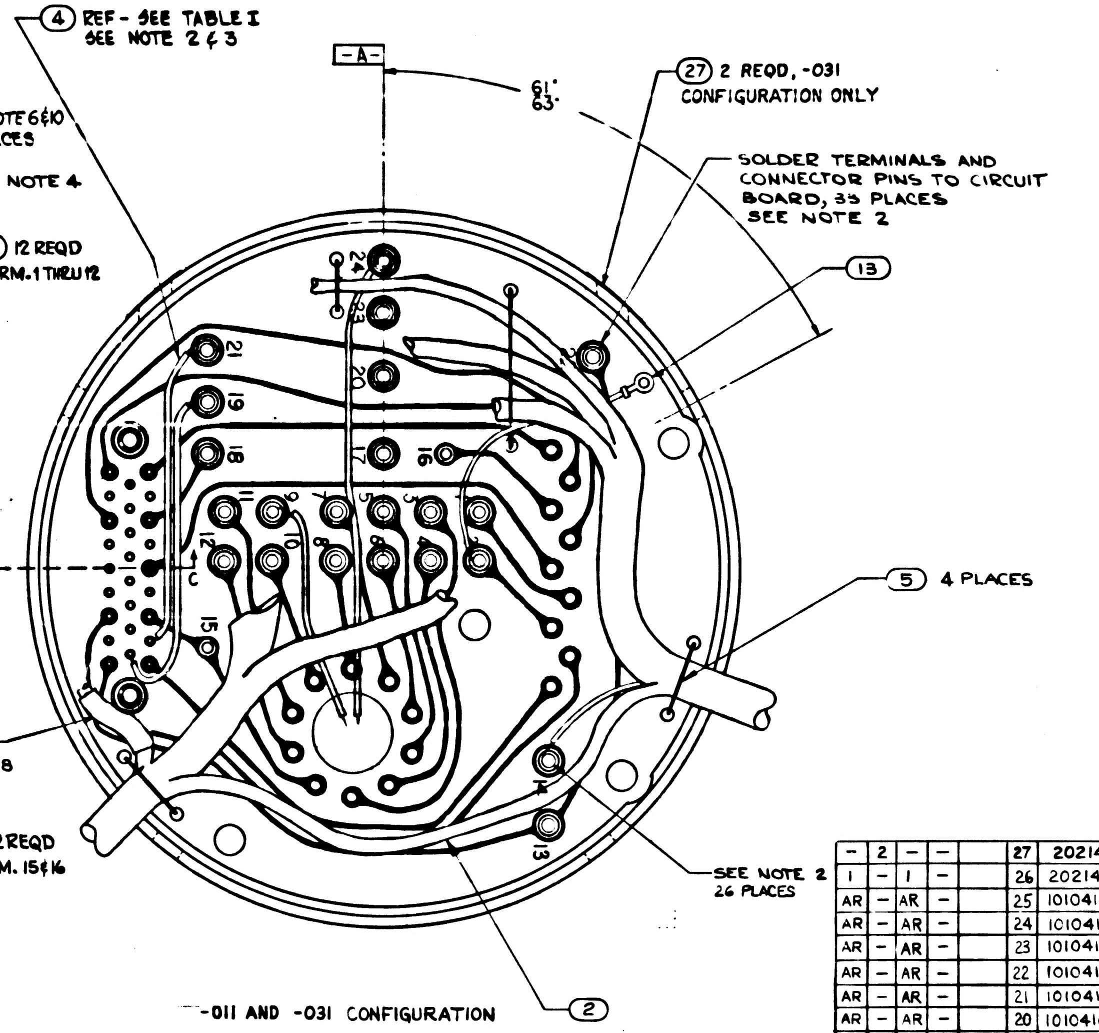


SECTION B-B


.038-.042 DIA X
.030 MIN DEEP
DO NOT BREAK THRU
35°
5°
A
B
B
.020-.030
R1
R5
R2
R4
R3
1
3
5
7
9
11
2
4
6
8
10
12
PIN "A"
A


SWAGE TERMINALS 10 PLACES
SEE NOTE 6 & 10 2 PLACES
SEE NOTE 4
⑪ 10 REQD
⑨ 12 REQD TERM. 1 THRU 12
⑧
⑰ 2 REQD
SWAGE TERMINALS 14 PLACES
⑩ 2 REQD TERM. 15 & 16
⑫
SEE NOTE 7
①

SECTION A-A


④ REF - SEE TABLE I
SEE NOTE 2 & 3
-A-
61°
63°
㉗ 2 REQD, -031 CONFIGURATION ONLY
SOLDER TERMINALS AND CONNECTOR PINS TO CIRCUIT BOARD, 35 PLACES SEE NOTE 2
⑬
⑤ 4 PLACES
C
C
⑭ SEE NOTE 8
SEE NOTE 2 26 PLACES
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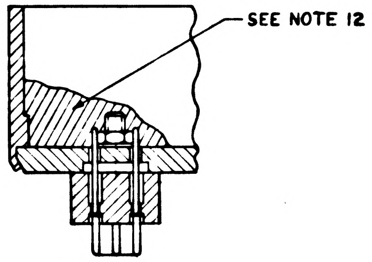
-011 AND -031 CONFIGURATION



PARTIAL SECTION C-C
-031 CONFIGURATION ONLY

TABLE I (SEE NOTE 11)

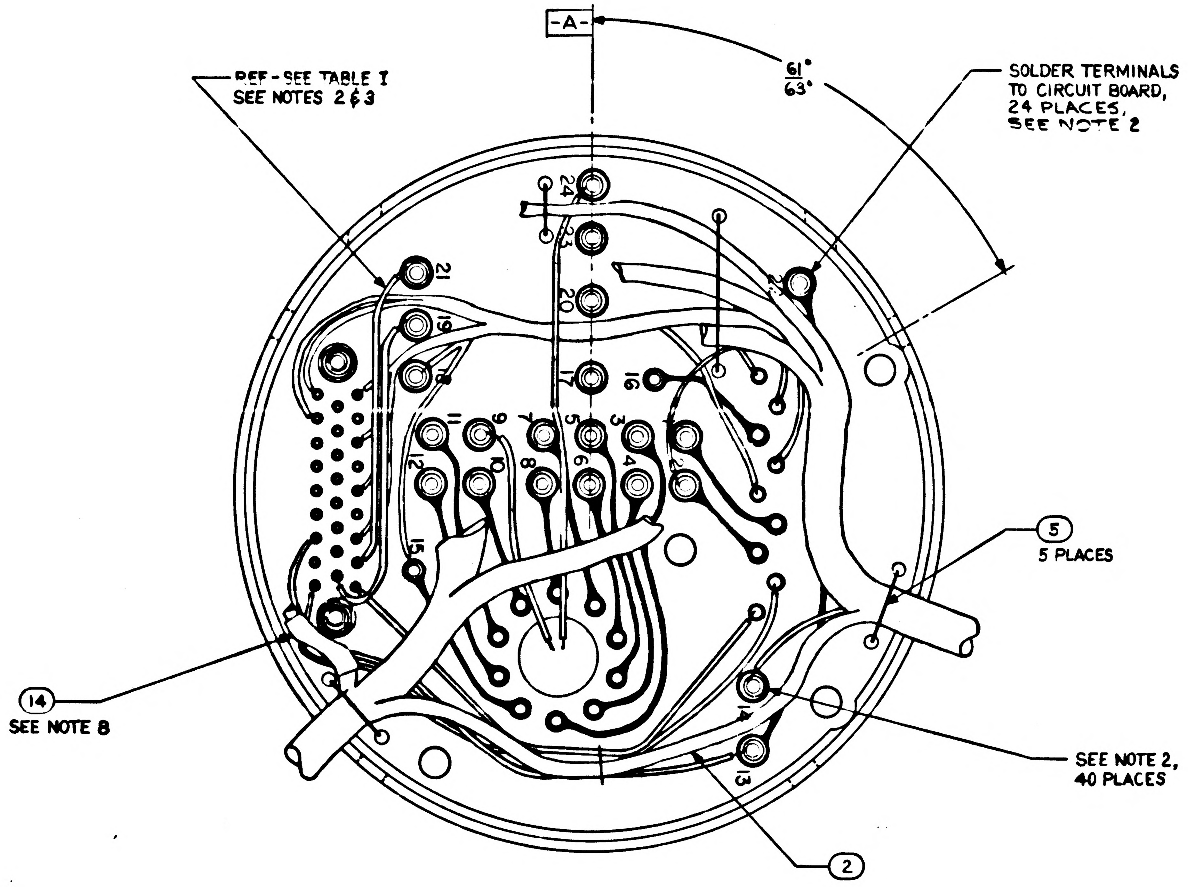
CONDUCTOR CHART							
COND. NO.	FROM			TO			ITEM NO.
	CIR. PT.	STRIP	TIN	CIR. PT.	STRIP	TIN	
1	E19	.20	Y	J1a	.20	Y	4
2	E21	.20	Y	J1b	.20	Y	4
3	E24	.20	Y	-	.20	Y	4
4	E9	.20	Y	-	.20	Y	6
5	----	.20	Y	J1H	.20	Y	18
6	----	.20	Y	J1A	.20	Y	19
7	----	.20	Y	J1C	.20	Y	20
8	E18	.20	Y	J1K	.20	Y	21
9	----	.20	Y	J1S	.20	Y	22
10	E15	.20	Y	J1Y	.20	Y	6
11	----	.20	Y	J1d	.20	Y	23
12	----	.20	Y	J1c̄	.20	Y	24
13	E13	.20	Y	J1W	.20	Y	25

041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
-	2	-	-		27	2021405	COVER PLATE, ACCESS
1	-	1	-		26	2021410	PRINTED CIRCUIT BOARD
AR	-	AR	-		25	1010416-9	WIRE, 28E AWG. GRY
AR	-	AR	-		24	1010416-8	WIRE, 28E AWG. VIT
AR	-	AR	-		23	1010416-7	WIRE, 28E AWG. BLU
AR	-	AR	-		22	1010416-5	WIRE, 28E AWG. YEL
AR	-	AR	-		21	1010416-4	WIRE, 28E AWG. ORG
AR	-	AR	-		20	1010416-3	WIRE, 28E AWG. RED
AR	-	AR	-		19	1010416-2	WIRE, 28E AWG. BWN
AR	-	AR	-		18	1010416-1	WIRE, 28E AWG. BLK
2	-	2	-		17	NAS 620C2	WASHER, FLAT
AR	AR	AR	AR		16	1010679	ACTIVATOR-W
AR	AR	AR	AR		15	1010661	C-7 ADHESIVE
AR	AR	AR	AR		14	1006776-13	INSULATION SLEEVING
-	1	1	1		13	2021803	GROUND WIRE
-	1	-	1		12	2021808	PRINTED CIRCUIT BOARD
10	10	10	10		11	1008924-001	TERMINAL
2	2	2	2		10	1008925-001	TERMINAL
12	12	12	12		9	1008926-001	TERMINAL
1	1	1	1		8	1008928-26	CONNECTOR
AR	AR	AR	AR		7	2021527	FLUX SOLDERING
AR	AR	AR	AR		6	1010416-6	WIRE, 28E AWG GRN
AR	AR	AR	AR		5	MIL-T-713	LACING TAPE, TYPE P
AR	AR	AR	AR		4	1010416-10	WIRE, 28E AWG WHT
AR	AR	AR	AR		3	SN60	SOLDER QQ-S-571
1	1	1	1		2	2021810	WIRING HARNESS A
1	1	1	1		1	2021804	RING, MOUNTING
QUANTITY REQUIRED						LIST OF PARTS AND MATERIALS	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE DECIMALS ± — 3 PLACE DECIMALS ± — ANGLES ± —	MIT INSTRUMENTATION LAB CAMBRIDGE MASS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN ______ DATE ______ CHECKED APPROVAL CONTRACT NAS 9-3426	PLATE MOUNTING AND HARNESS ASSEMBLY
MATERIAL ——	NASA APPROVAL	SIZE CODE IDENT NO. 80230 2021805
APPROVAL	MIT APPROVAL	SCALE SHEET OF 2

REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPD
	D	REVISED PER TDRR 35477 NEW SHEET ADDED		3 FEB 68	J.W
	E	REV STATUS CHANGED		20 FEB 68	J.
	F	REVISION STATUS CHANGED		28 FEB 68	DL



-A-
61°
63°
REF - SEE TABLE I
SEE NOTES 2 & 3
SOLDER TERMINALS
TO CIRCUIT BOARD,
24 PLACES,
SEE NOTE 2
24
23
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3
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1
5
5 PLACES
14
SEE NOTE 8
SEE NOTE 2,
40 PLACES
2

BOTTOM VIEW

-021 CONFIGURATION

D THIS SHEET ADDED

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN Walisiewicz DATE 2-8-68
CHECKED R HEISEL 4 FEB 68
APPROVAL
CONTRACT
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE, MOUNTING, AND
HARNESS ASSEMBLY

SIZE
CODE IDENT NO. 80230
2021805
SCALE 4:1
SHEET 2 OF 2

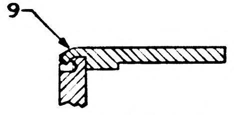
2021805 F

2021805

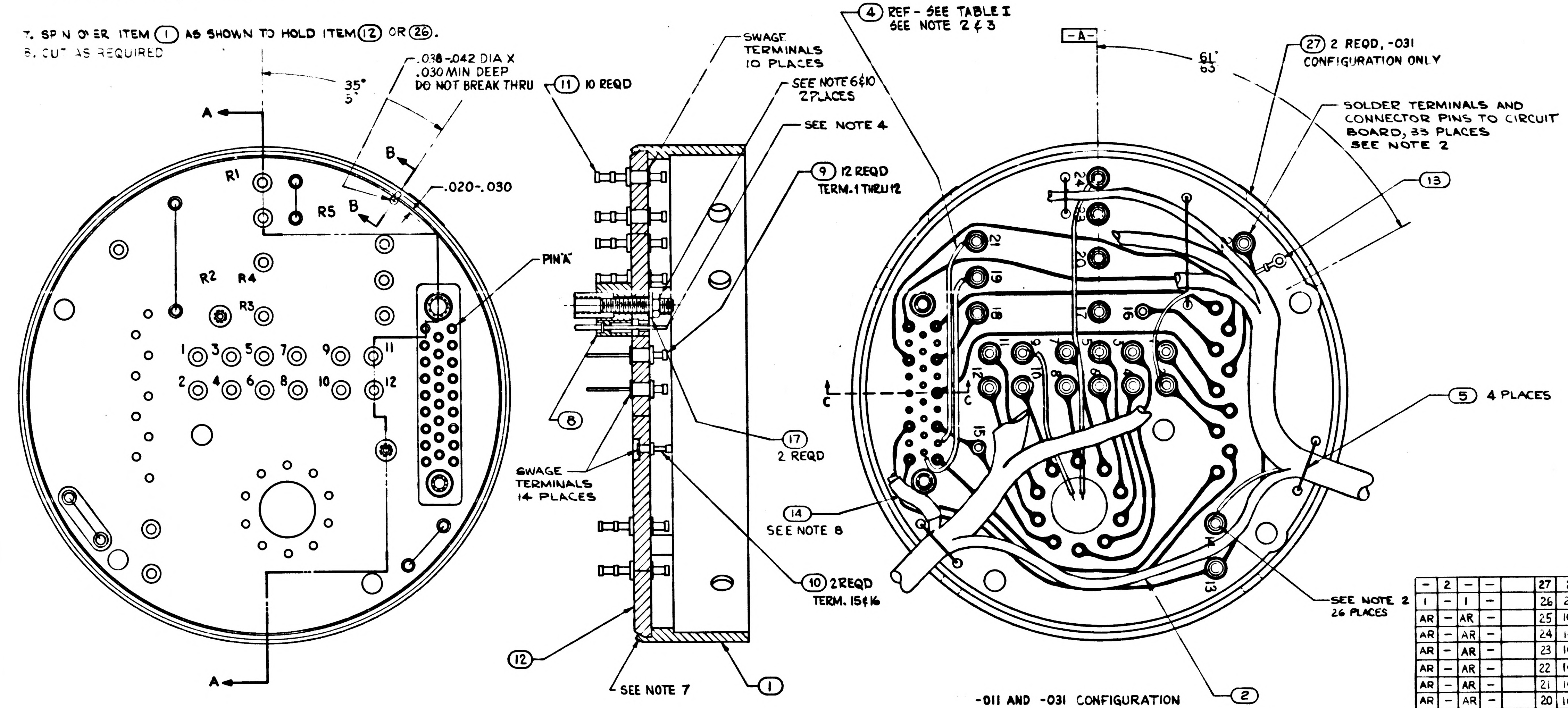
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER ND1002071 USING ITEMS ③ AND ⑦. PERCHLORETHYLENE MAY BE USED FOR FLUX REMOVAL AND CLEANING.
3. NUMBERED DESIGNATIONS ON PRINTED CIRCUIT BOARD ARE PARTIAL DESIGNATIONS. NUMBER SHOULD BE PRECEDED BY THE LETTER E TO CONFORM WITH SCHEMATIC NASA DRAWING NO. 2021806
4. TIN 26 CONNECTOR PINS WITH SN60 PRIOR TO ASSEMBLING AND SOLDERING CONNECTOR TO THE CIRCUIT BOARD.
5. WICKING SHALL NOT EXCEED A POINT WHERE WIRE FLEXIBILITY IS LOST 1/8 INCH FROM END OF INSULATION.
6. SCREW TORQUE REQUIREMENT 1.00 INCH LB. ± 0.25 INCH LB. FOR -011 & -031 CONFIGURATION & 1.75 - 2.00 INCH LB. FOR -021, -041 AND SUBSEQUENT CONFIGURATIONS.
7. SPIN OVER ITEM ① AS SHOWN TO HOLD ITEM ⑫ OR ㉖.
8. CUT AS REQUIRED
9. STAKE OVER ITEM ① AS SHOWN TO HOLD ITEM ⑫. FILL .042 DIA HOLE PER ND1002187 WITH ITEMS ⑭ AND ⑮.
10. APPLY ITEMS ⑮ & ⑯ PER ND1002187 TYPE I TO THE THREADS OF ITEM ⑧ FOR -021, -041 AND SUBSEQUENT CONFIGURATIONS.
11. CONDUCTORS 5 THRU 13 NOT APPLICABLE TO THE -011 AND -031 CONFIGURATION.
12. FILL AREA ABOVE CONNECTOR TERMINATIONS WITH ITEMS 15 AND 16 PER ND1002187 TYPE IV.

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO	DATE	APPROVED
	A	INITIAL RELEASE PER TDRR 33686			
	B	REVISED PER TDRR 334[illegible]			
	C	REVISED PER TDRR 34702		67	RWH
	D	REVISED PER TDRR 35477		68	RWH
	E	REVISED PER TDRR 35479		68	
	F	REVISED PER TDRR 35553		26 FEB 68	
	G	REVISED PER TDRR 36961		7 68	



SECTION B-B

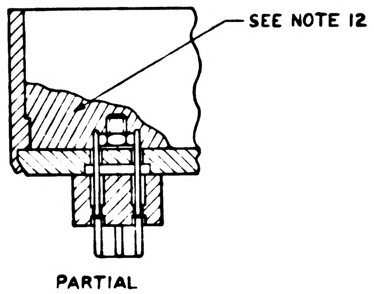

A
A
35° 5'
.038-.042 DIA X .030 MIN DEEP DO NOT BREAK THRU
⑪ 10 REQD
B
B
.020-.030
R1
R5
R2
R4
R3
1 3 5 7 9 11
2 4 6 8 10 12
PIN "A"
SWAGE TERMINALS 10 PLACES
SEE NOTE 6&10 2 PLACES
SEE NOTE 4
⑨ 12 REQD TERM. 1 THRU 12
⑧
⑰ 2 REQD
SWAGE TERMINALS 14 PLACES
⑭ SEE NOTE 8
⑩ 2 REQD TERM. 15&16
⑫
SEE NOTE 7
①
④ REF - SEE TABLE I SEE NOTE 2 & 3
-A-
61° 63'
㉗ 2 REQD, -031 CONFIGURATION ONLY
SOLDER TERMINALS AND CONNECTOR PINS TO CIRCUIT BOARD, 33 PLACES SEE NOTE 2
⑬
24
23
21
20
19
18
17
16
15
12
11
10
9
13
C
C
⑤ 4 PLACES
SEE NOTE 2 26 PLACES
②

SECTION A-A

-011 AND -031 CONFIGURATION

TABLE I (SEE NOTE 11)

CONDUCTOR CHART							
COND. NO.	FROM			TO			ITEM NO.
	CIR. PT.	STRIP	TIN	CIR. PT.	STRIP	TIN	
1	E19	.20	Y	J1a	.20	Y	4
2	E21	.20	Y	J1b	.20	Y	4
3	E24	.20	Y	-	.20	Y	4
4	E9	.20	Y	-	.20	Y	6
5	----	.20	Y	J1H	.20	Y	18
6	----	.20	Y	J1A	.20	Y	19
7	----	.20	Y	J1C	.20	Y	20
8	E18	.20	Y	J1K	.20	Y	21
9	----	.20	Y	J1S	.20	Y	22
10	E15	.20	Y	J1Y	.20	Y	6
11	----	.20	Y	J1d	.20	Y	23
12	----	.20	Y	J1$\bar{C}$	.20	Y	24
13	E13	.20	Y	J1W	.20	Y	25



PARTIAL SECTION C-C -031 CONFIGURATION ONLY

041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
-	2	-	-		27	2021405	COVER PLATE, ACCESS
1	-	1	-		26	2021410	PRINTED CIRCUIT BOARD
AR	-	AR	-		25	1010416-9	WIRE, 28E AWG. GRY
AR	-	AR	-		24	1010416-8	WIRE, 28E AWG. VIT
AR	-	AR	-		23	1010416-7	WIRE, 28E AWG. BLU
AR	-	AR	-		22	1010416-5	WIRE, 28E AWG. YEL
AR	-	AR	-		21	1010416-4	WIRE, 28E AWG. ORG
AR	-	AR	-		20	1010416-3	WIRE, 28E AWG. RED
AR	-	AR	-		19	1010416-2	WIRE, 28E AWG. BWN
AR	-	AR	-		18	1010416-1	WIRE, 28E AWG. BLK
2	-	2	-		17	NAS 620C2	WASHER, FLAT
AR	AR	AR	AR		16	1010679	ACTIVATOR-W
AR	AR	AR	AR		15	1010661	C-7 ADHESIVE
AR	AR	AR	AR		14	1006[illegible]6-13	INSULATION SLEEVING
-	1	1	1		13	2021803	GROUND WIRE
-	1	-	1		12	2021808	PRINTED CIRCUIT BOARD
10	10	10	10		11	1008924-001	TERMINAL
2	2	2	2		10	1008925-001	TERMINAL
12	12	12	12		9	1008926-001	TERMINAL
1	1	1	1		8	1008928-26	CONNECTOR
AR	AR	AR	AR		7	2021527	FLUX SOLDERING
AR	AR	AR	AR		6	1010416-6	WIRE, 28E AWG GRN
AR	AR	AR	AR		5	MIL-T-713	LACING TAPE, TYPE P
AR	AR	AR	AR		4	1010416-10	WIRE, 28E AWG WHT
AR	AR	AR	AR		3	SN60	SOLDER QQ-S-571
1	1	1	1		2	2021810	WIRING HARNESS A
1	1	1	1		1	2021804	RING, MOUNTING
QUANTITY REQUIRED						LIST OF PARTS AND MATERIALS	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± — 3 PLACE DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

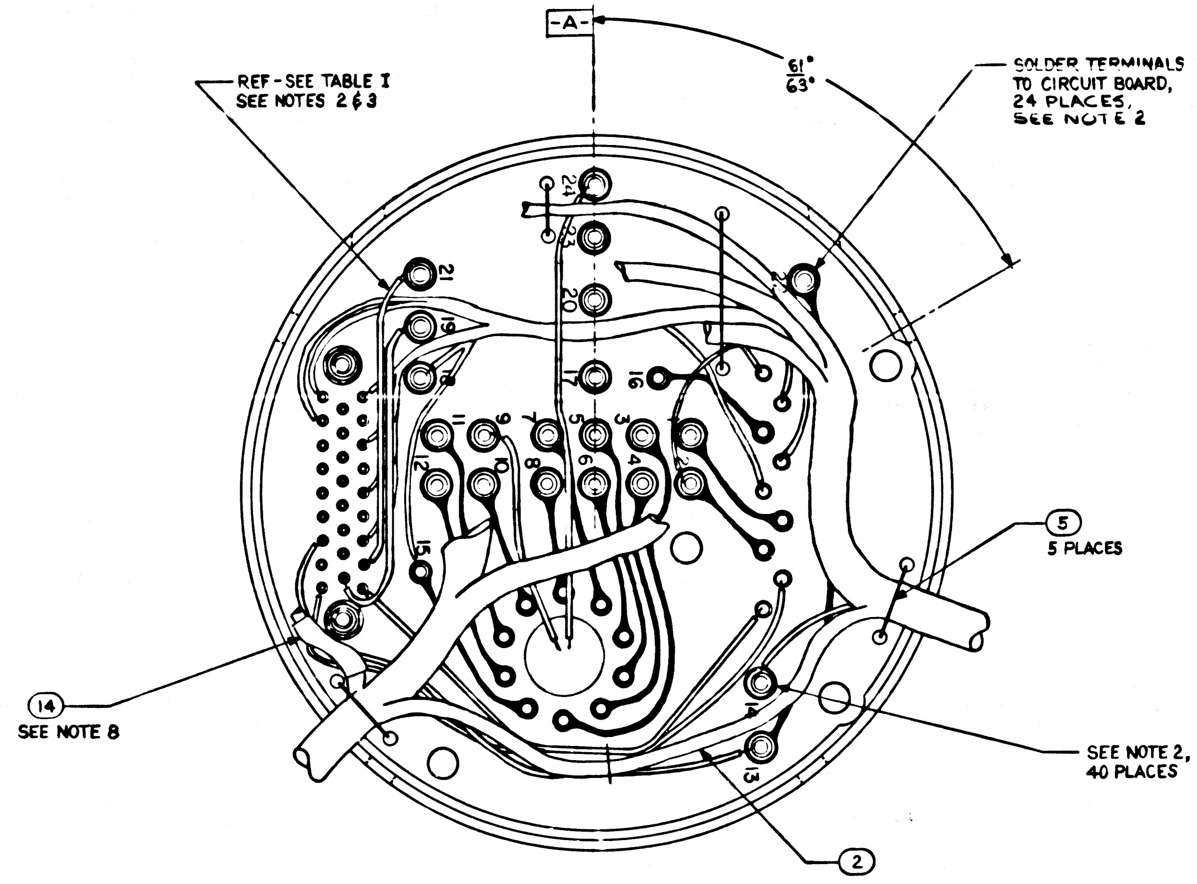
MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN ____ DATE ____
CHECKED
APPROVAL
CONTRACT NAS 9-3426
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE MOUNTING AND HARNESS ASSEMBLY

SIZE
CODE IDENT NO. 80230
2021805
SCALE 4
SHEET 1 OF 2

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPD
	D	REVISED PER TDRR 35477 NEW SHEET ADDED		FEB 68	J.W.
	E	REV STATUS CHANGED		20 FEB 68	3.
	F	REVISION STATUS CHANGED		28 FEB 68	DL
	G	REVISED PER TDRR 36961		NOV 68	DKS



-A-
61°
63°
REF-SEE TABLE I
SEE NOTES 2 & 3
SOLDER TERMINALS
TO CIRCUIT BOARD,
24 PLACES.
SEE NOTE 2
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
5
5 PLACES
14
SEE NOTE 8
SEE NOTE 2,
40 PLACES
2

BOTTOM VIEW
-021,-041 AND
SUBSEQUENT CONFIGURATIONS

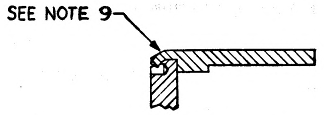
D THIS SHEET ADDED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE DECIMALS ± — 3 PLACE DECIMALS ± — ANGLES ± —	MIT INSTRUMENTATION LAB CAMBRIDGE MASS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Walisiewicz DATE 2-8-68 CHECKED R. Heisel 4 FEB 68 APPROVAL CONTRACT	PLATE, MOUNTING, AND HARNESS ASSEMBLY
MATERIAL —	NASA APPROVAL	SIZE CODE IDENT NO. 80230 2021805
APPROVAL	MIT APPROVAL	SCALE 4:1 SHEET 2 OF 2

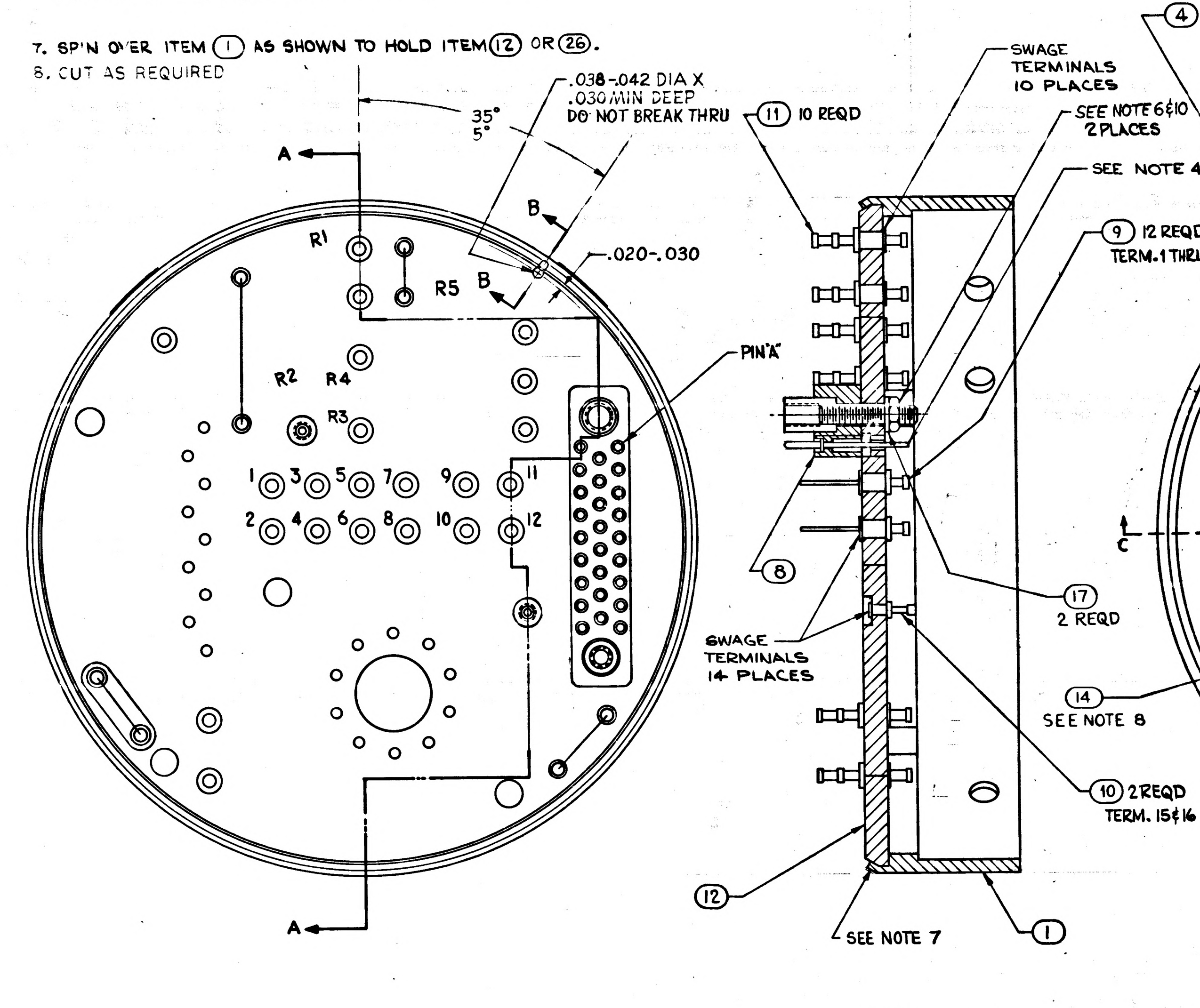
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER ND1002071 USING ITEMS ③ AND ⑦. PERCHLORETHYLENE MAY BE USED FOR FLUX REMOVAL AND CLEANING.
3. NUMBERED DESIGNATIONS ON PRINTED CIRCUIT BOARD ARE PARTIAL DESIGNATIONS. NUMBER SHOULD BE PRECEDED BY THE LETTER E TO CONFORM WITH SCHEMATIC NASA DRAWING NO. 2021806
4. TIN 26 CONNECTOR PINS WITH SN60 PRIOR TO ASSEMBLING AND SOLDERING CONNECTOR TO THE CIRCUIT BOARD.
5. WICKING SHALL NOT EXCEED A POINT WHERE WIRE FLEXIBILITY IS LOST 1/16 INCH FROM END OF INSULATION.
6. SCREW TORQUE REQUIREMENT 1.00 INCH LB. ± 0.25 INCH LB. FOR -011 & -031 CONFIGURATION & 1.75 - 2.00 INCH LB. FOR -021, -041 AND SUBSEQUENT CONFIGURATIONS.
7. SPIN OVER ITEM ① AS SHOWN TO HOLD ITEM ⑫ OR ㉖.
8. CUT AS REQUIRED
9. STAKE OVER ITEM ① AS SHOWN TO HOLD ITEM ⑫. FILL .042 DIA HOLE PER ND1002187 WITH ITEMS ⑭ AND ⑮.
10. APPLY ITEMS ⑮ & ⑯ PER ND1002187 TYPE I TO THE THREADS OF ITEM ⑧ FOR -021, -041 AND SUBSEQUENT CONFIGURATIONS.
11. CONDUCTORS 5 THRU 13 NOT APPLICABLE TO THE -011 AND -031 CONFIGURATION.
12. FILL AREA ABOVE CONNECTOR TERMINATIONS WITH ITEMS 15 AND 16 PER ND1002187 TYPE IV.

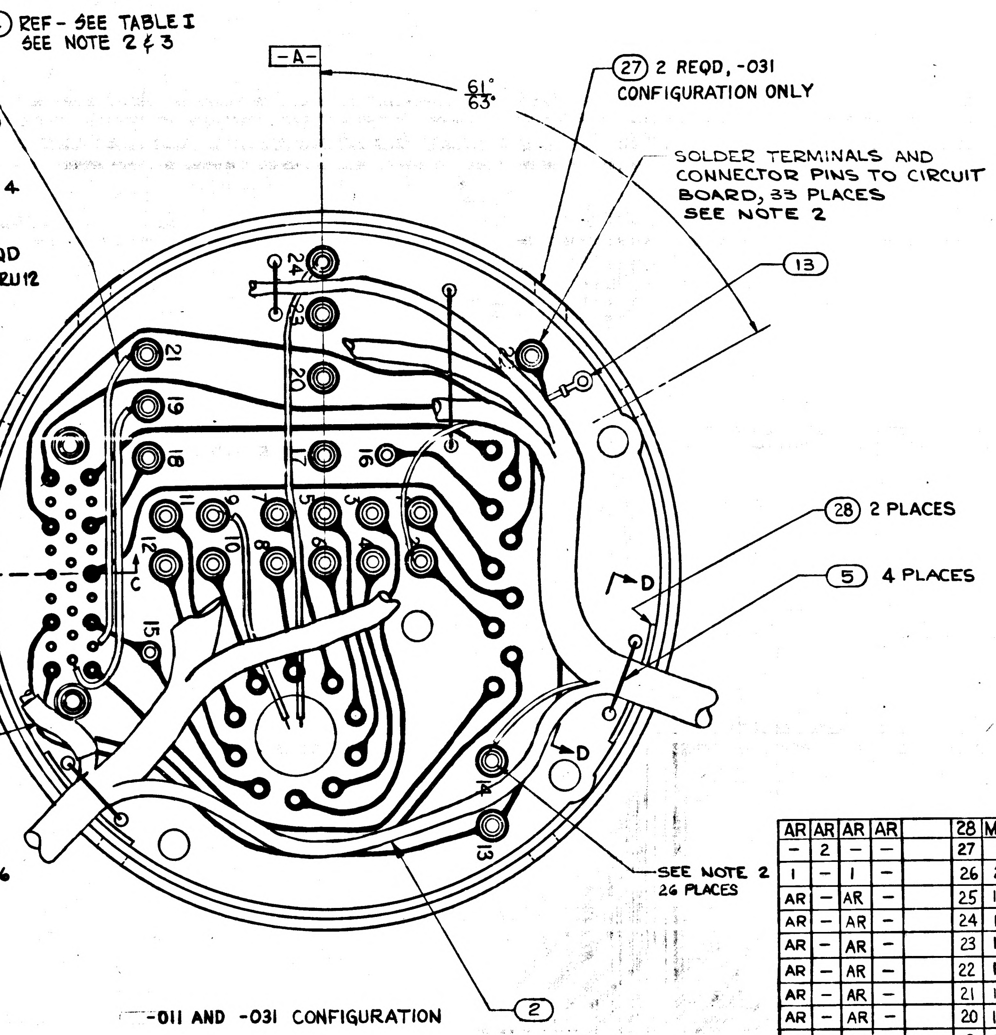
REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE PER TDRR 33686		28 FEB 67	
	B	REVISED PER TDRR 33961		6-6-67	
	C	REVISED PER TDRR 34702		29 FEB 67	J.S. RNH
	D	REVISED PER TDRR 35477		8 FEB 68	J.W. RWH
	E	REVISED PER TDRR 35478		20-FEB-68	
	F	REVISED PER TDRR 35553		28 FEB 68	DL JPG
	G	REVISED PER TDRR 36961		7 NOV 68	DRJ
	H	REVISED PER TDRR 37069		9 DEC 68	



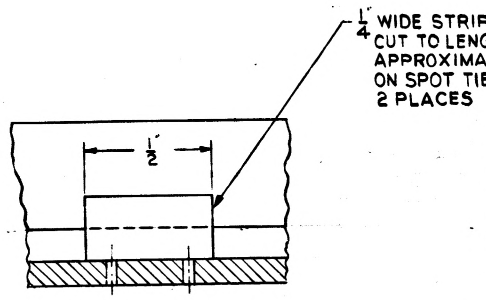
SECTION B-B


A
35°
5°
.038-.042 DIA X
.030 MIN DEEP
DO NOT BREAK THRU
⑪ 10 REQD
B
B
.020-.030
R1
R5
R2
R4
R3
1
2
3
4
5
6
7
8
9
10
11
12
PIN 'A'
SWAGE TERMINALS 10 PLACES
SEE NOTE 6&10 2 PLACES
SEE NOTE 4
⑨ 12 REQD TERM. 1 THRU 12
⑧
⑰ 2 REQD
SWAGE TERMINALS 14 PLACES
⑩ 2 REQD TERM. 15&16
⑫
SEE NOTE 7
①
A

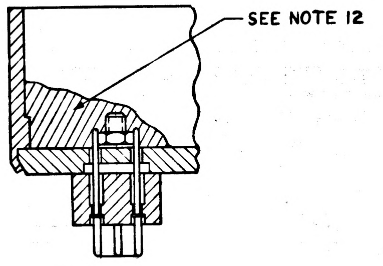
SECTION A-A


④ REF - SEE TABLE I
SEE NOTE 2 & 3
-A-
61°
63°
㉗ 2 REQD, -031
CONFIGURATION ONLY
SOLDER TERMINALS AND CONNECTOR PINS TO CIRCUIT BOARD, 33 PLACES
SEE NOTE 2
⑬
㉘ 2 PLACES
⑤ 4 PLACES
D
D
C
⑭
SEE NOTE 8
SEE NOTE 2
26 PLACES
②
24
21
23
20
19
18
17
16
15
14
13

-011 AND -031 CONFIGURATION


1/4" WIDE STRIP OF ITEM ㉘, CUT TO LENGTH SHOWN, APPROXIMATELY CENTERED ON SPOT TIE HOLES, 2 PLACES
1/2"

PARTIAL SECTION D-D



PARTIAL SECTION C-C
-031 CONFIGURATION ONLY

TABLE I (SEE NOTE 11)

CONDUCTOR CHART							
COND. NO.	FROM			TO			ITEM NO.
	CIR. PT.	STRIP	TIN	CIR. PT.	STRIP	TIN	
1	E19	.20	Y	J1a	.20	Y	4
2	E21	.20	Y	J1b	.20	Y	4
3	E24	.20	Y	-	.20	Y	4
4	E9	.20	Y	-	.20	Y	6
5	----	.20	Y	J1H	.20	Y	18
6	----	.20	Y	J1A	.20	Y	19
7	----	.20	Y	J1C	.20	Y	20
8	E18	.20	Y	J1K	.20	Y	21
9	----	.20	Y	J1S	.20	Y	22
10	E15	.20	Y	J1Y	.20	Y	6
11	----	.20	Y	J1d	.20	Y	23
12	----	.20	Y	J1c̄	.20	Y	24
13	E13	.20	Y	J1W	.20	Y	25

041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
AR	AR	AR	AR		28	MIL-I-15126F	TYPE MF 2.5 MYLAR TAPE
-	2	-	-		27	2021405	COVER PLATE, ACCESS
1	-	1	-		26	2021410	PRINTED CIRCUIT BOARD
AR	-	AR	-		25	1010416-9	WIRE, 28E AWG. GRY
AR	-	AR	-		24	1010416-8	WIRE, 28E AWG. VIT
AR	-	AR	-		23	1010416-7	WIRE, 28E AWG. BLU
AR	-	AR	-		22	1010416-5	WIRE, 28E AWG. YEL
AR	-	AR	-		21	1010416-4	WIRE, 28E AWG. ORG
AR	-	AR	-		20	1010416-3	WIRE, 28E AWG. RED
AR	-	AR	-		19	1010416-2	WIRE, 28E AWG. BWN
AR	-	AR	-		18	1010416-1	WIRE, 28E AWG. BLK
2	-	2	-		17	NAS 620C2	WASHER, FLAT
AR	AR	AR	AR		16	1010679	ACTIVATOR-W
AR	AR	AR	AR		15	1010661	C-7 ADHESIVE
AR	AR	AR	AR		14	1006776-13	INSULATION SLEEVING
-	1	1	1		13	2021803	GROUND WIRE
-	1	-	1		12	2021808	PRINTED CIRCUIT BOARD
10	10	10	10		11	1008924-001	TERMINAL
2	2	2	2		10	1008925-001	TERMINAL
12	12	12	12		9	1008926-001	TERMINAL
1	1	1	1		8	1008928-26	CONNECTOR
AR	AR	AR	AR		7	2021527	FLUX SOLDERING
AR	AR	AR	AR		6	1010416-6	WIRE, 28E AWG GRN
AR	AR	AR	AR		5	MIL-T-713	LACING TAPE, TYPE P
AR	AR	AR	AR		4	1010416-10	WIRE, 28E AWG WHT
AR	AR	AR	AR		3	SN60	SOLDER QQ-S-571
1	1	1	1		2	2021810	WIRING HARNESS A
1	1	1	1		1	2021804	RING, MOUNTING
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

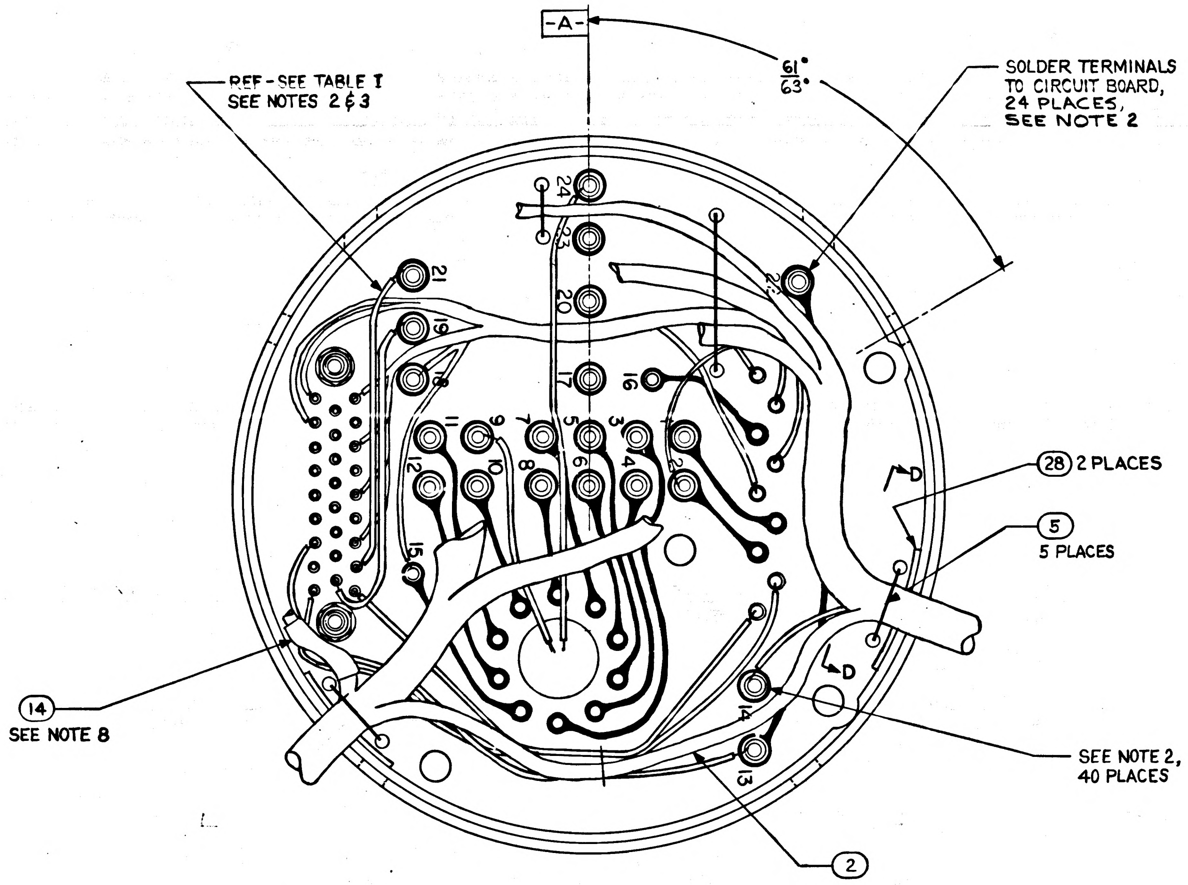
MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN ____ DATE ____
CHECKED R. Wagner
APPROVAL 8/18/66
CONTRACT NAS 9-3426
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PLATE, MOUNTING AND
HARNESS ASSEMBLY

SIZE
CODE IDENT NO. 80230
2021805
SCALE
SHEET 1 OF 2

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPD
	D	REVISED PER TDRR 35477 NEW SHEET ADDED		5 FEB 68	J.W.
	E	*REV STATUS CHANGED*		20 FEB 68	B.
	F	REVISION STATUS CHANGED		28 FEB 68	DL
	G	REVISED PER TDRR 36961		7 NOV 68	DKP
	H	REVISED PER TDRR 37069		10 DEC 68	JJJ


REF-SEE TABLE I
SEE NOTES 2 & 3
-A-
61°
63°
SOLDER TERMINALS
TO CIRCUIT BOARD,
24 PLACES,
SEE NOTE 2
(28) 2 PLACES
(5)
5 PLACES
D
D
(14)
SEE NOTE 8
SEE NOTE 2,
40 PLACES
(2)
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1

BOTTOM VIEW
-021,-041 AND
SUBSEQUENT CONFIGURATIONS

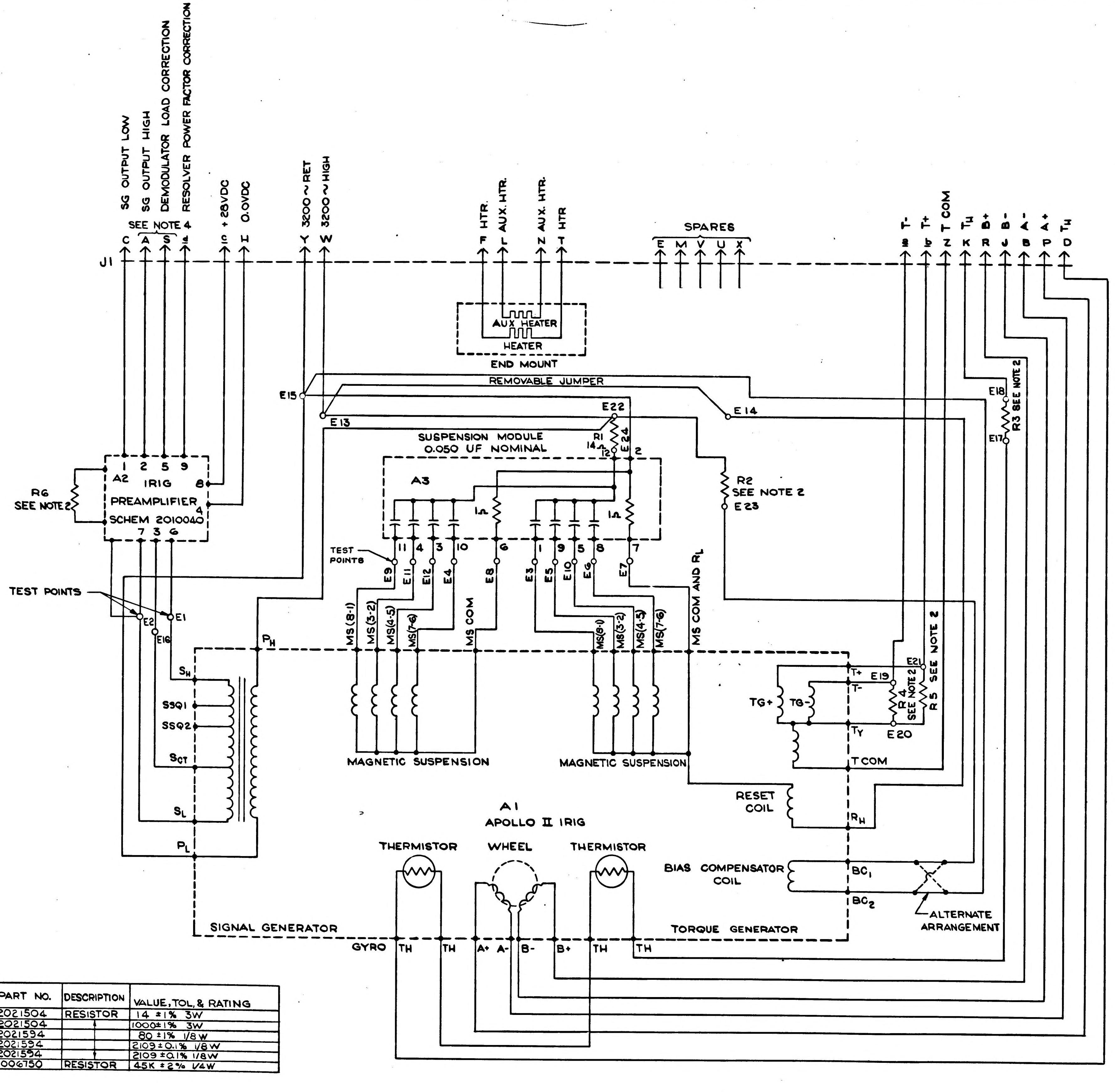
D THIS SHEET ADDED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE DECIMALS ± — 3 PLACE DECIMALS ± — ANGLES ± —	MIT INSTRUMENTATION LAB CAMBRIDGE MASS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Walisiewicz DATE 2-8-68 CHECKED R. HEISEL 14 FEB 68 APPROVAL CONTRACT	PLATE, MOUNTING, AND HARNESS ASSEMBLY
MATERIAL —	NASA APPROVAL	SIZE CODE IDENT NO. 80230 2021805
APPROVAL	MIT APPROVAL	SCALE 1:1 SHEET 2 OF 2

2021805 H

2021805

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	INITIAL RELEASE PER TDRR 33086		28 FEB 67	


SG OUTPUT LOW
SG OUTPUT HIGH
DEMODULATOR LOAD CORRECTION
RESOLVER POWER FACTOR CORRECTION
SEE NOTE 4
+28VDC
0.0VDC
3200~ RET
3200~ HIGH
J1
C A S d c H Y W
F HTR.
L AUX. HTR.
Z AUX. HTR.
T HTR
AUX HEATER
HEATER
END MOUNT
SPARES
E M V U X
T-
T+
T COM
TH
B+
B-
A-
A+
TH
a b Z K R J B P D
REMOVABLE JUMPER
E15
E13
E14
E22
R1
14Ω
12
E24
2
SUSPENSION MODULE
0.050 UF NOMINAL
A3
1Ω
1Ω
11 4 3 10 6 1 9 5 8 7
TEST POINTS
E9 E11 E12 E4 E8 E3 E5 E10 E6 E7
R2
SEE NOTE 2
E23
E18
R3 SEE NOTE 2
E17
R6
SEE NOTE 2
1 2 5 9
A2
IRIG
8
PREAMPLIFIER
4
SCHEM 2010040
7 3 6
TEST POINTS
E2
E1
E16
PH
SH
SSQ1
SSQ2
SCT
SL
PL
MS(8-1)
MS(3-2)
MS(4-5)
MS(7-6)
MS COM
MS(8-1)
MS(3-2)
MS(4-5)
MS(7-6)
MS COM AND RL
MAGNETIC SUSPENSION
MAGNETIC SUSPENSION
TG+
TG-
T+
T-
E19
E21
R4 SEE NOTE 2
R5 SEE NOTE 2
E20
TY
T COM
RESET COIL
RH
A1
APOLLO II IRIG
THERMISTOR
WHEEL
THERMISTOR
BIAS COMPENSATOR COIL
BC1
BC2
ALTERNATE ARRANGEMENT
SIGNAL GENERATOR
TORQUE GENERATOR
GYRO
TH TH A+ A- B- B+ TH TH

REF DES	PART NO.	DESCRIPTION	VALUE, TOL, & RATING
R1	2021504	RESISTOR	14 ±1% 3W
R2	2021504		1000±1% 3W
R3	2021594		80 ±1% 1/8W
R4	2021594		2109±0.1% 1/8W
R5	2021594		2109 ±0.1% 1/8W
R6	1006750	RESISTOR	45K ±2% 1/4W

NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. THIS SCHEMATIC APPLIES TO 2021500-071 ONLY.
3. THE VALUE OF R2, R3, R4, R5, R6 TO BE SELECTED AT FINAL TEST. PART TO BE SELECTED FROM CHARTS ON 2021500 USING PROCEDURES OF MC 25-845.
4. WHEN LOADING THE PREAMPLIFIER WITH A DEMODULATOR CONNECT PIN A TO S.
5. WHEN LOADING THE PREAMPLIFIER WITH A RESOLVER CONNECT PIN d TO A.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± 3 PLACE DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN R. Scholtes DATE 21-OCT-66
CHECKED
APPROVAL 10/26/66
CONTRACT NAS 9-3426
NASA APPROVAL
MIT APPROVAL 2-17-67

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC DIAGRAM,
ELECTRICAL
NORMALIZING NETWORK

SIZE E
CODE IDENT NO. 80230
2021806
SCALE —
SHEET 1 OF 1

APPLICATION	
NEXT ASSY	USED ON

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE CLASS A PER TDRR 33086	28 FEB 67	15 JAN 67

19 AUG 66

REV									
SHEET									
REV STATUS OF SHEETS — REV	A	A	A	A	A	A	A	A	A
REV STATUS OF SHEETS — SHEET	1	2	3	4	5	6	7	8	9

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES.

REFERENCE: ACSK ONLY

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAFTSMAN	S PLANE 27 JUL 66 (DAY MO YR)
CHECKER	19 AUG 66
ENGINEER	19 AUG 66
APPROVAL	2/7/67
CONTR NO.	
NASA APPROVAL	
MIT APPROVAL	2-16-67

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS "A"

SIZE	CODE IDENT. NO	
A	80230	2021810
SCALE NONE		SHEET 1 OF 9

WIRING HARNESS A 2021810

NOTE NUMBER	GENERAL NOTES DESCRIPTION
1	NOTE 1 DOES NOT APPLY.
2	INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
3	UNLESS OTHERWISE SPECIFIED - FEATURE CENTERLINES AT TRUE POSITION WITHIN + OR - .25 INCH RELATIVE TO GRID. ENDS OF CONDUCTORS OR ACCESSORIES AT TRUE POSITION WITHIN + OR - .12 INCH RELATIVE TO GRID. TRUE POSITION DIMENSIONS ARE REGARDLESS OF FEATURE SIZE.
4	VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
5	VENDOR ITEM - SEE SOURCE CONTROL DRAWING.
6	THE TERMINATION OF CONDUCTORS A1 AND A2 (E15, E23) ARE DETERMINED BY PREALIGNMENT PROCEDURE.
7	FABRICATE HARNESS PER ND 1002032.
8	TOLERANCE ON STRIP LENGTHS + .020, - .020.
9	SOLDER PER ND1002071 USING ITEM 31 AND 32.
10	GRID IS SHOWN FOR DIMENSIONING PURPOSES.
11	GRID MODULE IS 1 INCH BASIC.
12	LACES AND TIES TO BE LOCATED WITHIN 1/16 IN. OF POSITION SHOWN.
13	KNOTS TO BE LOCATED AS SHOWN.
14	WIRE LENGTHS ARE FOR REFERENCE ONLY.
15	WICKING SHALL NOT EXCEED A POINT WHERE WIRE FLEXIBILITY IS LOST 1/16 INCH BEYOND END OF INSULATION.

SIZE	CODE IDENT NO.		
A	~~99974~~ 80230	2021810	
SCALE-NONE	REV LTR A		SHEET 2 OF 9

MIL 2064 9-65

WIRING HARNESS A 2021810

NOTE NUMBER	GENERAL NOTES DESCRIPTION
16	LACE HARNESS USING ITEM 30.

SIZE	CODE IDENT NO.		
A	~~99974~~ 80230	2021810	
SCALE-NONE	REV LTR A		SHEET 3 OF 9

MIL 2064 9-65

WIRING HARNESS A 2021810

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
4	1	1	1010416- 1	WIRE, ELECTRICAL 28AWG BLK 9.50IN TOTAL LENGTH
4	2	1	1010416- 2	WIRE, ELECTRICAL 28AWG BRN 11.50IN TOTAL LENGTH
4	3	1	1010416- 3	WIRE, ELECTRICAL 28AWG RED 10.00IN TOTAL LENGTH
4	4	1	1010416- 4	WIRE, ELECTRICAL 28AWG ORN 11.00IN TOTAL LENGTH
4	5	1	1010416- 5	WIRE, ELECTRICAL 28AWG YEL 11.00IN TOTAL LENGTH
4	6	1	1010416- 6	WIRE, ELECTRICAL 28AWG GRN 11.00IN TOTAL LENGTH
4	7	1	1010416- 7	WIRE, ELECTRICAL 28AWG BLU 15.00IN TOTAL LENGTH
4	8	1	1010416- 8	WIRE, ELECTRICAL 28AWG VIO 7.00IN TOTAL LENGTH
4	9	1	1010416- 9	WIRE, ELECTRICAL 28AWG GY 9.00IN TOTAL LENGTH
4	10	1	1010416- 10	WIRE, ELECTRICAL 28AWG WHT 10.50IN TOTAL LENGTH
4	11	1	1010416-300	WIRE, ELECTRICAL 28AWG WHT/BLK 10.50IN TOT LG
4	12	1	1010416-301	WIRE, ELECTRICAL 28AWG WHT/BRN 10.50IN TOT LG
4	13	1	1010416-302	WIRE, ELECTRICAL 28AWG WHT/RED 9.00IN TOT LG
4	14	1	1010416-303	WIRE, ELECTRICAL 28AWG WHT/ORN 8.00IN TOT LG
4	15	1	1010416-304	WIRE, ELECTRICAL 28AWG WHT/YEL 9.50IN TOT LG
4	16	1	1010416-305	WIRE, ELECTRICAL 28AWG WHT/GRN 10.50IN TOT LG
4	17	1	1010416-306	WIRE, ELECTRICAL 28AWG WHT/BLU 7.00IN TOT LG
4	18	1	1010416-307	WIRE, ELECTRICAL 28AWG WHT/VIO 7.50IN TOT LG

SIZE	CODE IDENT NO.		
A	~~99974~~ 80230	2021810	
SCALE-NONE	REV LTR A		SHEET 4 OF 9

MIL 2064 9-65

WIRING HARNESS A 2021810

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
4	19	1	1010416-308	WIRE, ELECTRICAL 28AWG WHT/GY 9.00IN TOT LG
4	20	1	1010416-309	WIRE, ELECT 28AWG WHT/BLK/BRN 10.00IN TOT LG
4	21	1	1010416-310	WIRE, ELECT 28AWG WHT/BLK/RED 7.50IN TOT LG
4	22	1	1010416-311	WIRE, ELECT 28AWG WHT/BLK/ORN 10.00IN TOT LG
4	23	1	1010416-312	WIRE, ELECT 28AWG WHT/BLK/YEL 10.50IN TOT LG
4	24	1	1010416-313	WIRE, ELECT 28AWG WHT/BLK/GRN 8.50IN TOT LG
4	25	1	1010416-314	WIRE, ELECT 28AWG WHT/BLK/BLU 7.50IN TOT LG
4	26	1	1010416-315	WIRE, ELECT 28AWG WHT/BLK/VIO 9.50IN TOT LG
4	27	1	1010416-316	WIRE, ELECT 28AWG WHT/BLK/GY 9.50IN TOT LG
4	28	1	1010416-318	WIRE, ELECT 28AWG WHT/BRN/ORN 12.50IN TOT LG
4	29	1	1010416-319	WIRE, ELECT 20AWG WHT/BRN/YEL 10.00IN TOT LG
5	30	AR	1012507-002	TAPE, LACING
	31	AR	SN60W/S	SOLDER QQ-S-571
4	32	AR	2021527	FLUX
4	33	2.12	1006776-15	INSULATION SLEEVING

SIZE	CODE IDENT NO.		
A	~~99974~~ 80230	2021810	
SCALE-NONE	REV LTR A		SHEET 5 OF 9

MIL 2064 9-65

WIRING HARNESS A 2021810

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 1	11	10.50	TG-BC2 SEENOTE-6	58 36				.15	YES			
A 2	16	10.50	TG-BC1 SEENOTE-6	57 37				.15	YES			
A 3	9	9.00	TG-T(+) E-21	56 40				.15	YES			
A 4	7	15.00	TG-TM SG-TM	55 12				.15	YES			
A 5	19	9.00	TG-TM E-17	54 34				.15	YES			
A 6	5	11.00	TG-B(-) J1-J	53 41				.10	YES			
A 7	26	9.50	TG-TY E-20	52 35				.15	YES			
A 8	6	11.00	TG-A(-) J1-B	51 42				.10	YES			
A 9	1	9.50	TG-M7 E-6	50 31				.15	YES			
A 10	12	10.50	TG-M4 E-10	49 38				.15	YES			
A 11	23	10.50	TG-T(-) E-19	48 39				.15	YES			
A 12	3	10.00	TG-M8 E-3	47 30				.15	YES			

SIZE	CODE IDENT NO.	
A	~~99974~~ 80230	2021810
SCALE-NONE	REV LTR A	SHEET 6 OF 9

MIL 2084 9-65

WIRING HARNESS A 2021810

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 13	10	10.50	TG-M3 E-5	46 32				.15	YES			
A 14	4	11.00	TG-MC E-7	45 33				.15	YES			
A 15	27	9.50	TG-RH E-14	44 29				.15	YES			
A 16	2	11.50	TG-TC J1-Z	43 18				.10	YES			
A 17	25	7.50	SG-SCT E-16	14 26				.15	YES			
A 18	21	7.50	SG-SL E-2	13 28				.15	YES			
A 19	8	7.00	SG-TH J1-D	11 15				.10	YES			
A 20	17	7.00	SG-A(+) J1-P	10 17				.10	YES			
A 21	14	8.00	SG-SH E-1	9 27				.15	YES			
A 22	18	7.50	SG-B(+) J1-R	8 16				.10	YES			
A 23	13	9.00	SG-M7 E-4	7 25				.15	YES			
A 24	24	8.50	SG-M4 E-12	6 20				.15	YES			

SIZE	CODE IDENT NO.	
A	~~99974~~ 80230	2021810
SCALE-NONE	REV LTR A	SHEET 7 OF 9

MIL 2084 9-65

WIRING HARNESS A 2021810

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
A 25	28	12.50	SG-PH E-22	5 19				.15	YES			
A 26	15	9.50	SG-M8 F-9	4 24				.15	YES			
A 27	22	10.00	SG-M3 E-11	3 22				.15	YES			
A 28	20	10.00	SG-MC E-8	2 23				.15	YES			
A 29	29	10.00	SG-PL E-15	1 21				.15	YES			

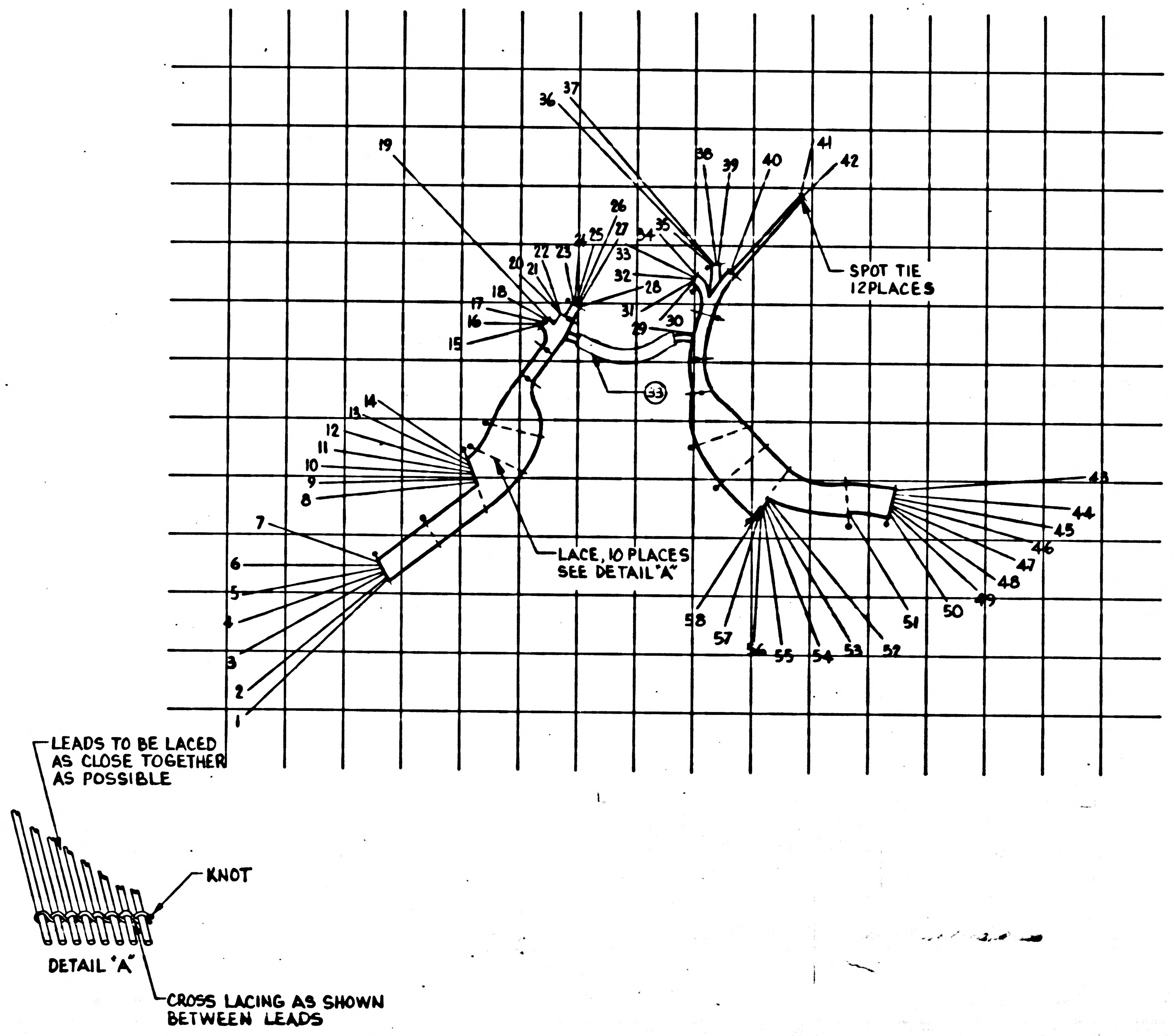
SIZE	CODE IDENT NO.	
A	~~99974~~ 80230	2021810
SCALE-NONE	REV LTR A	SHEET 8 OF 9

MIL 2084 9-65

2021810 A

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	SEE SHEET I FOR REVISION RECORD			

REVISIONS TDRR 33086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SPOT TIE
12 PLACES
LACE, 10 PLACES
SEE DETAIL "A"
LEADS TO BE LACED
AS CLOSE TOGETHER
AS POSSIBLE
KNOT
DETAIL "A"
CROSS LACING AS SHOWN
BETWEEN LEADS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN C. PLANE DATE 27 JUL 66
CHECKED 19 AUG 66
APPROVED C. 12 AUG 66
CONTRACT NAS 9-3426
NASA APPROVAL
MIT APPROVAL 2-7-67

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WIRING HARNESS "A"

SIZE	CODE IDENT NO.	
D	80230	2021810

SCALE 1/1
SHEET 5 OF 5

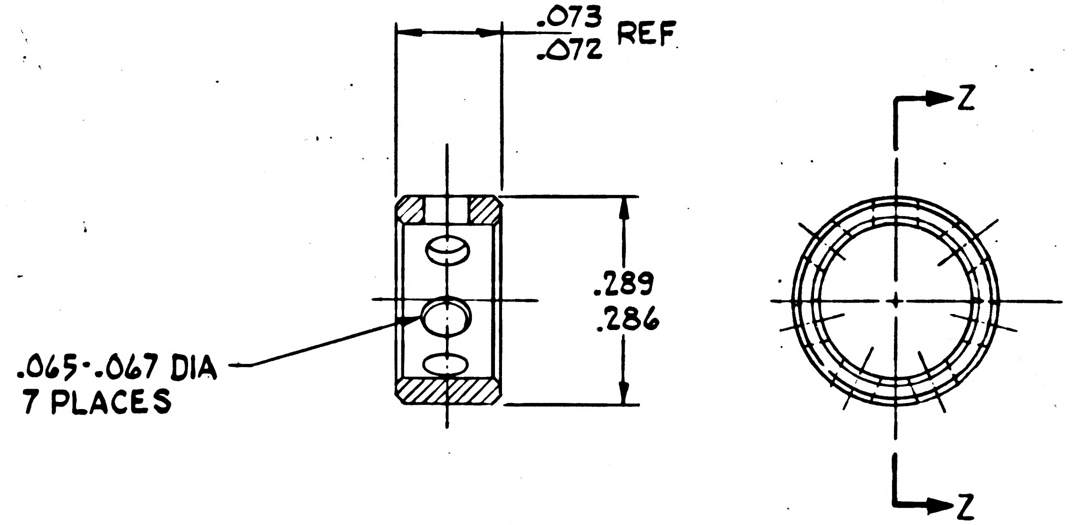
202181O A

REVISIONS						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	—	INITIAL RELEASE PER TDRR 35598			13 Feb 68	
	A	REVISED PER TDRR 36621		CP	23 AUG 68	

NOTES:
1. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327

2 INSPECTION AND ACCEPTANCE:
   A. MECHANICAL REQUIREMENTS:
      (1.) LUBRICATION: IMPREGNATE PER ATP 2021500, MC 25-880 PARAGRAPH 9

      (2.) FINISH: ALL SURFACES TO BE FREE FROM FOREIGN OBJECTS, BURRS, VOIDS, FUZZ, CHIPS, OR CRACKS USING A 20X MAGNIFICATION MICROSCOPE



SECTION Z-Z

SEE NOTE 2 A(1)

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
2	AR		2021550	LUBRICANT		
1	1		2021816	BEARING RETAINER, BALL (DRY)		

LIST OF MATERIALS

NEXT ASSY	USED ON
2021811	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH
SEE NOTES

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO. 9-497

DRAWN	A. LINCIS	9-15-67
CHECKED	[illegible]	9-18-67
APPROVED	B. Rochower	9-18-67
APPROVED	[illegible]	9-18-67

MIT APPROVED DATE 3/13/68
NASA APPROVED DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BEARING RETAINER, BALL
IMPREGNATED
APOLLO II IRIG

SIZE	CODE IDENT NO.	DRAWING NO.
C	80230	2021817

SCALE NONE
SHEET 1 OF 1

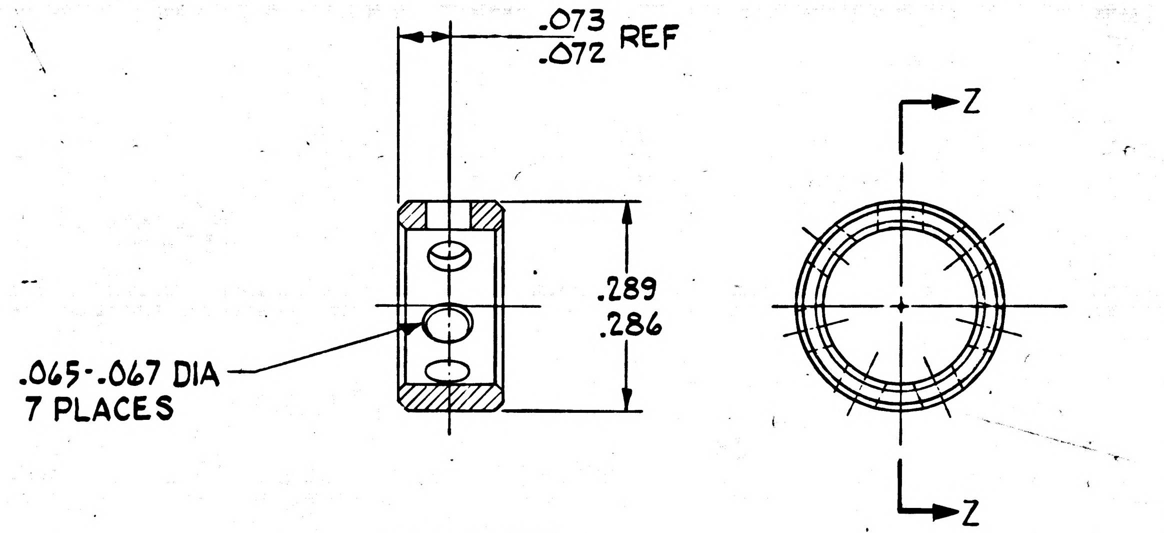
REVISIONS						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
ⓜ	—	INITIAL RELEASE PER TDRR 35598			13 Feb 68	
ⓜ	A	REVISED PER TDRR 36621	TK	CP	23 AUG 68	
	B	REVISED PER TDRR 37424	JJJ	CP	20 MAR 69	

NOTES:

1. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327

2. INSPECTION AND ACCEPTANCE:
   A. MECHANICAL REQUIREMENTS:
      (1.) LUBRICATION: IMPREGNATE PER ATP 2021500, MC 25-880 PARAGRAPH 9

      (2.) FINISH: ALL SURFACES TO BE FREE FROM FOREIGN OBJECTS, BURRS, VOIDS, FUZZ, CHIPS, OR CRACKS USING A 20X MAGNIFICATION MICROSCOPE



SECTION Z-Z

SEE NOTE 2 A(1)

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
2	AR		2021550	LUBRICANT		
1	1		2021816	BEARING RETAINER, BALL (DRY)		

LIST OF MATERIALS

2021811	2021500
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL

FINISH
SEE NOTES

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO. 9-497

DRAWN	A. LINCIS	9-15-67
CHECKED	J. Zimmerman	9-18-67
APPROVED	B. Rochower	9-18-67
APPROVED	E. J. Hall	9-18-67

~~MIT~~ APPROVED DATE 2/13/68

NASA APPROVED DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BEARING RETAINER, BALL
IMPREGNATED
APOLLO II IRIG

SIZE	CODE IDENT NO.	DRAWING NO.
C	80230	2021817

SCALE NONE SHEET 1 OF 1

REVISIONS TDRR 35598						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED

NOTES

1. SCOPE
   1.1 THIS SPECIFICATION ESTABLISHES THE REQUIREMENTS FOR THE PROCUREMENT OF STEEL 52100

2. GENERAL
   2.1 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
   2.2 SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 2.
   2.3 EACH SHIPPING AND UNIT CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME. NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS, LOT NUMBER, DATE OF MANUFACTURER, AND AS SPECIFIED IN 4

3. REQUIREMENTS

3.1 GENERAL

3.1.1 QUANTITY AND/OR SIZE SHALL BE AS SPECIFIED ON THE PURCHASE ORDER

3.2 DESIGN

3.2.1 COMPOSITION: PER TABLE 1

3.2.2 CONDITION: UNLESS OTHERWISE SPECIFIED, WIRE AND BARS SHALL BE SUPPLIED IN A MACHINABLE COLD FINISH CONDITION WITH MICRO-STRUCTURE OF SPHEROIDIZED CEMENTITE IN FERRITE MATRIX AND HAVING HARDNESS NOT HIGHER THAN BRINELL 248 OR EQUIVALENT.

3.2.3 DECARBURIZATION: COLD DRAWN BARS:

SIZE	DECARBURIZATION (PER SIDE)
UP TO 3/4"	0.006"
3/4" TO 1.125	0.010"
OVER 1.125	0.015"

3.2.4 HARDENABILITY: REPRESENTATIVE SPECIMENS WHEN HEATED FOR 20 MINUTES AT 1525°F. ± 10° QUENCHED IN COMMERCIAL PARAFIN OIL (100 SUS AT 100 F.) AT ROOM TEMPERATURE SHALL HAVE SUBSTANTIALLY UNIFORM HARDNESS NOT LOWER THAN ROCKWELL C 63 AT ANY POINT BELOW PERMISSIBLE DECARBURIZATION.

3.2.5 INCLUSIONS

3.2.5.1 SPECIMENS SELECTED SHALL REPRESENT PARTS OF INGOTS AND INGOTS OF EACH MELT TO BE USED BY THE BEARING MANUFACTURER.

3.2.5.2 ONE OR MORE SPECIMENS PER MELT SHALL BE RATED.

3.2.5.3 POLISHED FACE SHALL BE LONGITUDINAL TO THE DIRECTION OF THE ROLLING.

3.2.5.4 WORST FIELD OF EACH INCLUSION TYPE FROM EACH SPECIMEN SHALL BE RECORDED AS THE RATING FOR THAT SPECIMEN.

3.2.5.5 TWO-THIRDS OF THE SPECIMENS AS WELL AS THE AVERAGE OF ALL SPECIMENS SHALL NOT EXCEED THE RATING AS TABULATED BELOW.

3.2.5.6 J-K RATING OF 1/2 SQUARE INCH SECTION THROUGH CENTER SHALL BE WITHIN VALUES TABULATED BELOW.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON NO 1002034 FOR THIS DRAWING

THIN SERIES	A1, B1, C1, D1-1/2,
THICK SERIES	A1, B1, C1, D1.
MAX. NO. OF FIELDS (A+B+C+D)	5 THIN SERIES 1 THICK SERIES

3.2.6 MICROSTRUCTURE: DEEP ACID ETCH OF SECTION THROUGH CENTER LINE OF TUBE BARS PARALLEL TO DIRECTION OF ROLLING SHALL SHOW FREEDOM FROM PIPE, EXCESSIVE POROSITY, INJURIOUS INCLUSIONS, SEAMS AND LAPS.

3.2.7 GRAIN SIZE: AFTER 1525°F. +10° FOR 20 MINUTES AND OIL QUENCHED, A FRACTURED SPECIMEN (NOT EXCEEDING 3/8" DIAMETER) SHALL HAVE SHEPHERD GRAIN SIZE NOT LESS THAN 8. THE FRACTURE SHALL BE FREE OF SPECULAR FACETS AND COARSE GRAINS.

3.3 INSPECTION FOR ACCEPTANCE (MINIMUM REQUIREMENTS)

3.3.1 DIMENSIONS: AS SPECIFIED

3.3.2 WIRES AND BARS: UNLESS OTHERWISE STATED, THE LATEST ISSUE OF AMS 2251 IS APPLICABLE. DIAMETER TOLERANCES FOR COLD FINISHED BARS SHALL CONFORM TO TABLE 1, COLUMN HEATED "OVER 0.55 AND ALL CARBONS HEAT TREATED".

3.3.3 MECHANICAL TUBING: UNLESS OTHERWISE STATED, THE LATEST ISSUE OF AMS 2253 AS APPLICABLE TO MECHANICAL TYPE.

3.3.4 DATE AS SPECIFIED IN 4.1.3

3.4 SPECIAL CONDITIONING: NONE

4. MARKING AND PACKAGING:

4.1.1 DIFFERENT SIZES MUST BE DISTINCTLY MARKED WITH THE ORDER NO. ON EACH BUNDLE OR BOX OF STEEL.

4.1.2 ALL BARS IN ANY ONE BUNDLE OR BOX FROM ANY ONE SHIPMENT OF BARS OF ONE SIZE MUST BE FROM THE SAME MELT.

4.1.3 COPIES OF MANUFACTURER'S ANALYSIS, PROPERLY IDENTIFIED, FOR EACH MELT IN EACH SHIPMENT SHALL BE SUBMITTED TO THE BEARING MANUFACTURER.

4.1.4 BARS MUST BE ADEQUATELY PROTECTED FROM RUSTING OR OTHER DAMAGE IN TRANSIT BY SUITABLE OILING OR PACKING.

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTES

FINISH
NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO. 9-497

DRAWN		
CHECKED		9-18-67
APPROVED	B. Rochower	9-19-67
APPROVED	E. J. Hall	9-19-67

MIT APPROVED DATE 2/18/68

NASA APPROVED DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

STEEL 52100

SPECIFICATION CONTROL DRAWING

SIZE	CODE IDENT NO.	DRAWING NO.
C	80230	2021818

SCALE NONE SHEET 1 OF 2

REVISIONS TDRR 35598

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A	REVISED PER TDRR 36399	PHG	Jim	7-29-68	

NOTES

1. SCOPE

1.1 THIS SPECIFICATION ESTABLISHES THE REQUIREMENTS FOR THE PROCUREMENT OF SINTERED NYLON SLUGS.

2. GENERAL

2.1 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

2.2 SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 2.

2.3 EACH SHIPPING AND UNIT CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME. NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS, LOT NUMBER, DATE OF MANUFACTURE.

3. REQUIREMENTS

3.1 GENERAL

3.1.1 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

3.2 DESIGN

3.2.1 PHYSICAL PROPERTIES: THE SINTERED NYLON SHALL MEET THE REQUIREMENTS OF TABLE 1 AND TABLE 11.

3.2.2 OIL CAPACITY AND BLEED RATE FORMULAS

3.2.2.1 FORMULA FOR COMPUTING OIL CAPACITY AT 400 G'S, (%) IS

$$\frac{W_1 - W_0}{W_0} \text{ X } 100$$

WHERE:

W_0 = MOISTURE-FREE WEIGHT OF SLUG WITHOUT OIL.

W_1 = WEIGHT OF SLUG AFTER IMPREGNATING WITH OIL, BLOTTING WITH LENS TISSUE TO REMOVE EXCESS OIL, AND CENTRIFUGING FOR 10 MINUTES AT 400 G'S IN THE DIRECTION OF THE SLUG AXIS.

3.2.2.2 BLEED RATE, (%) IS

$$\frac{W_1 - W_2}{W_1 - W_0} \text{ X } 100$$

WHERE:

W_0 = MOISTURE-FREE WEIGHT OF SLUG WITHOUT OIL.

W_1 = WEIGHT OF SLUG AFTER IMPREGNATING WITH OIL, BLOTTING WITH LENS TISSUE TO REMOVE EXCESS OIL, AND CENTRIFUGING FOR 10 MINUTES AT 400 G'S IN THE DIRECTION OF THE AXIS.

W_2 = WEIGHT OF SLUG AFTER IMPREGNATING WITH OIL, BLOTTING WITH LENS TISSUE TO REMOVE EXCESS OIL, CENTRIFUGING FOR 10 MINUTES AT 400 G'S AND FOR 10 MINUTES AT 700 G'S IN THE DIRECTION OF THE SLUG AXIS.

3.3 INSPECTION FOR ACCEPTANCE (MINIMUM REQUIREMENTS)

3.3.1 ALL PHYSICAL PROPERTIES OTHER THAN THOSE DEFINED IN SECTION 3.2.2 SHALL BE DETERMINED BY THE MANUFACTURER, AS SPECIFIED IN TABLES 1 AND 11.

3.3.2 DENSITY (100% INSPECTION): PER TABLE 1

3.3.2.1 REJECT THE ENTIRE LOT IF MORE THAN 50% OF A LOT HAS BEEN REJECTED FOR APPARENT DENSITY.

3.3.3 SAMPLES SHALL BE DRAWN AT RANDOM AFTER THE PIECES REJECTED FOR DENSITY HAVE BEEN REMOVED.

3.3.3.1 TWO PER CENT (BUT NOT LESS THAN TWO (2) SAMPLES) OF EACH LOT SHALL BE DRAWN FOR A TEST OF OIL CAPACITY AND BLEED RATE.

3.3.3.1.1 REJECT THE ENTIRE LOT IF ANY INDIVIDUAL VALUE FOR OIL CAPACITY OR BLEED RATE IS OUTSIDE SPECIFICATIONS.

3.3.3.2 TWO PER CENT (BUT NOT LESS THAN SIX (6) SAMPLES) OF EACH LOT SHALL BE DRAWN FOR OIL ABSORPTION. AFTER PERFORMING THE OIL DROP ABSORPTION TEST, ONE-THIRD (BUT NOT LESS THAN TWO (2) OF THE SAMPLES SHALL THEN BE TESTED FOR PORE SIZE DISTRIBUTION.

3.3.3.2.1 REJECT THE ENTIRE LOT IF THE AVERAGE VALUE FOR OIL DROP ABSORPTION, OR PORE SIZE DISTRIBUTION IS OUTSIDE SPECIFICATIONS.

3.3.4 THE MANUFACTURER SHALL FURNISH A COPY OF ALL APPLICABLE TEST METHODS WITH EACH SHIPMENT.

3.4 SPECIAL CONDITIONING: NONE

4. MARKING AND PACKAGING:

4.1 PREPARATION FOR DELIVERY SHALL BE AS SPECIFIED IN 2.3

4.1.1 EACH SLUG SHALL BE PACKAGED IN A PLASTIC CONTAINER WHICH SHALL BE MARKED WITH THE LOT CONTROL NUMBER.

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTES

FINISH
NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO. 9-497

DRAWN
CHECKED 9-18-67
APPROVED B. Rockower 9-18-67
APPROVED 9-18-67

APPROVED DATE 2/13/68

NASA APPROVED DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

NYLON, SINTERED

SPECIFICATION CONTROL DRAWING

SIZE C | CODE IDENT NO. 80230 | DRAWING NO. 2021819

SCALE NONE | SHEET 1 OF 2

Ⓜ REVISIONS TDRR 35598

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A	REVISED PER TDRR 36399	PHG	Gem	7-29-68	

4.1.2 THE INDIVIDUAL PLASTIC CONTAINER SHALL BE PACKED WITH SUFFICIENT CUSHIONING MATERIAL TO PREVENT DAMAGE IN TRANSIT.

TABLE 1

RETAINER MATERIAL PHYSICAL PROPERTIES

PROPERTY	REQUIREMENTS
APPARENT DENSITY, GM/CC	0.80-0.90
OIL CAPACITY AT 400 G'S %	18 -30
BLEED RATE, %	2 - 6
RING TENSILE STRENGTH, PSI, MINIMUM AVG.	1,400
OIL DROP ABSORPTION, MINUTES, MAXIMUM AVG	30
LENGTH, INCHES	1.250 ± 0.25
DIAMETER, INCHES	0.930 ± 0.050
COLOR	OFF-WHITE
APPEARANCE	THE MATERIAL SHALL BE FREE OF CONTAMINATION AND DEEP CRACKS. HOWEVER, OCCASIONAL BROWN PARTICLES ARE CONSIDERED NORMAL.

TABLE II

AVERAGE PORE SIZE DISTRIBUTION (INFORMATION ONLY)

PORE RANGE (MICRONS)	CC OF PORES CC OF SAMPLE
100-5.0	0.005-0.03
5.0-1.3	0.08-0.125
1.3-0.3	0.08-0.14
0.3-0.058	0.025 MAX.

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTES

FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO. 9-497

DRAWN
CHECKED F. Guiman 9-18-67
APPROVED B. Rochlmer 9-18-67
APPROVED Exhall 9-18-67

~~MIT~~ APPROVED DATE 2/13/68

NASA APPROVED DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

NYLON, SINTERED

SPECIFICATION CONTROL DRAWING

SIZE C | CODE IDENT NO. 80230 | DRAWING NO. 2021819

SCALE NONE | SHEET 2 OF 2

REVISIONS TDRR 35598

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED

NOTES

1. SCOPE

1.1 THIS SPECIFICATION ESTABLISHES THE REQUIREMENTS FOR THE PROCUREMENT OF SINTERED NYLON SLUGS.

2. GENERAL

2.1 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

2.2 SUPPLIER PROCESS AND QUALITY CONTROL, INCLUDING FINAL TESTING, SHALL BE IN ACCORDANCE WITH SPECIFICATION ND 1015404, CLASS 2.

2.3 EACH SHIPPING AND UNIT CONTAINER SHALL BE PERMANENTLY AND LEGIBLY MARKED WITH THE MANUFACTURER'S NAME AND/OR SYMBOL, ITEM NAME. NASA DRAWING NUMBER AND REVISION LETTER, NET CONTENTS, LOT NUMBER, DATE OF MANUFACTURE.

3. REQUIREMENTS

3.1 GENERAL

3.1.1 INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

3.2 DESIGN

3.2.1 PHYSICAL PROPERTIES: THE SINTERED NYLON SHALL MEET THE REQUIREMENTS OF TABLE 1 AND TABLE 11.

3.2.2 OIL CAPACITY AND BLEED RATE FORMULAS

3.2.2.1 FORMULA FOR COMPUTING OIL CAPACITY AT 400 G'S, (%) IS

$$\frac{W_1 - W_0}{W_0} \times 100$$

WHERE:

W_0 = MOISTURE-FREE WEIGHT OF OIL-LESS SLUG.

W_1 = WEIGHT OF SLUG AFTER IMPREGNATING WITH OIL, BLOTTING WITH LENS TISSUE TO REMOVE EXCESS OIL, AND CENTRIFUGING FOR 10 MINUTES AT 400 G'S IN THE DIRECTION OF THE SLUG AXIS.

3.2.2.2 BLEED RATE, (%) IS

$$\frac{W_1 - W_2}{W_1 - W_0} \times 100$$

WHERE:

W_0 = MOISTURE-FREE WEIGHT OF OIL-LESS SLUG

W_1 = WEIGHT OF SLUG AFTER IMPREGNATING WITH OIL, BLOTTING WITH LENS TISSUE TO REMOVE EXCESS OIL, AND CENTRIFUGING FOR 10 MINUTES AT 400 G'S IN THE DIRECTION OF THE AXIS.

W_2 = WEIGHT OF SLUG AFTER IMPREGNATING WITH OIL, BLOTTING WITH LENS TISSUE TO REMOVE EXCESS OIL, CENTRIFUGING FOR 10 MINUTES AT 400 G'S AND FOR 10 MINUTES AT 700 G'S IN THE DIRECTION OF THE SLUG AXIS.

3.3 INSPECTION FOR ACCEPTANCE (MINIMUM REQUIREMENTS)

3.3.1 ALL PHYSICAL PROPERTIES OTHER THAN THOSE DEFINED IN SECTION 3.2.2 SHALL BE DETERMINED BY THE MANUFACTURER, AS SPECIFIED IN TABLES 1 AND 11.

3.3.2 DENSITY (100% INSPECTION): PER TABLE 1

3.3.2.1 REJECT THE ENTIRE LOT IF MORE THAN 50% OF A LOT HAS BEEN REJECTED FOR APPARENT DENSITY.

3.3.3 SAMPLES SHALL BE DRAWN AT RANDOM AFTER THE PIECES REJECTED FOR DENSITY HAVE BEEN REMOVED.

3.3.3.1 TWO PER CENT (BUT NOT LESS THAN TWO (2) SAMPLES) OF EACH LOT SHALL BE DRAWN FOR A TEST OF OIL CAPACITY AND BLEED RATE.

3.3.3.1.1 REJECT THE ENTIRE LOT IS ANY INDIVIDUAL VALUE FOR OIL CAPACITY OR BLEED RATE IS OUTSIDE SPECIFICATIONS.

3.3.3.2 TWO PER CENT (BUT NOT LESS THAN SIX (6) SAMPLES) OF EACH LOT SHALL BE DRAWN FOR OIL ABSORPTION.
AFTER PERFORMING THE OIL DROP ABSORPTION TEST, ONE-THIRD (BUT NOT LESS THAN TWO (2) OF THE SAMPLES SHALL THEN BE TESTED FOR PORE SIZE DISTRIBUTION.

3.3.3.2.1 REJECT THE ENTIRE LOT IS THE AVERAGE VALUE FOR OIL DROP ABSORPTION, OR PORE SIZE DISTRIBUTION IS OUTSIDE SPECIFICATIONS.

3.3.4 THE MANUFACTURER SHALL FURNISH A COPY OF ALL APPLICABLE TEST METHODS WITH EACH SHIPMENT.

3.4 SPECIAL CONDITIONING: NONE

4. MARKING AND PACKAGING:

4.1 PREPARATION FOR DELIVERY SHALL BE AS SPECIFIED IN 2.2

4.1.1 EACH SLUG SHALL BE PACKAGED IN A PLASTIC CONTAINER WHICH SHALL BE MARKED WITH THE LOT CONTROL NUMBER.

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTES

FINISH
NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO. 9-497

DRAWN
CHECKED Zimmerman 9-18-67
APPROVED B. Rockower 9-18-67
APPROVED 9-18-67

APPROVED DATE 2/13/68

NASA APPROVED DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

NYLON, SINTERED

SPECIFICATION CONTROL DRAWING

SIZE	CODE IDENT NO.	DRAWING NO.
C	80230	2021819

SCALE NONE SHEET 1 OF 2

REVISIONS TDRR 35598

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED

4.1.2 THE INDIVIDUAL PLASTIC CONTAINER SHALL BE PACKED WITH SUFFICIENT CUSHIONING MATERIAL TO PREVENT DAMAGE IN TRANSIT.

TABLE I

RETAINER MATERIAL PHYSICAL PROPERTIES

PROPERTY	REQUIREMENTS
APPARENT DENSITY, GM/CC	0.80-0.90
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TABLE II

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1.3-0.3	0.08-0.14
0.3-0.058	0.025 MAX.

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES

FINISH NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO. 9-497

DRAWN
CHECKED 9-18-67
APPROVED 9-18-67
APPROVED 9-18-67

~~MIT~~ APPROVED DATE 2/13/68

NASA APPROVED DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

NYLON, SINTERED

SPECIFICATION CONTROL DRAWING

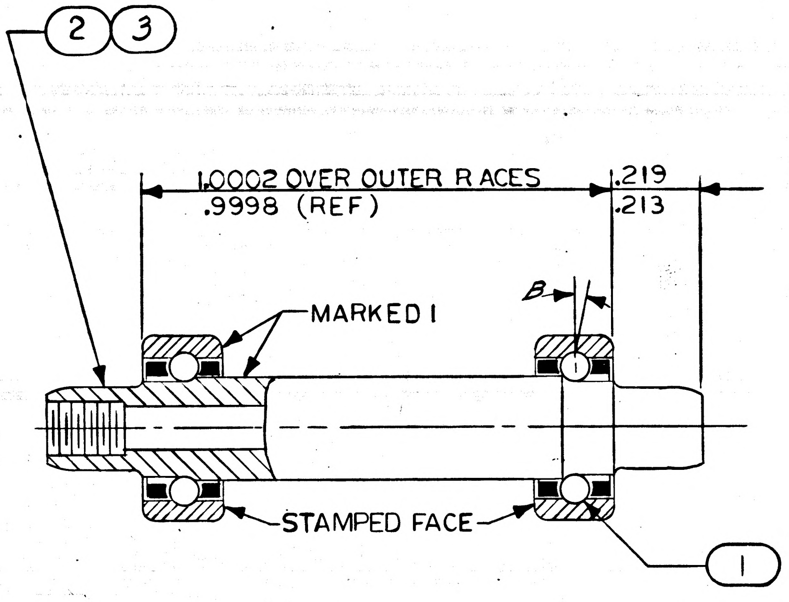
SIZE	CODE IDENT NO.	DRAWING NO.
C	80230	2021819

SCALE NONE SHEET 2 OF 2

REVISIONS						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
		INITIAL RELEASE PER TDRR 36602	AL		8-1-68	
	A	REVISED PER TDRR 37479	JJ	CP	10 APR 69	

NOTES:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327
2. MECHANICAL REQUIREMENTS:
   - A. CONSTRUCTION: SHAFT SEPARABLE BUT NOT INTERCHANGEABLE WITH OUTER RACE ASSEMBLIES. ASSEMBLE WITH MARKING ON SHAFT AND ON OUTER RACE AS SHOWN
   - B. DIAMETRAL CLEARANCE =.00216 (REF)
   - C. OPERATING CONTACT ANGLE UNDER 3 LBS THRUST LOAD 30.0°-32.0° (REF)



121	111	101	091	081	071	061	051	041	031	021	011	ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
1												3			2021826-061	BEARING & SHAFT SUB-ASSY(REFINISHED)		
	1														-051			
		1													-041			
			1												-031			
				1											-021			
					1										2021826-011	BEARING & SHAFT SUB-ASSY(REFINISHED)		
						1						2			2021822-061	BEARING & SHAFT SUB-ASSEMBLY		
							1								2021822-051	BEARING & SHAFT SUB-ASSEMBLY		
								1							2021822-041	BEARING & SHAFT SUB-ASSEMBLY		
									1						2021822-031	BEARING & SHAFT SUB-ASSEMBLY		
										1					2021822-021	BEARING & SHAFT SUB-ASSEMBLY		
											1				2021822-011	BEARING & SHAFT SUB-ASSEMBLY		
2	2	2	2	2	2	2	2	2	2	2	2	1			2021817	BEARING RETAINER, BALL (IMPREGNATED)		

LIST OF MATERIALS

THE ASSEMBLY PART NUMBER IS THE PART NUMBER AND THE APPLICABLE DASH NUMBER.

NEXT ASSY	USED ON
2021701	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTES

FINISH
NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO. 9-497

DRAWN	A. LINCIS	7-22-68
CHECKED	[illegible]	7/23/68
APPROVED	B. Rockower	7-25-68
APPROVED		

MIT APPROVED DATE
R Booth 7-25-68
8/1/68

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

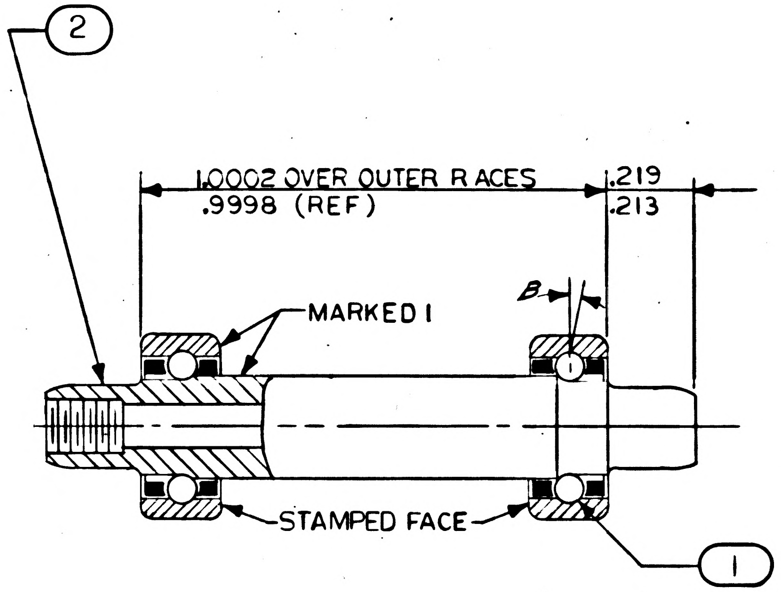
BEARING AND SHAFT ASS'Y
APOLLO II IRIG

SIZE	CODE IDENT NO.	DRAWING NO.
C	80230	2021823

SCALE NONE SHEET 1 OF 1

REVISIONS						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
		INITIAL RELEASE PER TDRR 36602	A L		8-1-68	

NOTES:
1. GENERAL:
   A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327
2. MECHANICAL REQUIREMENTS:
   A. CONSTRUCTION: SHAFT SEPARABLE BUT NOT INTERCHANGEABLE WITH OUTER RACE ASSEMBLIES. ASSEMBLE WITH MARKING ON SHAFT AND ON OUTER RACE AS SHOWN
   B. DIAMETRAL CLEARANCE = .00216 (REF)
   C. OPERATING CONTACT ANGLE UNDER 3 LBS THRUST LOAD 30.0°-32.0° (REF)



THE ASSEMBLY PART NUMBER IS THE PART NUMBER AND THE APPLICABLE DASH NUMBER

1						2			2021822-061	BEARING & SHAFT SUB-ASSEMBLY		
	1								2021822-051	BEARING & SHAFT SUB-ASSEMBLY		
		1							2021822-041	BEARING & SHAFT SUB-ASSEMBLY		
			1						2021822-031	BEARING & SHAFT SUB-ASSEMBLY		
				1					2021822-021	BEARING & SHAFT SUB-ASSEMBLY		
					1				2021822-011	BEARING & SHAFT SUB-ASSEMBLY		
2	2	2	2	2	2	1			2021817	BEARING RETAINER, BALL (IMPREGNATED)		
061	051	041	031	021	011	ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION

LIST OF MATERIALS

NEXT ASSY	USED ON
2021701	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTES

FINISH
NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO. 9-497
DRAWN A. LINCIS 7-22-68
CHECKED 7/23/68
APPROVED B. Rockower 7-25-68
APPROVED
MIT APPROVED DATE
7-25-68
8/1/68

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

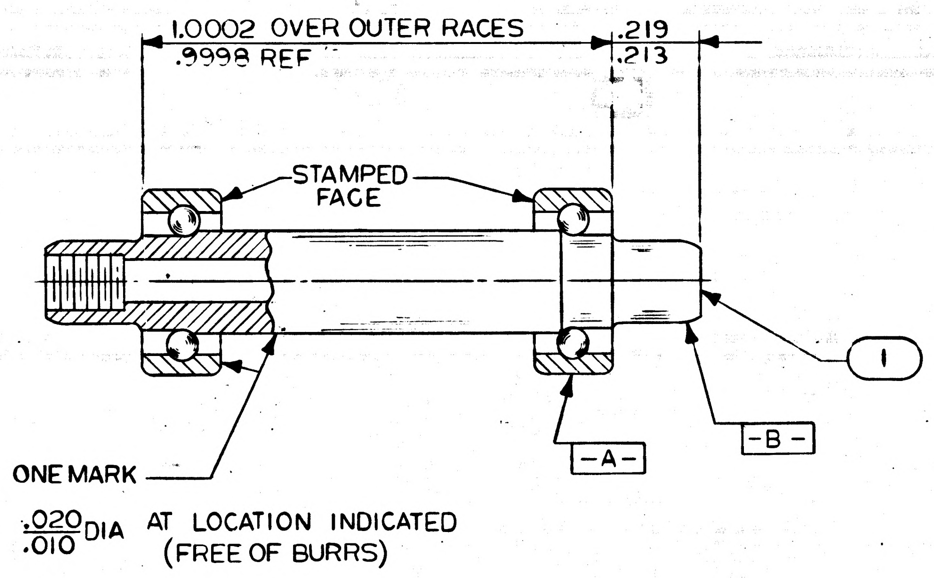
BEARING AND SHAFT ASS'Y
APOLLO II IRIG

SIZE C
CODE IDENT NO. 80230
DRAWING NO. 2021823
SCALE NONE
SHEET 1 OF 1

REVISIONS						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	—	INITIAL RELEASE TDRR 37477	A L		1-24-69	9 APRIL '69

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. REFINISH SURFACES OF ITEMS [-A-] AND [-B-] PER ATP 2021500, MC 25-916
3. PARTS REFINISHED PER NOTE 2 SHALL MEET THE REQUIREMENTS OF ITEM ①



QTY REQ'D 061	051	041	031	021	ITEM NO.	QTY REQD 011	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
1					1			2021822-061	BEARING AND SHAFT SUB-ASS'Y (MATCHED SET)		
	1							2021822-051	BEARING AND SHAFT SUB-ASS'Y (MATCHED SET)		
		1						2021822-041	BEARING AND SHAFT SUB-ASS'Y (MATCHED SET)		
			1					2021822-031	BEARING AND SHAFT SUB-ASS'Y (MATCHED SET)		
				1				2021822-021	BEARING AND SHAFT SUB-ASS'Y (MATCHED SET)		
						1		2021822-011	BEARING AND SHAFT SUB-ASS'Y (MATCHED SET)		

LIST OF MATERIALS

THE ASSEMBLY PART NO. IS THE DRAWING NO. AND THE APPLICABLE DASH NO.

NEXT ASSY	USED ON
2021824	
2021823	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTES

FINISH
NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.

DRAWN	A. LINCIS	1-24-69
CHECKED	F. Zimmerman	1/29/69
APPROVED	B. Kochower	2/3/69
APPROVED	P. R. Kempan	2-27-69

MIT APPROVED	DATE
	2 APR 1969
W.	4/9/69

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BEARING AND SHAFT SUBASSEMBLY
(MATCHED SET)
REFINISHED

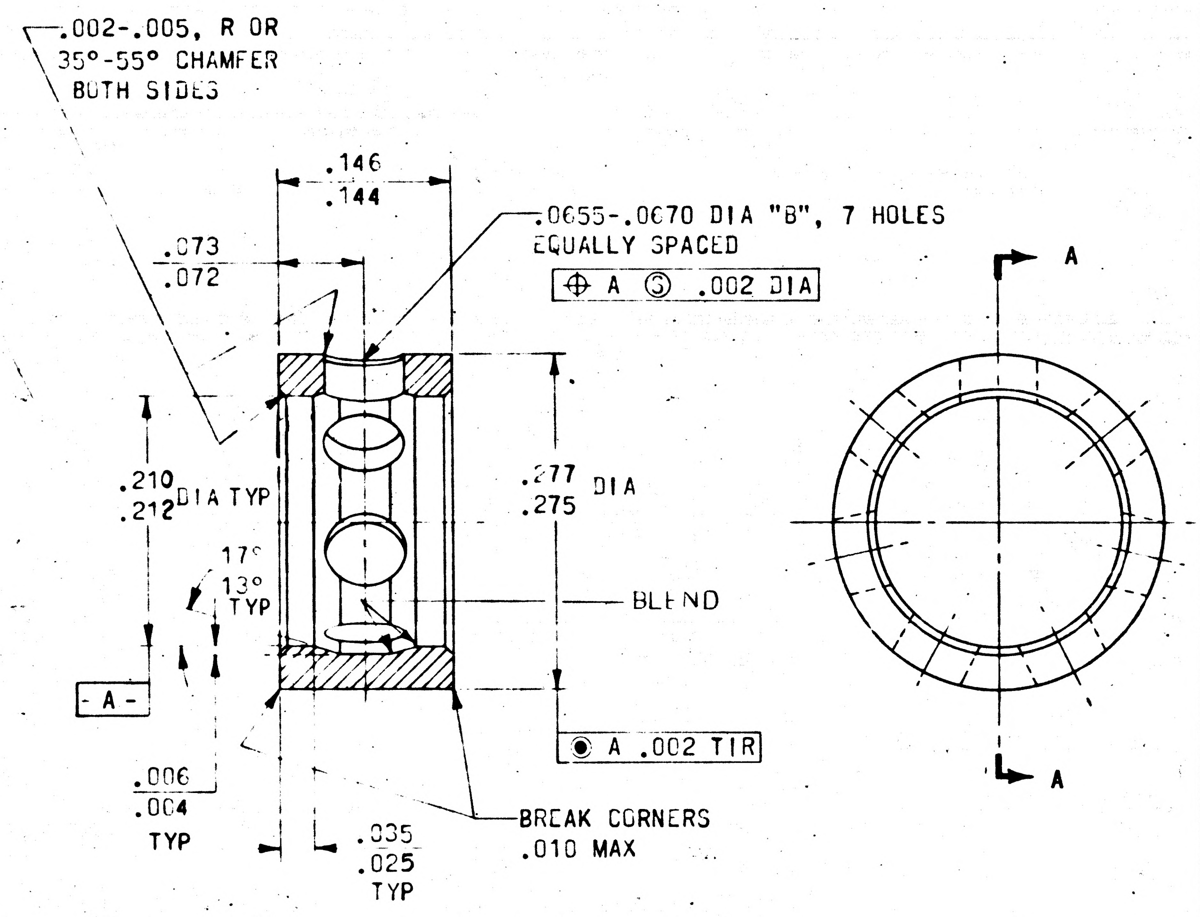
SIZE	CODE IDENT NO.	DRAWING NO.
C	80230	2021826

SCALE SHEET

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
	—	INITIAL RELEASE CLASS A PER TDRR 37713	4 AUG 69	

NOTES:

1. GENERAL:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. INSPECTION AND ACCEPTANCE:
   - A. MECHANICAL REQUIREMENTS:
     - (1) MATERIAL: PER SCD 2021819.
   - B. PROCESS PER ATP 2021500, MC 25-921
   - C. MARKING:
     - (1) PACKAGE: PACKAGING SHALL BE MARKED PER ND 1002215 PARAGRAPH 3.16.
     - (2) ADDITIONAL MARKING:
       - a. PACKAGING: THE RETAINERS SHALL BE PACKAGED IDENTIFIED BY LOT NUMBER AND QUANTITY, AND SHIPPED IN A DRY (NON-IMPREGNATED) CONDITION IN SEALED CONTAINERS PER ND 1002215, CLASS II. (PLASTIC BAGS MAY NOT BE USED FOR STORAGE OR SHIPMENT.)
       - b. DATE OF PACKAGING.
     - (3) MANUFACTURER'S PART NUMBER MAY APPEAR ON THE PACKAGE.


.002-.005, R OR
35°-55° CHAMFER
BOTH SIDES
.146
.144
.073
.072
.0655-.0670 DIA "B", 7 HOLES
EQUALLY SPACED
⊕ A Ⓢ .002 DIA
A
A
.210
.212 DIA TYP
17°
13°
TYP
.277
.275 DIA
BLEND
-A-
◉ A .002 TIR
.006
.004
TYP
.035
.025
TYP
BREAK CORNERS
.010 MAX

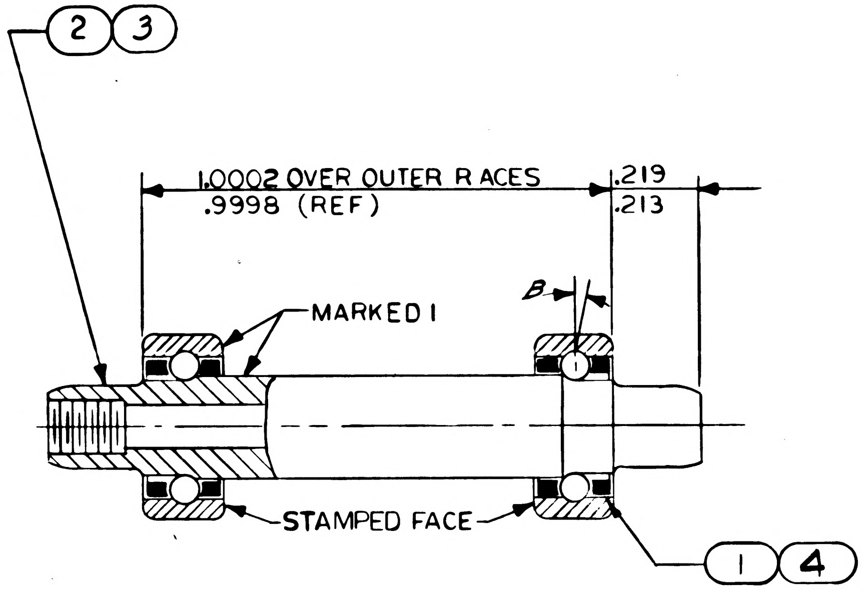
SECTION A-A

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE DECIMALS + — − — 3 PLACE DECIMALS + — − — ANGLES + — − —	MIT INSTRUMENTATION LAB CAMBRIDGE MASS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS			
	DRAWN A. LINCIS DATE 6-24-69 CHECKED 6/26/69 APPROVAL Fred P. Kerrigan 6-25-69 CONTRACT	RETAINER, BALL, BEARING — DRY			
DO NOT SCALE THIS DRAWING					
MATERIAL SEE NOTE 2.A.(1)	NASA APPROVAL Max D Holley 7-8-69	SIZE C	CODE IDENT NO 80230	2021829	
APPROVAL	MIT APPROVAL M. Murphy	SCALE 10:1			SHEET 1 OF 1

REVISIONS	TDRR 37713					
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A	REVISED PER TDRR 38528 SHT 1 OF 2 WAS SHT 1 OF 1	RJJ		22 DEC 71	

NOTES:

1. GENERAL:
   A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327
2. MECHANICAL REQUIREMENTS:
   A. CONSTRUCTION: SHAFT SEPARABLE BUT NOT INTERCHANGEABLE WITH OUTER RACE ASSEMBLIES. ASSEMBLE WITH MARKING ON SHAFT AND ON OUTER RACE AS SHOWN
   B. DIAMETRAL CLEARANCE = .00216 (REF)
   C. OPERATING CONTACT ANGLE UNDER 3 LBS THRUST LOAD 30.0°-32.0° (REF)



CONTINUED ON SHEET 2

121	111	101	091	081	071	061	051	041	031	021	011	ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
1												3			2021826-061	BEARING & SHAFT SUB-ASSY (REFINISHED)		
	1														-051			
		1													-041			
			1												-031			
				1											-021			
					1										2021826-011	BEARING & SHAFT SUB-ASSY (REFINISHED)		
						1						2			2021822-061	BEARING & SHAFT SUB-ASSEMBLY		
							1								-051	BEARING & SHAFT SUB-ASSEMBLY		
								1							-041	BEARING & SHAFT SUB-ASSEMBLY		
									1						-031	BEARING & SHAFT SUB-ASSEMBLY		
										1					-021	BEARING & SHAFT SUB-ASSEMBLY		
											1				2021822-011	BEARING & SHAFT SUB-ASSEMBLY		
2	2	2	2	2	2	2	2	2	2	2	2	1			2021830	BEARING RETAINER, BALL (IMPREGNATED)		

LIST OF MATERIALS

THE ASSEMBLY PART NUMBER IS THE PART NUMBER AND THE APPLICABLE DASH NUMBER.

NEXT ASSY	USED ON
2021832	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTES

FINISH
NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN M McDONALD 6-25-64
CHECKED 6/25/6[illegible]
APPROVED Paul R. Kerrigan 6-25-6[illegible]
APPROVED

MIT APPROVED DATE
M. Munley 6/25/6[illegible]
Max D. [illegible] 7-8-6[illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BEARING AND SHAFT ASS'Y
APOLLO II IRIG

SIZE C
CODE IDENT NO. 80230
DRAWING NO. 2021831
SCALE NONE
SHEET 1 OF 2

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		THIS SHEET ADDED PER TDRR 38528		22 Dec 71	RW

Rev A **THIS SHEET ADDED**

2	2	2	2	2	2		4	2020259	RETAINER, BEARING (IMPREGNATED)
1							3	2021826-121	BEARING & SHAFT SUB-ASSY (REFINISHED)
	1							-111	
		1						-101	
			1					-091	
				1				-081	
					1			2021826-071	BEARING & SHAFT SUB-ASSY (REFINISHED)
181	171	161	151	141	131		ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED							LIST OF PARTS AND MATERIALS		

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2021832	2021500	

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ — + — + —
— — — — — —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
CONTRACT

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN M McDONALD DATE 6-25-69
CHECKED
APPROVAL PAUL R. KENGAN 6-25-69
APPROVAL
NASA APPROVAL
MIT APPROVAL M. MURLEY 6-25-69

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BEARING AND SHAFT ASS'Y
APOLLO II IRIG

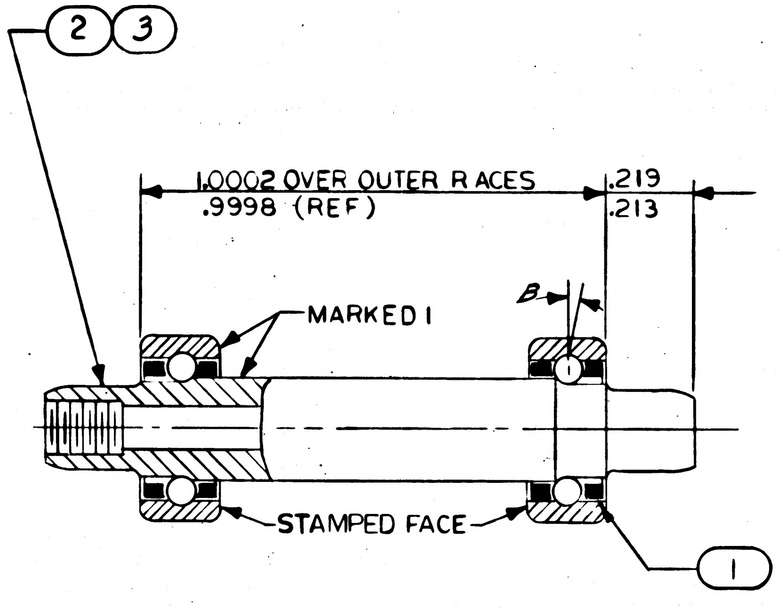
CODE IDENT NO. 80230
SIZE C
2021831
SCALE NONE
SHEET 2

REVISIONS TDRR 37713

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED

NOTES:

1. GENERAL:
   - A. INTERPRET DRAWING SYMBOLS, ABBREVIATIONS AND REFERENCE DESIGNATIONS IN ACCORDANCE WITH GOVERNMENT STANDARDS PRESCRIBED IN MIL-D-70327
2. MECHANICAL REQUIREMENTS:
   - A. CONSTRUCTION: SHAFT SEPARABLE BUT NOT INTERCHANGEABLE WITH OUTER RACE ASSEMBLIES. ASSEMBLE WITH MARKING ON SHAFT AND ON OUTER RACE AS SHOWN
   - B. DIAMETRAL CLEARANCE = .00216 (REF)
   - C. OPERATING CONTACT ANGLE UNDER 3 LBS THRUST LOAD 30.0°-32.0° (REF)
3. SELECT ONE OF ITEMS (2) OR (3)



121	111	101	091	081	071	061	051	041	031	021	011	ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
1												3			2021826-061	BEARING & SHAFT SUB-ASSY (REFINISHED)		
	1														-051			
		1													-041			
			1												-031			
				1											-021			
					1										2021826-011	BEARING & SHAFT SUB-ASSY (REFINISHED)		
						1						2			2021822-061	BEARING & SHAFT SUB-ASSEMBLY		
							1								-051	BEARING & SHAFT SUB-ASSEMBLY		
								1							-041	BEARING & SHAFT SUB-ASSEMBLY		
									1						-031	BEARING & SHAFT SUB-ASSEMBLY		
										1					-021	BEARING & SHAFT SUB-ASSEMBLY		
											1				2021822-011	BEARING & SHAFT SUB-ASSEMBLY -		
2	2	2	2	2	2	2	2	2	2	2	2	1			2021830	BEARING RETAINER, BALL (IMPREGNATED)		

LIST OF MATERIALS

THE ASSEMBLY PART NUMBER IS THE PART NUMBER AND THE APPLICABLE DASH NUMBER.

NEXT ASSY	USED ON
2021832	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTES

FINISH
NONE

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN M. McDonald 6-25-69
CHECKED 6/25/69
APPROVED Paul R. Kerrigan 6-25-69
APPROVED

MIT APPROVED DATE
M. Munley 6/25/69
Max D. Holley 7-8-69

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BEARING AND SHAFT ASS'Y
APOLLO II IRIG

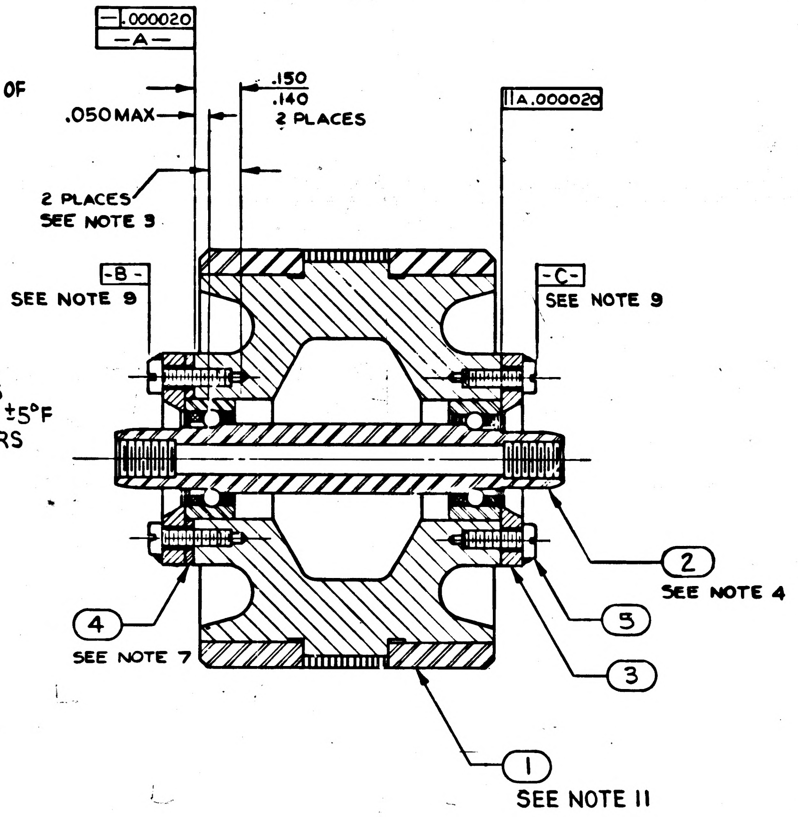
SIZE C
CODE IDENT NO. 80230
DRAWING NO. 2021831
SCALE NONE
SHEET 1 OF 1

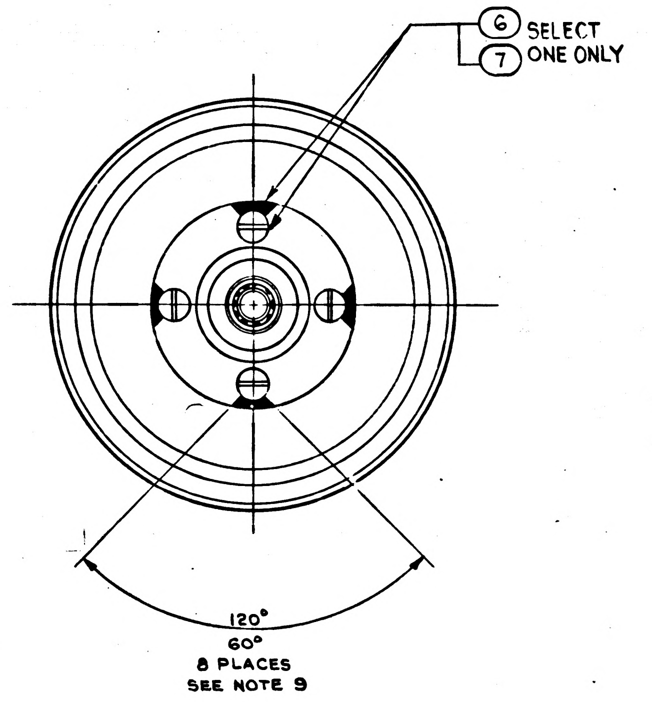
REVISIONS TDRR 37715						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A	REVISED PER TDRR 37926	J J		2 DEC 69	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ASSEMBLE 2021832-011 PER ATP 2021500, MC25-897.

   TEST 2021832-011 PER ATP 2021500, MC25-919
3. THIS PORTION OF BORES SHALL MEET THE FOLLOWING REQUIREMENTS:
   - A. BORE SHALL BE ROUND WITHIN .000010 ON DIA.
   - B. BORE TAPER SHALL BE .000010 TIR MAX.
   - C. BORE SIZE AT 73° F TO 77°F SHALL BE ITS MATCHED BEARING OUTER RACE OUTSIDE DIA MEASURED AT 73°F TO 77°F -.000003 +.000017.
4. FOR APPLICABLE CONFIGURATION SELECT ONE OF ITEM (2) TO MEET THE ASSEMBLY FIT REQUIREMENTS OF NOTE 3.
5. VACUUM BAKE (1) ONE HOUR AT 145° F TO 155° F AND A VACUUM OF 27 TO 29 INCHES OF HG AFTER FINISH SIZING.
6. ITEM (2) SHALL BE ASSEMBLED TO (1) WITH AN AXIAL FORCE OF 2 TO 5 LBS (REF). MARKED FACES OF BEARING OUTER RACES SHALL BE FACING INWARD IN THE ASSEMBLY.
7. SELECT ONE OF ITEM (4).
8. TORQUE SCREWS TO 11 TO 13 INCH OZ PRIOR TO CEMENTING CAP SCREWS.
9. APPLY (7) AS SHOWN, SHALL NOT EXTEND BEYOND SURFACES -B- AND -C-. MIX (7) PER ATP 2021500, MC 25-304. CURE 140°F ±5°F FOR ONE (1) HOUR ± FIVE (5) MINUTES PLUS 160°F ±5°F FOR SIX (6) HOURS MINIMUM.
10. BAG AND IDENTIFY PER ND 1002019.
11. SELECT ONE OF ITEM (1)





2021619	2021500	
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES CAPACITOR VALUES ARE IN μf RESISTOR VALUES ARE IN OHMS K = X1000 M = X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS

CONTRACT NO.
DRAWN M. MC DONALD
CHECKED 6/25/69
APPROVED Paul R Kemper 6/27/69
APPROVED

MIT APPROVED DATE 6/26/69
NASA APPROVED DATE 7-8

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

SIZE	CODE IDENT NO	DRAWING NO.
D	80230	2021832
SCALE 4/1		SHEET 1 OF 2

REVISIONS TDRR 37713						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A	REVISED PER TDRR 37926	JJ		2 DEC 69	

ASSEMBLY PART NO. IS THE PART NO. AND
THE APPLICABLE DASH NO.

ITEM NO	QTY REQD	SYMBOL	PART OR IDENT NO	DESCRIPTION	MATERIAL	SPECIFICATION
7	AR		2021552	ADHESIVE, EPOXY		
6	AR		COML	SEALING COMPOUND, RETAINING, GRADE A		MIL-S-22473
5	8		2021671	CAP CLAMPING SCREW		
4	1		2021670	SPACER		
3	2		2021669	BEARING CAP		
2	1		2021831-011	BEARING AND SHAFT ASSEMBLY		
			TO -121	BEARING AND SHAFT ASSEMBLY		
1	1		2021665 021	INERTIA ELEMENT ASSEMBLY		
	1		2021665-000	INERTIA ELEMENT ASSEMBLY		
	-011	LIST OF MATERIALS				

NEXT ASSY	USED ON
2021619	2021500
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = 1000 M = 1 000 000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB

CONTRACT NO

DRAWN M MC DONALD 6-25-69

CHECKED 6/-/69

APPROVED 6-25-69

APPROVED

MIT APPROVED DATE

7-9-69

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

SIZE	CODE IDENT NO	DRAWING NO.
D	80230	2021832

SCALE 4/1

SHEET 2 OF 2

2021832 A

2021832 B

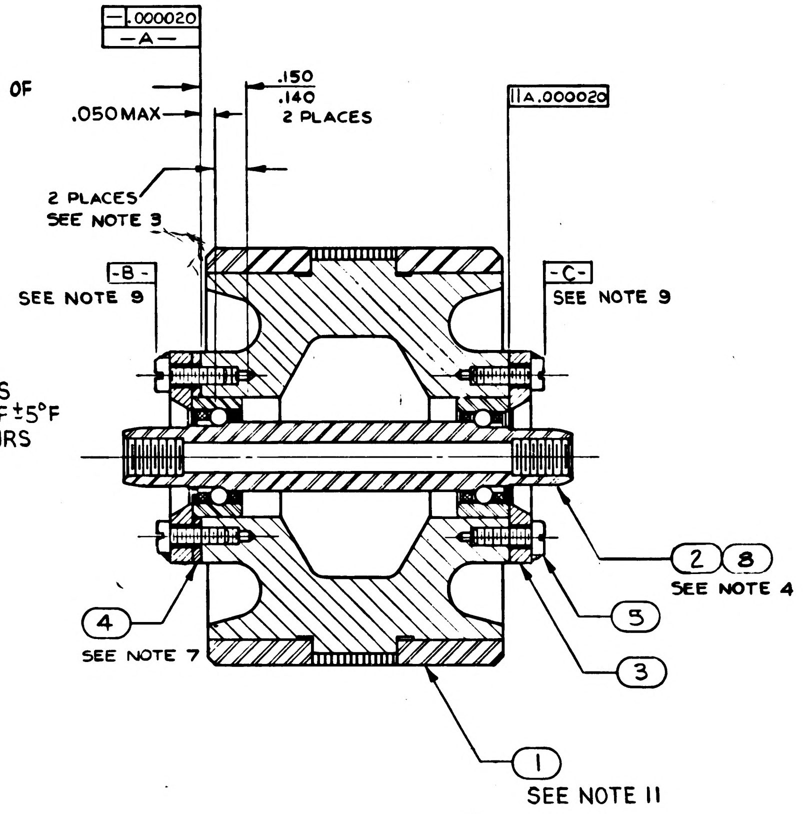
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A	REVISED PER TDRR 37926	JJ		2 DEC 69	
	B	REVISED PER TDRR 38529			17 DEC 71	

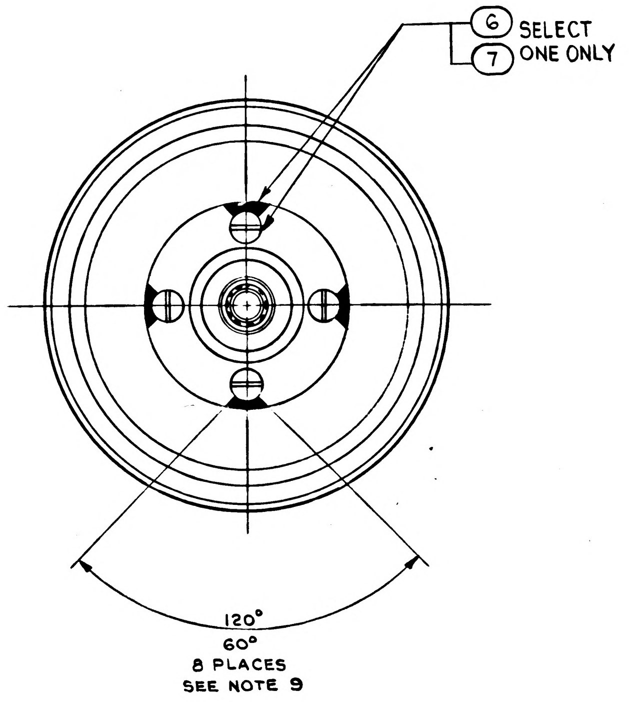
REVISIONS TDRR 37713

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ASSEMBLE 2021832-011 PER ATP 2021500, MC25-897.

   TEST 2021832-011 PER ATP 2021500, MC25-919
   ASSEMBLE 2021832-021 PER ND 1002457
   TEST 2021832-021 PER ND 1002458
3. THIS PORTION OF BORES SHALL MEET THE FOLLOWING REQUIREMENTS:
   - A. BORE SHALL BE ROUND WITHIN .000010 ON DIA.
   - B. BORE TAPER SHALL BE .000010 TIR MAX.
   - C. BORE SIZE AT 73° F TO 77°F SHALL BE ITS MATCHED BEARING OUTER RACE OUTSIDE DIA MEASURED AT 73°F TO 77°F -.000003 +.000017.
4. FOR APPLICABLE CONFIGURATION SELECT ONE OF ITEM ② OR ⑧ TO MEET THE ASSEMBLY FIT REQUIREMENTS OF NOTE 3.
5. VACUUM BAKE ① ONE HOUR AT 145° F TO 155° F AND A VACUUM OF 27 TO 29 INCHES OF HG AFTER FINISH SIZING.
6. ITEM ② SHALL BE ASSEMBLED TO ① WITH AN AXIAL FORCE OF 2 TO 5 LBS (REF). MARKED FACES OF BEARING OUTER RACES SHALL BE FACING INWARD IN THE ASSEMBLY.
7. SELECT ONE OF ITEM ④.
8. TORQUE SCREWS TO 11 TO 13 INCH OZ PRIOR TO CEMENTING CAP SCREWS.
9. APPLY ⑦ AS SHOWN, SHALL NOT EXTEND BEYOND SURFACES -B- AND -C-. MIX ⑦ PER ATP 2021500, MC 25-304. CURE 140°F ±5°F FOR ONE (1) HOUR ± FIVE (5) MINUTES PLUS 160°F ±5°F FOR SIX (6) HOURS MINIMUM.
10. BAG AND IDENTIFY PER ND 1002019.
11. SELECT ONE OF ITEM ①





2021619	2021500	
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN M. MC DONALD
CHECKED
APPROVED Paul R Kenyon 6-2-69
APPROVED
MIT APPROVED DATE
NASA APPROVED DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

SIZE D
CODE IDENT NO 80230
DRAWING NO. 2021832
SCALE 4/1
SHEET 1 OF 2

REVISIONS TDRR 37713

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED
	A	REVISED PER TDRR 37926	JJ		2 DEC 69	
	B	REVISED PER TDRR 38529	CM		17 DEC 71	

2021832 B

QTY REQD	ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
1	8	—		2021831-131	BEARING AND SHAFT ASSEMBLY		
				TO -181	BEARING AND SHAFT ASSEMBLY		
AR	7	AR		2021552	ADHESIVE, EPOXY		
AR	6	AR		COML	SEALING COMPOUND, RETAINING, GRADE A		MIL-S-22473
8	5	8		2021671	CAP CLAMPING SCREW		
1	4	1		2021670	SPACER		
2	3	2		2021669	BEARING CAP		
—	2	1		2021831-011	BEARING AND SHAFT ASSEMBLY		
				TO -121	BEARING AND SHAFT ASSEMBLY		
1	1	1		2021665-021	INERTIA ELEMENT ASSEMBLY		
1		1		2021665-000	INERTIA ELEMENT ASSEMBLY		
-021		-011					

LIST OF MATERIALS

ASSEMBLY PART NO. IS THE PART NO. AND THE APPLICABLE DASH NO.

NEXT ASSY	USED ON
2021619	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN M MC DONALD 6·25·69
CHECKED 6/25/69
APPROVED Paul R. Kemjon 6-25-69
APPROVED
MIT APPROVED DATE
M. Mu 6/25/69
Max D Helley 7-9-69

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

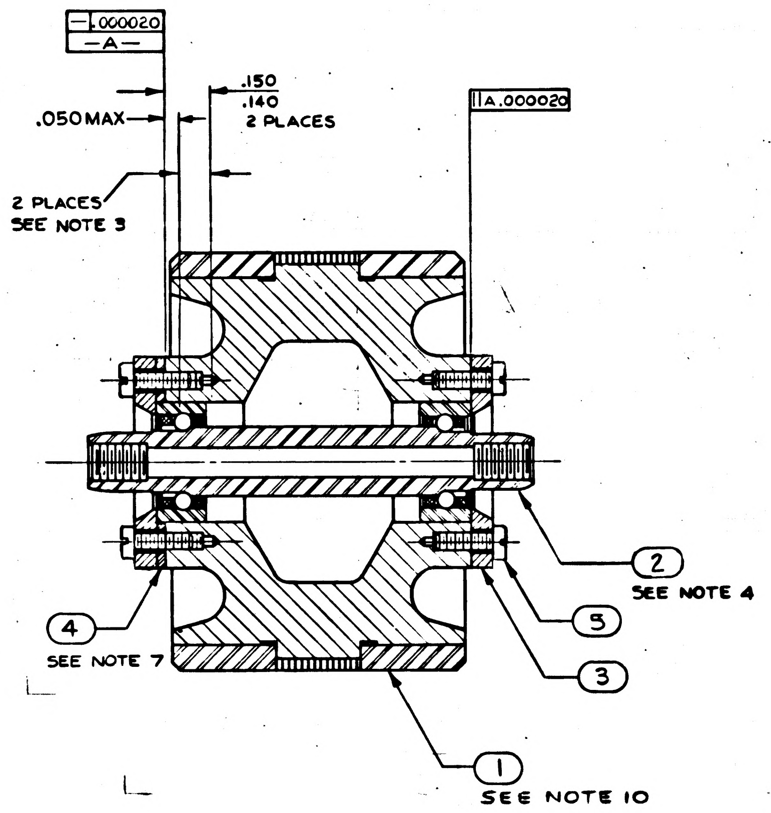
SIZE D
CODE IDENT NO 80230
DRAWING NO. 2021832
SCALE 4/1
SHEET 2 OF 2

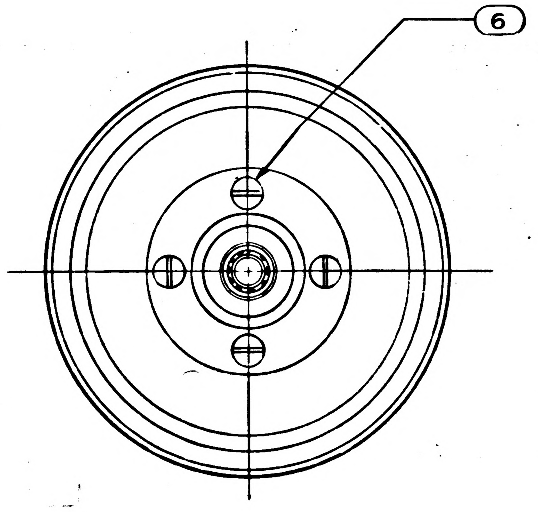
REVISIONS TDRR 37713						
ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. ASSEMBLE 2021832-011 PER ATP 2021500, MC25-897.

   TEST 2021832-011 PER ATP 2021500, MC25-919
3. THIS PORTION OF BORES SHALL MEET THE FOLLOWING REQUIREMENTS:
   - A. BORE SHALL BE ROUND WITHIN .000010 ON DIA.
   - B. BORE TAPER SHALL BE .000010 TIR MAX.
   - C. BORE SIZE AT 73° F TO 77° F SHALL BE ITS MATCHED BEARING OUTER RACE OUTSIDE DIA MEASURED AT 73° F TO 77° F -.000003 +.000017.
4. FOR APPLICABLE CONFIGURATION SELECT ONE OF ITEM ② TO MEET THE ASSEMBLY FIT REQUIREMENTS OF NOTE 3.
5. VACUUM BAKE ① ONE HOUR AT 145° F TO 155° F AND A VACUUM OF 27 TO 29 INCHES OF HG AFTER FINISH SIZING.
6. ITEM ② SHALL BE ASSEMBLED TO ① WITH AN AXIAL FORCE OF 2 TO 5 LBS (REF). MARKED FACES OF BEARING OUTER RACES SHALL BE FACING INWARD IN THE ASSEMBLY.
7. SELECT ONE OF ITEM ④.
8. TORQUE SCREWS TO 11 TO 13 INCH OZ PRIOR TO CEMENTING CAP SCREWS.
9. BAG AND IDENTIFY PER ND 1002019.
10. SELECT ONE OF ITEM ①





2021619	2021500	
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN μf
RESISTOR VALUES ARE IN OHMS
K - X1000 M - X1 000.000
DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS
CONTRACT NO.
DRAWN M. MC DONALD
CHECKED 6/25/69
APPROVED 6/25/69
APPROVED
MIT APPROVED DATE
NASA APPROVED DATE

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

SIZE	CODE IDENT NO	DRAWING NO.
D	80230	2021832
SCALE 4/1		SHEET 1 OF 2

REVISIONS TDRR 37713

ZONE	SYM	DESCRIPTION	DR	CHK	DATE	APPROVED

ASSEMBLY PART NO. IS THE PART NO. AND
THE APPLICABLE DASH NO.

ITEM NO.	QTY REQD	SYMBOL	PART OR IDENT. NO.	DESCRIPTION	MATERIAL	SPECIFICATION
6	AR		COML	SEALING COMPOUND, RETAINING, GRADE A		MIL-S-22473
5	8		2021671	CAP CLAMPING SCREW		
4	1		2021670	SPACER		
3	2		2021669	BEARING CAP		
2	1		2021831-011	BEARING AND SHAFT ASSEMBLY		
			TO -121	BEARING AND SHAFT ASSEMBLY		
1	1		2021665-021	INERTIA ELEMENT ASSEMBLY		
	1		2021665-000	INERTIA ELEMENT ASSEMBLY		
	-011			LIST OF MATERIALS		

NEXT ASSY	USED ON
2021619	2021500

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
CAPACITOR VALUES ARE IN µf
RESISTOR VALUES ARE IN OHMS
K = X1000 M = X1,000,000

DO NOT SCALE THIS DRAWING

MATERIAL

FINISH

MIT INSTRUMENTATION LAB
CAMBRIDGE, MASS

CONTRACT NO.

DRAWN M MCDONALD 6·25·69
CHECKED 6/25/69
APPROVED Paul R. Kempson 6-25-69
APPROVED

MIT APPROVED DATE
M. Murphy 6/25/69
Max D Holley 7-9-69

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INERTIA ELEMENT
AND BEARING ASSEMBLY
APOLLO II IRIG

SIZE	CODE IDENT NO	DRAWING NO.
D	80230	2021832

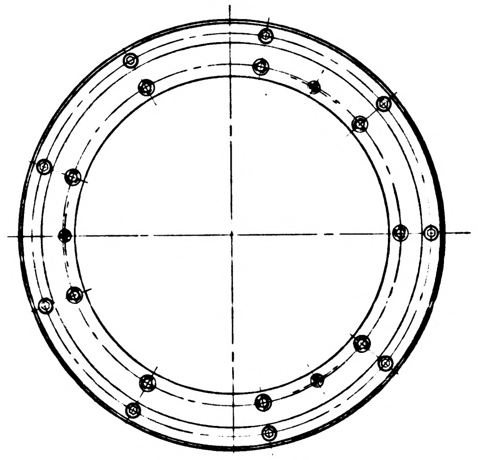
SCALE 4/1

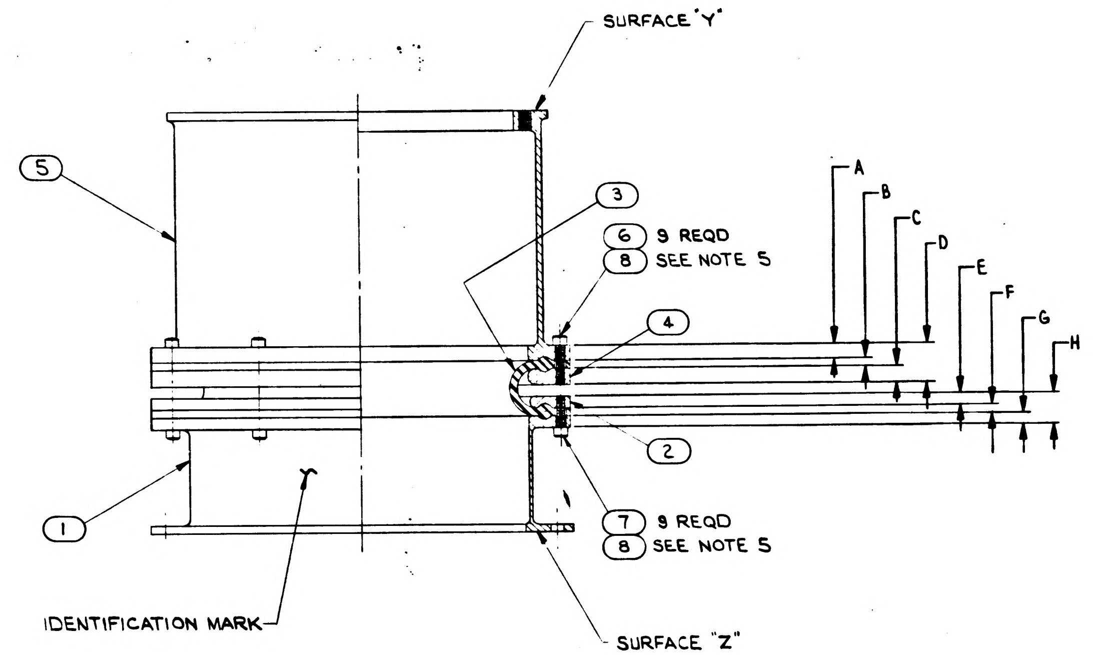
SHEET 2 OF 2

2898950

REVISIONS					
SYM	ZONE	DESCRIPTION 3596	CHG. NO.	DATE	APPD
A		REVISED PER TDRR 20962		27 JUL 65	RWH

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. PRIOR TO ASSEMBLY ALL METALLIC PARTS SHALL BE CLEANED WITH FREON TF TO REMOVE OIL, DIRT AND ANY OTHER FOREIGN MATERIAL. ALL ELASTOMERIC PARTS SHALL BE CLEANED WITH XYLOL TO REMOVE OIL, MOLD RELEASE, DIRT AND ANY OTHER FOREIGN MATERIAL.
3. ~~ITEM (3) REF SHALL BE COMPRESSED .040 - .045 FROM ITS FREE HEIGHT.~~
4. WITH SURFACES "Z" AND "Y" SEALED, THE ASSEMBLY RESTRAINED TO ITS FREE HEIGHT AND A PRESSURE DIFFERENTIAL OF 5 PSI APPLIED, THE MAXIMUM ALLOWABLE LEAK RATE SHALL NOT EXCEED 3×10^{-5} LB O_2/HR.
5. SAFETY WIRE PER MS33540
6. UNDER NO CONDITION SHALL THIS ASSEMBLY BE EXPANDED, CONTRACTED OR ALLOWED RELATIVE LATERAL MOTION IN EXCESS OF .12 INCH OF ITS FREE POSITION.
7. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267). SERIAL NUMBER, CURING DATE OF ELASTOMER AND MANUFACTURER'S SYMBOL AT THE INDICATED LOCATION PER ND1002023.
8. ASSEMBLY TO BE PROTECTIVELY PACKAGED UNTIL TIME OF USAGE IN A CLEAN NEW VAPORPROOF BAG MEETING MIL-B-117, TYPE I. CLASS C REQUIREMENTS. THE PROTECTIVE PACKAGE SHALL PROVIDE A METHOD OF RESTRAINING THE BELLOWS ASSY WITHIN THE LIMITATIONS OF NOTE 6 AND PROTECT SURFACES "Z" AND "Y" FROM ADVERSE HANDLING.
9. ASSEMBLY INSTRUCTIONS:
   - A. DETERMINE THE FREE HEIGHTS OF A, B, C, E, F & G.
   - B. TORQUE ITEM ⑥ UNTIL D = A + B + C − .020 ± .003.
   - C. TORQUE ITEM ⑦ UNTIL H = E + F + G − .020 ± .003.





					10		
					9		
			AR		8	MS20995C32	WIRE, LOCK
			9		7	NAS1352C6HLL8	SCREW, SCH
			9		6	NAS1352C6H10	(1897014-256) SCREW, SCH
			1		5	2898955	TUBE-SPACECRAFT END (SCT)
			1		4	2898954	CLAMP RING, SPACECRAFT END (SCT)
			1		3	2898953-001	SEAL, PRESSURE, STRAIN ISOLATION
			1		2	2898952-001	CLAMP RING - OPTICS END
			1		1	2898956	TUBE-OPTICS END (SCT)
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2899950-	2899950-	-011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — − — DECIMALS + — − — ANGLES + — − —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN 14 MAY 65 DATE
CHECKED 20 MAY
APPROVAL R. Lutz 20 MAY '65
APPROVAL 5/24/65
NASA APPROVAL
MIT APPROVAL

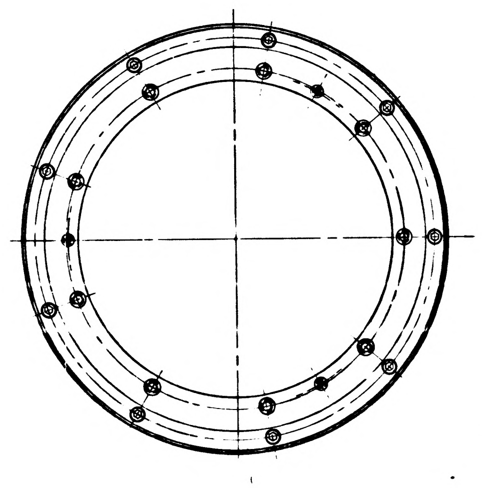
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

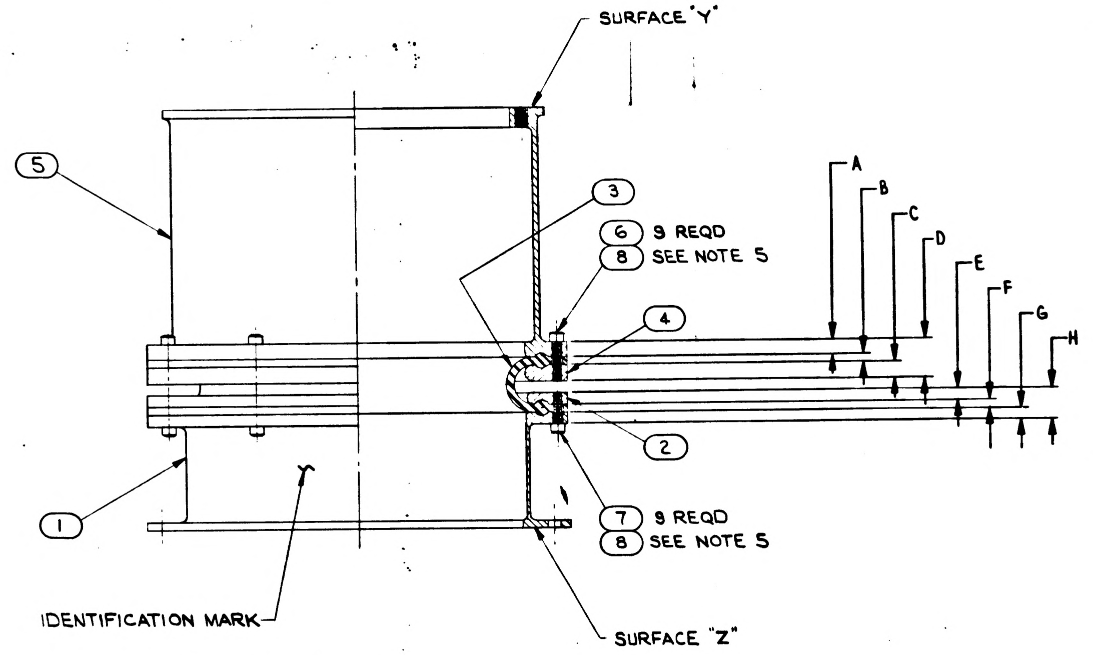
OPTICS TO SPACECRAFT SEAL (SCT)
ASSEMBLY

CODE IDENT NO 80230
SIZE E
2898950
SCALE FULL
SHEET 1 OF 1

REVISIONS					
SYM	ZONE	DESCRIPTION 19596	CHG. NO.	DATE	APPD
A		REVISED PER TDRR 20962		27 JUL 65	RWH
B		REVISED PER TDRR 22485		22 SEP 65	

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. PRIOR TO ASSEMBLY ALL METALLIC PARTS SHALL BE CLEANED WITH FREON TF TO REMOVE OIL, DIRT AND ANY OTHER FOREIGN MATERIAL. ALL ELASTOMERIC PARTS SHALL BE CLEANED WITH XYLOL TO REMOVE OIL, MOLD RELEASE, DIRT AND ANY OTHER FOREIGN MATERIAL.
3. ~~ITEM ③ REF SHALL BE COMPRESSED .040-.045 FROM ITS FREE HEIGHT.~~
4. WITH SURFACES "Z" AND "Y" SEALED, THE ASSEMBLY RESTRAINED TO ITS FREE HEIGHT AND A PRESSURE DIFFERENTIAL OF 5 PSI APPLIED, THE MAXIMUM ALLOWABLE LEAK RATE SHALL NOT EXCEED 3×10^{-5} LB O_2/HR.
5. SAFETY WIRE PER MS33540
6. UNDER NO CONDITION SHALL THIS ASSEMBLY BE EXPANDED, CONTRACTED OR ALLOWED RELATIVE LATERAL MOTION IN EXCESS OF .12 INCH OF ITS FREE POSITION.
7. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267). SERIAL NUMBER, CURING DATE OF ELASTOMER AND MANUFACTURER'S SYMBOL AT THE INDICATED LOCATION PER ND1002023.
8. ASSEMBLY TO BE PROTECTIVELY PACKAGED UNTIL TIME OF USAGE IN A CLEAN NEW VAPORPROOF BAG MEETING MIL-B-117, TYPE I. CLASS C REQUIREMENTS. THE PROTECTIVE PACKAGE SHALL PROVIDE A METHOD OF RESTRAINING THE BELLOWS ASSY WITHIN THE LIMITATIONS OF NOTE 6 AND PROTECT SURFACES "Z" AND "Y" FROM ADVERSE HANDLING.
9. ASSEMBLY INSTRUCTIONS:
   - A. DETERMINE THE FREE HEIGHTS OF A, B, C, E, F & G.
   - B. TORQUE ITEM ⑥ UNTIL D = A + B + C − .020 ± .003.
   - C. TORQUE ITEM ⑦ UNTIL H = E + F + G − .020 ± .003.





					10		
					9		
			AR		8	MS20995C32	WIRE, LOCK
			9		7	NAS1352C06H8	SCREW, SCH
			9		6	NAS1352C06H10	SCREW, SCH
			1		5	2898955	TUBE-SPACECRAFT END (SCT)
			1		4	2898954	CLAMP RING, SPACECRAFT END (SCT)
			1		3	2898953-001	SEAL, PRESSURE, STRAIN ISOLATION
			1		2	2898952-001	CLAMP RING - OPTICS END
			1		1	2898956	TUBE-OPTICS END (SCT)
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

2899950-	2899950-	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN E. H. Wasem 14 MAY 65 DATE
CHECKED 20 MAY
APPROVAL R. Lutz 20 MAY '65
APPROVAL 5/20/65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

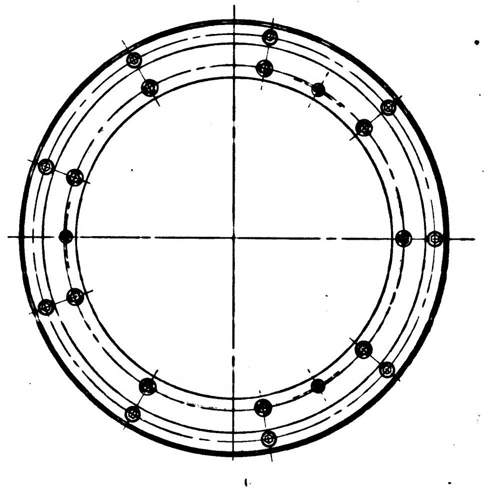
OPTICS TO SPACECRAFT SEAL (SCT)
ASSEMBLY

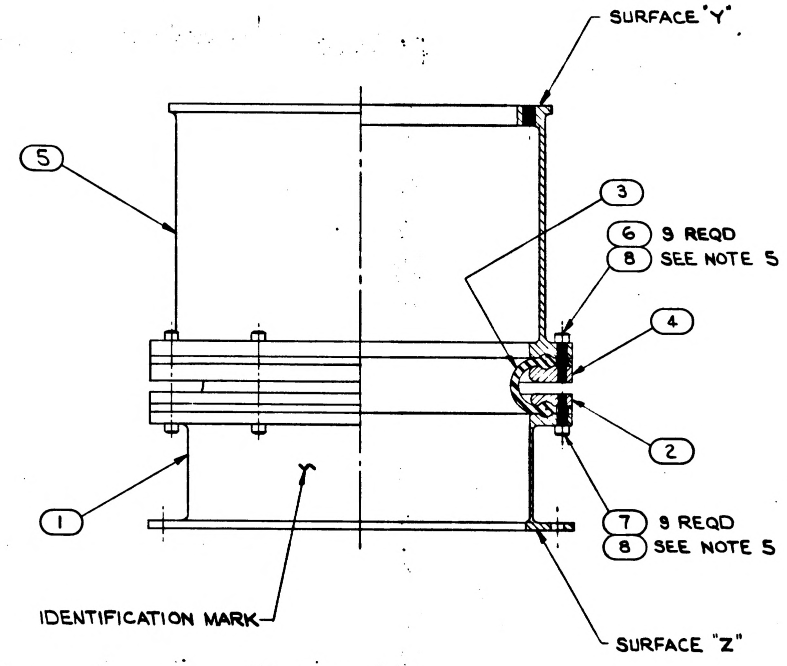
CODE IDENT NO. 80230
SIZE E
2898950
SCALE FULL
SHEET 1 OF 1

2898950 B

REVISIONS					
SYM	ZONE	DESCRIPTION	9596 CHG. NO.	DATE	APPD

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. PRIOR TO ASSEMBLY ALL METALLIC PARTS SHALL BE CLEANED WITH FREON TF TO REMOVE OIL, DIRT AND ANY OTHER FOREIGN MATERIAL. ALL ELASTOMERIC PARTS SHALL BE CLEANED WITH XYLOL TO REMOVE OIL, MOLD RELEASE, DIRT AND ANY OTHER FOREIGN MATERIAL.
3. ITEM ③ REF SHALL BE COMPRESSED .040 - .045 FROM ITS FREE HEIGHT.
4. WITH SURFACES "Z" AND "Y" SEALED, THE ASSEMBLY RESTRAINED TO ITS FREE HEIGHT AND A PRESSURE DIFFERENTIAL OF 5 PSI APPLIED, THE MAXIMUM ALLOWABLE LEAK RATE SHALL NOT EXCEED 3×10^{-5} LB O_2/HR.
5. SAFETY WIRE PER MS33540
6. UNDER NO CONDITION SHALL THIS ASSEMBLY BE EXPANDED, CONTRACTED OR ALLOWED RELATIVE LATERAL MOTION IN EXCESS OF .32 INCH OF ITS FREE POSITION.
7. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267). SERIAL NUMBER, CURING DATE OF ELASTOMER AND MANUFACTURER'S SYMBOL AT THE INDICATED LOCATION PER ND1002023.
8. ASSEMBLY TO BE PROTECTIVELY PACKAGED UNTIL TIME OF USAGE IN A CLEAN NEW VAPORPROOF BAG MEETING MIL-B-117, TYPE I, CLASS C REQUIREMENTS. THE PROTECTIVE PACKAGE SHALL PROVIDE A METHOD OF RESTRAINING THE BELLOWS ASSY WITHIN THE LIMITATIONS OF NOTE 6 AND PROTECT SURFACES "Z" AND "Y" FROM ADVERSE HANDLING.





					10		
					9		
			AR		8	MS20995C32	WIRE, LOCK
			9		7	NAS1352C6HLL8	SCREW, SCH
			9		6	NAS1352C6H10	(1897014-256) SCREW, SCH
			1		5	2898955	TUBE-SPACECRAFT END (SCT)
			1		4	2898954	CLAMP RING, SPACECRAFT END (SCT)
			1		3	2898953-001	SEAL, PRESSURE, STRAIN ISOLATION
			1		2	2898952-001	CLAMP RING - OPTICS END
			1		1	2898956	TUBE - OPTICS END (SCT)
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

2899950-	2899950-	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ — + — + —
- — - — - —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN E. H. Wasem 14 MAY 65 DATE
CHECKED 20 MAY 65
APPROVAL R. Lutz 20 MAY '65
APPROVAL 5/20/65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

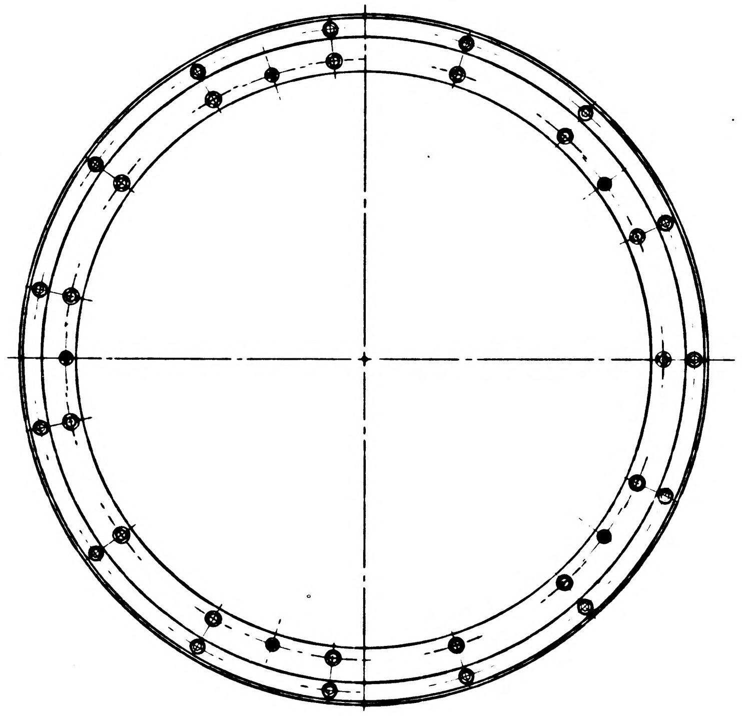
OPTICS TO SPACECRAFT SEAL (SCT)
ASSEMBLY

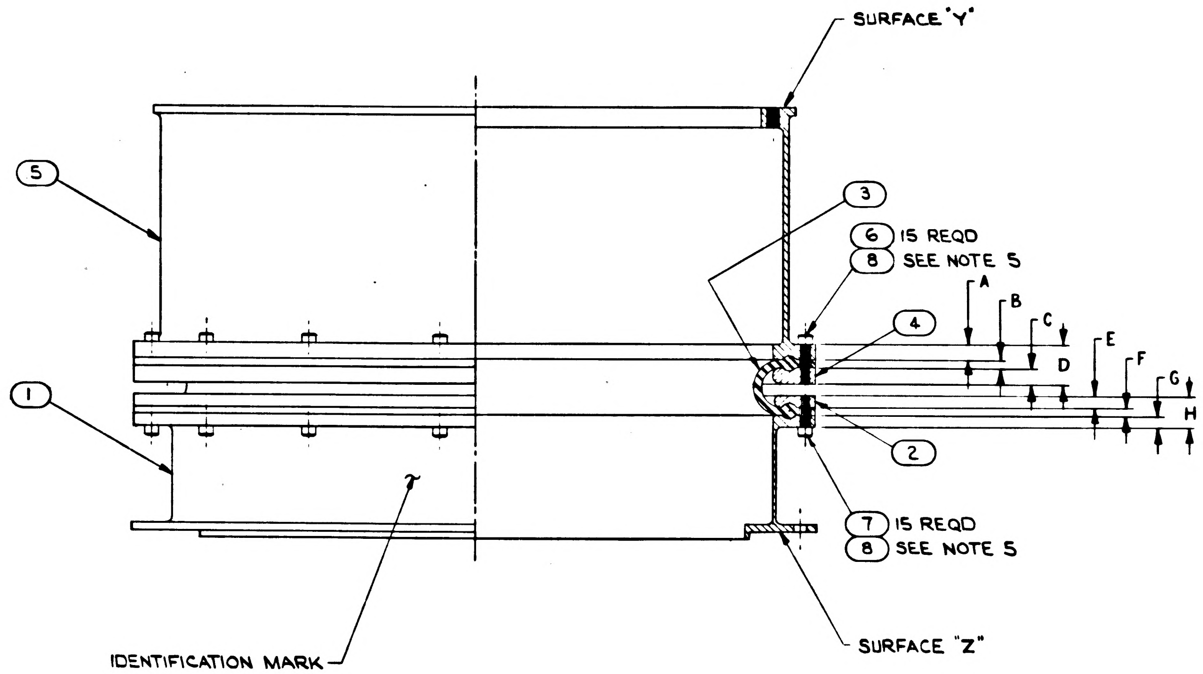
CODE IDENT NO. 80230
SIZE E
2898950
SCALE FULL
SHEET 1 OF 1

2898950

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
A		REVISED PER TDRR 20965			

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. PRIOR TO ASSEMBLY ALL METALLIC PARTS SHALL BE CLEANED WITH FREON TF TO REMOVE OIL, DIRT AND ANY OTHER FOREIGN MATERIAL. ALL ELASTOMERIC PARTS SHALL BE CLEANED WITH XYLOL TO REMOVE OIL, MOLD RELEASE, DIRT AND ANY OTHER FOREIGN MATERIAL.
3. ~~ITEM ③ REF SHALL BE COMPRESSED .040-.045 FROM ITS FREE HEIGHT.~~
4. WITH SURFACES "Z" AND "Y" SEALED, THE ASSEMBLY RESTRAINED TO ITS FREE HEIGHT AND A PRESSURE DIFFERENTIAL OF 5 PSI APPLIED, THE MAXIMUM ALLOWABLE LEAK RATE SHALL NOT EXCEED 3×10^{-5} LB O_2/HR.
5. SAFETY WIRE PER MS33540
6. UNDER NO CONDITION SHALL THIS ASSEMBLY BE EXPANDED, CONTRACTED OR ALLOWED RELATIVE LATERAL MOTION IN EXCESS OF .12 INCH OF ITS FREE POSITION.
7. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NO. PER MIL-STD-130 (ES267). SERIAL NO., CURING DATE OF ELASTOMER AND MANUFACTURER'S SYMBOL AT THE INDICATED LOCATION PER ND1002023.
8. ASSEMBLY TO BE PROTECTIVELY PACKAGED UNTIL TIME OF USAGE IN A CLEAN NEW VAPORPROOF BAG MEETING MIL-B-117, TYPE I, CLASS C REQUIREMENTS. THE PROTECTIVE PACKAGE SHALL PROVIDE A METHOD OF RESTRAINING THE BELLOWS ASSY WITHIN THE LIMITATIONS OF NOTE 6 AND PROTECT SURFACES "Z" AND "Y" FROM ADVERSE HANDLING.
9. ASSEMBLY INSTRUCTIONS
   - A. DETERMINE THE FREE HEIGHTS OF A, B, C, D, E, F AND G
   - B. TORQUE ITEM ⑥ UNTIL D = A + B + C - .020 ± .003
   - C. TORQUE ITEM ⑦ UNTIL H = E + F + G - .020 ± .003





					10		
					9		
			AR		8	MS20995C32	WIRE, LOCK
			15		7	NAS1352C6HLL8	SCREW, SCH
			15		6	NAS1352C6H10	(1897014-256) SCREW, SCH
			1		5	2898958	TUBE-SPACECRAFT END (S_{XT})
			1		4	2898957	CLAMP RING, SPACECRAFT END (S_{XT})
			1		3	2898953-002	SEAL, PRESSURE, STRAIN ISOLATION
			1		2	2898952-002	CLAMP RING - OPTICS END
			1		1	2898959	TUBE-OPTICS ENDS (S_{XT})
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

2899950-	2899950-	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

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UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN 14 MAY 65 DATE
CHECKED 20 MAY 65
APPROVAL 20 MAY '65
APPROVAL 5/24/65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS TO SPACECRAFT SEAL (S_{XT})
ASSEMBLY

CODE IDENT NO. 80230 SIZE E 2898951
SCALE FULL SHEET 1 OF 1

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. PRIOR TO ASSEMBLY ALL METALLIC PARTS SHALL BE CLEANED WITH FREON TF TO REMOVE OIL, DIRT AND ANY OTHER FOREIGN MATERIAL. ALL ELASTOMERIC PARTS SHALL BE CLEANED WITH XYLOL TO REMOVE OIL, MOLD RELEASE, DIRT AND ANY OTHER FOREIGN MATERIAL.
3. ~~ITEM ③ REF SHALL BE COMPRESSED .040 - .045 FROM ITS FREE HEIGHT.~~
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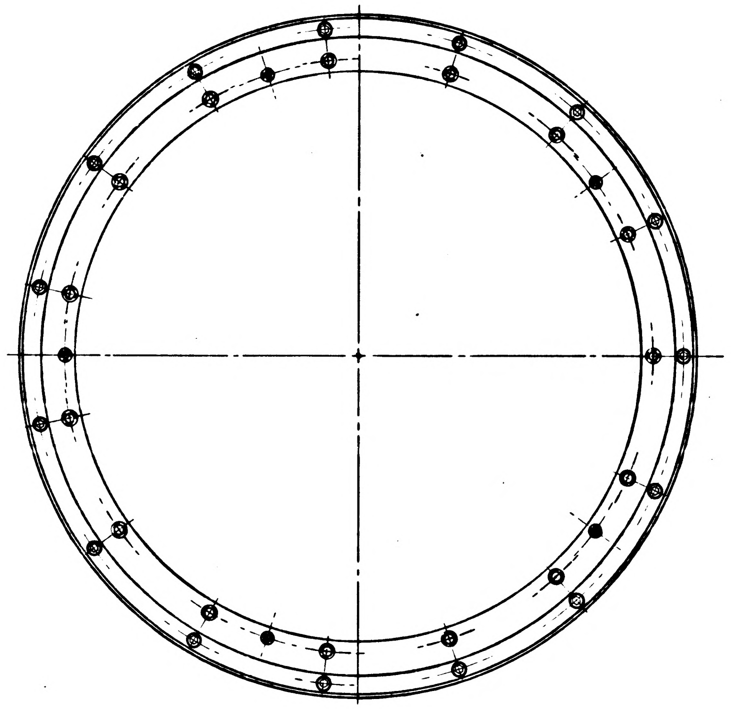
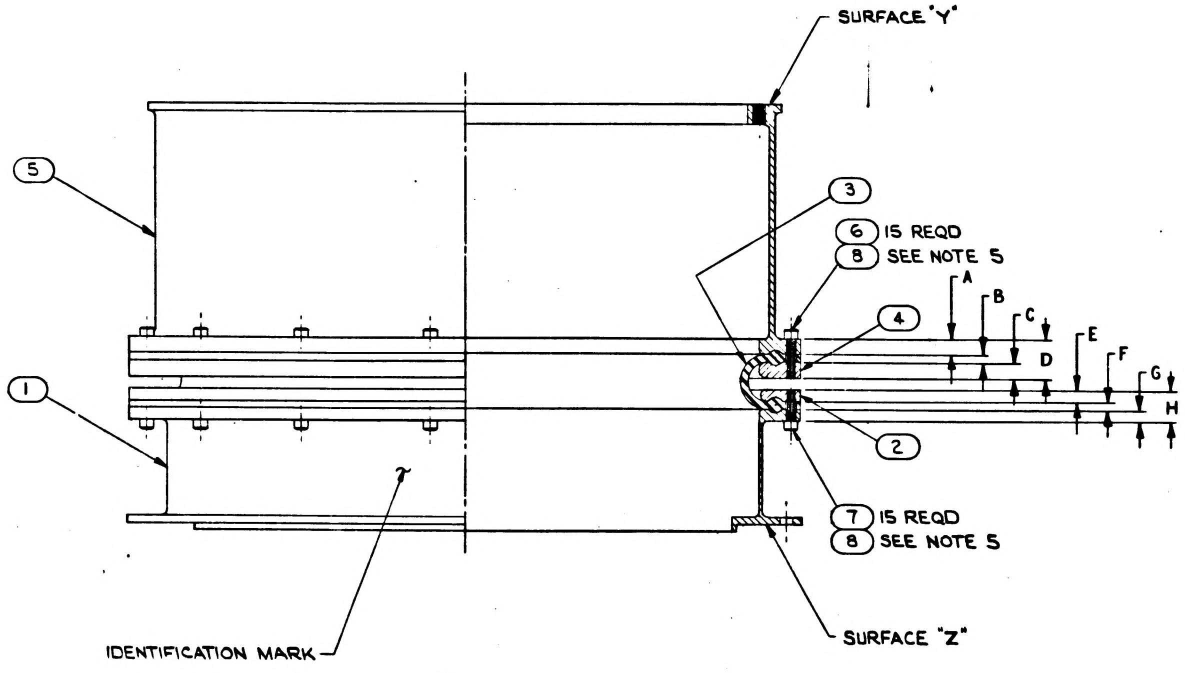
9. ASSEMBLY INSTRUCTIONS
   - A. DETERMINE THE FREE HEIGHTS OF A, B, C, D, E, F AND G
   - B. TORQUE ITEM ⑥ UNTIL D = A + B + C - .020 ± .003
   - C. TORQUE ITEM ⑦ UNTIL H = E + F + G - .020 ± .003

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
A		REVISED PER TDRR 20963		27 JUL 65	J.K.
B		REVISED PER TDRR 22486		22 SEP 65	RJP





					10		
					9		
			AR		8	MS20995C32	WIRE, LOCK
			15		7	NAS1352C06H8	SCREW, SCH
			15		6	NAS1352C06H10	SCREW, SCH
			1		5	2898958	TUBE-SPACECRAFT END (SXT)
			1		4	2898957	CLAMP RING, SPACECRAFT END (SXT)
			1		3	2898953-002	SEAL, PRESSURE, STRAIN ISOLATION
			1		2	2898952-002	CLAMP RING - OPTICS END
			1		1	2898959	TUBE-OPTICS ENDS (SXT)
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

2899950-	2899950-	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

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TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN E H Duzenuller DATE 14 MAY 65
CHECKED D Tolmaykow 20 MAY 65
APPROVAL R Kietz 20 MAY '65
APPROVAL R McLean 5/24/65
NASA APPROVAL
MIT APPROVAL W Kupfer 26 May 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS TO SPACECRAFT SEAL (SXT)
ASSEMBLY

CODE IDENT NO. 80230
SIZE E
2898951
SCALE FULL
SHEET 1 OF 1

REVISIONS					
SYM	ZONE	DESCRIPTION	546 CHG. NO.	DATE	APPD

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. PRIOR TO ASSEMBLY ALL METALLIC PARTS SHALL BE CLEANED WITH FREON TF TO REMOVE OIL, DIRT AND ANY OTHER FOREIGN MATERIAL. ALL ELASTOMERIC PARTS SHALL BE CLEANED WITH XYLOL TO REMOVE OIL, MOLD RELEASE, DIRT AND ANY OTHER FOREIGN MATERIAL.
3. ITEM ③ REF SHALL BE COMPRESSED .040-.045 FROM ITS FREE HEIGHT.
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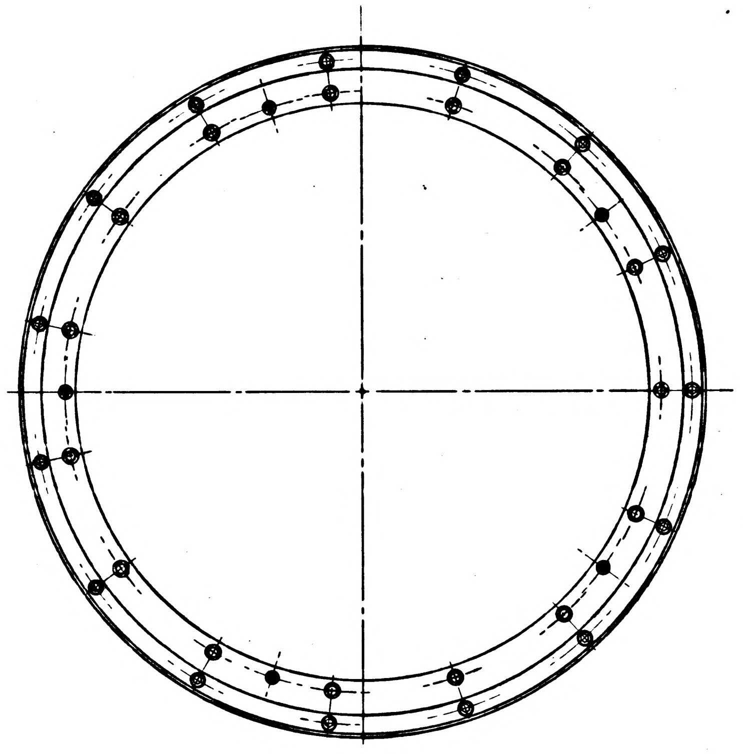
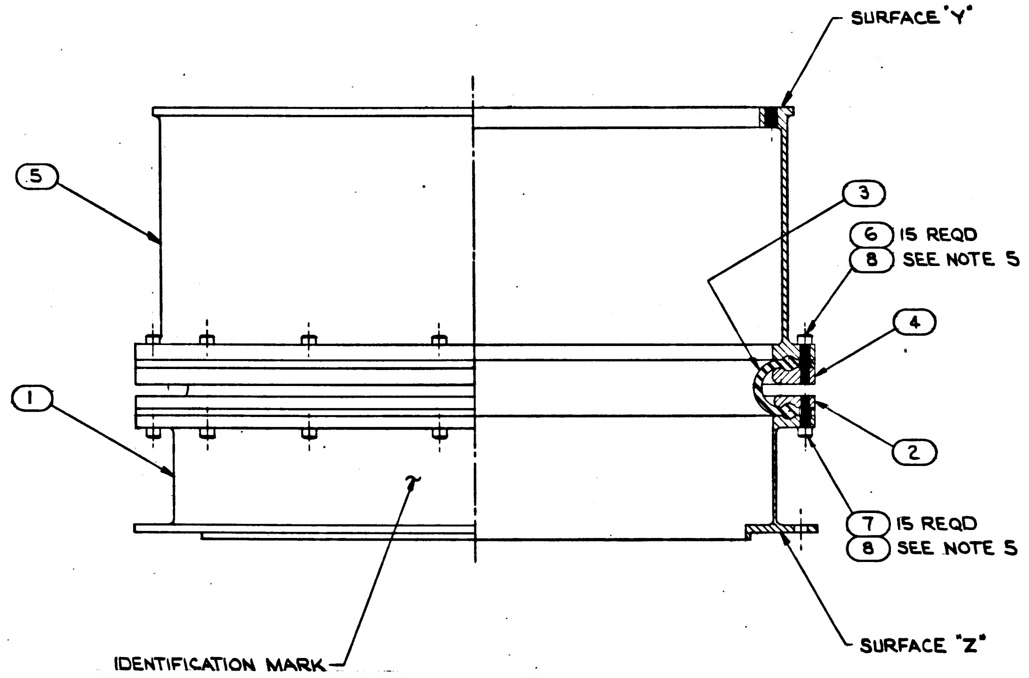
5. SAFETY WIRE PER MS33540
6. UNDER NO CONDITION SHALL THIS ASSEMBLY BE EXPANDED, CONTRACTED OR ALLOWED RELATIVE LATERAL MOTION IN EXCESS OF .32 INCH OF ITS FREE POSITION.
7. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NO. PER MIL-STD-130 (ES267). SERIAL NO., CURING DATE OF ELASTOMER AND MANUFACTURER'S SYMBOL AT THE INDICATED LOCATION PER ND1002023.
8. ASSEMBLY TO BE PROTECTIVELY PACKAGED UNTIL TIME OF USAGE IN A CLEAN NEW VAPORPROOF BAG MEETING MIL-B-117, TYPE I, CLASS C REQUIREMENTS. THE PROTECTIVE PACKAGE SHALL PROVIDE A METHOD OF RESTRAINING THE BELLOWS ASSY WITHIN THE LIMITATIONS OF NOTE 6 AND PROTECT SURFACES "Z" AND "Y" FROM ADVERSE HANDLING.





					10		
					9		
			AR		8	MS20995C32	WIRE, LOCK
			15		7	NAS1352C6HLL8	SCREW. SCH
			15		6	NAS1352C6H10	(1897014-256) SCREW, SCH
			1		5	2898958	TUBE-SPACECRAFT END (SXT)
			1		4	2898957	CLAMP RING, SPACECRAFT END (SXT)
			1		3	2898953-002	SEAL, PRESSURE, STRAIN ISOLATION
			1		2	2898952-002	CLAMP RING-OPTICS END
			1		1	2898959	TUBE-OPTICS ENDS (SXT)
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

2899950-	2899950-	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN 14 MAY 65
CHECKED 20 MAY 65
APPROVAL R. Lietz 20 MAY '65
APPROVAL 5/24/65
NASA APPROVAL
MIT APPROVAL 24 May 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

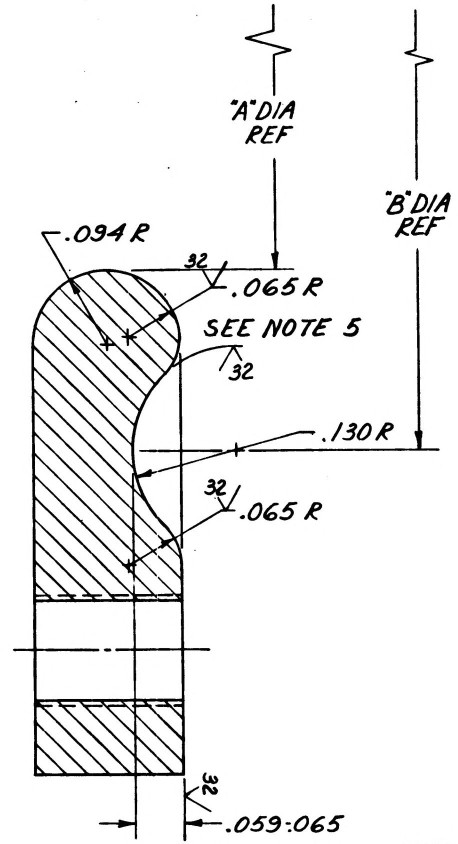
OPTICS TO SPACECRAFT SEAL (SXT)
ASSEMBLY

CODE IDENT NO. 80230
SIZE E
2898951
SCALE FULL
SHEET 1 OF 1

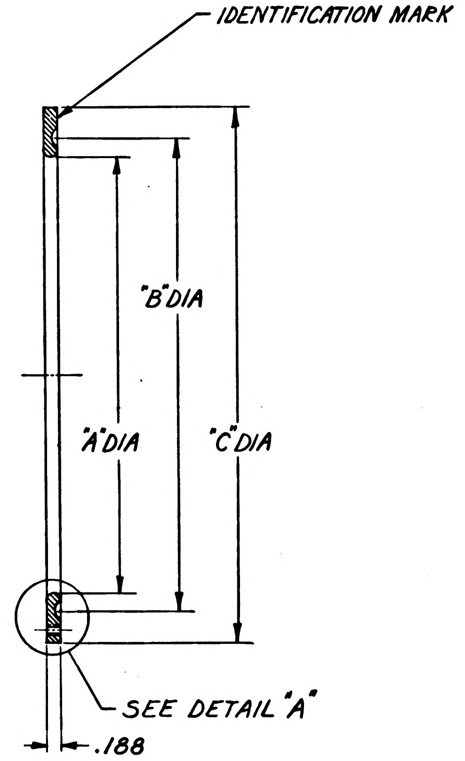
SYM	ZONE	DESCRIPTION 19596	CHG NO.	DATE	APPD.

REVISIONS

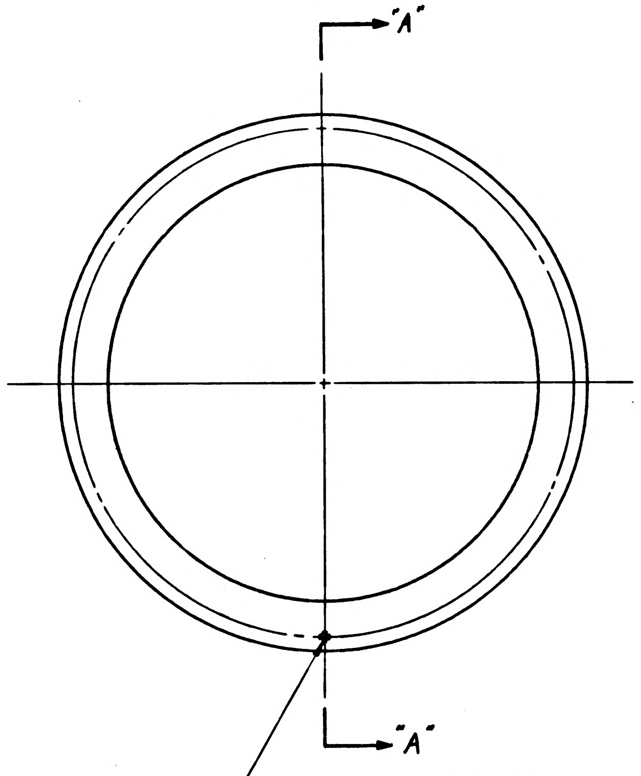
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED:
   A. MUST BE FREE FROM BURRS.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 63√
   C. ALL CORNERS MUST BE .005 TO .015 R, OR CHAMFER.
3. FINISH:
   A. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 (SIG C) E-300 (ES585).
4. IDENTIFY USING DRAWING NUMBER WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267).
5. FINISH MUST SPIRAL TO CENTER OF PIECE PART.



DETAIL "A"
SCALE 10:1



SECTION "A-A"



.110-.114 THRU ⊕ .005
#6-32 NC-2B THD
"N" HOLES EQUALLY SPACED ON "D" DIA B.C. BSC

PART NO.	"A" DIA	"B" DIA	"C" DIA	"D" DIA	"N" NO. OF HOLES
2898952-001	5.42	5.875	6.68	6.375	9 HOLES
2898952-002	9.42	9.875	10.68	10.375	15 HOLES

NEXT ASSY	USED ON
2898950-011	2899950-011
2898951-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+—	±.005	+—
——	±.02	——

DO NOT SCALE THIS DRAWING
MATERIAL QQ-S-763, CL 303 COND A, CF (ES-380-1)
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN D. Ryder DATE 10 MAY 65
CHECKED Stelmaker 20 MAY 65
APPROVAL R Lietz 20 MAY '65
APPROVAL R.G. [illegible] 5/24/65
NASA APPROVAL [illegible] 5/26/65
MIT APPROVAL [illegible] 24 May 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

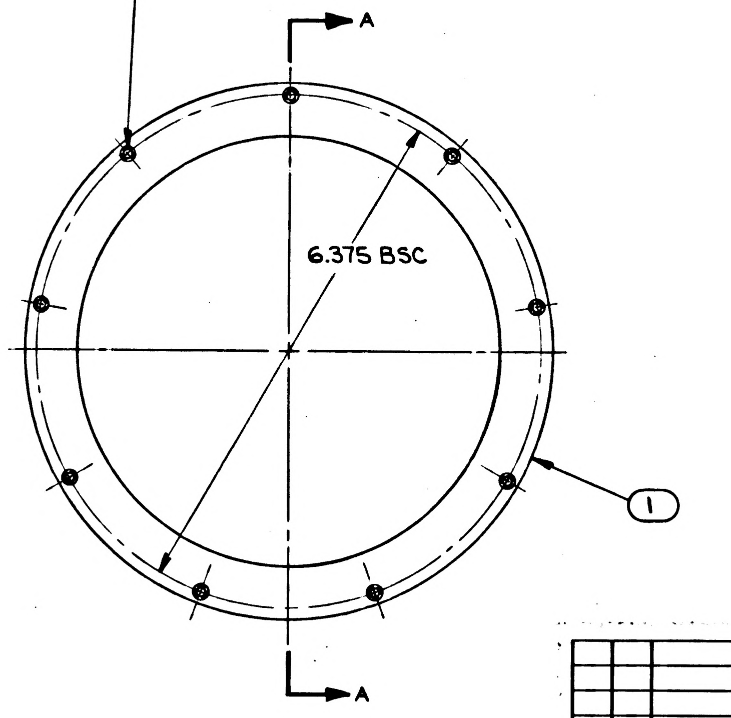
CLAMP RING-OPTICS END

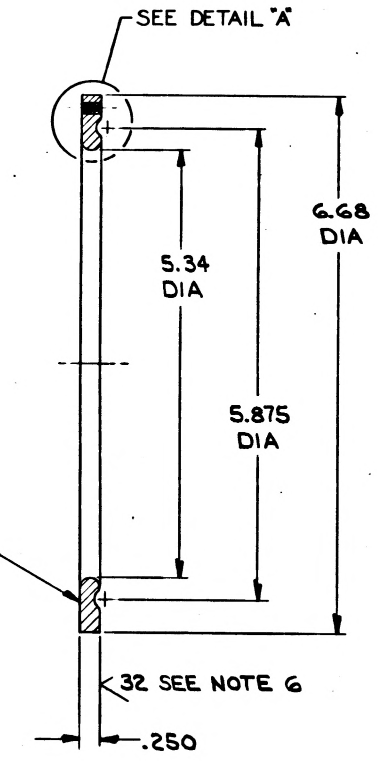
CODE IDENT NO. 80230
SIZE D
2898952
SCALE FULL
SHEET 1 OF 1

SYM	ZONE	DESCRIPTION 19596	CHG NO.	DATE	APPD.

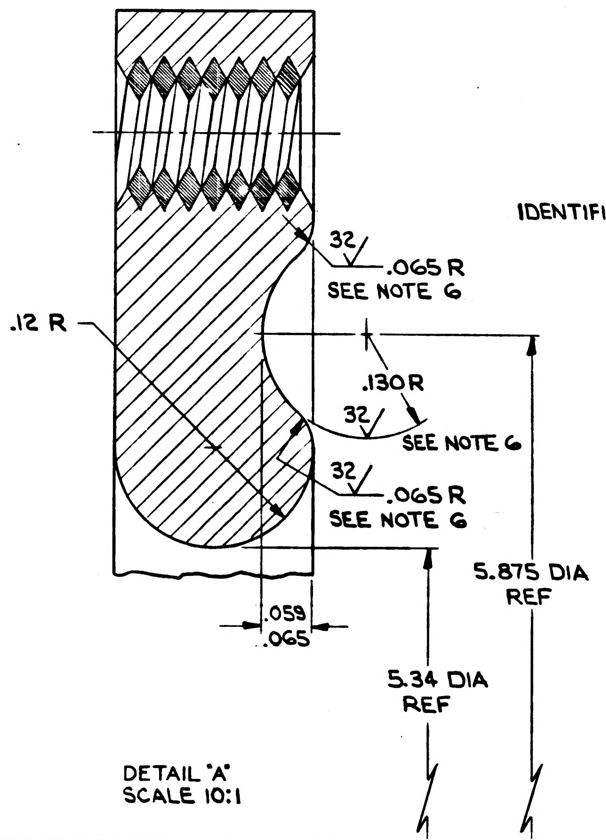
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED:
   A. MUST BE FREE FROM BURRS.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\overset{63}{\surd}$
   C. ALL CORNERS MUST BE .005 TO .015 R, OR CHAMFER.
3. MATERIAL:
   AL ALLOY QQ-A-250/4 TEMPER T351
4. FINISH:
   A. *ANODIC COAT PER MIL-A-8625 TYPE 1 CLEAR PRIOR TO INSTALLATION OF HELICOILS.*
5. IDENTIFY USING DRAWING NUMBER PER MIL STD 130 (ES267).
6. FINISH MUST SPIRAL TO CENTER OF PIECE PART.

② 9 REQD
LOCATE $\frac{3}{4}$ TO $1\frac{3}{4}$ THDS BELOW SURFACE. REMOVE TANG
.144-.150 THRU. $\boxed{\oplus\ .005}$ 9 HOLES EQUALLY SPACED. 120° CSK TO .178-.193
FOLLOW WITH HELICAL COIL TAP THRU FOR 6-32 UNC 3B INSERT SCREW THD


A
6.375 BSC
A
①


SEE DETAIL "A"
6.68 DIA
5.34 DIA
5.875 DIA
IDENTIFICATION MARK
32 SEE NOTE 6
.250

SECTION A-A


32
.065 R
SEE NOTE 6
.12 R
.130 R
32
SEE NOTE 6
32
.065 R
SEE NOTE 6
.059
.065
5.875 DIA REF
5.34 DIA REF

DETAIL "A"
SCALE 10:1

SEE NOTES 3&4

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	9	MS 21209-C0615	(8596197-003) INSERT-SCR THD, LOCKING
1	1	2898954-001	CLAMP RING

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2898950-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	±.02	±2°
- —	±.005	

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.

DRAWN E.A. Wasenthe DATE 11 MAY 65
CHECKED Stelmaglor 20 MAY 65
APPROVAL R. Lietz 20 May '65
APPROVAL R.W. Sims 5/24/65
NASA APPROVAL M. Shook 5/24/65
MIT APPROVAL W. Taylor 24 May 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

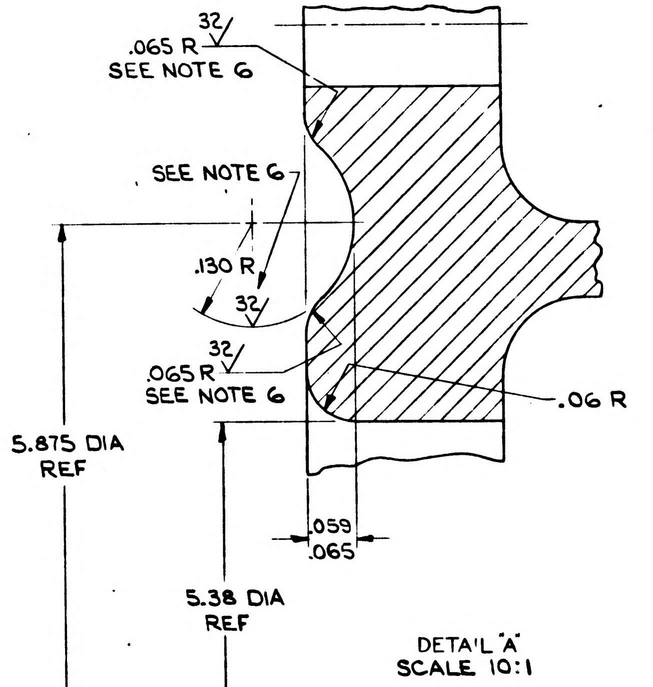
CLAMP RING, SPACECRAFT END (Sct)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2898954
SCALE FULL
SHEET 1 OF 1

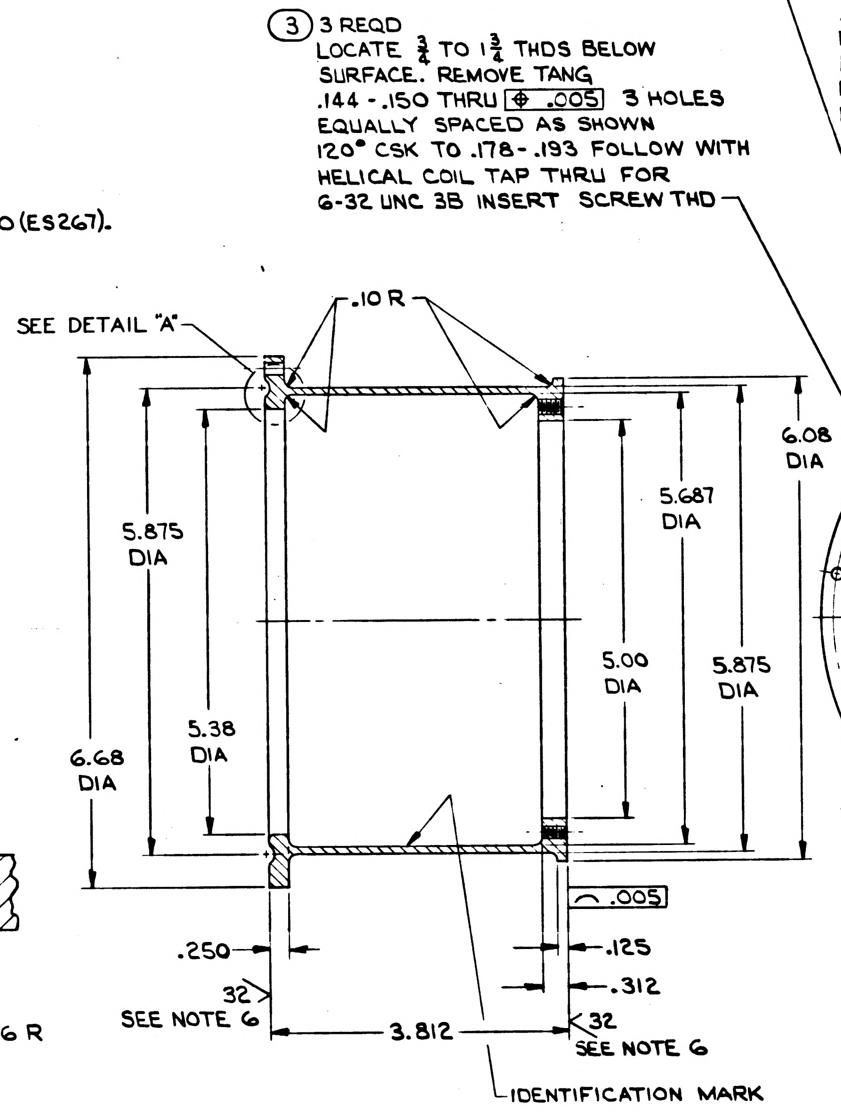
2898955

SYM	ZONE	DESCRIPTION 19596	CHG NO.	DATE	APPD
A		REVISED PER TDRR 20115		18 MAY 65	

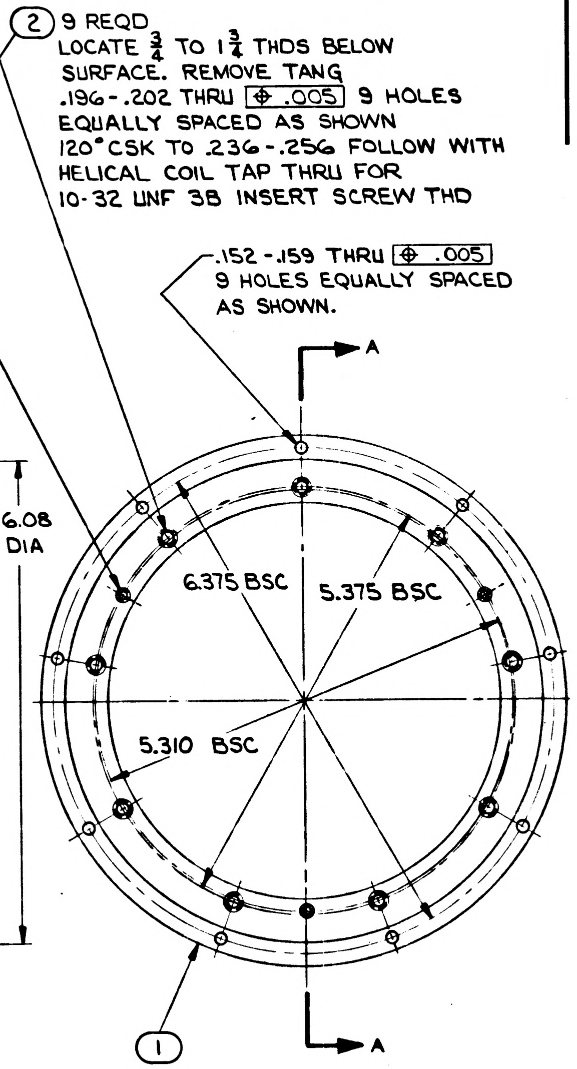
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED:
   A. MUST BE FREE FROM BURRS.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 63√
   C. ALL CORNERS MUST BE .005 TO .015 R, OR CHAMFER.
3. MATERIAL:
   AL ALLOY QQ-A-250/4 TEMPER T351
4. FINISH:
   A. *ANODIC COAT PER MIL-A-8625 TYPE 1 CLEAR PRIOR TO INSTALLATION OF HELICOILS.*
5. IDENTIFY USING DRAWING NUMBER PER MIL STD 130 (ES267).
6. FINISH MUST SPIRAL TO CENTER OF PIECE PART.


32
.065 R
SEE NOTE 6
SEE NOTE 6
.130 R
32
32
.065 R
SEE NOTE 6
.06 R
5.875 DIA REF
.059
.065
5.38 DIA REF

DETAIL "A"
SCALE 10:1


③ 3 REQD
LOCATE ¾ TO 1¾ THDS BELOW SURFACE. REMOVE TANG
.144 - .150 THRU ⌖ .005 3 HOLES EQUALLY SPACED AS SHOWN
120° CSK TO .178 - .193 FOLLOW WITH HELICAL COIL TAP THRU FOR 6-32 UNC 3B INSERT SCREW THD
SEE DETAIL "A"
.10 R
5.875 DIA
6.68 DIA
5.38 DIA
5.687 DIA
5.00 DIA
5.875 DIA
6.08 DIA
⌒ .005
.250
.125
.312
32
SEE NOTE 6
3.812
32
SEE NOTE 6
IDENTIFICATION MARK

SECTION A-A


② 9 REQD
LOCATE ¾ TO 1¾ THDS BELOW SURFACE. REMOVE TANG
.196 - .202 THRU ⌖ .005 9 HOLES EQUALLY SPACED AS SHOWN
120° CSK TO .236 - .256 FOLLOW WITH HELICAL COIL TAP THRU FOR 10-32 UNF 3B INSERT SCREW THD
.152 - .159 THRU ⌖ .005 9 HOLES EQUALLY SPACED AS SHOWN.
A
6.375 BSC
5.375 BSC
5.310 BSC
①
A

SEE NOTES 3 & 4

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
3	3	MS21209C0615	(8596197-003) INSERT-SCR THD, LOCKING
2	9	MS21209-F1-15	(8596197-007) INSERT-SCR THD, LOCKING
1	1	2898955 -001	TUBE - SPACECRAFT END

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2898950-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	±.02	±2°
- —	±.005	

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN E. Wasmuth DATE 7 MAY 65
CHECKED D. Holmes 30 MAY 65
APPROVAL R. Leitz 20 MAY '65
APPROVAL R.W. Booz 5/24/65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TUBE- SPACECRAFT END (Sct)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2898955
SCALE FULL
SHEET 1 OF 1

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED:
   A. MUST BE FREE FROM BURRS.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 63√
   C. ALL CORNERS MUST BE .005 TO .015 R, OR CHAMFER.

3. MATERIAL:
   AL ALLOY QQ-A-200/3 TEMPER T4
4. FINISH:
   A. *ANODIC COAT PER MIL-A-8625 TYPE 1 CLEAR PRIOR TO INSTALLATION OF HELICOILS.*

5. IDENTIFY USING DRAWING NUMBER PER MIL STD 130 (ES267).
6. FINISH MUST SPIRAL TO CENTER OF PIECE PART.

B	2898955	2	1

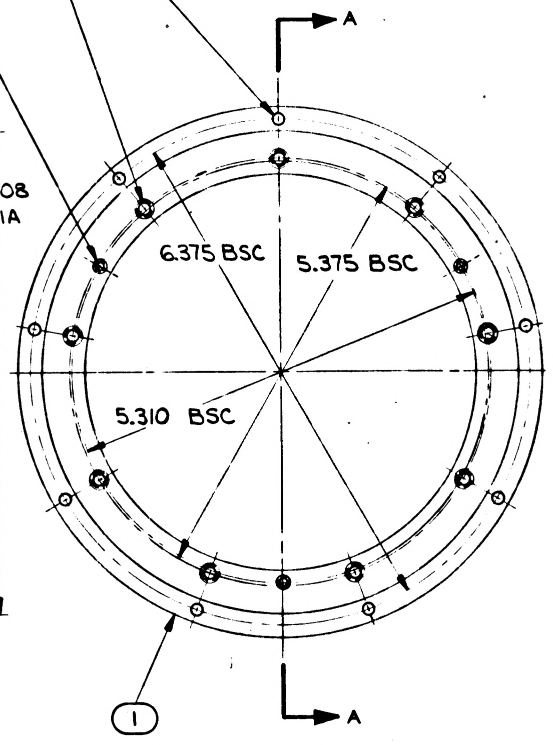
REVISIONS

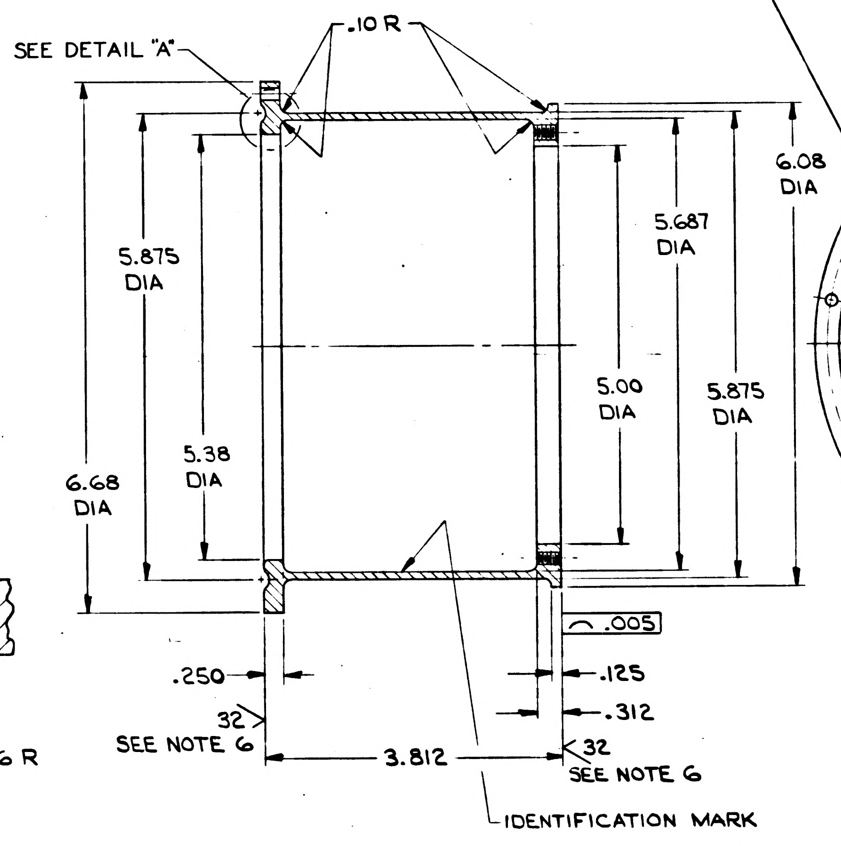
SYM	ZONE	DESCRIPTION 19596	CHG NO.	DATE	APPD
Ⓐ A		REVISED PER TDRR 20115		18 MAY 65	
B		REVISED PER TDRR 21172		30 JUL 65	RLP RWH

③ 3 REQD
LOCATE ¾ TO 1¾ THDS BELOW SURFACE. REMOVE TANG
.144 - .150 THRU ⌖ .005 3 HOLES EQUALLY SPACED AS SHOWN
120° CSK TO .178 - .193 FOLLOW WITH HELICAL COIL TAP THRU FOR 6-32 UNC 3B INSERT SCREW THD

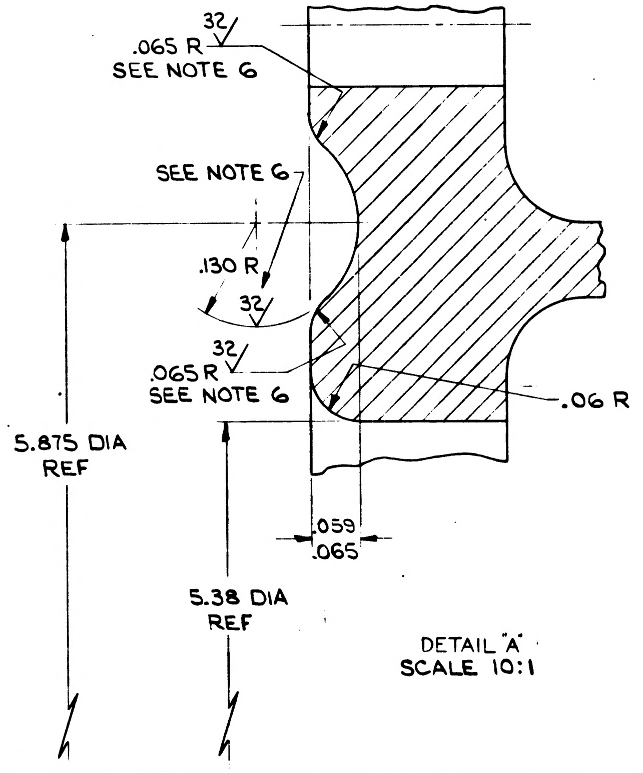
② 9 REQD
LOCATE ¾ TO 1¾ THDS BELOW SURFACE. REMOVE TANG
.196 - .202 THRU ⌖ .005 9 HOLES EQUALLY SPACED AS SHOWN
120° CSK TO .236 - .256 FOLLOW WITH HELICAL COIL TAP THRU FOR 10-32 UNF 3B INSERT SCREW THD

.152 - .159 THRU ⌖ .005 9 HOLES EQUALLY SPACED AS SHOWN.


A
6.375 BSC
5.375 BSC
5.310 BSC
①
A


SEE DETAIL "A"
.10 R
6.08 DIA
5.687 DIA
5.875 DIA
5.00 DIA
5.875 DIA
5.38 DIA
6.68 DIA
⌒ .005
.250
.125
.312
32
SEE NOTE 6
3.812
32
SEE NOTE 6
IDENTIFICATION MARK

SECTION A-A


32
.065 R
SEE NOTE 6
SEE NOTE 6
.130 R
32
32
.065 R
SEE NOTE 6
.06 R
5.875 DIA
REF
.059
.065
5.38 DIA
REF

DETAIL "A"
SCALE 10:1

SEE NOTES 3 & 4

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
3	3	MS21209C0615	(8596197-003) INSERT-SCR THD, LOCKING
2	9	MS21209-F1-15	(8596197-007) INSERT-SCR THD, LOCKING
1	1	2898955 -001	TUBE-SPACECRAFT END

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2898950-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	±.02	±2°
— —	±.005	

DO NOT SCALE THIS DRAWING

MATERIAL ———

CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN E.H. Dassmann DATE 7 MAY 65
CHECKED D. Lehman 20 MAY 65
APPROVAL K. Lutz 20 MAY '65
APPROVAL R.W. Boas 5/24/65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TUBE- SPACECRAFT END (Sct)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2898955
SCALE FULL
SHEET 1 OF 1

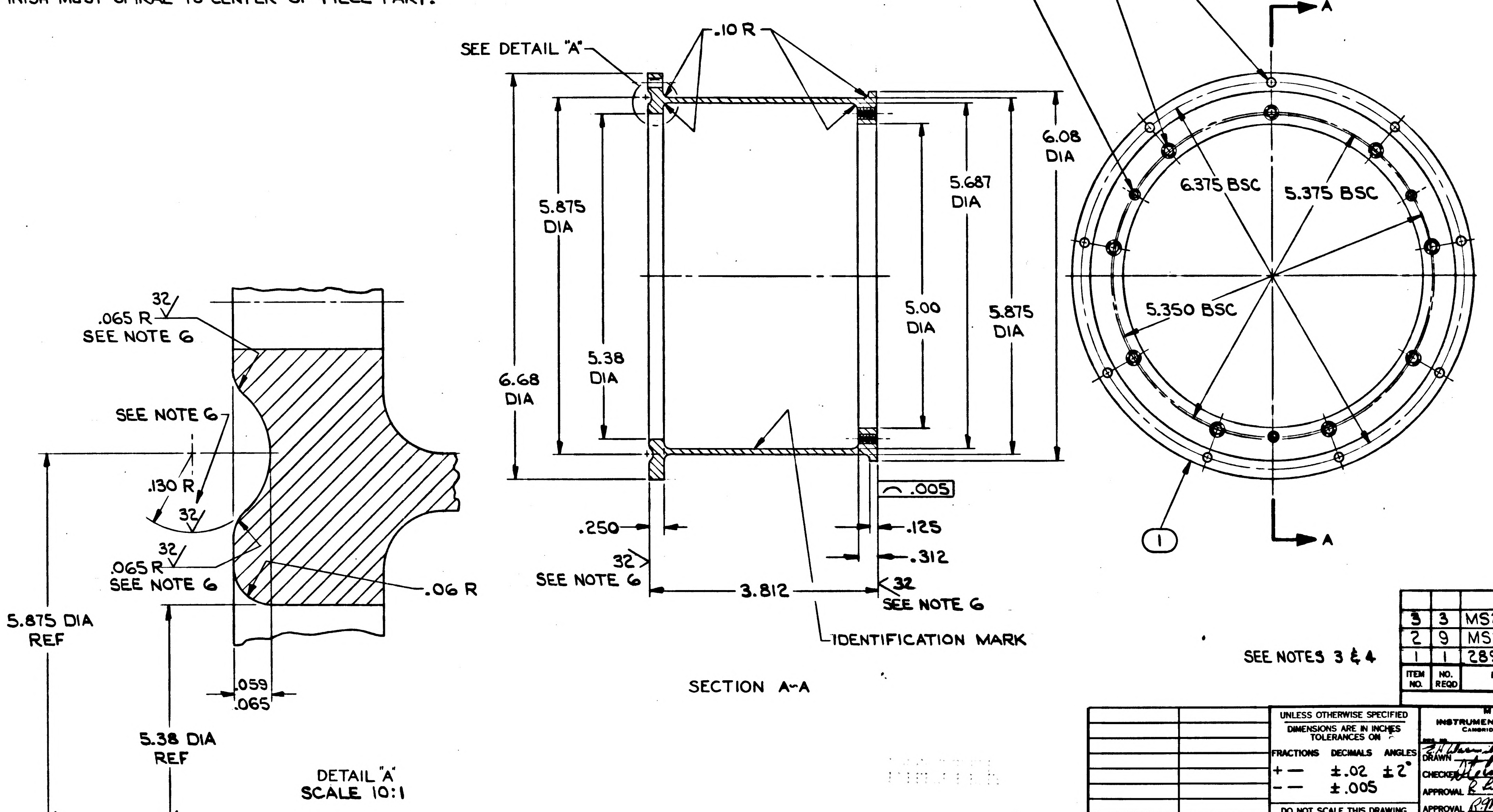
2898955

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED:
   A. MUST BE FREE FROM BURRS.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\sqrt[63]{}$
   C. ALL CORNERS MUST BE .005 TO .015 R, OR CHAMFER.
3. MATERIAL:
   AL ALLOY QQ-A-250/4 TEMPER T351
4. FINISH:
   A. *ANODIC COAT PER MIL-A-8625 TYPE 1 CLEAR PRIOR TO INSTALLATION OF HELICOILS.*
5. IDENTIFY USING DRAWING NUMBER PER MIL STD 130 (ES267).
6. FINISH MUST SPIRAL TO CENTER OF PIECE PART.

③ 3 REQD
LOCATE $\frac{3}{4}$ TO $1\frac{3}{4}$ THDS BELOW SURFACE. REMOVE TANG
.144 - .150 THRU $\boxed{\oplus\ .005}$ 3 HOLES EQUALLY SPACED AS SHOWN
120° CSK TO .178 - .193 FOLLOW WITH HELICAL COIL TAP THRU FOR 6-32 UNC 3B INSERT SCREW THD

② 9 REQD
LOCATE $\frac{3}{4}$ TO $1\frac{3}{4}$ THDS BELOW SURFACE. REMOVE TANG
.196 - .202 THRU $\boxed{\oplus\ .005}$ 9 HOLES EQUALLY SPACED AS SHOWN
120° CSK TO .236 - .256 FOLLOW WITH HELICAL COIL TAP THRU FOR 10-32 UNF 3B INSERT SCREW THD

.152 - .159 THRU $\boxed{\oplus\ .005}$ 9 HOLES EQUALLY SPACED AS SHOWN.


SEE DETAIL "A"
.10 R
5.875 DIA
6.68 DIA
5.38 DIA
5.00 DIA
5.687 DIA
6.08 DIA
5.875 DIA
.005
.250
.125
.312
32
SEE NOTE 6
3.812
32
SEE NOTE 6
IDENTIFICATION MARK
SECTION A-A
A
A
6.375 BSC
5.375 BSC
5.350 BSC
①
.065 R
32
SEE NOTE 6
SEE NOTE 6
.130 R
32
32
.065 R
SEE NOTE 6
.06 R
5.875 DIA REF
5.38 DIA REF
.059
.065
DETAIL "A" SCALE 10:1

SEE NOTES 3 & 4

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
3	3	MS21209C0615	(8596197-003) INSERT-SCR THD, LOCKING
2	9	MS21209-F1-15	(8596197-007) INSERT-SCR THD, LOCKING
1	1	2898955 -001	TUBE - SPACECRAFT END

LIST OF PARTS AND MATERIALS

REVISIONS

SYM	ZONE	DESCRIPTION 19596	CHG NO.	DATE	APPD

NEXT ASSY	USED ON
2898950-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	±.02	±2°
— —	±.005	

DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN E.H. Wassmith DATE 7 MAY 65
CHECKED 20 MAY 65
APPROVAL R. Lietz 20 MAY '65
APPROVAL R.W. Boss 5/24/65
NASA APPROVAL 5/24/65
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

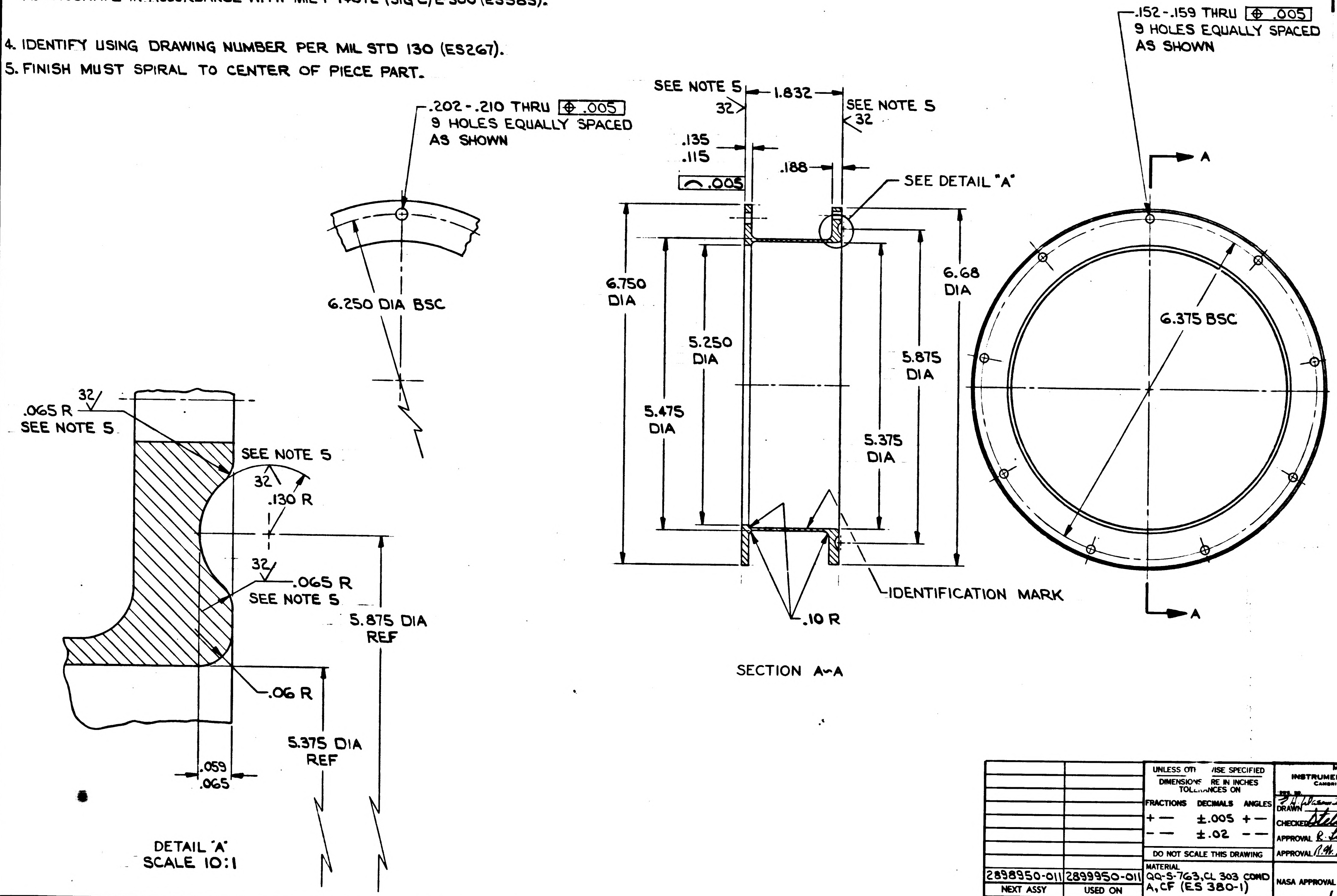
TUBE- SPACECRAFT END (Sct)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE D
2898955
SCALE FULL
SHEET 1 OF 1

2898956

SYM	ZONE	REVISIONS DESCRIPTION 19596	DATE	APPD.
		CHG NO.		

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED:
   A. MUST BE FREE FROM BURRS.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 63/
   C. ALL CORNERS MUST BE .005 TO .015 R, OR CHAMFER.
3. FINISH:
   A. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 (SIG C) E-300 (ES585).
4. IDENTIFY USING DRAWING NUMBER PER MIL STD 130 (ES267).
5. FINISH MUST SPIRAL TO CENTER OF PIECE PART.



.152-.159 THRU ⊕ .005
9 HOLES EQUALLY SPACED
AS SHOWN
A
A
6.375 BSC
.202-.210 THRU ⊕ .005
9 HOLES EQUALLY SPACED
AS SHOWN
6.250 DIA BSC
SEE NOTE 5
32
1.832
SEE NOTE 5
32
.135
.115
⌒ .005
.188
SEE DETAIL "A"
6.750 DIA
5.250 DIA
5.475 DIA
6.68 DIA
5.875 DIA
5.375 DIA
.10 R
IDENTIFICATION MARK
SECTION A-A
32
.065 R
SEE NOTE 5
SEE NOTE 5
32
.130 R
32
.065 R
SEE NOTE 5
5.875 DIA
REF
.06 R
5.375 DIA
REF
.059
.065
DETAIL "A"
SCALE 10:1

2898950-011	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	±.005	+ —
— —	±.02	— —

DO NOT SCALE THIS DRAWING

MATERIAL
QQ-S-763, CL 303 COND A, CF (ES 380-1)

CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN T. H. Wassmuth 5 MAY 65
CHECKED Stelma 20 MAY 65
APPROVAL R. Lutz 20 MAY '65
APPROVAL R. W. Dea 5/24/65
NASA APPROVAL 5/26/65
MIT APPROVAL 24 May 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TUBE-OPTICS END (SCT)

CODE IDENT NO. 80230
SIZE D
2898956
SCALE FULL
SHEET 1 OF 1

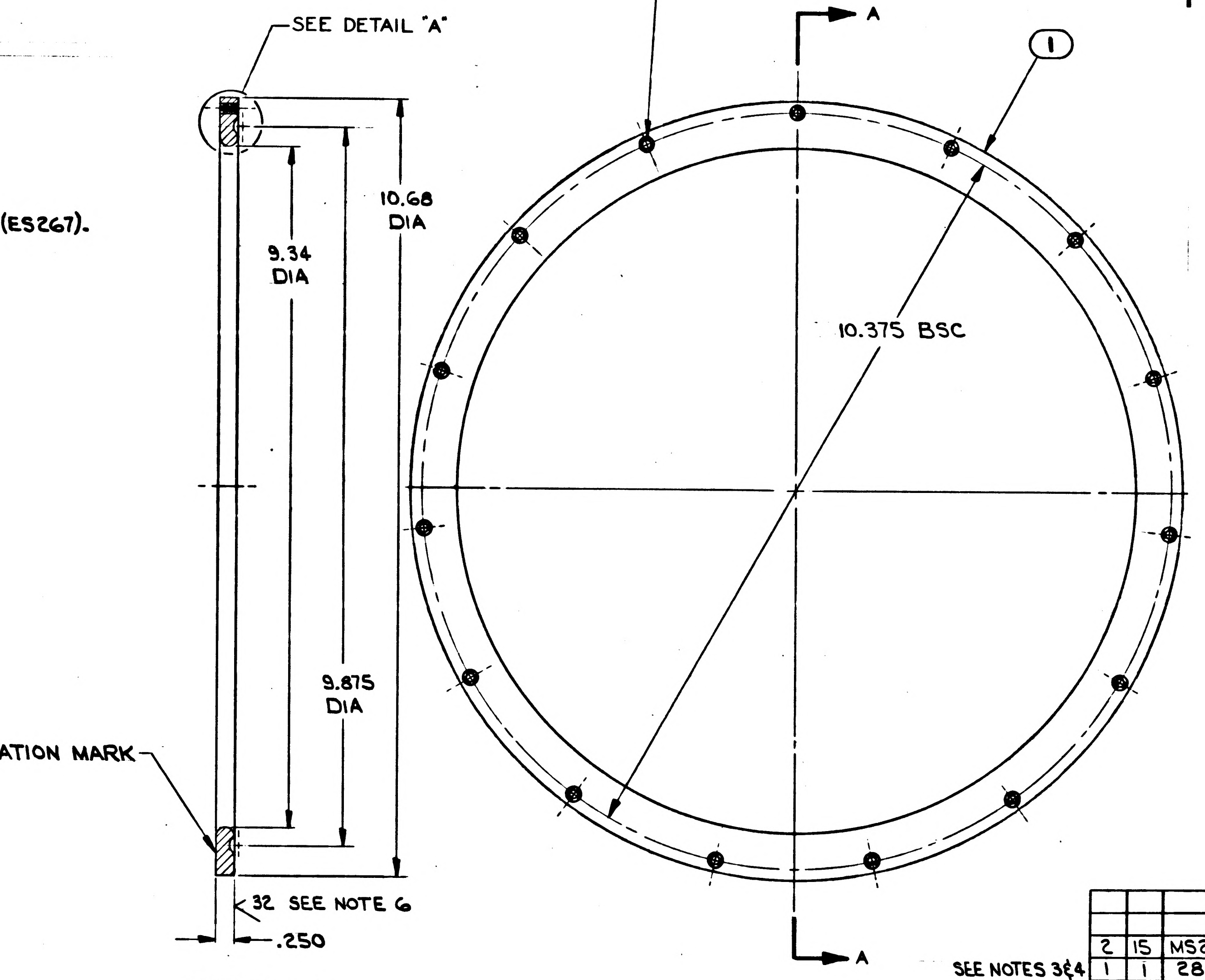
2898957

SYM	ZONE	DESCRIPTION 19596	CHG NO.	DATE	APPD.

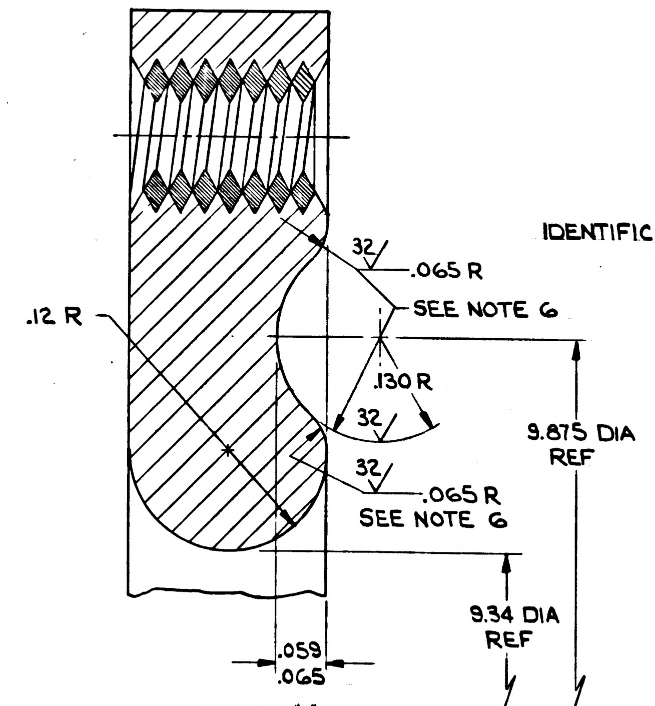
REVISIONS

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED:
   A. MUST BE FREE FROM BURRS.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\overset{63}{\surd}$
   C. ALL CORNERS MUST BE .005 TO .015 R, OR CHAMFER.
3. MATERIAL:
   AL ALLOY QQ-A-250/4 TEMPER T351
4. FINISH:
   A. *ANODIC COAT PER MIL-A-8625 TYPE I CLEAR PRIOR TO INSTALLATION OF HELICOILS.*
5. IDENTIFY USING DRAWING NUMBER PER MIL STD 130 (ES267).
6. FINISH MUST SPIRAL TO CENTER OF PIECE PART.

② 15 REQD
LOCATE $\frac{3}{4}$ TO $1\frac{3}{4}$ THDS BELOW SURFACE. REMOVE TANG
.144-.150 THRU $\boxed{\oplus\ .005}$ 15 HOLES EQUALLY SPACED. CSK 120° TO .178-.193
FOLLOW WITH HELICAL COIL TAP THRU FOR 6-32 UNC 3B INSERT SCREW THD


SEE DETAIL "A"
A
①
10.68 DIA
9.34 DIA
10.375 BSC
9.875 DIA
IDENTIFICATION MARK
32 SEE NOTE 6
.250
A

SECTION A-A


32
.065 R
.12 R
SEE NOTE 6
.130 R
32
9.875 DIA REF
32
.065 R
SEE NOTE 6
9.34 DIA REF
.059
.065

DETAIL "A"
SCALE 10:1

SEE NOTES 3&4

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	15	MS21209-C0615	(8596197-003) INSERT-SCR THD-LOCKING
1	1	2898957-001	CLAMP-RING

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2898951-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	±.02	±2°
– —	±.005	

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DRAWN E.H. Warren 10 MAY 65
CHECKED [illegible] 20 MAY 65
APPROVAL R. Lutz 20 MAY 65
APPROVAL [illegible] 5/24/65
NASA APPROVAL [illegible] 5/24/65
MIT APPROVAL [illegible]

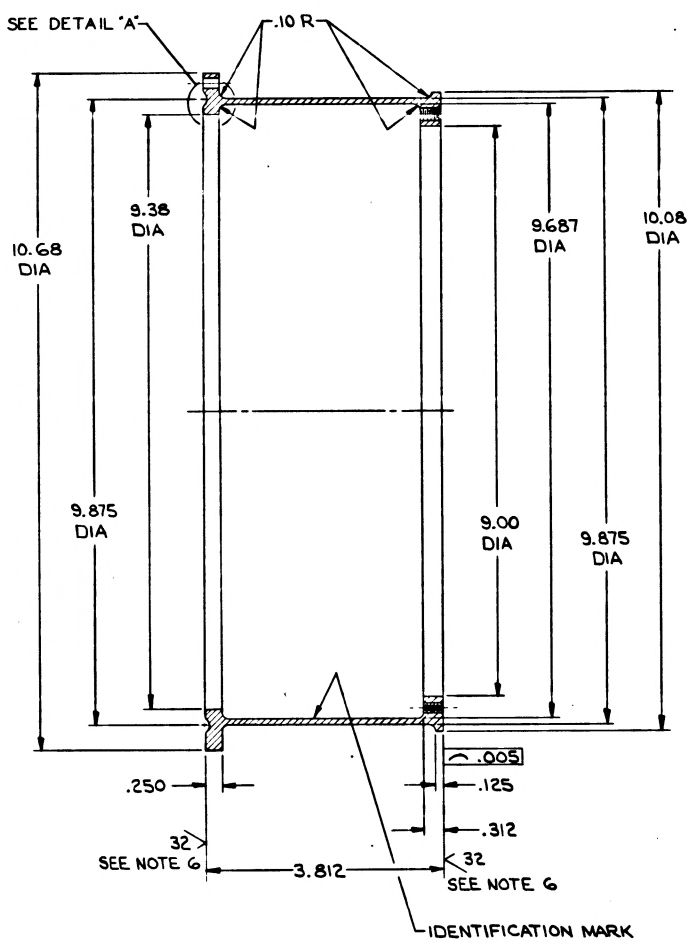
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CLAMP RING, SPACECRAFT END (S_{XT})
(INSEPARABLE ASSEMBLY)

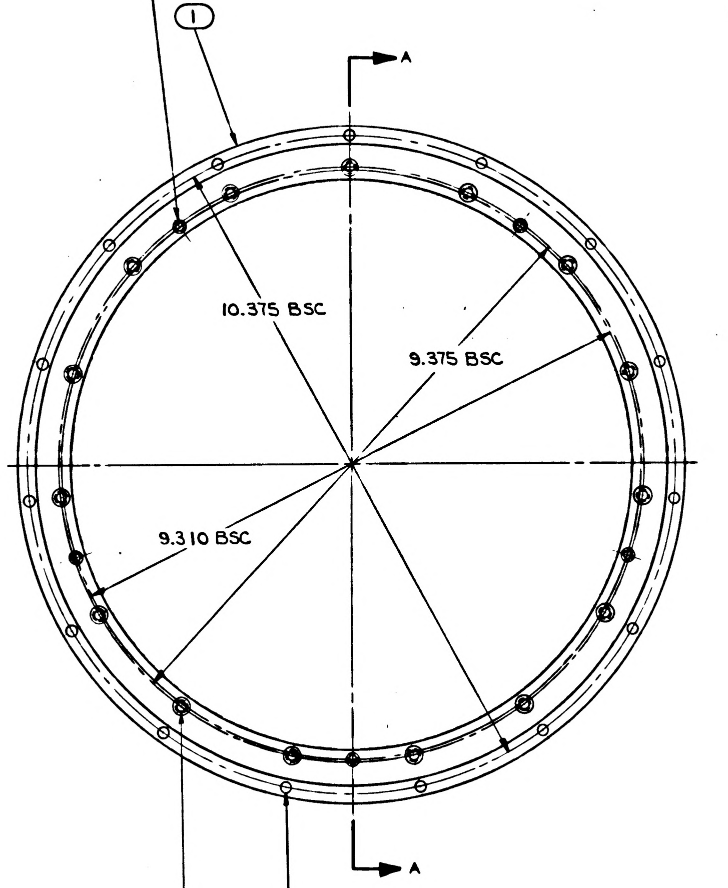
CODE IDENT NO. 80230
SIZE D
2898957
SCALE FULL
SHEET 1 OF 1

REVISIONS					
SYM	ZONE	DESCRIPTION 19596	CHG NO	DATE	APPD
A		REVISED PER TDRR 20116		19 JUN 65	R.W.S. / JBC

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED:
   A. MUST BE FREE FROM BURRS.
   B. SURFACE ROUGHNESS MUST NOT EXCEED 63√
   C. ALL CORNERS MUST BE .005 TO .015 R, OR CHAMFER.
3. MATERIAL:
   AL ALLOY QQ-A-250/4 TEMPER T351, *QQA-225/6 TEMPER T351, OR QQA-200/3 TEMPER 3511.*
4. FINISH:
   A. *ANODIC COAT PER MIL-A 8625 TYPE 1 CLEAR PRIOR TO INSTALLATION OF HELICOILS.*
5. IDENTIFY USING DRAWING NUMBER PER MIL STD 130 (ES267).
6. FINISH MUST SPIRAL TO CENTER OF PIECE PART.


SEE DETAIL "A"
.10 R
10.68 DIA
9.38 DIA
9.875 DIA
9.687 DIA
10.08 DIA
9.00 DIA
9.875 DIA
.005
.250
.125
.312
32
SEE NOTE 6
3.812
32
SEE NOTE 6
IDENTIFICATION MARK

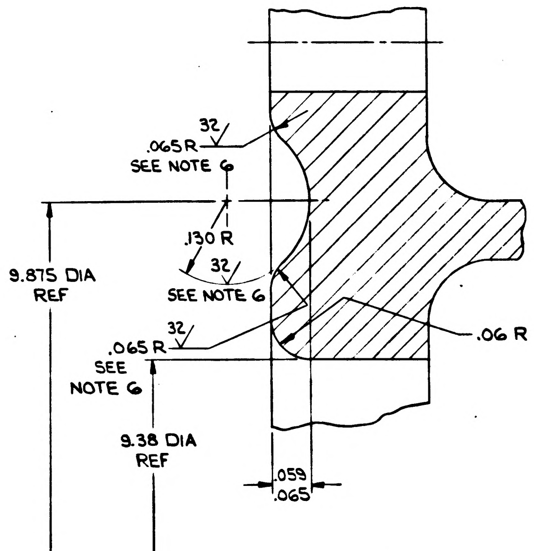
SECTION A-A


①
A
A
10.375 BSC
9.375 BSC
9.310 BSC

③ 5 REQD
LOCATE ¾ TO 1¾ THDS BELOW
SURFACE. REMOVE TANG. .144-.150 THRU ⌖ .005
5 HOLES EQUALLY SPACED AS SHOWN
120° CSK TO .178-.193 FOLLOW WITH
HELICAL COIL TAP THRU FOR
6-32 UNC 3B INSERT SCREW THD.

.152-.159 THRU ⌖ .005
15 HOLES EQUALLY SPACED
AS SHOWN

② 15 REQD
LOCATE ¾ TO 1¾ THDS BELOW
SURFACE. REMOVE TANG
.196-.202 THRU ⌖ .005 15 HOLES
EQUALLY SPACED AS SHOWN
120° CSK TO .236-.256 FOLLOW WITH
HELICAL COIL TAP THRU FOR
10-32 UNF 3B INSERT SCREW THD.


32
.065 R
SEE NOTE 6
.130 R
32
SEE NOTE 6
9.875 DIA REF
32
.065 R
SEE NOTE 6
.06 R
9.38 DIA REF
.059
.065

DETAIL "A"
SCALE 10:1

SEE NOTES 3 & 4

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
3	5	MS21209C0615	(8596197-003) INSERT, SCR THD LOCKING
2	15	MS21209-F1-15	(8596197-007) INSERT, SCR THD, LOCK 3
1	1	2898958-001	TUBE, SPACECRAFT END

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2898951-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	±.005	±2°
— —	±.02	

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS.
DRAWN E H Whitworth DATE 6 MAY 65
CHECKED 20 MAY 65
APPROVAL R Lietz 20 May '65
APPROVAL R.W. 5/24/65
NASA APPROVAL
MIT APPROVAL 26 May 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

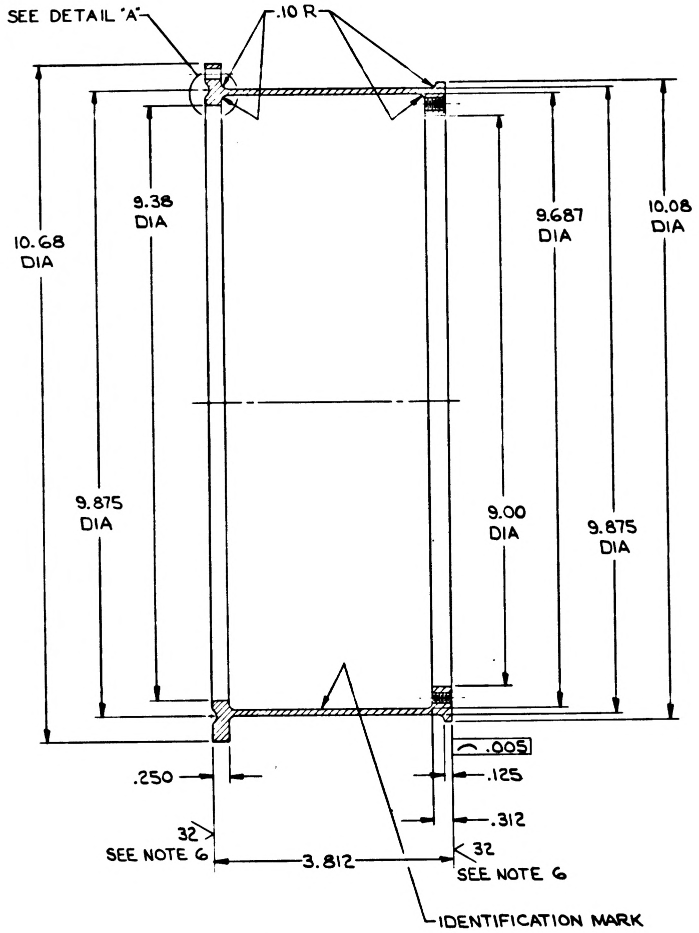
TUBE-SPACECRAFT END (Sxt)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO 80230
SIZE E
2898958
SCALE FULL
SHEET 1 OF 1

2898958 A

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED:
   - A. MUST BE FREE FROM BURRS.
   - B. SURFACE ROUGHNESS MUST NOT EXCEED $\overset{63}{\surd}$
   - C. ALL CORNERS MUST BE .005 TO .015 R, OR CHAMFER.
3. MATERIAL: AL ALLOY QQ-A-367, 6061 T6
4. FINISH:
   - A. *ANODIC COAT PER MIL-A-8625 TYPE 1 CLEAR PRIOR TO INSTALLATION OF HELICOILS.*
5. IDENTIFY USING DRAWING NUMBER PER MIL STD 130 (ES267).
6. FINISH MUST SPIRAL TO CENTER OF PIECE PART.

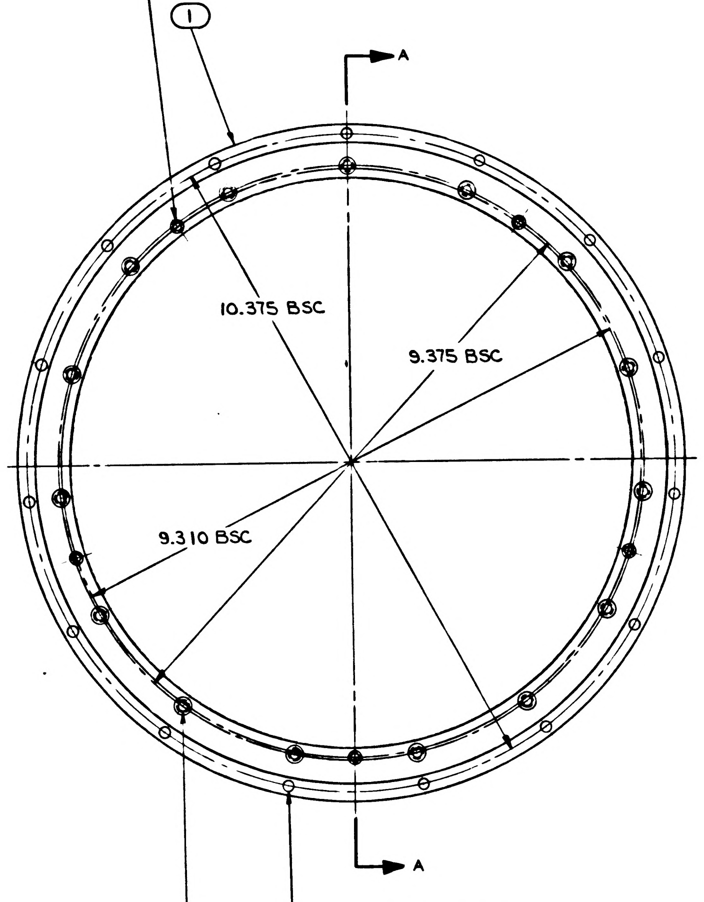
REVISIONS					
SYM	ZONE	DESCRIPTION 19596	CHG NO	DATE	APPD
Ⓜ A		*REVISED PER TDRR 20116*		19 JUN 65	R.W.T. / JAC
B		REVISED PER TDRR 21174		2 AUG 65	



SEE DETAIL "A"
.10 R
10.68 DIA
9.38 DIA
9.875 DIA
9.687 DIA
9.00 DIA
10.08 DIA
9.875 DIA
.005
.250
.125
.312
32
SEE NOTE 6
3.812
32
SEE NOTE 6
IDENTIFICATION MARK

SECTION A-A

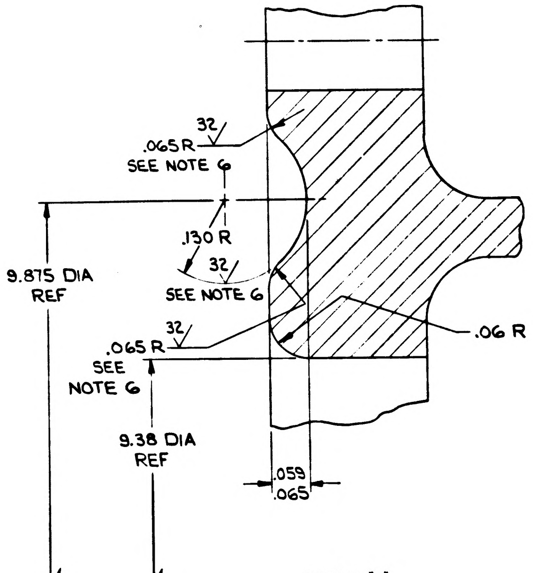
③ 5 REQD
LOCATE $\frac{3}{4}$ TO $1\frac{3}{4}$ THDS BELOW SURFACE. REMOVE TANG. .144-.150 THRU ⌖ .005
5 HOLES EQUALLY SPACED AS SHOWN
120° CSK TO .178-.193 FOLLOW WITH HELICAL COIL TAP THRU FOR 6-32 UNC 3B INSERT SCREW THD.



①
A
10.375 BSC
9.375 BSC
9.310 BSC
A

.152-.159 THRU ⌖ .005
15 HOLES EQUALLY SPACED AS SHOWN

② 15 REQD
LOCATE $\frac{3}{4}$ TO $1\frac{3}{4}$ THDS BELOW SURFACE. REMOVE TANG
.196-.202 THRU ⌖ .005 15 HOLES EQUALLY SPACED AS SHOWN
120° CSK TO .236-.256 FOLLOW WITH HELICAL COIL TAP THRU FOR 10-32 UNF 3B INSERT SCREW THD.



32
.065 R
SEE NOTE 6
.130 R
32
SEE NOTE 6
9.875 DIA REF
32
.065 R
SEE NOTE 6
.06 R
9.38 DIA REF
.059
.065

DETAIL "A"
SCALE 10:1

SEE NOTES 3 & 4

ITEM NO	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
3	5	MS21209C0615	(8596197-003) INSERT, SCR THD LOCKING
2	15	MS21209-F1-15	(8596197-007) INSERT, SCR THD, LOCK 3
1	1	2898958-001	TUBE, SPACECRAFT END

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2898951-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	±.005	±2°
- —	±.02	

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE 6 MAY 65
CHECKED 20 MAY 65
APPROVAL R Lietz 20 May '65
APPROVAL R.W. 5/24/65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

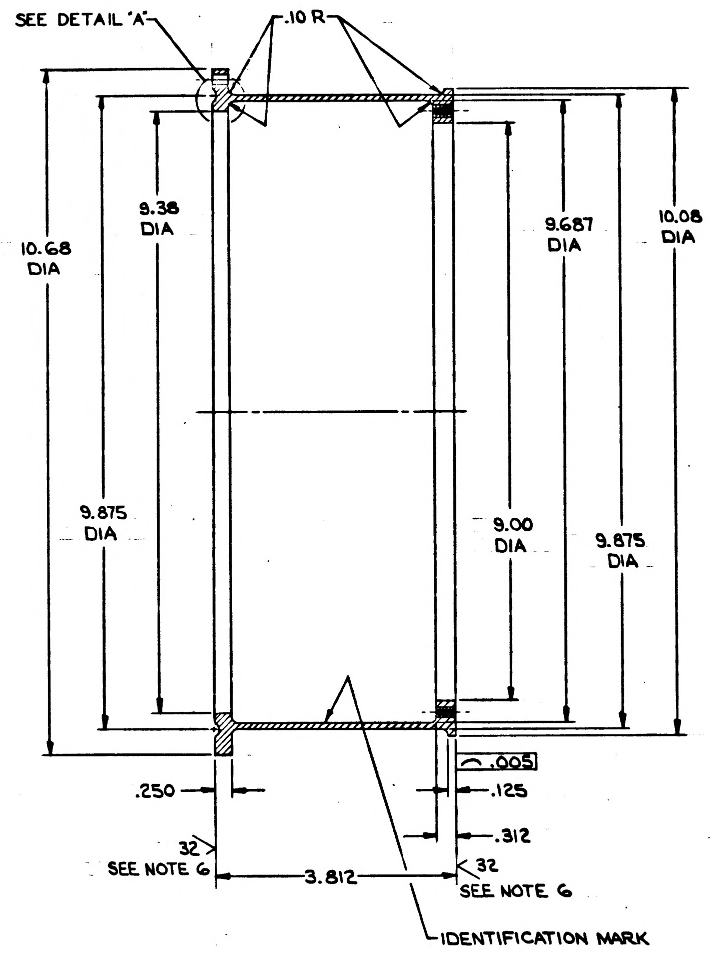
TUBE-SPACECRAFT END (Sxt)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO 80230
SIZE E
2898958
SCALE FULL
SHEET 1 OF 1

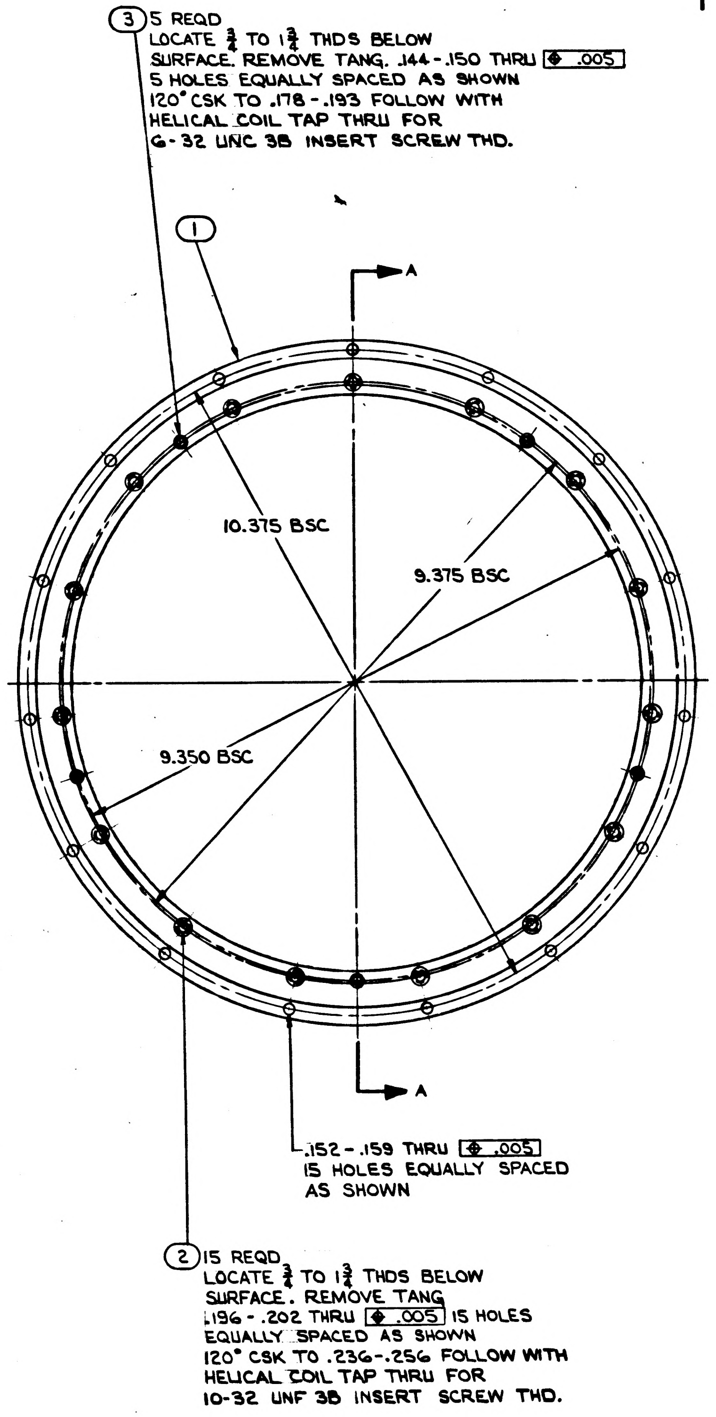
2898958 B

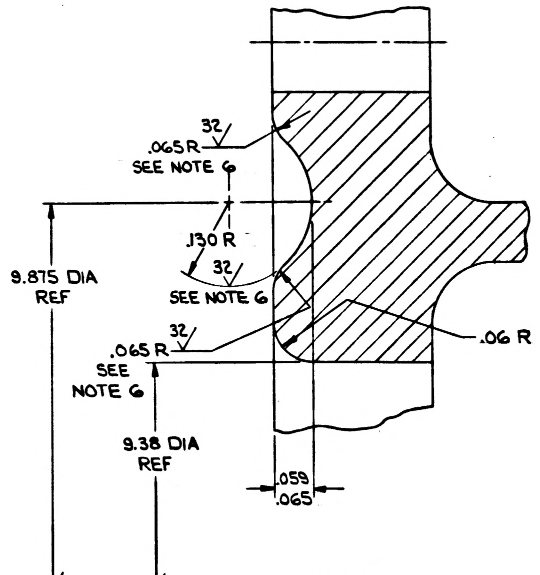
REVISIONS				
SYM	ZONE	DESCRIPTION 19596	DATE	APPD.
		CHG NO.		

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED:
   A. MUST BE FREE FROM BURRS.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\overset{63}{\surd}$
   C. ALL CORNERS MUST BE .005 TO .015 R, OR CHAMFER.
3. MATERIAL:
   AL ALLOY QQ-A-250/4 TEMPER T351, *QQA-225/6 TEMPER T351, OR QQA-200/3 TEMPER 3511.*
4. FINISH:
   A. *ANODIC COAT PER MIL-A 8625 TYPE 1 CLEAR PRIOR TO INSTALLATION OF HELICOILS.*
5. IDENTIFY USING DRAWING NUMBER PER MIL STD 130 (ES267).
6. FINISH MUST SPIRAL TO CENTER OF PIECE PART.


SEE DETAIL "A"
.10 R
10.68 DIA
9.38 DIA
9.875 DIA
9.687 DIA
10.08 DIA
9.00 DIA
9.875 DIA
.005
.250
.125
.312
32
SEE NOTE 6
3.812
32
SEE NOTE 6
IDENTIFICATION MARK

SECTION A-A


③ 5 REQD
LOCATE ¾ TO 1¾ THDS BELOW
SURFACE. REMOVE TANG. .144-.150 THRU ⌖ .005
5 HOLES EQUALLY SPACED AS SHOWN
120° CSK TO .178-.193 FOLLOW WITH
HELICAL COIL TAP THRU FOR
6-32 UNC 3B INSERT SCREW THD.
①
A
10.375 BSC
9.375 BSC
9.350 BSC
A
.152-.159 THRU ⌖ .005
15 HOLES EQUALLY SPACED
AS SHOWN
② 15 REQD
LOCATE ¾ TO 1¾ THDS BELOW
SURFACE. REMOVE TANG
.196-.202 THRU ⌖ .005 15 HOLES
EQUALLY SPACED AS SHOWN
120° CSK TO .236-.256 FOLLOW WITH
HELICAL COIL TAP THRU FOR
10-32 UNF 3B INSERT SCREW THD.


32
.065 R
SEE NOTE 6
.130 R
32
SEE NOTE 6
9.875 DIA REF
32
.065 R
SEE NOTE 6
.06 R
9.38 DIA REF
.059
.065

DETAIL "A"
SCALE 10:1

SEE NOTES 3 & 4

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
3	5	MS21209C0615	(8596197-003) INSERT, SCR THD LOCKING
2	15	MS21209-F1-15	(8596197-007) INSERT, SCR THD, LOCK G
1	1	2898958 -001	TUBE, SPACECRAFT END

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2898951-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — − — DECIMALS ±.005 ±.02 ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN E. H. 6 MAY 65
CHECKED 20 MAY
APPROVAL R. Lutz 20 MAY '65
APPROVAL R.W. 5/24/65
NASA APPROVAL
MIT APPROVAL 26 May 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

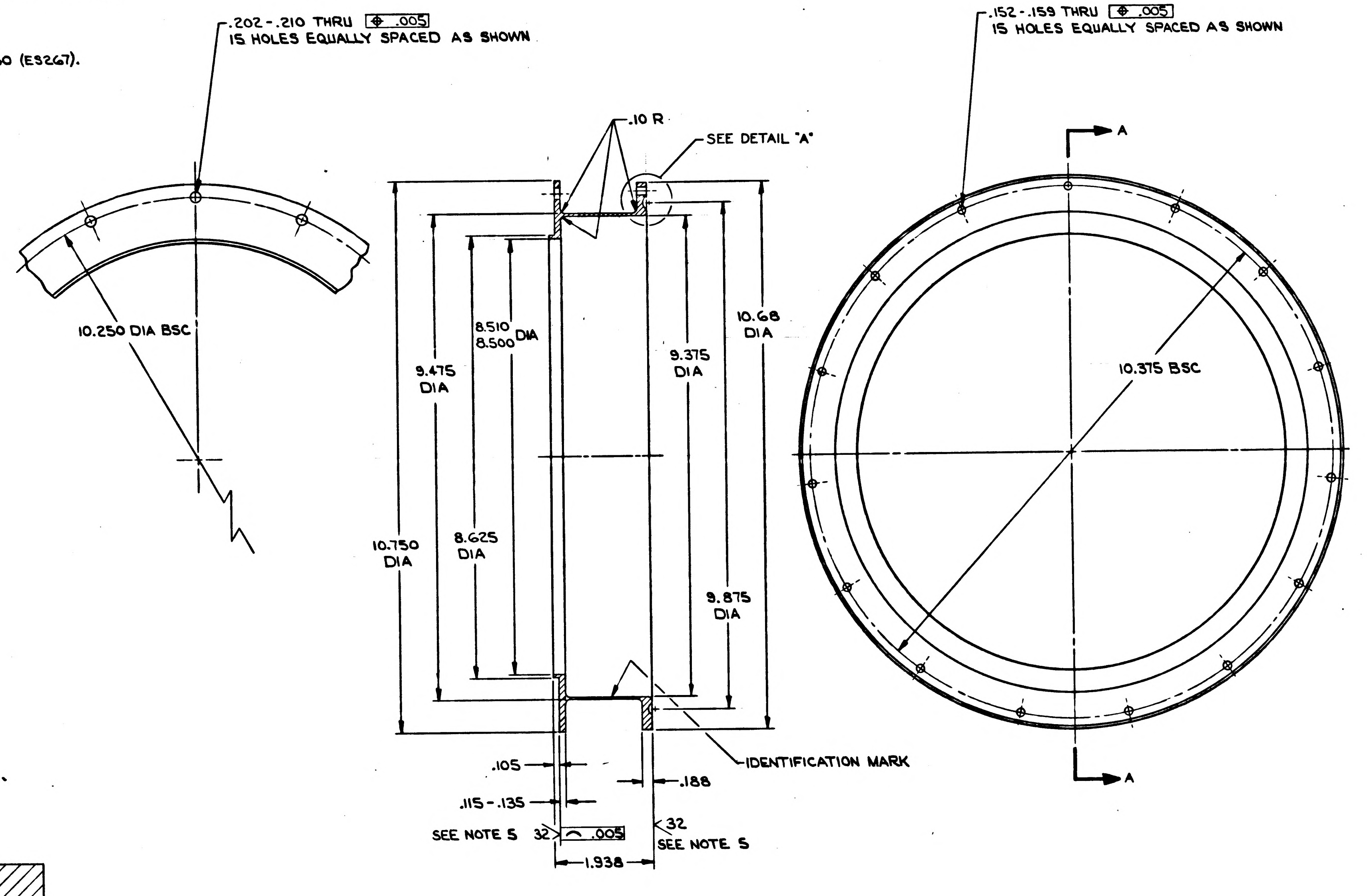
TUBE- SPACECRAFT END (SXT)
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 80230
SIZE E
2898958
SCALE FULL
SHEET 1 OF 1

2898958

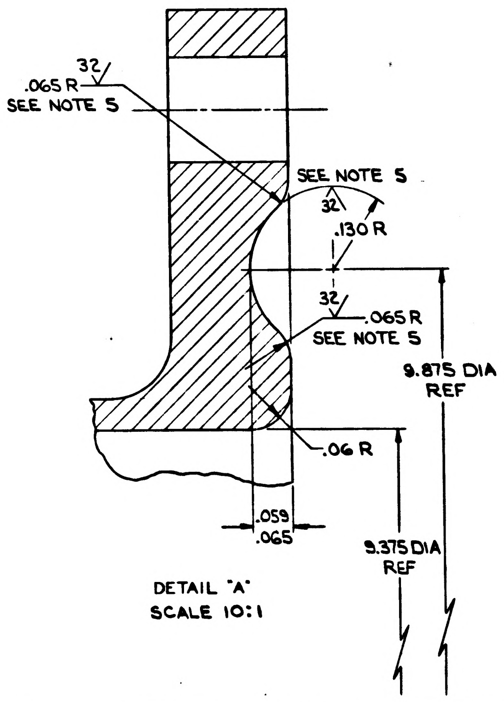
REVISIONS					
SYM	ZONE	DESCRIPTION 19596	CHG NO.	DATE	APPD.

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED:
   A. MUST BE FREE FROM BURRS.
   B. SURFACE ROUGHNESS MUST NOT EXCEED $\overset{63}{\surd}$
   C. ALL CORNERS MUST BE .005 TO .015 R, OR CHAMFER.
3. FINISH:
   A. PASSIVATE IN ACCORDANCE WITH MIL-F-14072 (SIG C) E-300 (ES585)
4. IDENTIFY USING DRAWING NUMBER PER MIL STD 130 (ES267).
5. FINISH MUST SPIRAL TO CENTER OF PIECE PART.



.202 - .210 THRU ⌖ .005
15 HOLES EQUALLY SPACED AS SHOWN
10.250 DIA BSC
.10 R
SEE DETAIL "A"
8.510
8.500 DIA
9.475 DIA
10.68 DIA
9.375 DIA
10.750 DIA
8.625 DIA
9.875 DIA
IDENTIFICATION MARK
.105
.188
.115 - .135
SEE NOTE 5
32
⌒ .005
32
SEE NOTE 5
1.938
.152 - .159 THRU ⌖ .005
15 HOLES EQUALLY SPACED AS SHOWN
A
10.375 BSC
A

SECTION A-A



32
.065 R
SEE NOTE 5
SEE NOTE 5
32
.130 R
32
.065 R
SEE NOTE 5
9.875 DIA REF
.06 R
.059
.065
9.375 DIA REF

DETAIL "A"
SCALE 10:1

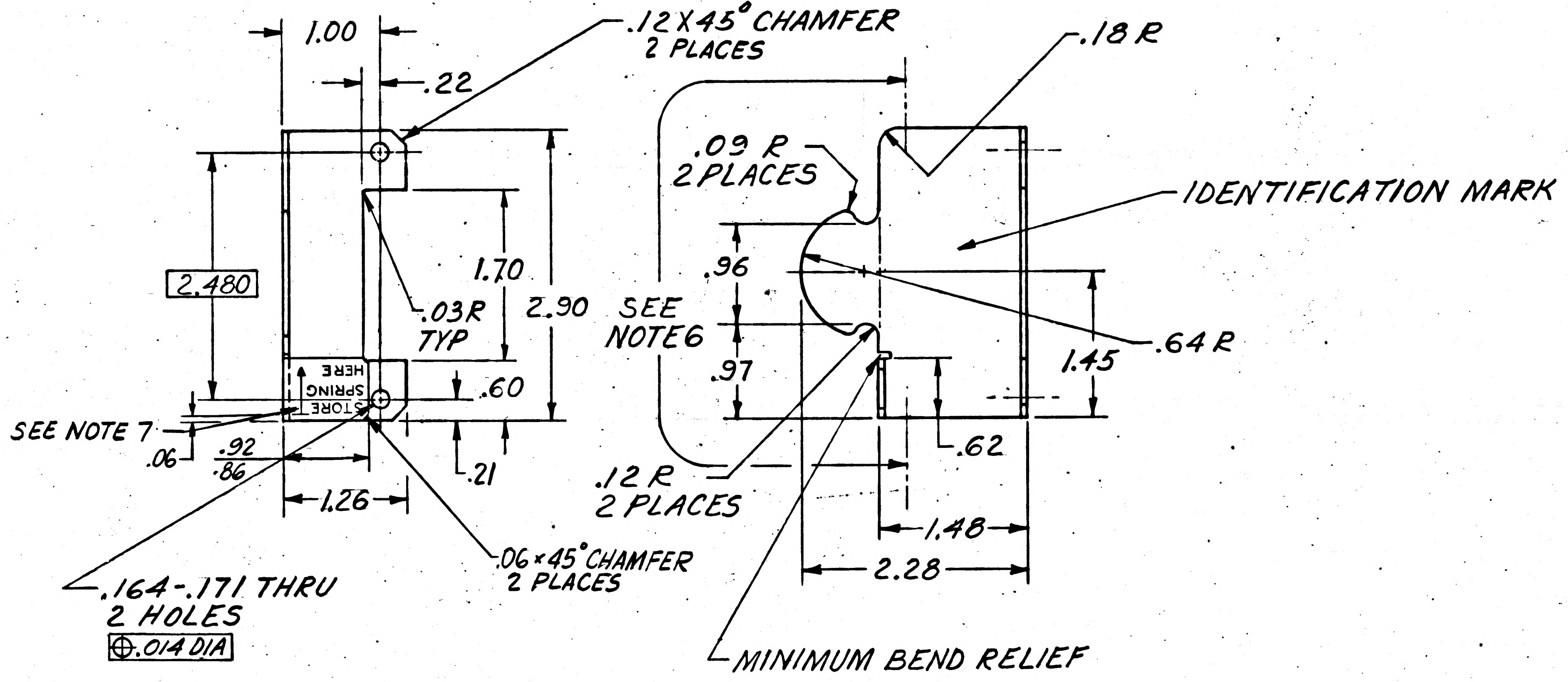
2898951-011 NEXT ASSY	2899950-011 USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + — DECIMALS ±.005 ±.02 ANGLES + — DO NOT SCALE THIS DRAWING	MIT INSTRUMENTATION LAB CAMBRIDGE MASS DRAWN 6 MAY 65 CHECKED 20 MAY 65 APPROVAL R Lietz 20 MAY 65 APPROVAL 5/24/65	MANNED SPACECRAFT CENTER HOUSTON, TEXAS TUBE-OPTICS END (SXT)
APPLICATION		MATERIAL QQ-S-763, CL 303 COND A, CF (ES 380-1)	NASA APPROVAL	CODE IDENT NO. 80230 · SIZE E · 2898959
		CONTRACT NAS 9-497	MIT APPROVAL	SCALE FULL · SHEET 1 OF 1

2898959

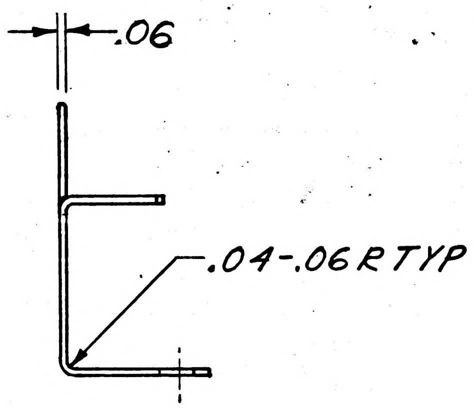
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD
	A	INITIAL RELEASE CLASS A PER TDRR 37795	28 AUG 69	JAK 30 JUN 69 GA

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MUST BE FREE FROM BURRS AND SHARP CORNERS.
3. MATERIAL: AL ALY PER QQ-A-250/8, TEMPER H32 (5052 H32 AL ALY).
4. FINISH: ANODIZE PER MIL-A-8625 TYPE I, CLASS I.
5. IDENTIFY USING DRAWING NO. PER ND 1002019.
6. BREAK EDGES .03 R IN AREA SHOWN.
7. IMPRESSION STAMP PER ND 1002019, .12 HIGH. FILL WITH BLACK ENAMEL, MIL-E-7729, TYPE I.



1.00
.12 X 45° CHAMFER 2 PLACES
.22
.18 R
.09 R 2 PLACES
IDENTIFICATION MARK
2.480
1.70
.03R TYP
2.90
SEE NOTE 6
.96
.97
.64 R
1.45
STORE SPRING HERE
.60
SEE NOTE 7
.06
.92
.86
.21
1.26
.62
.12 R 2 PLACES
1.48
2.28
.164-.171 THRU 2 HOLES
⊕ .014 DIA
.06 × 45° CHAMFER 2 PLACES
MINIMUM BEND RELIEF



.06
.04-.06 R TYP

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE DECIMALS ± .02 3 PLACE DECIMALS ± .005 ANGLES ±	AC ELECTRONICS DIVISION GENERAL MOTORS CORP. MILWAUKEE WIS.	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
	DRAWN G. Krohn DATE 11 JUNE 69 CHECKED Pertoque 23 JUN 69 APPROVAL D. Tschabold 24 JUNE 69	BRACKET, SPRING	
DO NOT SCALE THIS DRAWING	CONTRACT NAS 9-497		
MATERIAL SEE NOTE 3	NASA APPROVAL	SIZE C	CODE IDENT NO. 99974
			2898969
APPROVAL	MIT APPROVAL	SCALE FULL	SHEET 1 OF 1

MIL-1052C K

APOLLO G&N Specification
PS2898989 D
Original Issue Date: 23FEB70
Release Authority: TDRR 38038
Class A Release
CODE IDENT NO. 80230

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

RESTART MONITOR ASSEMBLY

DRAWING NUMBER 2898989

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				[redacted] CCB	NASA
12/30/69	A	ECO 240211	3, 6-10	-	-
1/5/70	B	ECO 240215	3	-	-
1/8/70	C	ECO 240220	3, 7, 8, 9. Was 10 pages, now 11.	-	-
/23/70	D	38038	All. Initial release		—

This specification consists of page 1 to 11 inclusive.

APPROVALS	NASA/MSC	EC Hall 4/26/70	W Stameris 28 June 1970 MIT/IL	CCB 2/23/70	ACSP	M. Cavalier

3. REQUIREMENTS

3.1 PERFORMANCE.

3.1.1 Thermal Conditioning. The assembly shall perform as specified herein after being thermally conditioned at temperature extremes of -10°C and +70°C prior to acceptance testing.

3.1.2 Input-Output Logic Function and DC Voltage Stability. With the input voltage limits of Table I applied, the output voltage limits shall be as specified in Table I. The assembly shall function as shown in Table II when each input has a source resistance of less than 100 ohms and each output is loaded with 1.2k ohms ±10 percent.

TABLE I

INPUT/OUTPUT VOLTAGE LEVELS

INPUT		PARAMETERS		OUTPUT	
Logic "1" (vdc)	Logic "0" (mvdc)	Temperature (°C)	$+V_{cc}$ (vdc)	Logic "1" (vdc)	Logic "0" (mvdc)
1.2±0.05	350±50	25±10	4.0±0.05	0.87 to 1.30	335 max
		25±10	4.8±0.1	0.87 to 1.47	
		25±10	3.4±0.1	0.70 to 1.20	
		70+2.8, -0	4.8±0.1	0.87 to 1.47	
		70+2.8, -0	3.4±0.1	0.70 to 1.20	
1.2±0.05	350±50	0+0, -2.8	3.4±0.1	0.72 to 1.31	335 max

3.1.3 Input Resistance. The input sink current of each input shall be 1.2±0.1 ma when the supply voltage is 4±0.05 vdc and the input is connected to ground through a resistance of less than 100 ohms.

3.1.4 Workmanship Vibration. The assembly shall meet the requirements of 3.1.2 and 3.2.4 when subjected to Workmanship-Vibration testing.

3.1.5 Thermal Stability. The assembly shall meet the requirements of 3.1.2 and 3.2.4 when subjected to thermal testing at the temperature and voltage limits specified in Table I.

3.1.6 Vacuum Extremes. The assembly shall meet the Input-Output Logic Function requirements of 3.1.2 and Table IV when subjected to an ambient environment of 25° ±10°C and 1 mm of Hg or less of barometric pressure. The vacuum exposure profile shall be as shown in Figure 2.

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with Apollo G&N Drawing 2898989 and all drawings and engineering data referenced thereon.

3.2.2 Weight. The assembly shall be weighed and the weight recorded.

3.2.3 Insulation Resistance. The insulation resistance between all unconnected (spare) pins (212, 813 and 815) and pin 901 shall be 50 megohms minimum.

3.2.4 **Continuity and DC Resistance.** Continuity and DC resistance shall be as specified in Table III.

TABLE III

DC RESISTANCE

PINS		RESISTANCE	PINS		RESISTANCE
From	To	(Ω)	From	To	(Ω)
110	915	<0.5Ω	708	915	<0.5Ω
111			713		
112			714		
113			809		
114			810		
115			811		
116			901		
603			902		
604			903		
605			905		
606			906		
607			907		
608			909		
609			911		
610			913		
611			Chassis	915	<0.5Ω
707	915	<0.5Ω			

4.3.3.3 Workmanship Vibration. The assembly shall be mounted on a vibration fixture and subjected to vibration along the axes as shown in Figure 1. The vibration holding fixture shall be configured to include the gravity vector as shown in Figure 1. The vibration profile for the Ya and Yb axes shall be 30 minutes at 1.0g^2/Hz ±3 db from 150 Hz to 400 Hz. Prior to vibration, the module shall be electrically tested as specified in 4.3.3.2.1 at 4.0 volts (Vcc) only. During vibration, the assembly shall be electrically tested as specified in 4.3.3.2.2 at 4.0 volts (Vcc) only as specified in Table IV. During vibration, continuity shall be continuously monitored between the pins listed in Table III, except between pins 902 and 915 and between chassis and pin 915. No open circuit shall exist for a period greater than 10 μsec during the vibration period. After vibration, the assembly shall be visually inspected as specified in 4.3.1.

TABLE IV

VIBRATION/THERMAL LOGIC FUNCTION

INPUT		PARAMETERS		OUTPUT	
Logic "1" (vdc)	Logic "0" (mvdc)	Temperature (°C)	+Vcc (vdc)	Logic "1" (vdc)	Logic "0" (mvdc)
1.6±0.5	335 max	25±10	4.0±0.05	1.2±0.4	335 max
1.6±0.5	335 max	70+2.5, -0	4.0±0.05	1.2±0.4	335 max
1.6±0.5	335 max	0+0, -2.5	4.0±0.05	1.2±0.4	335 max

4.3.3.4 Thermal Stability. The assembly shall be installed in a temperature chamber capable of maintaining ambient temperatures of 0°C, 25°C and 70°C within ±3°C. The assembly shall be powered and electrically tested according to the requirements of 4.3.3.2.1 at each temperature and Vcc as specified in Table I, after a thermal soak of one hour minimum. During the thermal soak, the assembly shall be tested according to the requirements of 4.3.3.2.2 with inputs and outputs as specified in Table IV. During thermal soak and functional testing, continuity shall be continuously monitored between the pins listed in Table III, except between pins 902 and 915 and between chassis and pin 915. No open circuit shall exist for a period greater than 10 μsec during thermal soak and functional testing.

4.3.3.5 Vacuum Extremes. The assembly shall be installed in an evacuation chamber capable of an evacuation level of 1 mm of Hg or less, and exposed to ambient barometric cycling as shown in Figure 2. At an ambient temperature of 25° ±10°C.

Evacuation levels are minimums and may be exceeded. The assembly shall be energized and tested as specified in 4.3.3.2.2 at a dc supply voltage (V_{CC}) of 4 ±0.05 vdc only. The assembly shall be energized and continually tested throughout the entire vacuum test period. Continuity shall be continuously monitored throughout vacuum testing, between the pins listed in Table III, except between pins 902 and 915 and between chassis and pin 915. No open circuit shall exist for a period greater than 10μsec during the vacuum test period.

4.3.4 Weight. Record the weight of the assembly to the nearest 0.01 pound.

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES. None.

[illegible]

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD
	A	INITIAL RELEASE CLASS A PER TDRR		

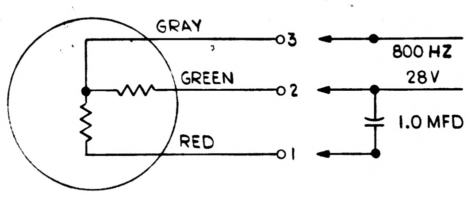
NOTES:

1. GENERAL REQUIREMENTS:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS AS SPECIFIED IN ND1015404, CLASS 2.
   - C. PACKING AND SHIPPING: THE BLOWER SHALL BE PRESERVED AND PACKAGED IN ACCORDANCE WITH ND 1002215, CLASS I.
   - D. IDENTIFY USING DRAWING NO., REV. LETTER, SERIAL NO. AND MANUFACTURER'S SYMBOL PER ND1002019. MANUFACTURER'S PART NO. MAY ALSO BE USED.

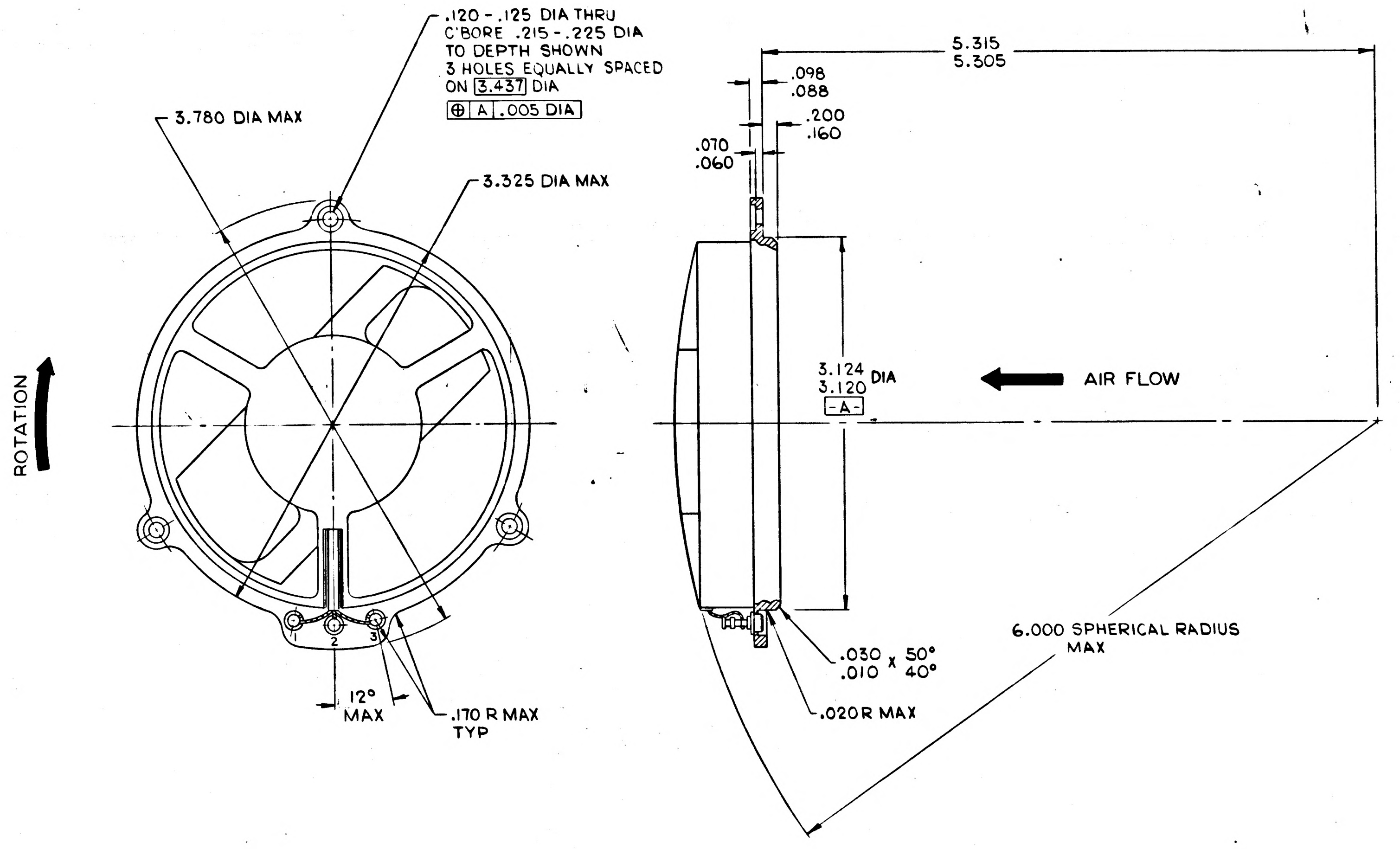
2. INSPECTION AND ACCEPTANCE:
   - A. OPERATING REQUIREMENTS:
     - (1) BLOWER SHALL MEET THE FOLLOWING OPERATING REQUIREMENTS WITH 800 -Z SINGLE PHASE SINE WAVE VOLTAGE APPLIED AND 1.0 MFD CAPACITOR CONNECTED AS SHOWN IN WIRING DIAGRAM:
       - * a. TOTAL POWER CONSUMPTION: 10 WATTS MAX.
       - b. VOLTAGE: 28VRMS ±1%.
       - c. MECHANICAL (AT 28VRMS ±1% INPUT, ONE ATMOSPHERE PRESSURE AND AT ROOM TEMPERATURE):
         - * ROTOR SPEED: 9500 RPM MIN IN DIRECTION SHOWN (FREE AIR DELIVERY)
         - ** FREE AIR DELIVERY: 43CFM MIN.
         - ** STATIC PRESSURE AT NO DELIVERY: 0.5 INCHES OF WATER MIN AIR FLOW: IN DIRECTION SHOWN.
       - d. RUN-IN: ALL BLOWERS SHALL BE SUBJECTED TO 240 HOURS OF OPERATION AT ROOM AMBIENT AND EXCITED WITH RATED VOLTAGE. BLOWERS MUST MEET ALL ACCEPTANCE REQUIREMENTS AFTER BURN-IN.
   - B. STATIC (NON-OPERATING) REQUIREMENTS:
     - (1) ELECTRICAL:
       - * a. D.C. RESISTANCE AT 68° TO 77° FAHRENHEIT: 1 TO 3: 33Ω ±10%
         2 TO 3: 31Ω ±10%
       - * b. INSULATION RESISTANCE 100 MEGOHMS MIN. AT 500VDC APPLIED FOR ONE MINUTE MAX. FROM EITHER WINDING TO THE CASE HOUSING.
   - C. MECHANICAL:
     - * (1) LEADS SHALL CONFORM TO MIL-W-16878, TYPE E-30 AND SHALL BE THE COLOR SPECIFIED IN THE WIRING DIAGRAM.
     - (2) UNBALANCE: THE ROTATING ASSEMBLY SHALL BE BALANCED SUCH THAT THE BLOWER, ELASTICALLY SUPPORTED AND OPERATING AT RATED SPEED, WILL HAVE LESS THAN .0005 IN. P-P DISPLACEMENT.
     - (3) TERMINAL PULL (AXIAL), TEST PER MIL-T-55155: 5 POUNDS MINIMUM.
     - (4) BEARING PRELOAD SHALL BE 0.75 ±0.5 LBS.

3. DESIGN REQUIREMENTS:
   - A. BLOWER SHALL BE CAPABLE OF MEETING THE REQUIREMENTS SPECIFIED IN ND1002058. BLOWER MUST OPERATE AT FULL SPEED CONDITION AT 3.0 PSIA MAX. PRESSURE AND 135°F ±5°F AMBIENT TEMPERATURE FOR 96 HRS. WITHOUT FAILURE.
   - B. BLOWER SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF THIS DRAWING FOR 5000 HRS. OF OPERATION AT 28VRMS ±1% INPUT AND 100°F ±5°F AMBIENT TEMPERATURE.
   - C. THE BLOWER SHALL HAVE A SHELF LIFE OF AT LEAST 5 YRS., WITHOUT OPERATION, AT AMBIENT ROOM TEMP., AFTER FINAL ACCEPTANCE AT THE VENDORS PLANT. PROVISIONS SHOULD BE MADE FOR BEARING REPLACEMENT.
   - D. MATERIAL: HOUSING: ALUMINUM, ANODIZED PER MIL-A-8625 DYED BLACK OR FINISHED WITH BLACK ENAMEL PER MIL-E-5557, TYPE IV.
   - E. SOLDER IN ACCORDANCE WITH ND1002071 PER QQ-S-571 SN10.
   - ** F. POWER FACTOR 0.9 MIN. WHEN OPERATING AS SHOWN IN THE WIRING DIAGRAM.
   - G. BEARINGS: ABEC 7 DOUBLE SHIELDED, .0005-.0008 RADIAL PLAY 440C STAINLESS STEEL, AND LUBRICATED 1/3 FULL WITH GREASE PER 1010870 (BEACON 325).

* ACCEPTANCE TESTS (100%)
** PERIODIC PRODUCTION TESTS



WIRING DIAGRAM



2018602	DL2018601	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE DECIMALS ± — 3 PLACE DECIMALS ± — ANGLES ± — DO NOT SCALE THIS DRAWING	M I T INSTRUMENTATION LAB CAMBRIDGE MASS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
NEXT ASSY	USED ON	MATERIAL —	DRAWN J. Wolski 26 OCT 70 CHECKED Lavoque 27 OCT 70 APPROVAL A. Lewandowski 28 OCT 70 CONTRACT NAS 9-10356	BLOWER SPECIFICATION CONTROL DRAWING	
APPLICATION		APPROVAL	NASA APPROVAL MIT APPROVAL 12/7/70	SIZE E SCALE 2:1	CODE IDENT NO. 80230 2899005 SHEET

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD
	A	INITIAL RELEASE CLASS A PER TDRR		
	B	REVISED PER TDRR 38377	MAR 71	

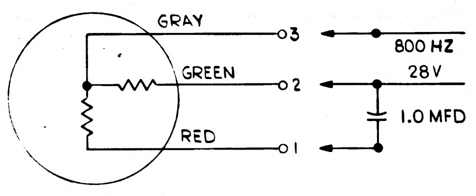
NOTES:

1. GENERAL REQUIREMENTS:
   - A. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
   - B. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS AS SPECIFIED IN ND1015404, CLASS 2.
   - C. PACKING AND SHIPPING: THE BLOWER SHALL BE PRESERVED AND PACKAGED IN ACCORDANCE WITH ND 1002215, CLASS I.
   - D. IDENTIFY USING DRAWING NO., REV. LETTER, SERIAL NO. AND MANUFACTURER'S SYMBOL PER ND1002019. MANUFACTURER'S PART NO. MAY ALSO BE USED.

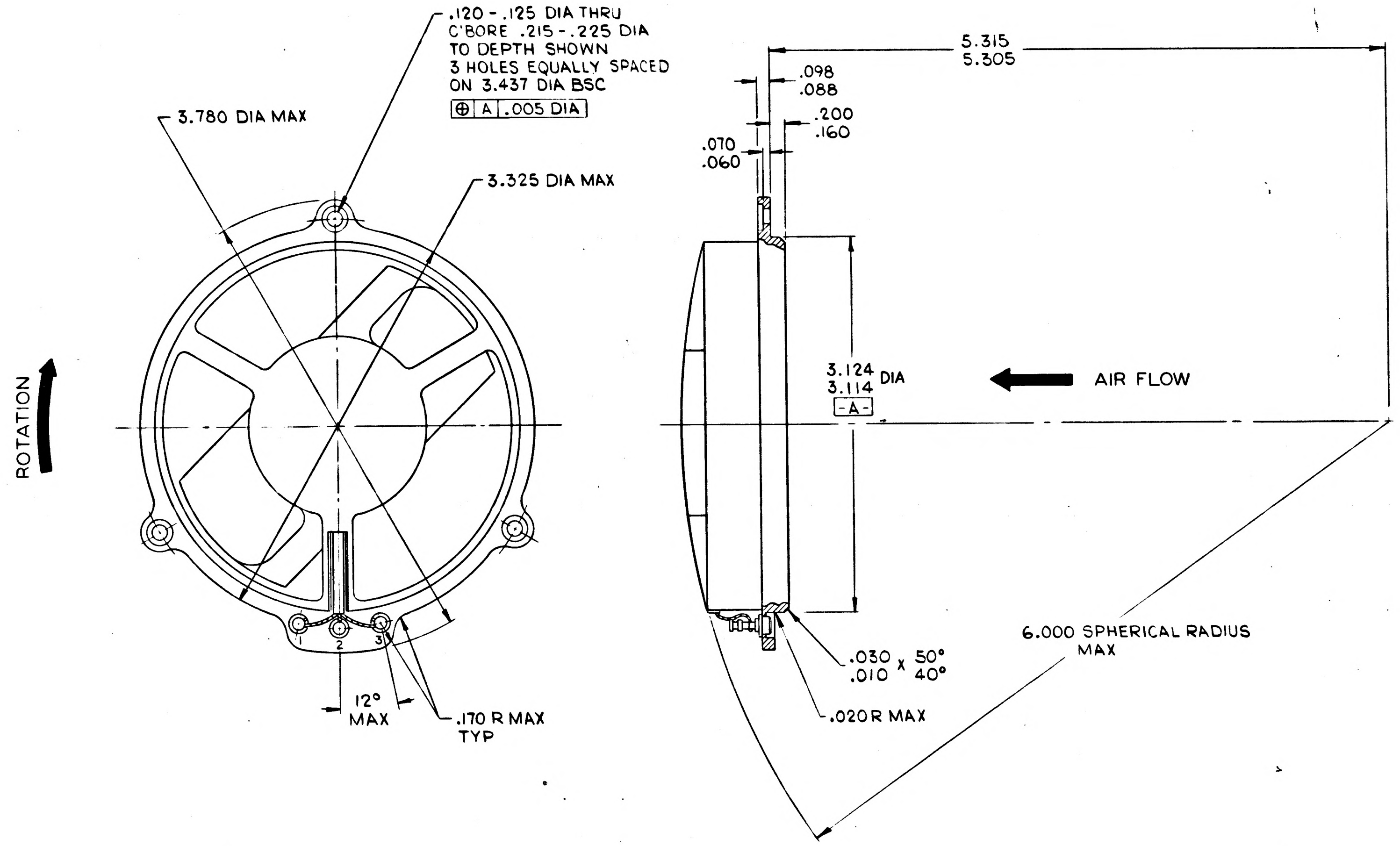
2. INSPECTION AND ACCEPTANCE:
   - A. OPERATING REQUIREMENTS:
     - (1) BLOWER SHALL MEET THE FOLLOWING OPERATING REQUIREMENTS WITH 800 ~Z SINGLE PHASE SINE WAVE VOLTAGE APPLIED AND 1.0 MFD CAPACITOR CONNECTED AS SHOWN IN WIRING DIAGRAM:
       - * a. TOTAL POWER CONSUMPTION: 10 WATTS MAX.
       - b. VOLTAGE: 28VRMS ±1%.
       - c. MECHANICAL (AT 28VRMS ±1% INPUT, ONE ATMOSPHERE PRESSURE AND AT ROOM TEMPERATURE):
         - * ROTOR SPEED: 9500 RPM MIN IN DIRECTION SHOWN (FREE AIR DELIVERY)
         - ** FREE AIR DELIVERY: 43CFM MIN.
         - ** STATIC PRESSURE AT NO DELIVERY: 0.5 INCHES OF WATER MIN
         - AIR FLOW: IN DIRECTION SHOWN.
       - d. RUN-IN: ALL BLOWERS SHALL BE SUBJECTED TO 240 HOURS OF OPERATION AT ROOM AMBIENT AND EXCITED WITH RATED VOLTAGE. BLOWERS MUST MEET ALL ACCEPTANCE REQUIREMENTS AFTER BURN-IN.
   - B. STATIC (NON-OPERATING) REQUIREMENTS:
     - (1) ELECTRICAL:
       - * a. D.C. RESISTANCE AT 68° TO 77° FAHRENHEIT: 1 TO 3: 33Ω ±10%
         2 TO 3: 31Ω ±10%
       - * b. INSULATION RESISTANCE 100 MEGOHMS MIN. AT 500VDC APPLIED FOR ONE MINUTE MAX. FROM EITHER WINDING TO THE CASE HOUSING.
   - C. MECHANICAL:
     - * (1) LEADS SHALL CONFORM TO MIL-W-16878, TYPE E-30 AND SHALL BE THE COLOR SPECIFIED IN THE WIRING DIAGRAM.
     - (2) UNBALANCE: THE ROTATING ASSEMBLY SHALL BE BALANCED SUCH THAT THE BLOWER, ELASTICALLY SUPPORTED AND OPERATING AT RATED SPEED, WILL HAVE LESS THAN .0005 IN. P-P DISPLACEMENT.
     - (3) TERMINAL PULL (AXIAL), TEST PER MIL-T-55155: 5 POUNDS MINIMUM.
     - (4) BEARING PRELOAD SHALL BE $0.50 {}^{+0.50}_{-0.25}$ LBS.

3. DESIGN REQUIREMENTS:
   - A. BLOWER SHALL BE CAPABLE OF MEETING THE REQUIREMENTS SPECIFIED IN ND1002058. BLOWER MUST OPERATE AT FULL SPEED CONDITION AT 3.0 PSIA MAX. PRESSURE AND 135°F ±5°F AMBIENT TEMPERATURE FOR 96 HRS. WITHOUT FAILURE.
   - B. BLOWER SHALL BE CAPABLE OF MEETING THE REQUIREMENTS OF THIS DRAWING FOR 5000 HRS. OF OPERATION AT 28VRMS ±1% INPUT AND 100°F ±5°F AMBIENT TEMPERATURE.
   - C. THE BLOWER SHALL HAVE A SHELF LIFE OF AT LEAST 5 YRS., WITHOUT OPERATION, AT AMBIENT ROOM TEMP., AFTER FINAL ACCEPTANCE AT THE VENDORS PLANT. PROVISIONS SHOULD BE MADE FOR BEARING REPLACEMENT.
   - D. MATERIAL: HOUSING: ALUMINUM, ANODIZED PER MIL-A-8625 DYED BLACK OR FINISHED WITH BLACK ENAMEL PER MIL-E-5557, TYPE IV.
   - E. SOLDER IN ACCORDANCE WITH ND1002071 PER QQ-S-571 SN10.
   - ** F. POWER FACTOR 0.9 MIN. WHEN OPERATING AS SHOWN IN THE WIRING DIAGRAM.
   - G. BEARINGS: ABEC 7 DOUBLE SHIELDED, .0005-.0008 RADIAL PLAY 440C STAINLESS STEEL, AND LUBRICATED 1/3 FULL WITH GREASE PER 1010870 (BEACON 325).

* ACCEPTANCE TESTS (100%)
** PERIODIC PRODUCTION TESTS



WIRING DIAGRAM



2018602	DL 2018601
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± 3 PLACE DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN Dolski 26 OCT 70
CHECKED 27 OCT 70
APPROVAL A. Lewandowski 28 OCT 70
CONTRACT NAS 9-10356
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BLOWER
SPECIFICATION CONTROL DRAWING

SIZE E
CODE IDENT NO. 80230
2899005
SCALE 2:1
SHEET

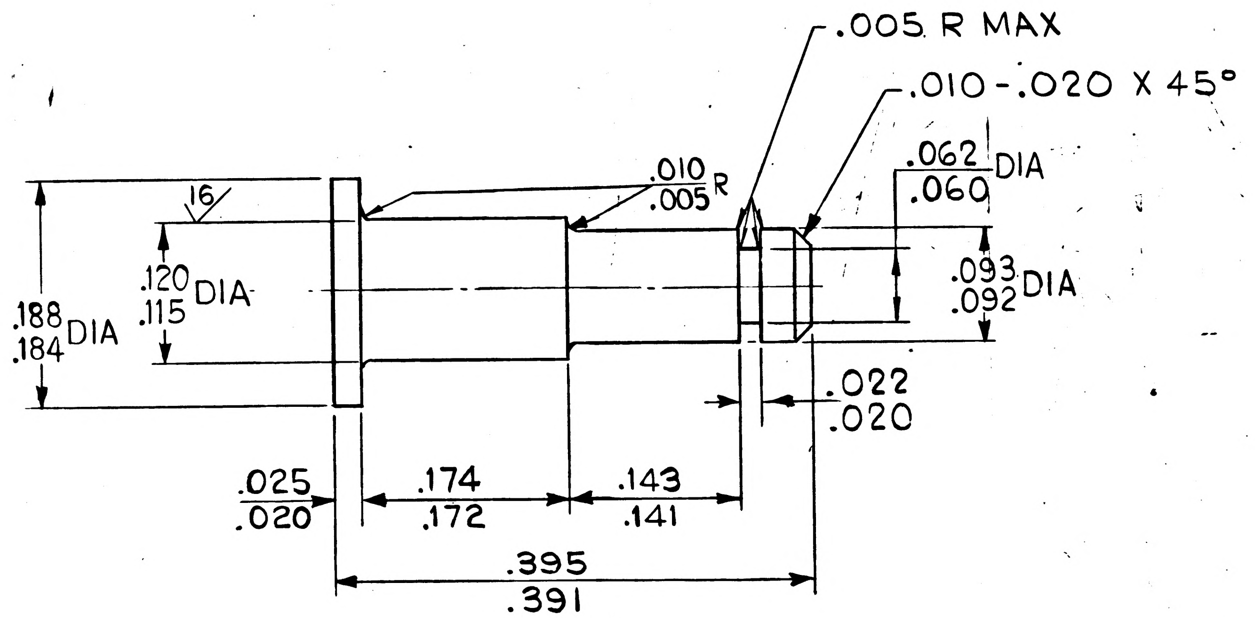
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPD
	A	INITIAL RELEASE CLASS A PER TDRR 38302	4 JAN 71	

NOTICE — WHEN GOVERNMENT DRAWINGS SPECIFICATIONS OR OTHER DATA ARE USED FOR ANY PURPOSE OTHER THAN IN CONNECTION WITH A DEFINITELY RELATED GOVERNMENT PROCUREMENT OPERATION THE UNITED STATES GOVERNMENT THEREBY INCURS NO RESPONSIBILITY NOR ANY OBLIGATION WHATSOEVER AND THE FACT THAT THE GOVERNMENT MAY HAVE FORMULATED FURNISHED OR IN ANY WAY SUPPLIED THE SAID DRAWINGS SPECIFICATIONS OR OTHER DATA IS NOT TO BE REGARDED BY IMPLICATION OR OTHERWISE AS IN ANY MANNER LICENSING THE HOLDER OR ANY OTHER PERSON OR CORPORATION, OR CONVEYING ANY RIGHTS OR PERMISSION TO MANUFACTURE USE OR SELL ANY PATENTED INVENTION THAT MAY IN ANY WAY BE RELATED THERETO

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PER QQ-S-763, CLASS 416, COND A, CF. (.10% MIN CARBON) OR QQ-S-764.
3. HEAT TREAT AFTER MACHINING PER MIL-H-8675 TO RC 37-41
4. FINISH: PER MIL-F-14072 (EL) FIN E-300 (PASSIVATE).
5. UNLESS OTHERWISE SPECIFIED:
   A. SURFACE ROUGHNESS MUST NOT EXCEED 125√.

6. IDENTIFY USING PART NUMBER PER ND 1002019.



		001
SHEET NUMBER	ZONE	DASH NUMBER

THE PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

1021358-021	1021373-041
1021358-011	1021373-031
NEXT ASSY	USED ON
APPLICATION	

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± 3 PLACE DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
APPROVAL Y. Tidson 10 DEC 70

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN J. WOLSKI DATE 9 DEC 70
CHECKED C. Piojda 10 DEC 70
APPROVAL Cat O'Malley 10 DEC 70
CONTRACT NAS 9-10356
NASA APPROVAL Max D. Holly 12-18-70
APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PIN, GROOVED, HEADED

SIZE	CODE IDENT NO.	
C	80230	2899006

SCALE 10:1 SHEET 1 OF 1

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REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPD
	A	INITIAL RELEASE CLASS A PER TDRR 38302	4 JAN 71	
	B	REVISED PER TDRR 38340	15 FEB 7	

NOTES:

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4. FINISH: PER MIL-F-14072 (EL) FIN E-300 (PASSIVATE).
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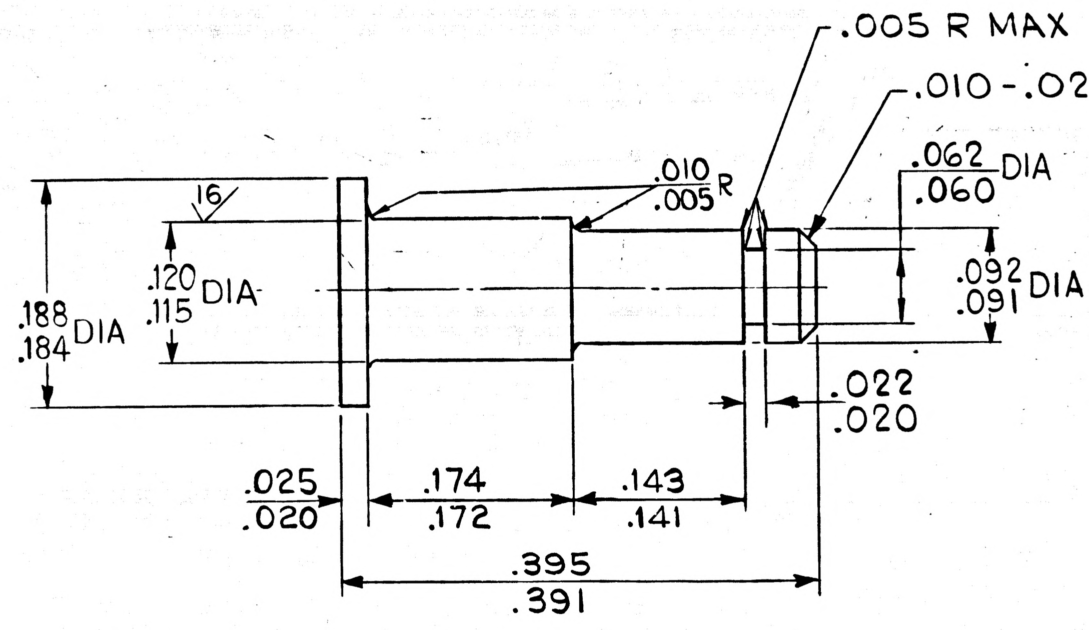

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THE PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

NEXT ASSY	USED ON
1021358-021	1021373-041
1021358-011	1021373-031

APPLICATION

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MATERIAL SEE NOTE 2
APPROVAL G. Fichuon 10 DEC 70

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DRAWN J. WOLSKI DATE 9 DEC 70
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CONTRACT NAS 9-10356
NASA APPROVAL Max D Haley 12-18-70
APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PIN, GROOVED, HEADED

SIZE C
CODE IDENT NO. 80230
2899006
SCALE 10:1
SHEET 1 OF 1

2899950 C

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		REVISED PER MXC-200275		12 FEB 65	FRW / CD
B		REVISED PER MXC-200344		11 MAR 65	FRW / EF
C		UPGRADED TO CLASS A PER TDRR 17811	—	15 MAR 65	J J J

PICTURE INCOMPLETE

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	3		26	2899991	WASHER, SHOULDERED & RECESSED
	6		25	1899971	SPRING-SEAL RETAINING
	1		24	1899997-002	SEAL-PLAIN ENCASED
	1		23	1899997-001	SEAL-PLAIN ENCASED
	1		22	1899996-002	SEAL-PLAIN ENCASED
	1		21	1899996-001	SEAL-PLAIN ENCASED
	24		20	AN960 C 10L	(1897006-019) WASHER, FLAT
	24		19	AN363 C 1032	(1896990-011) NUT, SELF-LOCKING
	1		18	1898952	BELLOWS ASSEMBLY, SXT.
	1		17	1899951	BELLOWS ASSEMBLY, SCT.
	2		16	NAS 674 V 18	BOLT, HEX. CAP
	2		15	2899992	BOLT, IMU MOUNT
	3		14	2899984-001	COLLAR, CENTERING
	6		13	2899979	WASHER - SPRING TENSION
	3		12	2899977-001	WASHER, FLAT, LUBRICATED
SEE NOTE 2	3		11	1010728-3	BOLT, EXTERNAL WRENCHING
	3		9	1899967	BALL, PRECISION
SEE NOTE 2	4		8	1010727-1	BOLT, INTERNAL WRENCHING
	4		7	AN960C616L	(1897006-063) WASHER, FLAT
	2		6	AN960C516L	(1897006-053) WASHER, FLAT
SEE NOTE 2	2		5	1010727-3	BOLT, INTERNAL WRENCHING
	1		4	2899988-011	MOUNTING ASSEMBLY, PLANE
	1		3	2899987-011	MOUNTING ASSEMBLY, LINE
	1		2	2899986-011	MOUNTING ASSEMBLY, FIXED

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 22 OCT 64
CHECKED 2 NOV 64
APPROVAL 2 NOV 64
APPROVAL 2 NOV 64
NASA APPROVAL 11-4-64
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

NAV. BASE, OPTICAL UNIT
AND
BELLOWS INSTALLATION KIT

CODE IDENT NO.
SIZE D
2899950
SCALE —
SHEET 1 OF 1

D 2899950

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
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B		REVISED PER MXC-200344		11 MAR 65	FRW / EF
C		UPGRADED TO CLASS A PER TDRR 17811	—	5 MAR 65	
D		REVISED PER TDRR 20250		26 JUN 65	RH / JAC

PICTURE INCOMPLETE

	QUANTITY REQUIRED							
				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				8		27	MS24671-8	SCREW, CAP-SOCKET HEAD, FLAT
				3		26	2899991	WASHER, SHOULDERED & RECESSED
				~~6~~		~~25~~	~~1899971~~	~~SPRING-SEAL RETAINING~~
SEE NOTE 2				1		24	1010915-2	PACKING, PREFORMED, RETAINED
SEE NOTE 2				1		23	1010915-1	PACKING, PREFORMED, RETAINED
				1		22	1899996-002	SEAL-PLAIN ENCASED
				1		21	1899996-001	SEAL-PLAIN ENCASED
				24		20	AN960C10L	(1897006-019) WASHER, FLAT
				24		19	AN363C1032	(1896990-011) NUT, SELF-LOCKING
				1		18	2898951-011	OPTICS TO SPACECRAFT SEAL ASSY (SXT)
				1		17	2898950-011	OPTICS TO SPACECRAFT SEAL ASSY (SCT)
				2		16	NAS674V18	BOLT, HEX. CAP
				2		15	2899992	BOLT, IMU MOUNT
				3		14	2899984-001	COLLAR, CENTERING
				6		13	2899979	WASHER - SPRING TENSION
				3		12	2899977-001	WASHER, FLAT, LUBRICATED
SEE NOTE 2				3		11	1010728-3	BOLT, EXTERNAL WRENCHING
				3		9	1899967	BALL, PRECISION
SEE NOTE 2				4		8	1010727-1	BOLT, INTERNAL WRENCHING
				4		7	AN960C616L	(1897006-063) WASHER, FLAT
				2		6	AN960C516L	(1897006-053) WASHER, FLAT
SEE NOTE 2				2		5	1010727-3	BOLT, INTERNAL WRENCHING
				1		4	2899988-011	MOUNTING ASSEMBLY, PLANE
				1		3	2899987-011	MOUNTING ASSEMBLY, LINE
				1		2	2899986-011	MOUNTING ASSEMBLY, FIXED

LIST OF PARTS AND MATERIALS

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DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN DATE 22 OCT 64
CHECKED 2 NOV 64
APPROVAL 2 NOV 64
APPROVAL 2 NOV 64
NASA APPROVAL 11-X-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

NAV. BASE, OPTICAL UNIT
AND
BELLOWS INSTALLATION KIT

CODE IDENT NO. 80230
SIZE D
2899950
SCALE —
SHEET 1 OF 1

2899950 E

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC-200275		12 FEB 65	FRW / CP
B		REVISED PER MXC-200344		11 MAR 65	FRW / EF
C		UPGRADED TO CLASS A PER TDRR 17811	—	5 MAR 65	
D		REVISED PER TDRR 20250		26 JUN 65	RH / JAC
E		REVISED PER TDRR 21733	—	20 AUG 65	

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL D-70327.

2. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.

PICTURE INCOMPLETE

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
				8		27	MS24671-8	SCREW, CAP-SOCKET HEAD, FLAT
				3		26	2899991	WASHER, SHOULDERED & RECESSED
				~~6~~		~~25~~	~~1899971~~	~~SPRING - SEAL RETAINING~~
SEE NOTE 2				1		24	1010915-2	PACKING, PREFORMED, RETAINED
SEE NOTE 2				1		23	1010915-1	PACKING, PREFORMED, RETAINED
				1		22	1899996-002	SEAL - PLAIN ENCASED
				1		21	1899996-001	SEAL - PLAIN ENCASED
				24		20	AN960 C 10L	(1897006-019) WASHER, FLAT
				24		19	AN363 C 1032	(1896990-011) NUT, SELF-LOCKING
				1		18	2898951-011	OPTICS TO SPACECRAFT SEAL ASSY (SXT)
				1		17	2898950-011	OPTICS TO SPACECRAFT SEAL ASSY (SCT)
				2		16	NAS 674 V 18	BOLT, HEX. CAP
				2		15	2899992	BOLT, IMU MOUNT
				3		14	2899984-001	COLLAR, CENTERING
				6		13	2899979	WASHER - SPRING TENSION
				3		12	2899977-001	WASHER, FLAT, LUBRICATED
SEE NOTE 2				3		11	1010728-3	BOLT, EXTERNAL WRENCHING
				3		9	1899967-001	BALL, PRECISION
SEE NOTE 2				4		8	1010727-1	BOLT, INTERNAL WRENCHING
				4		7	AN960C616L	(1897006-063) WASHER, FLAT
				2		6	AN960C516L	(1897006-053) WASHER, FLAT
SEE NOTE 2				2		5	1010727-3	BOLT, INTERNAL WRENCHING
				1		4	2899988-011	MOUNTING ASSEMBLY, PLANE
				1		3	2899987-011	MOUNTING ASSEMBLY, LINE
				1		2	2899986-011	MOUNTING ASSEMBLY, FIXED

LIST OF PARTS AND MATERIALS

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DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9 497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN DATE 22 OCT 64
CHECKED C. [illegible] 2 NOV 64
APPROVAL E. [illegible] 2 NOV 64
APPROVAL [illegible] 2 NOV 64
NASA APPROVAL W. J. [illegible] 11-4-64
MIT APPROVAL R. H. [illegible]

MANNED
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NAV. BASE, OPTICAL UNIT
AND
BELLOWS INSTALLATION KIT

CODE IDENT NO. 80230
SIZE D
2899950
SCALE —
SHEET 1 OF 1

F 2899950

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL D-70327.

2. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC-200275		12 FEB 65	FRW / CP
B		REVISED PER MXC-200344		11 MAR 65	FRW
C		UPGRADED TO CLASS A PER TDRR 17811	—	5 MAR 65	J J J
D		REVISED PER TDRR 20250		26 JUN 65	RH / JAC
E		REVISED PER TDRR 21733	—	30 AUG 65	
F		REVISED PER TDRR 29314		7 JUN 66	JIMP

PICTURE INCOMPLETE

	QUANTITY REQUIRED						
	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	4				34	NAS 674 V19	BOLT, HEX CAP
	2				33	2021204	BUSHING, SLEEVING-IMU MOUNT
	6	6			32	1899971	SPRING-SEAL RETAINING
	1	1			31	1899997-002	SEAL, PLAIN ENCASED
	1	1			30	1899997-001	SEAL, PLAIN ENCASED
	1	1			29	1898952	BELLOWS, SEXTANT(INSEP. ASSY)
	1	1			28	1899951	BELLOWS, ASSY, SCT
			8		27	MS24671-8	SCREW, CAP-SOCKET HEAD, FLAT
	3	3	3		26	2899991	WASHER, SHOULDERED & RECESSED
			~~6~~		~~25~~	~~1893971~~	~~SPRING-SEAL RETAINING~~
SEE NOTE 2			1		24	1010915-2	PACKING, PREFORMED, RETAINED
SEE NOTE 2			1		23	1010915-1	PACKING, PREFORMED, RETAINED
	1	1	1		22	1899996-002	SEAL-PLAIN ENCASED
	1	1	1		21	1899996-001	SEAL-PLAIN ENCASED
	24	24	24		20	AN960 C 10L	(1897006-019) WASHER, FLAT
	24	24	24		19	AN363 C 1032	(1896990-011) NUT, SELF-LOCKING
			1		18	2898951-011	OPTICS TO SPACECRAFT SEAL ASSY(SXT)
			1		17	2898950-011	OPTICS TO SPACECRAFT SEAL ASSY(SCT)
	-	2	2		16	NAS 674 V18	BOLT, HEX. CAP
	-	2	2		15	2899992	BOLT, IMU MOUNT
	3	3	3		14	2899984-001	COLLAR, CENTERING
	6	6	6		13	2899979	WASHER - SPRING TENSION
	3	3	3		12	2899977-001	WASHER, FLAT, LUBRICATED
SEE NOTE 2	3	3	3		11	1010728-3	BOLT, EXTERNAL WRENCHING
	3	3	3		9	1899967-001	BALL, PRECISION
SEE NOTE 2	4	4	4		8	1010727-1	BOLT, INTERNAL WRENCHING
	4	4	4		7	AN960C616L	(1897006-063) WASHER, FLAT
	2	2	2		6	AN960C516L	(1897006-053) WASHER, FLAT
SEE NOTE 2	2	2	2		5	1010727-3	BOLT, INTERNAL WRENCHING
	1	1	1		4	2899988-011	MOUNTING ASSEMBLY, PLANE
	1	1	1		3	2899987-011	MOUNTING ASSEMBLY, LINE
	1	1	1		2	2899986-011	MOUNTING ASSEMBLY, FIXED

LIST OF PARTS AND MATERIALS

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CONTRACT NAS 9-497

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN DATE 22 OCT 64
CHECKED C. Hyde 2 NOV 64
APPROVAL 2 NOV. 64
APPROVAL 2 NOV 64
NASA APPROVAL 11-4-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

NAV. BASE, OPTICAL UNIT
AND
BELLOWS INSTALLATION KIT

CODE IDENT NO. 80230
SIZE D
2899950
SCALE —
SHEET 1 OF 1

MIL 10780-P

Ac

2899950 F

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		REVISED PER MXC-200275		12 FEB 65	FRW / CP
B		REVISED PER MXC-200344		11 MAR 65	FRW / EF
C		UPGRADED TO CLASS A PER TDRR 17811	—	15 MAR 65	J J J
D		REVISED PER TDRR 20250		26 JUN 65	RH / JAC
E		REVISED PER TDRR 21733	—	30 AUG 65	
F		REVISED PER TDRR 29314		7 JUN 66	JIM
G		REVISED PER TDRR 31549		21 OCT 66	VE / NW

PICTURE INCOMPLETE

	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	4	4			34	NAS 674 V19	BOLT, HEX CAP
	2	2			33	2021204	BUSHING, SLEEVING-IMU MOUNT
	~~6~~	6			32	1899971	SPRING-SEAL RETAINING
	~~1~~	1			31	1899997-002	SEAL, PLAIN ENCASED
	~~1~~	1			30	1899997-001	SEAL, PLAIN ENCASED
	~~1~~	~~1~~			29	1898952 -	BELLOWS, SEXTANT (INSEP. ASSY)
	~~1~~	~~1~~			28	1899951	BELLOWS, ASSY, SCT
	8		8		27	MS24671-8	SCREW, CAP-SOCKET HEAD, FLAT
	3	3	3		26	2899991	WASHER, SHOULDERED & RECESSED
			~~6~~		~~25~~	~~1899971~~	~~SPRING-SEAL RETAINING~~
SEE NOTE 2	1		1		24	1010915-2	PACKING, PREFORMED, RETAINED
SEE NOTE 2	1		1		23	1010915-1	PACKING, PREFORMED, RETAINED
	1	~~1~~	1		22	1899996-002	SEAL-PLAIN ENCASED
	1	~~1~~	1		21	1899996-001	SEAL PLAIN ENCASED
	24	~~24~~	24		20	AN960 C 10L	(1897006-019) WASHER, FLAT
	24	~~24~~	24		19	AN363 C 1032	(1896990-011) NUT, SELF-LOCKING
	1		1		18	2898951-011	OPTICS TO SPACECRAFT SEAL ASSY (SXT)
	1		1		17	2898950-011	OPTICS TO SPACECRAFT SEAL ASSY (SCT)
	-	~~2~~	2		16	NAS 674 V18	BOLT, HEX. CAP
	-	~~2~~	2		15	2899992	BOLT, IMU MOUNT
	3	3	3		14	2899984-001	COLLAR, CENTERING
	6	6	6		13	2899979	WASHER - SPRING TENSION
	3	3	3		12	2899977-001	WASHER, FLAT, LUBRICATED
SEE NOTE 2	3	3	3		11	1010728-3	BOLT, EXTERNAL WRENCHING
	3	3	3		9	1899967-001	BALL, PRECISION
SEE NOTE 2	4	4	4		8	1010727-1	BOLT, INTERNAL WRENCHING
	4	4	4		7	AN960C616L	(1897006-063) WASHER, FLAT
	2	2	2		6	AN960C516L	(1897006-053) WASHER, FLAT
SEE NOTE 2	2	2	2		5	1010727-3	BOLT, INTERNAL WRENCHING
	1	1	1		4	2899988-011	MOUNTING ASSEMBLY, PLANE
	1	1	1		3	2899987-011	MOUNTING ASSEMBLY, LINE
	1	1	1		2	2899986-011	MOUNTING ASSEMBLY, FIXED

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE 22 OCT 64
CHECKED C. Pyrde 2 NOV 64
APPROVAL 2 NOV 64
APPROVAL 2 NOV 64
NASA APPROVAL 11-4-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

NAV. BASE, OPTICAL UNIT
AND
BELLOWS INSTALLATION KIT

CODE IDENT NO. 80230
SIZE D
2899950
SCALE —
SHEET 1 OF 1

2899950

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.

PICTURE INCOMPLETE

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 **DATE**

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	2		16	NAS 674-18	BOLT, HEX. CAP
	2		15	2899992	BOLT, IMU MOUNT
	3		14	2899984-001	COLLAR, CENTERING
	6		13	2899979	WASHER - SPRING TENSION
	3		12	2899977-001	WASHER, FLAT, LUBRICATED
SEE NOTE 2	3		11	1010732-014	BOLT, EXTERNAL WRENCHING
	1		10	1011000	OPTICAL UNIT
	3		9	1899967	BALL, PRECISION
SEE NOTE 2	4		8	1010727-1	BOLT, INTERNAL WRENCHING
	4		7	AN960C616L	(1897006-063) WASHER, FLAT
	2		6	AN960C516L	(1897006-053) WASHER, FLAT
SEE NOTE 2	2		5	1010727-3	BOLT, INTERNAL WRENCHING
	1		4	2899988-011	MOUNTING ASSEMBLY, PLANE
	1		3	2899987-011	MOUNTING ASSEMBLY, LINE
	1		2	2899986-011	MOUNTING ASSEMBLY, FIXED
	1		1	2899982-011	NAVIGATION BASE ASSEMBLY

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 22 OCT 64
CHECKED 2 NOV 64
APPROVAL 2 NOV. 64
APPROVAL 2 NOV 64
NASA APPROVAL 11-4-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

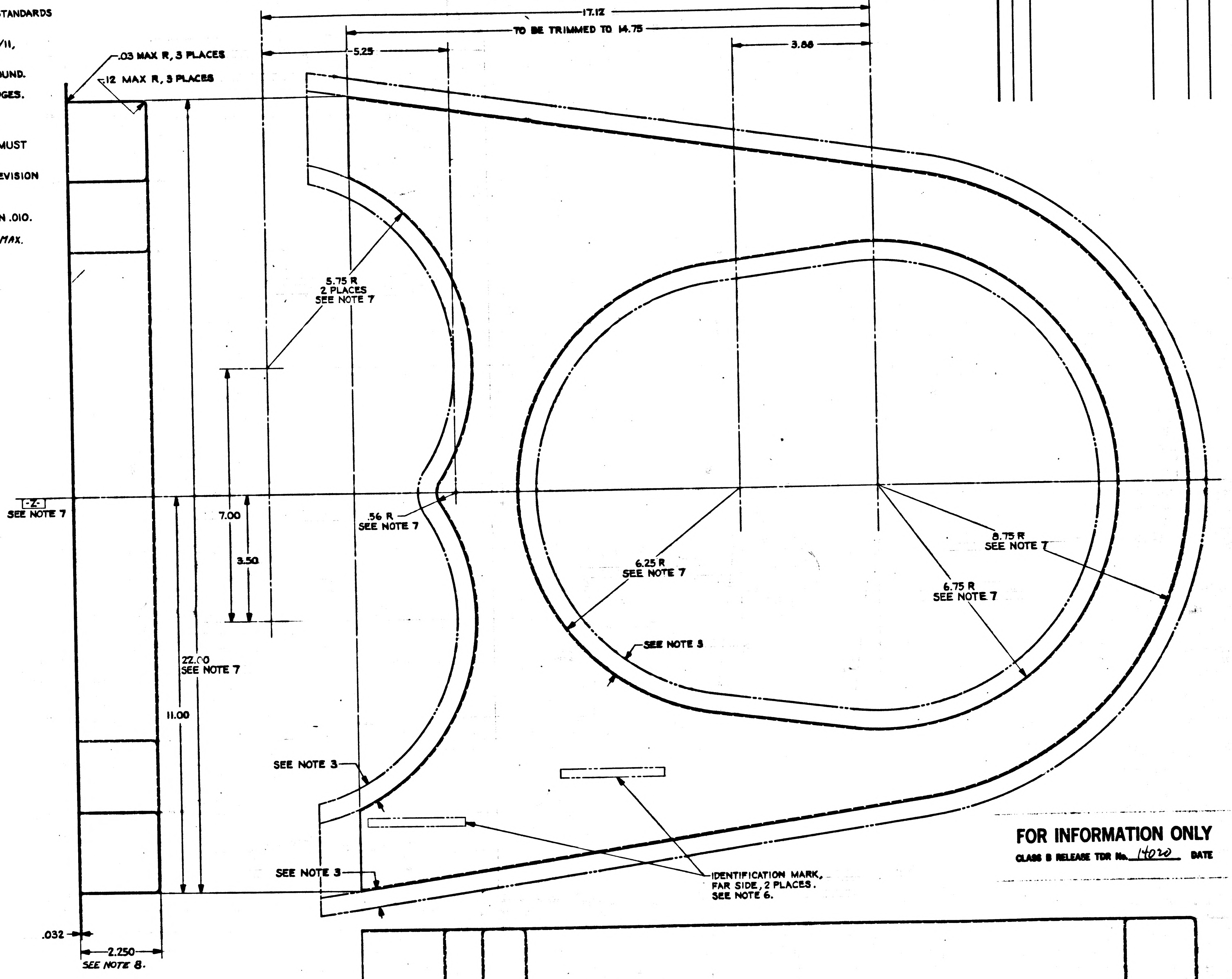
NAVIGATION BASE AND OPTICAL UNIT ASSEMBLY - BLOCK II

CODE IDENT NO. SIZE D 2899950
SCALE —
SHEET 1 OF 1

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPD.
		CHG NO.		

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY PER QQ-A-250/11, TEMPER T6 (TYPE 6061, ES-2106).
3. FLANGE WIDTH TO BE .12 MINIMUM ALL AROUND.
4. MUST BE FREE FROM BURRS AND SHARP EDGES.
5. UNLESS OTHERWISE SPECIFIED:
   - a. SURFACE ROUGHNESS TO BE AS ROLLED OR DRAWN.
   - b. PUNCHED, CUT OR MACHINED SURFACES MUST NOT EXCEED 63√.
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND1002019.
7. ALL DIMENSIONS INDICATED ARE TO BE SYMMETRICAL ABOUT DATUM -Z- WITHIN .010.
8. *DIMENSION TO BE MAINTAINED WITH 3 PSI. MAX. APPLIED TO FLAT SURFACES.*


17.12
TO BE TRIMMED TO 14.75
5.25
3.88
.03 MAX R, 3 PLACES
.12 MAX R, 3 PLACES
5.75 R
2 PLACES
SEE NOTE 7
7.00
3.50
.56 R
SEE NOTE 7
-Z-
SEE NOTE 7
22.00
SEE NOTE 7
11.00
6.25 R
SEE NOTE 7
8.75 R
SEE NOTE 7
6.75 R
SEE NOTE 7
SEE NOTE 3
SEE NOTE 3
SEE NOTE 3
IDENTIFICATION MARK,
FAR SIDE, 2 PLACES.
SEE NOTE 6.
.032
2.250
SEE NOTE 8.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 DATE

2899955

MASTER

2899981	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.02	±1°
—	±.005	

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN C. Berg 25 AUG 64 DATE
CHECKED C. Pizzida 26 OCT 64
APPROVAL E. Lambert 26 OCT 64
APPROVAL 27 OCT 64
NASA APPROVAL 11-6-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BLANK, FORMED,
NAVIGATION BASE

CODE IDENT NO. SIZE E 2899955

SCALE 1:1 SHEET 1 OF 1

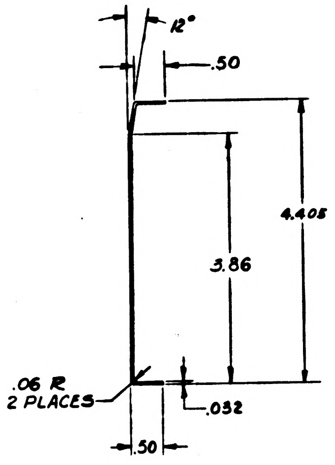
Charleston 26 OCT 64

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY PER QQ-A-250/11, TEMPER T6, (TYPE 6061-T6 ES-2106).
3. MUST BE FREE FROM BURRS AND SHARP CORNERS.
4. WELD PER MIL-W-6858, CLASS B, GROUP A.
5. ADHESIVE TO BE APPLIED TO ALL RIVETED JOINTS PRIOR TO RIVETING AND CURED PER ND-1002254.
6. IDENTIFY USING DRAWING NO. AND REVISION LETTER PER ND-1002019.
7. DIMENSION TO BE DETERMINED BY MATING PART AT NEXT HIGHER ASSEMBLY.
8. ALL RIVET SPACING TOLERANCES TO BE NON-CUMULATIVE. RIVET STEMS SHALL NOT PROTRUDE BEYOND RIVET HEAD BY MORE THAN .03 MAX.
9. FOAM FILL THE ASSEMBLY THRU .50 DIA HOLE USING ITEMS 7 & 8 PER ND , SO THAT AN AVERAGE CURED FOAM DENSITY OF 3.5 TO 4.0 LBS/CUBIC FOOT IS OBTAINED.
10. ANODIZE ALL PIECEPARTS AFTER FITUP AND LESS THAN THAN 8 HOURS PRIOR TO BONDING. SPOTWELD AREAS TO BE FREE OF ANODIZE. ANODIZE PER MIL-A-8625, TYPE I (ES-385).

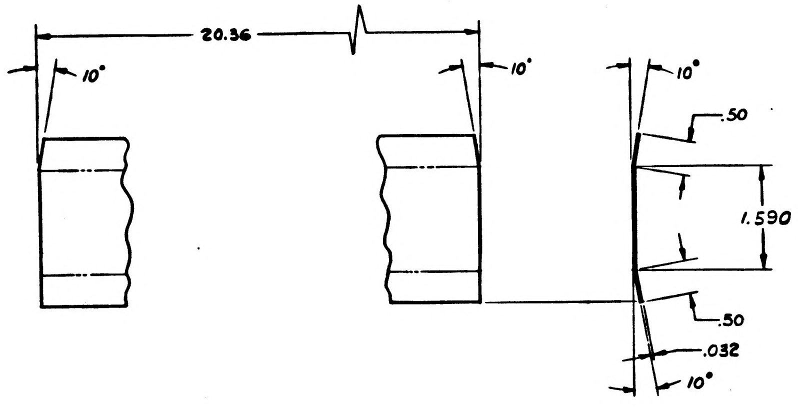
REVISIONS 14020

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
B		UPGRADED TO CLASS A PER TDRR 17027		1 MAR 65	S.U.



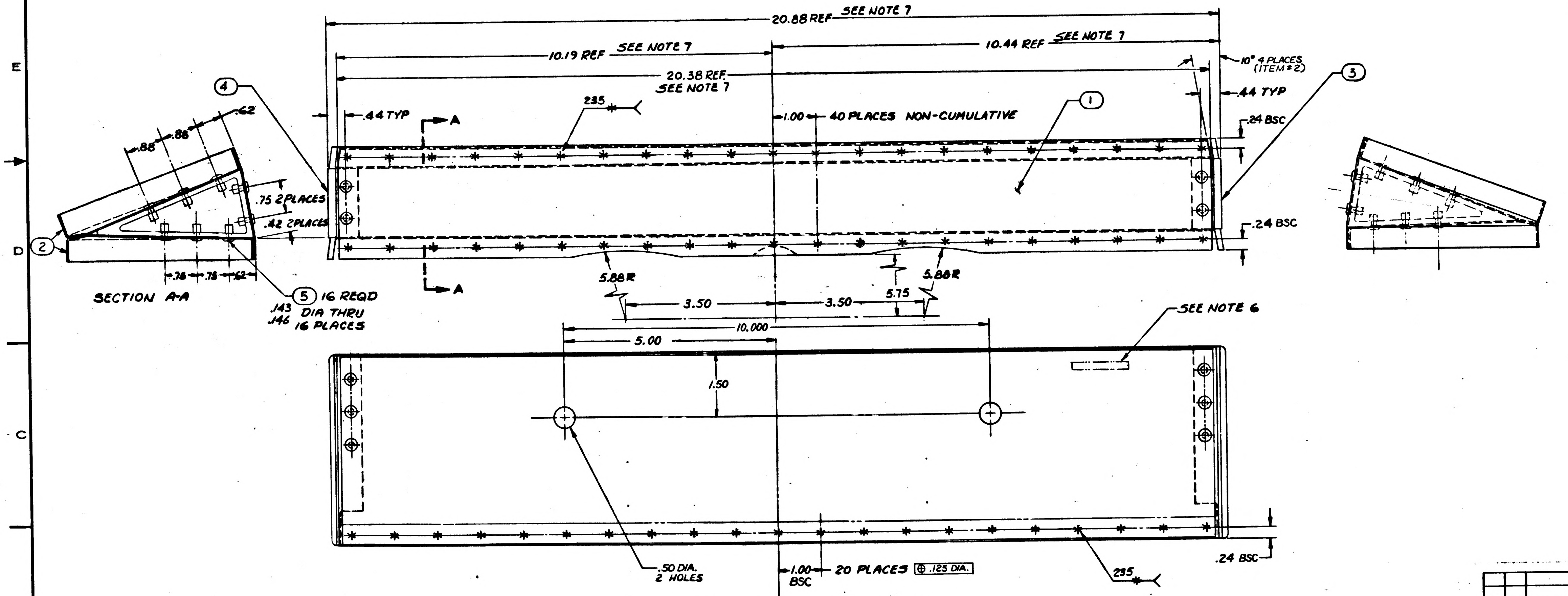
12°
.50
4.405
3.86
.06 R
2 PLACES
.032
.50

DETAIL OF ITEM 2

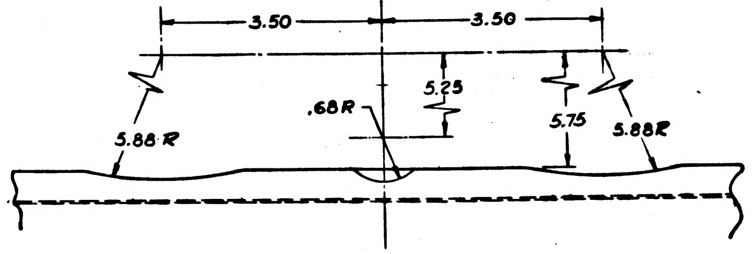


20.36
10°
10°
10°
.50
1.590
.50
.032
10°

DETAIL OF ITEM 1



20.88 REF SEE NOTE 7
10.19 REF SEE NOTE 7
10.44 REF SEE NOTE 7
20.38 REF. SEE NOTE 7
10° 4 PLACES (ITEM #2)
.44 TYP
.44 TYP
A
A
235
1.00
40 PLACES NON-CUMULATIVE
.24 BSC
.24 BSC
1
3
4
2
5
16 REQD
.88
.88
.62
.75 2 PLACES
.42 2 PLACES
.75
.75
.62
SECTION A-A
.143
.146
DIA THRU
16 PLACES
5.88 R
5.88 R
3.50
3.50
5.75
10.000
5.00
SEE NOTE 6
1.50
.50 DIA.
2 HOLES
1.00 BSC
20 PLACES
.125 DIA.
235
.24 BSC



3.50
3.50
5.25
.68 R
5.75
5.88 R
5.88 R

SEE NOTE 5

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
8	AR	1010864	PREPOLYMER, POLYURETHANE
7	AR	1010863	RESIN, POLYURETHANE
6	AR	1010877	ADHESIVE (EC-2186)
5	16	1010868-3	RIVET-BLIND, UNIVERSAL HEAD
4	1	2899958	END PLATE - LEFT HAND
3	1	2899957	END PLATE - RIGHT HAND
2	2	2899956-002	SIDE PLATE SEE NOTE 2
1	1	2899956-001	BOTTOM PLATE SEE NOTE 2

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2899981	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — −
DECIMALS ±.02 ±.005
ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN [illegible] DATE 18 OCT 64
CHECKED C. Pizzo 26 OCT 64
APPROVAL E. Lambert 26 OCT 64
APPROVAL [illegible] 27 OCT 64
NASA APPROVAL W. J. Rhine 11-4-64
MIT APPROVAL R. H. Brown W. Kuyper 4 Nov 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BEAM, TRIANGULAR
(INSEPARABLE ASSEMBLY)

CODE IDENT NO.
SIZE E
2899956
SCALE 1:1
SHEET 1 OF 1

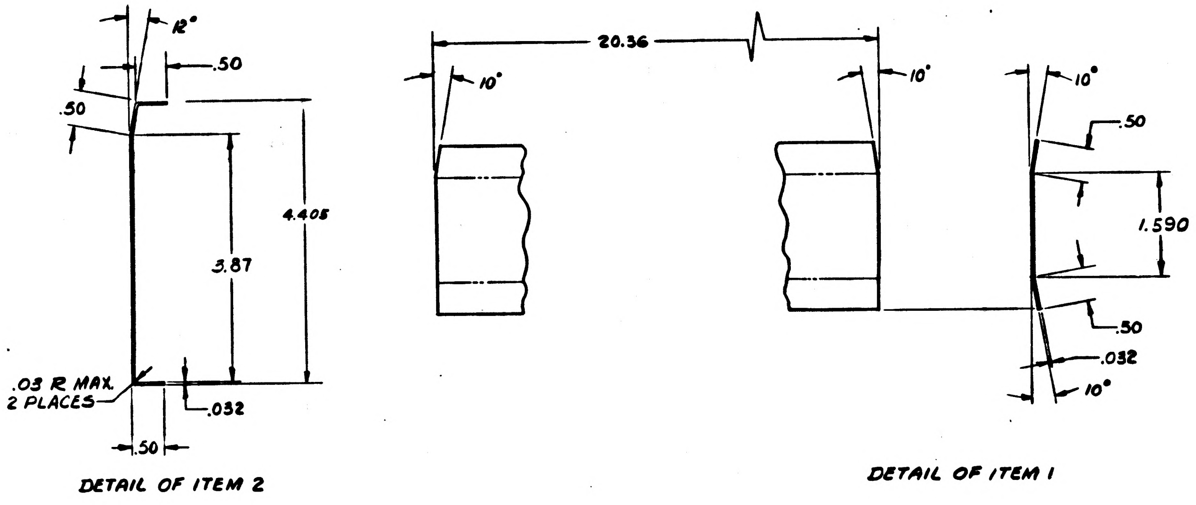
Charleson 26 OCT 64

2899956 B

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY PER QQ-A-250/11, TEMPER T6, (TYPE 6061-T6 ES-2106).
3. MUST BE FREE FROM BURRS AND SHARP CORNERS.
4. WELD PER MIL-W-6858, CLASS B, GROUP A.
5. ADHESIVE TO BE APPLIED TO ALL RIVETED JOINTS PRIOR TO RIVETING AND CURED PER ND.
6. IDENTIFY USING DRAWING NO. AND REVISION LETTER PER ND-1002019.
7. DIMENSION TO BE DETERMINED BY MATING PART AT NEXT HIGHER ASSEMBLY.
8. ALL RIVET SPACING TOLERANCES TO BE NON-CUMULATIVE. RIVET STEMS SHALL NOT PROTRUDE BEYOND RIVET HEAD BY MORE THAN .03 MAX.
9. FOAM FILL THE ASSEMBLY THRU .50 DIA HOLE USING ITEMS 7 & 8 PER ND , SO THAT AN AVERAGE CURED FOAM DENSITY OF 3.5 TO 4.0 LBS/CUBIC FOOT IS OBTAINED.

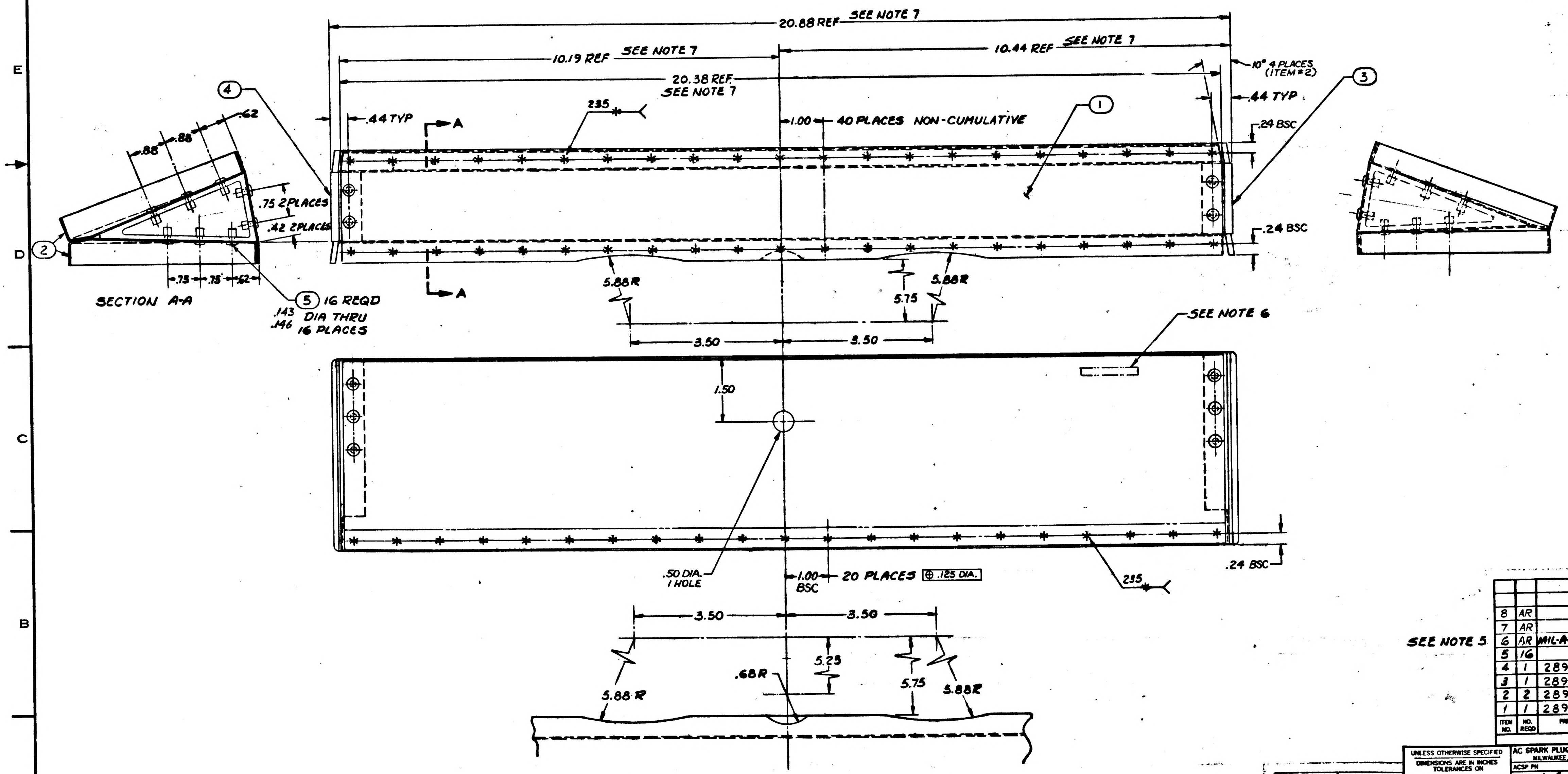

12°
.50
.50
4.408
3.87
.03 R MAX.
2 PLACES
.032
.50
20.36
10°
10°
10°
.50
1.590
.50
.032
10°

DETAIL OF ITEM 2

DETAIL OF ITEM 1

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 DATE


20.88 REF SEE NOTE 7
10.19 REF SEE NOTE 7
10.44 REF SEE NOTE 7
20.38 REF SEE NOTE 7
10° 4 PLACES (ITEM #2)
.44 TYP
.44 TYP
.24 BSC
.24 BSC
235
1.00 40 PLACES NON-CUMULATIVE
④
①
③
②
.88
.88
.62
.75 2 PLACES
.42 2 PLACES
.75
.75
.62
A
A
5.88 R
5.75
5.88 R
3.50
3.50
SEE NOTE 6
1.50
.50 DIA. 1 HOLE
1.00 BSC
20 PLACES ⊕ .125 DIA.
235
.24 BSC
3.50
3.50
5.25
.68 R
5.75
5.88 R
5.88 R

SECTION A-A

⑤ 16 REQD

.143 .146 DIA THRU 16 PLACES

SEE NOTE 5

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
8	AR		PREPOLYMER, POLYURETHANE
7	AR		RESIN, POLYURETHANE
6	AR	MIL-A-5090 TYPE I	ADHESIVE (EC-2126)
5	16		RIVET-BLIND, PROTRUDING HD
4	1	2899958	END PLATE - LEFT HAND
3	1	2899957	END PLATE - RIGHT HAND
2	2	2899956-002	SIDE PLATE SEE NOTE 2
1	1	2899956-001	BOTTOM PLATE SEE NOTE 2

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2899981	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — − DECIMALS ±.02 ±.005 ANGLES + − 1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN 13 OCT 64 DATE
CHECKED C. Pizzo 26 OCT 64
APPROVAL E. Lambert 26 OCT 64
APPROVAL 27 OCT 64
NASA APPROVAL 11-4-64
MIT APPROVAL 11 Nov 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BEAM, TRIANGULAR
(INSEPARABLE ASSEMBLY)

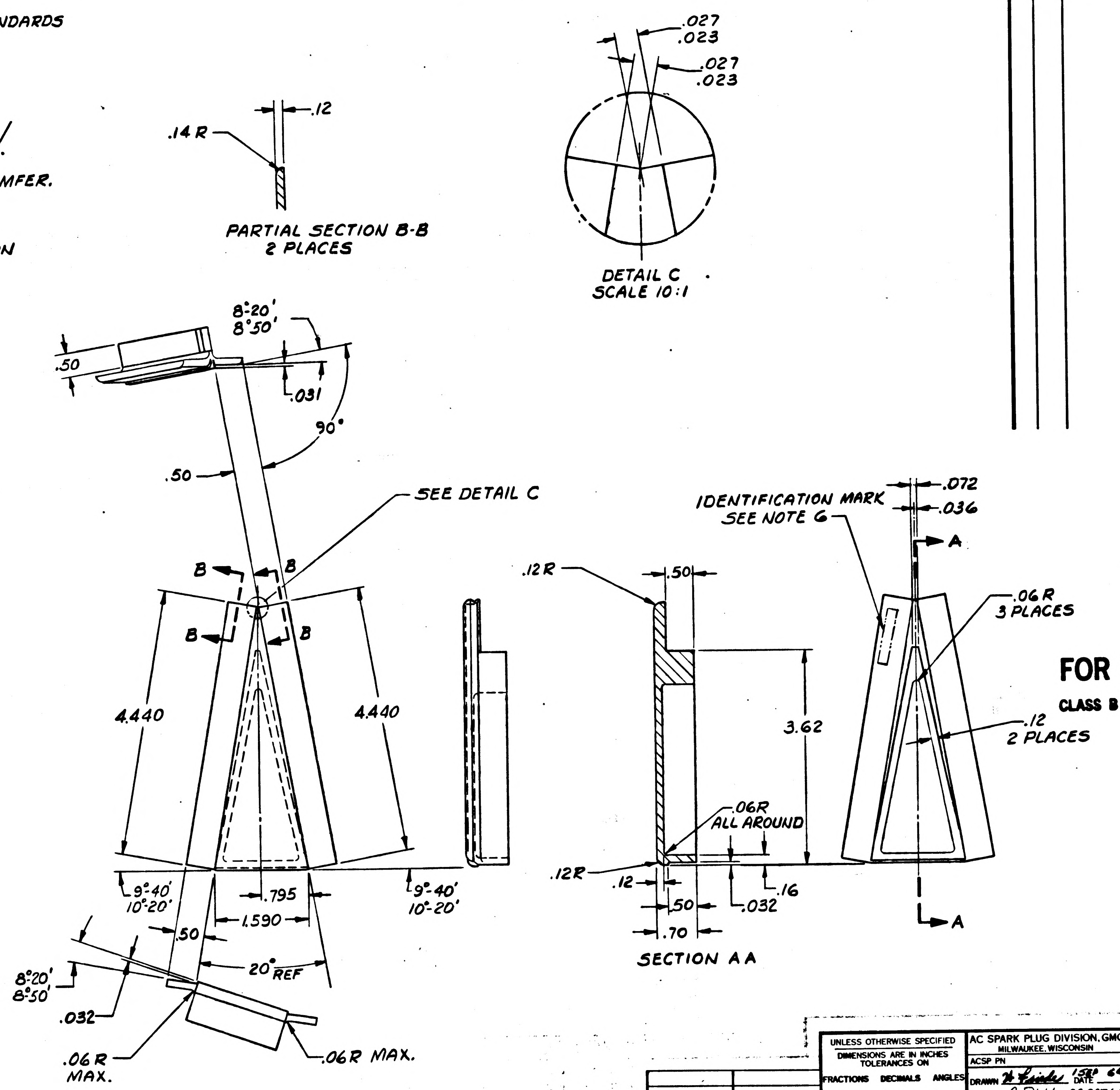
CODE IDENT NO. SIZE E 2899956
SCALE 1:1 SHEET 1 OF 1

2899956

2899957

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: QQ-A-250/4, TEMPER T-4, AL ALLOY TYPE 2024 (ES 2104 TYPE 2024).
3. UNLESS OTHERWISE SPECIFIED:
   a. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
   b. ALL CORNERS MUST BE .005 TO .015 R OR CHAMFER.
4. MUST BE FREE FROM BURRS.
5. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.


.14 R
.12
PARTIAL SECTION B-B
2 PLACES
.027
.023
.027
.023
DETAIL C
SCALE 10:1
8°20'
8°50'
.50
.031
90°
.50
SEE DETAIL C
B
B
B
B
4.440
4.440
9°40'
10°20'
9°40'
10°20'
.795
1.590
.50
20° REF
8°20'
8°50'
.032
.06 R MAX.
.06R MAX.
.12R
.50
3.62
.06R ALL AROUND
.12R
.12
.50
.70
.16
.032
SECTION AA
IDENTIFICATION MARK SEE NOTE 6
.072
.036
A
A
.06R 3 PLACES
.12 2 PLACES

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 DATE

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

2899956	2899950-011	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + — − DECIMALS ±.02 ±.005 ANGLES +− 1° DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN H. Fiskke DATE 15 SEP 64 CHECKED C. Pizzida 20 OCT 64 APPROVAL E. Lyndon 26 OCT 64 APPROVAL J. Densley 27 OCT 64	MANNED SPACECRAFT CENTER HOUSTON, TEXAS END PLATE, RIGHT HAND
NEXT ASSY	USED ON	MATERIAL SEE NOTE 2	NASA APPROVAL 11-4-64 R.W. Snas	CODE IDENT NO. — SIZE D — 2899957
APPLICATION		CONTRACT NAS 9-497	MIT APPROVAL	SCALE 1:1 — SHEET 1 OF 1

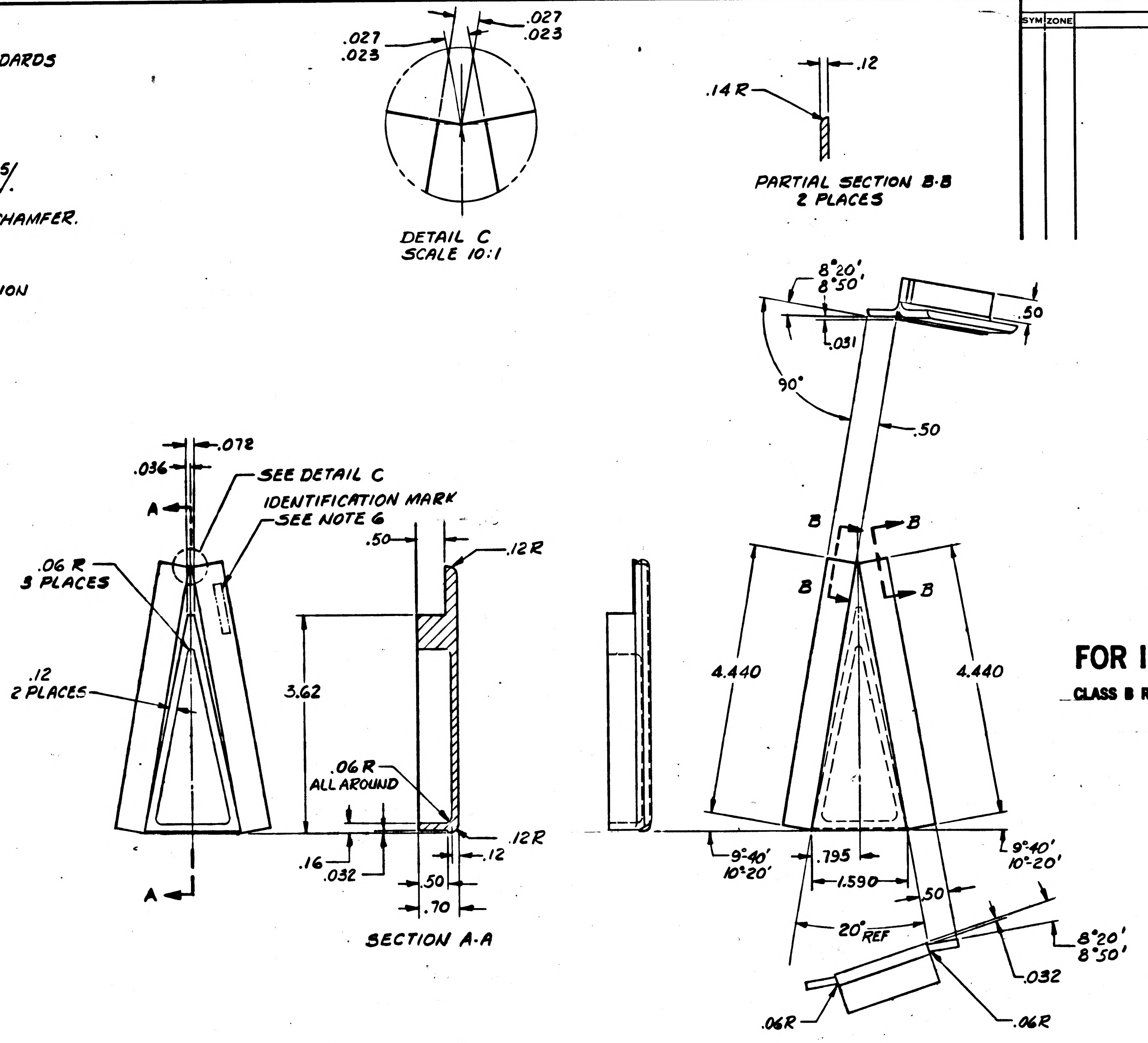
3 Charleston 26 OCT 64

NOTES:

1. INTREPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: QQ-A-250/4, TEMPER T-4, AL ALLOY (ES-2104 TYPE 2024).
3. UNLESS OTHERWISE SPECIFIED:
   a. SURFACE ROUGHNESS MUST NOT EXCEED $\sqrt[125]{}$.
   b. ALL CORNERS MUST BE .005 TO .015 R OR CHAMFER.
4. MUST BE FREE FROM BURRS.
5. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.


.027
.023
.027
.023
DETAIL C
SCALE 10:1
.14 R
.12
PARTIAL SECTION B-B
2 PLACES
8°20'
8°50'
.031
.50
90°
.50
B
B
B
B
.072
.036
SEE DETAIL C
IDENTIFICATION MARK
SEE NOTE 6
A
A
.06 R
3 PLACES
.12
2 PLACES
.50
.12R
3.62
.06 R
ALL AROUND
.12R
.16
.032
.12
.50
.70
SECTION A-A
4.440
4.440
9°40'
10°20'
.795
1.590
9°40'
10°20'
.50
20° REF
8°20'
8°50'
.032
.06R
.06R

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 DATE

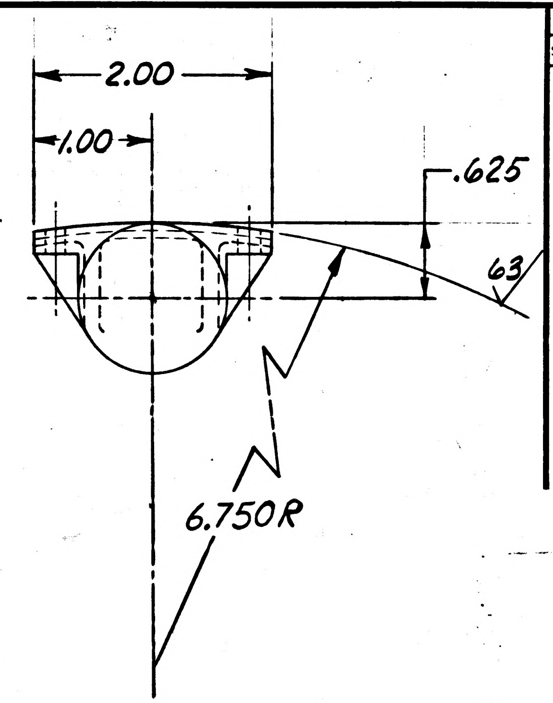
MASTER

2899956	2899950-011	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + — DECIMALS ±.02 ±.005 ANGLES ± 1° DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN H. Snider DATE 1 SEP 64 CHECKED C. Pinda 20 OCT 64 APPROVAL E. Lambert 26 OCT 64 APPROVAL A. Hensley 27 OCT 64	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	END PLATE, LEFT HAND
NEXT ASSY	USED ON	MATERIAL SEE NOTE 2	NASA APPROVAL 11-4-64 MIT APPROVAL 4 Nov 64	CODE IDENT NO.	SIZE D 2899958
APPLICATION		CONTRACT NAS 9-497		SCALE 1:1	SHEET 1 OF 1

Charleston 26 Oct 64

NOTES:

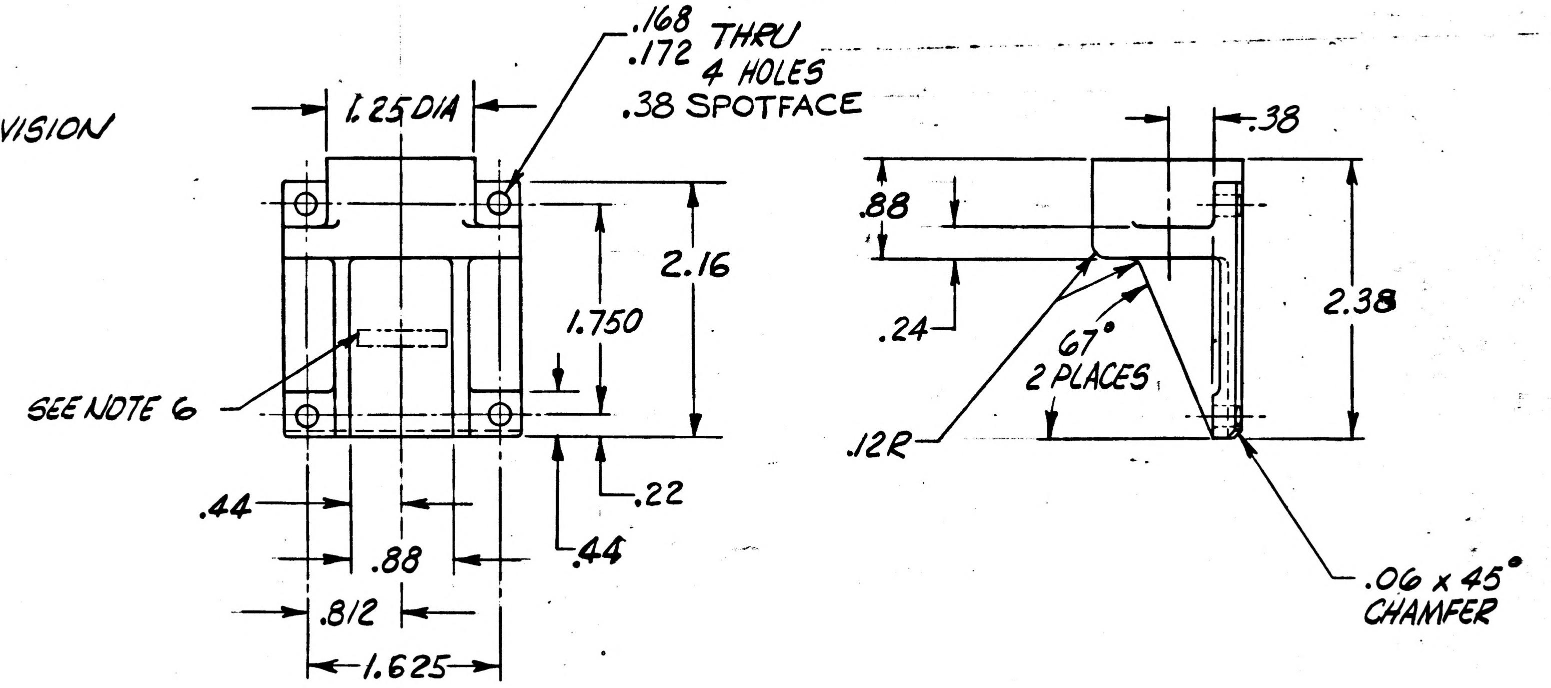
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PRECISION CAST PER MIL-C-11856 USING COMPOSITION 2 (356) TEMPER T6
3. INSPECT PER MIL-C-6021, CLASS IA, GRADE B.
4. UNLESS OTHERWISE SPECIFIED:
   - a. ALL CAST RADII TO BE .06.
   - b. ALL CAST RIBS AND WALL THICKNESS TO BE .12 THICK.
   - c. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
   - .ALL CORNERS MUST BE .005 TO .015 R OR CHAMFER.
5. MUST BE FREE FROM BURRS.
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND-1002019.


2.00
1.00
.625
63
6.750R

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 **DATE**


1.25 DIA
.168
.172 THRU
4 HOLES
.38 SPOTFACE
2.16
1.750
SEE NOTE 6
.44
.22
.88
.44
.812
1.625
.38
.88
.24
2.38
67°
2 PLACES
.12R
.06 x 45°
CHAMFER

2899981	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — DECIMALS ±.02 ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN 3 SEP 64 DATE
CHECKED C. Pioda 20 OCT 64
APPROVAL E. Lemkuil 26 OCT 64
APPROVAL 27 OCT 64
NASA APPROVAL 11-4-64
MIT APPROVAL
Charleston 26 OC 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BRACKET, SUPPORT, REAR

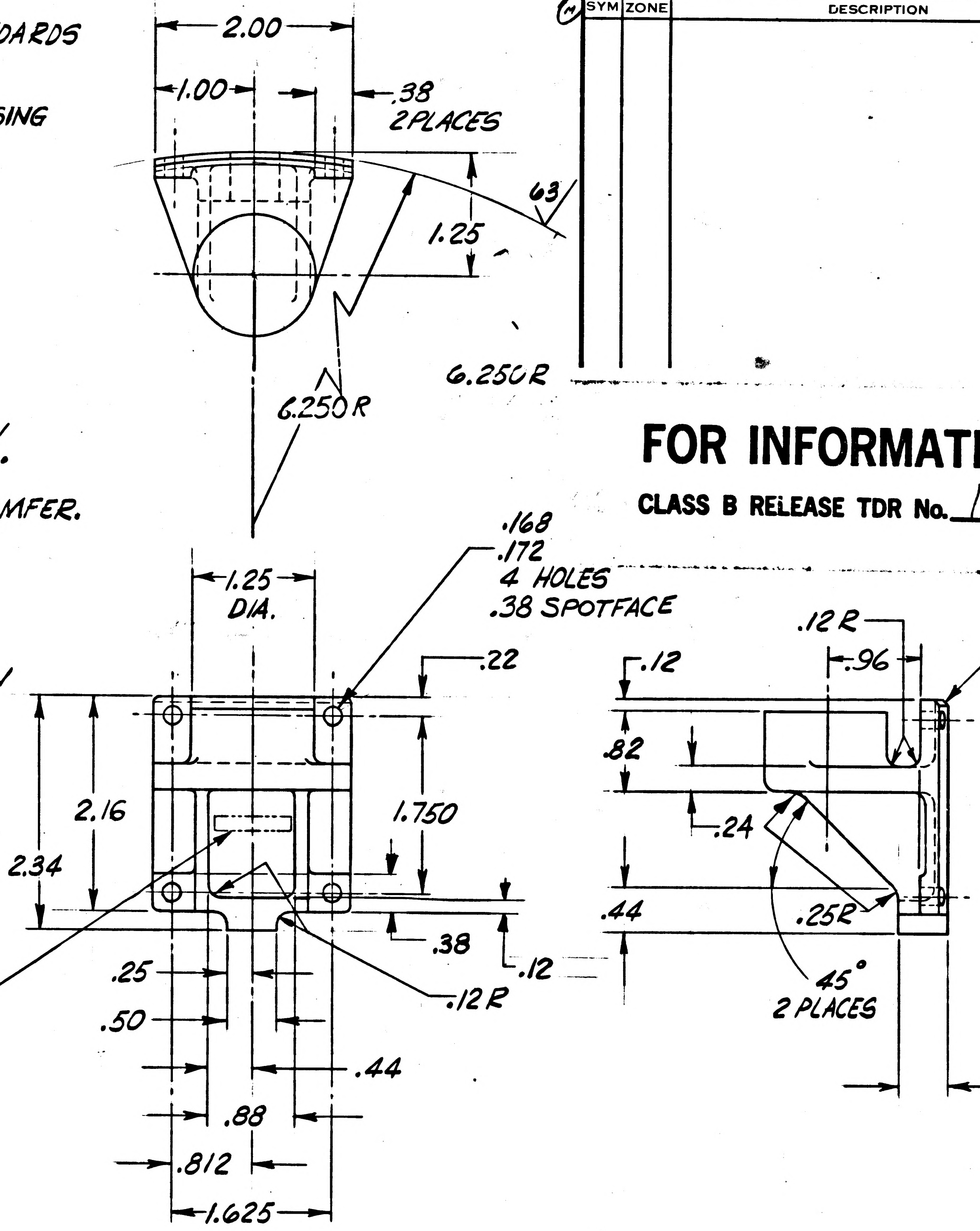
CODE IDENT NO.
SIZE C
2899959
SCALE 1:1
SHEET 1 OF 1

MIL 1077C—P

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PRECISION CAST PER MIL-C-11866 USING COMPOSITION 2 (356) TEMPER T6
3. INSPECT PER MIL-C-6021, CLASS 1A, GRADE B.
4. UNLESS OTHERWISE SPECIFIED:
    a. ALL CAST RADII TO BE .06.
    b. ALL CAST RIBS TO BE .12 THICK.
    c. SURFACE ROUGHNESS MUST NOT EXCEED 125/.
    d. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
5. MUST BE FREE FROM BURRS.
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND-1002019.



2.00
1.00
.38
2 PLACES
63/
1.25
6.250 R
6.250 R
1.25
DIA.
.168
.172
4 HOLES
.38 SPOTFACE
.22
2.16
2.34
1.750
.38
.12
.12 R
SEE NOTE 6
.25
.50
.44
.88
.812
1.625
.12 R
.96
.06 x 45°
CHAMFER
.12
.82
.24
.44
.25 R
45°
2 PLACES
.50

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

REVISIONS

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 1402 **DATE**

NEXT ASSY	USED ON
2899981	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.02 ±.005	±2°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN
DRAWN John A. Spudnoski DATE 2 SEP 64
CHECKED C. Piojda 20 OCT 64
APPROVAL E. Lenhil 26 OCT 64
APPROVAL D. Hensley 27 OCT 64
NASA APPROVAL W J Rhine
R.M. Gras
MIT APPROVAL
Charleston 26 OCT 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BRACKET, SUPPORT, FORWARD

CODE IDENT NO.
SIZE C
2899960
SCALE 1:1
SHEET 1 OF 1

2899960

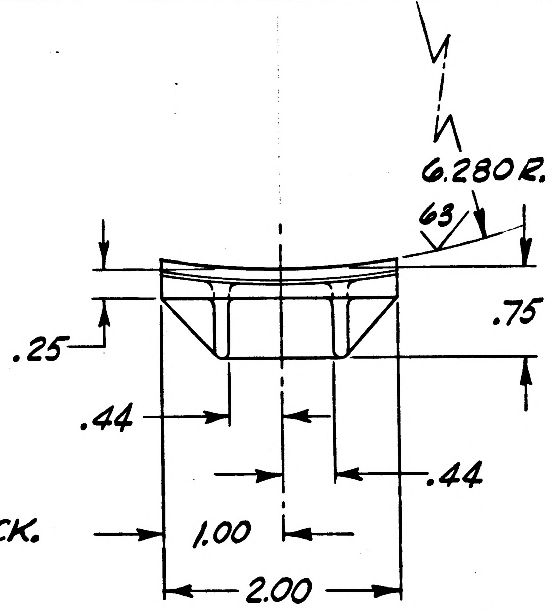
MIL 1077C-P

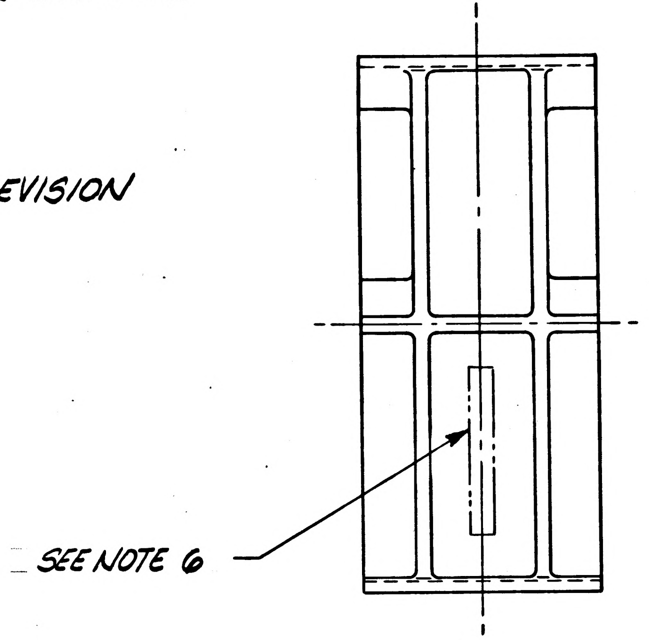
INCHES
0 1 2

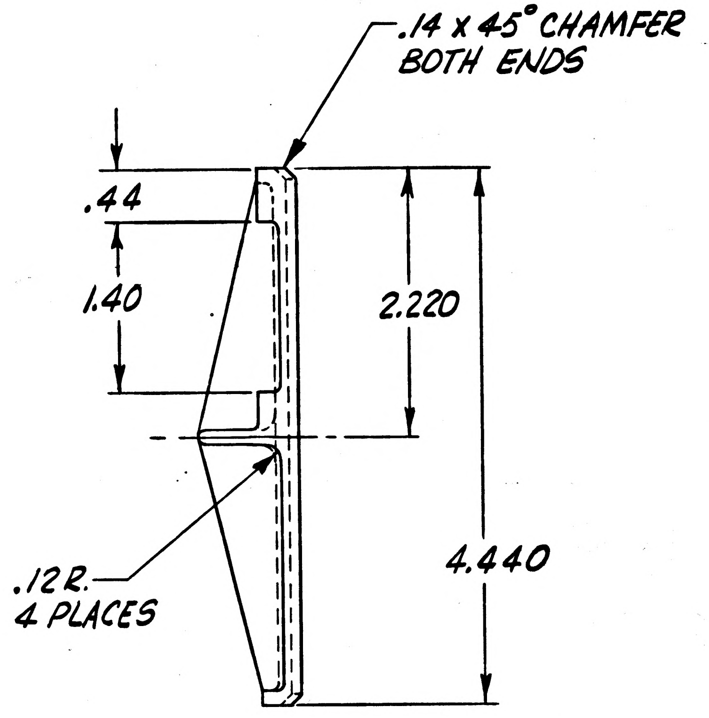
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PRECISION CAST PER MIL-C-11866 USING COMPOSITION 2(356) TEMPER T6.
3. INSPECT PER MIL-C-6021, CLASS 1A, GRADE B.
4. UNLESS OTHERWISE SPECIFIED:
   - a. ALL CAST RADII TO BE .06.
   - b. ALL CAST RIBS AND WALL THICKNESS TO BE .12 THICK.
   - c. SURFACE ROUGHNESS MUST NOT EXCEED 125/
   - d. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
5. MUST BE FREE FROM BURRS.
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.







FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 140W **DATE**

2899981	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.02 ±.005	± 2°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN 28 AUG 64 DATE
CHECKED C. Pioda 20 OCT 64
APPROVAL E. Lenkuil 26 OCT 64
APPROVAL 27 OCT 64
NASA APPROVAL 11-4-64
MIT APPROVAL R.W. Gras 4 Nov 64
Charleston 26 Oct. 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BRACKET, REINFORCING
FRONT

CODE IDENT NO. SIZE C 2899961

SCALE FULL SHEET 1 OF 1

MIL 1077C-P

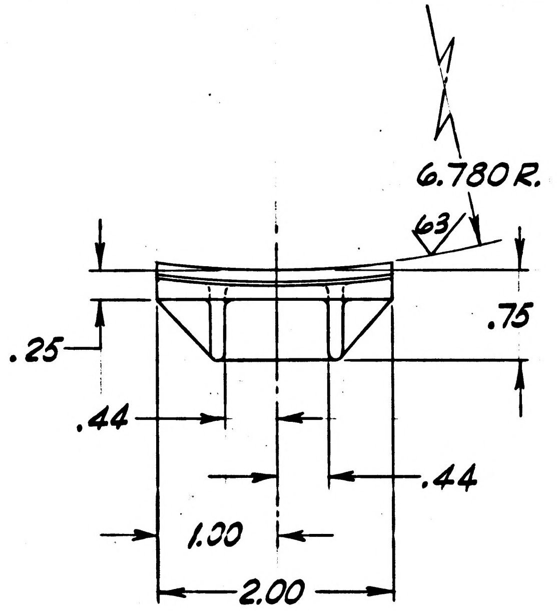
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

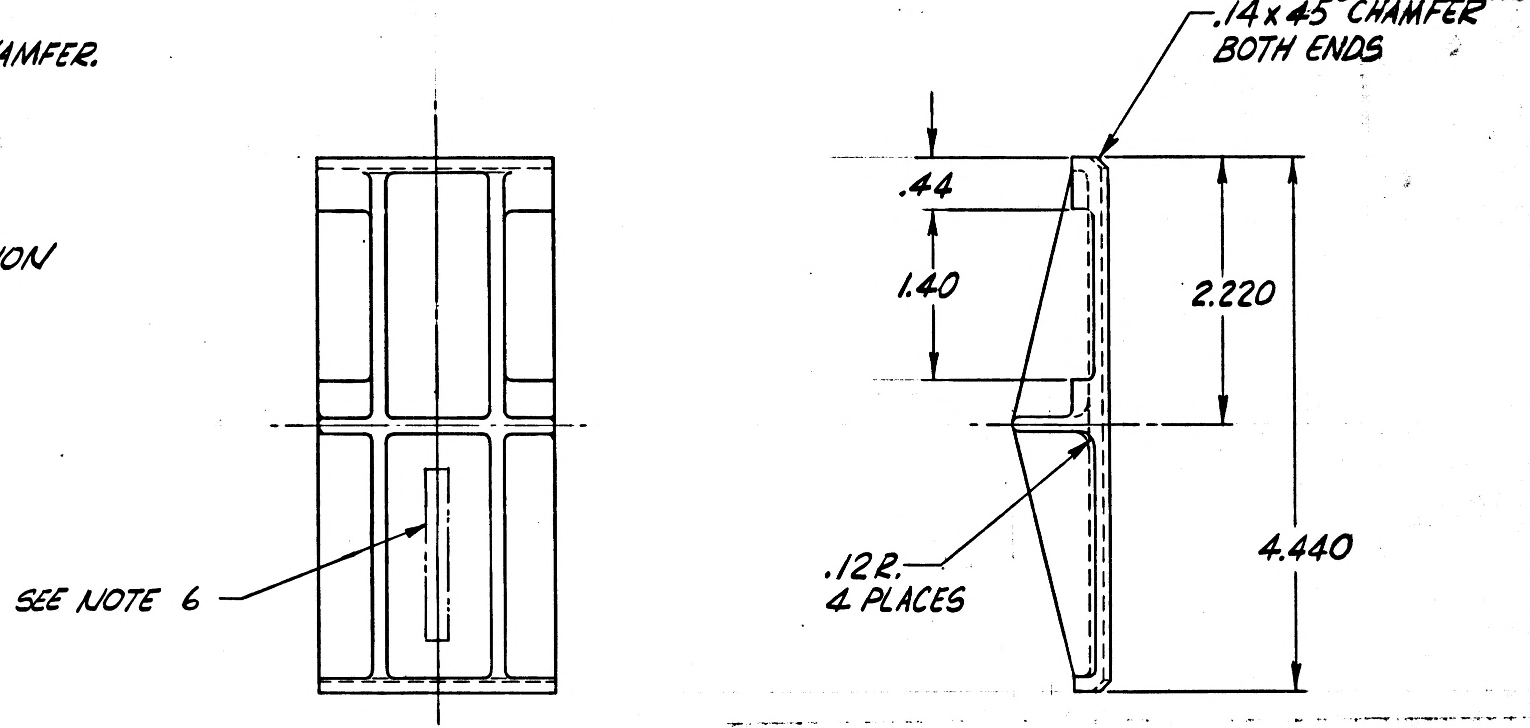
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PRECISION CAST PER MIL-C-11866 USING COMPOSITION 2 (356) TEMPER T6
3. INSPECT PER MIL-C-6021, CLASS 1A, GRADE B.
4. UNLESS OTHERWISE SPECIFIED:
   - a. ALL CAST RADII TO BE .06.
   - b. ALL CAST RIBS AND WALL THICKNESS TO BE .12 THICK.
   - c. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
   - d. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
5. MUST BE FREE FROM BURRS.
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND-1002019.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.





FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 DATE

2899981	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± ___	±.02 ±.005	±2°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN John A. Kusnowski DATE 27 AUG 64
CHECKED C. Piojda 20 OCT 64
APPROVAL E. Lombard 26 OCT 64
APPROVAL A. Hensley 26 OCT 64
NASA APPROVAL W. J. Rhine 11-4-64
MIT APPROVAL R. H. Gass W. Kupfer 4 Nov 64
Charleston 26 OCT 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BRACKET, REINFORCING
REAR

CODE IDENT NO. SIZE C 2899962

SCALE FULL SHEET 1 OF 1

MIL 1077C—P

INCHES 1 2 PHOTOGRAPHIC SCALE ONLY

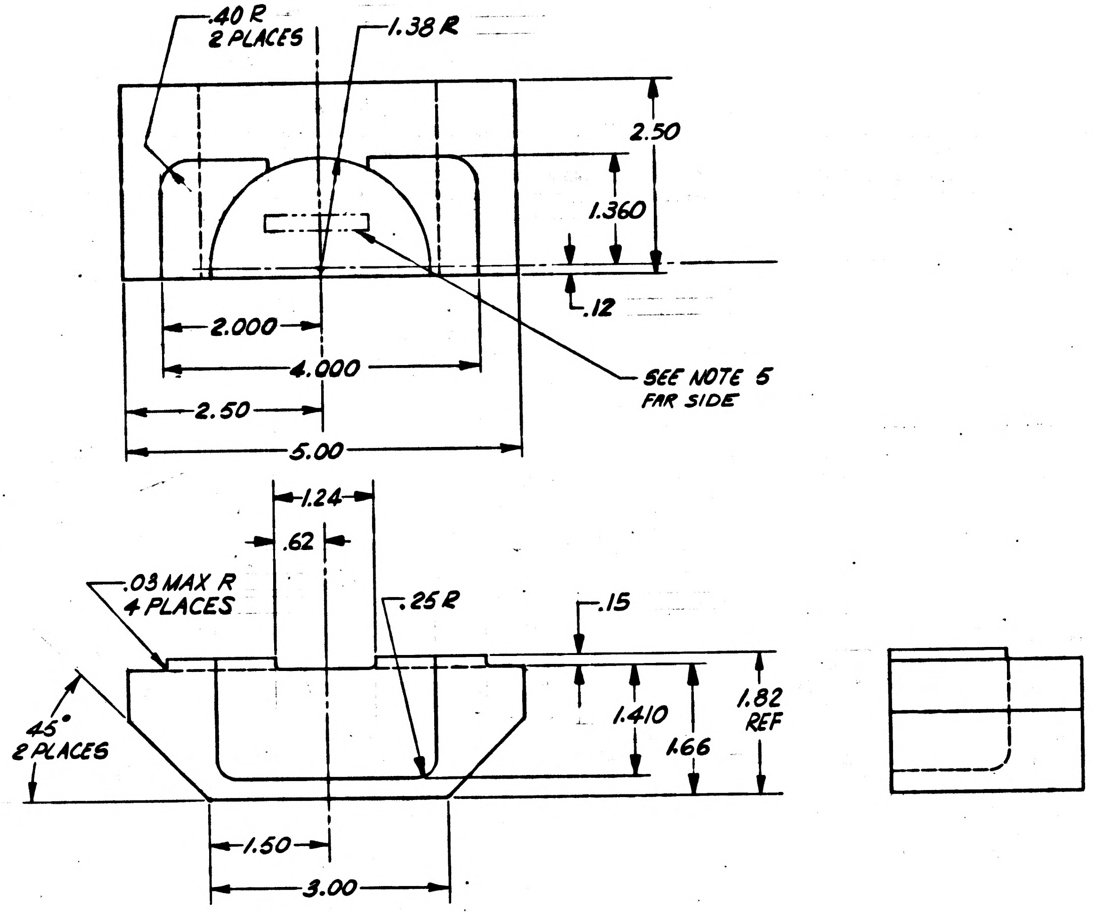
2899963 | 2

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY PER QQ-A-250/4, TEMPER T4 (2024-T4 ES-2104).
3. UNLESS OTHERWISE SPECIFIED:
   a. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
   b. ALL CORNERS TO BE .005 TO .015R OR CHAMFER.
4. MUST BE FREE FROM BURRS.
5. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND1002019.


.40 R
2 PLACES
1.38 R
2.50
1.360
.12
2.000
4.000
2.50
5.00
SEE NOTE 5
FAR SIDE
1.24
.62
.03 MAX R
4 PLACES
.25 R
.15
45°
2 PLACES
1.410
1.66
1.82
REF
1.50
3.00

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 1020 DATE

2899981	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS ±.02 ±.005
ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN [illegible] DATE 31 AUG 64
CHECKED C. Pizjda 20 OCT 64
APPROVAL E. [illegible] 26 OCT 64
APPROVAL D. Hensley 27 OCT 64
NASA APPROVAL [illegible] 11-4-64
R.H. [illegible]
MIT APPROVAL [illegible]
Charleston 26 OCT 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

INSERT, MOUNTING - REAR

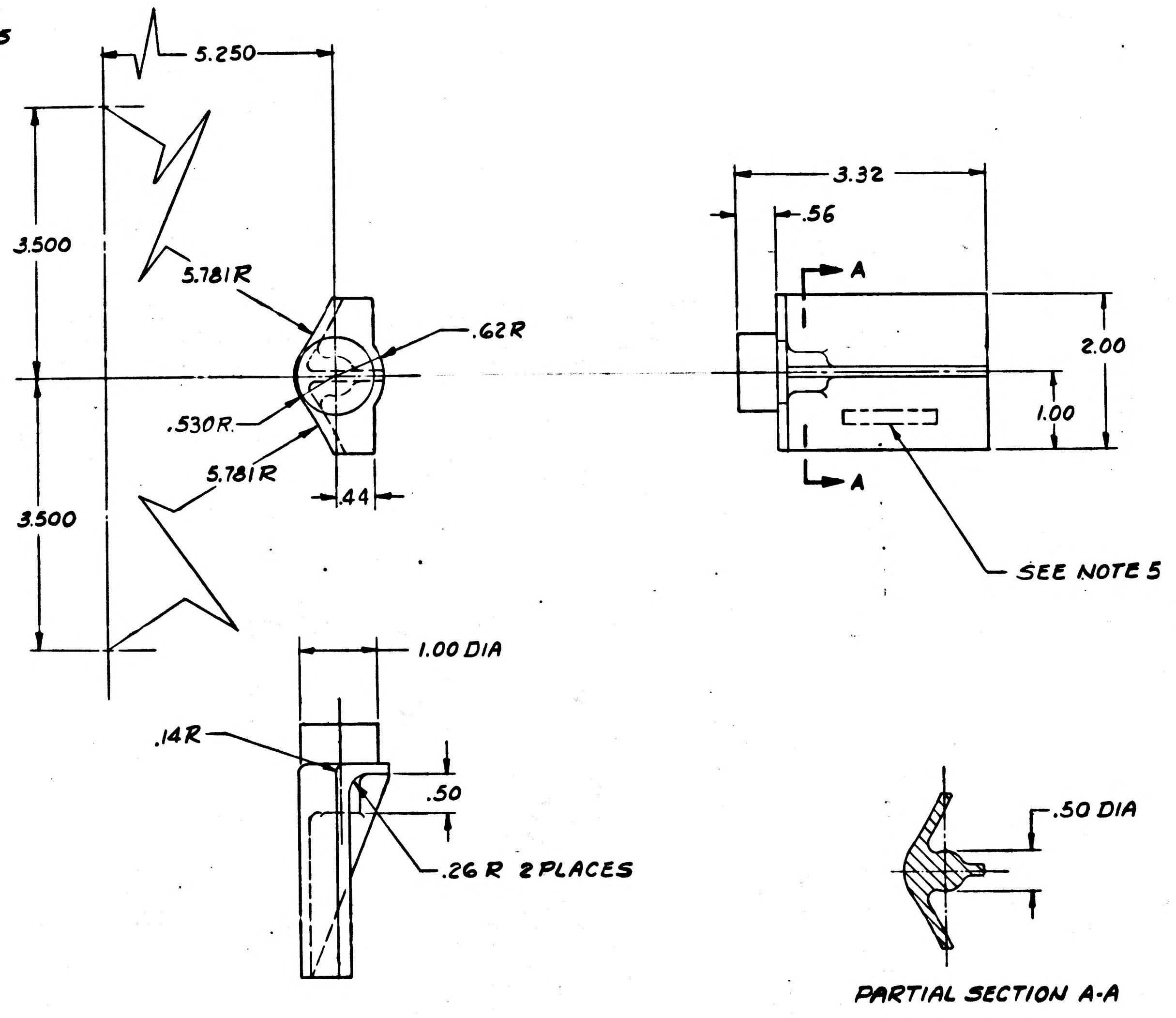
CODE IDENT NO.
SIZE D
2899963
SCALE 1:1
SHEET 1 OF 1

MASTER

2899964 B

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
		REVISIONS TDRR 14020			
B		UPGRADED TO CLASS A PER TDRR 17013		1MAR 65	S.A.

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PRECISION CAST PER MIL-C-11866, USING COMPOSITION 2 (356) TEMPER T6
3. UNLESS OTHERWISE SPECIFIED:
   a. ALL CAST INSIDE RADII TO BE .12, OUTSIDE RADII .06
   b. ALL CAST RIBS TO BE .12 THICK.
   c. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
4. INSPECT PER MIL-C-6021, CLASS IA, GRADE B.
5. IDENTIFY USING DRAWING NO. AND REVISION LETTER PER ND1002019.



PARTIAL SECTION A-A

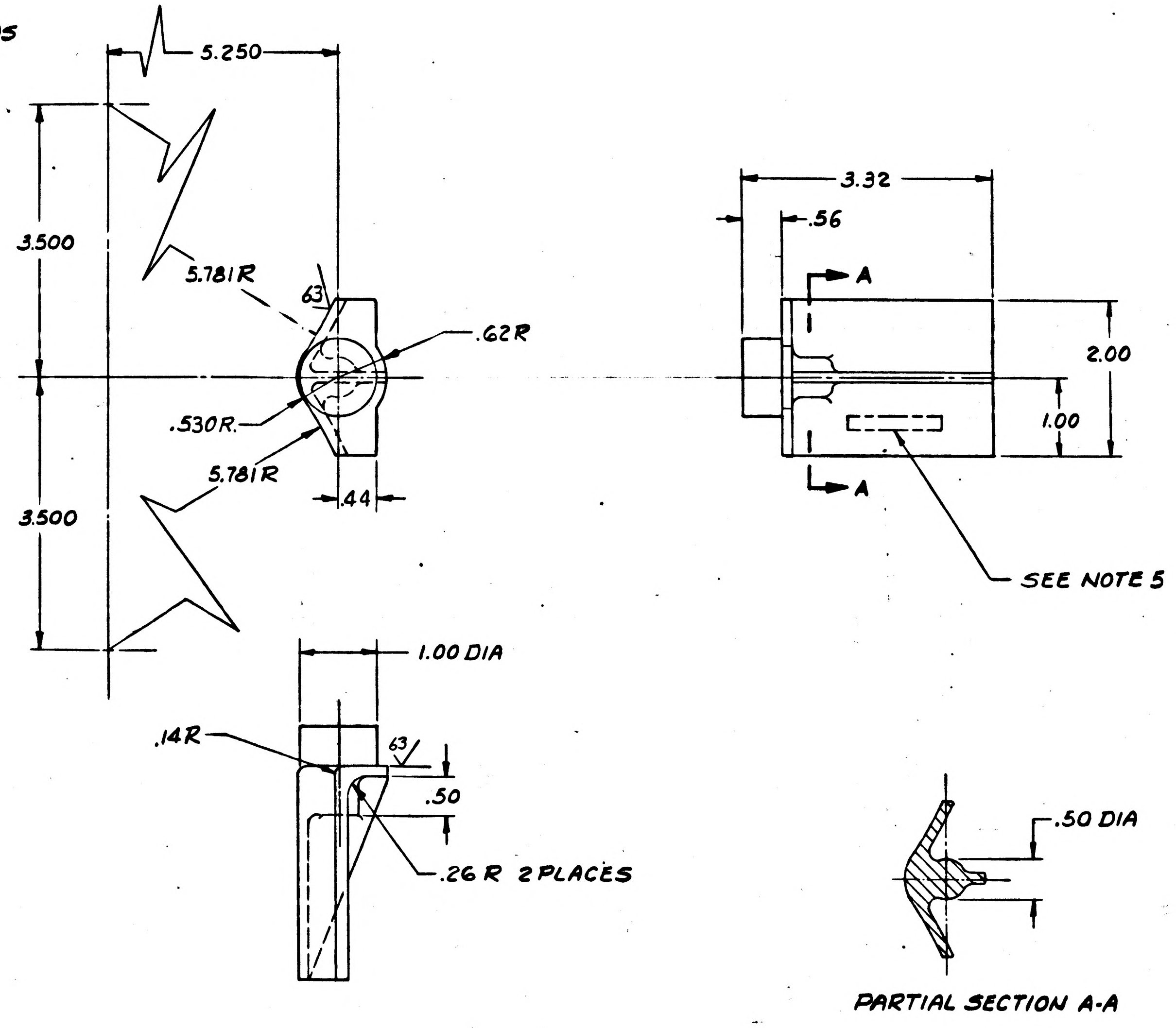
MASTER

2899981	2899950-011	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ±.02 ±.005 ANGLES ± — DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN H. Linde DATE 25AUG 64 CHECKED C. Pizjda 20 OCT 64 APPROVAL E. Lombard 26 OCT 64 APPROVAL H. Hensley 27 OCT 64	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	BRACKET, OPTICS, REAR
NEXT ASSY	USED ON	MATERIAL SEE NOTE 2	NASA APPROVAL 11-4-64 MIT APPROVAL R.H. Goss	CODE IDENT NO.	SIZE D 2899964
APPLICATION		CONTRACT NAS 9-497		SCALE 1:1	SHEET 1 OF 1

3 Charleston 26 OCT 64

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PRECISION CAST PER MIL-C-11866, USING COMPOSITION 2 (356) TEMPER T6
3. UNLESS OTHERWISE SPECIFIED:
   a. ALL CAST INSIDE RADII TO BE .12, OUTSIDE RADII .06
   b. ALL CAST RIBS TO BE .12 THICK.
   c. SURFACE ROUGHNESS MUST NOT EXCEED 125/√
4. INSPECT PER MIL-C-6021, CLASS I_A, GRADE B.
5. IDENTIFY USING DRAWING NO. AND REVISION LETTER PER ND1002019.



PARTIAL SECTION A-A

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 14020 DATE

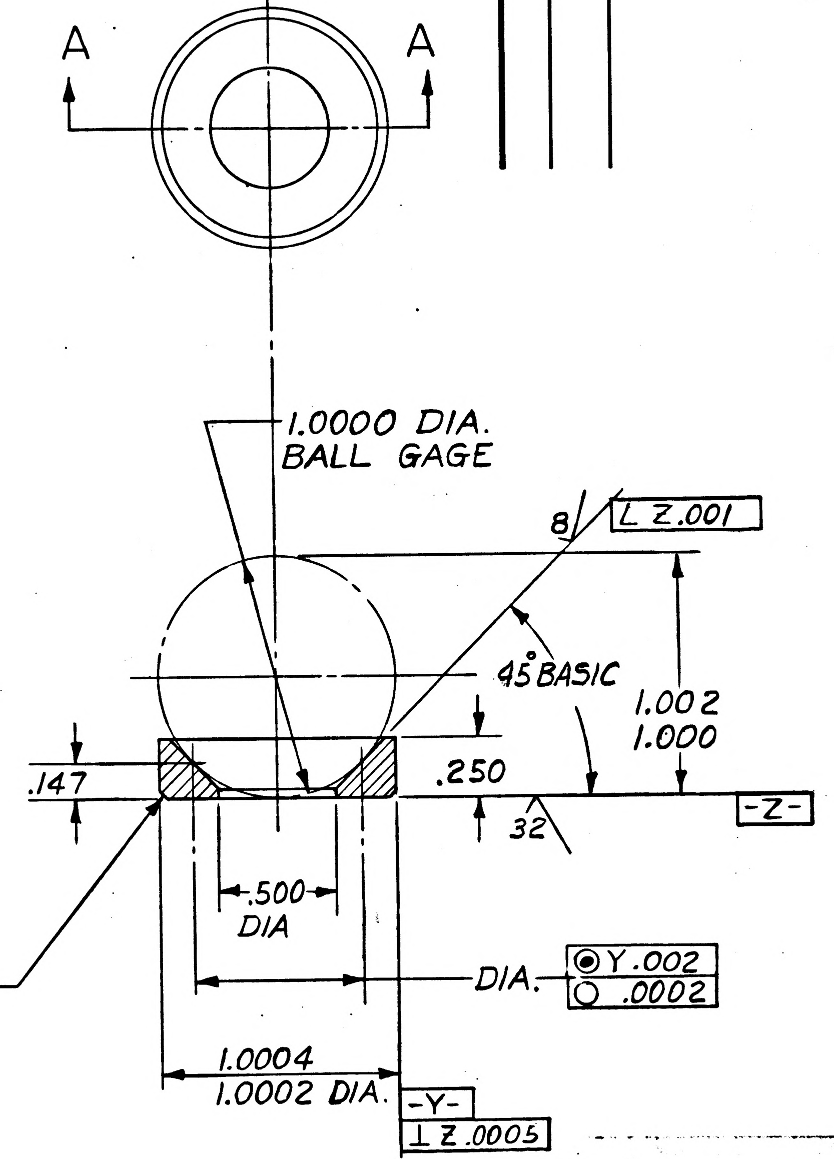
MASTER

2899981	2899950-011	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ±.02 ±.005 ANGLES ± — DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN H. Eicide DATE 25 AUG 64 CHECKED C. Pizjda 20 OCT 64 APPROVAL E. [illegible] 26 OCT 64 APPROVAL A. Hensley 27 OCT 64	MANNED SPACECRAFT CENTER HOUSTON, TEXAS BRACKET, OPTICS, REAR
NEXT ASSY	USED ON	MATERIAL SEE NOTE 2	NASA APPROVAL 11-[illegible] W. J. [illegible]	CODE IDENT NO. SIZE D 2899964
APPLICATION		CONTRACT NAS 9-497	R.H. Goss MIT APPROVAL	SCALE 1:1 SHEET 1 of 1

Charleston 26 OCT 64

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: STAINLESS STEEL PER QQ-S-763 CLASS 440 C, COND. ACF (ES-373).
3. HEAT TREAT PER MIL-H-6875, TO Rc 58 MINIMUM (ES-2020-3).
4. UNLESS OTHERWISE SPECIFIED:
   a. ALL CORNERS TO BE .005 TO .015 R. OR CHAMFER.
   b. SURFACE ROUGHNESS MUST NOT EXCEED 63/.
   c. MUST BE FREE OF BURRS.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-F-14072 (SIG C) FINISH E-300 PRIOR TO FINISH MACHINING OF 8/ SURFACE (ES-585).
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.



SECTION A-A

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 DATE

NEXT ASSY	USED ON
2899989	
2899978	
2899970	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± –	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN DATE 1 OCT 64
CHECKED C. Pjojda 3 NOV 64
APPROVAL E. Lenkiel 3 NOV 64
APPROVAL Hensley 3 NOV 64
NASA APPROVAL 11-4-64
R.H. Bras
MIT APPROVAL 4 NOV 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

INSERT, BALL MOUNT

CODE IDENT NO.
SIZE C
2899965
SCALE 2:1
SHEET 1 OF 1

2 Charleston 2 NOV. 64

MIL 1077C-P

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

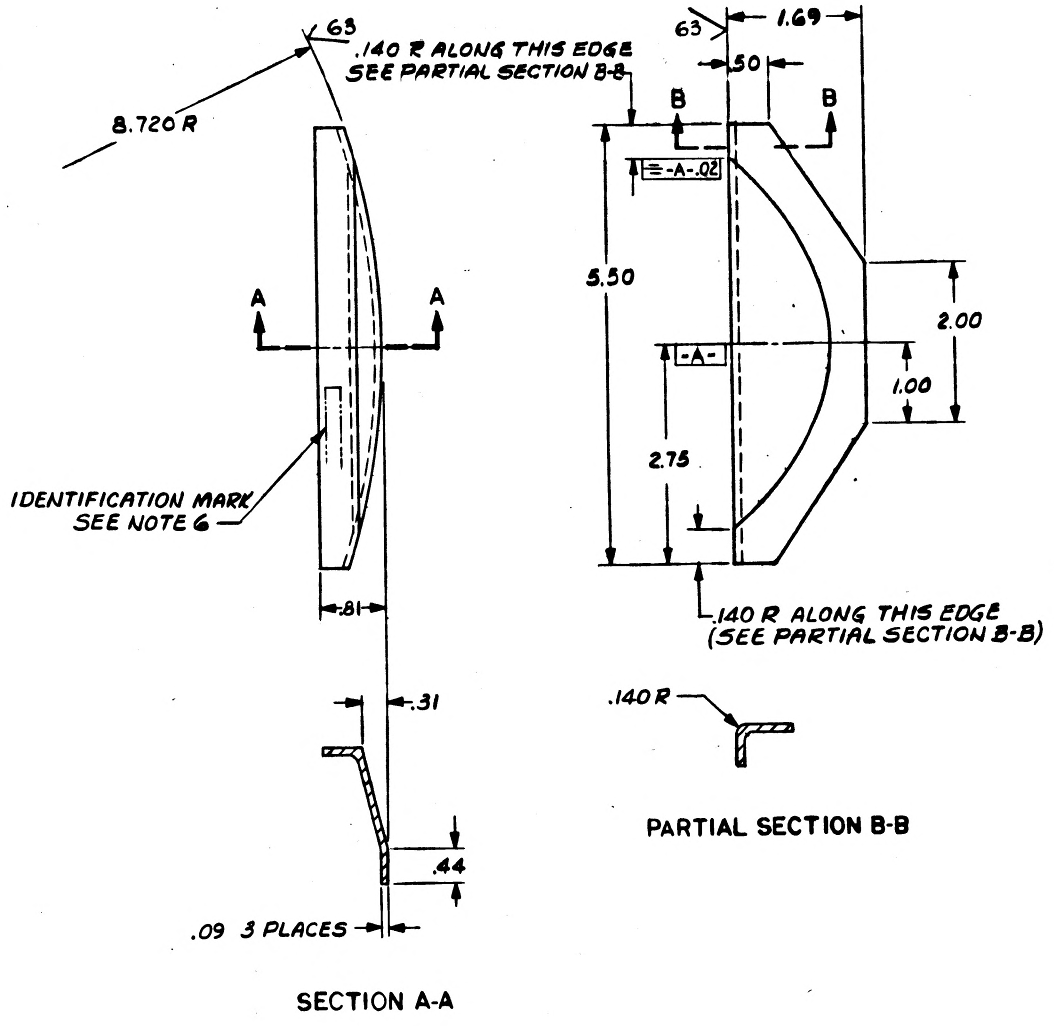
2899966 B

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
B		UPGRADED TO CLASS A PER TDRR 17014		1 MAR 65	8

REVISIONS 15436

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PRECISION CAST USING ALUMINUM ALLOY QQ-A-601 ALLOY 356 TEMPER T6.
3. UNLESS OTHERWISE SPECIFIED:
   CAST ALL INSIDE RADII .12 R.
   CAST ALL OUTSIDE RADII .06 R MAX.
   SURFACE ROUGHNESS MUST NOT EXCEED 125√.
4. MUST BE FREE FROM BURRS.
5. INSPECT PER MIL-C-6021, CLASS 1A, GRADE B.
6. IDENTIFY USING DRAWING NUMBER PER ND 1002019.


63
.140 R ALONG THIS EDGE
SEE PARTIAL SECTION B-B
8.720 R
A
A
IDENTIFICATION MARK
SEE NOTE 6
.81
.31
.44
.09 3 PLACES
SECTION A-A
63
1.69
.50
B
B
-A- .02
5.50
-A-
2.00
1.00
2.75
.140 R ALONG THIS EDGE
(SEE PARTIAL SECTION B-B)
.140 R
PARTIAL SECTION B-B

MASTER

2899981	2899950-011	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + — − — DECIMALS ±.005 ±.02 ANGLES + — − — DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN DATE 17 Dec 64 CHECKED W. Dieft 8 Jan '65 APPROVAL E. Lenkeul 8 JAN 65 APPROVAL 8 JAN 65
NEXT ASSY	USED ON	MATERIAL SEE NOTE 2	NASA APPROVAL 1-13-65 R.M. 1/12/65 MIT APPROVAL 13 Jan 65
APPLICATION		CONTRACT NAS 9-497	Charleston 8 JAN 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

INSERT, ANGULAR

CODE IDENT NO. | SIZE D | 2899966

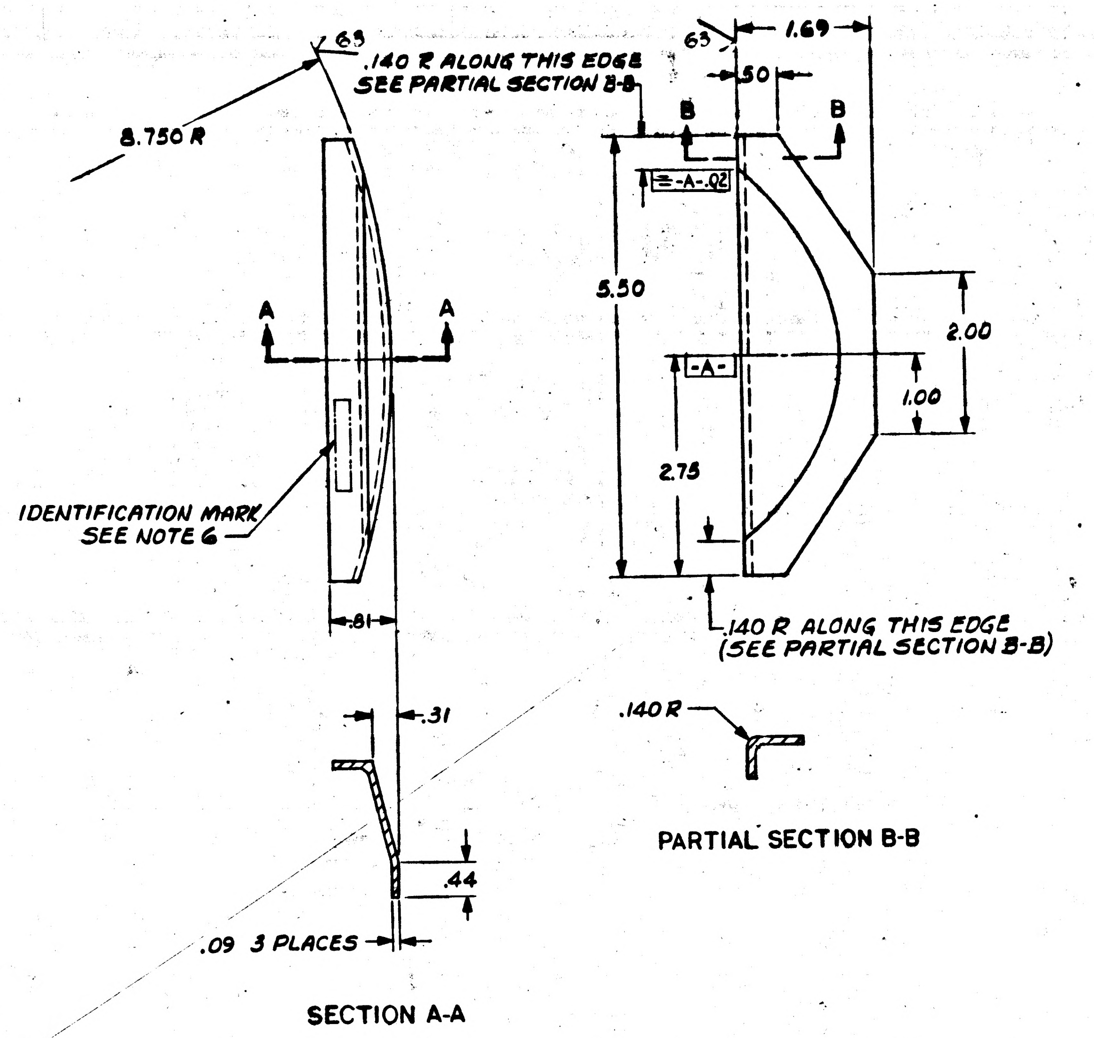
SCALE 1:1 | SHEET 1 OF 1

2899966

REVISIONS 15436					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PRECISION CAST USING ALUMINUM ALLOY QQ-A-601 ALLOY 356 TEMPER T6.
3. UNLESS OTHERWISE SPECIFIED:
   CAST ALL INSIDE RADII .12R.
   CAST ALL OUTSIDE RADII .06R MAX.
   SURFACE ROUGHNESS MUST NOT EXCEED 125√.
4. MUST BE FREE FROM BURRS.
5. INSPECT PER MIL-C-6021, CLASS 1A, GRADE B.
6. IDENTIFY USING DRAWING NUMBER PER ND 1002019.



63
.140 R ALONG THIS EDGE
SEE PARTIAL SECTION B-B
8.750 R
A
A
IDENTIFICATION MARK
SEE NOTE 6
.81
.31
.44
.09 3 PLACES
SECTION A-A
63
1.69
.50
B
B
-A- .02
5.50
-A-
2.00
1.00
2.75
.140 R ALONG THIS EDGE
(SEE PARTIAL SECTION B-B)
.140 R
PARTIAL SECTION B-B

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 15436 DATE 1/13/65

MASTER

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
		FRACTIONS + — − —	ACSP PN	
		DECIMALS ±.005 ±.02	DRAWN 17 Dec 64 DATE	INSERT, ANGULAR
		ANGLES + — − —	CHECKED W. Drage 8 JAN 65	
		DO NOT SCALE THIS DRAWING	APPROVAL E. Lenhard 8 JAN 65 APPROVAL 8 JAN 65	
2899981	2899950-011	MATERIAL SEE NOTE 2	NASA APPROVAL 1-13-65	CODE IDENT NO. / SIZE D / 2899966
NEXT ASSY	USED ON		1/13/65	
APPLICATION		CONTRACT NAS 9-497	MIT APPROVAL 13 Jan 65	SCALE 1:1 / SHEET 1 OF 1

Charleston 8 JAN 65

2899967

NOTES :

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. MATERIAL: STAINLESS STEEL PER QQ-S-763, CLASS 440 C, CONDITION A (ES-373).

3. HEAT TREAT PER MIL-H-6875 TO Rc 58 MIN. (ES-2020-3).

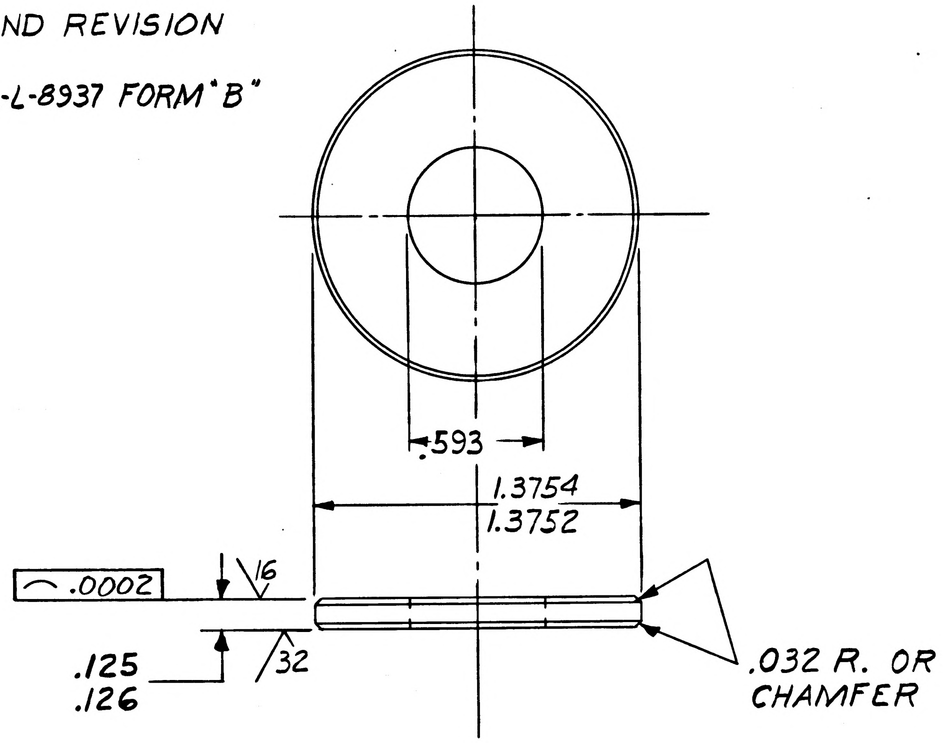
4. UNLESS OTHERWISE SPECIFIED:
   a. ALL CORNERS TO BE .005 TO .015 R. OR CHAMFER.
   b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   c. MUST BE FREE OF BURRS.

5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-F-14072 (SIG C) FINISH E-300 (ES-585).

6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.

7. APPLY DRY FILM LUBRICATE PER MIL-L-8937 FORM "B" TO 16√ SURFACE ONLY.

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		UPGRADED TO CLASS A PER TDRR 16951		1 MAR 65	S. A.



		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± .005 ANGLES ± 1° DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN DATE 6 OCT 64 CHECKED C. Piojda 3 NOV 64 APPROVAL E. Lemkuil 3 NOV 64 APPROVAL D. Hensley 3 NOV 64	MANNED SPACECRAFT CENTER HOUSTON, TEXAS INSERT, PLANE BASE
2899969	2899950-011	MATERIAL SEE NOTE 2	NASA APPROVAL W. J. Rhine 11-4-64	CODE IDENT NO. SIZE C 2899967
NEXT ASSY	USED ON	CONTRACT NAS 9-497	R. H. Grass MIT APPROVAL 4 Nov 64	SCALE 2:1 SHEET 1 OF 1
APPLICATION				

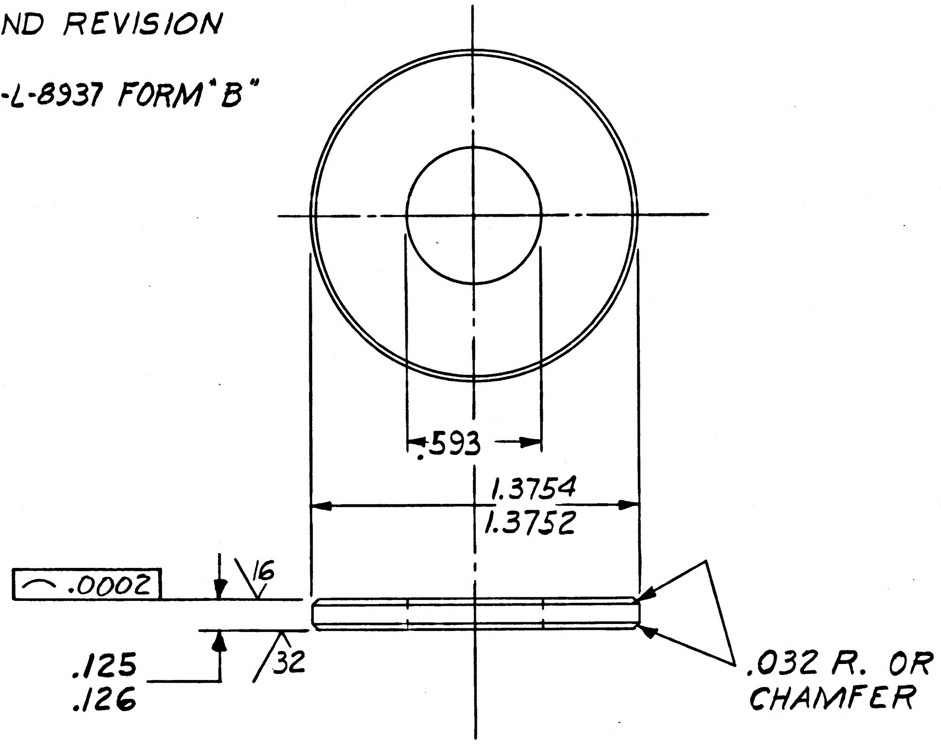
MIL 1077C—F

Charlston 2 NOV-64

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: STAINLESS STEEL PER QQ-S-763, CLASS 440 C, CONDITION A (ES-373).
3. HEAT TREAT PER MIL-H-6875 TO Rc 58 MIN. (ES-2020-3).
4. UNLESS OTHERWISE SPECIFIED:
   a. ALL CORNERS TO BE .005 TO .015 R. OR CHAMFER.
   b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   c. MUST BE FREE OF BURRS.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-F-14072 (SIG C) FINISH E-300 (ES-585).
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.
7. **APPLY DRY FILM** LUBRICATE PER **MIL**-L-8937 FORM "B" TO 16√ SURFACE ONLY.



FOR INFORMATION ONLY

CLASS B' RELEASE TDR No. 14020 **DATE**

NEXT ASSY: 2899969	USED ON: 2899950-011	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ±.005 ANGLES ±1° DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN Bob Koberg DATE 6 OCT 64 CHECKED C. Piojda 3 NOV 64 APPROVAL E. Lemkuil 3 NOV 64 APPROVAL D. Hensley 3 NOV 64	MANNED SPACECRAFT CENTER HOUSTON, TEXAS INSERT, PLANE BASE
APPLICATION		MATERIAL SEE NOTE 2 CONTRACT NAS 9-497	NASA APPROVAL W J Rhine 11-4-64 R.H. Gras MIT APPROVAL 4 Nov 64	CODE IDENT NO. SIZE C 2899967 SCALE 2:1 SHEET 1 OF 1

2 Charleston 2 NOV 64

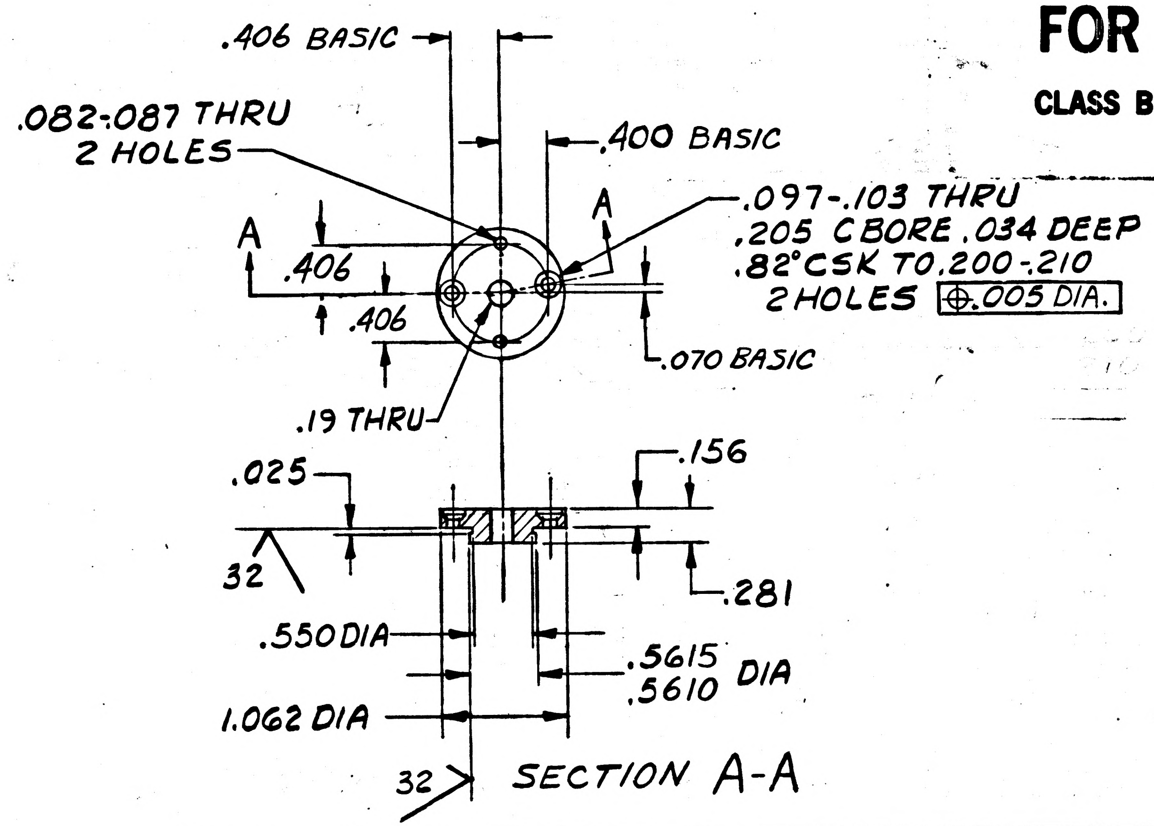
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

NOTES:-

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: STAINLESS STEEL PER AMS-5643-TYPE 17-4 PH (ES-2102 TYPE 17-4).
3. UNLESS OTHERWISE SPECIFIED:
   - a. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
   - b. ALL CORNERS MUST BE .005 TO .015 R OR CHAMFER.
4. FINISH:
   - a. HARDEN PER MIL-H-6875, TYPE 17-4 PH, COND H-1150
   - b. PASSIVATE PER MIL-F-14072 (SIG C) FINISH E-300 (ES-585).
5. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 **DATE**


.406 BASIC
.082-.087 THRU
2 HOLES
.400 BASIC
A
A
.406
.406
.097-.103 THRU
.205 C BORE .034 DEEP
.82° CSK TO .200-.210
2 HOLES ⊕.005 DIA.
.070 BASIC
.19 THRU
.025
.156
32
.281
.550 DIA
.5615
.5610 DIA
1.062 DIA
32

SECTION A-A

2899982-011	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN H. Friedl DATE 3 SEP 64
CHECKED C. Piojda 26 OCT 64
APPROVAL E. Lemkuil 26 OCT 64
APPROVAL A. Henaley 27 OCT 64
NASA APPROVAL W. J. Rhine 11-4-64
R.H. Mas
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PAD, MOUNTING

CODE IDENT NO. SIZE C 2899968
SCALE 1:1 SHEET 1 OF 1

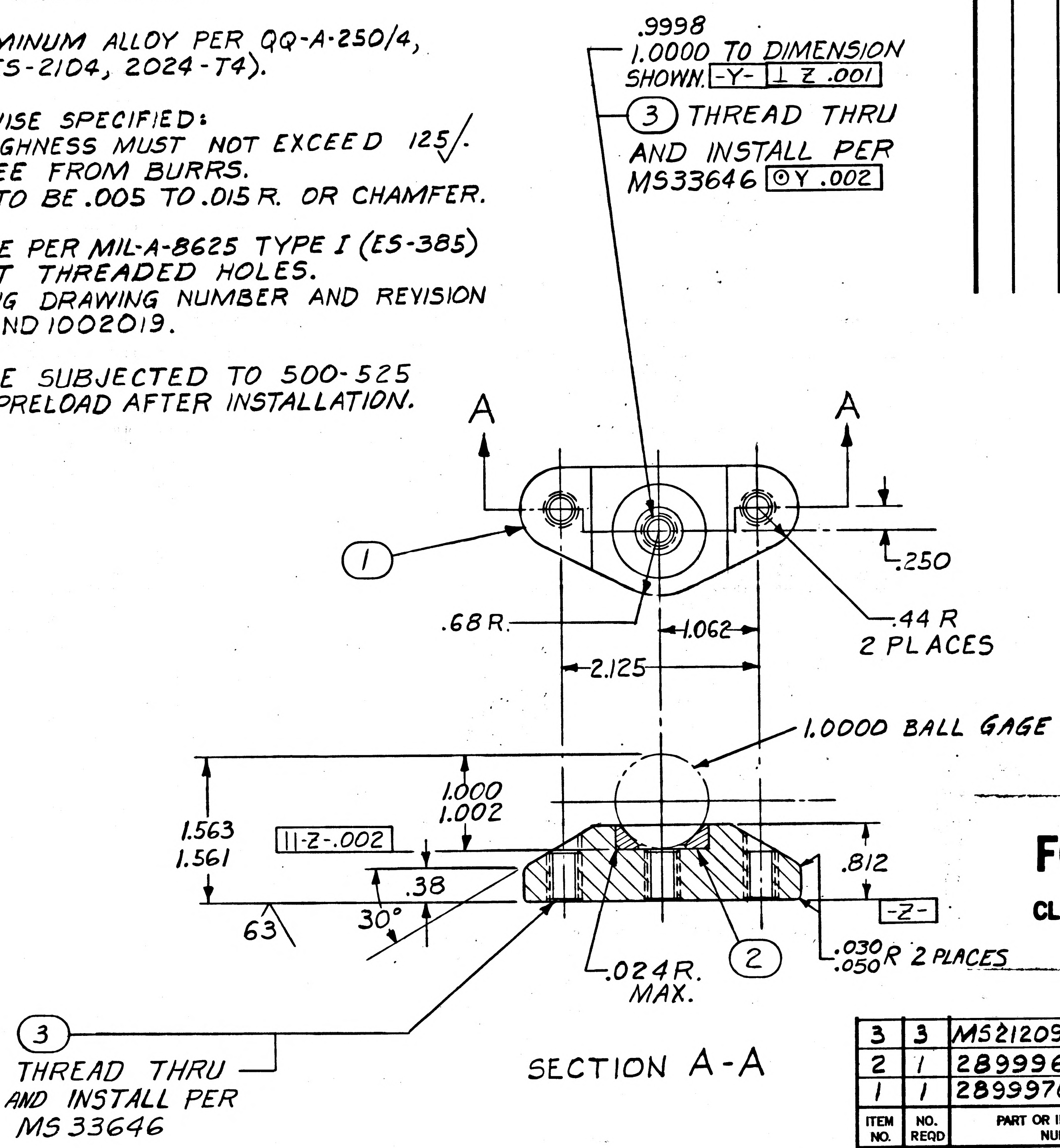
2 Charleston 26 OCT. 64

INCHES
0 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY PER QQ-A-250/4, TEMPER T4 (ES-2104, 2024-T4).
3. UNLESS OTHERWISE SPECIFIED:
   a. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
   b. MUST BE FREE FROM BURRS.
   c. ALL CORNERS TO BE .005 TO .015 R. OR CHAMFER.
4. FINISH: ANODIZE PER MIL-A-8625 TYPE I (ES-385) EXCEPT THREADED HOLES.
5. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND1002019.
6. ITEM ② TO BE SUBJECTED TO 500-525 POUNDS AXIAL PRELOAD AFTER INSTALLATION.


.9998
1.0000 TO DIMENSION
SHOWN. -Y- ⊥ Z .001
③ THREAD THRU
AND INSTALL PER
MS33646 ⊚Y .002
A
A
①
.250
.68 R.
1.062
2.125
.44 R
2 PLACES
1.0000 BALL GAGE
1.000
1.002
1.563
1.561
∥-Z-.002
.38
30°
63
.812
-Z-
.024 R.
MAX.
②
.030
.050 R 2 PLACES
③
THREAD THRU
AND INSTALL PER
MS 33646

SECTION A-A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 **DATE**

3	3	MS21209F5-15	(1897059-205) INSERT, LOCKING
2	1	2899965	INSERT, BALL MOUNT
1	1	2899970-001	MOUNT, NAV. BASE, FORWARD
ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2899987-011	2899950-011
2899986-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ −	±.005 ±.02	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9-497

~~AC SPARK PLUG DIVISION, GMC~~
MILWAUKEE, WISCONSIN

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

ACSP PN

DRAWN Bob Kesling DATE 12 OCT 64
CHECKED C. Pizida 3 NOV 64
APPROVAL E. Lemkuil 3 NOV 64
APPROVAL S. Henley 3 NOV 64
NASA APPROVAL 11-4-64 W. J. Rhine
R. N. Gras
MIT APPROVAL W. Kupfer 4 Nov 64
Charleston 2 Nov. 64

MOUNT,
NAVIGATION BASE,
FORWARD
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. SIZE C 2899970

SCALE FULL SHEET 1 OF 1

MIL 1077C—P

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. MATERIAL: STAINLESS STEEL PER QQ-S-763, CLASS 440 C, CONDITION A (ES 373, 440C).

3. HEAT TREAT PER MIL-H-6875, TO Rc 58 MINIMUM (ES 2020-3).

4. UNLESS OTHERWISE SPECIFIED:
   a. ALL CORNERS TO BE .005 TO .015 R. OR CHAMFER.
   b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   c. MUST BE FREE OF BURRS.

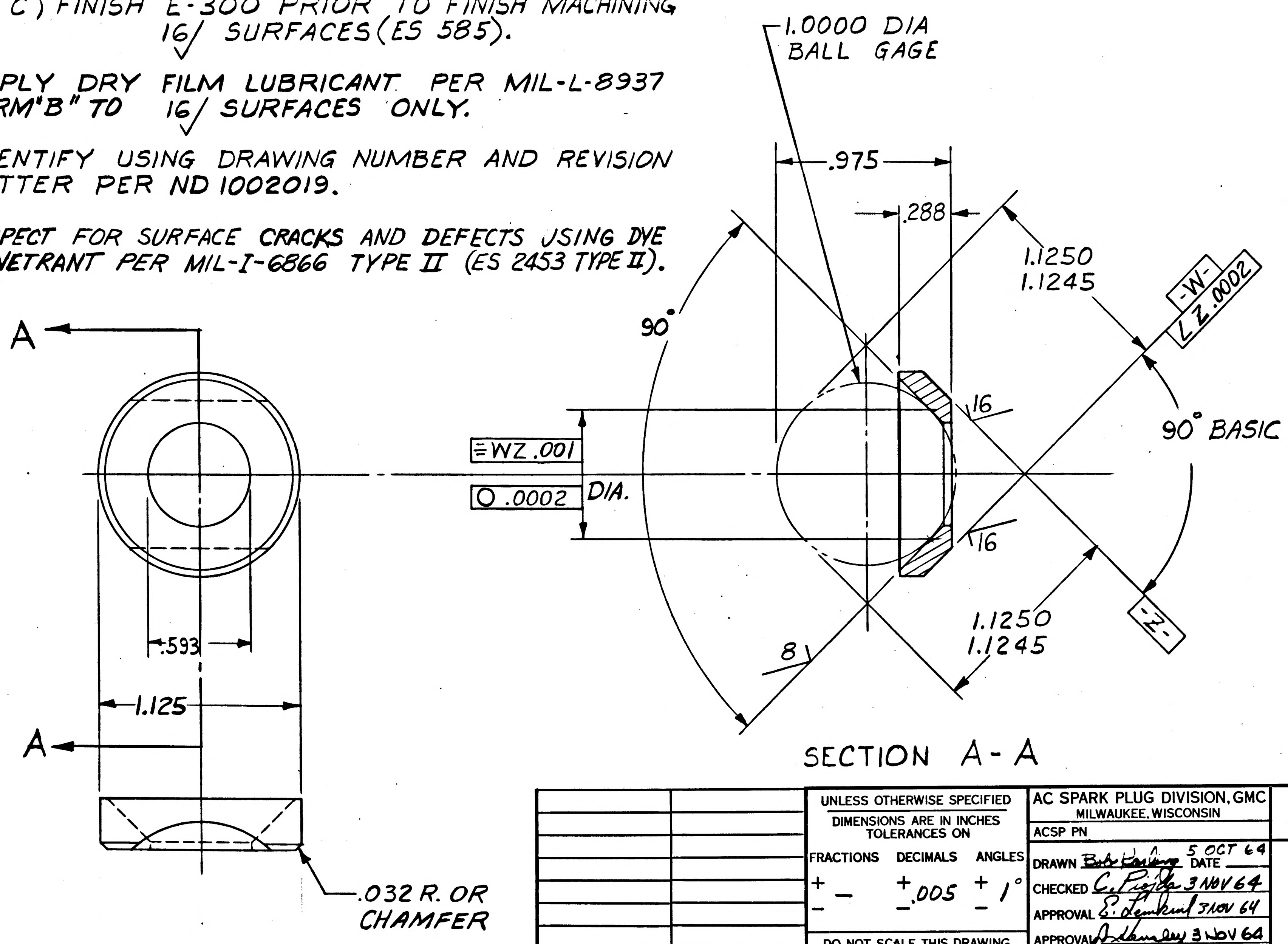
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-F-14072 (SIG C) FINISH E-300 PRIOR TO FINISH MACHINING OF 16√ SURFACES (ES 585).

6. APPLY DRY FILM LUBRICANT PER MIL-L-8937 FORM "B" TO 16√ SURFACES ONLY.

7. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.

8. INSPECT FOR SURFACE CRACKS AND DEFECTS USING DYE PENETRANT PER MIL-I-6866 TYPE II (ES 2453 TYPE II).

REVISIONS 14020					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
B		UPGRADED TO CLASS A PER TDRR 17029		1 MAR 65	



SECTION A-A

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON		AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN		MANNED SPACECRAFT CENTER HOUSTON, TEXAS
FRACTIONS ± —	DECIMALS ± .005	ANGLES ± 1°	ACSP PN	
			DRAWN Bob Kanlong DATE 5 OCT 64	BALL MOUNT, LINE
			CHECKED C. Piojda 3 NOV 64	
			APPROVAL E. Lemkuil 3 NOV 64	
DO NOT SCALE THIS DRAWING			APPROVAL A. Lamsley 3 NOV 64	
MATERIAL SEE NOTE 2			NASA APPROVAL W. J. Rhine 11-4-64	CODE IDENT NO. / SIZE C / 2899971
CONTRACT NAS 9-497			R.H. Gras MIT APPROVAL	SCALE 2:1 / SHEET 1 OF 1

2899987-011	2899950-011
NEXT ASSY	USED ON
APPLICATION	

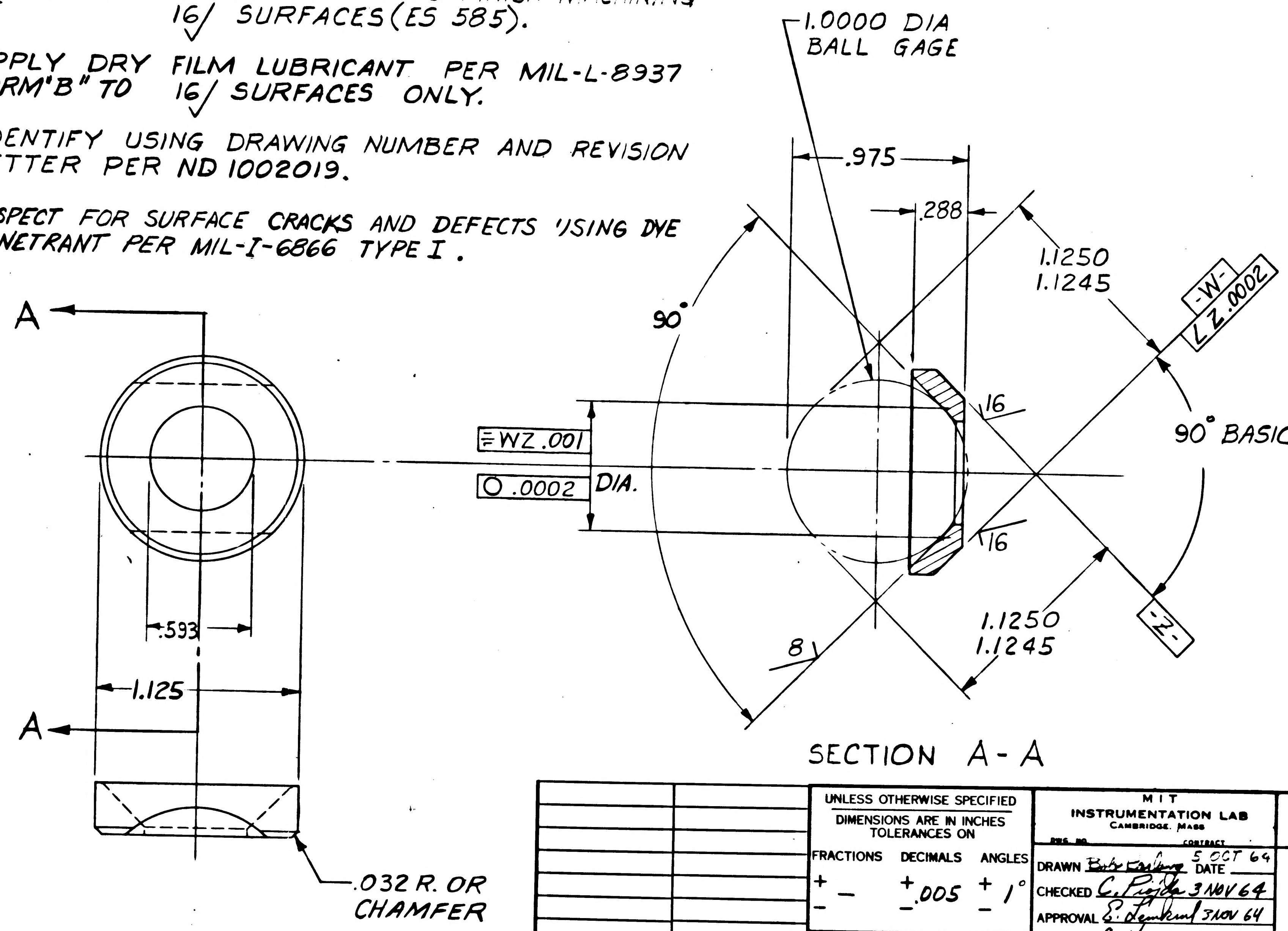
Charleston 2 NOV 64

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: STAINLESS STEEL PER QQ-S-763, CLASS 440 C, CONDITION A (ES 373, 440C).
3. HEAT TREAT PER MIL-H-6875. TO Rc 58 MINIMUM (ES 2020-3).
4. UNLESS OTHERWISE SPECIFIED:
   a. ALL CORNERS TO BE .005 TO .015 R. OR CHAMFER.
   b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   c. MUST BE FREE OF BURRS.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-F-14072 (SIG C) FINISH E-300 PRIOR TO FINISH MACHINING OF 16√ SURFACES (ES 585).
6. APPLY DRY FILM LUBRICANT PER MIL-L-8937 FORM "B" TO 16√ SURFACES ONLY.
7. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.
8. INSPECT FOR SURFACE CRACKS AND DEFECTS USING DYE PENETRANT PER MIL-I-6866 TYPE I.

REVISIONS 14020

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
B		UPGRADED TO CLASS A PER TDRR 17029		1 MAR 65	S. a.
C		REVISED PER TDRR 19947		14 JUN 65	RS C7P



SECTION A - A

NEXT ASSY	USED ON
2899987-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DRAWN Bob Carlson DATE 5 OCT 64
CHECKED C. Piojda 3 NOV 64
APPROVAL E. Lemkuhl 3 NOV 64
APPROVAL 3 NOV 64
NASA APPROVAL W. J. Rhine 11-4-64
R.H. Maas
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BALL MOUNT, LINE

CODE IDENT NO. 80230
SIZE C
2899971
SCALE 2:1
SHEET 1 OF 1

2 Charleston 2 NOV 64

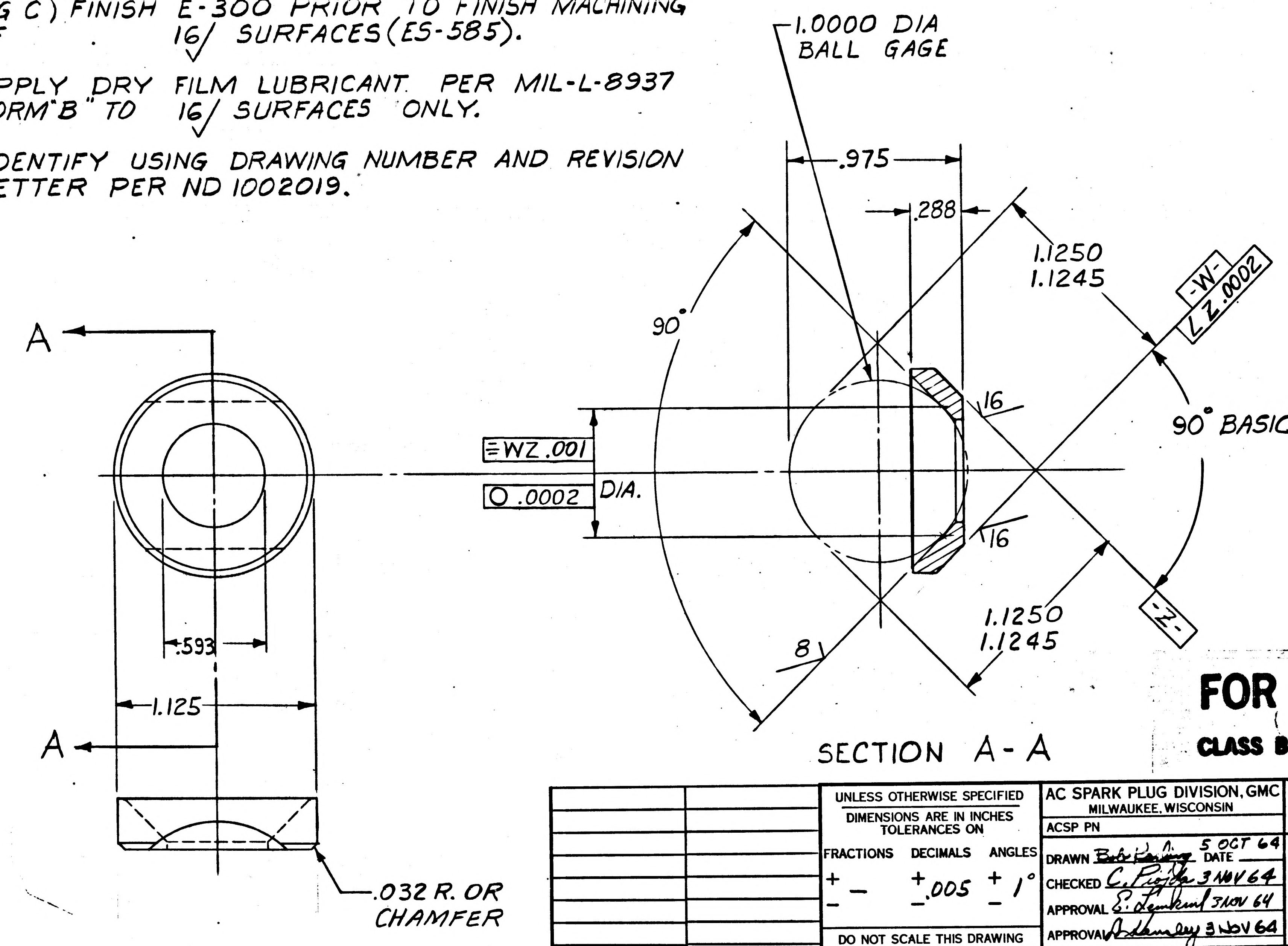
MIL 1077C—P

2899971

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: STAINLESS STEEL PER QQ-S-763, CLASS 440 C, CONDITION A (ES-373, 440 C).
3. HEAT TREAT PER MIL-H-6875. TO Rc 58 MINIMUM (ES-2020-3).
4. UNLESS OTHERWISE SPECIFIED:
   a. ALL CORNERS TO BE .005 TO .015 R. OR CHAMFER.
   b. SURFACE ROUGHNESS MUST NOT EXCEED 63/.
   c. MUST BE FREE OF BURRS.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-F-14072 (SIG C) FINISH E-300 PRIOR TO FINISH MACHINING OF 16/ SURFACES (ES-585).
6. APPLY DRY FILM LUBRICANT PER MIL-L-8937 FORM "B" TO 16/ SURFACES ONLY.
7. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.



SECTION A-A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 **DATE**

2899987-011	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± .005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 5 OCT 64
CHECKED C. Piojda 3 NOV 64
APPROVAL E. Lenkind 3 NOV 64
APPROVAL 3 NOV 64
NASA APPROVAL 11-4-64
MIT APPROVAL R.H. Bass

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BALL MOUNT, LINE

CODE IDENT NO. SIZE C 2899971
SCALE 2:1 SHEET 1 OF 1

Charleston 2 NOV 64

MIL 1077C—P

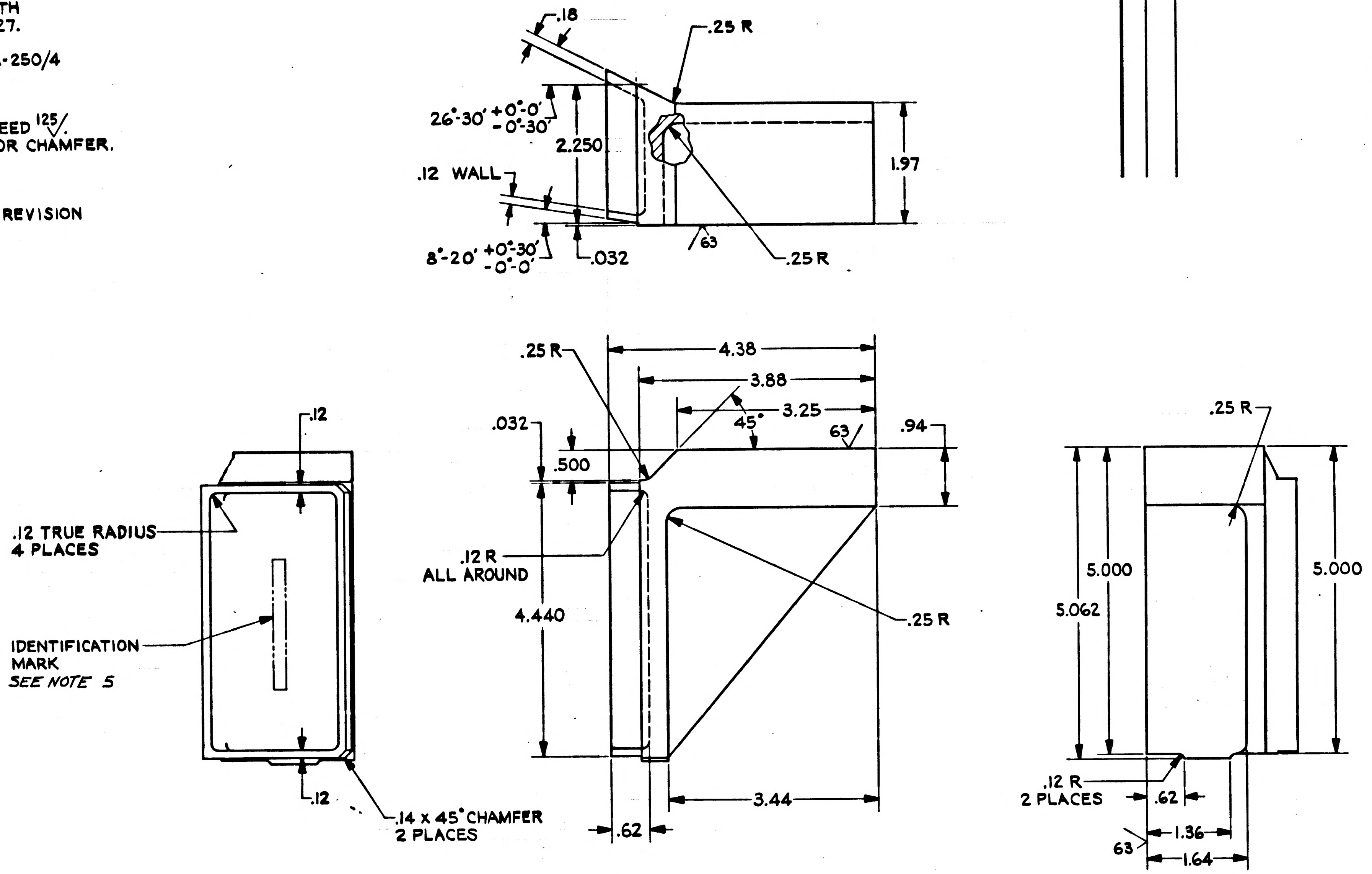
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2899972 A

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		UPGRADED TO CLASS A PER TDRR 16951		1 MAR 65	S a

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY PER QQ-A-250/4 TEMPER T4 (ES-2104, TYPE 2024).
3. UNLESS OTHERWISE SPECIFIED:
   a. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
   b. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
4. MUST BE FREE FROM BURRS.
5. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND1002019.



.18
.25 R
26°-30' +0°-0' -0°-30'
2.250
1.97
.12 WALL
8°-20' +0°-30' -0°-0'
.032
63
.25 R
.25 R
4.38
3.88
3.25
45°
63
.94
.032
.500
.12 R ALL AROUND
4.440
.25 R
3.44
.62
.12
.12 TRUE RADIUS 4 PLACES
IDENTIFICATION MARK SEE NOTE 5
.12
.14 x 45° CHAMFER 2 PLACES
.25 R
5.000
5.062
5.000
.12 R 2 PLACES
.62
1.36
1.64
63

MASTER

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS ±.02 ±.005
ANGLES ±1°
DO NOT SCALE THIS DRAWING

NEXT ASSY	USED ON
2899981	2899950-011

APPLICATION

MATERIAL SEE NOTE 2
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN C. Leny DATE 28 AUG 64
CHECKED C. Piojda 26 OCT 64
APPROVAL E. Lemke 26 OCT 64
APPROVAL 27 OCT 64
NASA APPROVAL 11-4-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

ARM, R.H.
NAVIGATION BASE

CODE IDENT NO.
SIZE D
2899972
SCALE 1:1
SHEET 1 OF 1

Charleston 26 OCT 64

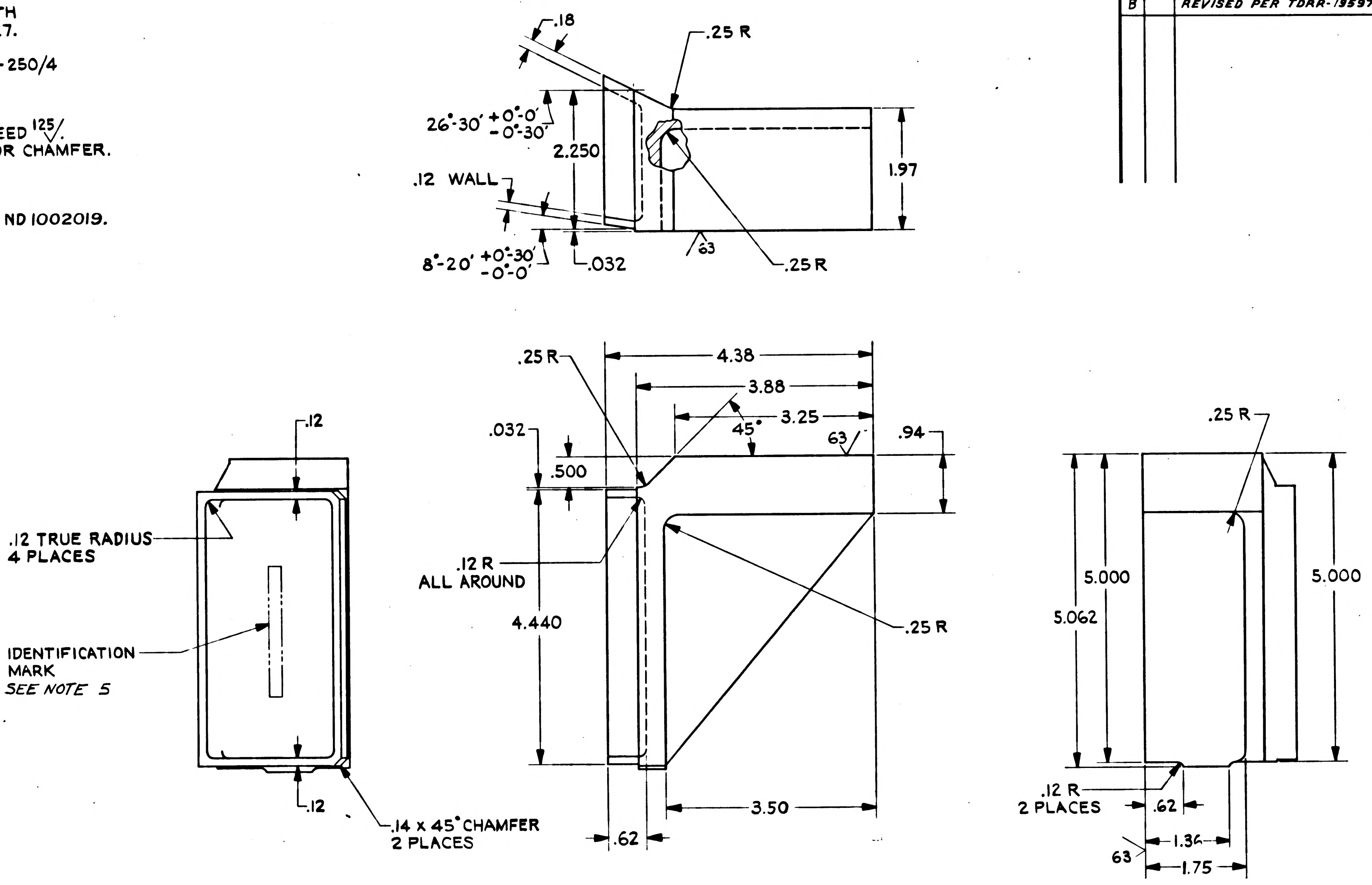
B | 2899972 | 2

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		UPGRADED TO CLASS A PER TDRR 16951		1 MAR 65	S. A.
B		REVISED PER TDRR-19597		28 MAY 65	B.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY PER QQ-A-250/4 TEMPER T4 (ES-2104, TYPE 2024).
3. UNLESS OTHERWISE SPECIFIED:
   a. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
   b. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
4. MUST BE FREE FROM BURRS.
5. IDENTIFY USING DRAWING NUMBER PER ND 1002019.



.18
.25 R
26°-30′ +0°-0′ -0°-30′
2.250
1.97
.12 WALL
8°-20′ +0°-30′ -0°-0′
.032
63
.25 R
.25 R
4.38
3.88
3.25
45°
63
.94
.032
.500
.12 R ALL AROUND
4.440
.25 R
3.50
.62
.12
.12 TRUE RADIUS 4 PLACES
IDENTIFICATION MARK SEE NOTE 5
.12
.14 x 45° CHAMFER 2 PLACES
.25 R
5.000
5.062
5.000
.12 R 2 PLACES
.62
1.36
63
1.75

2899981	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.02 ±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN C. Leng DATE 28 AUG 64
CHECKED C Pozda 26 OCT 64
APPROVAL E. Lemkuhl 26 OCT 64
APPROVAL [illegible] 27 OCT 64
NASA APPROVAL [illegible] 11-4-64
MIT APPROVAL R.H. Bass [illegible] Nov 4 [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

ARM, R.H.
NAVIGATION BASE

CODE IDENT NO. 80230
SIZE D
2899972
SCALE 1:1
SHEET 1 OF 1

3 [illegible] 26 OCT 64

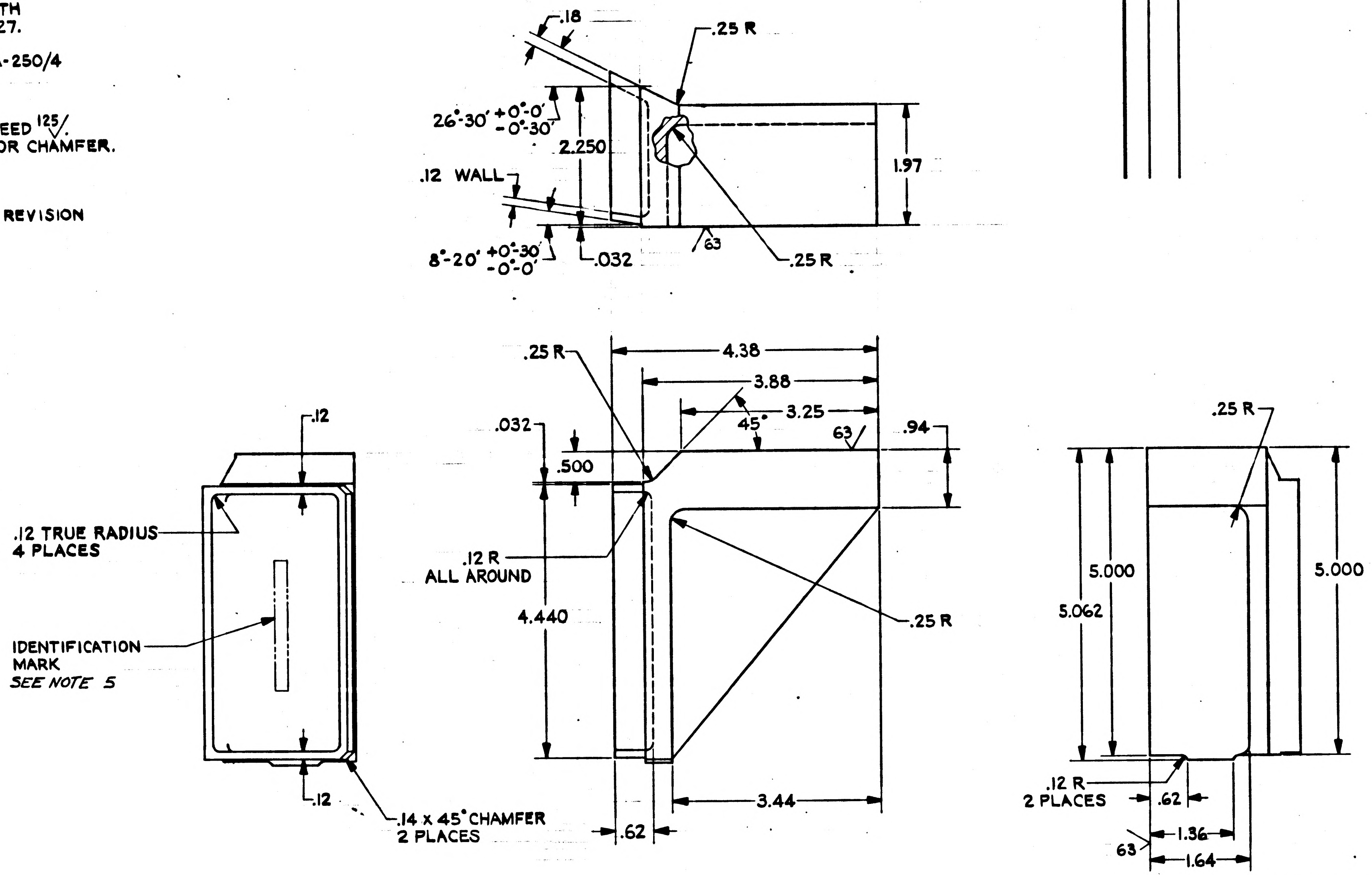
2899972

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

REVISIONS

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY PER QQ-A-250/4 TEMPER T4 (ES-2104, TYPE 2024).
3. UNLESS OTHERWISE SPECIFIED:
   a. SURFACE ROUGHNESS MUST NOT EXCEED 125/.
   b. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
4. MUST BE FREE FROM BURRS.
5. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND1002019.


.18
.25 R
26°-30' +0°-0' -0°-30'
2.250
.12 WALL
1.97
8°-20' +0°-30' -0°-0'
.032
63
.25 R
.25 R
4.38
3.88
3.25
45°
63
.94
.032
.500
.12
.12 TRUE RADIUS 4 PLACES
IDENTIFICATION MARK SEE NOTE 5
.12
.14 x 45° CHAMFER 2 PLACES
.12 R ALL AROUND
4.440
.25 R
3.44
.62
.25 R
5.000
5.062
5.000
.12 R 2 PLACES
.62
1.36
1.64
63

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 1402 DATE

2899981	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.02 ±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN C. Leng DATE 28 AUG 64
CHECKED C Piojda 26 OCT 64
APPROVAL E. [illegible] 26 OCT 64
APPROVAL [illegible] 27 OCT 64
NASA APPROVAL [illegible] 11-4-64
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

ARM, R.H.
NAVIGATION BASE

CODE IDENT NO. SIZE D 2899972

SCALE 1:1 SHEET 1 OF 1

Charleston 26 OCT 64

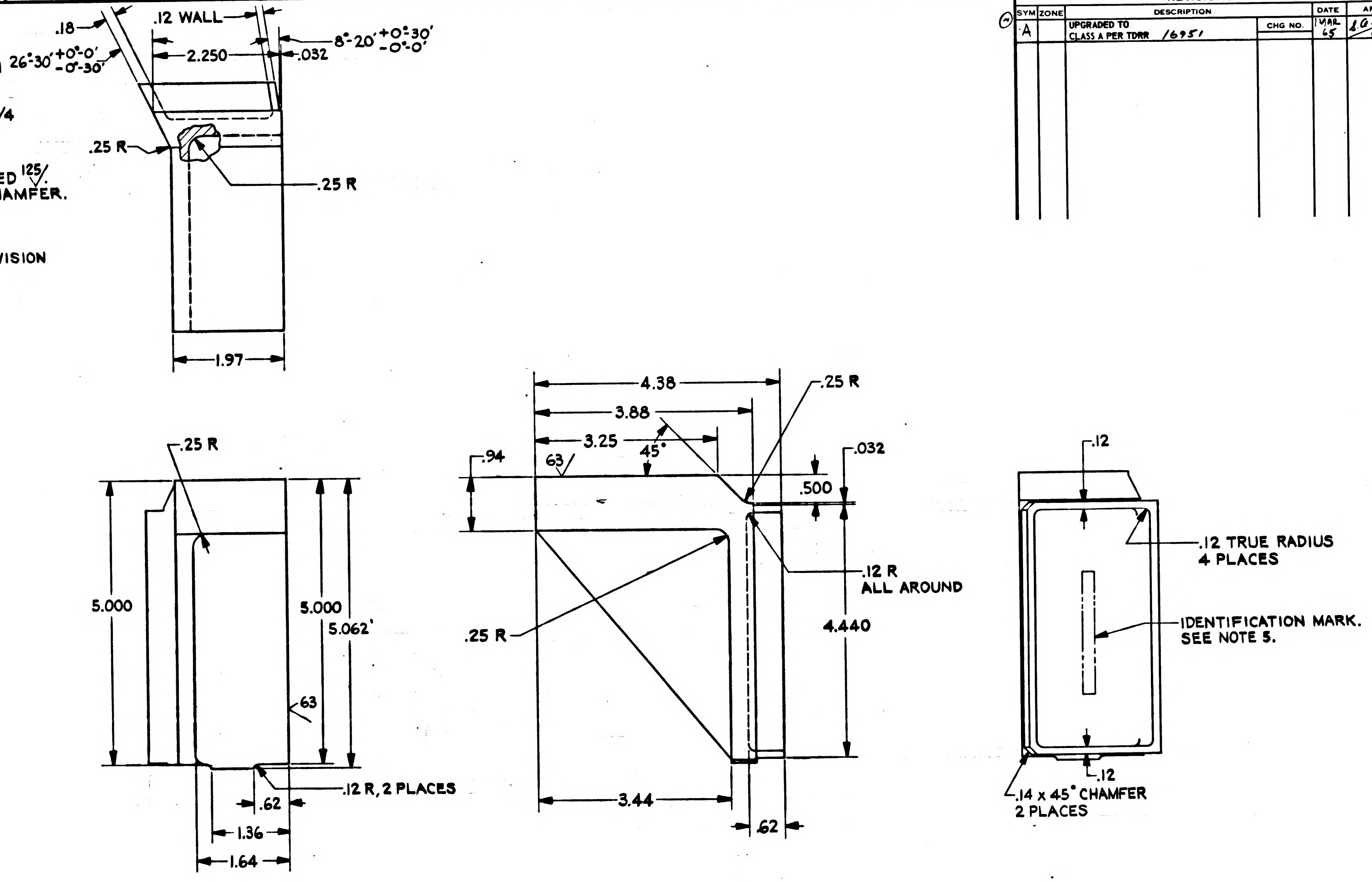
MASTER

2899973 A

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		UPGRADED TO CLASS A PER TDRR 16951		1 MAR 65	S.A.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY PER QQ-A-250/4 TEMPER T4 (ES-2104, TYPE 2024).
3. UNLESS OTHERWISE SPECIFIED:
   a. SURFACE ROUGHNESS MUST NOT EXCEED 125/.
   b. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
4. MUST BE FREE FROM BURRS.
5. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND1002019.



.18
.12 WALL
26°30' +0°-0' -0°-30'
2.250
.032
8°-20' +0°-30' -0°-0'
.25 R
.25 R
1.97
.25 R
5.000
5.000
5.062'
63
.12 R, 2 PLACES
.62
1.36
1.64
4.38
3.88
3.25
45°
.25 R
.94
63
.032
.500
.12 R
ALL AROUND
.25 R
4.440
3.44
.62
.12
.12 TRUE RADIUS
4 PLACES
IDENTIFICATION MARK.
SEE NOTE 5.
.12
.14 x 45° CHAMFER
2 PLACES

MASTER

2899981	2899950-011	MATERIAL SEE NOTE 2	NASA APPROVAL 1-4-64 W J R
NEXT ASSY	USED ON		R.H. Bass MIT APPROVAL 4 Nov 64
APPLICATION		CONTRACT NAS9-497	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ — −	±.02 ±.005	+ 1° −

DO NOT SCALE THIS DRAWING

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN C. Lenz DATE 28 AUG 64
CHECKED C. Pizda 22 OCT 64
APPROVAL E. Lenkel 26 OCT 64
APPROVAL 27 OCT 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

ARM, L.H.
NAVIGATION BASE

CODE IDENT NO. SIZE D 2899973
SCALE 1:1 SHEET 1 OF 1

Charleston
26 OCT 64

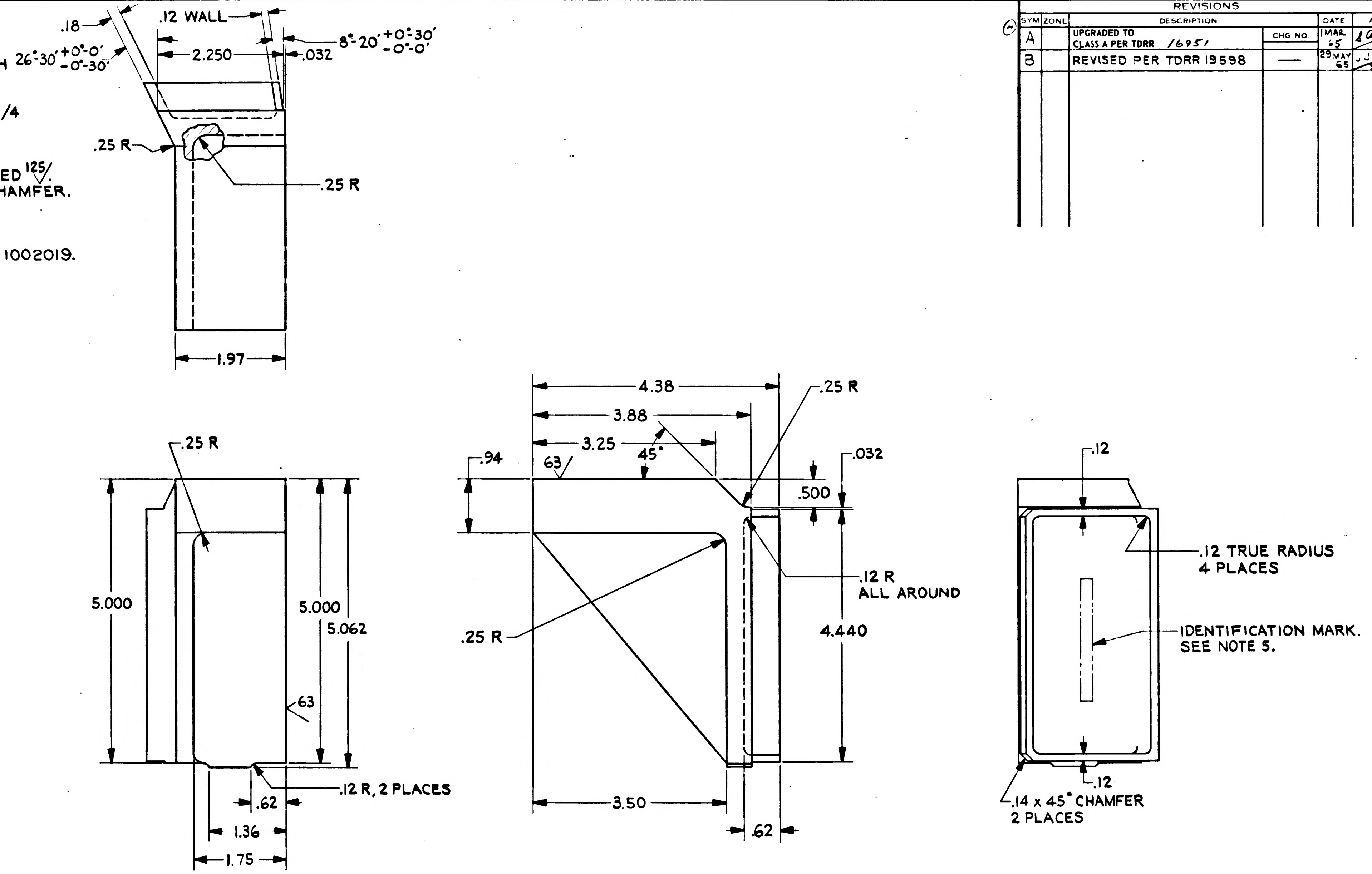
B 2899973

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY PER QQ-A-250/4 TEMPER T4 (ES-2104, TYPE 2024).
3. UNLESS OTHERWISE SPECIFIED:
   a. SURFACE ROUGHNESS MUST NOT EXCEED 125/√.
   b. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
4. MUST BE FREE FROM BURRS.
5. IDENTIFY USING DRAWING NUMBER PER ND1002019.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		UPGRADED TO CLASS A PER TDRR 16951		1 MAR 65	
B		REVISED PER TDRR 19598	—	29 MAY 65	JJJ



.18
.12 WALL
26°30' +0°-0' -0°-30'
2.250
.032
8°-20' +0°-30' -0°-0'
.25 R
.25 R
1.97
.25 R
5.000
5.000
5.062
63
.12 R, 2 PLACES
.62
1.36
1.75
4.38
3.88
3.25
.25 R
.94
63
45°
.032
.500
.12 R
ALL AROUND
.25 R
4.440
3.50
.62
.12
.12 TRUE RADIUS
4 PLACES
IDENTIFICATION MARK.
SEE NOTE 5.
.12
.14 x 45° CHAMFER
2 PLACES

2899981	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.02 ±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS

DRAWN C. Lenz DATE 28 AUG 64
CHECKED C. Pizzola 22 OCT 64
APPROVAL 26 OCT 64
APPROVAL 27 OCT 64
NASA APPROVAL 11-4-64
MIT APPROVAL 4 NOV 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

ARM, L.H.
NAVIGATION BASE

CODE IDENT NO. 80230
SIZE D
2899973
SCALE 1:1
SHEET 1 OF 1

26 OCT 64

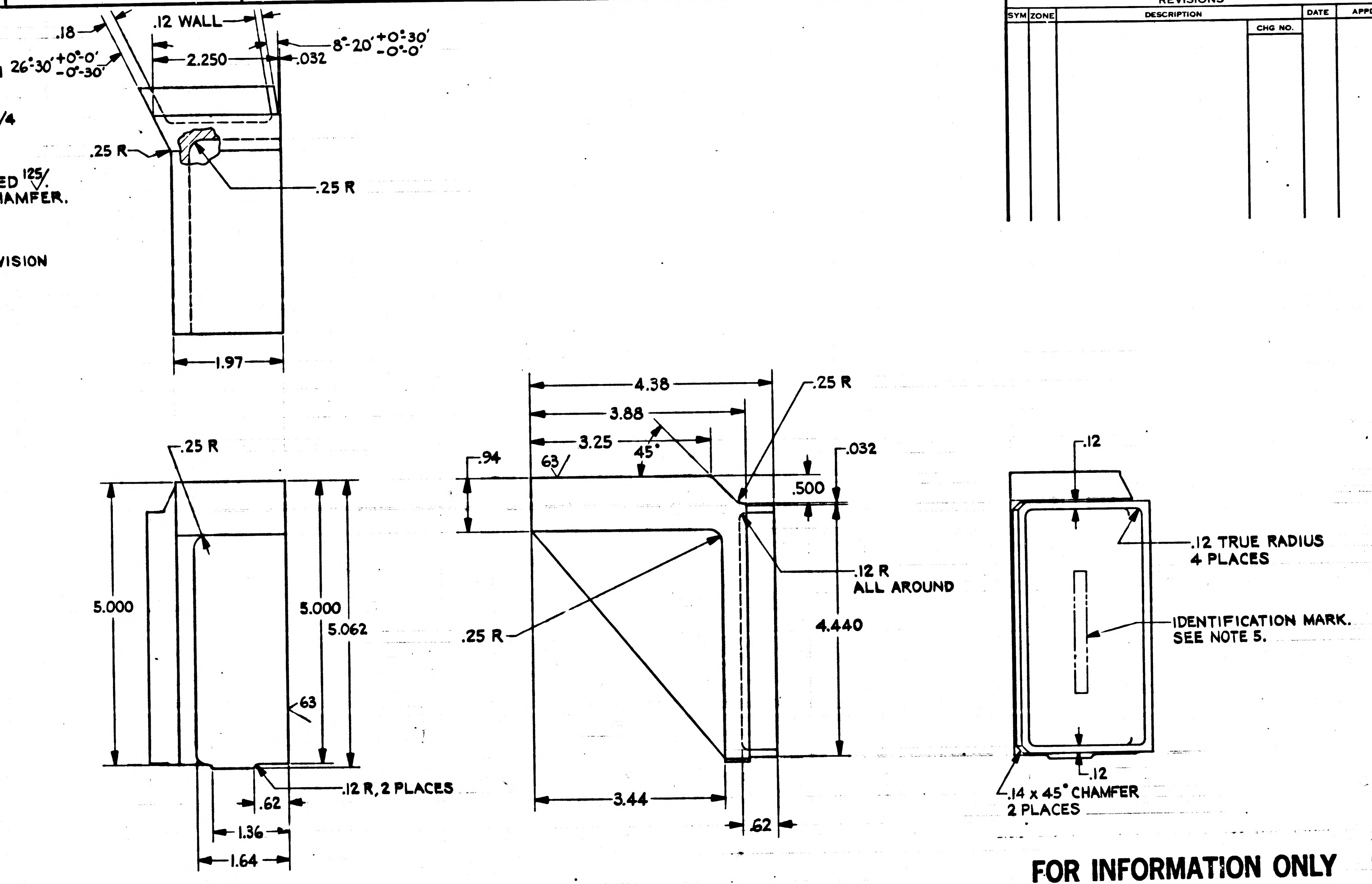
2899973

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

REVISIONS

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY PER QQ-A-250/4 TEMPER T4 (ES-2104, TYPE 2024).
3. UNLESS OTHERWISE SPECIFIED:
   a. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
   b. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
4. MUST BE FREE FROM BURRS.
5. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND1002019.



.18
.12 WALL
26°30' +0°-0' -0°-30'
8°-20' +0°-30' -0°-0'
2.250
.032
.25 R
.25 R
1.97
.25 R
5.000
5.000
5.062
63
.12 R, 2 PLACES
.62
1.36
1.64
4.38
3.88
3.25
45°
.94
63
.25 R
.032
.500
.12 R
ALL AROUND
.25 R
4.440
3.44
.62
.12
.12 TRUE RADIUS
4 PLACES
IDENTIFICATION MARK.
SEE NOTE 5.
.12
.14 x 45° CHAMFER
2 PLACES

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 DATE

MASTER

2899981	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.02 ±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN C. Zlmy 28 AUG 64 DATE

CHECKED C. Pizjda 22 OCT 64

APPROVAL E. Lenhard 26 OCT 64

APPROVAL D. Hensley 27 OCT 64

NASA APPROVAL W. J. Rhine 11-4-64

MIT APPROVAL R. H. Bons 11/4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

ARM, L.H.
NAVIGATION BASE

CODE IDENT NO.

SIZE D

2899973

SCALE 1:1

SHEET 1 OF 1

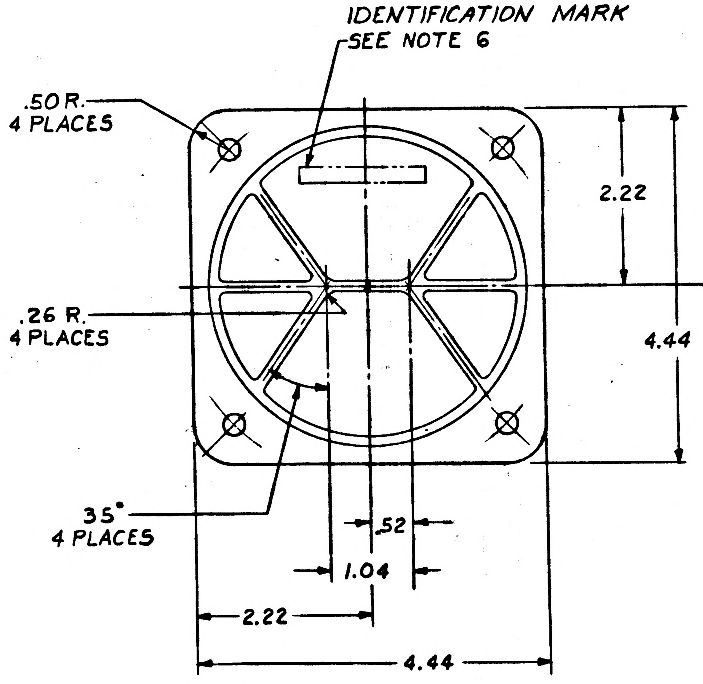
Charleston 26 OCT 64

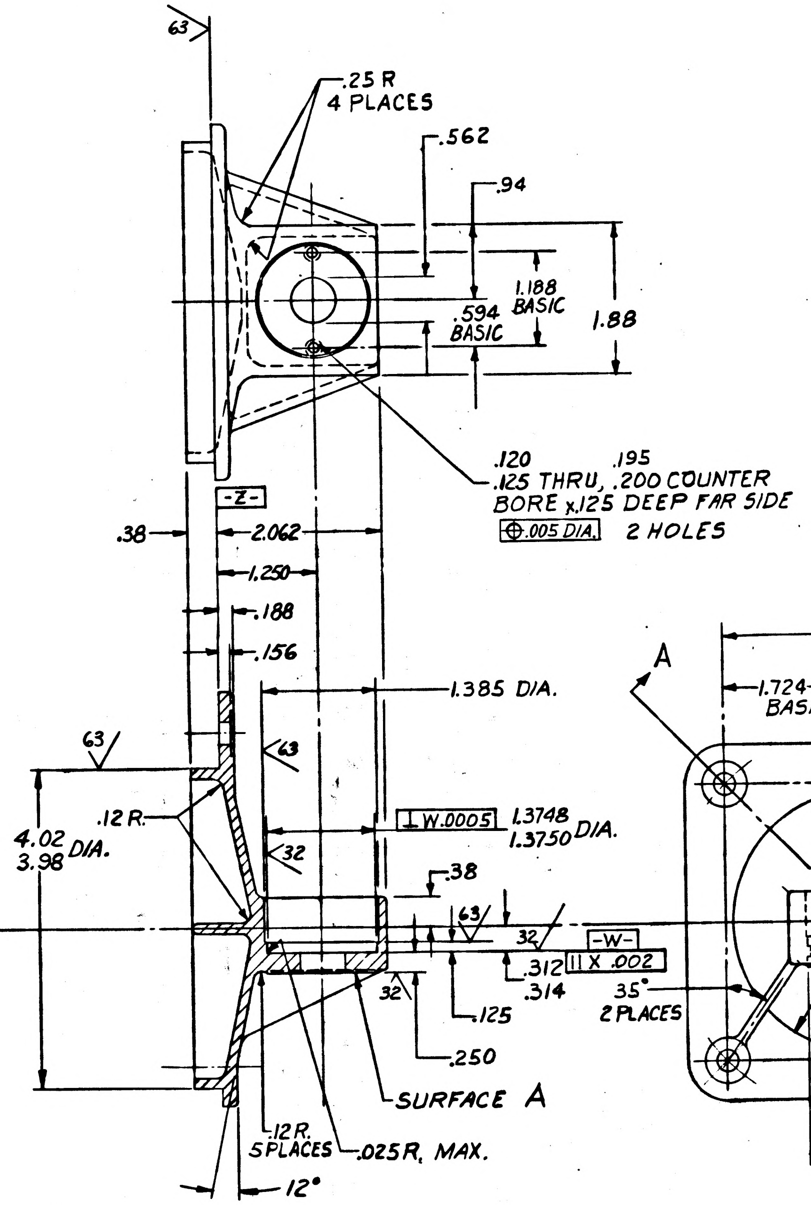
B | 2899974

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.
REVISIONS 14020					
B		UPGRADED TO CLASS A PER TDRR 17019		1 MAR 65	S.a. / JM

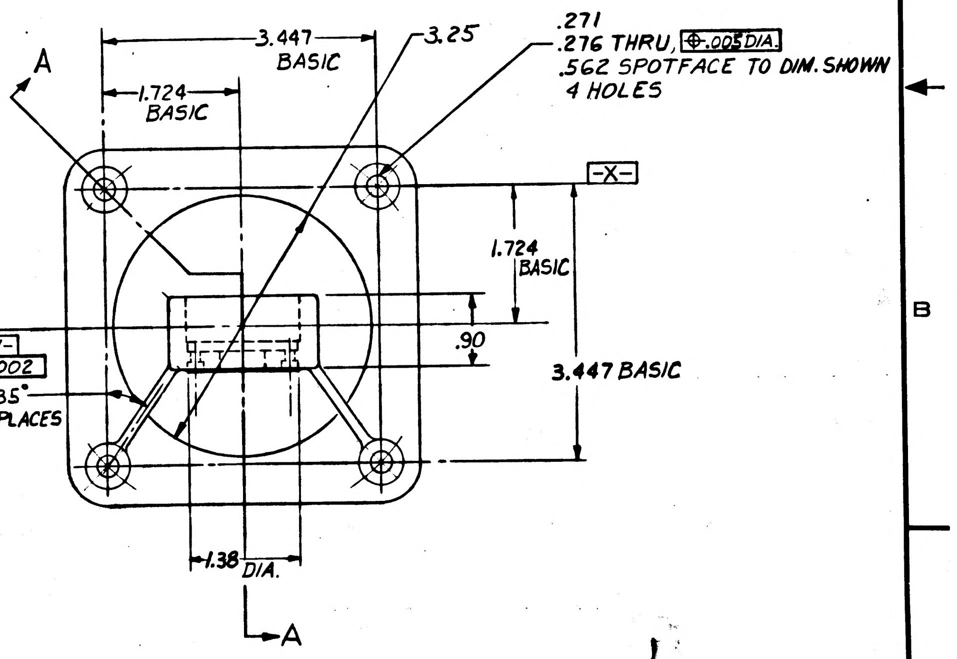
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PRECISION CAST USING ALUMINUM ALLOY QQ-A-601 COMPOSITION -220 TEMPER T4.
3. INSPECT PER MIL-C-6021, CLASS 1A, GRADE B.
4. UNLESS OTHERWISE SPECIFIED:
    - a. ALL CAST RADII TO BE .06.
    - b. ALL CAST WALLS TO BE .12 THICK.
    - c. SURFACE ROUGHNESS MUST NOT EXCEED 125.
    - d. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
    - e. MUST BE FREE FROM BURRS AND SHARP CORNERS.
5. FINISH: ANODIZE PER MIL-A-8625 TYPE I (ES-385).
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019. (ES-267).
7. APPLY DRY FILM LUBRICANT PER MIL-L-8937 FORM "B" TO SURFACE A.


IDENTIFICATION MARK
SEE NOTE 6
.50 R.
4 PLACES
.26 R.
4 PLACES
35°
4 PLACES
2.22
4.44
.52
1.04
2.22
4.44


63
.25 R
4 PLACES
.562
.94
1.188
BASIC
.594
BASIC
1.88
.120 .195
.125 THRU, .200 COUNTER
BORE x.125 DEEP FAR SIDE
⊕ .005 DIA.
2 HOLES
-Z-
.38
2.062
1.250
.188
.156
1.385 DIA.
63
63
.12 R.
4.02
3.98
DIA.
⊥ W .0005
1.3748
1.3750
DIA.
32
.38
63
32
-W-
∥ X .002
.312
.314
35°
2 PLACES
32
.125
.250
SURFACE A
.12 R.
5 PLACES
.025 R, MAX.
12°

SECTION A-A


A
3.447
BASIC
1.724
BASIC
3.25
.271
.276 THRU, ⊕ .005 DIA.
.562 SPOTFACE TO DIM. SHOWN
4 HOLES
-X-
1.724
BASIC
.90
3.447 BASIC
1.38
DIA.
A

2899990	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ -	±.005	+ 1°
-	±.02	-

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN Bu Kaling DATE 13 OCT 64
CHECKED C. Pizzida 3 Nov 64
APPROVAL E. Lembril 3 NOV 64
APPROVAL D. Hensley 3 NOV 64
NASA APPROVAL W. J. Rhine 1-4-64
MIT APPROVAL R. W. Buss 4 Nov 64
Charleston 2 NOV 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SUPPORT, BALL MOUNT,
UPPER RIGHT

CODE IDENT NO.
SIZE D
2899974
SCALE FULL
SHEET 1 OF 1

MASTER

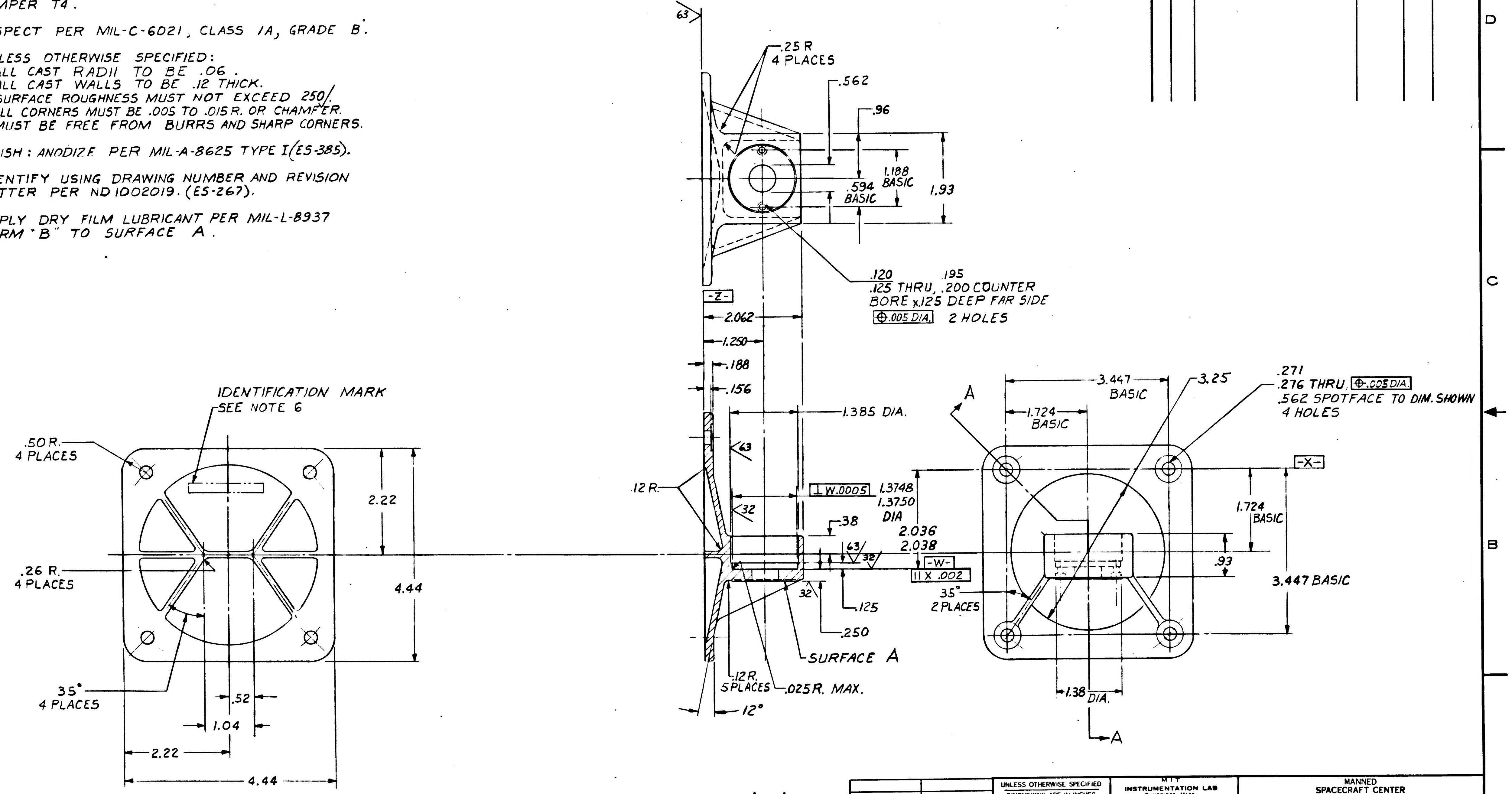
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PRECISION CAST USING ALUMINUM ALLOY QQ-A-601 COMPOSITION -220 TEMPER T4.
3. INSPECT PER MIL-C-6021, CLASS 1A, GRADE B.
4. UNLESS OTHERWISE SPECIFIED:
   a. ALL CAST RADII TO BE .06.
   b. ALL CAST WALLS TO BE .12 THICK.
   c. SURFACE ROUGHNESS MUST NOT EXCEED 250√.
   d. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
   e. MUST BE FREE FROM BURRS AND SHARP CORNERS.
5. FINISH: ANODIZE PER MIL-A-8625 TYPE I (ES-385).
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019. (ES-267).
7. APPLY DRY FILM LUBRICANT PER MIL-L-8937 FORM "B" TO SURFACE A.

C | 2899974

REVISIONS .4020

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
B		UPGRADED TO CLASS A PER TDRR 17019		1 MAR 65	22/
C		REVISED PER TDRR-19599		28 MAY 65	B.



IDENTIFICATION MARK SEE NOTE 6
.50 R. 4 PLACES
.26 R. 4 PLACES
35° 4 PLACES
2.22
4.44
.52
1.04
2.22
4.44
63
.25 R 4 PLACES
.562
.96
1.188 BASIC
.594 BASIC
1.93
.120 .125 THRU, .195 .200 COUNTER BORE x .125 DEEP FAR SIDE ⊕ .005 DIA. 2 HOLES
-Z-
2.062
1.250
.188
.156
1.385 DIA.
63
.12 R.
32
⊥ W .0005
1.3748 1.3750 DIA
.38
63
32
2.036 2.038
-W-
∥ X .002
32
.125
.250
SURFACE A
.12 R. 5 PLACES
.025 R. MAX.
12°
A
3.447 BASIC
1.724 BASIC
3.25
.271 .276 THRU, ⊕ .005 DIA. .562 SPOTFACE TO DIM. SHOWN 4 HOLES
-X-
1.724 BASIC
.93
3.447 BASIC
35° 2 PLACES
1.38 DIA.
A

SECTION A-A

2899990	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.005 ±.02 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DWG NO CONTRACT
DRAWN DATE 3 OCT 64
CHECKED C Pigoda 3 Nov 64
APPROVAL E. Leonard 3 NOV 64
APPROVAL 3 Nov 64
NASA APPROVAL 1-4-64
MIT APPROVAL R.H. Bass 4 Nov 64
2 NOV 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SUPPORT, BALL MOUNT, UPPER RIGHT

CODE IDENT NO. 80230
SIZE D
2899974
SCALE FULL
SHEET 1 OF 1

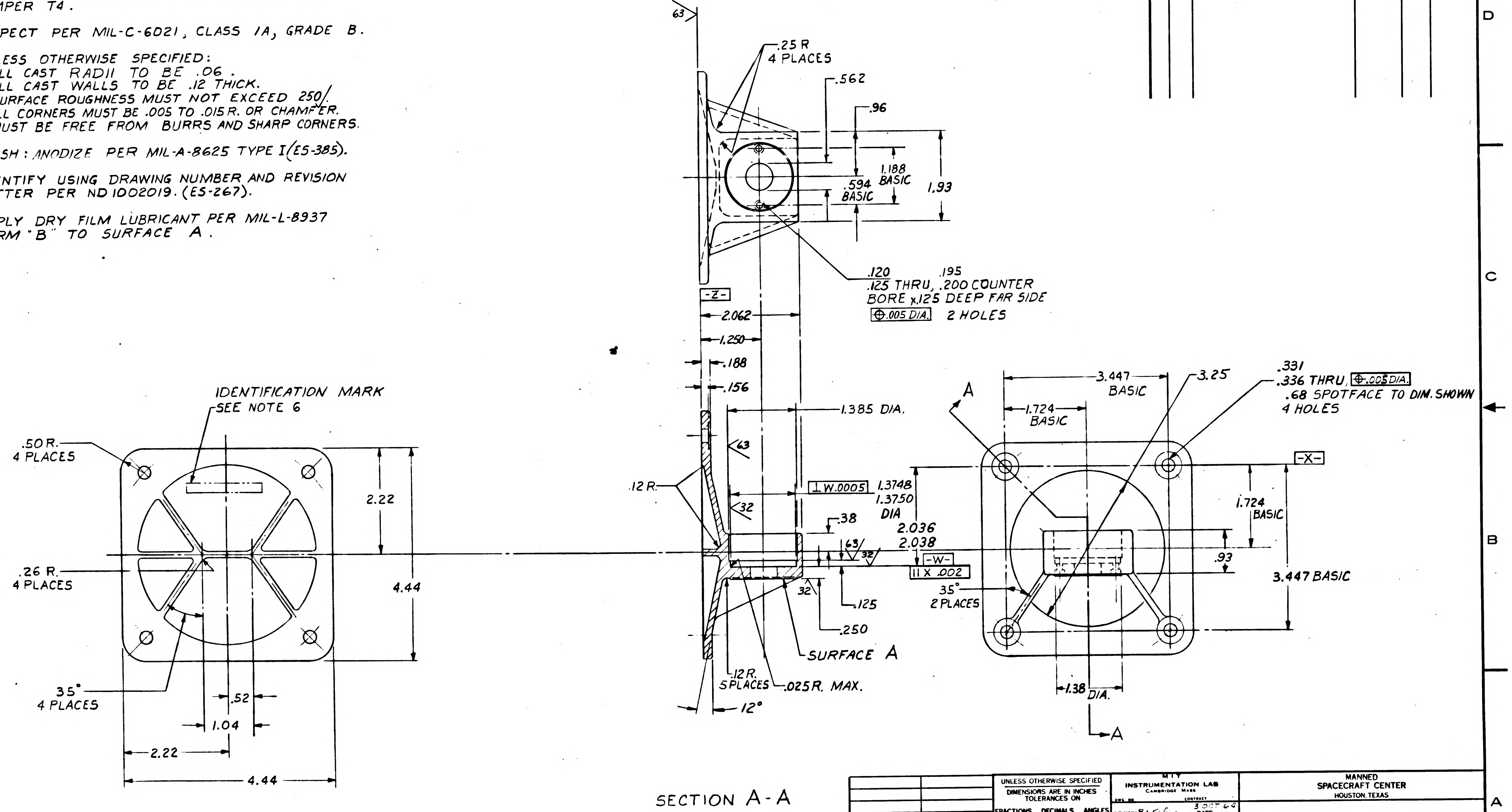
D 2899974

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PRECISION CAST USING ALUMINUM ALLOY QQ-A-601 COMPOSITION -220 TEMPER T4.
3. INSPECT PER MIL-C-6021, CLASS 1A, GRADE B.
4. UNLESS OTHERWISE SPECIFIED:
   a. ALL CAST RADII TO BE .06.
   b. ALL CAST WALLS TO BE .12 THICK.
   c. SURFACE ROUGHNESS MUST NOT EXCEED 250/
   d. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
   e. MUST BE FREE FROM BURRS AND SHARP CORNERS.
5. FINISH: ANODIZE PER MIL-A-8625 TYPE I (ES-385).
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019. (ES-267).
7. APPLY DRY FILM LUBRICANT PER MIL-L-8937 FORM "B" TO SURFACE A.

REVISIONS 14020

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.
B		UPGRADED TO CLASS A PER TDRR 17019		1 MAR 65	
C		REVISED PER TDRR-19599		28 MAY 65	B.
D		REVISED PER TDRR 20960		26 JUL 65	RWH


63
.25 R
4 PLACES
.562
.96
1.188 BASIC
.594 BASIC
1.93
.120
.125 THRU, .195
.200 COUNTER BORE x.125 DEEP FAR SIDE
.005 DIA. 2 HOLES
-Z-
2.062
1.250
.188
.156
1.385 DIA.
IDENTIFICATION MARK
SEE NOTE 6
.50 R.
4 PLACES
2.22
4.44
.26 R.
4 PLACES
35°
4 PLACES
.52
1.04
2.22
4.44
.12 R.
63
W .0005
1.3748
1.3750
DIA
32
.38
2.036
2.038
63/
32/
-W-
II X .002
32
.125
.250
SURFACE A
.12 R.
5 PLACES
.025 R. MAX.
12°
A
3.447 BASIC
1.724 BASIC
3.25
.331
.336 THRU, .005 DIA.
.68 SPOTFACE TO DIM. SHOWN
4 HOLES
-X-
1.724 BASIC
.93
3.447 BASIC
35°
2 PLACES
1.38 DIA.
A

SECTION A-A

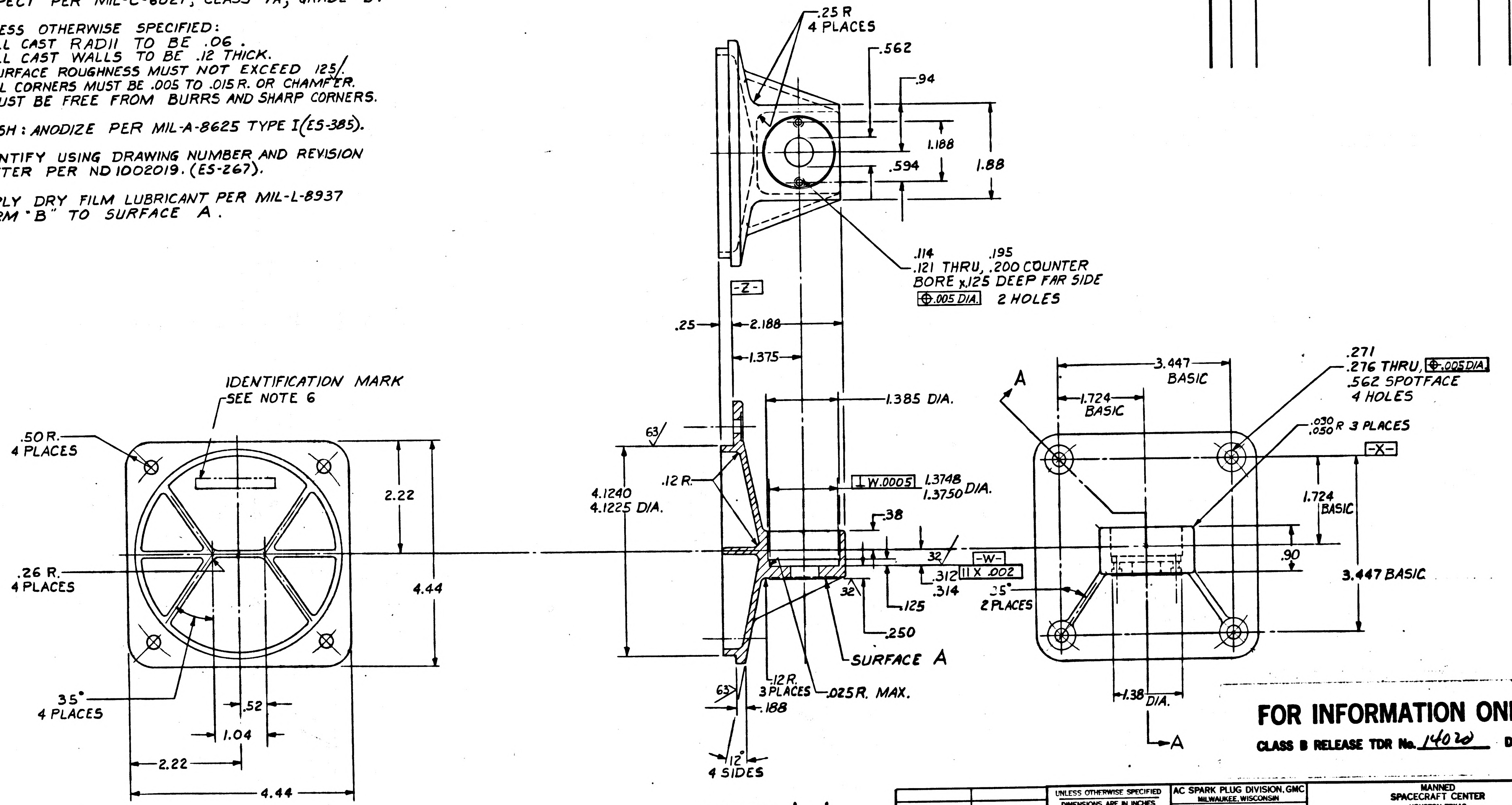
2899990	2899950-011	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	MIT INSTRUMENTATION LAB CAMBRIDGE MASS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
NEXT ASSY	USED ON	FRACTIONS + − DECIMALS ±.005 ±.02 ANGLES +1° −	DRAWN DATE 3 OCT 64 CHECKED C Pizzida 3 Nov 64 APPROVAL E. Lemieux 3 NOV 64 APPROVAL 3 Nov 64	SUPPORT, BALL MOUNT, UPPER RIGHT
APPLICATION		DO NOT SCALE THIS DRAWING	NASA APPROVAL 11-4-64	CODE IDENT NO. 80230 SIZE D 2899974
		MATERIAL SEE NOTE 2	MIT APPROVAL R. H. Bass 4 Nov 64	
		CONTRACT NAS 9-497	2 NOV 64	SCALE FULL SHEET 1 OF 1

MIL 10770 A

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PRECISION CAST PER MIL-C-11866 USING ALUMINUM ALLOY QQ-A-601 COMPOSITION -220 TEMPER T4.
3. INSPECT PER MIL-C-6021, CLASS 1A, GRADE B.
4. UNLESS OTHERWISE SPECIFIED:
   - a. ALL CAST RADII TO BE .06.
   - b. ALL CAST WALLS TO BE .12 THICK.
   - c. SURFACE ROUGHNESS MUST NOT EXCEED 125/.
   - d. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
   - e. MUST BE FREE FROM BURRS AND SHARP CORNERS.
5. FINISH: ANODIZE PER MIL-A-8625 TYPE I (ES-385).
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019. (ES-267).
7. APPLY DRY FILM LUBRICANT PER MIL-L-8937 FORM "B" TO SURFACE A.


IDENTIFICATION MARK
SEE NOTE 6
.50 R.
4 PLACES
2.22
4.44
.26 R.
4 PLACES
35°
4 PLACES
.52
1.04
2.22
4.44
.25 R
4 PLACES
.562
.94
1.188
.594
1.88
.114
.121 THRU, .195
.200 COUNTER BORE x.125 DEEP FAR SIDE
⊕.005 DIA.
2 HOLES
-Z-
.25
2.188
1.375
1.385 DIA.
63
.12 R.
4.1240
4.1225 DIA.
⊥W.0005
1.3748
1.3750 DIA.
.38
32
-W-
.312
.314
∥ X .002
32
.125
.250
SURFACE A
.12 R.
3 PLACES
.025 R. MAX.
63
.188
12°
4 SIDES
A
3.447
BASIC
1.724
BASIC
.271
.276 THRU, ⊕.005 DIA.
.562 SPOTFACE
4 HOLES
.030
.050 R 3 PLACES
-X-
1.724
BASIC
.90
3.447 BASIC
35°
2 PLACES
1.38 DIA.
A

SECTION A-A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 **DATE**

MASTER

2899990	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ −	±.005	+ 1°
−	±.02	−

DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 13 OCT 64
CHECKED C. Pizzida 3 Nov 64
APPROVAL E. Lambert 3 NOV 64
APPROVAL 3 NOV 64
NASA APPROVAL W. J. 1-4-64
MIT APPROVAL R. W. Bass 4/16/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SUPPORT, BALL MOUNT,
UPPER RIGHT

CODE IDENT NO.
SIZE D
2899974
SCALE FULL
SHEET 1 OF 1

Charleston
2 NOV 64

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. MATERIAL: PRECISION CAST USING ALUMINUM ALLOY QQ-A-601 COMPOSITION -220 TEMPER T4.

3. INSPECT PER MIL-C-6021, CLASS 1A, GRADE B.

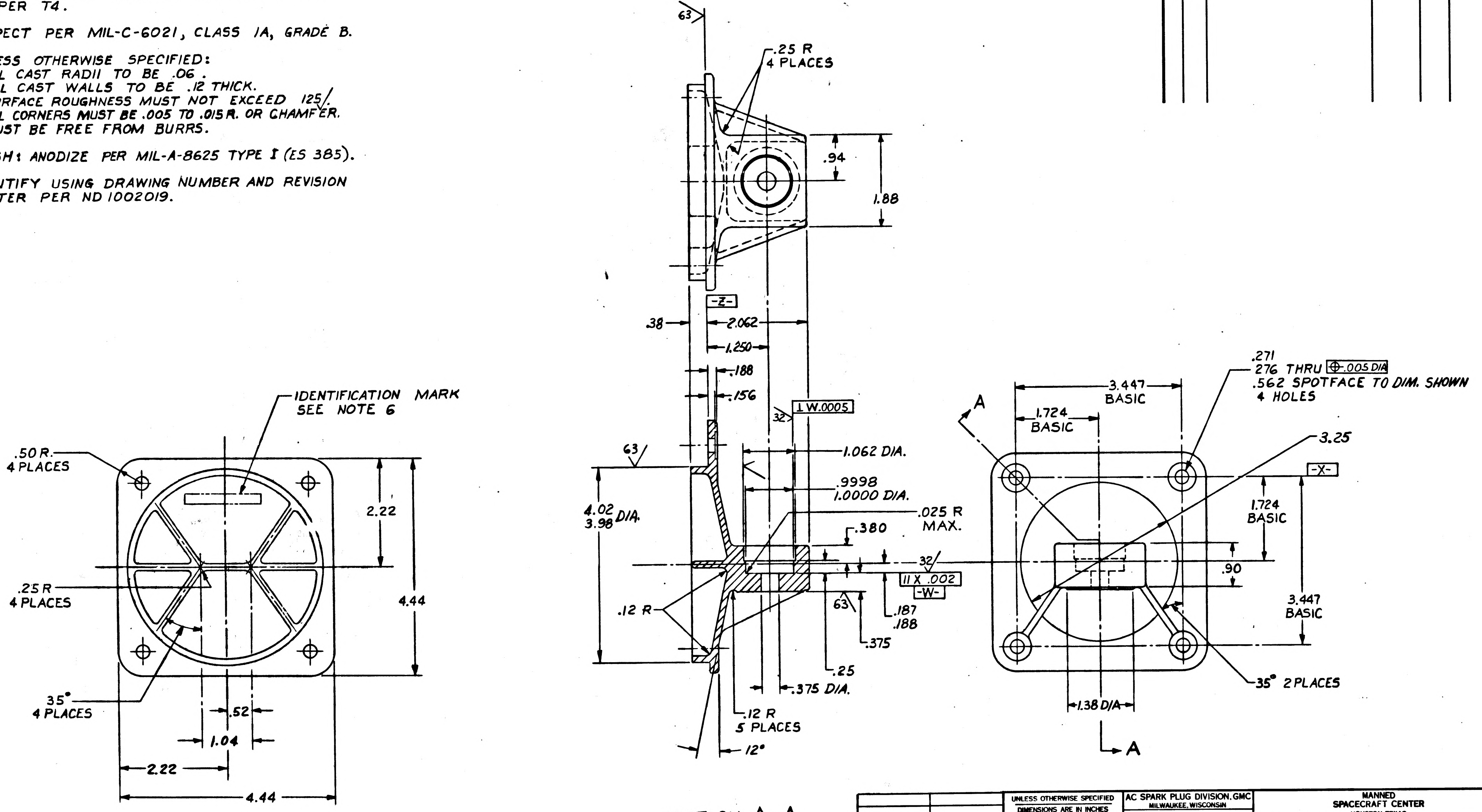
4. UNLESS OTHERWISE SPECIFIED:
   a. ALL CAST RADII TO BE .06.
   b. ALL CAST WALLS TO BE .12 THICK.
   c. SURFACE ROUGHNESS MUST NOT EXCEED 125/.
   d. ALL CORNERS MUST BE .005 TO .015R. OR CHAMFER.
   e. MUST BE FREE FROM BURRS.

5. FINISH: ANODIZE PER MIL-A-8625 TYPE I (ES 385).

6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.

B 2899975

REVISIONS 14306					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
B		UPGRADED TO CLASS A PER TDRR 17020		1 MAR 65	


63
.25 R
4 PLACES
.94
1.88
-Z-
.38
2.062
1.250
.188
.156
32
⊥ W.0005
63
1.062 DIA.
.9998
1.0000 DIA.
4.02
3.98 DIA.
.025 R
MAX.
.380
32
II X .002
-W-
.12 R
63
.187
.188
.375
.25
.375 DIA.
.12 R
5 PLACES
12°
IDENTIFICATION MARK
SEE NOTE 6
.50 R.
4 PLACES
2.22
4.44
.25 R
4 PLACES
35°
4 PLACES
.52
1.04
2.22
4.44
A
3.447
BASIC
1.724
BASIC
.271
.276 THRU ⊕ .005 DIA
.562 SPOTFACE TO DIM. SHOWN
4 HOLES
3.25
-X-
1.724
BASIC
.90
3.447
BASIC
35° 2 PLACES
1.38 DIA
A

SECTION A-A

MASTER

2899989	2899950-011	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + − DECIMALS ±.005 ±.02 ANGLES ±1° DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN Bob Keeling DATE 6 NOV 64 CHECKED C. Pioyda 13 NOV 64 APPROVAL E. Lambert 13 NOV 64 APPROVAL 13 NOV 64	MANNED SPACECRAFT CENTER HOUSTON, TEXAS SUPPORT, BALL MOUNT, UPPER LEFT
NEXT ASSY	USED ON	MATERIAL SEE NOTE 2	NASA APPROVAL 11-27-64 R.W. Gross	CODE IDENT NO. SIZE D 2899975
APPLICATION		CONTRACT NAS 9-497	MIT APPROVAL 11/17/64	SCALE FULL SHEET 1 OF 1

3 Charleston 11 NOV 64

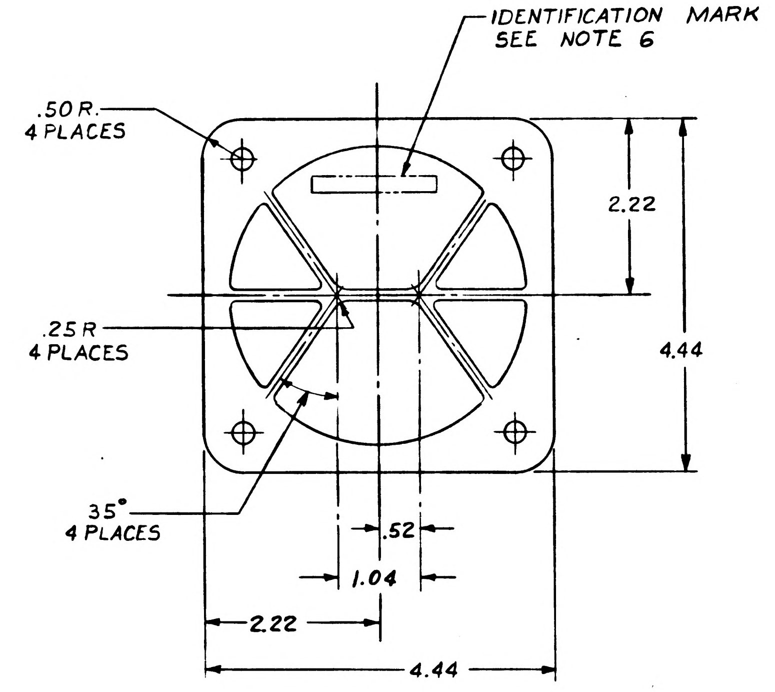
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PRECISION CAST USING ALUMINUM ALLOY QQ-A-601 COMPOSITION -220 TEMPER T4.
3. INSPECT PER MIL-C-6021, CLASS IA, GRADE B.
4. UNLESS OTHERWISE SPECIFIED:
   - a. ALL CAST RADII TO BE .06.
   - b. ALL CAST WALLS TO BE .12 THICK.
   - c. SURFACE ROUGHNESS MUST NOT EXCEED 250/.
   - d. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
   - e. MUST BE FREE FROM BURRS.
5. FINISH: ANODIZE PER MIL-A-8625 TYPE I (ES 385).
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.

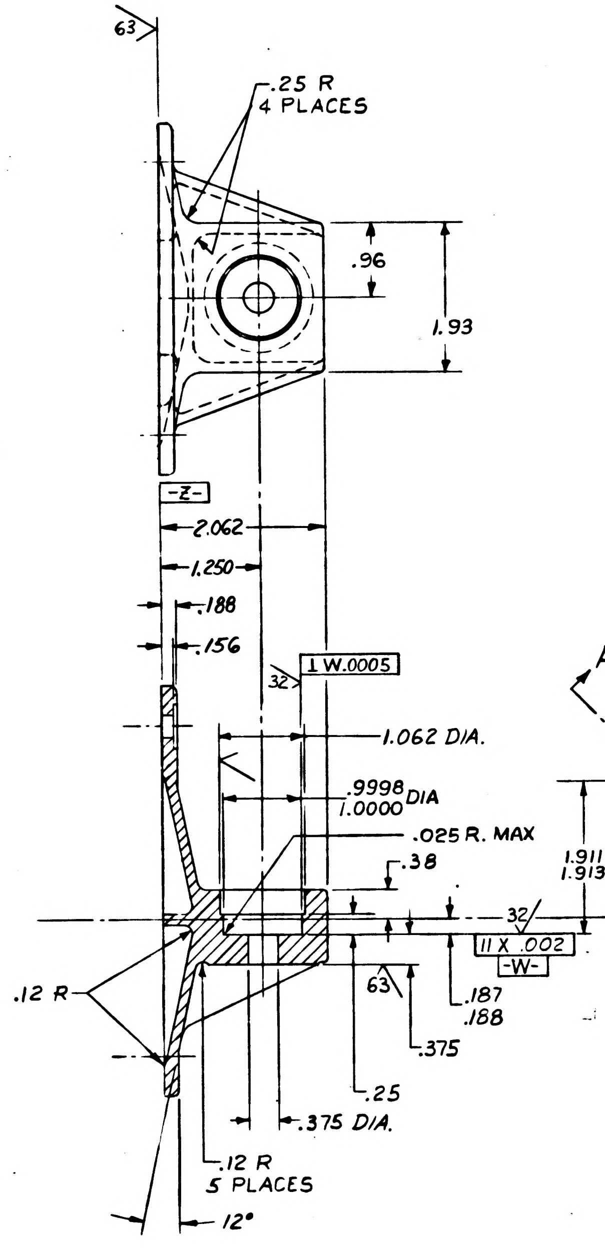
(r)

REVISIONS 14306

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.
B		UPGRADED TO CLASS A PER TDRR 17020		1 MAR 65	
C		REVISED PER TDRR 19600	—	29 MAY 65	J J J

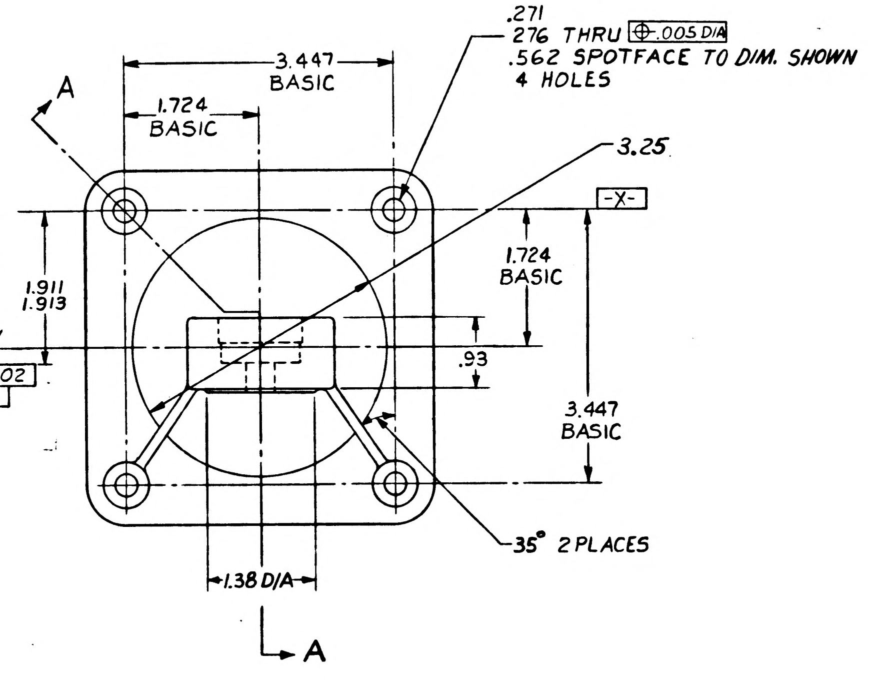


.50 R. 4 PLACES
IDENTIFICATION MARK SEE NOTE 6
2.22
4.44
.25 R 4 PLACES
35° 4 PLACES
.52
1.04
2.22
4.44



63
.25 R 4 PLACES
.96
1.93
-Z-
2.062
1.250
.188
.156
32
⊥ W .0005
1.062 DIA.
.9998 1.0000 DIA
.025 R. MAX
.38
1.911 1.913
32
// X .002
-W-
63
.187 .188
.375
.25
.12 R
.375 DIA.
.12 R 5 PLACES
12°

SECTION A-A



.271 .276 THRU ⊕ .005 DIA .562 SPOTFACE TO DIM. SHOWN 4 HOLES
3.447 BASIC
1.724 BASIC
A
3.25
-X-
1.724 BASIC
.93
3.447 BASIC
35° 2 PLACES
1.38 DIA
A

2899989	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ − —	±.005 ±.03	+1° −

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN Bob Xirling DATE 6 NOV 64
CHECKED C. Pizzda 13 NOV 64
APPROVAL 13 NOV 64
APPROVAL 13 NOV 64
NASA APPROVAL W. J. 11-27-64
R.W. Gre
MIT APPROVAL 11/17/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SUPPORT, BALL MOUNT,
UPPER LEFT

CODE IDENT NO 80230 SIZE D 2899975

SCALE FULL SHEET 1 OF 1

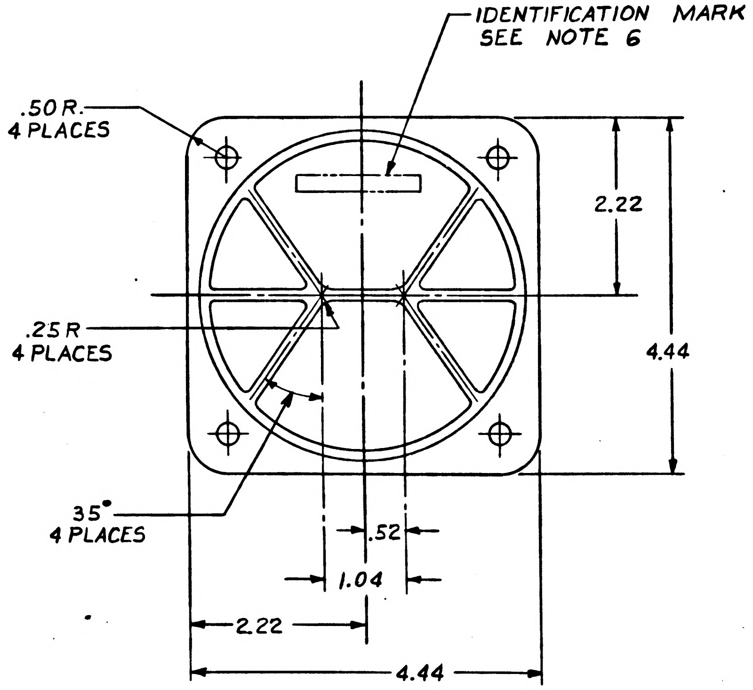
Charleston 11 NOV 64

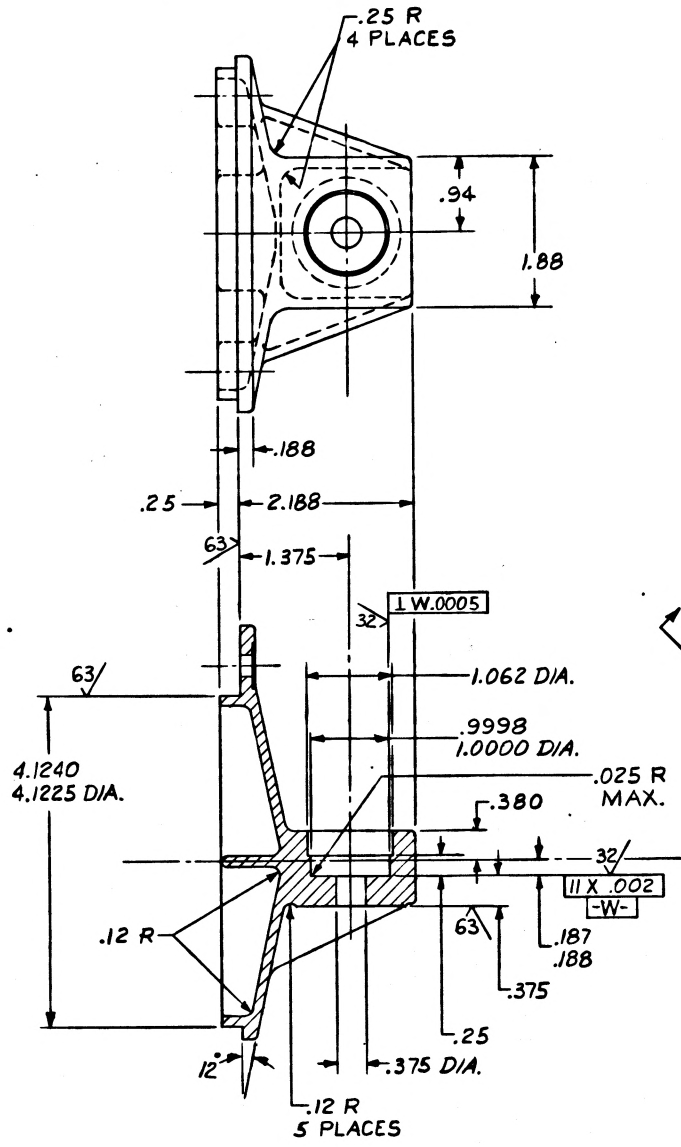
2899975

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
		REVISIONS			

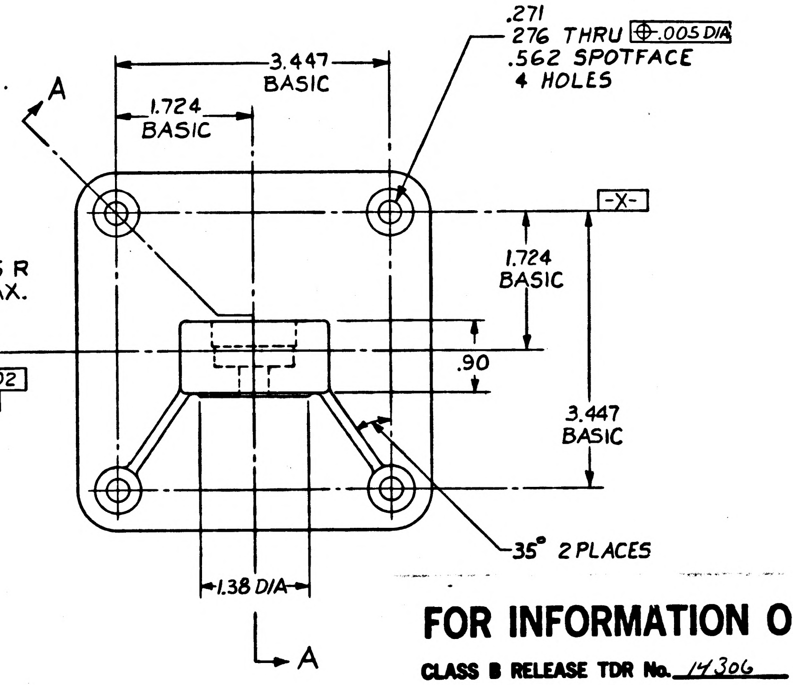
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PRECISION CAST USING ALUMINUM ALLOY QQ-A-601 COMPOSITION -220 TEMPER T4.
3. INSPECT PER MIL-C-6021, CLASS 1A, GRADE B.
4. UNLESS OTHERWISE SPECIFIED:
   a. ALL CAST RADII TO BE .06.
   b. ALL CAST WALLS TO BE .12 THICK.
   c. SURFACE ROUGHNESS MUST NOT EXCEED 125/.
   d. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
   e. MUST BE FREE FROM BURRS.
5. FINISH: ANODIZE PER MIL-A-8625 TYPE I (ES-385).
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.


IDENTIFICATION MARK SEE NOTE 6
.50 R. 4 PLACES
.25 R 4 PLACES
35° 4 PLACES
2.22
4.44
.52
1.04
2.22
4.44


.25 R 4 PLACES
.94
1.88
.188
.25
2.188
63
1.375
32
⊥ W .0005
1.062 DIA.
63
.9998
1.0000 DIA.
.025 R MAX.
4.1240
4.1225 DIA.
.380
32
// X .002
-W-
.12 R
63
.187
.188
.375
.25
.375 DIA.
12°
.12 R 5 PLACES

SECTION A-A


A
3.447 BASIC
1.724 BASIC
.271
.276 THRU ⌖ .005 DIA
.562 SPOTFACE
4 HOLES
-X-
1.724 BASIC
.90
3.447 BASIC
35° 2 PLACES
1.38 DIA
A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14306 **DATE** 11/17/64

2899989	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	±.005	+ 1°
−	±.02	−

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bob Kasling DATE 6 NOV 64
CHECKED C. Pioda 13 Nov 64
APPROVAL 13 NOV 64
APPROVAL 13 NOV 64
NASA APPROVAL W J 11-17-64
R.W. Dias
MIT APPROVAL 11/17/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SUPPORT, BALL MOUNT,
UPPER LEFT

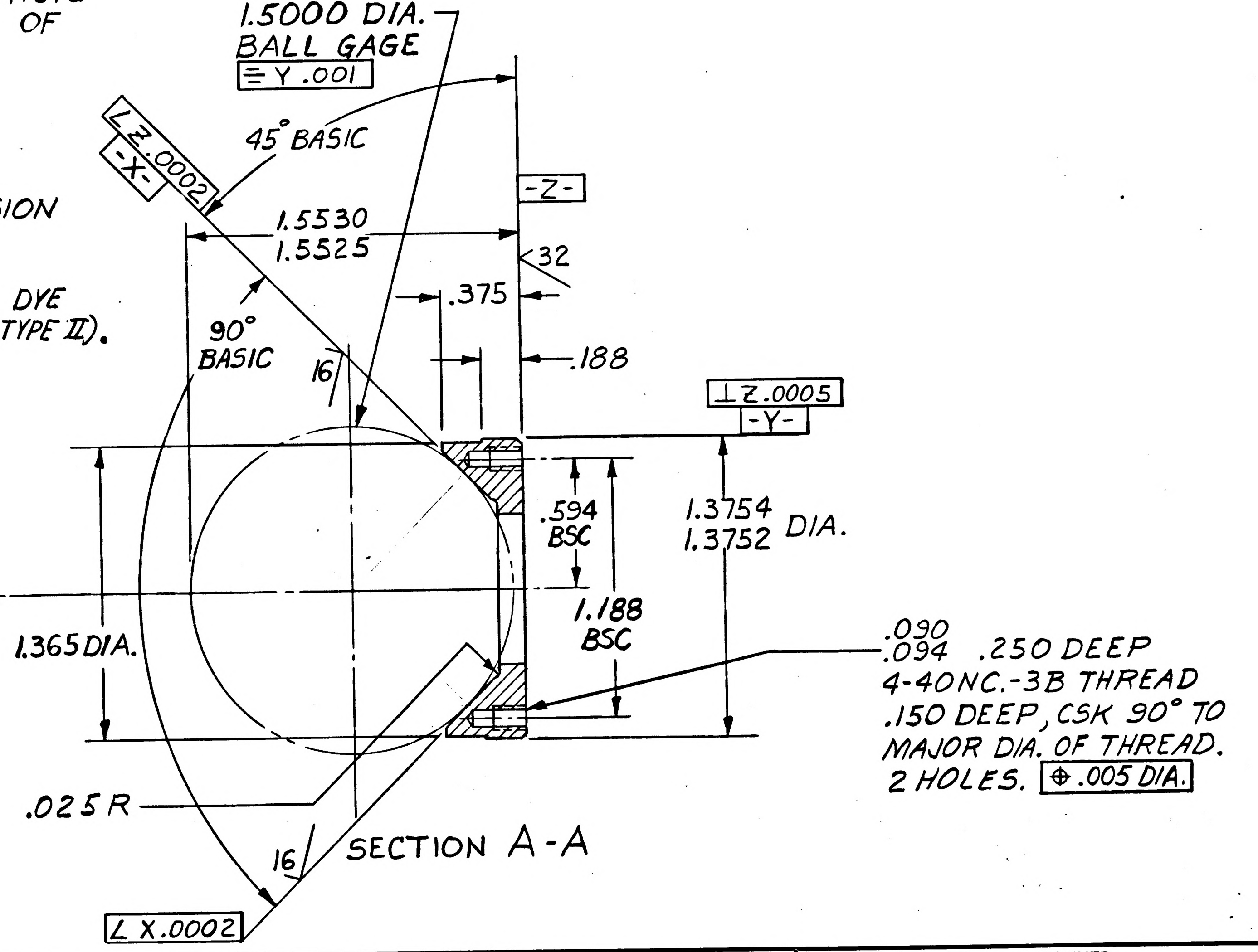
CODE IDENT NO.
SIZE D
2899975
SCALE FULL
SHEET 1 OF 1

3 Charlton 11 NOV. 64

REVISIONS 14020					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
B		UPGRADED TO CLASS A PER TDRR 17025		1 MAR 65	

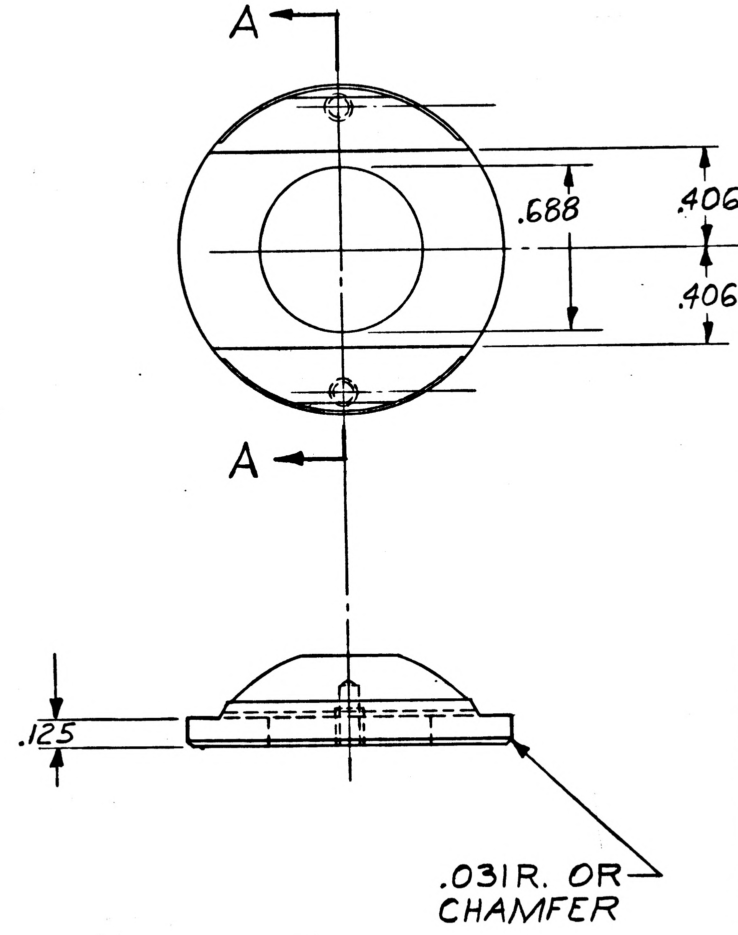
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: STAINLESS STEEL PER QQ-S-763, CLASS 440 C, COND. A (ES 373, 440C)
3. HEAT TREAT PER MIL-H-6875, TO Rc 58 MINIMUM (ES 2020-3).
4. UNLESS OTHERWISE SPECIFIED:
   - a. ALL CORNERS TO BE .005 TO .015 R. OR CHAMFER.
   - b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   - c. MUST BE FREE OF BURRS.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-F-14072 (SIG-C) FINISH E-300 PRIOR TO FINISH MACHINING OF 16√ SURFACE (ES 585).
6. APPLY DRY FILM LUBRICANT PER MIL-L-8937 FORM "B" TO 16√ SURFACES ONLY.
7. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.
8. INSPECT FOR SURFACE CRACKS AND DEFECTS USING DYE PENETRANT PER MIL-I-6866 TYPE II (ES 2453 TYPE II).



1.5000 DIA.
BALL GAGE
≡ Y .001
45° BASIC
∠ Z .0002
-X-
-Z-
1.5530
1.5525
32
.375
.188
90° BASIC
16
⊥ Z .0005
-Y-
.594 BSC
1.3754
1.3752 DIA.
1.188 BSC
1.365 DIA.
.090
.094 .250 DEEP
4-40NC.-3B THREAD
.150 DEEP, CSK 90° TO
MAJOR DIA. OF THREAD.
2 HOLES. ⊕ .005 DIA.
.025 R
16
∠ X .0002

SECTION A-A



A
A
.688
.406
.406
.125
.031 R. OR
CHAMFER

2899990	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN B.L. Keeling DATE 5 OCT 64
CHECKED C. Pizjda 3 NOV 64
APPROVAL E. Lenkel 3 NOV 64
APPROVAL A. Hensley 3 NOV 64
NASA APPROVAL W. J. Klein 11-4-64
MIT APPROVAL R. W. Gee W. Kuyfer 4 Nov 64
Charleston 2 NOV 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

INSERT, LINE BASE

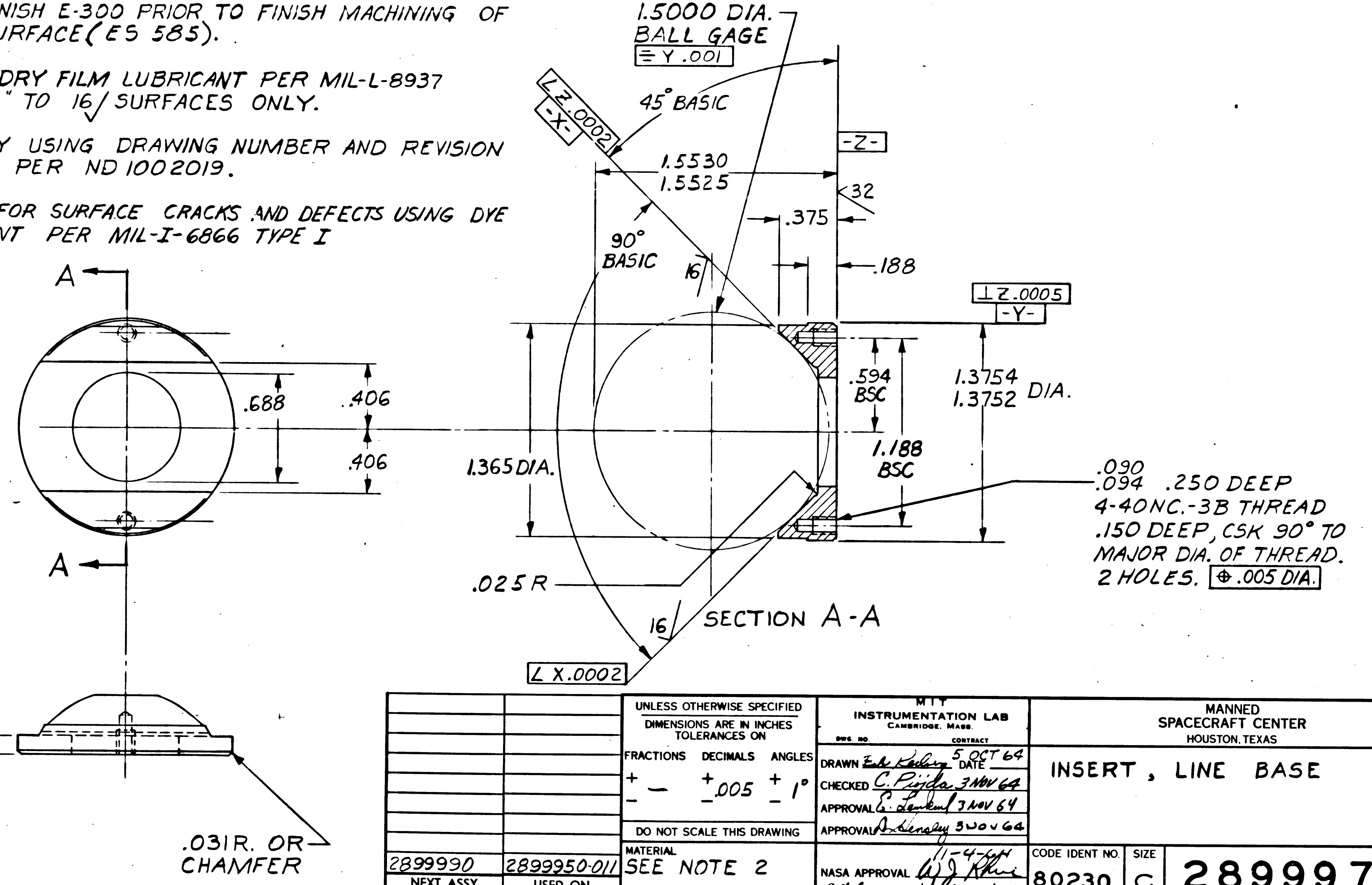
CODE IDENT NO.
SIZE C
2899976
SCALE 2:1
SHEET 1 OF 1

MIL 1077C-P

REVISIONS 14020					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
B		UPGRADED TO CLASS A PER TDRR 17025		1 MAR 65	S.A.
C		REVISED PER TDRR 19948		14 JUN 65	RJW Y.M.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: STAINLESS STEEL PER QQ-S-763, CLASS 440 C, COND. A (ES 373, 440C)
3. HEAT TREAT PER MIL-H-6875, TO Rc 58 MINIMUM (ES 2020-3).
4. UNLESS OTHERWISE SPECIFIED:
   a. ALL CORNERS TO BE .005 TO .015 R. OR CHAMFER.
   b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   c. MUST BE FREE OF BURRS.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-F-14072 (SIG-C) FINISH E-300 PRIOR TO FINISH MACHINING OF 16√ SURFACE (ES 585).
6. APPLY DRY FILM LUBRICANT PER MIL-L-8937 FORM "B" TO 16√ SURFACES ONLY.
7. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.
8. INSPECT FOR SURFACE CRACKS AND DEFECTS USING DYE PENETRANT PER MIL-I-6866 TYPE I


1.5000 DIA.
BALL GAGE
≡ Y .001
45° BASIC
∠ Z .0002
-X-
-Z-
1.5530
1.5525
32
.375
.188
90° BASIC
16
⊥ Z .0005
-Y-
A
A
.688
.406
.406
1.365 DIA.
.594 BSC
1.188 BSC
1.3754
1.3752 DIA.
.090
.094 .250 DEEP
4-40NC.-3B THREAD
.150 DEEP, CSK 90° TO
MAJOR DIA. OF THREAD.
2 HOLES. ⊕ .005 DIA.
.025 R
16
SECTION A-A
∠ X .0002
.125
.031 R. OR CHAMFER

2899990	2899950-011	
NEXT ASSY	USED ON	
APPLICATION		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS.
DWG. NO. CONTRACT
DRAWN Ed Keeling DATE 5 OCT 64
CHECKED C. Pijda 3 NOV 64
APPROVAL E. Lenkent 3 NOV 64
APPROVAL A. Hensley 3 NOV 64
NASA APPROVAL W. J. Rhine 11-4-64
R.H. Grass
MIT APPROVAL W. Kupfer 4 Nov 64
Charleston 2 NOV 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

INSERT, LINE BASE

CODE IDENT NO. 80230
SIZE C
2899976
SCALE 2:1
SHEET 1 OF 1

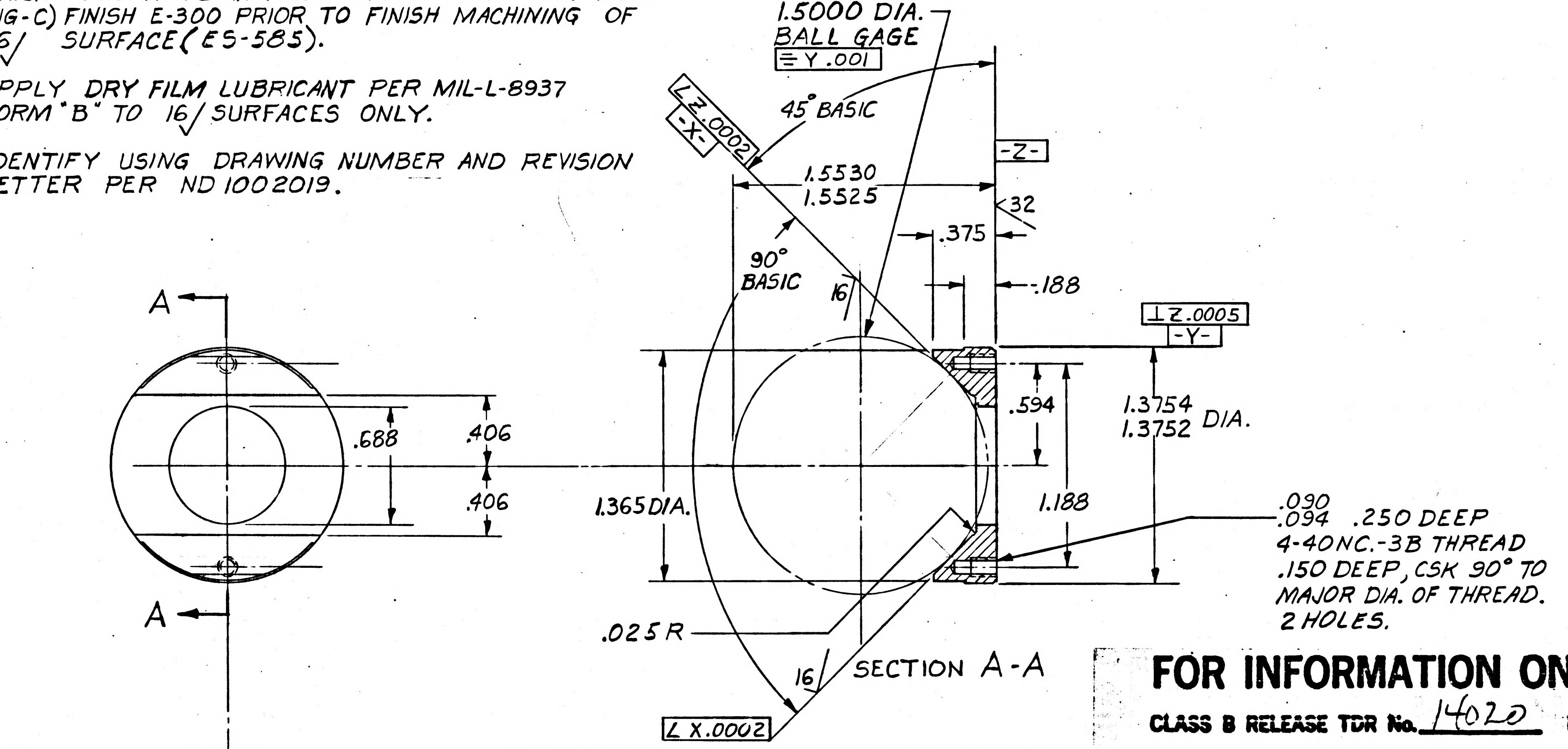
MIL 1077C—P

NOTES:

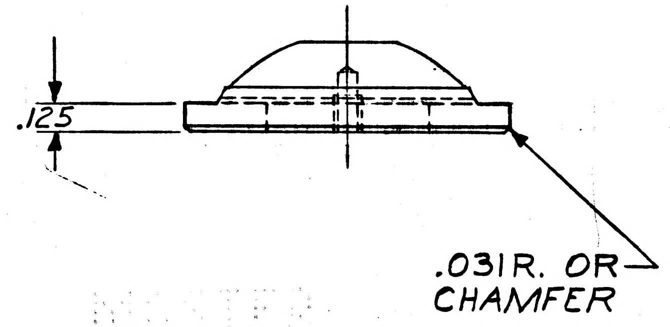
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: STAINLESS STEEL PER QQ-S-763, CLASS 440 C, COND. A (ES-373, 440C)
3. HEAT TREAT PER MIL-H-6875, TO Rc 58 MINIMUM (ES-2020-3).
4. UNLESS OTHERWISE SPECIFIED:
   - a. ALL CORNERS TO BE .005 TO .015R. OR CHAMFER.
   - b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   - c. MUST BE FREE OF BURRS.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-F-14072 (SIG-C) FINISH E-300 PRIOR TO FINISH MACHINING OF 16√ SURFACE (ES-585).
6. APPLY DRY FILM LUBRICANT PER MIL-L-8937 FORM "B" TO 16√ SURFACES ONLY.
7. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.



1.5000 DIA.
BALL GAGE
= Y .001
45° BASIC
∠ Z .0002
-X-
-Z-
1.5530
1.5525
32
.375
.188
90° BASIC
16
⊥ Z .0005
-Y-
A
A
.688
.406
.406
1.365 DIA.
.594
1.3754
1.3752 DIA.
1.188
.090
.094 .250 DEEP
4-40NC.-3B THREAD
.150 DEEP, CSK 90° TO
MAJOR DIA. OF THREAD.
2 HOLES.
.025 R
16
SECTION A-A
∠ X .0002



.125
.031R. OR
CHAMFER

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 **DATE**

2899990	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	± .005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN Bob Kerling DATE 5 OCT 64
CHECKED C. Pijda 3 NOV 64
APPROVAL E. Lenkel 3 NOV 64
APPROVAL A. Hensley 3 NOV 64
NASA APPROVAL W. J. Rhine 11-4-64
MIT APPROVAL R. H. Baca W. Kyffer 4 Nov 64
Charleston 2 NOV 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

INSERT, LINE BASE

CODE IDENT NO.
SIZE C
2899976
SCALE 2:1
SHEET 1 OF 1

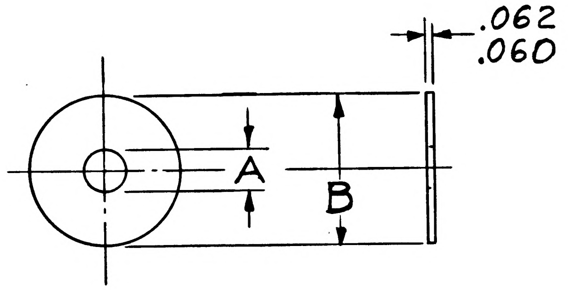
MIL 1077C—P

INCHES 0 1 2

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		UPGRADED TO CLASS A PER TDRR 16951		1 MAR 65	S.A.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: STAINLESS STEEL PER AMS-5643, TYPE 17-4 PH (ES-2102).
3. UNLESS OTHERWISE SPECIFIED:
   a. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
   b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   c. MUST BE FREE FROM BURRS.
4. FINISH:
   a. HEAT TREAT PER MIL-H-6875, TYPE 17-4 PH, CONDITION H-900 (ES-2011-1).
   b. PASSIVATE PER MIL-F-14072 (SIG. C) FINISH E-300 (ES-585).
5. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.
6. APPLY DRY FILM LUBRICANT PER MIL-L-8937 FORM "B".



PART NO.	DIM. A	DIM. B
2899977-001	.255-.260	1.250
2899977-002	.315-.320	1.250
2899977-003	.255-.260	.750

NEXT ASSY	USED ON
2899988-011	2899950-011
2899987-011	2899950-011
2899986-011	2899950-011
2899950-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ –	±.02	+ 1°
–	±.005	–

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9 - 497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 6 OCT 64
CHECKED 3 NOV 64
APPROVAL 3 NOV. 64
APPROVAL 3 NOV 64
NASA APPROVAL 12-4-64
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WASHER, FLAT,
LUBRICATED

CODE IDENT NO.
SIZE C
2899977
SCALE FULL
SHEET 1 OF 1

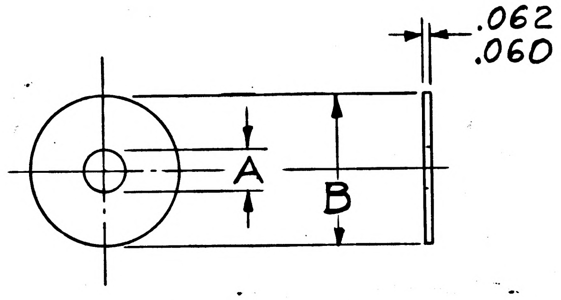
MIL 1077C—P

Charleston 2 Nov 64

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: STAINLESS STEEL PER AMS-5643, TYPE 17-4 PH (ES-2102).
3. UNLESS OTHERWISE SPECIFIED:
   a. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
   b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   c. MUST BE FREE FROM BURRS.
4. FINISH:
   a. HEAT TREAT PER MIL-H-6875, TYPE 17-4 PH, CONDITION H-900 (ES-2011-1).
   b. PASSIVATE PER MIL-F-14072 (516.C) FINISH E-300 (ES-585).
5. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.
6. APPLY DRY FILM LUBRICANT PER MIL-L-8937 FORM "B".

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.



PART NO.	DIM. A	DIM. B
2899977-001	.255-.260	1.250
2899977-002	.315-.320	1.250
2899977-003	.255-.260	.750

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 **DATE**

NEXT ASSY	USED ON
2899988-011	2899950-011
2899987-011	2899950-011
2899986-011	2899950-011
2899950-011	2899950-011
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + – – DECIMALS ±.02 ±.005 ANGLES + – 1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bob Kesling DATE 6 OCT 64
CHECKED C. Pigilla 3 NOV 64
APPROVAL E. Lenkel 3 NOV. 64
APPROVAL B. Hensley 3 NOV 64
NASA APPROVAL W. J. Rhine 11-4-64
MIT APPROVAL R. W. Geas W. Hopfer 4 Nov 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WASHER, FLAT,
LUBRICATED

CODE IDENT NO. SIZE C 2899977
SCALE FULL SHEET 1 OF 1

Charleston 2 Nov 64

MIL 1077C-F

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

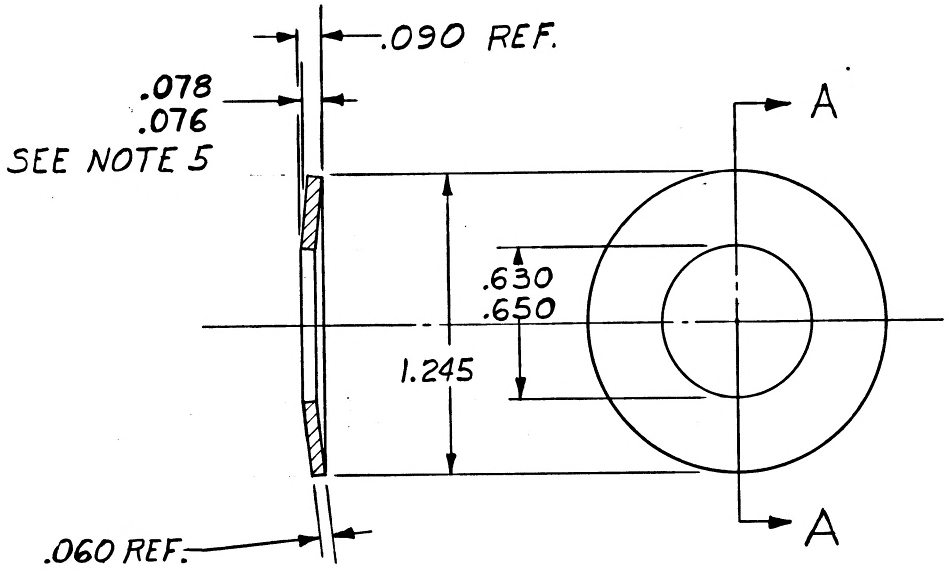
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: SPRING STEEL PER QQ-S-00640 (SAE-1075).
3. FINISH: ELECTROLESS NICKEL PER MIL-C-26074, CLASS I, .0004 TO .0007 THICK.
4. MUST BE FREE FROM BURRS AND SHARP CORNERS.
5. LOAD AT COMPRESSION THRU THE RANGE OF .076-.078 HEIGHT MUST AT EACH POINT BE WITHIN 400-450 POUNDS.
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND1002019.
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS SPECIFIED PER ND1015404 CLASS III.

REVISIONS

Ⓜ

SYM	ZONE	DESCRIPTION 14020	CHG NO.	DATE	APPD.
B	—	UPGRADED TO CLASS A PER TDRR 17028	—	1 MAR 65	S.A.



SECTION A-A

2899950-011	2899950-011
2899986-011	2899950-011
2899987-011	2899950-011
2899988-011	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
±	±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN DATE 14 OCT 64
CHECKED 3 NOV 64
APPROVAL 3 NOV 64
APPROVAL 3 NOV 64
NASA APPROVAL 11-4-64
MIT APPROVAL 4 NOV

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WASHER- SPRING TENSION

CODE IDENT NO.
SIZE C
2899979

SCALE 2:1
SHEET 1 OF 1

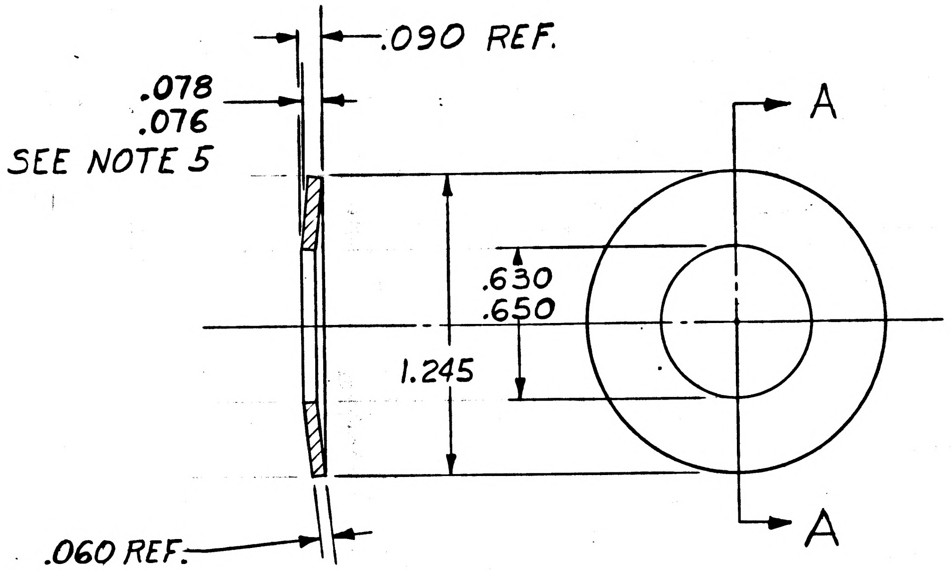
Charleston 2 NOV 64

2899979

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: SPRING STEEL PER QQ-S-00640 (SAE-1075).
3. FINISH: ELECTROLESS NICKEL PER MIL-C-26074, CLASS I, .0004 TO .0007 THICK.
4. MUST BE FREE FROM BURRS AND SHARP CORNERS.
5. LOAD AT COMPRESSION TO .076 -.078 HEIGHT MUST EQUAL 400 - 450 POUNDS.
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND1002019.
7. SUPPLIER SHALL CONFORM TO THE QUALITY ASSURANCE PROVISIONS AS SPECIFIED PER ND1015404 CLASS III.

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPD.
		CHG NO.		



SECTION A-A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 **DATE**

2899950-011	2899950-011
2899986-011	2899950-011
2899987-011	2899950-011
2899988-011	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bob Kaling DATE 14 OCT 64
CHECKED C. Pioyda 3 NOV 64
APPROVAL E. Lenkeit 3 NOV 64
APPROVAL A. Hensley 3 NOV 64
NASA APPROVAL 11-4-64
R. H. Gras
MIT APPROVAL 4 Nov
Charleston 2 NOV 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WASHER- SPRING TENSION

CODE IDENT NO.
SIZE C
2899979
SCALE 2:1
SHEET 1 OF 1

MIL 1077C—P

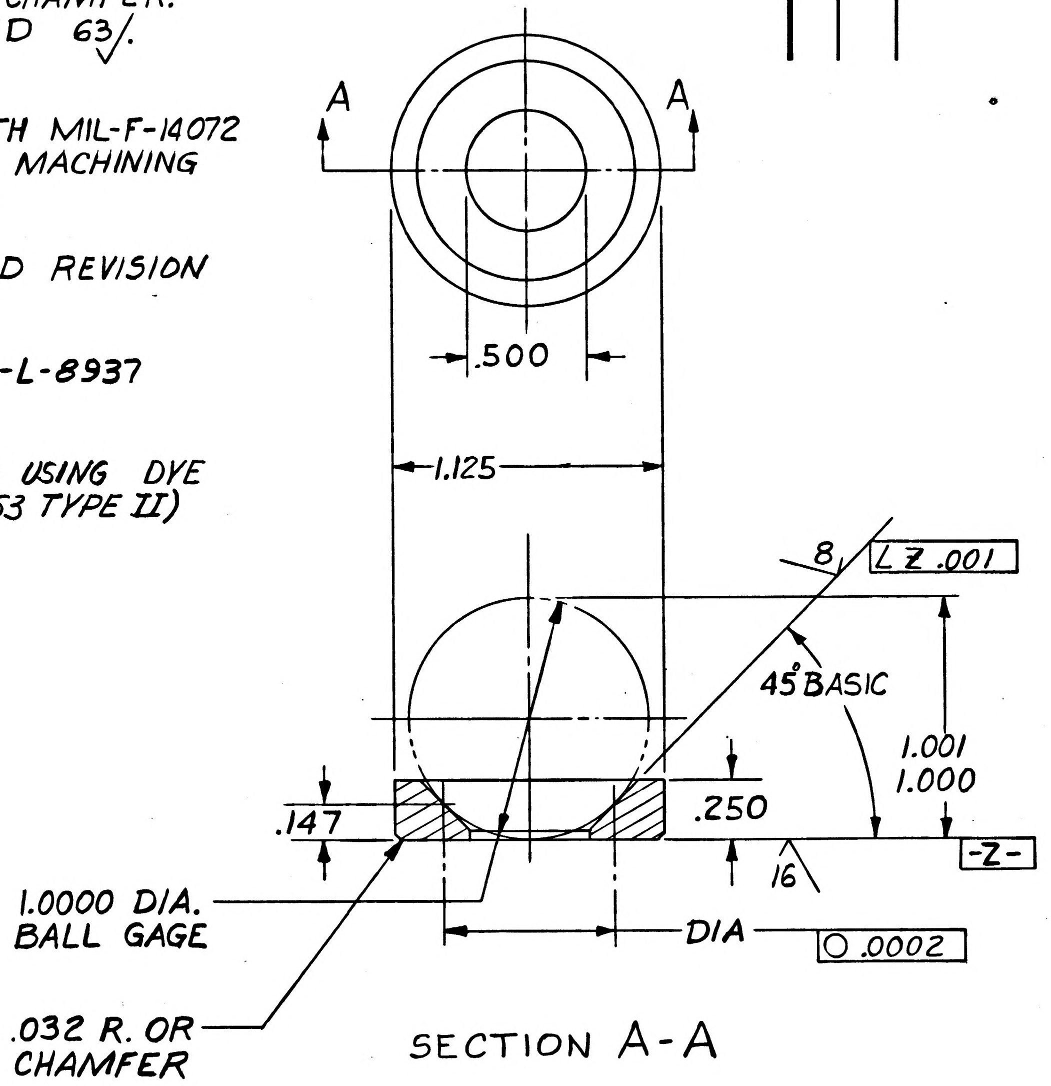
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: STAINLESS STEEL PER QQ-S-763 CLASS 440C, COND. ACF (ES 373).
3. HEAT TREAT PER MIL-H-6875, TO Rc 58 MINIMUM (ES 2020-3).
4. UNLESS OTHERWISE SPECIFIED:
   a. ALL CORNERS TO BE .005 TO .015 R. OR CHAMFER.
   b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   c. MUST BE FREE OF BURRS.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-F-14072 (SIG C) FINISH E-300 PRIOR TO FINISH MACHINING OF 8√ AND [Z] SURFACES (ES 585).
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.
7. APPLY DRY FILM LUBRICANT PER MIL-L-8937 FORM "B" TO [-Z-] SURFACE ONLY.
8. INSPECT FOR SURFACE CRACKS AND DEFECTS USING DYE PENETRANT PER MIL-I-6866 TYPE II (ES 2453 TYPE II)

REVISIONS 14020

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
B		UPGRADED TO CLASS A PER TDRR 17024		1 MAR 65	S.a.



SECTION A-A

2899988	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± –   DECIMALS ± .005   ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bob Xarling DATE 5 OCT 64
CHECKED C. Pijda 3 NOV 64
APPROVAL E. Lembert 3 NOV 64
APPROVAL D. Hensley 3 NOV 64
NASA APPROVAL W J Rhine 11-4-64
MIT APPROVAL R.W. Boss W Kupfer 4 Nov 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BALL MOUNT, PLANE

CODE IDENT NO.   SIZE C   2899980
SCALE 2:1   SHEET 1 OF 1

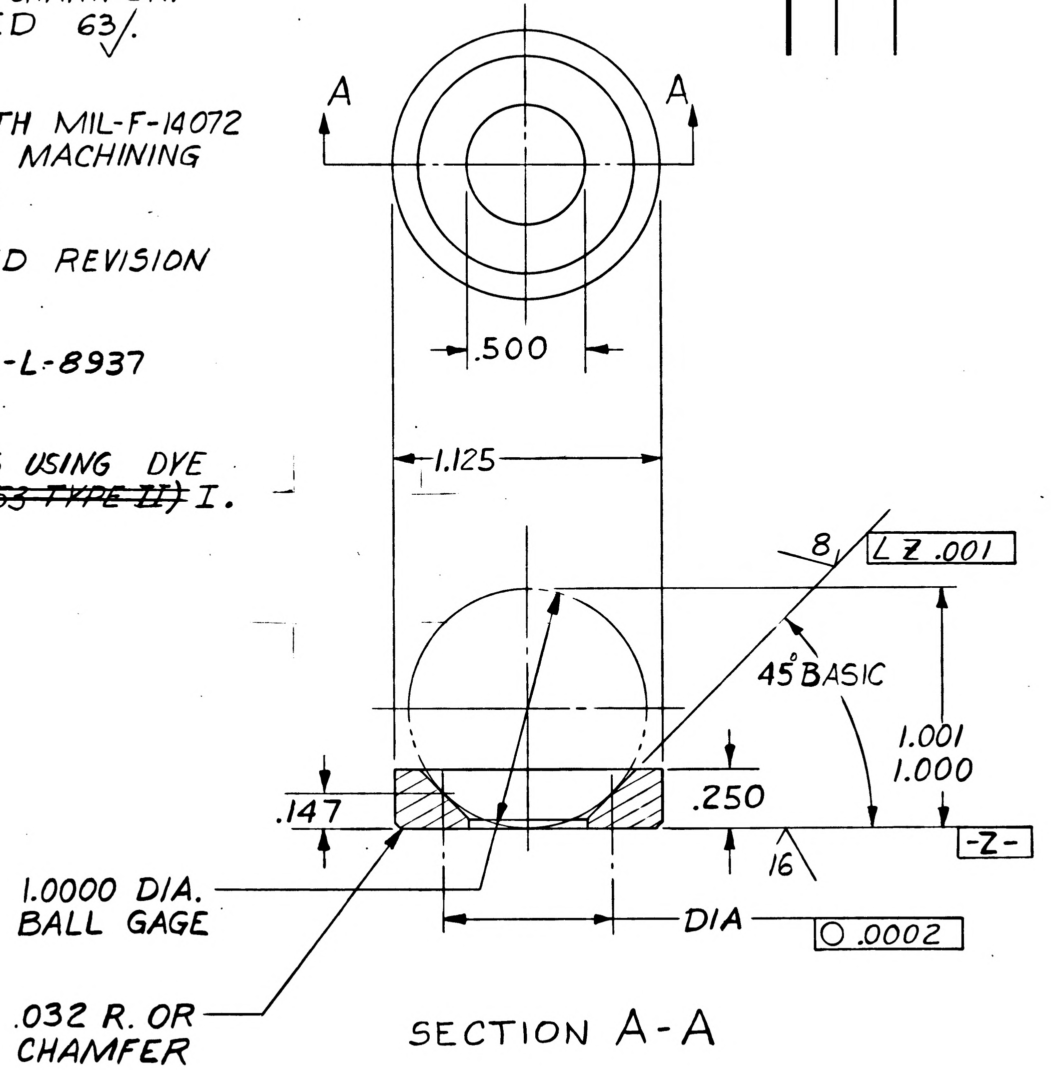
MIL 1077C—P

2 Charleston 2 Nov. 64

2899980

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: STAINLESS STEEL PER QQ-S-763 CLASS 440C, COND. ACF ~~(ES 373).~~
3. HEAT TREAT PER MIL-H-6875, TO Rc 58 MINIMUM (ES 2020-3).
4. UNLESS OTHERWISE SPECIFIED:
   a. ALL CORNERS TO BE .005 TO .015 R. OR CHAMFER.
   b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   c. MUST BE FREE OF BURRS.
5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-F-14072 (SIG C) FINISH E-300 PRIOR TO FINISH MACHINING OF 8√ AND $\boxed{Z}$ SURFACES ~~(ES 585).~~
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.
7. APPLY DRY FILM LUBRICANT PER MIL-L-8937 FORM "B" TO $\boxed{-Z-}$ SURFACE ONLY.
8. INSPECT FOR SURFACE CRACKS AND DEFECTS USING DYE PENETRANT PER MIL-I-6866 TYPE ~~II (ES 2453 TYPE II)~~ I.

REVISIONS 14020					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
B		UPGRADED TO CLASS A PER TDRR 17024		1 MAR 65	8.a.
C		REVISED PER TDRR 19738		7 JUN 65	RHB / EF



SECTION A-A

NEXT ASSY: 2899988	USED ON: 2899950-011	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± - DECIMALS ± .005 ANGLES ± 1°	MIT INSTRUMENTATION LAB CAMBRIDGE, MASS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
APPLICATION		DO NOT SCALE THIS DRAWING	DRAWN Bob Koling DATE 5 OCT 64 CHECKED C. Pijda 3 NOV 64 APPROVAL E. Lemkul 3 NOV 64 APPROVAL D. Hensley 3 NOV 64	BALL MOUNT, PLANE
		MATERIAL SEE NOTE 2	NASA APPROVAL 11-4-64 MIT APPROVAL W Kupfer 4 Nov 64	CODE IDENT NO. 80230 SIZE C 2899980
		CONTRACT NAS 9-497		SCALE 2:1 SHEET 1 OF 1

2 Cl 2 Nov. 64

MIL 1077C-P

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. MATERIAL: STAINLESS STEEL PER QQ-S-763 CLASS 440C, COND. ACF (ES-373).

3. HEAT TREAT PER MIL-H-6875, TO Rc 58 MINIMUM (ES-2020-3).

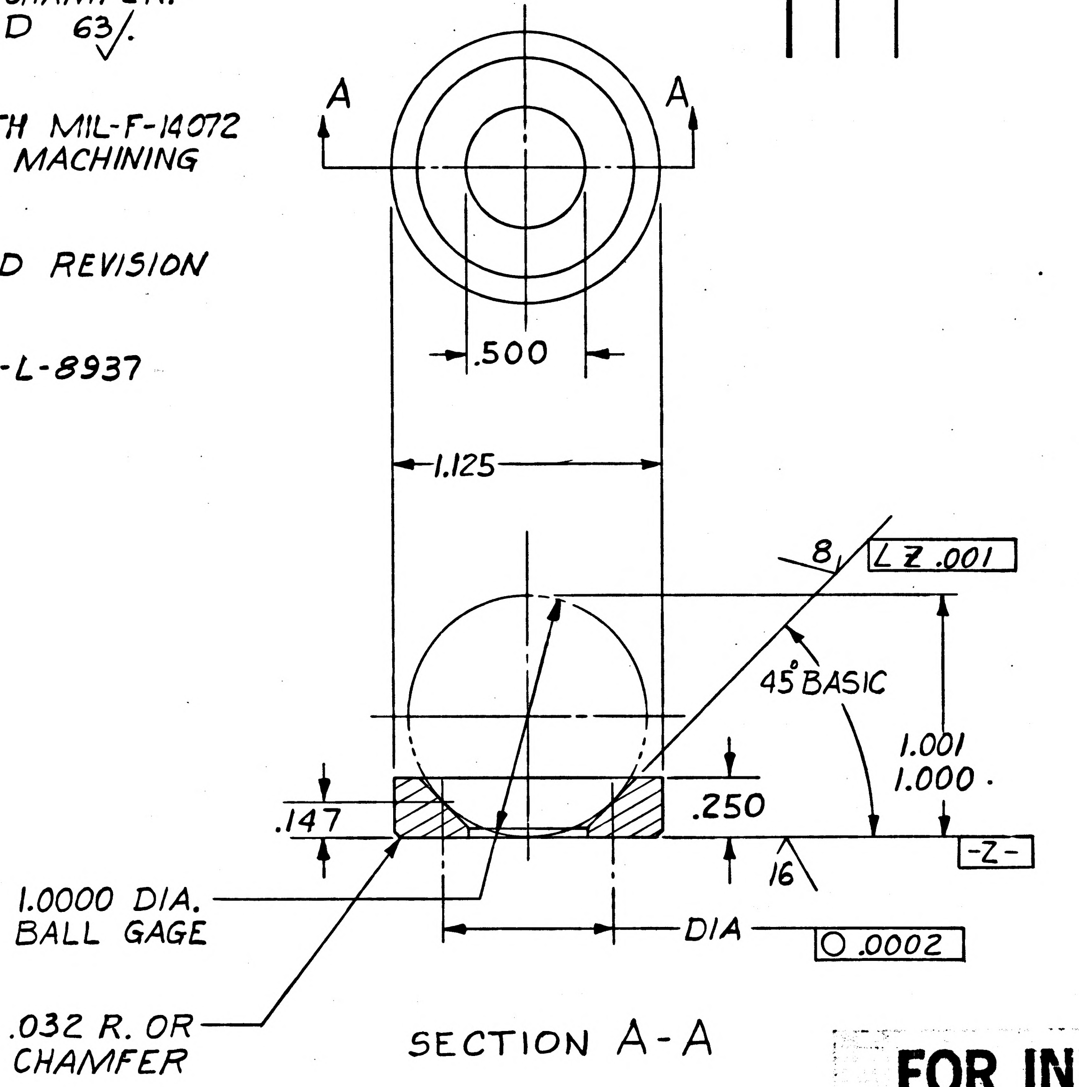
4. UNLESS OTHERWISE SPECIFIED:
   - a. ALL CORNERS TO BE .005 TO .015 R. OR CHAMFER.
   - b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   - c. MUST BE FREE OF BURRS.

5. FINISH: PASSIVATE IN ACCORDANCE WITH MIL-F-14072 (SIG C) FINISH E-300 PRIOR TO FINISH MACHINING OF 8√ AND [Z] SURFACES (ES-585).

6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.

7. APPLY DRY FILM LUBRICANT PER MIL-L-8937 FORM "B" TO [-Z-] SURFACE ONLY.

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.



SECTION A-A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 **DATE**

2899988	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± - DECIMALS ±.005 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bob Xarling DATE 5 OCT 64
CHECKED C. Pijda 3 NOV 64
APPROVAL E. Lemkuil 3 NOV 64
APPROVAL D. Hensley 3 NOV 64
NASA APPROVAL W J Rhine 11-4-64
MIT APPROVAL R.W. Ross W Kupfer 4 Nov 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BALL MOUNT, PLANE

CODE IDENT NO. SIZE C 2899980
SCALE 2:1 SHEET 1 OF 1

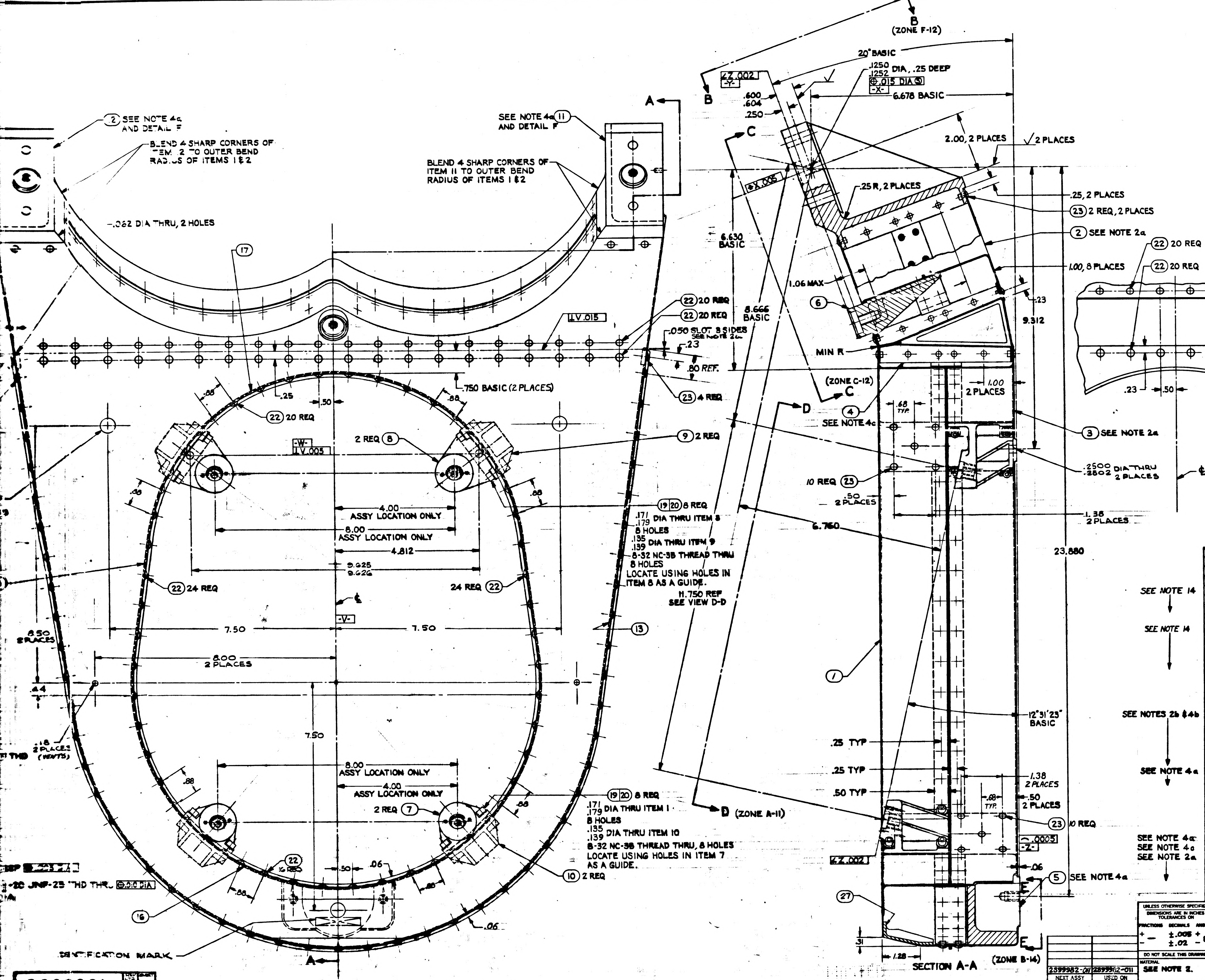
2 Charleston 2 Nov. 64

MIL 1077C-P

INCHES 0 1 2 PHOTOGRAPHIC SCALE ONLY

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC 200341		15-MAR-65	
B		UPGRADED TO CLASS A PER TDIR 17813		15 MAR 65	J J J

REVISIONS



B
(ZONE F-12)
20° BASIC
.1250 .1252 DIA, .25 DEEP
⊕ .015 DIA Ⓢ
-X-
6.678 BASIC
⌖ Z .002
-Y-
.600 .604
.250
B
A
C
2.00, 2 PLACES
√ 2 PLACES
.25 R, 2 PLACES
.25, 2 PLACES
(23) 2 REQ, 2 PLACES
(2) SEE NOTE 2a
(22) 20 REQ
(22) 20 REQ
1.00, 8 PLACES
6.630 BASIC
1.06 MAX
(6)
.23
9.312
8.666 BASIC
MIN R
(ZONE C-12) C
(4) SEE NOTE 4c
1.00 2 PLACES
.68 TYP
D
(3) SEE NOTE 2a
.2500 .2802 DIA THRU 2 PLACES
℄
10 REQ (23)
.50 2 PLACES
1.38 2 PLACES
6.760
23.880
(1)
12°31'23" BASIC
.25 TYP
.25 TYP
.50 TYP
1.38 2 PLACES
.68 TYP
.50 2 PLACES
(23) 10 REQ
⌖ Z .002
.0005
-Z-
.06
(5) SEE NOTE 4a
(27)
.31
1.28
SECTION A-A
(ZONE B-14)
D (ZONE A-11)
.23
.50
(2) SEE NOTE 4a AND DETAIL F
BLEND 4 SHARP CORNERS OF ITEM 2 TO OUTER BEND RADIUS OF ITEMS 1 & 2
.062 DIA THRU, 2 HOLES
SEE NOTE 4a (11) AND DETAIL F
BLEND 4 SHARP CORNERS OF ITEM 11 TO OUTER BEND RADIUS OF ITEMS 1 & 2
(17)
(22) 20 REQ
(22) 20 REQ
⊥ V .015
.050 SLOT 8 SIDES SEE NOTE 2c
.23
.80 REF.
.750 BASIC (2 PLACES)
(23) 4 REQ
.88
.25
.50
.88
(22) 20 REQ
-W-
⊥ V .005
2 REQ (8)
(9) 2 REQ
.88
.88
4.00 ASSY LOCATION ONLY
8.00 ASSY LOCATION ONLY
(19)(20) 8 REQ
.171 .179 DIA THRU ITEM 8 8 HOLES
.135 .139 DIA THRU ITEM 9
8-32 NC-3B THREAD THRU 8 HOLES
LOCATE USING HOLES IN ITEM 8 AS A GUIDE.
11.750 REF SEE VIEW D-D
4.812
9.625 9.626
(22) 24 REQ
24 REQ (22)
℄
-V-
7.50
7.50
(13)
8.50 2 PLACES
8.00 2 PLACES
.44
.18 2 PLACES (VENTS)
7.50
8.00 ASSY LOCATION ONLY
4.00 ASSY LOCATION ONLY
2 REQ (7)
(19)(20) 8 REQ
.171 .179 DIA THRU ITEM 1 8 HOLES
.135 .139 DIA THRU ITEM 10
8-32 NC-3B THREAD THRU, 8 HOLES
LOCATE USING HOLES IN ITEM 7 AS A GUIDE.
.88
.88
(10) 2 REQ
(22) 16 REQ
.50
.06
.88
(16)
.06
IDENTIFICATION MARK
A
-20 UNF-2B THD THRU ⊕ .010 DIA
THD
SEE NOTE 14
SEE NOTE 14
SEE NOTES 2b & 4b
SEE NOTE 4a
SEE NOTE 4a
SEE NOTE 4c
SEE NOTE 2a

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
30	AR	1010750	CURING AGENT
29	AR	1010749	FILLER
28	AR	1010748	EPOXY RESIN
27	1	2899966	INSERT, ANGULAR
26	AR	1010864	PREPOLYMER, POLYURETHANE
25	AR	1010863	RESIN, POLYURETHANE
24	AR	1010877	ADHESIVE (EC-2186)
23	64	1010868-3	↑ ↑
22	310	1010868-2	RIVET, BLIND
21	2	MS21209-F4-15	(1897059-204) INSERT, LOCKING
20	16	AN960C8	(1897006-028) WASHER, FLAT
19	16	NAS1352C08LL10	(1897014-428) SCREW, SOCKET HEAD, SELF LOCKING
18	2	↑ -008	↑ ↑
17	1	-007	
16	1	-006	
15	2	-005	
14	2	-004	
13	1	2899981-003	STRIP, REINFORCING
12	1	2899973	ARM, L.H.
11	1	2899972	ARM, R.H.
10	2	2899962	↑ ↑ , REAR
9	2	2899961	, REINFORCING, FORWARD
8	2	2899960	↑ , FORWARD
7	2	2899959	, SUPPORT, REAR
6	1	2899964	BRACKET, OPTICS, REAR
5	1	2899963	INSERT, MTG, REAR
4	1	2899956	BEAM, TRIANGULAR (INSEP ASSY)
3	1	2899981-002	↑ ↑ ↑
2	1	2899981-001	, PARTIAL
1	1	2399955	BLANK, FORMED

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2399982-011	2899982-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS ±.005 ±.02 ANGLES + − °
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2.
CONTRACT NAS9-497

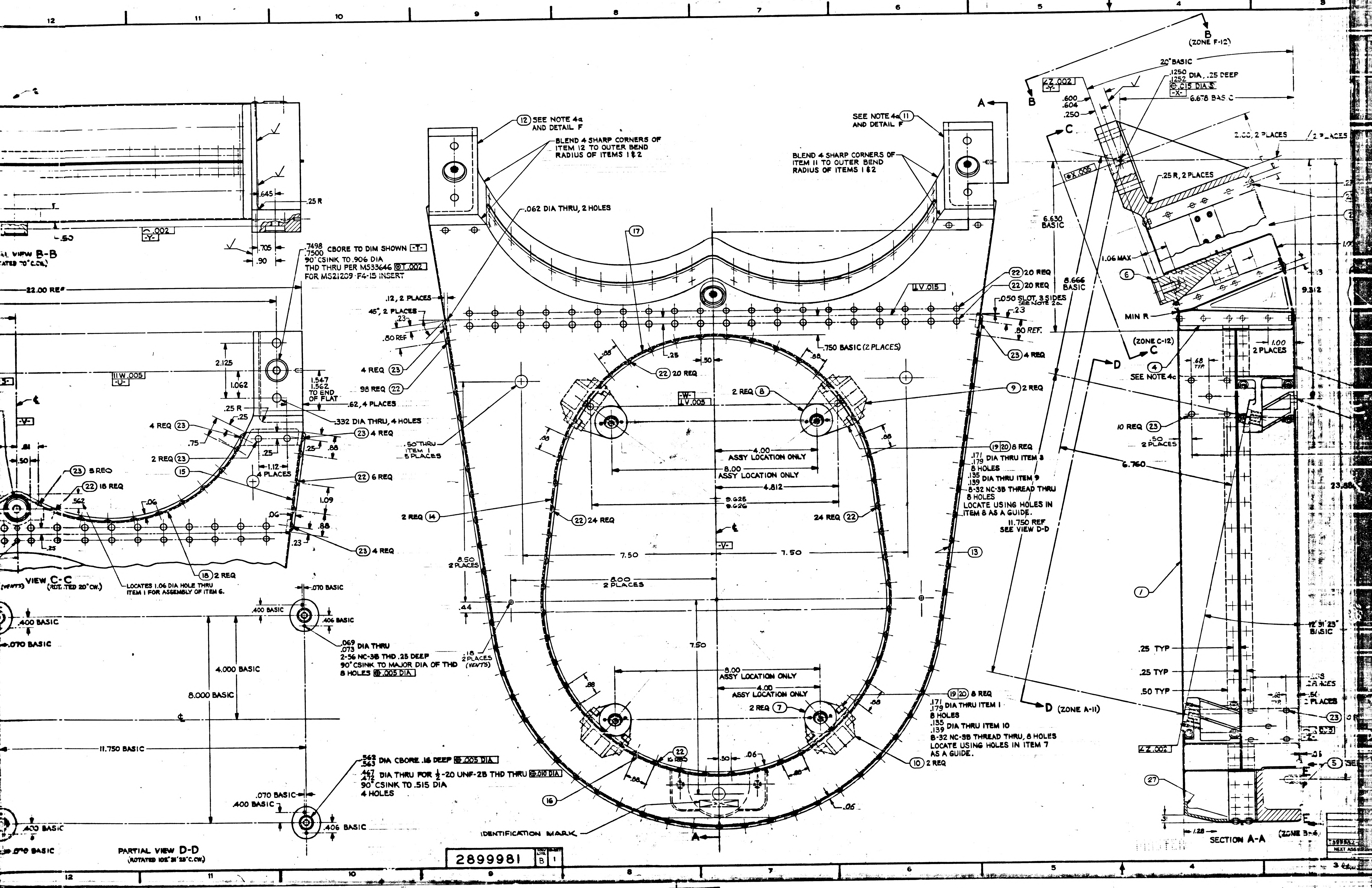
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN C. Long 25 SEP 64 DATE
CHECKED C. Pizzida 27 OCT 64
APPROVAL 27 OCT 64
APPROVAL 27 OCT 64
NASA APPROVAL 11-4-64
MIT APPROVAL 4/4

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, NAVIGATION
INSEPARABLE ASSEMBLY

CODE IDENT NO.
SIZE J
2899981
SCALE 1:1
SHEET 1 OF 1

2899981 B 1



12
11
10
9
8
7
6
5
4
3
B
(ZONE F-12)
20° BASIC
.1250 .1252 DIA, .25 DEEP
6.678 BAS.C
.600 .604
.250
2.00, 2 PLACES
.25 R, 2 PLACES
6.630 BASIC
1.06 MAX
8.666 BASIC
9.312
MIN R
(ZONE C-12)
C
D
SEE NOTE 4c
1.00 2 PLACES
10 REQ
.50 2 PLACES
6.760
23.88
12°31'23" BASIC
.25 TYP
.25 TYP
.50 TYP
D (ZONE A-11)
SECTION A-A
(ZONE B-6)
1.28
12 SEE NOTE 4a AND DETAIL F
BLEND 4 SHARP CORNERS OF ITEM 12 TO OUTER BEND RADIUS OF ITEMS 1 & 2
SEE NOTE 4a 11 AND DETAIL F
BLEND 4 SHARP CORNERS OF ITEM 11 TO OUTER BEND RADIUS OF ITEMS 1 & 2
A
.062 DIA THRU, 2 HOLES
17
.7498 .7500 CBORE TO DIM SHOWN -T-
90° CSINK TO .906 DIA
THD THRU PER MS33646 T .002
FOR MS21209 F4-15 INSERT
.12, 2 PLACES
45°, 2 PLACES
.80 REF
4 REQ 23
98 REQ 22
.62, 4 PLACES
.332 DIA THRU, 4 HOLES
23 4 REQ
.50 THRU ITEM 1 5 PLACES
22 20 REQ
22 20 REQ
.050 SLOT, 3 SIDES SEE NOTE 2a
.23
.80 REF.
23 4 REQ
.750 BASIC (2 PLACES)
V .015
22 20 REQ
2 REQ 8
9 2 REQ
-W- V .005
4.00 ASSY LOCATION ONLY
8.00 ASSY LOCATION ONLY
4.812
9.625 9.626
19 20 8 REQ
.171 .179 DIA THRU ITEM 3 8 HOLES
.135 .139 DIA THRU ITEM 9
8-32 NC-3B THREAD THRU 8 HOLES
LOCATE USING HOLES IN ITEM 8 AS A GUIDE.
11.750 REF SEE VIEW D-D
2 REQ 14
22 24 REQ
24 REQ 22
-V-
7.50
7.50
13
8.50 2 PLACES
8.00 2 PLACES
.44
7.50
.18 2 PLACES (VENTS)
8.00 ASSY LOCATION ONLY
4.00 ASSY LOCATION ONLY
2 REQ 7
19 20 8 REQ
.171 .179 DIA THRU ITEM 1 8 HOLES
.135 .139 DIA THRU ITEM 10
8-32 NC-3B THREAD THRU, 8 HOLES
LOCATE USING HOLES IN ITEM 7 AS A GUIDE.
10 2 REQ
22 16 REQ
16
.06
IDENTIFICATION MARK
A
.645
.25 R
.002 -Y-
.50
.705
.90
VIEW B-B (ROTATED 70° C.CW.)
22.00 REF
2.125
1.062
W .005 -U-
1.547 1.562 TO END OF FLAT
.25 R
4 REQ 23
.75
2 REQ 23
15
.81
.50
23 8 REQ
22 18 REQ
.562
.06
1.12 4 PLACES
22 6 REQ
1.09
.88
.23
23 4 REQ
18 2 REQ
VIEW C-C (ROTATED 20° CW.)
LOCATES 1.06 DIA HOLE THRU ITEM 1 FOR ASSEMBLY OF ITEM 6.
.070 BASIC
.400 BASIC
.406 BASIC
.069 .073 DIA THRU
2-56 NC-3B THD .25 DEEP
90° CSINK TO MAJOR DIA OF THD
8 HOLES .005 DIA
4.000 BASIC
8.000 BASIC
11.750 BASIC
.562 .563 DIA CBORE .16 DEEP .005 DIA
.467 .472 DIA THRU FOR 1/2-20 UNF-2B THD THRU .010 DIA
90° CSINK TO .515 DIA
4 HOLES
.070 BASIC
.400 BASIC
.406 BASIC
PARTIAL VIEW D-D (ROTATED 102°31'23" C.CW.)
27
5
23
Z .002
X .005
Z .002 -Y-
6
4
1

2899981 B 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. MATERIAL:
   a. ITEMS 1, 2 & 3 ARE A MATCHED SET MADE FROM TWO OF P/N 2899955 BY MAKING A .050 CUT IN BOTH PARTS IN LINE WITHIN .015 INCH. ITEMS 1, 2 & 3 ARE TO BE SERIALIZED AS A MATCHED SET IN THE AREA OF THE DETAIL PIECEMARKS PER ND1002023.
   b. ITEMS 13 THRU 18 ARE TO BE MADE FROM ALUMINUM ALLOY QQ-A-250/11, TEMPER T6, .031 x 1.00 x 100 INCHES LONG. SEE NOTE 4b.

3. UNLESS OTHERWISE SPECIFIED:
   a. MACHINED SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   b. √ MEANS 63√.
   c. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   d. RIVET SPACING TO BE 1.00 BETWEEN CTR. SEE NOTE 11.

4. FIT AT ASSEMBLY:
   a. ITEMS *5, 9, 10, 11 + 12 TO BE* MACHINED AT ASSEMBLY TO PROVIDE FIT-UP WITH .002 TO .007 CLEARANCE FOR EACH ADHESIVE JOINT. SEE VIEW E-E AND DETAIL F. A .12 MINIMUM RADIUS OR CHAMFER MUST BE PROVIDED ON ALL CORNERS WHICH WILL MATE WITH INTERNAL RADII OF ITEMS 1, 2 & 3.
   b. ITEMS 13 THRU 18 MUST BE CUT TO LENGTH TO FIT RESPECTIVE SPACES WITH .005 TO .030 CLEARANCE AT EACH END.
   c. ITEM 4 MUST BE MATED TO ITEMS 1, 2 & 3 TO ENSURE PROPER FIT-UP WITH .002 TO .007 CLEARANCE FOR EACH ADHESIVE JOINT. SHEET METAL FLANGES OF ITEM 4 CAN BE RE-FORMED TO PROVIDE REQUIRED ALIGNMENT.

5. BOND AND RIVET ALL ITEMS TOGETHER IN NOT MORE THAN THREE STAGES USING ITEMS 22, 23 & 24. ALL ADHESIVE JOINTS ARE TO BE CONTROLLED TO .002 TO .007 ADHESIVE THICKNESS. PROCESS PER ND 1002254

6. ANODIZE ALL PIECE PARTS EXCEPT ITEM 4 AFTER FITUP, AND LESS THAN 8 HOURS PRIOR TO BONDING, TO INSURE CHEMICALLY CLEAN SURFACES AT BOND JOINTS. ANODIZE PER MIL-A-8625, TYPE I (ES-385). JOINT SURFACES OF ITEM 4 MUST BE ABRASIVELY CLEANED AND WASHED WITH FREON PRIOR TO BONDING

7. FOAM FILL THE ASSEMBLY THRU 5 ACCESS HOLES USING 2 LBS/CUBIC FT (RATED) CO_2 BLOWN FOAM, ITEMS 25 & 26, PER ND1002002 TYPE C SO THAT AN AVERAGE CURED FOAM DENSITY OF 3.5 TO 4.0 LBS/CUBIC FT IS OBTAINED. FOAM TO BE CURED AT 180°F ± 5° FOR 2 HOURS MIN. WITH COOLING TO AMBIENT AT A RATE NOT GREATER THAN 10°F/HOUR.

8. SEAL THE FOAM FILL ACCESS HOLES FLUSH TO OUTER SURFACE USING COMPOUND, ITEMS 28, 29, & 30 PER ND1002203. COMPOUND THICKNESS AT HOLE TO BE .12 TO .25 THICK AND LARGER THAN HOLE IN METAL SHELL.

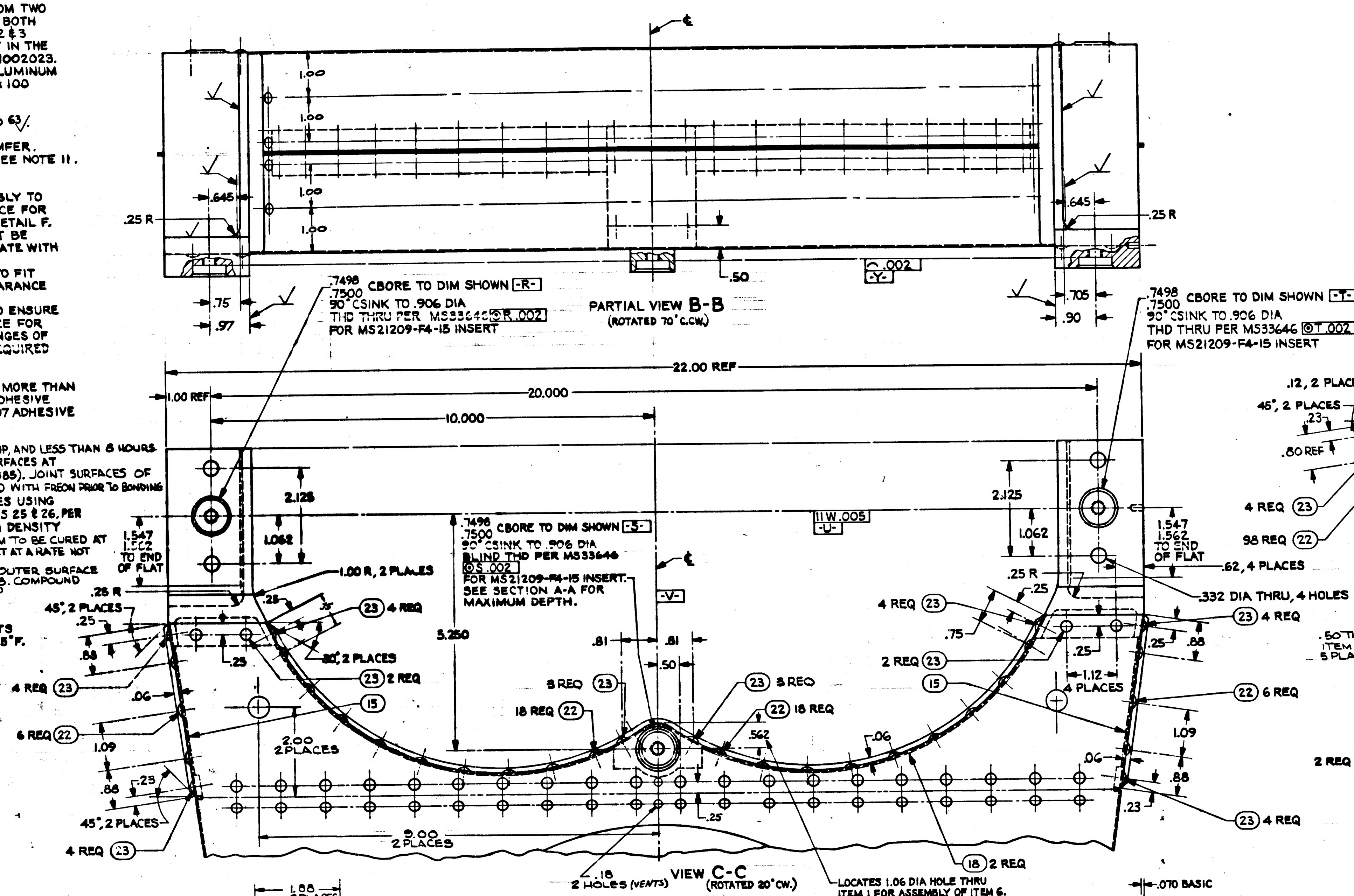
9. MUST BE FREE FROM BURRS.

10. ALL DIMENSIONS TO BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 65° TO 75°F.

11. ALL RIVET SPACING TOLERANCES TO BE NON-CUMULATIVE. RIVET STEMS SHALL NOT PROTRUDE BEYOND RIVET HEAD BY MORE THAN .03 MAXIMUM. PROVIDE *.143/.146* DIA HOLES THRU FOR ALL RIVETS.

13.

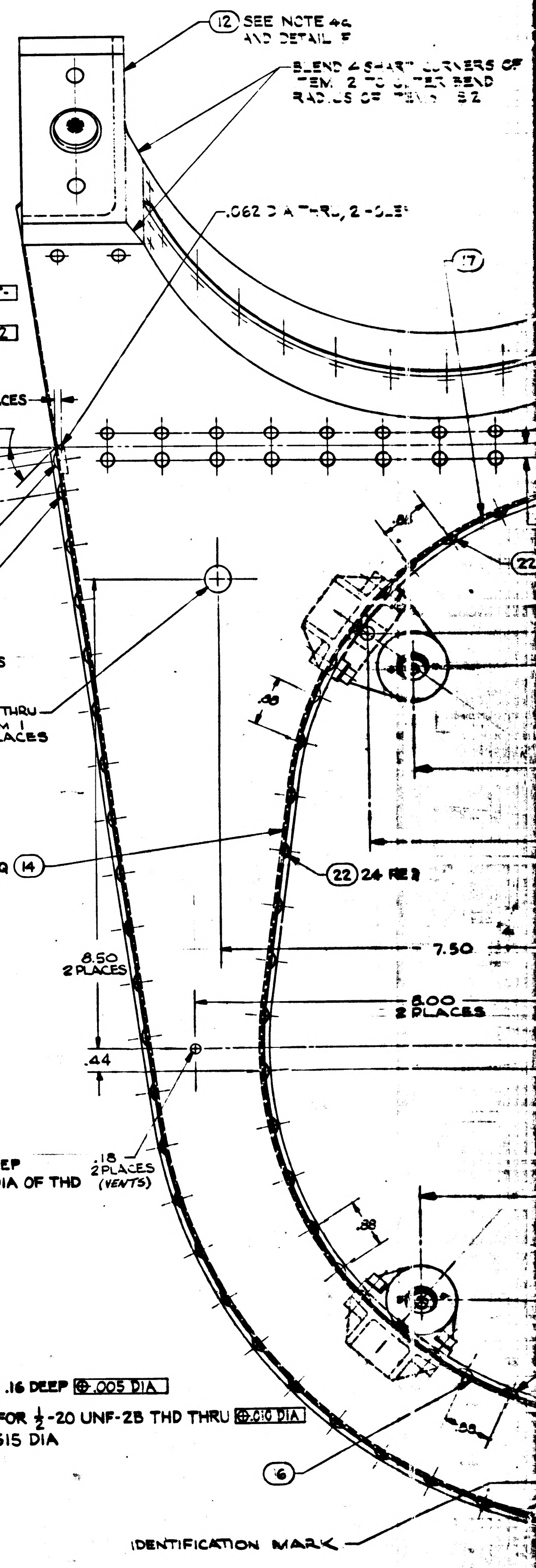
14. VENDOR ITEM - SEE SPEC CONTROL DWG.



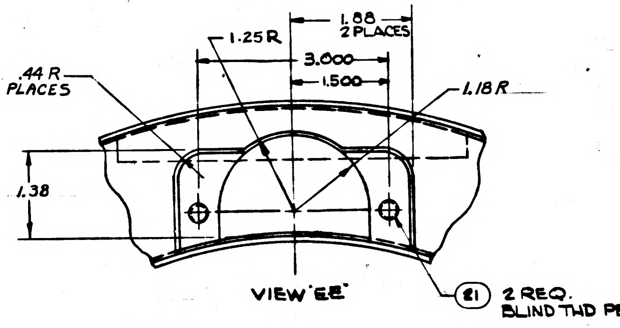
¢
1.00
1.00
1.00
1.00
.645
.25 R
.75
.97
.7498 .7500 CBORE TO DIM SHOWN -R-
90° CSINK TO .906 DIA
THD THRU PER MS33646 ◎R.002
FOR MS21209-F4-15 INSERT
.50
⌒.002 -Y-
.705
.90
.7498 .7500 CBORE TO DIM SHOWN -T-
90° CSINK TO .906 DIA
THD THRU PER MS33646 ◎T.002
FOR MS21209-F4-15 INSERT
22.00 REF
1.00 REF
20.000
10.000
2.125
1.062
1.547 1.562 TO END OF FLAT
.7498 .7500 CBORE TO DIM SHOWN -S-
90° CSINK TO .906 DIA
BLIND THD PER MS33646 ◎S.002
FOR MS21209-F4-15 INSERT.
SEE SECTION A-A FOR MAXIMUM DEPTH.
11W.005 -U-
-V-
5.250
1.00 R, 2 PLACES
.25 R
45°, 2 PLACES
.25
.88
.25
.75
30°, 2 PLACES
(23) 4 REQ
(23) 2 REQ
(15)
4 REQ (23)
.06
6 REQ (22)
1.09
.88
.23
45°, 2 PLACES
4 REQ (23)
2.00 2 PLACES
9.00 2 PLACES
.81
.81
.50
3 REQ (23)
18 REQ (22)
(23) 3 REQ
(22) 18 REQ
.562
.06
.25
.18 2 HOLES (VENTS)
LOCATES 1.06 DIA HOLE THRU ITEM 1 FOR ASSEMBLY OF ITEM 6.
(18) 2 REQ
4 REQ (23)
2 REQ (23)
(15)
.25 R
.25
.75
.25
1.12 4 PLACES
.62, 4 PLACES
.332 DIA THRU, 4 HOLES
(23) 4 REQ
(22) 6 REQ
1.09
.06
.88
.23
(23) 4 REQ

PARTIAL VIEW B-B
(ROTATED 70° C.CW.)

VIEW C-C
(ROTATED 20° CW.)

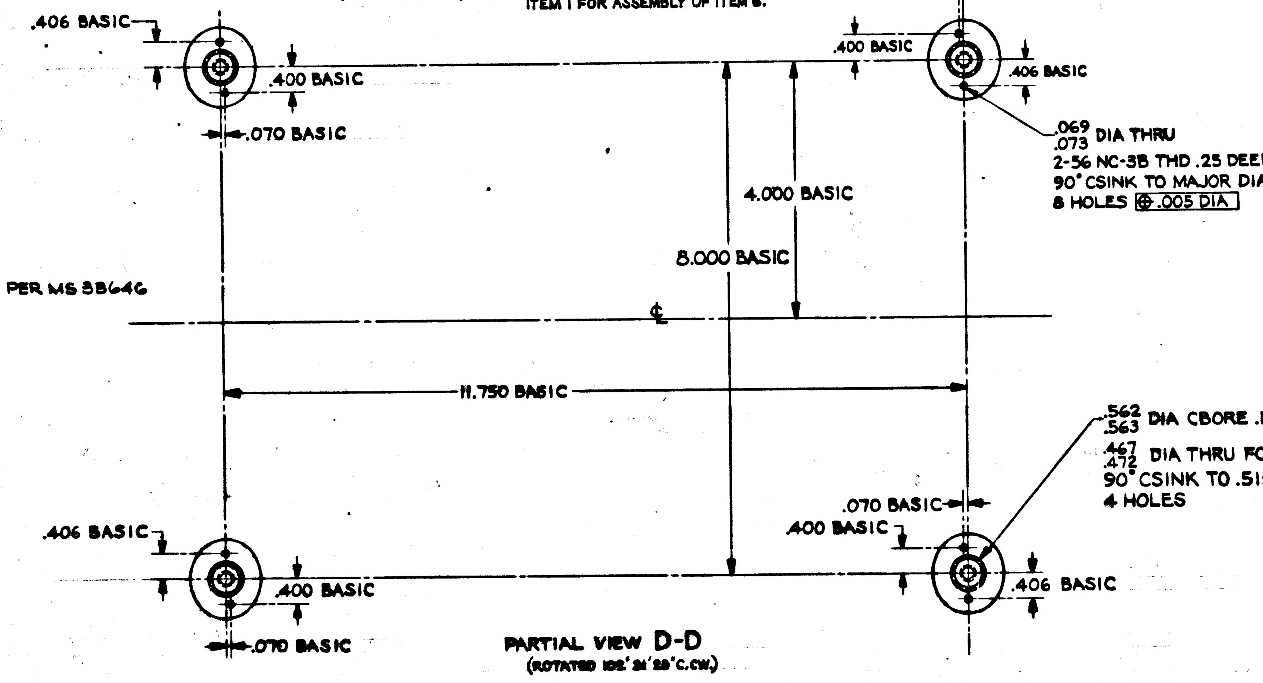


(12) SEE NOTE 4a AND DETAIL F
BLEND 4 SHARP CORNERS OF ITEM 2 TO OUTER BEND RADIUS OF ITEMS 1 & 2
.062 DIA THRU, 2 HOLES
(17)
.12, 2 PLACES
45°, 2 PLACES
.23
.80 REF
4 REQ (23)
98 REQ (22)
.50 THRU ITEM 1 5 PLACES
.88
(22)
2 REQ (14)
(22) 24 REQ
7.50
8.50 2 PLACES
8.00 2 PLACES
.44
.18 2 PLACES (VENTS)
.88
.88
(6)
IDENTIFICATION MARK



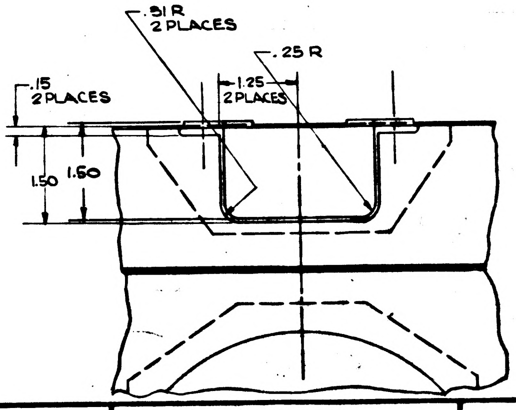
1.25 R
1.88 2 PLACES
3.000
1.500
.44 R 2 PLACES
1.18 R
1.38
(21) 2 REQ.
BLIND THD PER MS 33646

VIEW 'EE'

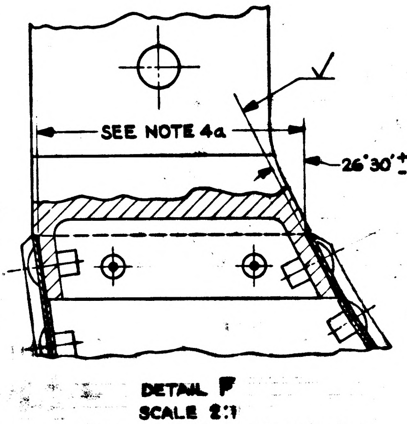


.406 BASIC
.400 BASIC
.070 BASIC
.070 BASIC
.400 BASIC
.406 BASIC
.069 .073 DIA THRU
2-56 NC-3B THD .25 DEEP
90° CSINK TO MAJOR DIA OF THD
8 HOLES ⊕.005 DIA
4.000 BASIC
8.000 BASIC
¢
11.750 BASIC
.562 .563 DIA CBORE .16 DEEP ⊕.005 DIA
.467 .472 DIA THRU FOR ½-20 UNF-2B THD THRU ⊕.010 DIA
90° CSINK TO .515 DIA
4 HOLES
.070 BASIC
.400 BASIC
.406 BASIC
.406 BASIC
.400 BASIC
.070 BASIC

PARTIAL VIEW D-D
(ROTATED 102° 31' 29" C.CW.)



.31 R 2 PLACES
.25 R
.15 2 PLACES
1.25 2 PLACES
1.50
1.60

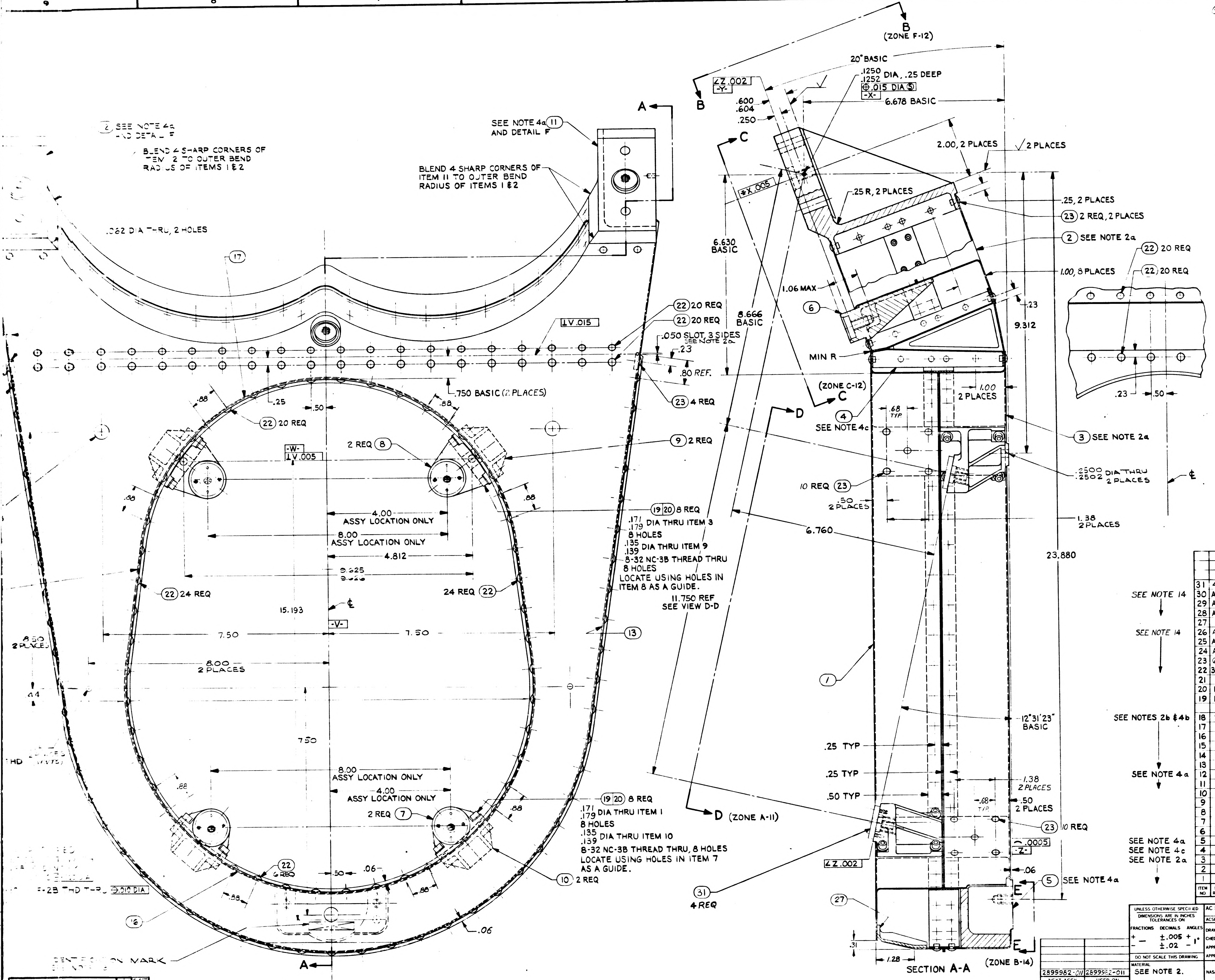


SEE NOTE 4a
26°30' +0°0' -0°30'

DETAIL F
SCALE 2:1
(TYPICAL FOR ITEMS 11 & 12)

2899981 | REV 3 | SH 1

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC 200341		15-MAR-65	
B		UPGRADED TO CLASS A PER TDRR 17813		8 MAR 65	
C		REVISED PER TDRR 2078		65	



SEE NOTE 4a AND DETAIL F
BLEND 4 SHARP CORNERS OF ITEM 2 TO OUTER BEND RADIUS OF ITEMS 1 & 2
BLEND 4 SHARP CORNERS OF ITEM 11 TO OUTER BEND RADIUS OF ITEMS 1 & 2
.062 DIA THRU, 2 HOLES
SEE NOTE 4a (11) AND DETAIL F
A
B (ZONE F-12)
B
20° BASIC
.1250 .1252 DIA, .25 DEEP
⊕ .015 DIA Ⓢ -X-
∠Z .002 -Y-
.600 .604
.250
6.678 BASIC
C
2.00, 2 PLACES
2 PLACES
.25 R, 2 PLACES
.25, 2 PLACES
(23) 2 REQ, 2 PLACES
(2) SEE NOTE 2a
(22) 20 REQ
(22) 20 REQ
1.00, 8 PLACES
⫽X .005
6.630 BASIC
8.666 BASIC
1.06 MAX
(6)
.23
9.312
MIN R
(ZONE C-12) C
1.00 2 PLACES
(4) SEE NOTE 4c
.68 TYP
(3) SEE NOTE 2a
.2500 .2502 DIA THRU 2 PLACES
℄
10 REQ (23)
.50 2 PLACES
1.38 2 PLACES
6.760
23.880
.23
.50
(17)
(22) 20 REQ
(22) 20 REQ
⊥V .015
.050 SLOT, 3 SIDES SEE NOTE 2a
.23
.80 REF.
.750 BASIC (2 PLACES)
(23) 4 REQ
.25
.50
.88
(22) 20 REQ
D
-W- ⊥V .005
2 REQ (8)
(9) 2 REQ
4.00 ASSY LOCATION ONLY
8.00 ASSY LOCATION ONLY
4.812
9.625 9.626
(19)(20) 8 REQ
.171 .179 DIA THRU ITEM 3
8 HOLES
.135 .139 DIA THRU ITEM 9
8-32 NC-3B THREAD THRU
8 HOLES
LOCATE USING HOLES IN ITEM 8 AS A GUIDE.
11.750 REF SEE VIEW D-D
(22) 24 REQ
24 REQ (22)
15.193
℄
-V-
7.50
7.50
(13)
8.00 2 PLACES
8.50 2 PLACES
.44
7.50
(1)
12°31'23" BASIC
.25 TYP
.25 TYP
.50 TYP
1.38 2 PLACES
.68 TYP
.50 2 PLACES
8.00 ASSY LOCATION ONLY
4.00 ASSY LOCATION ONLY
2 REQ (7)
(19)(20) 8 REQ
.171 .179 DIA THRU ITEM 1
8 HOLES
.135 .139 DIA THRU ITEM 10
8-32 NC-3B THREAD THRU, 8 HOLES
LOCATE USING HOLES IN ITEM 7 AS A GUIDE.
(10) 2 REQ
D (ZONE A-11)
(23) 10 REQ
.0005 -Z-
∠Z .002
.06
(5) SEE NOTE 4a
E
E
(31) 4 REQ
(27)
(22) 6 REQ
.50
.06
.88
.06
(16)
F-28 THD THRU ⊕.010 DIA
THD
IDENTIFICATION MARK
.31
1.28
SECTION A-A (ZONE B-14)
A
9 8 7 6 5 4 3 2 1
H G F E D C A

SEE NOTE	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	31	4	2899968	PAD MOUNTING
SEE NOTE 14	30	AR	1010750	CURING AGENT
	29	AR	1010749	FILLER
	28	AR	1010748	EPOXY RESIN
	27	1	2899966	INSERT, ANGULAR
SEE NOTE 14	26	AR	1010864	PREPOLYMER, POLYURETHANE
	25	AR	1010863	RESIN, POLYURETHANE
	24	AR	1010877	ADHESIVE (EC-2186)
	23	64	1010868-3	
	22	310	1010868-2	RIVET, BLIND
	21	2	MS21209-F4-15	(1897059-204) INSERT, LOCKING
	20	16	AN960C8	(1897006-028) WASHER, FLAT
	19	16	NAS1352C08LL10	(1897014-428) SCREW, SOCKET HEAD, SELF LOCKING
SEE NOTES 2b & 4b	18	2	-008	
	17	1	-007	
	16	1	-006	
	15	2	-005	
	14	2	-004	
	13	1	2899981-003	STRIP, REINFORCING
SEE NOTE 4a	12	1	2899973	ARM, L.H.
	11	1	2899972	ARM, R.H.
	10	2	2899962	, REAR
	9	2	2899961	, REINFORCING, FORWARD
	8	2	2899960	, FORWARD
	7	2	2899959	, SUPPORT, REAR
	6	1	2899964	BRACKET, OPTICS, REAR
SEE NOTE 4a	5	1	2899963	INSERT, MTG, REAR
SEE NOTE 4c	4	1	2899956	BEAM, TRIANGULAR (INSEP ASSY)
SEE NOTE 2a	3	1	2899981-002	
	2	1	2899981-001	, PARTIAL
	1	1	2899955	BLANK, FORMED

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2899982-011	2899982-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS ±.005 ±.02 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2.
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN C. Lenz DATE 25 SEP 64
CHECKED 27 OCT 64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

BASE, NAVIGATION
INSEPARABLE ASSEMBLY

CODE IDENT NO
SIZE J
2899981
SCALE 1:1
SHEET 1 OF 1

27 OCT 64

2899981 C 1

2899981

2/2899981

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. MATERIAL:
   - a. ITEMS 1, 2 & 3 ARE A MATCHED SET MADE FROM TWO OF P/N 2899955 BY MAKING A .050 CUT IN BOTH PARTS IN LINE WITHIN .015 INCH. ITEMS 1, 2 & 3 ARE TO BE SERIALIZED AS A MATCHED SET IN THE AREA OF THE DETAIL PIECEMARKS PER ND1002023.
   - b. ITEMS 13 THRU 18 ARE TO BE MADE FROM ALUMINUM ALLOY QQ-A-250/11, TEMPER T6, .031 x 1.00 x 100 INCHES LONG. SEE NOTE 4b.

3. UNLESS OTHERWISE SPECIFIED:
   - a. MACHINED SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   - b. √ MEANS 63.
   - c. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   - d. RIVET SPACING TO BE 1.00 BETWEEN CTR. SEE NOTE 11.

4. FIT AT ASSEMBLY:
   - a. ITEMS *5, 9, 10, 11 & 12 TO BE* MACHINED AT ASSEMBLY TO PROVIDE FIT-UP WITH .002 TO .007 CLEARANCE FOR EACH ADHESIVE JOINT. SEE VIEW E-E AND DETAIL F. A .12 MINIMUM RADIUS OR CHAMFER MUST BE PROVIDED ON ALL CORNERS WHICH WILL MATE WITH INTERNAL RADII OF ITEMS 1, 2 & 3.
   - b. ITEMS 13 THRU 18 MUST BE CUT TO LENGTH TO FIT RESPECTIVE SPACES WITH .005 TO .030 CLEARANCE AT EACH END.
   - c. ITEM 4 MUST BE MATED TO ITEMS 1, 2 & 3 TO ENSURE PROPER FIT-UP WITH .002 TO .007 CLEARANCE FOR EACH ADHESIVE JOINT. SHEET METAL FLANGES OF ITEM 4 CAN BE RE-FORMED TO PROVIDE REQUIRED ALIGNMENT.

5. BOND AND RIVET ALL ITEMS TOGETHER IN NOT MORE THAN THREE STAGES USING ITEMS 22, 23 & 24. ALL ADHESIVE JOINTS ARE TO BE CONTROLLED TO .002 TO .007 ADHESIVE THICKNESS. PROCESS PER ND 1002254

6. ANODIZE ALL PIECE PARTS EXCEPT ITEM 4 AFTER FITUP AND LESS THAN 8 HOURS PRIOR TO BONDING, TO INSURE CHEMICALLY CLEAN SURFACES AT BOND JOINTS. ANODIZE PER MIL-A-8625, TYPE I (ES-385). JOINT SURFACES OF ITEM 4 MUST BE ABRASIVELY CLEANED AND WASHED WITH FREON PRIOR TO BONDING

7. FOAM FILL THE ASSEMBLY THRU 5 ACCESS HOLES USING 2 LBS/CUBIC FT (RATED) CO_2 BLOWN FOAM, ITEMS 25 & 26, PER ND1002002 TYPE C SO THAT AN AVERAGE CURED FOAM DENSITY OF 3.5 TO 4.0 LBS/CUBIC FT IS OBTAINED. FOAM TO BE CURED AT 180°F ±5° FOR 2 HOURS MIN. WITH COOLING TO AMBIENT AT A RATE NOT GREATER THAN 30°F/HOUR. REMOVE FROM FIXTURE AND GIVE A POST-CURE AT 180°F ±5° FOR SIX HOURS WITH HEATING AND COOLING RATES NOT GREATER THAN 30°F/HR.

8. SEAL THE FOAM FILL ACCESS HOLES FLUSH TO OUTER SURFACE USING COMPOUND ITEMS 28, 29 & 30 PER ND 1002203. COMPOUND THICKNESS AT HOLE TO BE .12 TO .25 THICK AND LARGER THAN HOLE IN METAL SHELL.

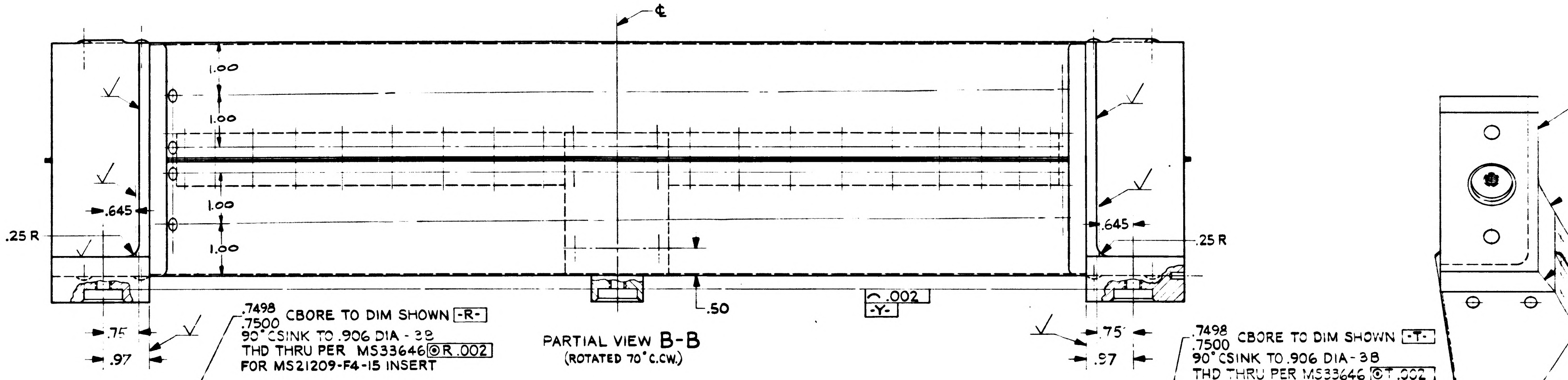
9. MUST BE FREE FROM BURRS.

10. ALL DIMENSIONS TO BE WITHIN SPECIFIED AT A UNIFORM PART TEMPERATURE OF 65° TO 75° F.

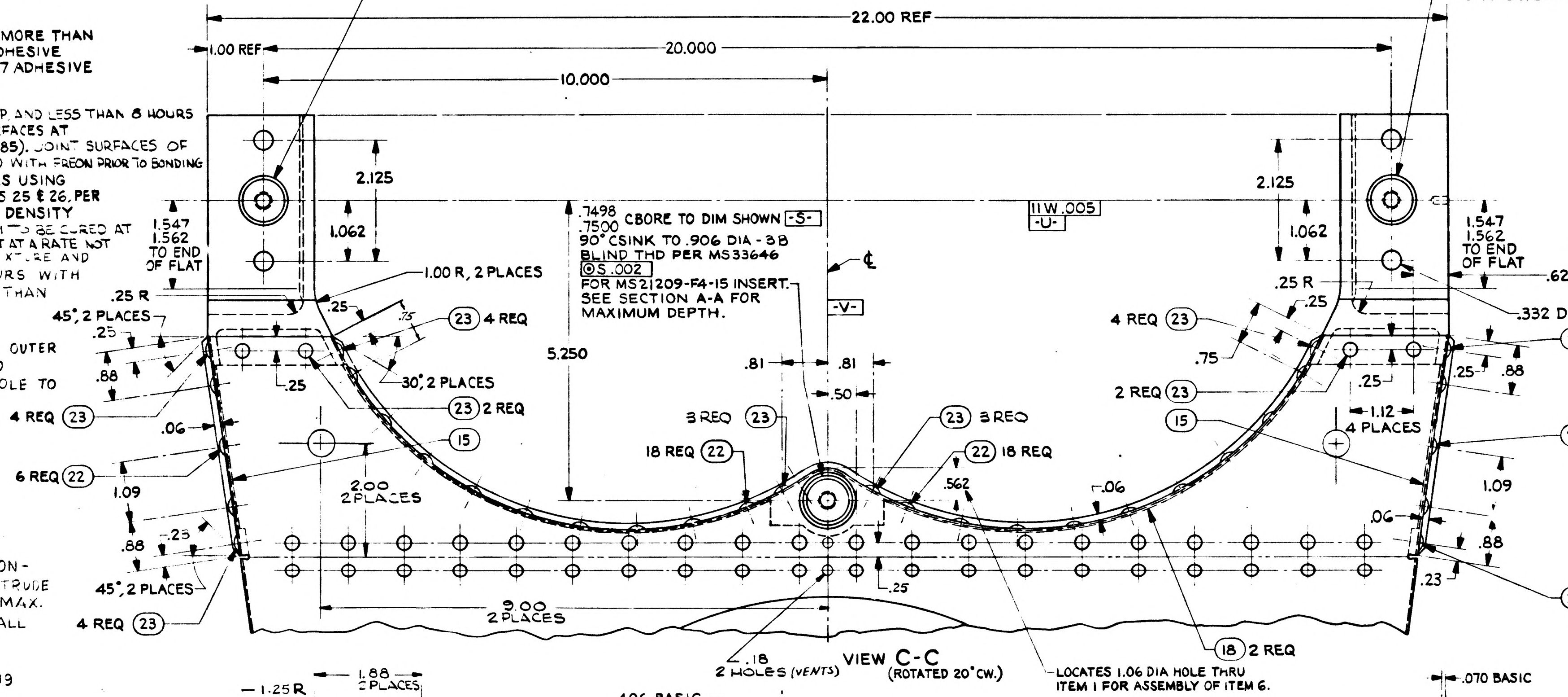
11. ALL RIVET SPACING TOLERANCES TO BE NON-CUMULATIVE. RIVET STEMS SHALL NOT PROTRUDE BEYOND RIVET HEAD BY MORE THAN .03 MAX. PROVIDE .143/.146 DIA HOLES THRU FOR ALL RIVETS.

13. IDENTIFY USING DRAWING NO. PER ND 1002019 AND SERIALIZE PER ND 1002023.

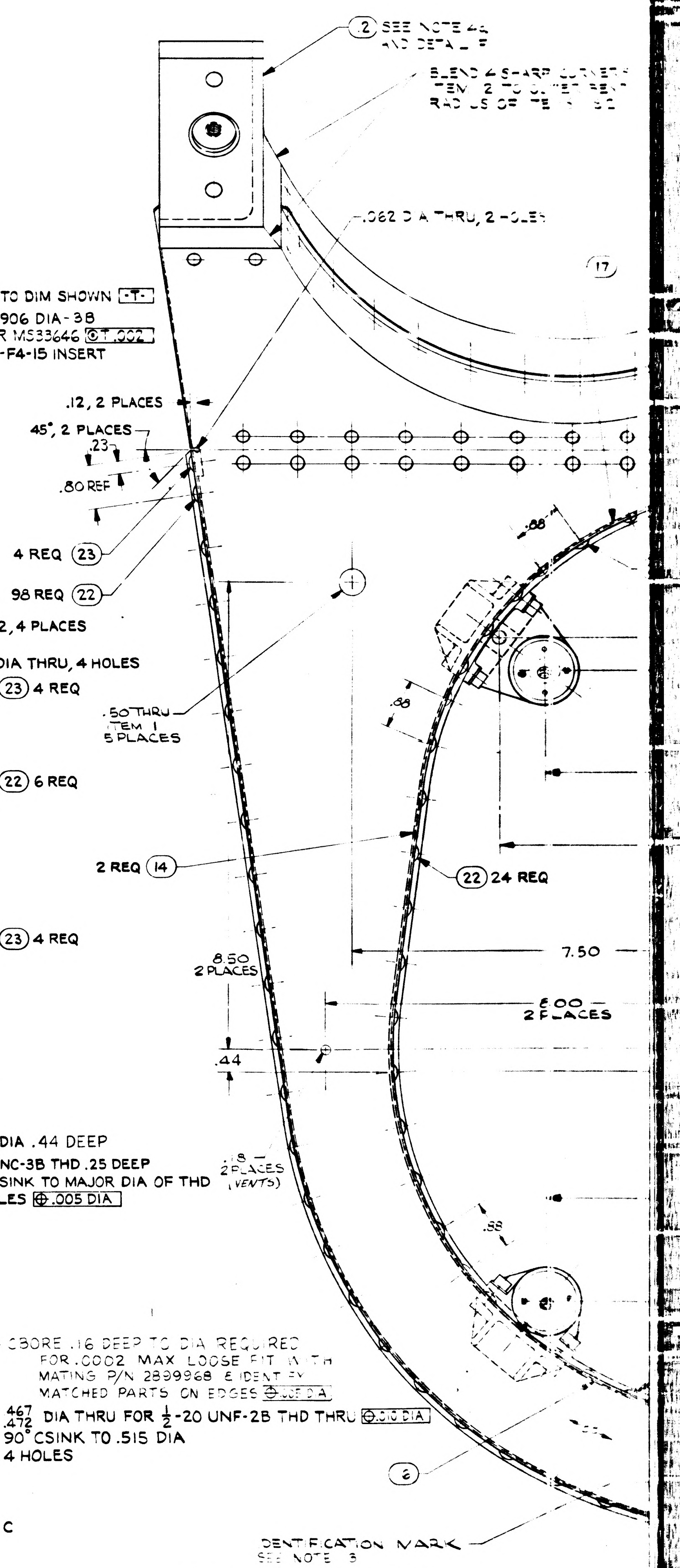
14. *VENDOR ITEM - SEE SPEC CONTROL DWG.*

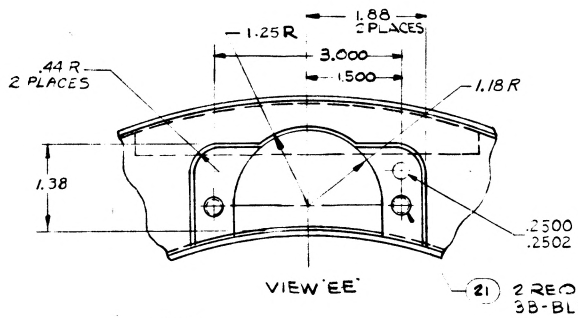

℄
1.00
1.00
1.00
1.00
.645
.645
.25 R
.25 R
.75
.97
.75
.97
.50
⌒ .002 -Y-
.7498 .7500 CBORE TO DIM SHOWN -R-
90° CSINK TO .906 DIA -3B THD THRU PER MS33646 ◎R .002
FOR MS21209-F4-15 INSERT
.7498 .7500 CBORE TO DIM SHOWN -T-
90° CSINK TO .906 DIA -3B THD THRU PER MS33646 ◎T .002
FOR MS21209-F4-15 INSERT

PARTIAL VIEW B-B
(ROTATED 70° C.CW.)

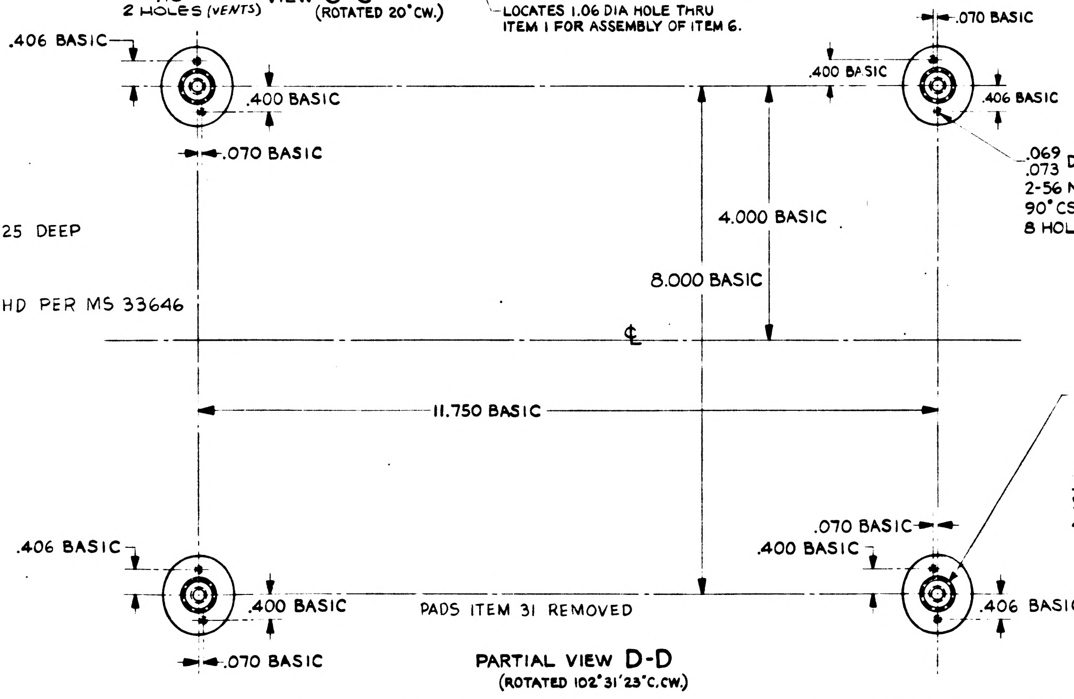

22.00 REF
1.00 REF
20.000
10.000
2.125
2.125
1.062
1.062
1.547 1.562 TO END OF FLAT
1.547 1.562 TO END OF FLAT
.7498 .7500 CBORE TO DIM SHOWN -S-
90° CSINK TO .906 DIA -3B BLIND THD PER MS33646 ◎S .002
FOR MS21209-F4-15 INSERT. SEE SECTION A-A FOR MAXIMUM DEPTH.
11W .005 -U-
℄
-V-
1.00 R, 2 PLACES
.25 R
.25 R
.62, 4 PLACES
.332 DIA THRU, 4 HOLES
45°, 2 PLACES
.25
.25
.75
.88
.88
.25
.25
23 4 REQ
23 4 REQ
23 4 REQ
23 4 REQ
23 4 REQ
23 4 REQ
30°, 2 PLACES
23 2 REQ
2 REQ 23
5.250
.81
.81
.50
3 REQ 23
23 3 REQ
18 REQ 22
22 18 REQ
15
15
1.12 4 PLACES
22 6 REQ
6 REQ 22
.06
.06
.06
.562
1.09
1.09
2.00 2 PLACES
.25
.88
.88
45°, 2 PLACES
.23
.25
9.00 2 PLACES
.18 2 HOLES (VENTS)
LOCATES 1.06 DIA HOLE THRU ITEM 1 FOR ASSEMBLY OF ITEM 6.
18 2 REQ

VIEW C-C
(ROTATED 20° CW.)

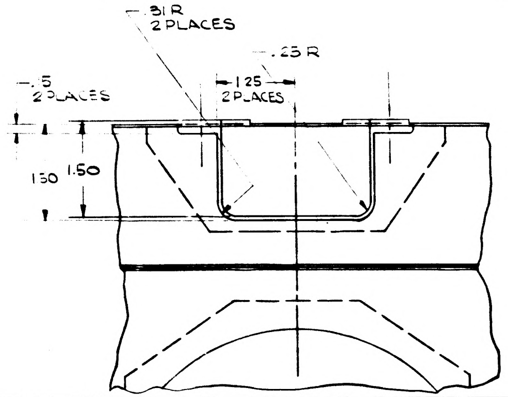

2 SEE NOTE 4a AND DETAIL F
BLEND 4 SHARP CORNERS ITEM 2 TO OUTER BENT RADIUS OF ITEM 15
.062 DIA THRU, 2 HOLES
17
.12, 2 PLACES
45°, 2 PLACES
.23
.80 REF
4 REQ 23
98 REQ 22
.50 THRU ITEM 1 5 PLACES
.88
.88
.88
2 REQ 14
22 24 REQ
8.50 2 PLACES
7.50
8.00 2 PLACES
.44
.18 2 PLACES (VENTS)
6
IDENTIFICATION MARK SEE NOTE 13

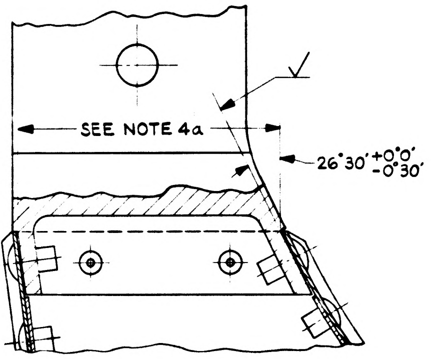

1.25 R
1.88 2 PLACES
3.000
1.500
.44 R 2 PLACES
1.18 R
1.38
.2500 .2502 DIA. .25 DEEP
21 2 REQ. 3B-BLIND THD PER MS 33646

VIEW 'EE'


.406 BASIC
.400 BASIC
.070 BASIC
.070 BASIC
.400 BASIC
.406 BASIC
.069 .073 DIA .44 DEEP
2-56 NC-3B THD .25 DEEP
90° CSINK TO MAJOR DIA OF THD
8 HOLES ⊕ .005 DIA
4.000 BASIC
8.000 BASIC
℄
11.750 BASIC
CBORE .16 DEEP TO DIA REQUIRED FOR .0002 MAX LOOSE FIT WITH MATING P/N 2899968 & IDENTIFY MATCHED PARTS ON EDGES ⊕ .005 DIA
.467 .472 DIA THRU FOR 1/2-20 UNF-2B THD THRU ⊕ .010 DIA
90° CSINK TO .515 DIA
4 HOLES
.406 BASIC
.070 BASIC
.400 BASIC
.400 BASIC
.406 BASIC
.070 BASIC
PADS ITEM 31 REMOVED

PARTIAL VIEW D-D
(ROTATED 102°31'25" C.CW.)

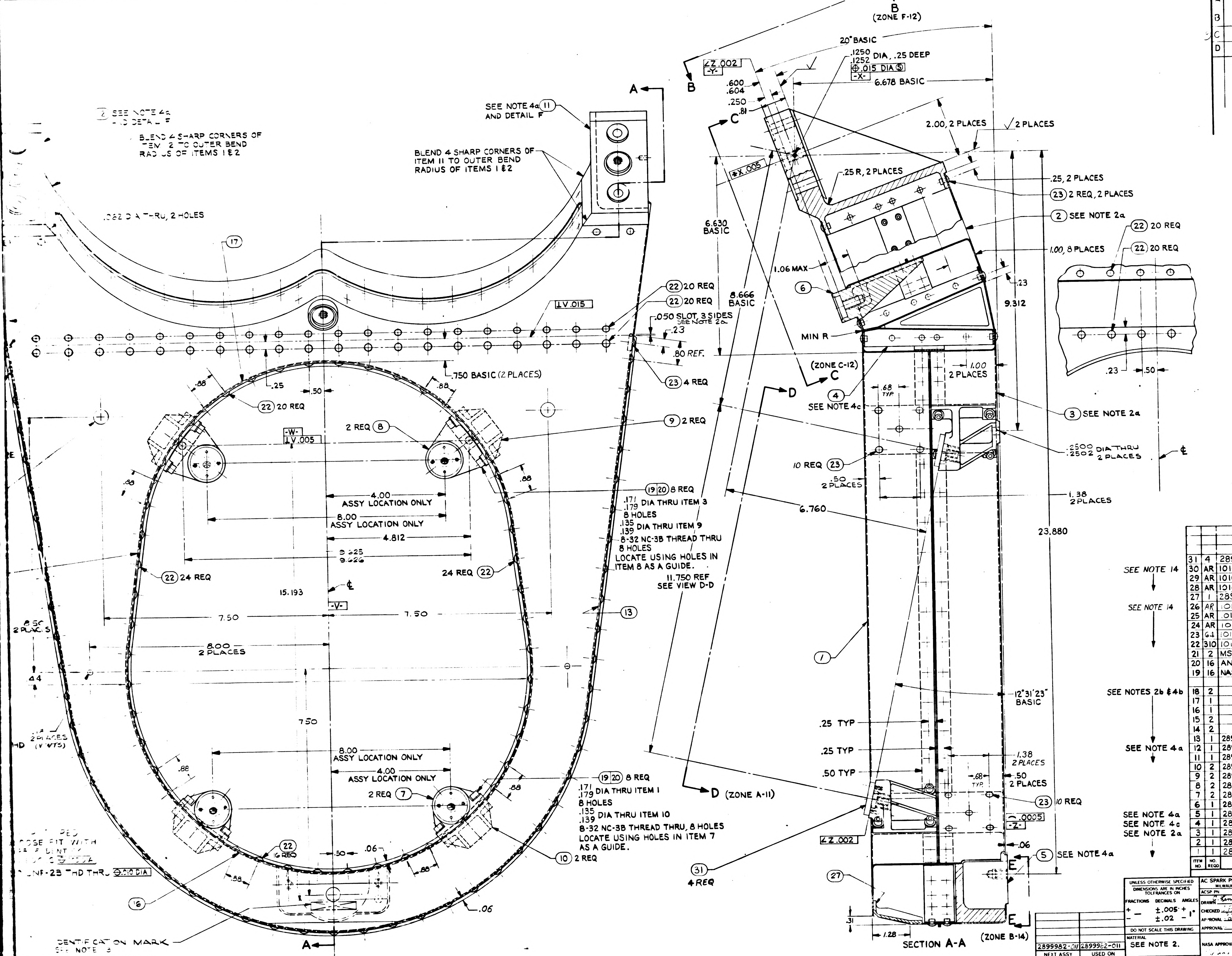

.31 R 2 PLACES
.23 R
.5 2 PLACES
1.25 2 PLACES
1.50
1.60


SEE NOTE 4a
26°30' +0°0' -0°30'

DETAIL F
SCALE 2:1
(TYPICAL FOR ITEMS 11 & 12)

2899981

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC 200341		15 MAR 65	
B		UPGRADED TO CLASS A PER TDRR 17813		5 MAR 65	
C		REVISED PER TDRR 2078		19 JUL 65	
D		REVISED PER TDRR 2163		20 AUG 65	



2 SEE NOTE 4a AND DETAIL F
BLEND 4 SHARP CORNERS OF ITEM 12 TO OUTER BEND RADIUS OF ITEMS 1 & 2
SEE NOTE 4a (11) AND DETAIL F
BLEND 4 SHARP CORNERS OF ITEM 11 TO OUTER BEND RADIUS OF ITEMS 1 & 2
A
.062 DIA THRU, 2 HOLES
(17)
⊥V .015
(22) 20 REQ
(22) 20 REQ
.050 SLOT, 3 SIDES SEE NOTE 2a
.23
.80 REF.
(23) 4 REQ
.750 BASIC (2 PLACES)
.88
.25
.50
.88
(22) 20 REQ
(9) 2 REQ
2 REQ (8)
-W-
⊥V .005
.88
.88
(19)(20) 8 REQ
4.00 ASSY LOCATION ONLY
8.00 ASSY LOCATION ONLY
.171 .179 DIA THRU ITEM 3 8 HOLES
.135 .139 DIA THRU ITEM 9
8-32 NC-3B THREAD THRU 8 HOLES
LOCATE USING HOLES IN ITEM 8 AS A GUIDE.
4.812
9.625 9.626
(22) 24 REQ
24 REQ (22)
11.750 REF SEE VIEW D-D
15.193
℄
-V-
7.50
7.50
(13)
8.50 2 PLACES
8.00 2 PLACES
.44
7.50
8.00 ASSY LOCATION ONLY
4.00 ASSY LOCATION ONLY
(19)(20) 8 REQ
2 REQ (7)
.171 .179 DIA THRU ITEM 1 8 HOLES
.135 .139 DIA THRU ITEM 10
8-32 NC-3B THREAD THRU, 8 HOLES
LOCATE USING HOLES IN ITEM 7 AS A GUIDE.
.88
.88
(10) 2 REQ
(22) 16 REQ
.50
.06
.88
.38
.06
(16)
IDENTIFICATION MARK SEE NOTE 3
UNF-2B THD THRU ⊕ .010 DIA
A
B (ZONE F-12)
B
20° BASIC
.1250 .1252 DIA, .25 DEEP
⊕ .015 DIA Ⓢ -X-
∠Z .002 -Y-
6.678 BASIC
.600 .604
.250
C .81
2.00, 2 PLACES
2 PLACES
⊥X .005
.25 R, 2 PLACES
.25, 2 PLACES
(23) 2 REQ, 2 PLACES
(2) SEE NOTE 2a
(22) 20 REQ
(22) 20 REQ
6.630 BASIC
8.666 BASIC
1.00, 8 PLACES
1.06 MAX
(6)
.23
9.312
MIN R
.23
.50
(ZONE C-12) C
(4) SEE NOTE 4c
D
1.00 2 PLACES
.68 TYP
(3) SEE NOTE 2a
.2500 .2502 DIA THRU 2 PLACES
℄
10 REQ (23)
.50 2 PLACES
1.38 2 PLACES
6.760
23.880
(1)
12°31'23" BASIC
.25 TYP
.25 TYP
.50 TYP
1.38 2 PLACES
.68 TYP
.50 2 PLACES
(23) 10 REQ
D (ZONE A-11)
-Z- .0005
∠Z .002
.06
(5) SEE NOTE 4a
E
(31) 4 REQ
(27)
.31
1.28
E
SECTION A-A
(ZONE B-14)

31	4	2899968	PAD MOUNTING
30	AR	1010750	CURING AGENT
29	AR	1010749	FILLER
28	AR	1010748	EPOXY RESIN
27	1	2899966	INSERT, ANGULAR
26	AR	1010864	PREPOLYMER, POLYURETHANE
25	AR	1010863	RESIN, POLYURETHANE
24	AR	1010877	ADHESIVE (EC-2186)
23	64	1010868-3	↑ ↑
22	310	1010868-2	RIVET, BLIND
21	2	MS21209-F4-15	(1897059-204) INSERT, LOCKING
20	16	AN960C8	(1897006-028) WASHER, FLAT
19	16	NAS1352C08LL10	(1897014-428) SCREW, SOCKET HEAD, SELF LOCKING
18	2	-008	↑ ↑
17	1	-007	
16	1	-006	
15	2	-005	
14	2	↑ -004	
13	1	2899981-003	STRIP, REINFORCING
12	1	2899973	ARM, L.H.
11	1	2899972	ARM, R.H.
10	2	2899962	↑ ↑ ,REAR
9	2	2899961	,REINFORCING, FORWARD
8	2	2899960	↑ ,FORWARD
7	2	2899959	,SUPPORT, REAR
6	1	2899964	BRACKET, OPTICS, REAR
5	1	2899963	INSERT, MTG, REAR
4	1	2899956	BEAM, TRIANGULAR (INSEP ASSY)
3	1	2899981-002	↑ ↑ ↑
2	1	2899981-001	,PART A
1	1	2899955	BLANK, FORMED
ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

SEE NOTE 14 (items 30–28)
SEE NOTE 14 (items 26–23)
SEE NOTES 2b & 4b (items 18–14)
SEE NOTE 4a (items 13–11)
SEE NOTE 4a (item 5)
SEE NOTE 4c (item 4)
SEE NOTE 2a (items 3–2)
NOTE 4a (item 1)

2899982-011	2899982-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ –	±.005	+ 1°
–	±.02	–

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2.

CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN C. Leny DATE 25 SEP 64
CHECKED J. Pozyda 27 OCT 64
APPROVAL 27 OCT 64
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, NAVIGATION
INSEPARABLE ASSEMBLY

CODE IDENT NO. | SIZE J | 2899981
SCALE 1:1 | SHEET 1 OF 1

2899981 | D | 1

27 OCT 64

2899981

21/2899981

2899981

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. MATERIAL:
   a. ITEMS 1, 2 & 3 ARE A MATCHED SET MADE FROM TWO OF P/N 2899955 BY MAKING A .050 CUT IN BOTH PARTS IN LINE WITHIN .015 INCH. ITEMS 1, 2 & 3 ARE TO BE SERIALIZED AS A MATCHED SET IN THE AREA OF THE DETAIL PIECEMARKS PER ND1002023.
   b. ITEMS 13 THRU 18 ARE TO BE MADE FROM ALUMINUM ALLOY QQ-A-250/11, TEMPER T6, .031 x 1.00 x 100 INCHES LONG. SEE NOTE 4b.

3. UNLESS OTHERWISE SPECIFIED:
   a. MACHINED SURFACE ROUGHNESS MUST NOT EXCEED 63/.
   b. √ MEANS 63.
   c. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   d. RIVET SPACING TO BE 1.00 BETWEEN CTR. SEE NOTE 11.

4. FIT AT ASSEMBLY:
   a. ITEMS *5, 9, 10, 11 + 12 TO BE* MACHINED AT ASSEMBLY TO PROVIDE FIT-UP WITH .002 TO .007 CLEARANCE FOR EACH ADHESIVE JOINT. SEE VIEW E-E AND DETAIL F. A .12 MINIMUM RADIUS OR CHAMFER MUST BE PROVIDED ON ALL CORNERS WHICH WILL MATE WITH INTERNAL RADII OF ITEMS 1, 2 & 3.
   b. ITEMS 13 THRU 18 MUST BE CUT TO LENGTH TO FIT RESPECTIVE SPACES WITH .005 TO .030 CLEARANCE AT EACH END.
   c. ITEM 4 MUST BE MATED TO ITEMS 1, 2 & 3 TO ENSURE PROPER FIT-UP WITH .002 TO .007 CLEARANCE FOR EACH ADHESIVE JOINT. SHEET METAL FLANGES OF ITEM 4 CAN BE RE-FORMED TO PROVIDE REQUIRED ALIGNMENT.

5. BOND AND RIVET ALL ITEMS TOGETHER IN NOT MORE THAN THREE STAGES USING ITEMS 22, 23 & 24. ALL ADHESIVE JOINTS ARE TO BE CONTROLLED TO .002 TO .007 ADHESIVE THICKNESS. PROCESS PER ND 1002254

6. ANODIZE ALL PIECE PARTS EXCEPT ITEM 4 AFTER FITUP AND LESS THAN 8 HOURS PRIOR TO BONDING, TO INSURE CHEMICALLY CLEAN SURFACES AT BOND JOINTS. ANODIZE PER MIL-A-8625, TYPE I (ES-385). JOINT SURFACES OF ITEM 4 MUST BE ABRASIVELY CLEANED AND WASHED WITH FREON PRIOR TO BONDING

7. FOAM FILL THE ASSEMBLY THRU 5 ACCESS HOLES USING 2 LBS/CUBIC FT (RATED) CO_2 BLOWN FOAM, ITEMS 25 & 26, PER ND1002002 TYPE C SO THAT AN AVERAGE CURED FOAM DENSITY OF 3.5 TO 4.0 LBS/CUBIC FT IS OBTAINED. FOAM TO BE CURED AT 180°F ± 5° FOR 2 HOURS MIN. WITH COOLING TO AMBIENT AT A RATE NOT GREATER THAN 30°F/HOUR. REMOVE FROM FIXTURE AND GIVE A POST-CURE AT 180°F ± 5° FOR SIX HOURS WITH HEATING AND COOLING RATES NOT GREATER THAN 30°F/HR.

8. SEAL THE FOAM FILL ACCESS HOLES FLUSH TO OUTER SURFACE USING COMPOUND ITEMS 28, 29 & 30 PER ND 1002203. COMPOUND THICKNESS AT HOLE TO BE .12 TO .25 THICK AND LARGER THAN HOLE IN METAL SHELL.

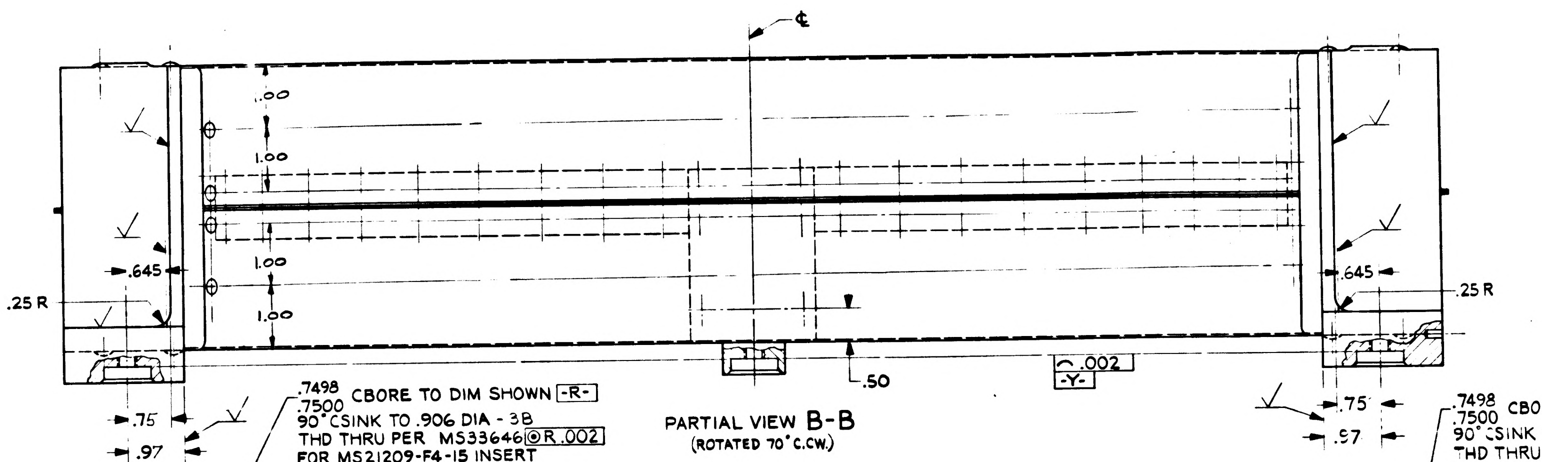
9. MUST BE FREE FROM BURRS.

10. ALL DIMENSIONS TO BE WITHIN SPECIFIED AT A UNIFORM PART TEMPERATURE OF 65° TO 75° F.

11. ALL RIVET SPACING DIMENSIONS TO BE BASIC DIMENSIONS. ALL RIVET HOLES TO BE .143/.146 DIA. THRU ⊕ .125 DIA. RIVET STEMS SHALL NOT PROTRUDE BEYOND RIVET HEAD BY MORE THAN .03 MAX.

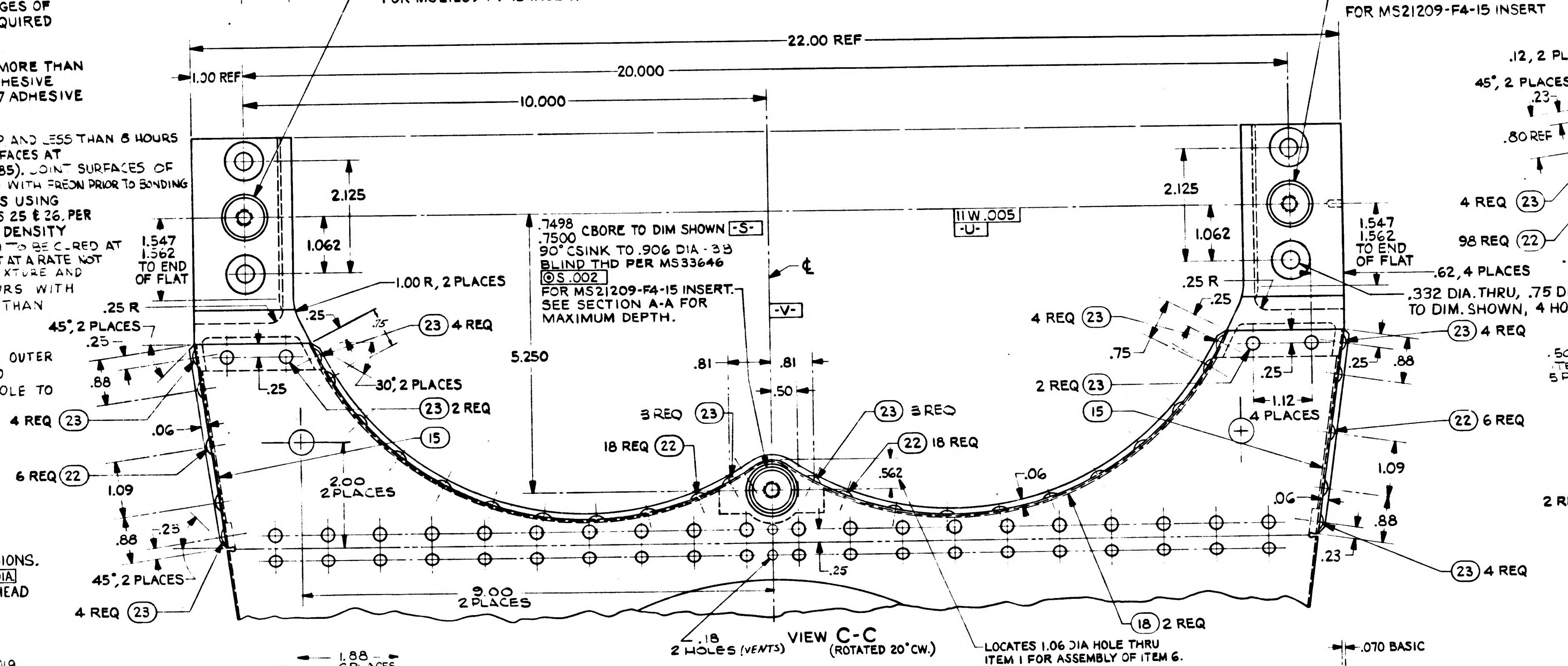
13. IDENTIFY USING DRAWING NO. PER ND 1002019 AND SERIALIZE PER ND 1002023.

14. *VENDOR ITEM - SEE SPEC CONTROL DWG.*



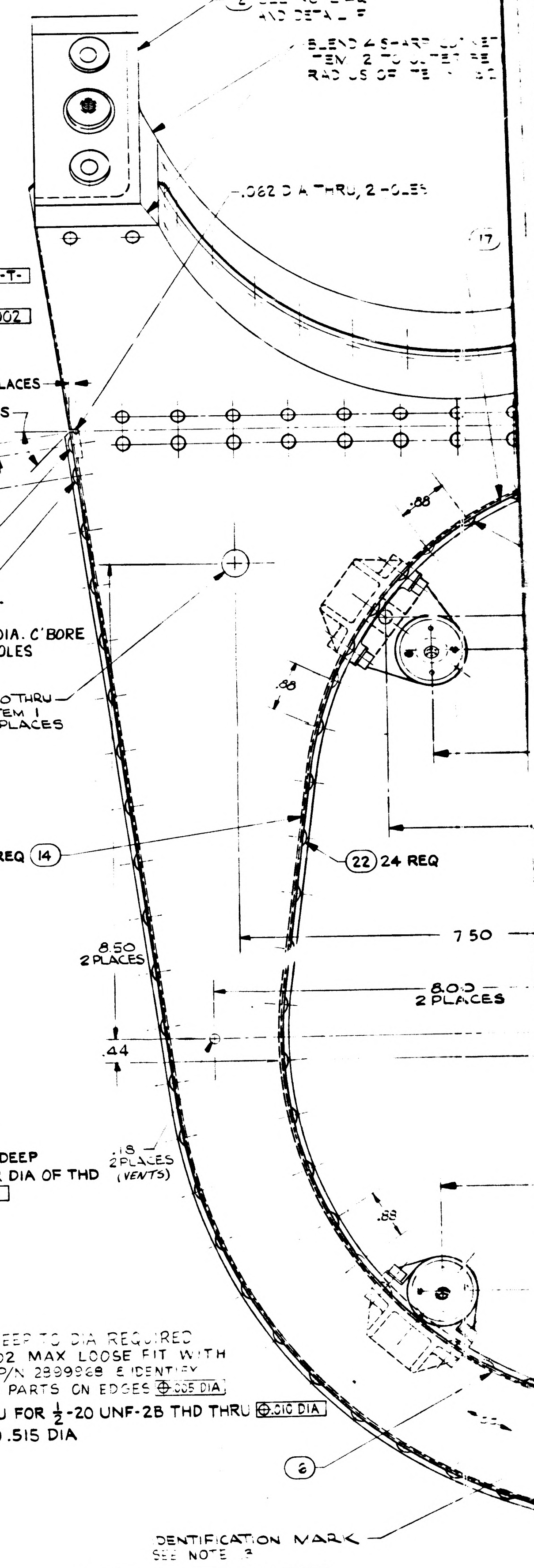
¢
.00
1.00
1.00
1.00
.25 R
.645
.645
.25 R
.50
⌒ .002 -Y-
.75
.97
.75
.97

PARTIAL VIEW B-B
(ROTATED 70° C.CW.)

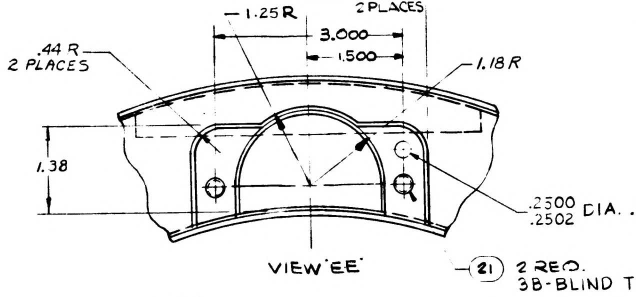


.7498 .7500 CBORE TO DIM SHOWN -R-
90° CSINK TO .906 DIA - 3B THD THRU PER MS33646 ⊚R .002
FOR MS21209-F4-15 INSERT
.7498 .7500 CBORE TO DIM SHOWN -T-
90° CSINK TO .906 DIA 3B THD THRU PER MS33646 ⊚T .002
FOR MS21209-F4-15 INSERT
22.00 REF
1.00 REF
20.000
10.000
2.125
1.062
1.547 1.562 TO END OF FLAT
.25 R
1.00 R, 2 PLACES
.7498 .7500 CBORE TO DIM SHOWN -S-
90° CSINK TO .906 DIA - 3B BLIND THD PER MS33646 ⊚S .002
FOR MS21209-F4-15 INSERT. SEE SECTION A-A FOR MAXIMUM DEPTH.
¢
-V-
11 W .005 -U-
2.125
1.062
1.547 1.562 TO END OF FLAT
.25 R
.62, 4 PLACES
.332 DIA. THRU, .75 DIA. C'BORE TO DIM. SHOWN, 4 HOLES
45°, 2 PLACES
.25
.75
(23) 4 REQ
30°, 2 PLACES
(23) 2 REQ
(15)
.88
.25
4 REQ (23)
.06
6 REQ (22)
1.09
.88
.25
45°, 2 PLACES
4 REQ (23)
2.00 2 PLACES
5.250
.81
.81
.50
3 REQ (23)
18 REQ (22)
(23) 3 REQ
(22) 18 REQ
.562
.06
9.00 2 PLACES
.25
(18) 2 REQ
4 REQ (23)
.75
.25
2 REQ (23)
(15)
.25
.25
.88
1.12 4 PLACES
(23) 4 REQ
(22) 6 REQ
1.09
.06
.88
.23
(23) 4 REQ
.18 2 HOLES (VENTS)
LOCATES 1.06 DIA HOLE THRU ITEM 1 FOR ASSEMBLY OF ITEM 6.

VIEW C-C
(ROTATED 20° CW.)

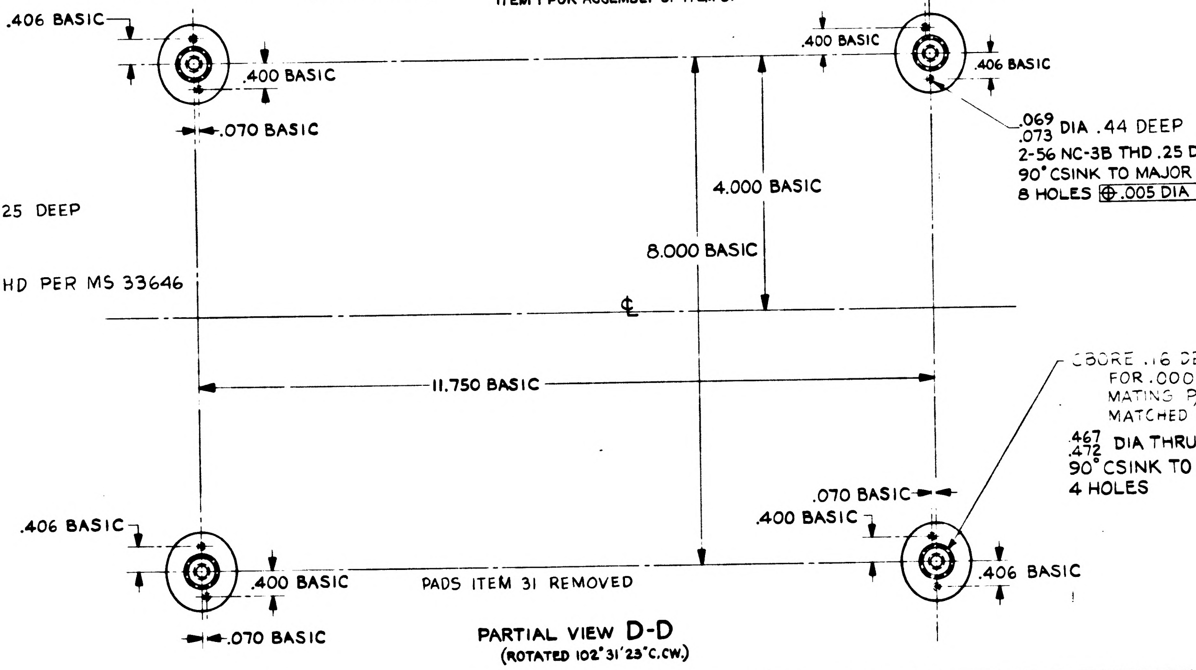


(2) SEE NOTE 4a AND DETAIL F
BLEND & SHARP CORNER ITEM 2 TO OUTER FREE RADIUS OF ITEM 3
.062 DIA THRU, 2 HOLES
(17)
.12, 2 PLACES
45°, 2 PLACES
.23
.80 REF
4 REQ (23)
98 REQ (22)
.88
.50 THRU ITEM 1 5 PLACES
.88
2 REQ (14)
(22) 24 REQ
7.50
8.50 2 PLACES
8.00 2 PLACES
.44
.18 2 PLACES (VENTS)
.88
(6)
IDENTIFICATION MARK SEE NOTE 13



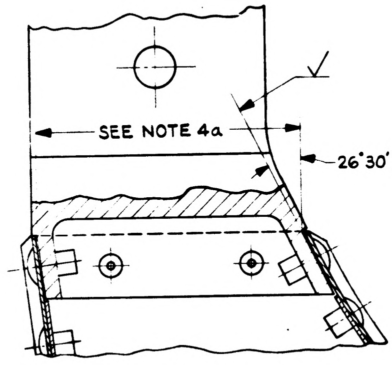
1.25 R
1.88 2 PLACES
3.000
1.500
.44 R 2 PLACES
1.18 R
1.38
.2500 .2502 DIA. .25 DEEP
(21) 2 REQ. 3B-BLIND THD PER MS 33646

VIEW 'EE'



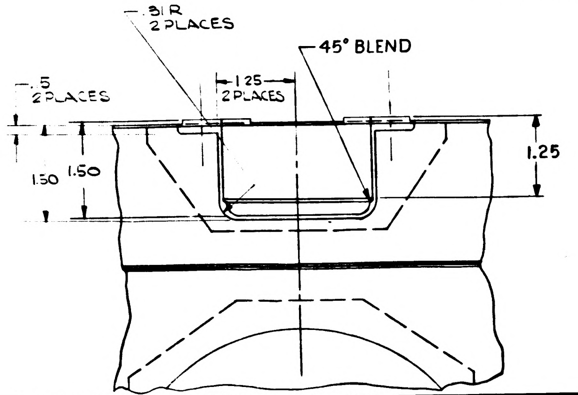
.406 BASIC
.400 BASIC
.070 BASIC
.070 BASIC
.400 BASIC
.406 BASIC
.069 .073 DIA .44 DEEP
2-56 NC-3B THD .25 DEEP
90° CSINK TO MAJOR DIA OF THD
8 HOLES ⊕ .005 DIA
4.000 BASIC
8.000 BASIC
¢
11.750 BASIC
CBORE .16 DEEP TO DIA REQUIRED FOR .0002 MAX LOOSE FIT WITH MATING P/N 2899968 & IDENTIFY MATCHED PARTS ON EDGES ⊕ .005 DIA
.467 .472 DIA THRU FOR 1/2-20 UNF-2B THD THRU ⊕ .010 DIA
90° CSINK TO .515 DIA
4 HOLES
.070 BASIC
.400 BASIC
.406 BASIC
.400 BASIC
.070 BASIC
.406 BASIC
PADS ITEM 31 REMOVED

PARTIAL VIEW D-D
(ROTATED 102°31'23" C.CW.)



SEE NOTE 4a
26°30' +0°0' -0°30'

DETAIL F
SCALE 2:1
(TYPICAL FOR ITEMS 11 & 12)

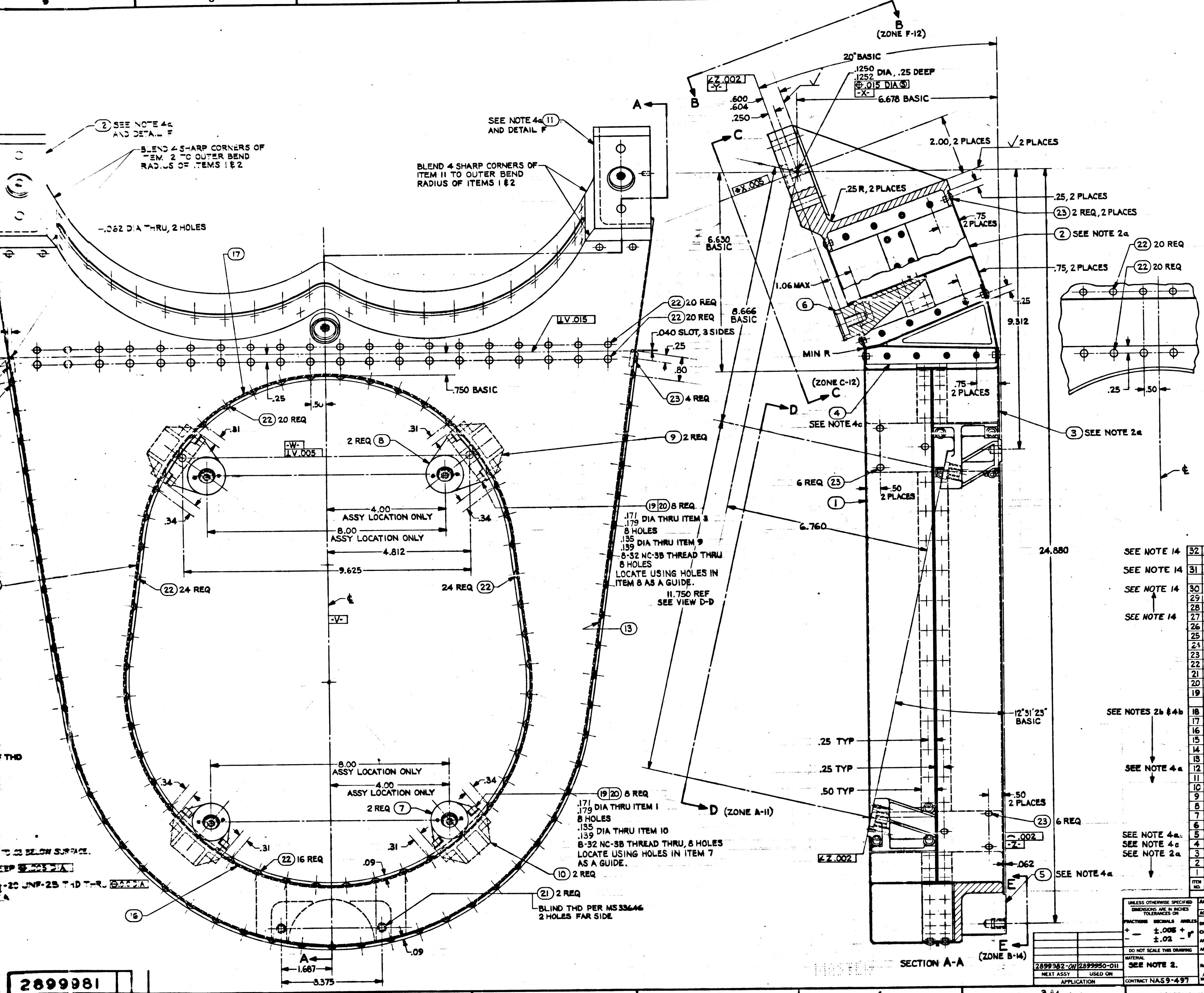


.81 R 2 PLACES
45° BLEND
.5 2 PLACES
1.25 2 PLACES
1.25
1.50
1.50

2899981 | REV D | SHEET 1

1/2899981

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD



B (ZONE F-12)
20° BASIC
.1250 .1252 DIA, .25 DEEP
⊕ .015 DIA Ⓢ
-X-
6.678 BASIC
∠Z .002
-Y-
.600 .604
.250
B
A
C
2.00, 2 PLACES
√ 2 PLACES
.25 R, 2 PLACES
.25, 2 PLACES
23 2 REQ, 2 PLACES
.75 2 PLACES
2 SEE NOTE 2a
22 20 REQ
22 20 REQ
.75, 2 PLACES
.25
9.312
6.630 BASIC
8.666 BASIC
1.06 MAX
6
MIN R
(ZONE C-12) C
.75 2 PLACES
4 SEE NOTE 4c
3 SEE NOTE 2a
6 REQ 23
.50 2 PLACES
1
6.760
24.880
12°31'23" BASIC
.25 TYP
.25 TYP
.50 TYP
.50 2 PLACES
23 6 REQ
.002
-Z-
∠Z .002
.062
5 SEE NOTE 4a
E
E (ZONE B-14)
SECTION A-A
D
D (ZONE A-11)
.25
.50
2 SEE NOTE 4a AND DETAIL F
BLEND 4 SHARP CORNERS OF ITEM 2 TO OUTER BEND RADIUS OF ITEMS 1 & 2
SEE NOTE 4a 11 AND DETAIL F
BLEND 4 SHARP CORNERS OF ITEM 11 TO OUTER BEND RADIUS OF ITEMS 1 & 2
.062 DIA THRU, 2 HOLES
17
⊥V .015
22 20 REQ
22 20 REQ
.040 SLOT, 3 SIDES
.25
.80
.750 BASIC
23 4 REQ
.25
.50
22 20 REQ
.81
.31
-W-
⊥V .005
2 REQ 8
9 2 REQ
.34
.34
4.00 ASSY LOCATION ONLY
8.00 ASSY LOCATION ONLY
4.812
9.625
19 20 8 REQ
.171 .179 DIA THRU ITEM 3
8 HOLES
.135 .139 DIA THRU ITEM 9
8-32 NC-3B THREAD THRU 8 HOLES
LOCATE USING HOLES IN ITEM 8 AS A GUIDE.
11.750 REF SEE VIEW D-D
22 24 REQ
24 REQ 22
℄
-V-
13
THD
8.00 ASSY LOCATION ONLY
4.00 ASSY LOCATION ONLY
.34
.34
2 REQ 7
19 20 8 REQ
.171 .179 DIA THRU ITEM 1
8 HOLES
.135 .139 DIA THRU ITEM 10
8-32 NC-3B THREAD THRU, 8 HOLES
LOCATE USING HOLES IN ITEM 7 AS A GUIDE.
10 2 REQ
.31
.31
.09
.09
22 16 REQ
16
21 2 REQ
BLIND THD PER MS33646 2 HOLES FAR SIDE
.03 BELOW SURFACE.
EP ⊕ .005 DIA
-20 UNF-2B THD THRU ⊕ .005 DIA
A
A
1.687
3.375
22 20 REQ
22 20 REQ
.25
.50
℄

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 DATE

	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 14	32	AR	1010730	CATALYST, EPOXY BUTADIENE ENAMEL
SEE NOTE 14	31	AR	1010729-1	RESIN, EPOXY BUTADIENE ENAMEL
SEE NOTE 14	30	AR	1010750	CURING AGENT
	29	AR	1010749	FILLER
	28	AR	1010748	EPOXY RESIN
SEE NOTE 14	27	4	1010802-002	INSERT, FLOATING, LOCKING THD
	26	AR		PREPOLYMER, POLYURETHANE
	25	AR		RESIN, POLYURETHANE
	24	AR	MIL-A-5090, TYPE I	ADHESIVE (EC-2186)
	23	56		↑ ↑
	22	310		RIVET, BLIND
	21	2	MS21209-F4-15	(1897059-204) INSERT, LOCKING
	20	16	AN960C8	(1897006-028) WASHER, FLAT
	19	16	NAS1352C08LL10P	(1897013-428) SCREW, SOCKET HEAD, SELF LOCKING
SEE NOTES 2b & 4b	18	2	↑ -008	↑ ↑
	17	1	-007	
	16	1	-006	
	15	2	-005	
	14	2	-004	
	13	1	2899981-003	STRIP, REINFORCING
SEE NOTE 4a	12	1	2899973	ARM, L.H.
	11	1	2899972	ARM, R.H.
	10	2	2899962	↑ ↑ , REAR
	9	2	2899961	, REINFORCING, FORWARD
	8	2	2899960	↑ , FORWARD
	7	2	2899959	, SUPPORT, REAR
	6	1	2899964	BRACKET, OPTICS, REAR
SEE NOTE 4a	5	1	2899963	INSERT, ISOLATOR MTG, REAR
SEE NOTE 4c	4	1	2899956	BEAM, TRIANGULAR (INSEP ASSY)
SEE NOTE 2a	3	1	2899981-002	↑ ↑ ↑
	2	1	2899981-001	, PARTIAL
	1	1	2899955	BLANK, FORMED

LIST OF PARTS AND MATERIALS

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS ±.005 ±.02 ANGLES + − °
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2.
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN C. King 25 SEP 64 DATE
CHECKED C. Pyrda 27 OCT 64
APPROVAL 27 OCT 64
APPROVAL 27 OCT 64
NASA APPROVAL 11-4-64
MIT APPROVAL 4 Nov 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, NAVIGATION
INSEPARABLE ASSEMBLY

CODE IDENT NO.
SIZE J
2899981
SCALE 1:1
SHEET 1 OF 1

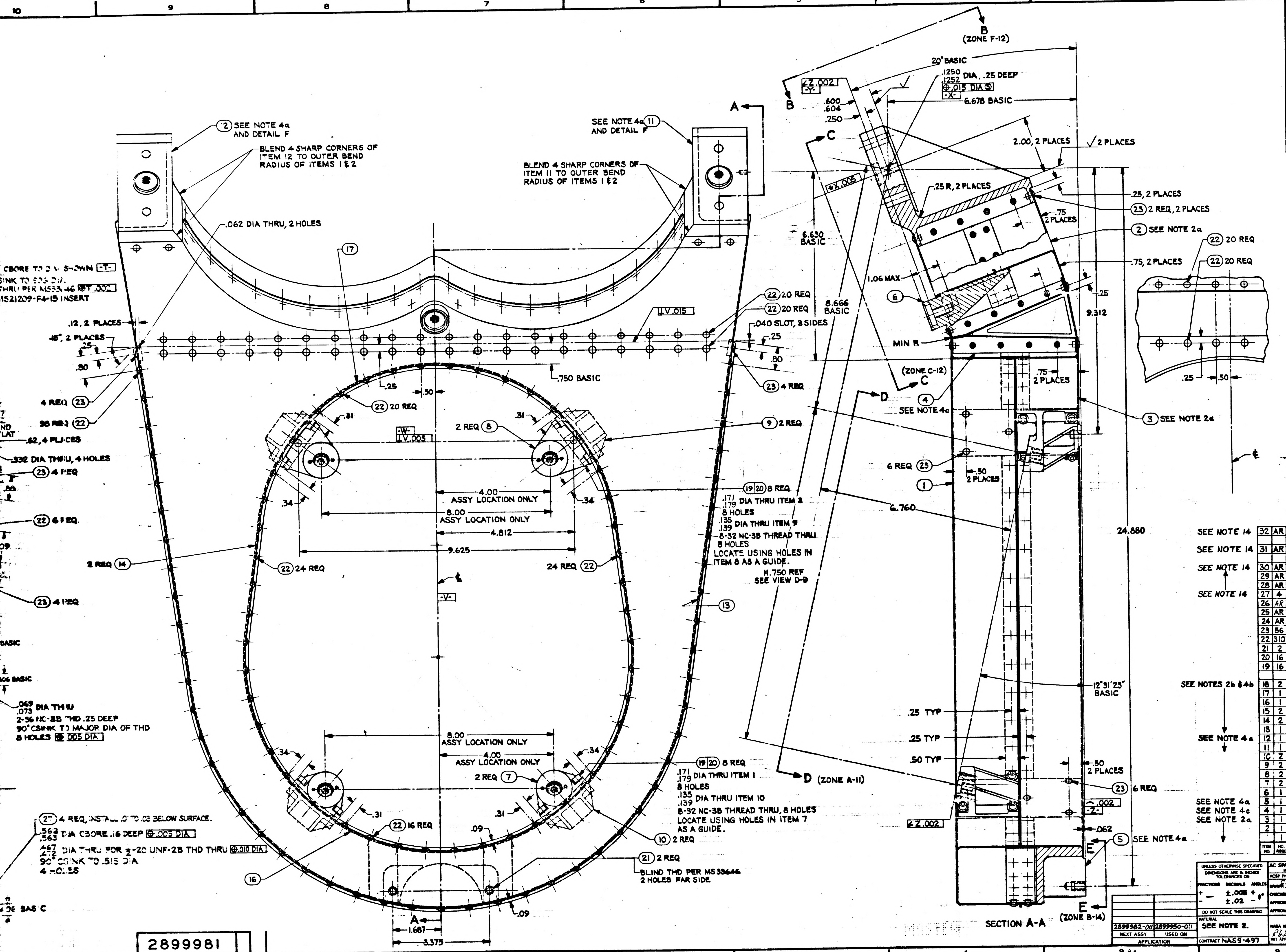
2899982-011	2899950-011
NEXT ASSY	USED ON
APPLICATION	

2899981

3 Charleston 27 OCT 64

2899981

(3-)


REVISIONS
SYM ZONE DESCRIPTION DATE APPD CHG NO
B (ZONE F-12)
20° BASIC
.1250 .1252 DIA, .25 DEEP
⊕ .015 DIA Ⓢ -X-
6.678 BASIC
⫽ Z .002 -Y-
.600 .604
.250
B
A
C
2 SEE NOTE 4a AND DETAIL F
BLEND 4 SHARP CORNERS OF ITEM 12 TO OUTER BEND RADIUS OF ITEMS 1 & 2
SEE NOTE 4a 11 AND DETAIL F
BLEND 4 SHARP CORNERS OF ITEM 11 TO OUTER BEND RADIUS OF ITEMS 1 & 2
.062 DIA THRU, 2 HOLES
17
CBORE TO 2 .. SHOWN -T-
SINK TO .506 DIA
THRU PER MS33646 ⊕ T .002
MS21209-F4-15 INSERT
.12, 2 PLACES
45°, 2 PLACES
.25
.80
4 REQ 23
96 REQ 22
.62, 4 PLACES
.332 DIA THRU, 4 HOLES
23 4 REQ
22 6 REQ
23 4 REQ
2 REQ 14
BASIC
.406 BASIC
.069 .073 DIA THRU
2-56 NC-3B THD .25 DEEP
90° CSINK TO MAJOR DIA OF THD
8 HOLES ⊕ .005 DIA
27 4 REQ, INSTALL .01 TO .03 BELOW SURFACE.
.562 .563 DIA CBORE .16 DEEP ⊕ .005 DIA
.467 .472 DIA THRU FOR 1/2-20 UNF-2B THD THRU ⊕ .010 DIA
90° CSINK TO .515 DIA
4 HOLES
4.06 BASIC
22 20 REQ
22 20 REQ
⫽ V .015
.040 SLOT, 3 SIDES
.25
.80
.750 BASIC
23 4 REQ
.25
.50
22 20 REQ
.81
-W- ⫽ V .005
2 REQ 8
.31
9 2 REQ
.34
.34
4.00 ASSY LOCATION ONLY
8.00 ASSY LOCATION ONLY
4.812
9.625
19 20 8 REQ
.171 .179 DIA THRU ITEM 3
8 HOLES
.135 .139 DIA THRU ITEM 9
8-32 NC-3B THREAD THRU
8 HOLES
LOCATE USING HOLES IN ITEM 8 AS A GUIDE.
11.750 REF
SEE VIEW D-D
22 24 REQ
24 REQ 22
℄
-V-
13
8.00 ASSY LOCATION ONLY
4.00 ASSY LOCATION ONLY
.34
.34
2 REQ 7
19 20 8 REQ
.171 .179 DIA THRU ITEM 1
8 HOLES
.135 .139 DIA THRU ITEM 10
8-32 NC-3B THREAD THRU, 8 HOLES
LOCATE USING HOLES IN ITEM 7 AS A GUIDE.
.31
22 16 REQ
.09
.31
10 2 REQ
21 2 REQ
BLIND THD PER MS33646
2 HOLES FAR SIDE
16
.09
A
1.687
3.375
6.630 BASIC
8.666 BASIC
⫽ X .005
.25 R, 2 PLACES
2.00, 2 PLACES
√ 2 PLACES
.25, 2 PLACES
23 2 REQ, 2 PLACES
.75 2 PLACES
2 SEE NOTE 2a
1.06 MAX
.75, 2 PLACES
6
.25
9.312
MIN R
(ZONE C-12) C
.75 2 PLACES
4 SEE NOTE 4c
D
3 SEE NOTE 2a
6 REQ 23
1
.50 2 PLACES
6.760
24.880
12°31'23" BASIC
.25 TYP
.25 TYP
.50 TYP
.50 2 PLACES
23 6 REQ
⫽ Z .002
⫽ .002 -Z-
.062
5 SEE NOTE 4a
E
E (ZONE B-14)
D (ZONE A-11)
SECTION A-A
22 20 REQ
22 20 REQ
.25
.50
℄
10 9 8 7 6 5 4 3 2 1
H G F E D C B A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020

	ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 14	32	AR	1010730	CATALYST, EPOXY BUTADIENE ENAMEL
SEE NOTE 14	31	AR	1010729-1	RESIN, EPOXY BUTADIENE ENAMEL
SEE NOTE 14	30	AR	1010750	CURING AGENT
↑	29	AR	1010749	FILLER
	28	AR	1010748	EPOXY RESIN
SEE NOTE 14	27	4	1010802-002	INSERT, FLOATING, LOCKING THD
	26	AR		PREPOLYMER, POLYURETHANE
	25	AR		RESIN, POLYURETHANE
	24	AR	MIL-A-5090, TYPE I	ADHESIVE (EC-2186)
	23	56		↑ ↑
	22	310		RIVET, BLIND
	21	2	MS21209-F4-15	(1897059-204) INSERT, LOCKING
	20	16	AN960C8	(1897006-028) WASHER, FLAT
	19	16	NAS1352C08LL10P	(1897013-428) SCREW, SOCKET HEAD, SELF LOCKING
SEE NOTES 2b & 4b	18	2	↑ -008	↑ ↑
	17	1	-007	
	16	1	-006	
	15	2	-005	
↓	14	2	-004	
	13	1	2899981-003	STRIP, REINFORCING
SEE NOTE 4a	12	1	2899973	ARM, L.H.
↓	11	1	2899972	ARM, R.H.
	10	2	2899962	↑ ↑ REAR
	9	2	2899961	REINFORCING, FORWARD
	8	2	2899960	↑ FORWARD
	7	2	2899959	SUPPORT, REAR
	6	1	2899964	BRACKET, OPTICS, REAR
SEE NOTE 4a	5	1	2899963	INSERT, ISOLATOR MTG, REAR
SEE NOTE 4c	4	1	2899956	BEAM, TRIANGULAR (INSERT ASSY)
SEE NOTE 2a	3	1	2899981-002	↑ ↑
↓	2	1	2899981-001	, PARTIAL
NOTE 4a	1	1	2899955	BLANK, FORMED

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2899982-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — − | DECIMALS ±.005 ±.02 | ANGLES ± 1°
DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2.

CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN C. King DATE 25 SEP 64
CHECKED C. Pagida 27 OCT 64
APPROVAL 22 OCT 64
APPROVAL 27 OCT 64
NASA APPROVAL 11-4-64
MIT APPROVAL 4 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BASE, NAVIGATION
INSEPARABLE ASSY, BUR

CODE IDENT NO. | SIZE J | 2899981
SCALE 1:1

2899981

3 Charleston 22 Oct 64

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. MATERIAL:
   a. ITEMS [illegible], 2 & 3 ARE A MATCHED SET MADE FROM TWO OF P/N 2899955 BY MAKING A .040 CUT IN BOTH PARTS [illegible] WITHIN .015 INCH. ITEMS 1, 2 & 3 ARE TO BE SERIALIZED AS A MATCHED SET IN THE AREA OF THE DETAIL PIECEMARKS PER ND1002023.
   b. ITEMS [illegible]3 THRU [illegible]8 ARE TO BE MADE FROM ALUMINUM ALLOY [illegible]-250/11, TEMPER T6, .031 x 1.00 x 100 INCHES LONG. SEE NOTE 4b.

3. UNLESS OTHERWISE SPECIFIED:
   a. MACHINED SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   b. √ MEANS 63
   c. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
   d. RIVET SPACING TO BE 1.00 BETWEEN CTR. SEE NOTE 11.

4. FIT AT ASSEMBLY:
   a. ITEMS [illegible] TO BE MACHINED AT ASSEMBLY TO PROVIDE FIT-UP WITH .002 TO .007 CLEARANCE FOR EACH ADHESIVE JOINT. SEE VIEW E-E AND DETAIL F. A .12 MINIMUM RADIUS OR CHAMFER MUST BE PROVIDED ON ALL CORNERS WHICH WILL MATE WITH INTERNAL RADII OF ITEMS 1, 2 & 3.
   b. ITEMS 13 THRU 18 MUST BE CUT TO LENGTH TO FIT RESPECTIVE SPACES WITH .005 TO .030 CLEARANCE AT EACH END.
   c. ITEM 4 MUST BE MATED TO ITEMS 1, 2 & 3 TO ENSURE PROPER FIT-UP WITH .002 TO .007 CLEARANCE FOR EACH ADHESIVE JOINT. SHEET METAL FLANGES OF ITEM 4 CAN BE RE-FORMED TO PROVIDE REQUIRED ALIGNMENT.

5. BOND AND RIVET ALL ITEMS TOGETHER IN NOT MORE THAN THREE STAGES USING ITEMS 22, 23 & 24. ALL ADHESIVE JOINTS ARE TO BE CONTROLLED TO .002 TO .007 ADHESIVE THICKNESS. PROCESS PER ND .

6. ANODIZE ALL PIECE PARTS AFTER FITUP, AND LESS THAN 8 HOURS PRIOR TO BONDING, TO INSURE CHEMICALLY CLEAN SURFACES AT BOND JOINTS. ANODIZE PER MIL-A-8625, TYPE I (ES-385).

7. FOAM FILL THE ASSEMBLY THRU 6 ACCESS HOLES USING 2 LBS/CUBIC FT (RATED) CO_2 BLOWN FOAM, ITEMS 25 & 26, PER ND , SO THAT AN AVERAGE CURED FOAM DENSITY OF 3.5 TO 4.0 LBS/CUBIC FT IS OBTAINED.

8. SEAL THE FOAM FILL ACCESS HOLES FLUSH TO OUTER SURFACE USING COMPOUND, ITEMS 28, 29 & 30, PER ND1002203.

9. MUST BE FREE FROM BURRS.

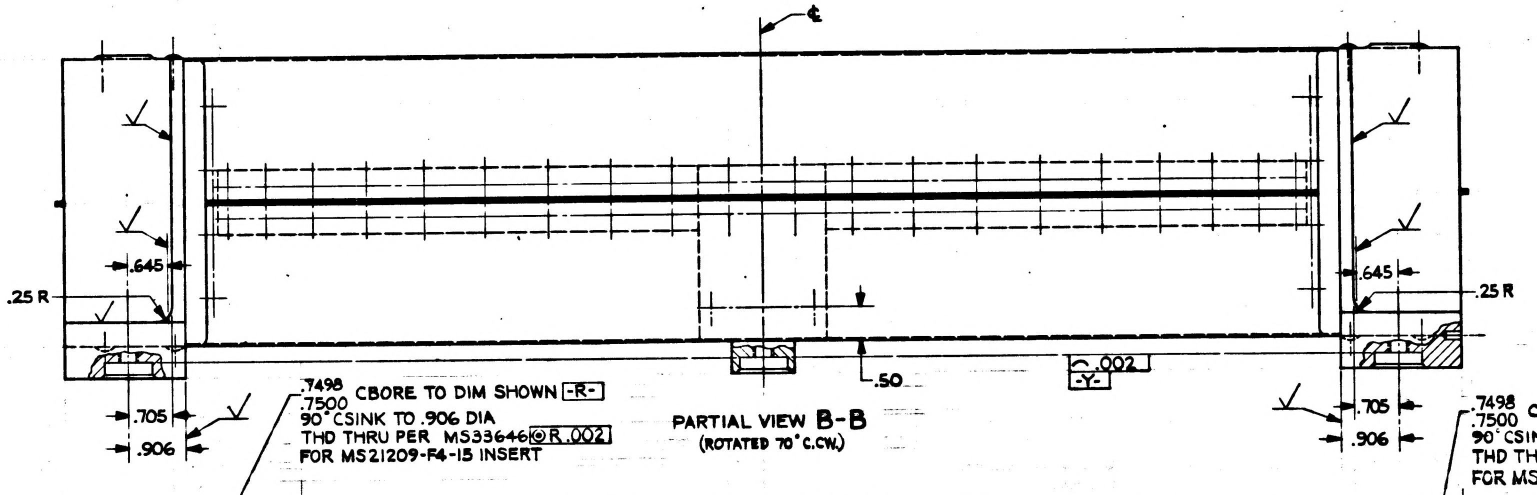
10. ALL DIMENSIONS TO BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 65°TO 75°F.

11. ALL RIVET SPACING TOLERANCES TO BE NON-CUMULATIVE. RIVET STEMS SHALL NOT PROTRUDE BEYOND RIVET HEAD BY MORE THAN .03 MAXIMUM. PROVIDE .143/.146 DIA HOLES THRU FOR ALL RIVETS.

12. FINISH: APPLY LUSTERLESS EPOXY ENAMEL, ITEMS 31 & 32, GREY, COLOR NO. 36231 OF FED-STD-595. APPLY PER ND1002110, TYPE II. THE FOLLOWING AREAS TO BE MASKED AND FREE OF PAINT:
    a. ALL HOLES
    b. ALL PRECISION COUNTERBORES (DATUM PLANE -Y-)
    c. ALL SURFACES ON DATUM -Z-
    d. ALL SURFACES OF PARTIAL VIEW D-D

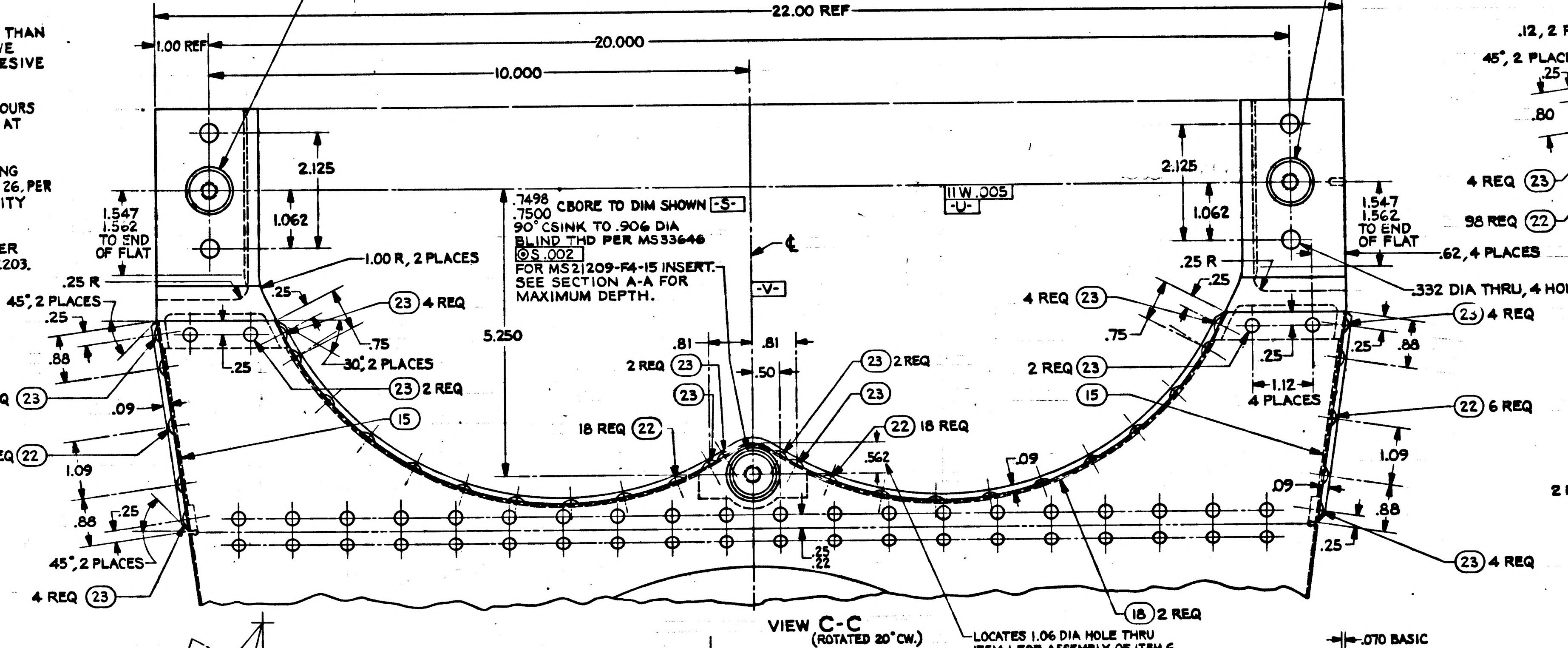
13. IDENTIFY USING DRAWING NUMBER, REVISION LETTER AND SERIAL NUMBER PER ND1002023.

14. *VENDOR ITEM - SEE SPEC CONTROL DWG.*



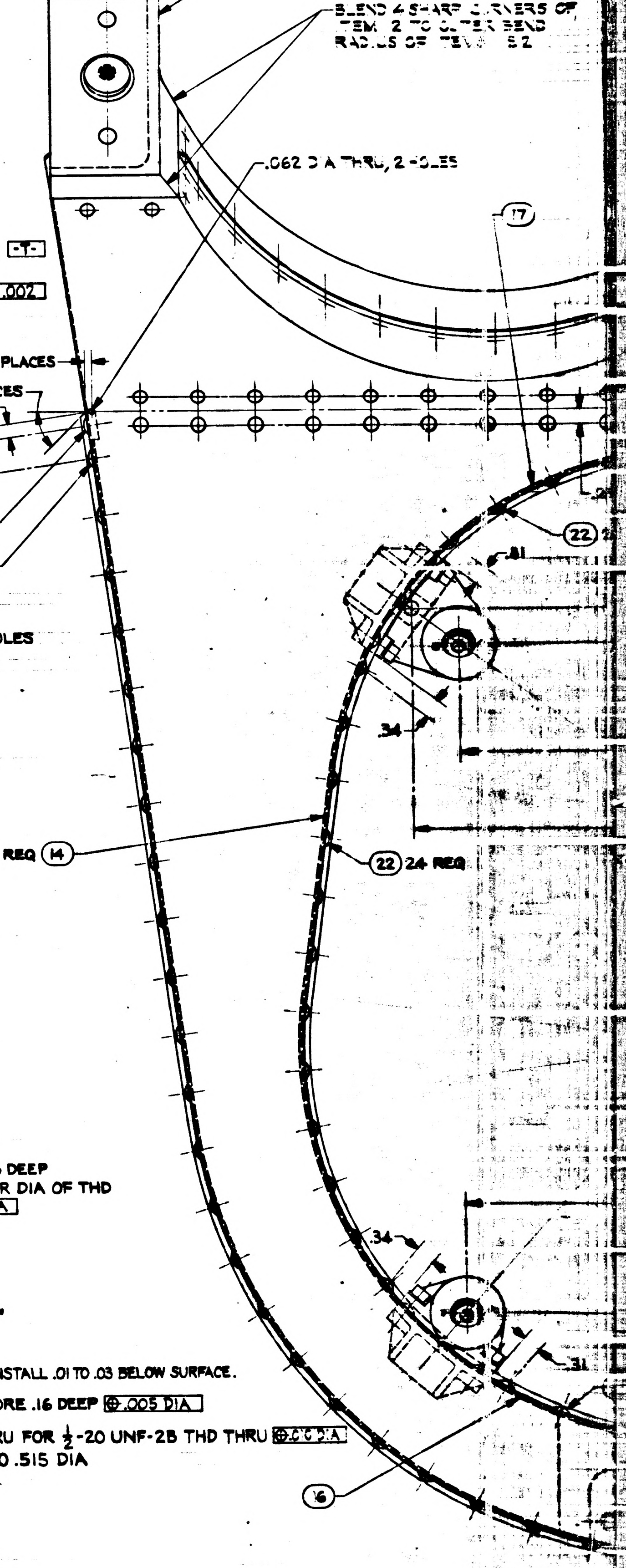
¢
.25 R
.645
.705
.906
.50
.002
-Y-
.25 R
.645
.705
.906
.7498 .7500 CBORE TO DIM SHOWN -R-
90° CSINK TO .906 DIA
THD THRU PER MS33646 ⊕ R .002
FOR MS21209-F4-15 INSERT

PARTIAL VIEW B-B
(ROTATED 70° C.CW.)

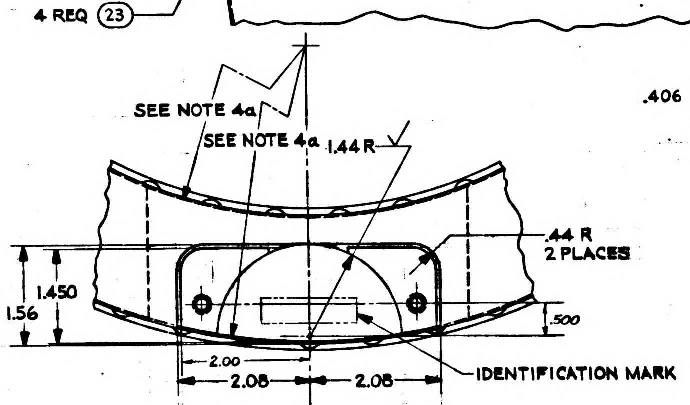


22.00 REF
1.00 REF
20.000
10.000
2.125
1.062
1.547 1.562 TO END OF FLAT
.25 R
45°, 2 PLACES
.25
.88
4 REQ (23)
.09
6 REQ (22)
1.09
.88
.25
45°, 2 PLACES
4 REQ (23)
1.00 R, 2 PLACES
.25
(23) 4 REQ
.75
30°, 2 PLACES
(23) 2 REQ
(15)
5.250
.7498 .7500 CBORE TO DIM SHOWN -S-
90° CSINK TO .906 DIA
BLIND THD PER MS33646 ⊕ S .002
FOR MS21209-F4-15 INSERT.
SEE SECTION A-A FOR MAXIMUM DEPTH.
-V-
¢
.81
.81
2 REQ (23)
(23)
.50
18 REQ (22)
(23) 2 REQ
(23)
(22) 18 REQ
.562
.25 .22
11 W .005 -U-
2.125
1.062
1.547 1.562 TO END OF FLAT
.25 R
.25
4 REQ (23)
.75
2 REQ (23)
(15)
.09
.09
(18) 2 REQ
LOCATES 1.06 DIA HOLE THRU ITEM 1 FOR ASSEMBLY OF ITEM 6.
.62, 4 PLACES
.332 DIA THRU, 4 HOLES
(23) 4 REQ
.25
.88
.25
1.12 4 PLACES
(22) 6 REQ
1.09
.88
.25
(23) 4 REQ
.7498 .7500 CBORE TO DIM SHOWN -T-
90° CSINK TO .906 DIA
THD THRU PER MS33646 ⊕ T .002
FOR MS21209-F4-15 INSERT

VIEW C-C
(ROTATED 20° CW.)

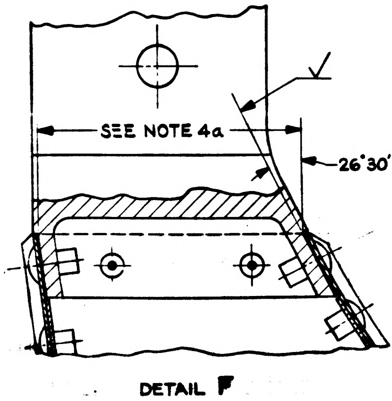


(2) SEE NOTE 4a AND DETAIL F
BLEND 4 SHARP CORNERS OF ITEM 2 TO OUTER BEND RADIUS OF ITEMS 52
.062 DIA THRU, 2 HOLES
(17)
.12, 2 PLACES
45°, 2 PLACES
.25
.80
4 REQ (23)
98 REQ (22)
(22)
.81
.34
2 REQ (14)
(22) 24 REQ
.34
(16)



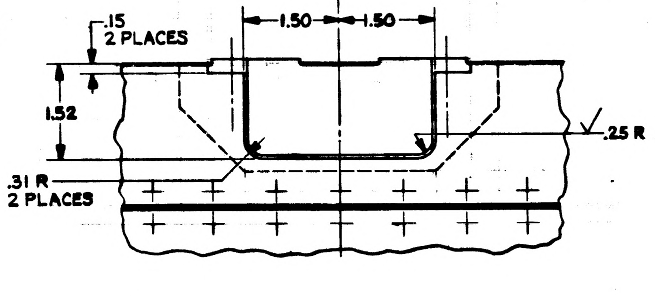
SEE NOTE 4a
SEE NOTE 4a
1.44 R
.44 R 2 PLACES
1.450
1.56
.500
2.00
2.08
2.08
IDENTIFICATION MARK

VIEW E-E

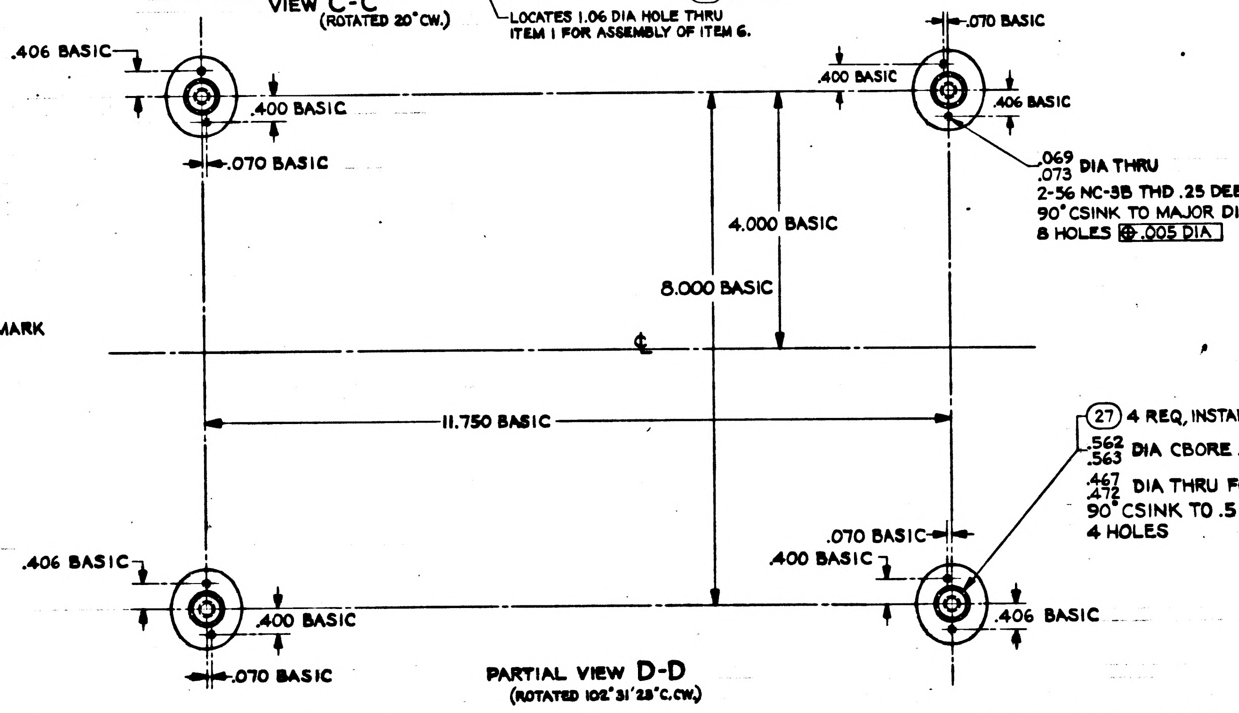


SEE NOTE 4a
26°30' +0°0' -0°30'

DETAIL F
SCALE 2:1
(TYPICAL FOR ITEMS 11 & 12)



.15 2 PLACES
1.50
1.50
.25 R
1.52
.31 R 2 PLACES

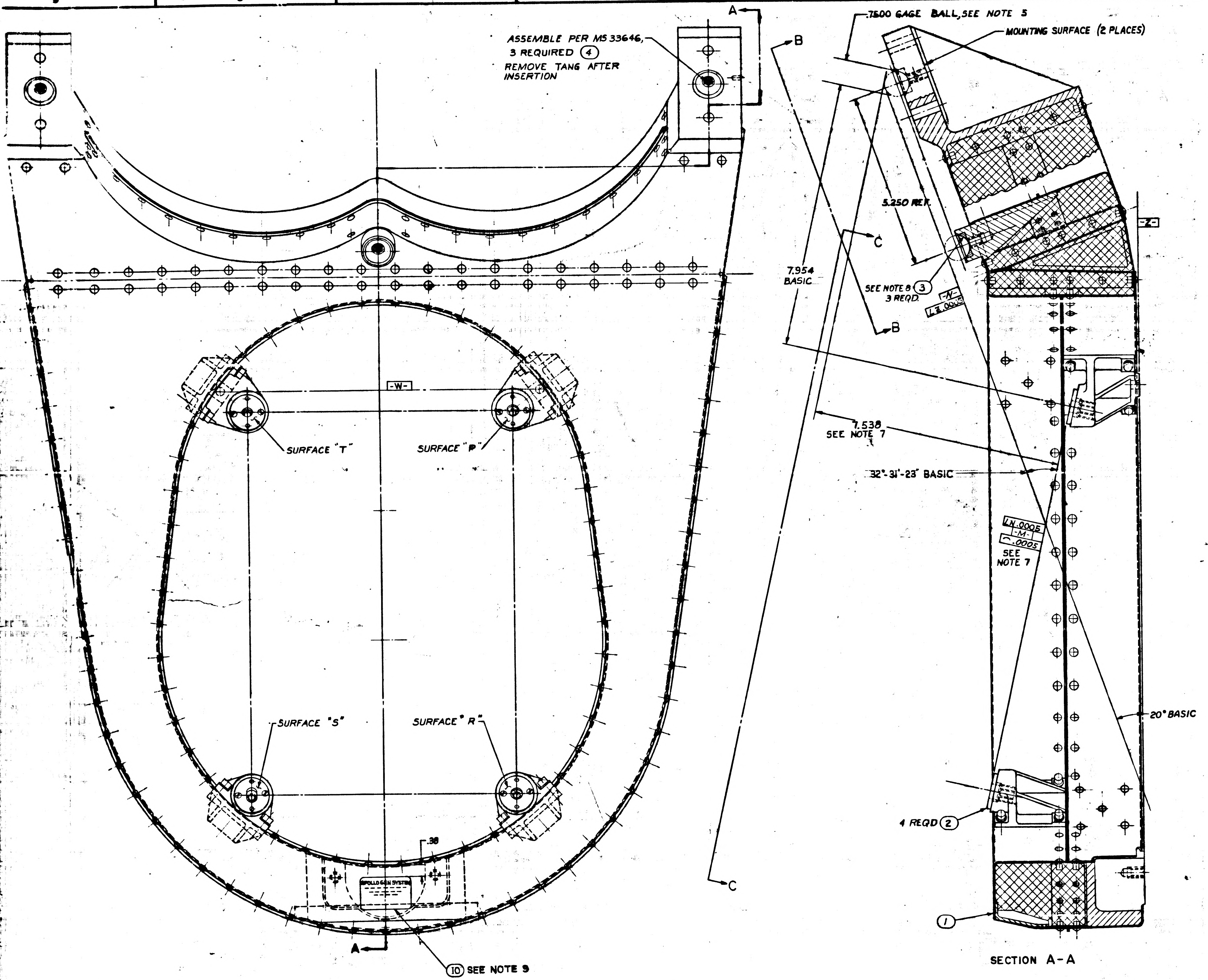


.406 BASIC
.070 BASIC
.400 BASIC
.406 BASIC
.400 BASIC
.070 BASIC
4.000 BASIC
8.000 BASIC
¢
11.750 BASIC
.406 BASIC
.400 BASIC
.070 BASIC
.070 BASIC
.400 BASIC
.406 BASIC
.069 .073 DIA THRU
2-56 NC-3B THD .25 DEEP
90° CSINK TO MAJOR DIA OF THD
8 HOLES ⊕ .005 DIA

(27) 4 REQ, INSTALL .01 TO .03 BELOW SURFACE.
.562 .563 DIA CBORE .16 DEEP ⊕ .005 DIA
.467 .472 DIA THRU FOR ½-20 UNF-2B THD THRU ⊕ .010 DIA
90° CSINK TO .515 DIA
4 HOLES

PARTIAL VIEW D-D
(ROTATED 102° 31' 28" C.CW.)

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
REVISIONS					
A		REVISED PER MXC 200343	–	15 MAR 65	J J J
B		UPGRADED TO CLASS A PER TDRR 17814	–	15 MAR 65	J J J



ASSEMBLE PER MS 33646, 3 REQUIRED ④
REMOVE TANG AFTER INSERTION
A
B
C
-W-
SURFACE "T"
SURFACE "P"
SURFACE "S"
SURFACE "R"
.38
APOLLO G&N SYSTEM
⑩ SEE NOTE 9
.7500 GAGE BALL, SEE NOTE 5
MOUNTING SURFACE (2 PLACES)
5.250 REF.
7.954 BASIC
SEE NOTE 8 ③ 3 REQD.
-N-
-Z-
7.538 SEE NOTE 7
32°-31'-23" BASIC
.0005
-M-
.0005
SEE NOTE 7
20° BASIC
4 REQD ②
①

SECTION A-A

QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			011				
			1		10	1014650-20	PLATE, IDENTIFICATION
			AR		9	1010730	CATALYST, EPOXY, BUTADIENE ENAMEL
			AR		8	1010729-1	RESIN, EPOXY, BUTADIENE ENAMEL
			4		7	1010802-002	INSERT, FLOATING, LOCKING THD.
			8		6	1010867-3	SCREW, FLAT HEAD, SELF LOCK
			8		5	MS-171494	PIN, SPRING
			3		4	MS21209-F4-15	(1837059-204) INSERT, LOCKING
			3		3	1899965	INSERT - OPTICS MOUNTING
			4		2	2899968	PAD, MOUNTING
			1		1	2899981	BASE, NAVIGATION INSEP. ASSY

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
		011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + – –
DECIMALS ±.005 ±.02
ANGLES + 1° –
DO NOT SCALE THIS DRAWING
MATERIAL –
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN [illegible] DATE 30 SEP 64
CHECKED C. Pugh 26 OCT 64
APPROVAL E. [illegible] 26 OCT 64
APPROVAL [illegible] 26 OCT 64
NASA APPROVAL 11-4-64
R.W. Dean
MIT APPROVAL W Kaufman 4 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

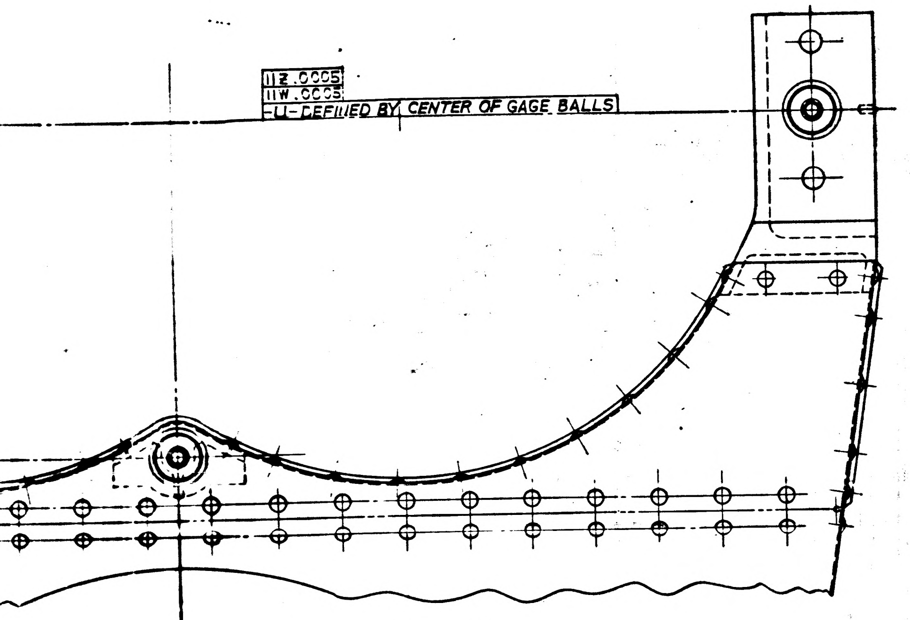
NAVIGATION BASE ASSEMBLY
BLOCK II

CODE IDENT NO.
SIZE J 2899982
SCALE FULL
SHEET 1 OF 1

2899982 B

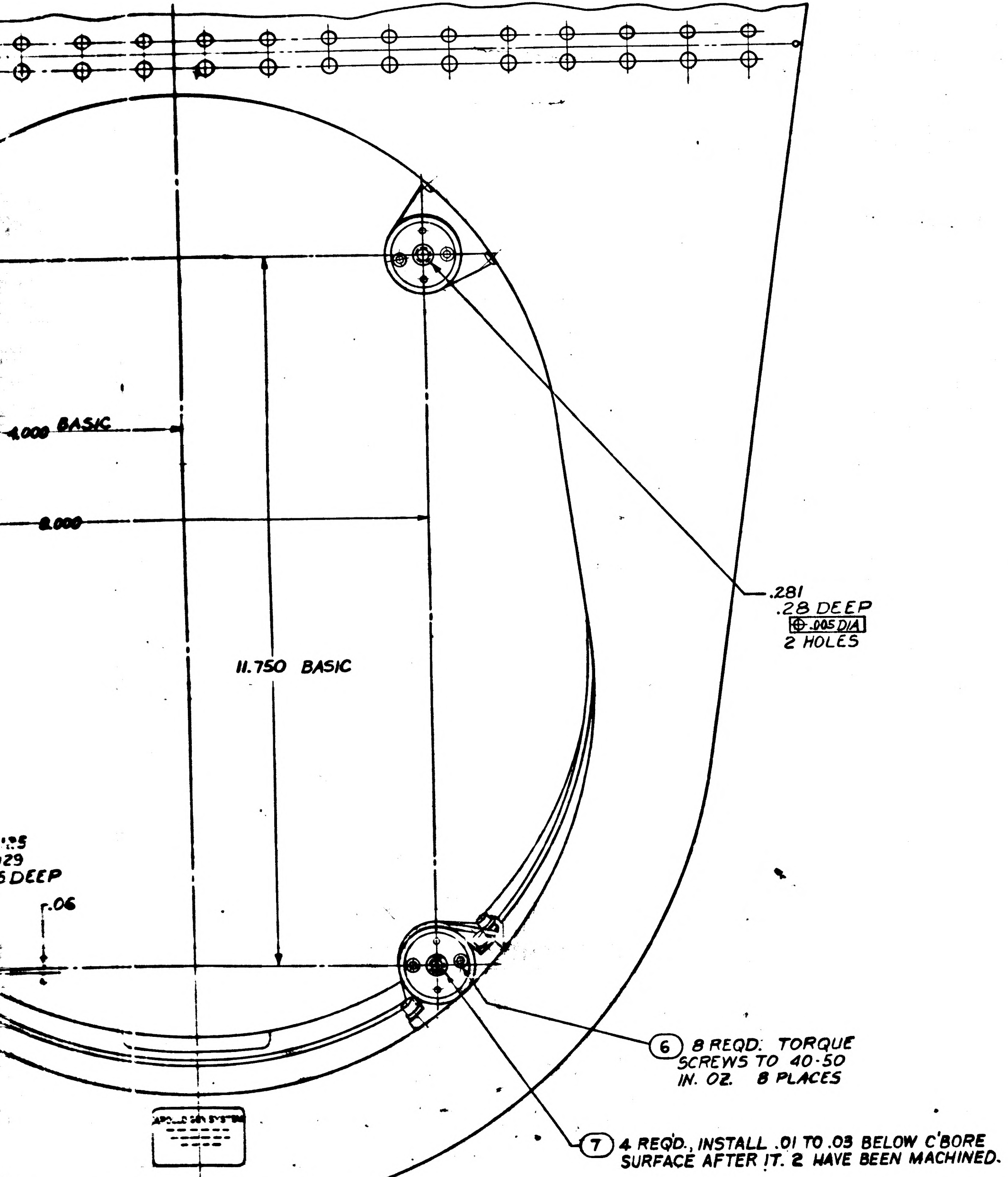
MASTER

2899985



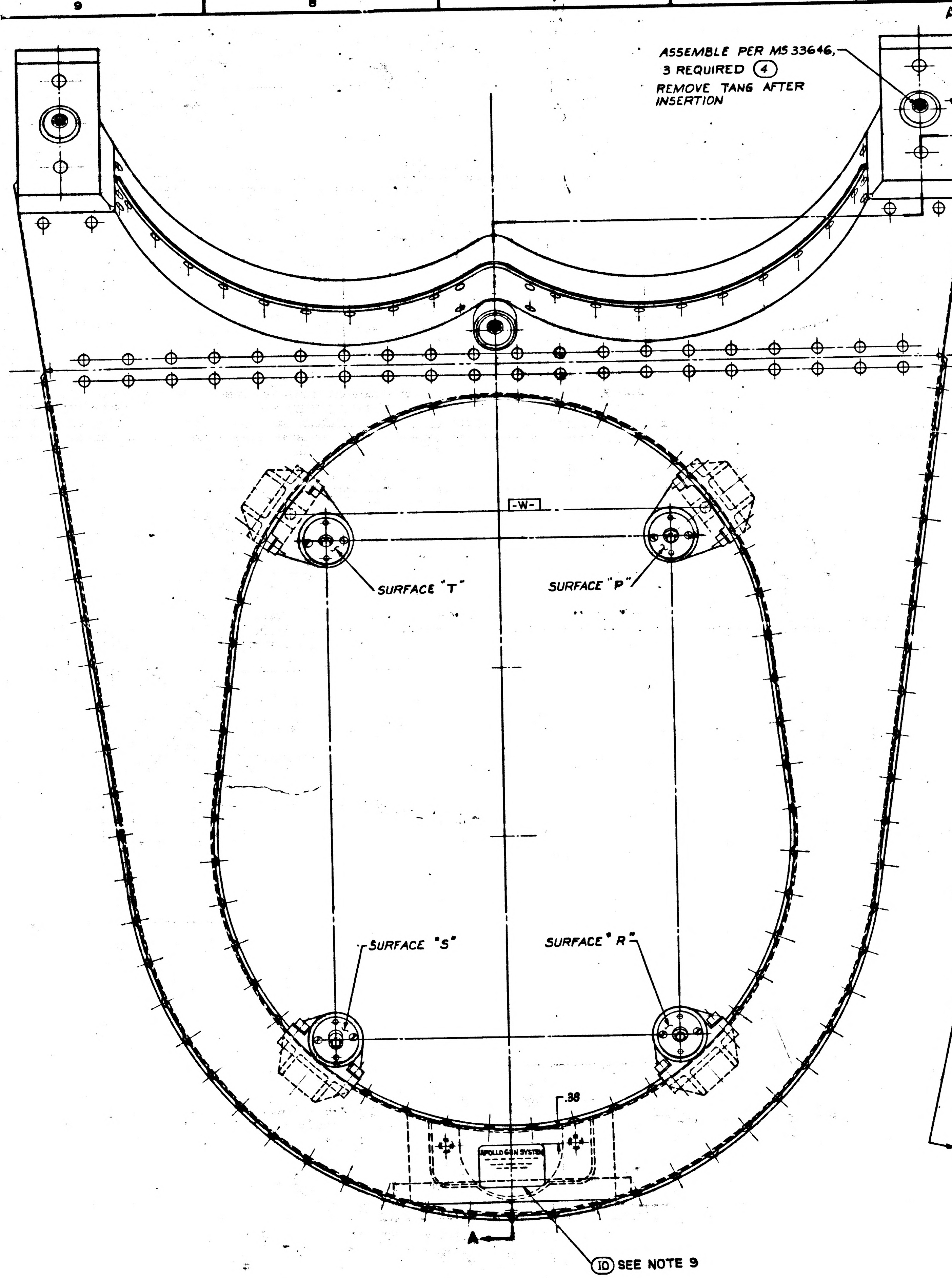
|| Z .0005
|| W .0005
-U- DEFINED BY CENTER OF GAGE BALLS

VIEW B-B ROTATED 20°

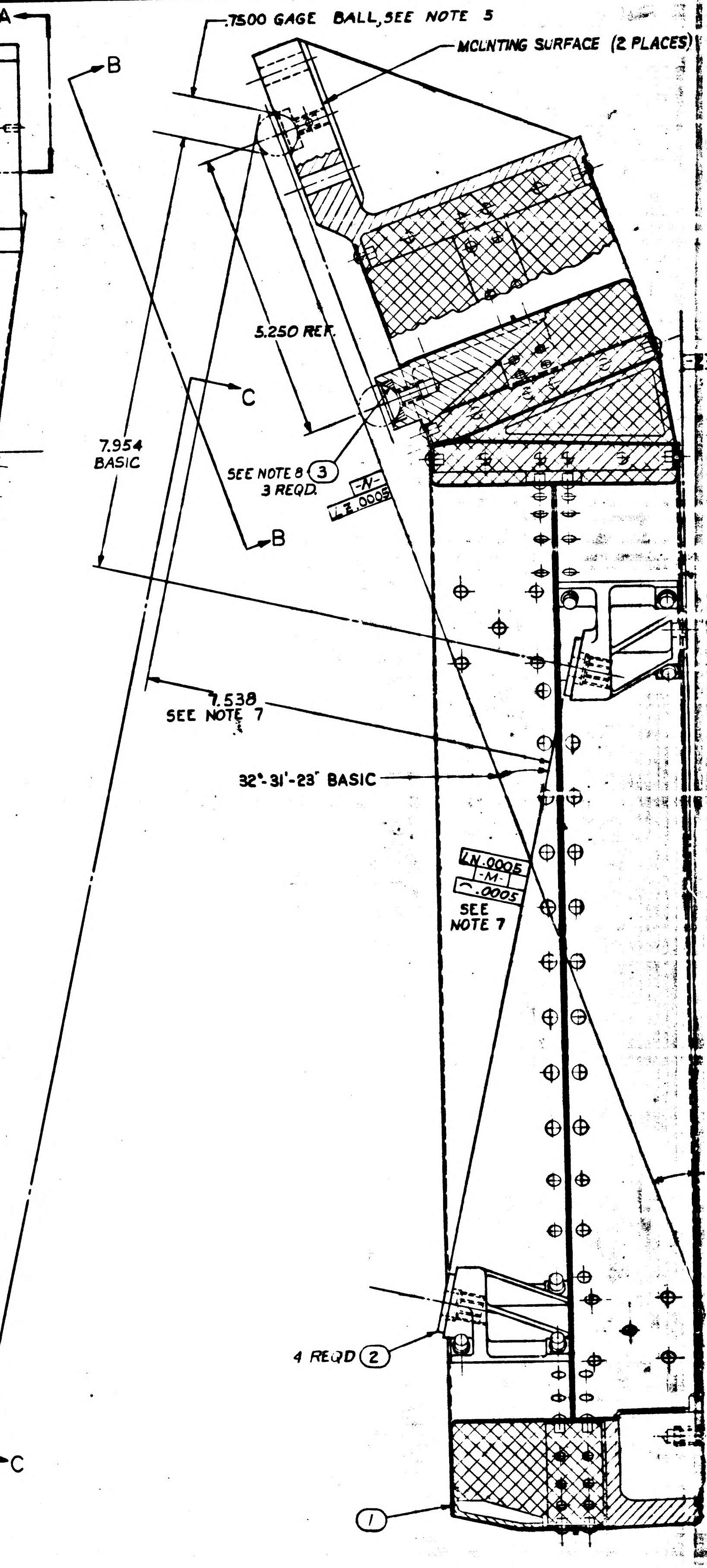


4.000 BASIC
8.000
11.750 BASIC
.281
.28 DEEP
⊕ .005 DIA
2 HOLES
.125
.129
.5 DEEP
.06
⑥ 8 REQD. TORQUE SCREWS TO 40-50 IN. OZ. 8 PLACES
⑦ 4 REQD., INSTALL .01 TO .03 BELOW C'BORE SURFACE AFTER IT. 2 HAVE BEEN MACHINED.
APOLLO G&N SYSTEM

VIEW C-C ROTATED 12½°



A
ASSEMBLE PER MS 33646, 3 REQUIRED ④
REMOVE TANG AFTER INSERTION
-W-
SURFACE "T"
SURFACE "P"
SURFACE "S"
SURFACE "R"
.38
APOLLO G&N SYSTEM
A
⑩ SEE NOTE 9



.7500 GAGE BALL, SEE NOTE 5
MOUNTING SURFACE (2 PLACES)
B
5.250 REF.
C
7.954 BASIC
SEE NOTE 8 ③ 3 REQD.
-N-
⊥ Z .0005
B
7.538 SEE NOTE 7
32°-31'-23" BASIC
⊥ N .0005
-M-
⌒ .0005
SEE NOTE 7
4 REQD ②
C
①

SECTION A-A

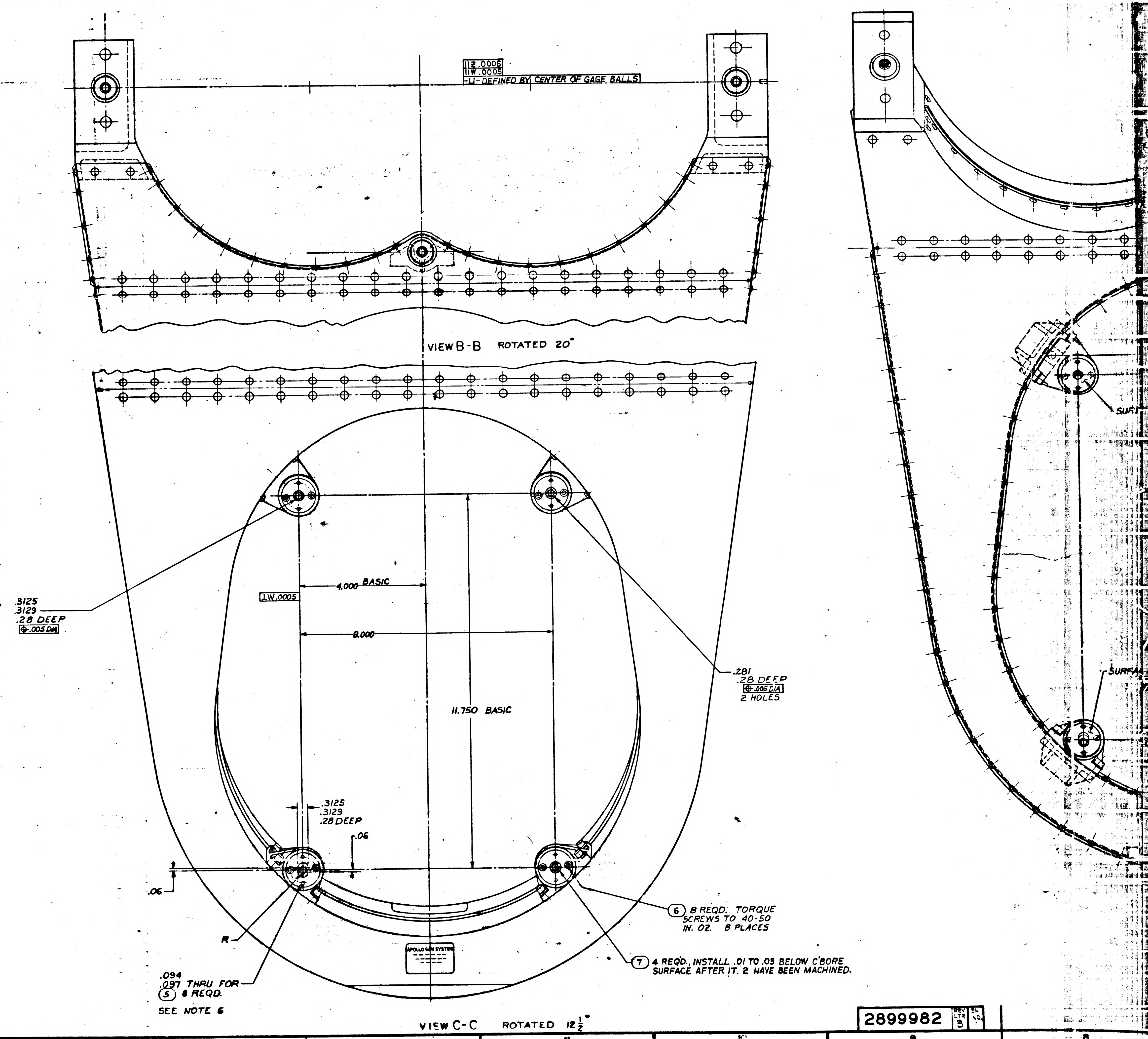
MASTER

NEXT ASSY
THE ASSEMBLY ... NUMBER AND ...

2899982 REV LTR B SH NO. 1

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED:
   a. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
   b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   c. MUST BE FREE OF BURRS.
3. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 65° TO 75°F.
4. ITEM ③ MAY BE LAPPED OR MACHINED ON BOTTOM SURFACE PRIOR TO INSERTION TO OBTAIN PARALLELISM AND ANGULAR REQUIREMENTS.
5. THE SIZE AND SPHERICITY OF THE 3 GAGE BALLS MUST BE WITHIN A .000010 TOLERANCE ZONE.
6. INSERT PINS ITEM ⑤ .04 BELOW SURFACES "S" & "T" PRIOR TO FINISH MACHINING OF THESE SURFACES.
7. SURFACES P, R, S & T ESTABLISH DATUM "M" WHEREIN ALL POINTS ON EACH SURFACE MUST LIE WITHIN .0005 INCH.
8. ITEM ③ TO BE SUBJECTED TO 500 LBS. AXIAL PRELOAD AFTER ASSEMBLY AND PRIOR TO FINAL MACHINING OF SURFACES P, R, S & T.
9. SERIALIZE PER ND 1002023.
10. FINISH: APPLY LUSTERLESS EPOXY ENAMEL, ITEMS ⑧ AND ⑨, GREY, COLOR NO. 36231 OF FED-STD-595. APPLY PER ND 1002110 TYPE II WITH CURE OF 180°F ± 5° FOR 4 HOURS. THE FOLLOWING AREAS TO BE MASKED.
    - ALL THREADED INSERTS
    - ITEMS NO. 3 & 2
    - SURFACES FORMING DATUM Z
    - TWO PRECISION REF. HOLES
    - TWO MOUNTING SURFACES

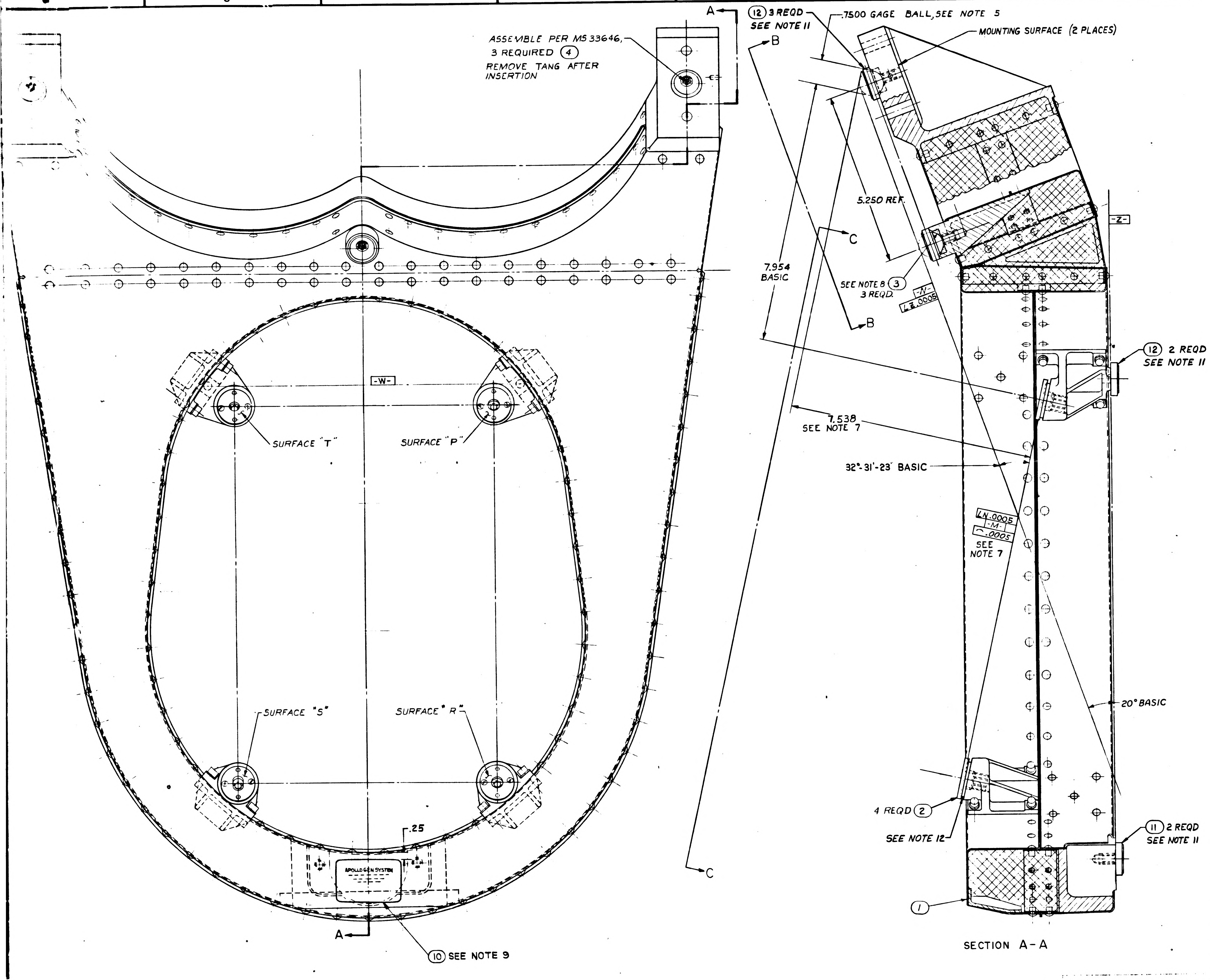


‖ Z .0005
‖ W .0005
-U- DEFINED BY CENTER OF GAGE BALLS
VIEW B-B ROTATED 20°
⊥ W .0005
4.000 BASIC
8.000
11.750 BASIC
.3125
.3129
.28 DEEP
⊕ .005 DIA
.281
.28 DEEP
⊕ .005 DIA
2 HOLES
.3125
.3129
.28 DEEP
.06
.06
R
.094
.097 THRU FOR
⑤ 8 REQD.
SEE NOTE 6
⑥ 8 REQD. TORQUE SCREWS TO 40-50 IN. OZ. 8 PLACES
⑦ 4 REQD., INSTALL .01 TO .03 BELOW C'BORE SURFACE AFTER IT. 2 HAVE BEEN MACHINED.
APOLLO G&N SYSTEM
VIEW C-C ROTATED 12½°
SURF
SURFA
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

2899982 REV LTR B SH NO.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC 200343	–	15 MAR 65	J J J
B		UPGRADED TO CLASS A PER TDRR 17814	–	15 MAR 65	J J J
C		REVISED PER TDRR 2096			RWH



A
ASSEMBLE PER MS 33646, 3 REQUIRED ④
REMOVE TANG AFTER INSERTION
⑫ 3 REQD
SEE NOTE 11
B
.7500 GAGE BALL, SEE NOTE 5
MOUNTING SURFACE (2 PLACES)
5.250 REF.
7.954 BASIC
C
SEE NOTE 8 ③ 3 REQD.
-N-
⊥ .0005
B
-Z-
⑫ 2 REQD
SEE NOTE 11
-W-
SURFACE "T"
SURFACE "P"
7.538
SEE NOTE 7
32°-31'-23" BASIC
⊥ N .0005
-M-
⌒ .0005
SEE NOTE 7
20° BASIC
SURFACE "S"
SURFACE "R"
4 REQD ②
SEE NOTE 12
⑪ 2 REQD
SEE NOTE 11
.25
APOLLO GEN SYSTEM
C
①
A
⑩ SEE NOTE 9
SECTION A-A

QTY			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			5		12	2899996-002	THUMBSCREW, PROTECTIVE
			2		11	2899996-001	THUMBSCREW, PROTECTIVE
			1		10	1004260-100	NAMEPLATES, APOLLO GEN/GSE
			AR		9	1010730	CATALYST POLYAMIDE
			AR		8	1010729-1	PAINT, EPOXY RESIN
			4		7	1010802-002	INSERT, FLOATING, LOCKING THD.
			8		6	1010867-3	SCREW, FLAT HEAD, SELF LOCK
			8		5	MS-171494	PIN, SPRING
			3		4	MS21209-F4-15	(1897059-204) INSERT, LOCKING
			3		3	1899965	INSERT - OPTICS MOUNTING
			4		2	2899995	THUMBSCREW, PROTECTIVE
			1		1	2899981	BASE, NAVIGATION INSEP. ASSY.

QUANTITY REQUIRED — LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
		011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + – –
DECIMALS ±.005 ±.02
ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL –
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bob Keeling DATE 30 SEP 64
CHECKED C. Pizzo 26 OCT 64
APPROVAL 26 OCT 64
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

NAVIGATION BASE ASSEMBLY
BLOCK II

CODE IDENT NO.
SIZE J
2899982
SCALE FULL
SHEET 1 OF 1

2899982 C

2899982

2/2899982

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. UNLESS OTHERWISE SPECIFIED:
   a. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
   b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   c. MUST BE FREE OF BURRS.

3. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 65° TO 75°F.

4. ITEM (3) MAY BE LAPPED OR MACHINED ON BOTTOM SURFACE PPIOR TO INSERTION TO OBTAIN PARALLELISM AND ANGULAR REQUIREMENTS.

5. THE SIZE AND SPHERICITY OF THE 3 GAGE BALLS MUST BE WITHIN A .000010 TOLERANCE ZONE.

6. INSERT PINS ITEM (5) .04 BELOW SURFACES "S" & "T" PRIOR TO FINISH MACHINING OF THESE SURFACES.

7. SURFACES P, R, S & T ESTABLISH DATUM "M" WHEREIN ALL POINTS ON EACH SURFACE MUST LIE WITHIN .0005 INCH.

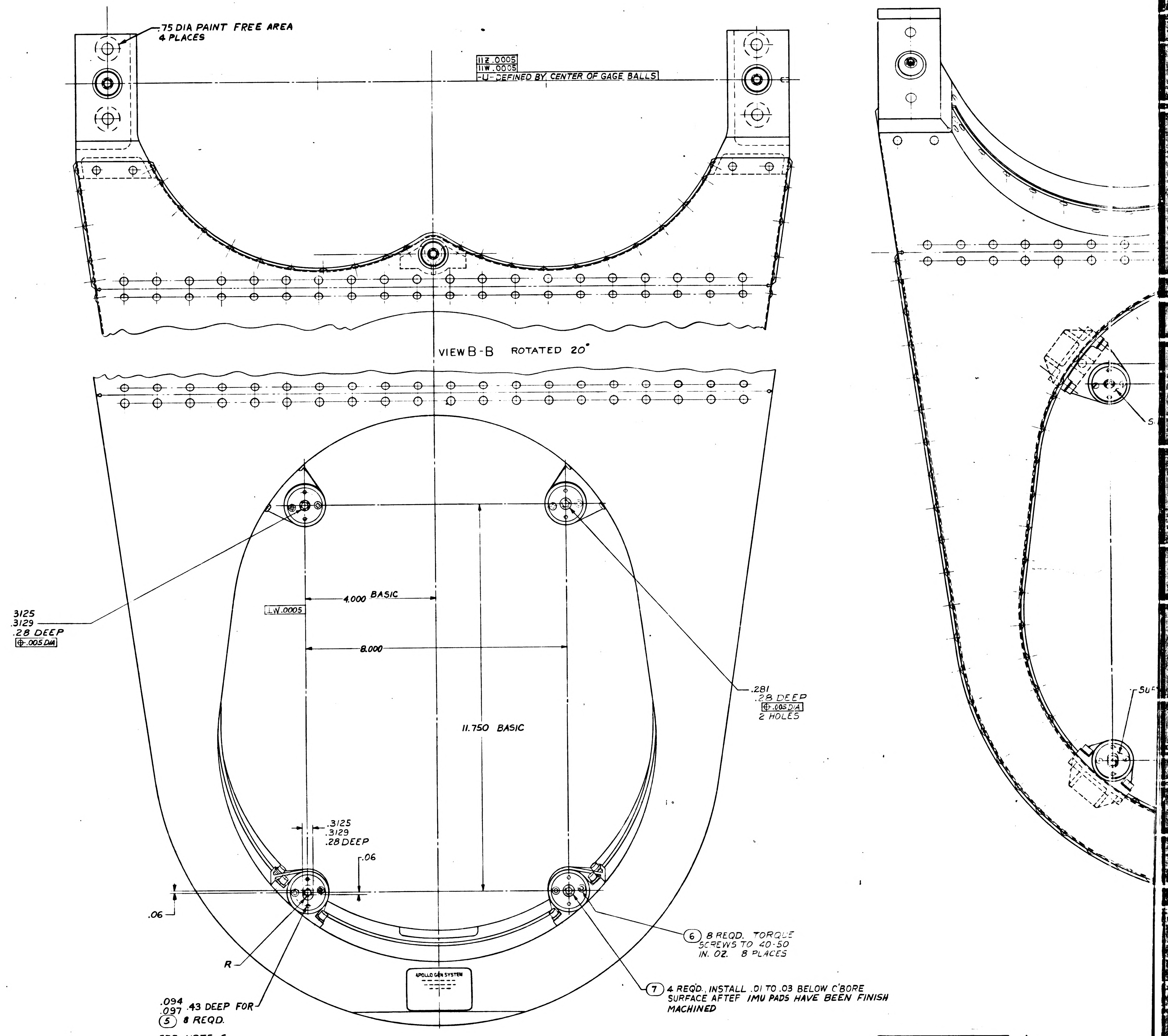
8. ITEM (3) TO BE SUBJECTED TO 500 LBS. AXIAL PRELOAD AFTER ASSEMBLY AND PRIOR TO FINAL MACHINING OF SURFACES P, R, S & T.

9. SERIALIZE AND ADD ASSEMBLY DASH NO. PER ND1002023 APPLY NAMEPLATE PER ND1002219.

10. FINISH: APPLY LUSTERLESS EPOXY PAINT ITEMS (8) AND (9), GREY, COLOR NO. 36231 OF FED-STD-595. APPLY PER ND 1002110 TYPE II WITH CURE AT ROOM TEMPERATURE FOR 8 HOURS. THE FOLLOWING AREAS TO BE MASKED.
    ALL THREADED INSERTS
    ITEMS NO. 3 & 2
    SURFACES FORMING DATUM Z
    TWO PRECISION REF. HOLES
    TWO MOUNTING SURFACES
    IMU MOUNTING PADS AND MATING SURFACES
    .75 DIA AREAS - 4 PLACES

11. ITEMS (2), (11) & (12) ARE PROTECTIVE PADS WHICH MUST BE REMOVED WHEN THIS ASSEMBLY IS BEING USED AT A SYSTEM OR SUBSYSTEM LEVEL. PADS ARE SHOWN IN SIDE VIEW ONLY.

12. REFERENCE PART NO.: 2899968

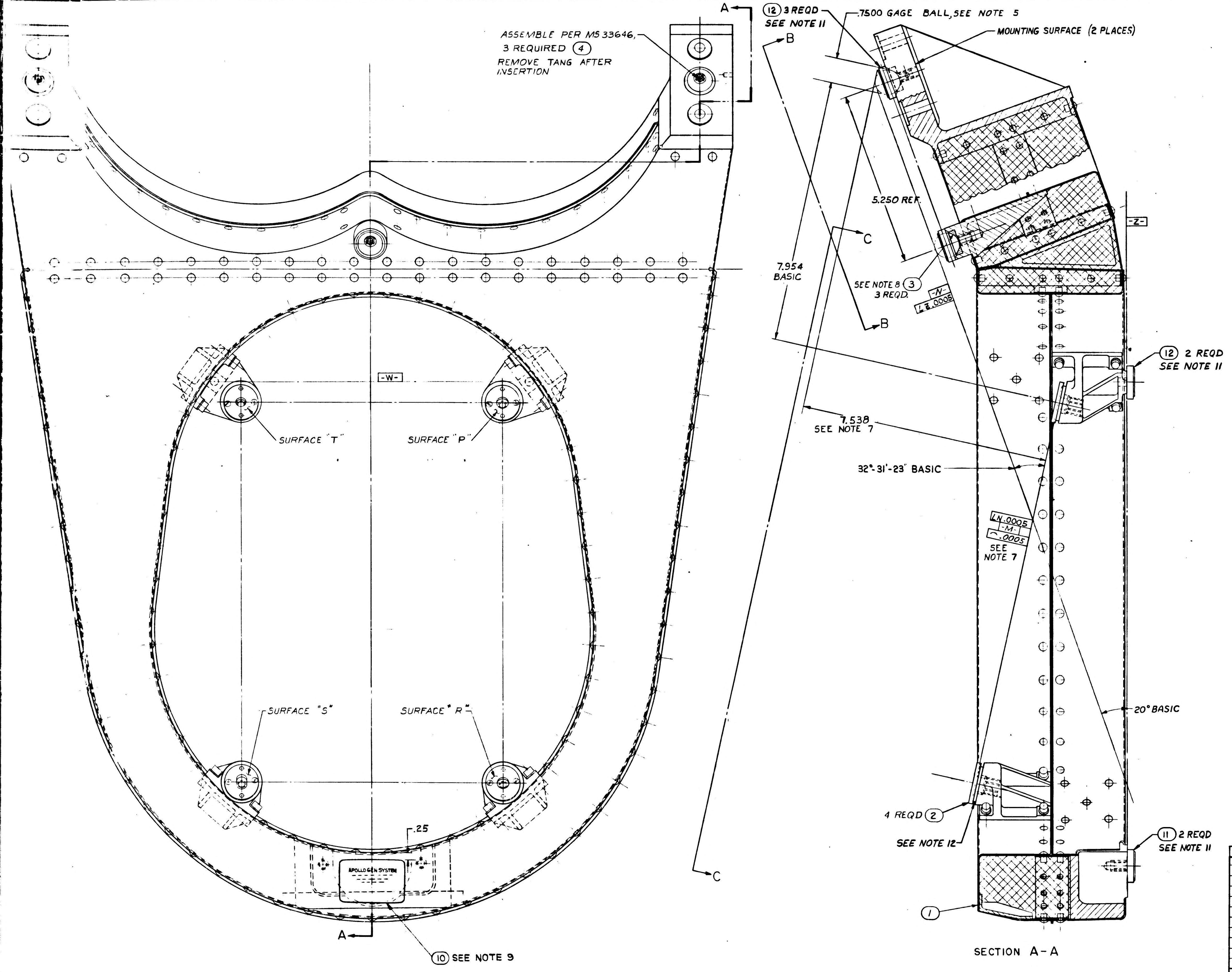

.75 DIA PAINT FREE AREA
4 PLACES
11Z .0005
11W .0005
-U- DEFINED BY CENTER OF GAGE BALLS
VIEW B-B ROTATED 20°
4.000 BASIC
LW .0005
8.000
11.750 BASIC
.3125
.3129
.28 DEEP
⊕ .005 DIA
.281
.28 DEEP
⊕ .005 DIA
2 HOLES
.3125
.3129
.28 DEEP
.06
.06
R
APOLLO G&N SYSTEM
.094
.097 .43 DEEP FOR
(5) 8 REQD.
SEE NOTE 6
(6) 8 REQD. TORQUE SCREWS TO 40-50 IN. OZ. 8 PLACES
(7) 4 REQD., INSTALL .01 TO .03 BELOW C'BORE SURFACE AFTEF IMU PADS HAVE BEEN FINISH MACHINED
5
50°

VIEW C-C ROTATED 12½°

2899982 REV LTR C

1/2899982

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC 200343	–	15 MAR 65	JJJ
B		UPGRADED TO CLASS A PER TDRR 17814	–	15 MAR 65	JJJ
C		REVISED PER TDRR 2096		65	RWH
D		REVISED PER TDRR 24396		6 DEC 65	



A
ASSEMBLE PER MS 33646, 3 REQUIRED ④ REMOVE TANG AFTER INSERTION
⑫ 3 REQD SEE NOTE 11
B
.7500 GAGE BALL, SEE NOTE 5
MOUNTING SURFACE (2 PLACES)
5.250 REF.
-Z-
C
7.954 BASIC
SEE NOTE 8 ③ 3 REQD.
-N-
.0005
B
-W-
SURFACE "T"
SURFACE "P"
⑫ 2 REQD SEE NOTE 11
7.538 SEE NOTE 7
32°-31'-23" BASIC
.0005
-M-
.0005
SEE NOTE 7
20° BASIC
SURFACE "S"
SURFACE "R"
.25
APOLLO G&N SYSTEM
4 REQD ②
SEE NOTE 12
⑪ 2 REQD SEE NOTE 11
C
①
A
⑩ SEE NOTE 9
SECTION A-A

			5		12	2899996-002	THUMBSCREW, PROTECTIVE
			2		11	2899996-001	THUMBSCREW, PROTECTIVE
			1		10	1004260-100	NAMEPLATES, APOLLO G&N/GSE
					9		
					8		
			4		7	1010802-002	INSERT, FLOATING, LOCKING THD.
			8		6	1010867-3	SCREW, FLAT HEAD, SELF LOCK
			8		5	MS-171494	PIN, SPRING
			3		4	MS21209-F4-15	(1897059-204) INSERT, LOCKING
			3		3	1899965	INSERT - OPTICS MOUNTING
			4		2	2899995	THUMBSCREW, PROTECTIVE
			1		1	2899981	BASE, NAVIGATION INSEP ASSY.
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

NEXT ASSY	USED ON	APPLICABLE DASH NO.
		011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + – / – ; DECIMALS ±.005 / ±.02 ; ANGLES + 1° –
DO NOT SCALE THIS DRAWING
MATERIAL –
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN Bob Kadlung DATE 30 SEP 64
CHECKED C. Pizzolo 26 OCT 64
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

NAVIGATION BASE ASSEMBLY
BLOCK II

CODE IDENT NO. 80230
SIZE J
2899982
SCALE FULL
SHEET 1 OF 1

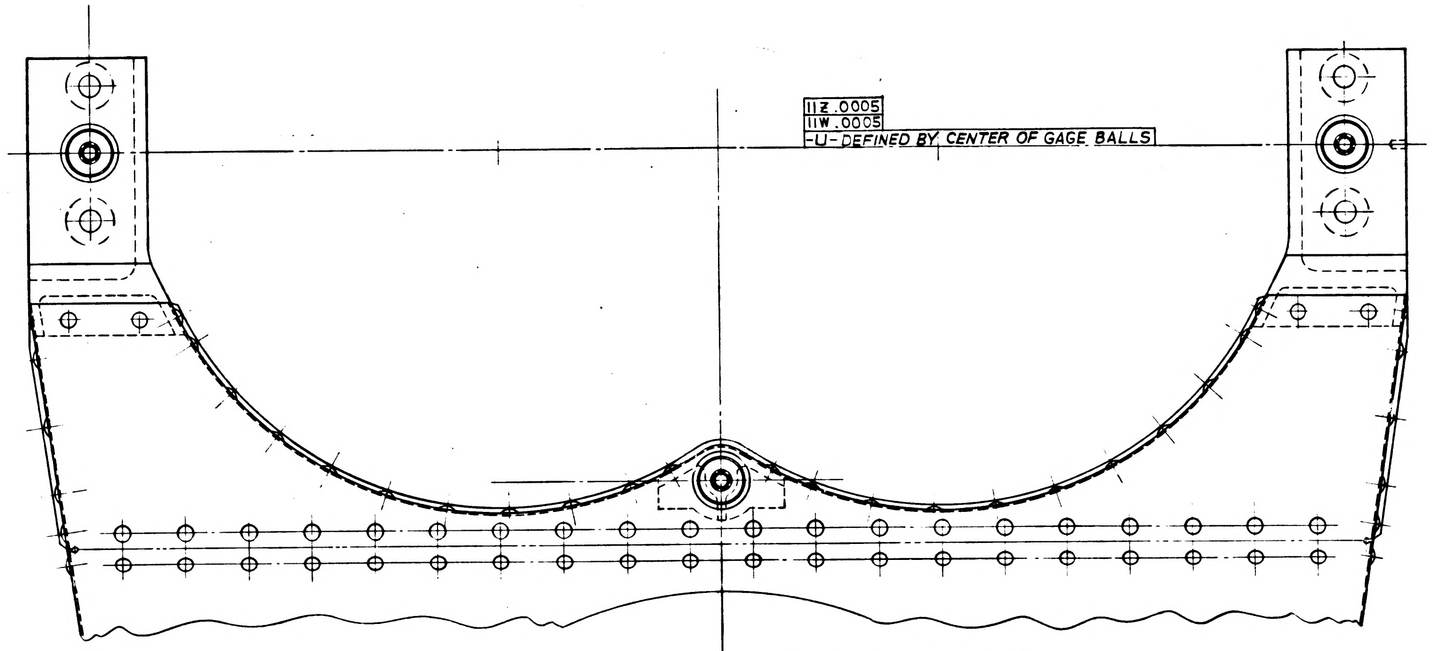
D 2899982

2899982 D

27 2899982

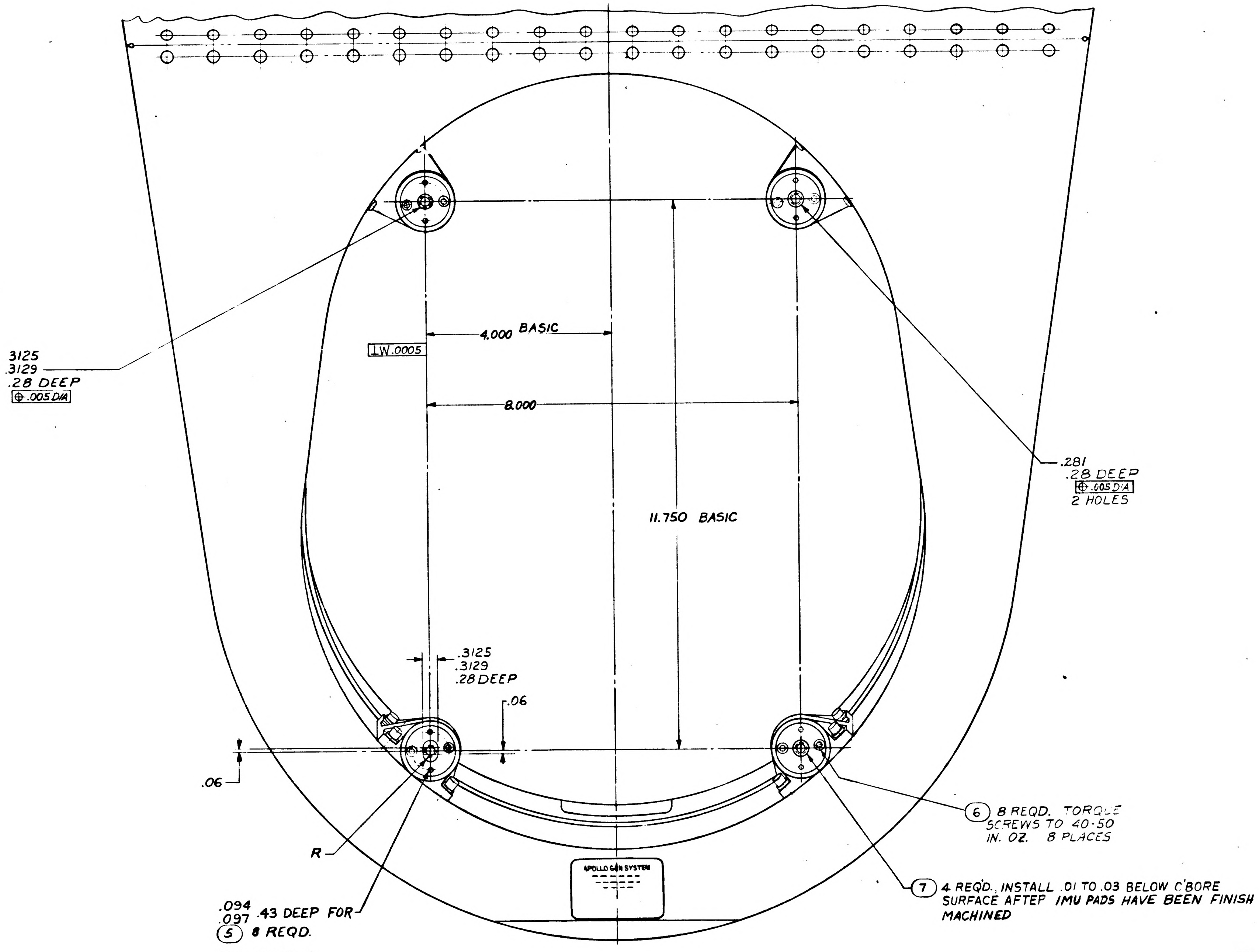
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED:
   - a. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
   - b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   - c. MUST BE FREE OF BURRS.
3. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 65° TO 75°F.
4. ITEM (3) MAY BE LAPPED OR MACHINED ON BOTTOM SURFACE PRIOR TO INSERTION TO OBTAIN PARALLELISM AND ANGULAR REQUIREMENTS.
5. THE SIZE AND SPHERICITY OF THE 3 GAGE BALLS MUST BE WITHIN A .000010 TOLERANCE ZONE.
6. INSERT PINS ITEM (5) .04 BELOW SURFACES "S" & "T" PRIOR TO FINISH MACHINING OF THESE SURFACES.
7. SURFACES P, R, S & T ESTABLISH DATUM "M" WHEREIN ALL POINTS ON EACH SURFACE MUST LIE WITHIN .0005 INCH.
8. ITEM (3) TO BE SUBJECTED TO 500 LBS. AXIAL PRELOAD AFTER ASSEMBLY AND PRIOR TO FINAL MACHINING OF SURFACES P, R S & T.
9. SERIALIZE AND ADD ASSEMBLY DASH NO. PER ND1002023. APPLY NAMEPLATE PER ND1002219.
10.
11. ITEMS (2), (11) & (12) ARE PROTECTIVE PADS WHICH MUST BE REMOVED WHEN THIS ASSEMBLY IS BEING USED AT A SYSTEM OR SUBSYSTEM LEVEL. PADS ARE SHOWN IN SIDE VIEW ONLY.
12. REFERENCE PART NO.: 2899968



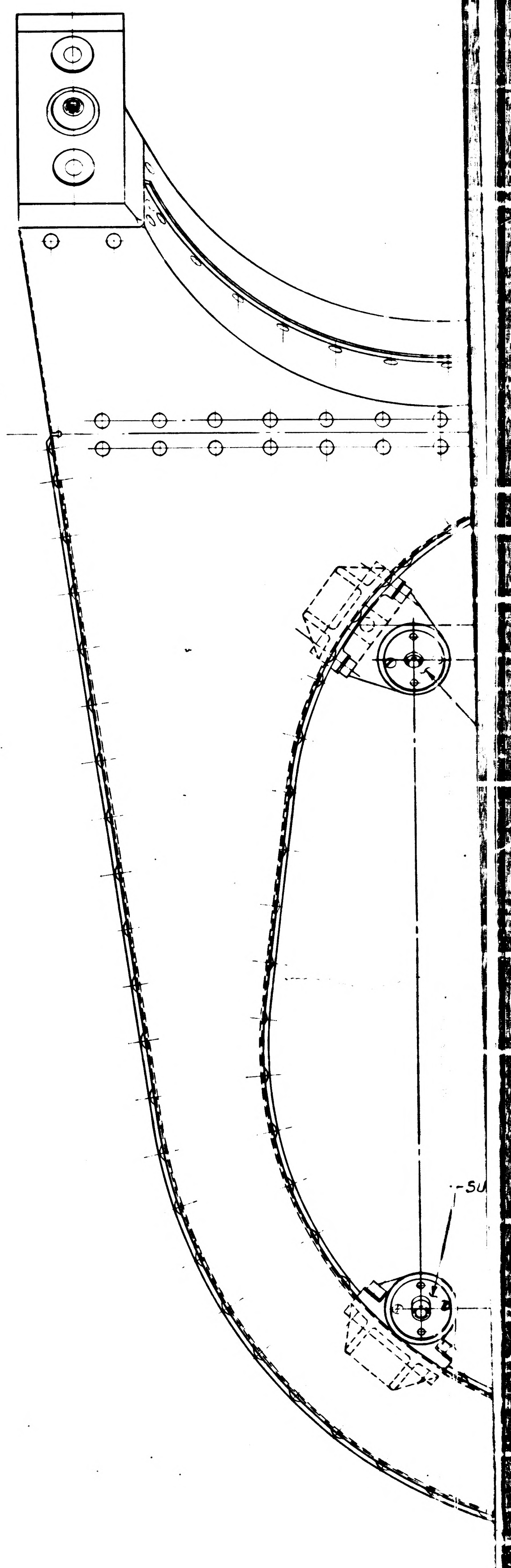
11Z .0005
11W .0005
-U- DEFINED BY CENTER OF GAGE BALLS

VIEW B-B ROTATED 20°



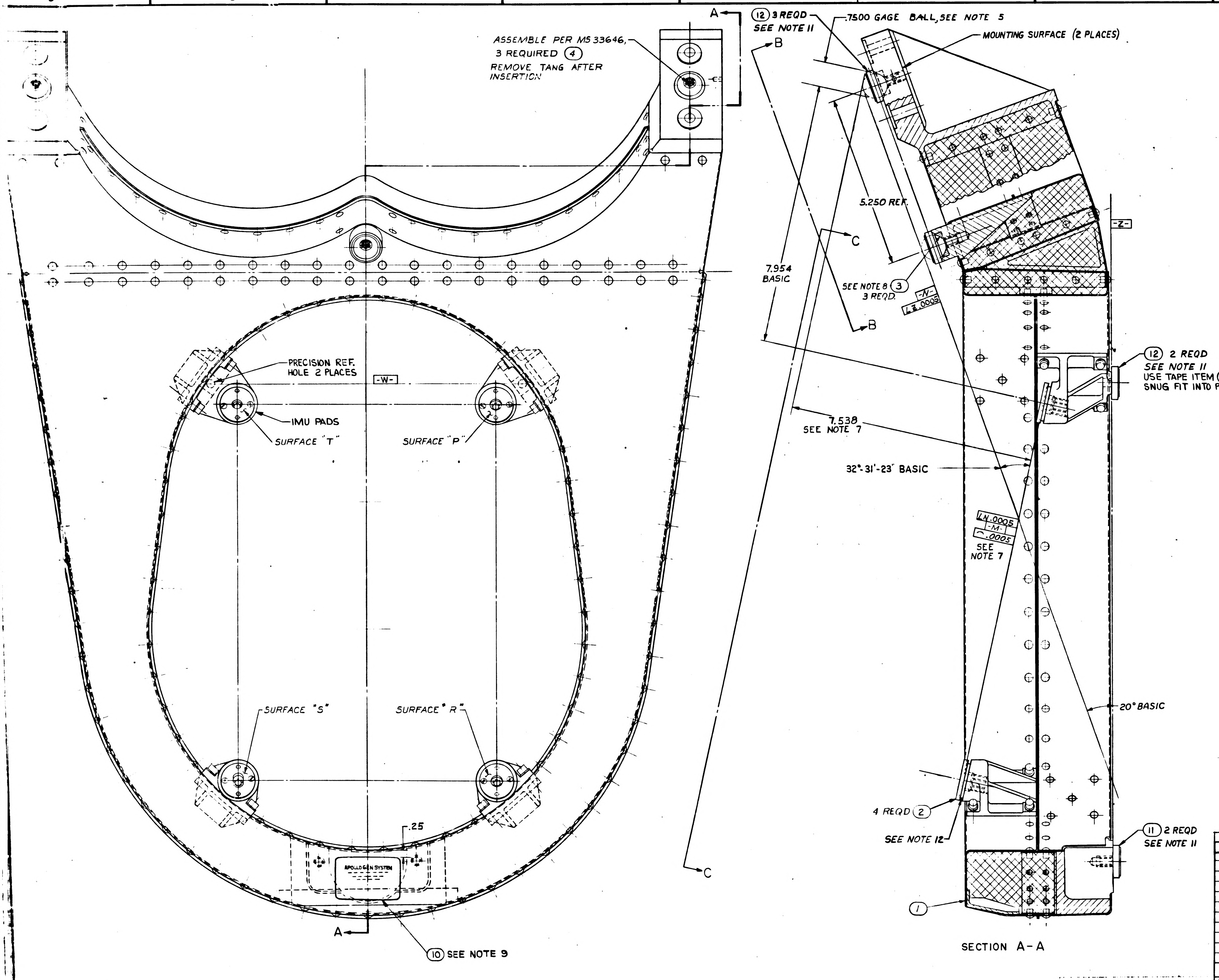
.3125
.3129
.28 DEEP
⊕ .005 DIA
⊥W .0005
4.000 BASIC
8.000
11.750 BASIC
.281
.28 DEEP
⊕ .005 DIA
2 HOLES
.3125
.3129
.28 DEEP
.06
.06
R
.094
.097 .43 DEEP FOR
(5) 8 REQD.
SEE NOTE 6
APOLLO G&N SYSTEM
(6) 8 REQD. TORQUE SCREWS TO 40-50 IN. OZ. 8 PLACES
(7) 4 REQD., INSTALL .01 TO .03 BELOW C'BORE SURFACE AFTER IMU PADS HAVE BEEN FINISH MACHINED

VIEW C-C ROTATED 12½°



2899982 REV LTR D

1/2899982


ASSEMBLE PER MS 33646, 3 REQUIRED (4) REMOVE TANG AFTER INSERTION
A
PRECISION REF. HOLE 2 PLACES
-W-
IMU PADS
SURFACE "T"
SURFACE "P"
SURFACE "S"
SURFACE "R"
.25
APOLLO G&N SYSTEM
A
(10) SEE NOTE 9
(12) 3 REQD SEE NOTE 11
.7500 GAGE BALL, SEE NOTE 5
MOUNTING SURFACE (2 PLACES)
B
5.250 REF.
7.954 BASIC
C
SEE NOTE 8 (3) 3 REQD.
-N-
⊥ .0005
B
-Z-
(12) 2 REQD SEE NOTE 11
USE TAPE ITEM (13) TO PROVIDE SNUG FIT INTO PRECISION HOLES.
7.538 SEE NOTE 7
32°-31'-23" BASIC
⊥ N .0005
-M-
⌒ .0005
SEE NOTE 7
20° BASIC
4 REQD (2)
SEE NOTE 12
C
(11) 2 REQD SEE NOTE 11
(1)
SECTION A-A

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC 200343	–	15 MAR 65	J J J
B		UPGRADED TO CLASS A PER TDRR 17814	–	15 MAR 65	J J J
C		REVISED PER TDRR 20961		2 65	RWH
D		REVISED PER TDRR 24396		6 DEC 65	
E		REVISED PER TDRR 26911		14 MAR 66	RP

QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			AR		13	MIL-T-22730	TAPE, ANTISEIZE
			5		12	2899996-002	THUMBSCREW, PROTECTIVE
			2		11	2899996-001	THUMBSCREW, PROTECTIVE
			1		10	1004260-100	NAMEPLATES, APOLLO GSV/GSE
			AR		9	1012543-003	PAINT, ENAMEL
			AR		8	MIL-P-8585	PRIMER COATING, ZINC CHROMATE
			4		7	1010802-002	INSERT, FLOATING, LOCKING THD.
			8		6	1010867-3	SCREW FLAT HEAD, SELF LOCK
			8		5	MS-171494	PIN, SPRING
			3		4	MS21209-F4-15	(1897059-204) INSERT, LOCKING
			3		3	1899965	INSERT - OPTICS MOUNTING
			4		2	2899995	THUMBSCREW, PROTECTIVE
			1		1	2899981	BASE, NAVIGATION INSEP. ASSY.
			011				

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
		011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + – –
DECIMALS ±.005 ±.02
ANGLES + – 1°
DO NOT SCALE THIS DRAWING
MATERIAL –
CONTRACT NAS 9-497

MIT INSTRUMENTATION LAB
Cambridge Mass
DRAWN Bob Kerling DATE 30 SEP 64
CHECKED C. Pingle 26 OCT 64
APPROVAL 26 OCT 64
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

NAVIGATION BASE ASSEMBLY
BLOCK II

CODE IDENT NO. 80230
SIZE J
2899982
SCALE FULL
SHEET 1 OF 1

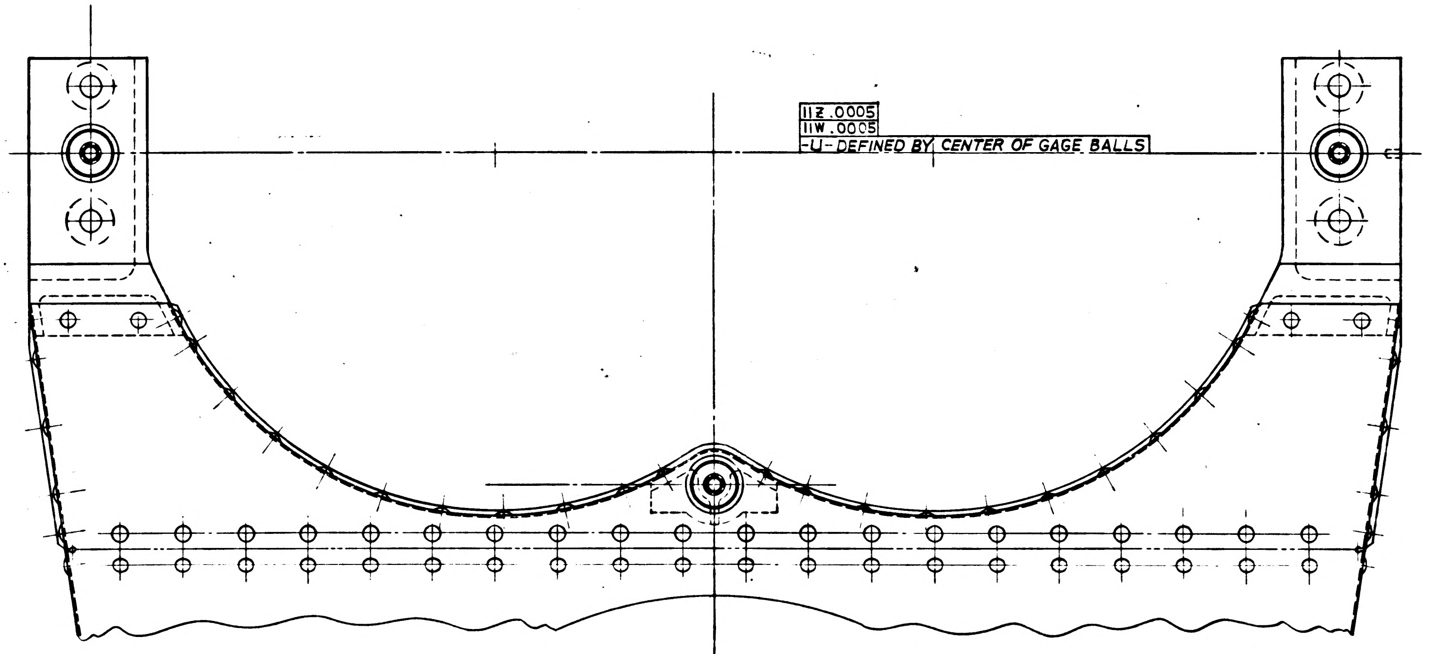
2899982 E

899982 E

2/2899982

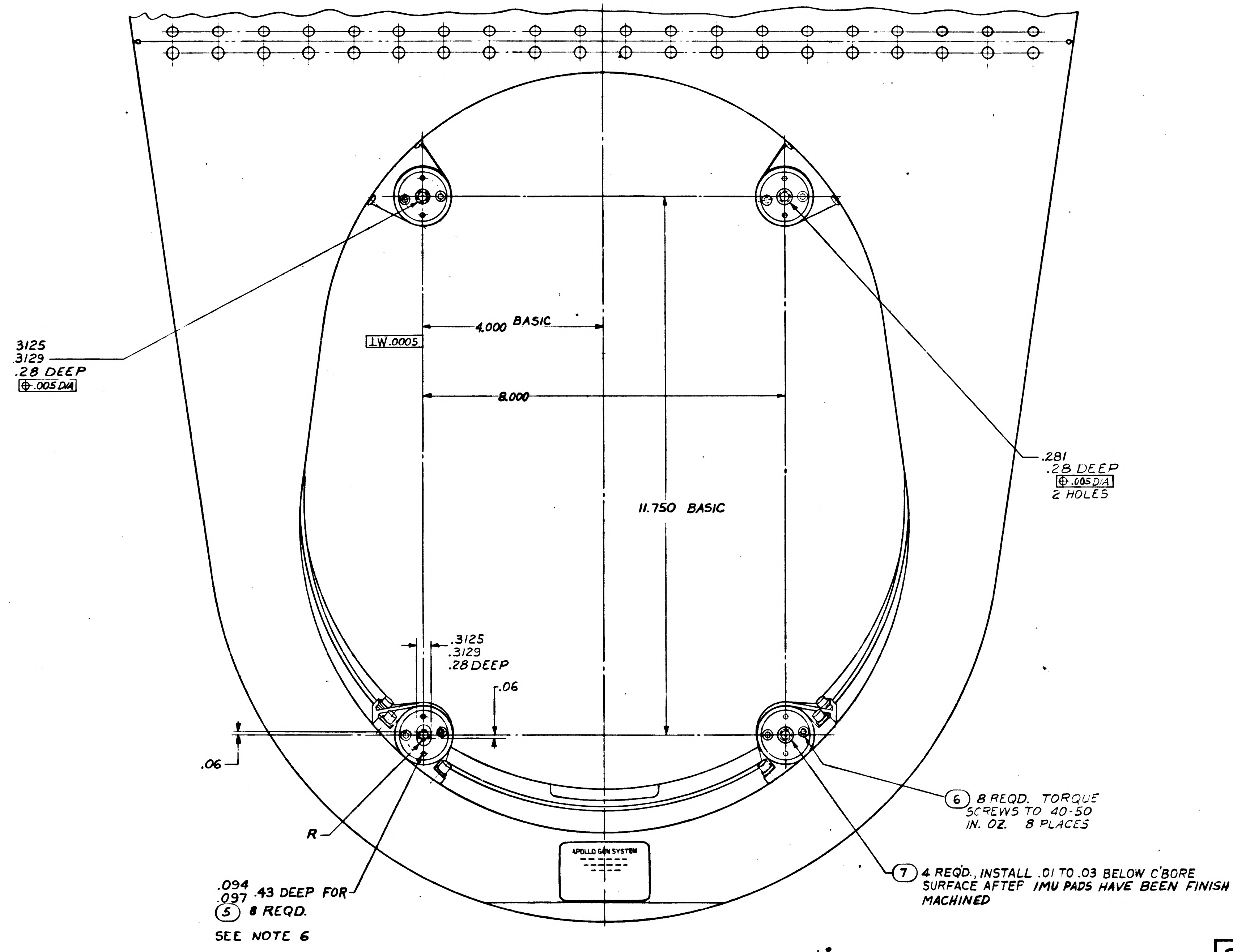
NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED:
   - a. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
   - b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   - c. MUST BE FREE OF BURRS.
3. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 65° TO 75°F.
4. ITEM ③ MAY BE LAPPED OR MACHINED ON BOTTOM SURFACE PPIOR TO INSERTION TO OBTAIN PARALLELISM AND ANGULAR REQUIREMENTS.
5. THE SIZE AND SPHERICITY OF THE 3 GAGE BALLS MUST BE WITHIN A .000010 TOLERANCE ZONE.
6. INSERT PINS ITEM ⑤ .04 BELOW SURFACES "S" & "T" PRIOR TO FINISH MACHINING OF THESE SURFACES.
7. SURFACES P, R, S & T ESTABLISH DATUM "M" WHEREIN ALL POINTS ON EACH SURFACE MUST LIE WITHIN .0005 INCH.
8. ITEM ③ TO BE SUBJECTED TO 500 LBS. AXIAL PRELOAD AFTER ASSEMBLY AND PRIOR TO FINAL MACHINING OF SURFACES P, R S & T.
9. SERIALIZE AND ADD ASSEMBLY DASH NO. PER ND1002023. APPLY NAMEPLATE PER ND1002219.
10. FINISH: APPLY PAINT ITEMS ⑧ AND ⑨, GREY, COLOR NO. 36231 OF FED-STD-595, PER ND1002291 WITH CURE AT 135°F ± 5°F FOR 24 HOURS. THE FOLLOWING AREAS ARE TO BE MASKED: ALL THREADED INSERTS, ITEMS NO. ③ AND ④, SURFACES FORMING DATUM Z, TWO PRECISION REF. HOLES, TWO MOUNTING SURFACES, IMU PADS AND MATING SURFACES, AND .75 DIA. COUNTERBORES. ALL UNPAINTED ALUM. SURFACES TO BE BRUSH ALODINE TREATED PER MIL-C-5541.
11. ITEMS ②, ⑪ & ⑫ ARE PROTECTIVE PADS WHICH MUST BE REMOVED WHEN THIS ASSEMBLY IS BEING USED AT A SYSTEM OR SUBSYSTEM LEVEL. PADS ARE SHOWN IN SIDE VIEW ONLY.
12. REFERENCE PART NO.: 2899968



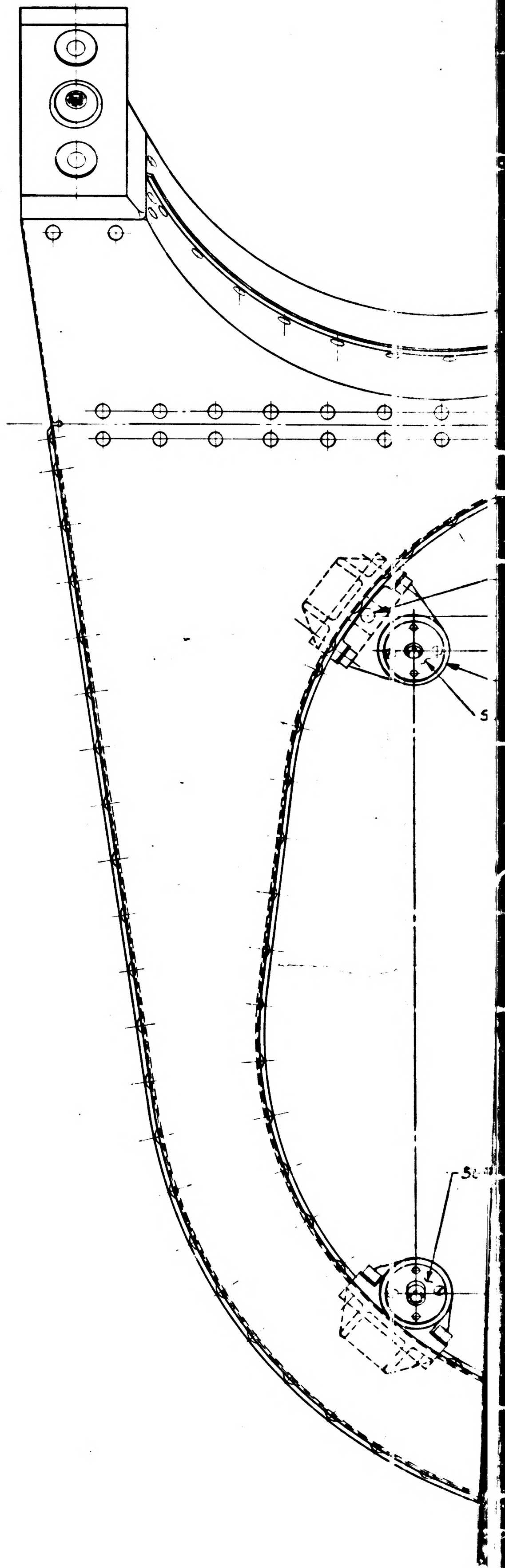
⊥Z .0005
⊥W .0005
-U- DEFINED BY CENTER OF GAGE BALLS

VIEW B-B ROTATED 20°



.3125
.3129
.28 DEEP
⊕ .005 DIA
⊥W .0005
4.000 BASIC
8.000
11.750 BASIC
.281
.28 DEEP
⊕ .005 DIA
2 HOLES
.3125
.3129
.28 DEEP
.06
.06
R
APOLLO G&N SYSTEM
.094
.097 .43 DEEP FOR
⑤ 8 REQD.
SEE NOTE 6
⑥ 8 REQD. TORQUE SCREWS TO 40-50 IN. OZ. 8 PLACES
⑦ 4 REQD., INSTALL .01 TO .03 BELOW C'BORE SURFACE AFTER IMU PADS HAVE BEEN FINISH MACHINED

VIEW C-C ROTATED 12½°



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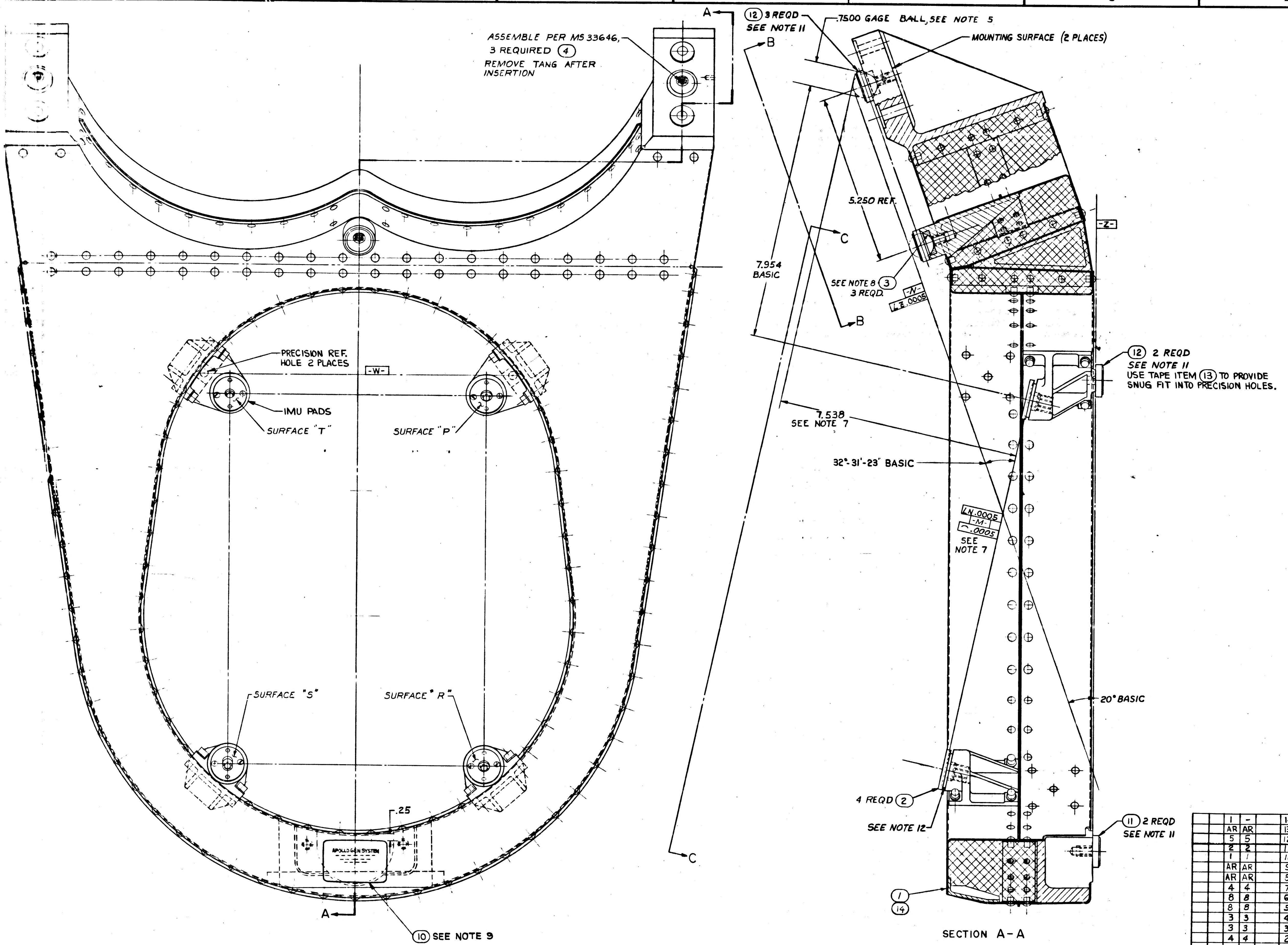


ASSEMBLE PER MS 33646, 3 REQUIRED (4) REMOVE TANG AFTER INSERTION
A
B
C
(12) 3 REQD SEE NOTE 11
.7500 GAGE BALL, SEE NOTE 5
MOUNTING SURFACE (2 PLACES)
5.250 REF.
7.954 BASIC
SEE NOTE 8 (3) 3 REQD.
-N-
-Z-
PRECISION REF. HOLE 2 PLACES
-W-
IMU PADS
SURFACE "T"
SURFACE "P"
SURFACE "S"
SURFACE "R"
(12) 2 REQD SEE NOTE 11 USE TAPE ITEM (13) TO PROVIDE SNUG FIT INTO PRECISION HOLES.
7.538 SEE NOTE 7
32°-31'-23" BASIC
-M-
.0005
SEE NOTE 7
20° BASIC
4 REQD (2)
SEE NOTE 12
(11) 2 REQD SEE NOTE 11
(1) (14)
.25
APOLLO G&N SYSTEM
(10) SEE NOTE 9
SECTION A-A

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC 200343	–	15 MAR 65	J J J
B		UPGRADED TO CLASS A PER TDRR 17814	–	15 MAR 65	J J J
C		REVISED PER TDRR 20961		2 [illegible] 65	RTP RWH
D		REVISED PER TDRR 24396		6 DEC 65	HTO
E		REVISED PER TDRR 26911		14 MAR 66	RP AU
F		REVISED PER TDRR 27844		12 APR 66	OKD

		QUANTITY REQUIRED 021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
		1	-		14	1025713	NAVIGATION BASE, INSEP ASSY (BLK II)
		AR	AR		13	MIL-T-22730	TAPE, ANTISEIZE
		5	5		12	2899996-002	THUMBSCREW, PROTECTIVE
		2	2		11	2899996-001	THUMBSCREW, PROTECTIVE
		1	1		10	1004260-100	NAMEPLATES, APOLLO G&N/GSE
		AR	AR		9	1012543-003	PAINT, ENAMEL
		AR	AR		8	MIL-P-8585	PRIMER COATING, ZINC CHROMATE
		4	4		7	1010802-002	INSERT, FLOATING, LOCKING THD.
		8	8		6	1010867-3	SCREW FLAT HEAD, SELF LOCK
		8	8		5	MS-171454	PIN, SPRING
		3	3		4	MS 21209-F4-15	(1897059-204) INSERT, LOCKING
		3	3		3	1899965	INSERT - OPTICS MOUNTING
		4	4		2	2899995	THUMBSCREW, PROTECTIVE
		–	1		1	2899981	BASE, NAVIGATION INSEP. ASSY.

LIST OF PARTS AND MATERIALS

		011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + – DECIMALS ±.005 ±.02 ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL –
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN [illegible] DATE 30 SEP 64
CHECKED C. Pizzi 26 OCT 64
APPROVAL [illegible] 26 OCT 64
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible] 4/64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

NAVIGATION BASE ASSEMBLY
BLOCK II

CODE IDENT NO. 80230
SIZE J
2899982
SCALE FULL
SHEET 1 OF 1

2899982 F

2728899982

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. UNLESS OTHERWISE SPECIFIED:
   a. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER
   b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   c. MUST BE FREE OF BURRS.

3. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 65° TO 75°F.

4. ITEM ③ MAY BE LAPPED OR MACHINED ON BOTTOM SURFACE PRIOR TO INSERTION TO OBTAIN PARALLELISM AND ANGULAR REQUIREMENTS.

5. THE SIZE AND SPHERICITY OF THE 3 GAGE BALLS MUST BE WITHIN A .000010 TOLERANCE ZONE.

6. INSERT PINS ITEM ⑤ .04 BELOW SURFACES "S" & "T" PRIOR TO FINISH MACHINING OF THESE SURFACES.

7. SURFACES P, R, S & T ESTABLISH DATUM "M" WHEREIN ALL POINTS ON EACH SURFACE MUST LIE WITHIN .0005 INCH.

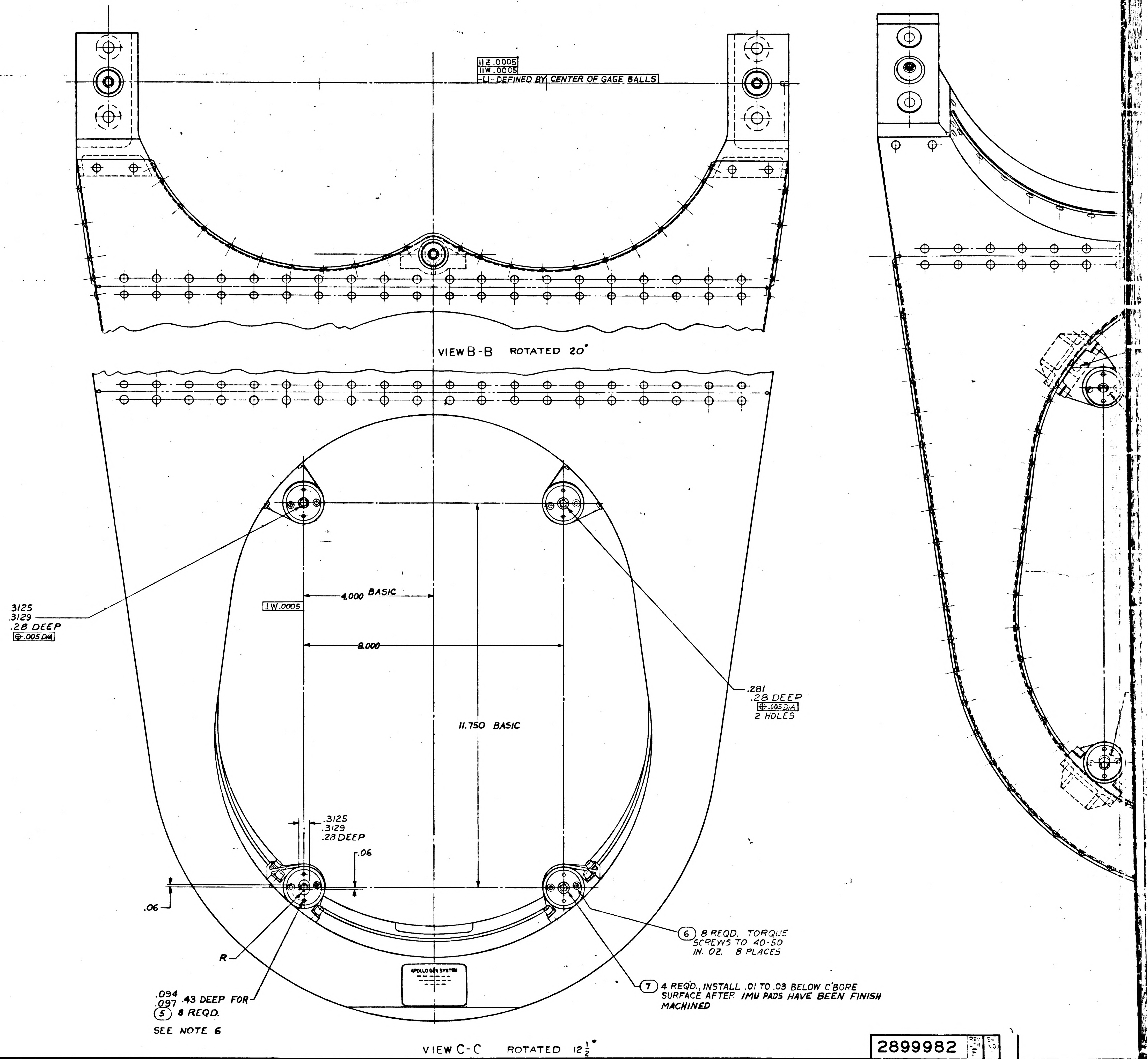
8. ITEM ③ TO BE SUBJECTED TO 500 LBS. AXIAL PRELOAD AFTER ASSEMBLY AND PRIOR TO FINAL MACHINING OF SURFACES P, R, S & T.

9. SERIALIZE AND ADD ASSEMBLY DASH NO. PER ND1002023. APPLY NAMEPLATE PER ND1002219.

10. FINISH: APPLY PAINT ITEMS ⑧ AND ⑨, GREY, COLOR NO. 36231 OF FED-STD-595, PER ND 1002291 WITH CURE AT 135°F ± 5°F FOR 24 HOURS. THE FOLLOWING AREAS ARE TO BE MASKED: ALL THREADED INSERTS, ITEMS NO. ③ AND ④, SURFACES FORMING DATUM Z, TWO PRECISION REF. HOLES, TWO MOUNTING SURFACES, IMU PADS AND MATING SURFACES, AND .75 DIA. COUNTERBORES. ALL UNPAINTED ALUM. SURFACES TO BE BRUSH ALODINE TREATED PER MIL-C-5541.

11. ITEMS ②, ⑪ & ⑫ ARE PROTECTIVE PADS WHICH MUST BE REMOVED WHEN THIS ASSEMBLY IS BEING USED AT A SYSTEM OR SUBSYSTEM LEVEL. PADS ARE SHOWN IN SIDE VIEW ONLY.

12. REFERENCE PART NO.: 2899968


||Z .0005
||W .0005
-U- DEFINED BY CENTER OF GAGE BALLS
VIEW B-B ROTATED 20°
.3125
.3129
.28 DEEP
⊕ .005 DIA
⊥W .0005
4.000 BASIC
8.000
11.750 BASIC
.281
.28 DEEP
⊕ .005 DIA
2 HOLES
.3125
.3129
.28 DEEP
.06
.06
R
.094
.097 .43 DEEP FOR
⑤ 8 REQD.
SEE NOTE 6
APOLLO G&N SYSTEM
⑥ 8 REQD. TORQUE SCREWS TO 40-50 IN. OZ. 8 PLACES
⑦ 4 REQD., INSTALL .01 TO .03 BELOW C'BORE SURFACE AFTER IMU PADS HAVE BEEN FINISH MACHINED
VIEW C-C ROTATED 12½°

2899982 REV LTR F

1/2899982

NOTES

1. INTERPPET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. UNLESS OTHERWISE SPECIFIED:
   a. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
   b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   c. MUST BE FREE OF BURRS.

3. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 65° TO 75 °F.

4. ITEM ③ MAY BE LAPPED OR MACHINED ON BOTTOM SURFACE PPIOR TO INSERTION TO OBTAIN PARALLELISM AND ANGULAR REQUIREMENTS.

5. THE SIZE AND SPHERICITY OF THE 3 GAGE BALLS MUST BE WITHIN A .000010 TOLERANCE ZONE.

6. INSERT PINS ITEM ⑤ .04 BELOW SURFACES "S" & "T" PRIOR TO FINISH MACHINING OF THESE SURFACES.

7. SURFACES P, R, S & T ESTABLISH DATUM "M" WHEREIN ALL POINTS ON EACH SURFACE MUST LIE WITHIN .0005 INCH.

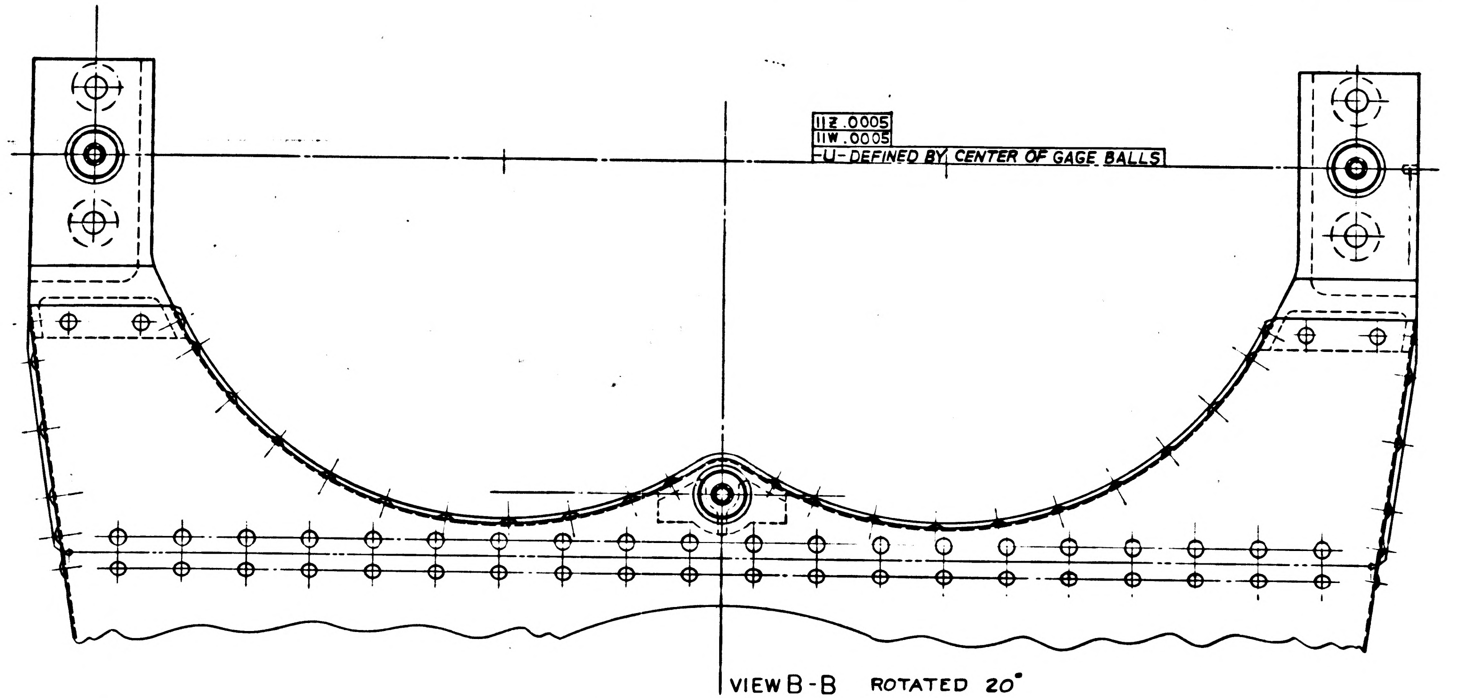
8. ITEM ③ TO BE SUBJECTED TO 500 LBS. AXIAL PRELOAD AFTER ASSEMBLY AND PRIOR TO FINAL MACHINING OF SURFACES P, R S & T.

9. SERIALIZE AND ADD ASSEMBLY DASH NO. PER ND1002023. APPLY NAMEPLATE PER ND1002219.

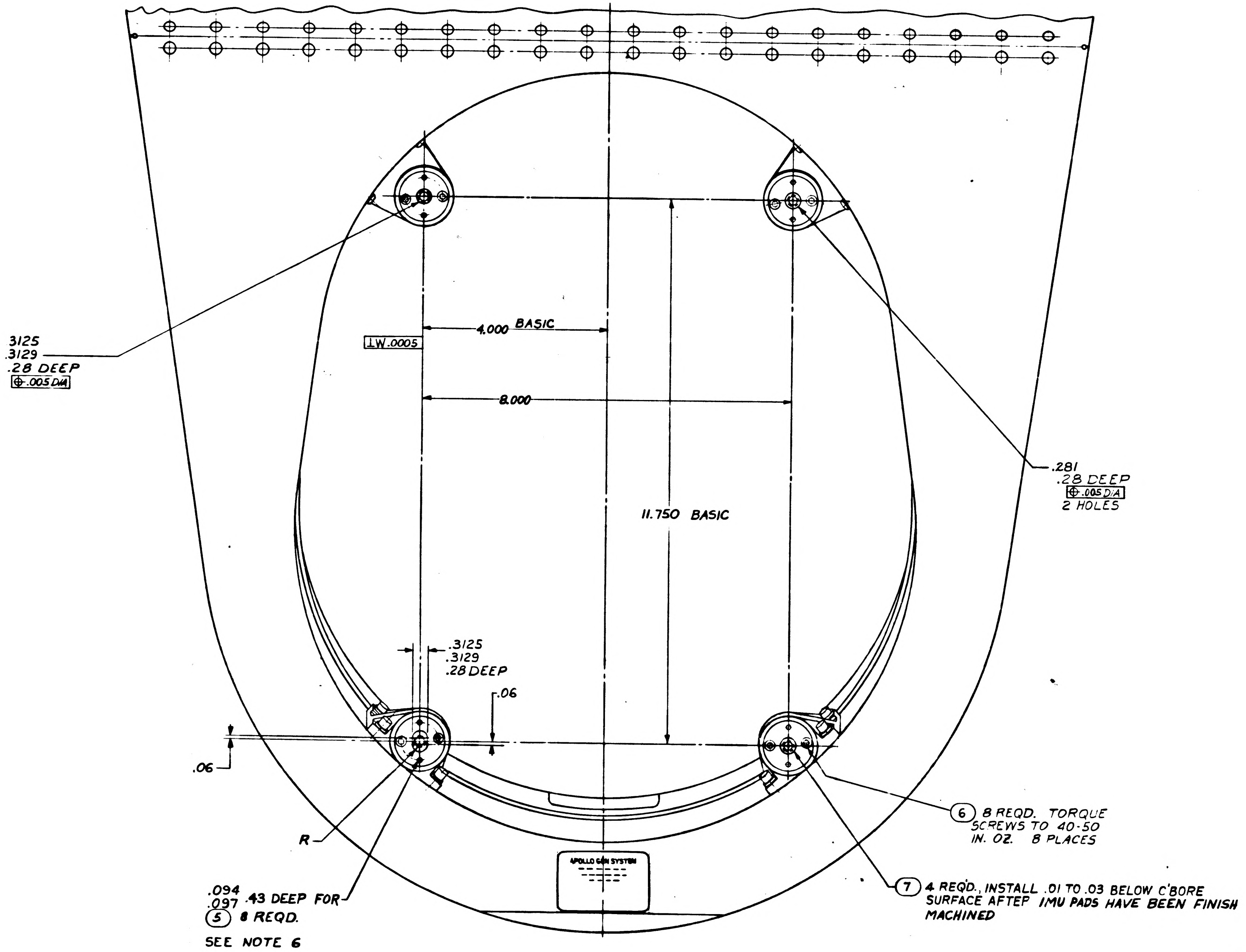
10. FINISH: APPLY PAINT ITEMS ⑧ AND ⑨, GREY, COLOR NO. 36231 OF FED-STD-595, PER ND 1002291 WITH CURE AT 135°F ± 5°F FOR 24 HOURS. THE FOLLOWING AREAS ARE TO BE MASKED: ALL THREADED INSERTS, ITEMS NO. ③ AND ④, SURFACES FORMING DATUM Z, TWO PRECISION REF. HOLES, TWO MOUNTING SURFACES, IMU PADS AND MATING SURFACES, AND .75 DIA. COUNTERBORES. ALL UNPAINTED ALUM. SURFACES TO BE BRUSH ALODINE TREATED PER MIL-C-5541.

11. ITEMS ②, ⑪ & ⑫ ARE PROTECTIVE PADS WHICH MUST BE REMOVED WHEN THIS ASSEMBLY IS BEING USED AT A SYSTEM OR SUBSYSTEM LEVEL. PADS ARE SHOWN IN SIDE VIEW ONLY.

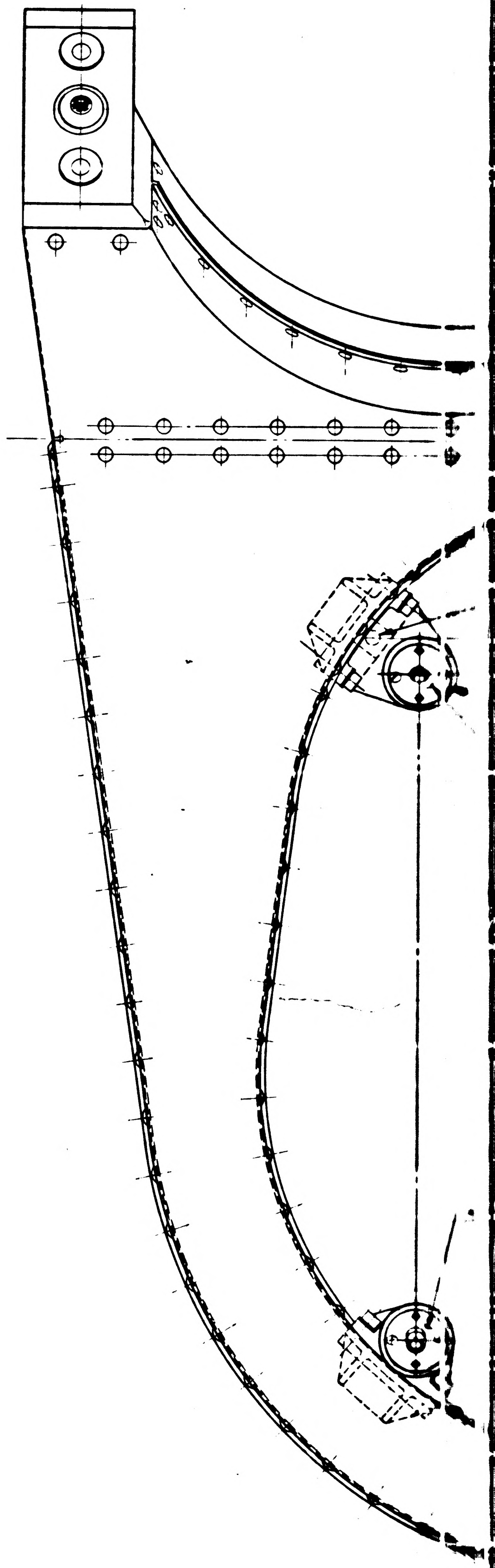
12. REFERENCE PART NO.: 2899968


∥Z .0005
∥W .0005
-U- DEFINED BY CENTER OF GAGE BALLS

VIEW B-B ROTATED 20°

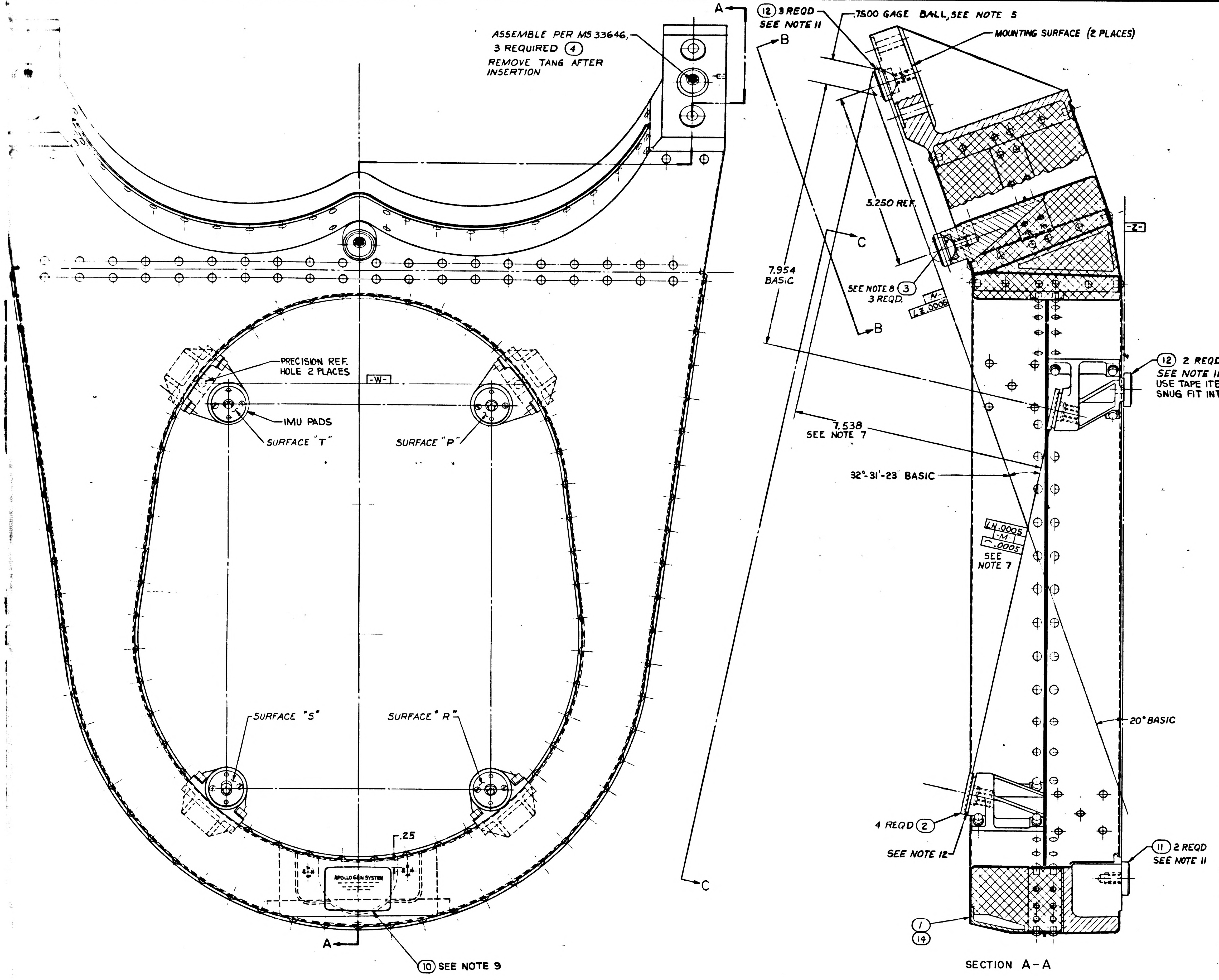

3125
.3129
.28 DEEP
⊕ .005 DIA
⊥W .0005
4.000 BASIC
8.000
11.750 BASIC
.281
.28 DEEP
⊕ .005 DIA
2 HOLES
.3125
.3129
.28 DEEP
.06
.06
R
.094
.097 .43 DEEP FOR
⑤ 8 REQD.
SEE NOTE 6
⑥ 8 REQD. TORQUE SCREWS TO 40-50 IN. OZ. 8 PLACES
⑦ 4 REQD., INSTALL .01 TO .03 BELOW C'BORE SURFACE AFTEP IMU PADS HAVE BEEN FINISH MACHINED
APOLLO G&N SYSTEM

VIEW C-C ROTATED 12½°



2899982 REV LTR G

1/2899982



ASSEMBLE PER MS 33646, 3 REQUIRED (4)
REMOVE TANG AFTER INSERTION
A
(12) 3 REQD SEE NOTE 11
B
.7500 GAGE BALL, SEE NOTE 5
MOUNTING SURFACE (2 PLACES)
5.250 REF.
7.954 BASIC
C
SEE NOTE 8 (3) 3 REQD.
N
⊥ .0005
B
-Z-
PRECISION REF. HOLE 2 PLACES
-W-
IMU PADS
SURFACE "T"
SURFACE "P"
(12) 2 REQD SEE NOTE 11
USE TAPE ITEM (13) TO PROVIDE SNUG FIT INTO PRECISION HOLES.
7.538 SEE NOTE 7
32°-31'-23" BASIC
⊥N .0005
-M-
⏥ .0005
SEE NOTE 7
SURFACE "S"
SURFACE "R"
20° BASIC
4 REQD (2)
SEE NOTE 12
.25
APOLLO GEN SYSTEM
C
(11) 2 REQD SEE NOTE 11
(1) (14)
A
(10) SEE NOTE 9
SECTION A-A

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC 200343	–	15 MAR 65	J J J
B		UPGRADED TO CLASS A PER TDRR 17814	–	15 MAR 65	J J J
C		REVISED PER TDRR 2096		2 JUL 65	RTD RWH
D		REVISED PER TDRR 24396		6 DEC 65	HTD
E		REVISED PER TDRR 26911		14 MAR 66	RP AU
F		REVISED PER TDRR 27844		12 AUG 66	CKD
G		REVISED PER TDRR 33964		2 AUG 67	ES

		021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
		1	–		14	1025713	NAVIGATION BASE, INSEP ASSY BLK II
		AR	AR		13	MIL-T-27730	TAPE, ANTISEIZE
		5	5		12	2899996-002	THUMBSCREW, PROTECTIVE
		2	2		11	2899996-001	THUMBSCREW, PROTECTIVE
		1	1		10	1004260-100	NAMEPLATES, APOLLO GEN/GSE
		AR	AR		9	1012543-003	PAINT, ENAMEL
		AR	AR		8	MIL-P-8585	PRIMER COATING, ZINC CHROMATE
		4	4		7	1010802-002	INSERT, FLOATING, LOCKING THD.
		8	8		6	1010867-3	SCREW FLAT HEAD, SELF LOCK
		8	8		5	MS-171494	PIN, SPRING
		3	3		4	MS 21209-F4-15	(1897059-204) INSERT, LOCKING
		3	3		3	1899965	INSERT - OPTICS MOUNTING
		4	4		2	2899995	THUMBSCREW, PROTECTIVE
		–	1		1	2899981	BASE, NAVIGATION INSEP. ASSY.

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
		011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + – DECIMALS ±.005 ±.02 ANGLES ± 1°
DO NOT SCALE THIS DRAWING
MATERIAL –
CONTRACT NAS 9-497

MIT INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN Kohn DATE 30 SEP 64
CHECKED C. Prindle 26 OCT 64
APPROVAL 26 Oct 64
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

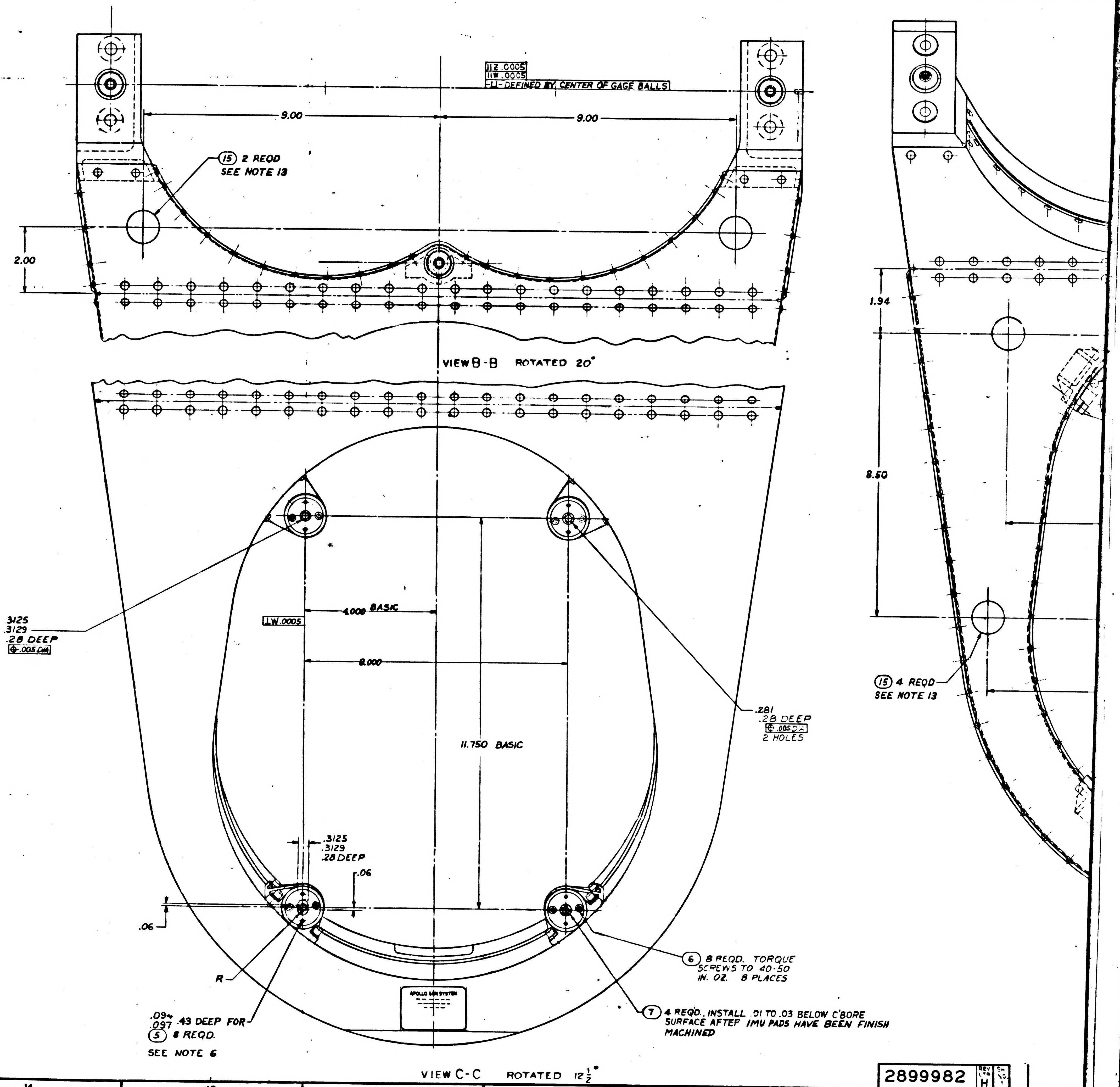
NAVIGATION BASE ASSEMBLY
BLOCK II

CODE IDENT NO. 80230
SIZE J
2899982
SCALE FULL
SHEET 1 OF 1

2/2899982

NOTES

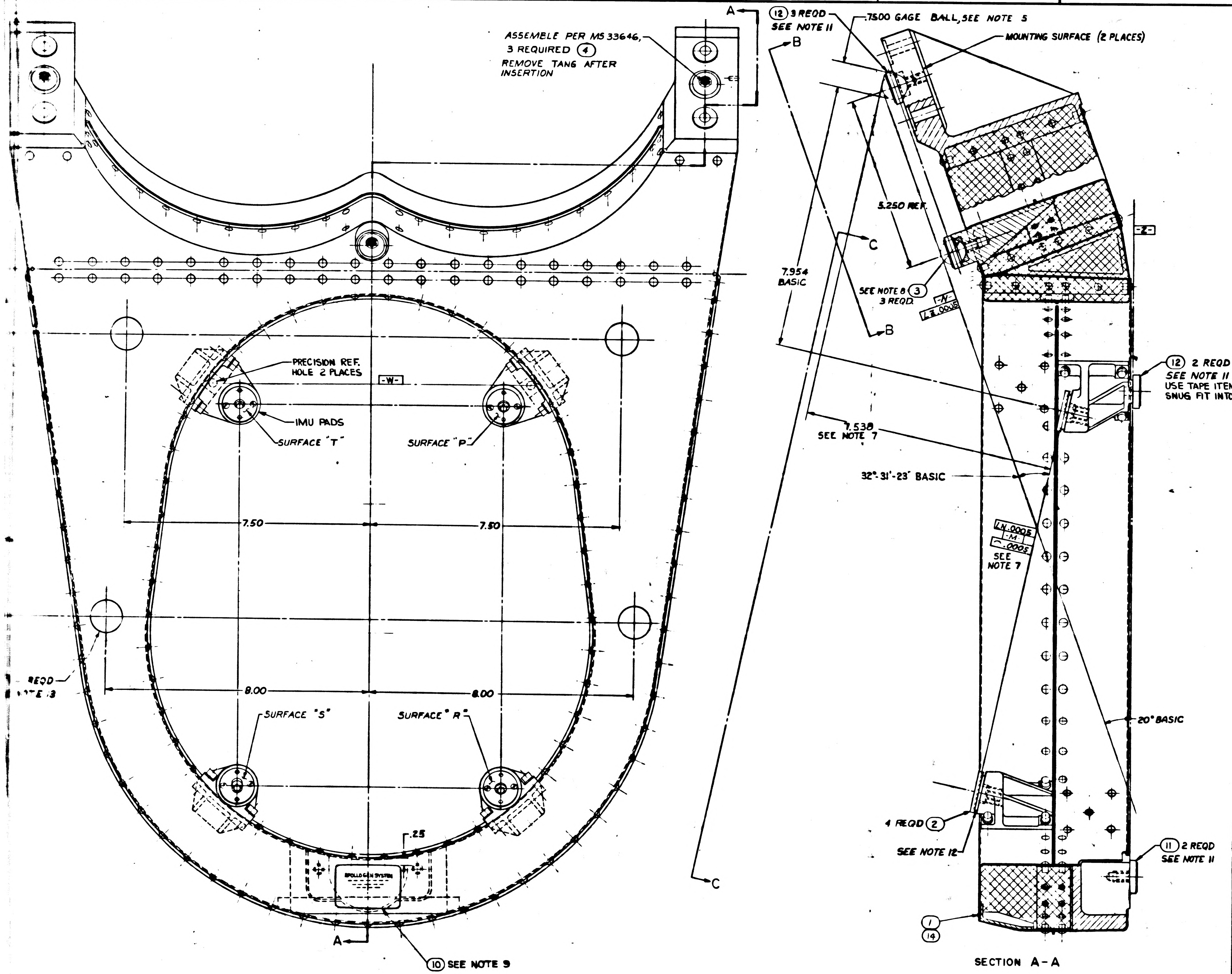
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED:
   - a. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
   - b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   - c. MUST BE FREE OF BURRS.
3. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 65° TO 75°F.
4. ITEM ③ MAY BE LAPPED OR MACHINED ON BOTTOM SURFACE PRIOR TO INSERTION TO OBTAIN PARALLELISM AND ANGULAR REQUIREMENTS.
5. THE SIZE AND SPHERICITY OF THE 3 GAGE BALLS MUST BE WITHIN A .000010 TOLERANCE ZONE.
6. INSERT PINS ITEM ⑤ .04 BELOW SURFACES "S" & "T" PRIOR TO FINISH MACHINING OF THESE SURFACES.
7. SURFACES P, R, S & T ESTABLISH DATUM "M" WHEREIN ALL POINTS ON EACH SURFACE MUST LIE WITHIN .0005 INCH.
8. ITEM ③ TO BE SUBJECTED TO 500 LBS. AXIAL PRELOAD AFTER ASSEMBLY AND PRIOR TO FINAL MACHINING OF SURFACES P, R, S & T.
9. SERIALIZE AND ADD ASSEMBLY DASH NO. PER ND1002023. APPLY NAMEPLATE PER ND1002219.
10. FINISH: APPLY PAINT ITEMS ⑧ AND ⑨, GREY, COLOR NO. 36231 OF FED-STD-595, PER ND1002291 WITH CURE AT 135°F ± 5°F FOR 24 HOURS. THE FOLLOWING AREAS ARE TO BE MASKED: ALL THREADED INSERTS, ITEMS NO. ③ AND ④, SURFACES FORMING DATUM Z, TWO PRECISION REF. HOLES, TWO MOUNTING SURFACES, IMU PADS AND MATING SURFACES, AND .75 DIA. COUNTERBORES. ALL UNPAINTED ALUM. SURFACES TO BE BRUSH ALODINE TREATED PER MIL-C-5541.
11. ITEMS ②, ⑪ & ⑫ ARE PROTECTIVE PADS WHICH MUST BE REMOVED WHEN THIS ASSEMBLY IS BEING USED AT A SYSTEM OR SUBSYSTEM LEVEL. PADS ARE SHOWN IN SIDE VIEW ONLY.
12. REFERENCE PART NO.: 2899968
13. DISC AND SEAL, ITEM 15, TO BE PRESSED FIRMLY IN PLACE TO EFFECT A COMPLETE BOND OVER ENTIRE AREA OF DISC AND SEAL. REMOVE RELEASE PAPER FROM DISC AND SEAL, ITEM 15, PRIOR TO USAGE.


|| Z .0005
|| W .0005
-U- DEFINED BY CENTER OF GAGE BALLS
9.00
9.00
⑮ 2 REQD
SEE NOTE 13
2.00
VIEW B-B ROTATED 20°
1.94
8.50
⑮ 4 REQD
SEE NOTE 13
.00
.3125
.3129
.28 DEEP
⊕ .005 DIA
⊥ W .0005
4.000 BASIC
8.000
11.750 BASIC
.281
.28 DEEP
⊕ .005 DIA
2 HOLES
.3125
.3129
.28 DEEP
.06
.06
R
.094
.097 .43 DEEP FOR
⑤ 8 REQD.
SEE NOTE 6
APOLLO G&N SYSTEM
⑥ 8 REQD. TORQUE SCREWS TO 40-50 IN. OZ. 8 PLACES
⑦ 4 REQD., INSTALL .01 TO .03 BELOW C'BORE SURFACE AFTER IMU PADS HAVE BEEN FINISH MACHINED
VIEW C-C ROTATED 12½°

2899982 REV LTR H

1/2899982

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC 200343	–	15 MAR 65	J J J
B		UPGRADED TO CLASS A PER TDRR 17814	–	15 MAR 65	J J J
C		REVISED PER TDRR 20961		27 JUL 65	PTP
D		REVISED PER TDRR 24396		6 DEC 65	HTO
E		REVISED PER TDRR 26911		14 MAR 66	RP AU
F		REVISED PER TDRR 27844		12 APR 66	DKD
G		REVISED PER TDRR 33964		2 AUG 67	ES
H		REVISED PER TDRR 34924		6-NOV-67	B.


ASSEMBLE PER MS 33646, 3 REQUIRED ④ REMOVE TANG AFTER INSERTION
A
PRECISION REF. HOLE 2 PLACES
-W-
IMU PADS
SURFACE "T"
SURFACE "P"
7.50
7.50
REQD
NOTE 3
8.00
8.00
SURFACE "S"
SURFACE "R"
.25
APOLLO G&N SYSTEM
A
⑩ SEE NOTE 9
⑫ 3 REQD SEE NOTE 11
.7500 GAGE BALL, SEE NOTE 5
B
MOUNTING SURFACE (2 PLACES)
5.250 REF.
7.954 BASIC
C
SEE NOTE 8 ③ 3 REQD.
-N-
⊥ .0005
B
-Z-
⑫ 2 REQD SEE NOTE 11
USE TAPE ITEM ⑬ TO PROVIDE SNUG FIT INTO PRECISION HOLES.
7.538 SEE NOTE 7
32°-31'-23" BASIC
⊥ N .0005
-M-
⏥ .0005
SEE NOTE 7
20° BASIC
4 REQD ②
SEE NOTE 12
⑪ 2 REQD SEE NOTE 11
C
①
⑭
SECTION A-A

6	6	–	–		15	2898960	DISC AND SEAL
1	–	1	–		14	1025713	NAVIGATION BASE, INSEP ASSY (B.K.
AR	AR	AR	AR		13	MIL-T-27730	TAPE, ANTISEIZE
5	5	5	5		12	2899996-002	THUMBSCREW, PROTECTIVE
2	2	2	2		11	2899996-001	THUMBSCREW, PROTECTIVE
1	1	1	1		10	1004260-100	NAMEPLATES, APOLLO GEN/GSE
AR	AR	AR	AR		9	1012543-003	PAINT, ENAMEL
AR	AR	AR	AR		8	MIL-P-8585	PRIMER COATING, ZINC CHROMATE
4	4	4	4		7	1010802-002	INSERT FLOATING LOCKING THD
8	8	8	8		6	1010867-3	SCREW FLAT HEAD, SELF LOCK
8	8	8	8		5	MS-171494	PIN, SPRING
3	3	3	3		4	MS 21209-F4-15	(1897059 204) INSERT, LOCKING
3	3	3	3		3	1899965	INSERT - OPTICS MOUNTING
4	4	4	4		2	2899995	THUMBSCREW PROTECTIVE
–	1	–	1		1	2899981	BASE, NAVIGATION INSEP. ASSY.
041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

NEXT ASSY	USED ON	APPLICABLE DASH NO.
		011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + – DECIMALS ±.005 ±.02 ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL –
CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS
DRAWN DATE 30 SEP 64
CHECKED C. Prugh 26 OCT 64
APPROVAL 26 OCT 64
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

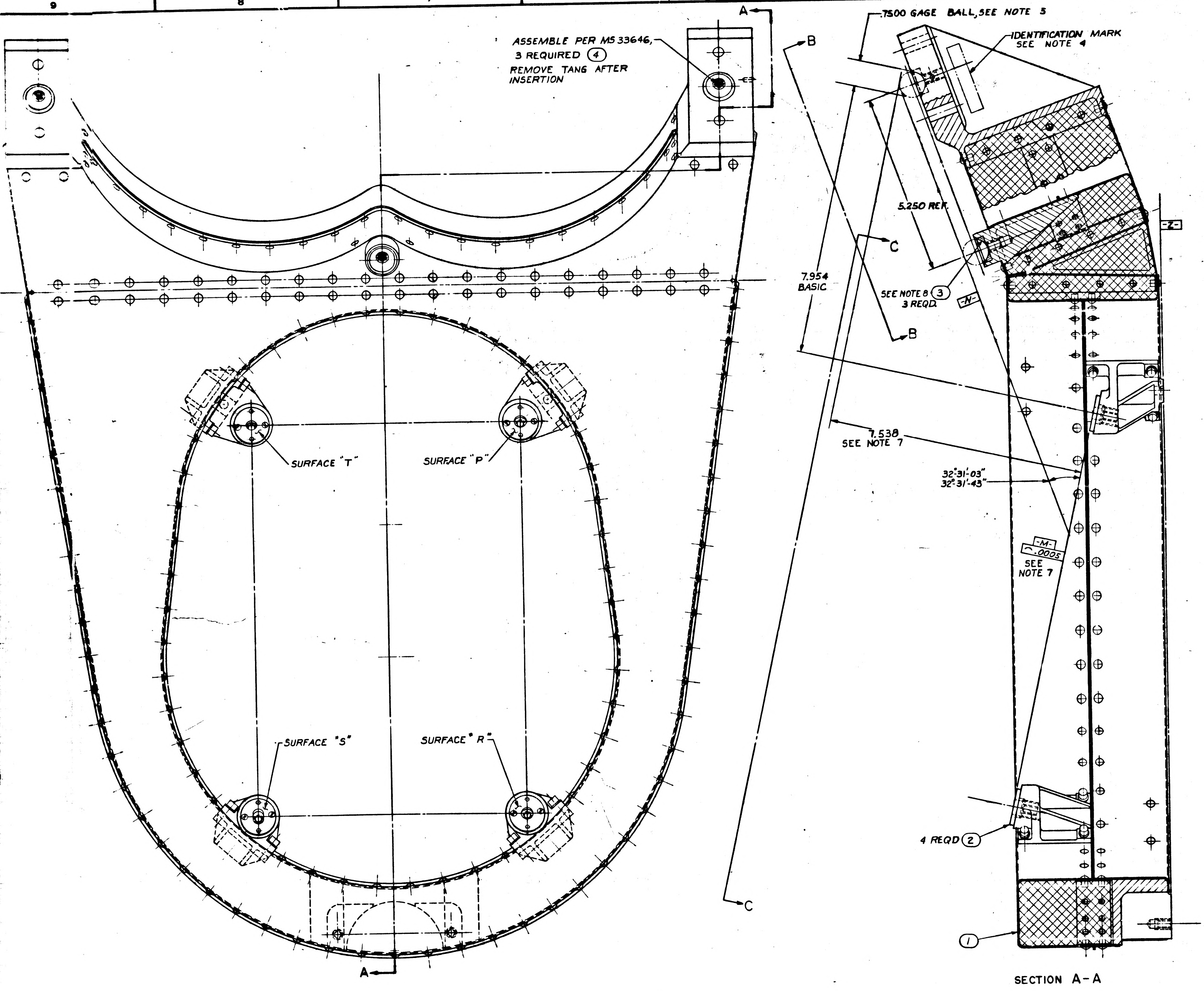
NAVIGATION BASE ASSEMBLY
BLOCK II

CODE IDENT NO. 80230
SIZE J
2899982
SCALE FULL
SHEET 1 OF 1

2899982 REV H

2899982 REV LTR H SH NO

2/2899982


A
ASSEMBLE PER MS 33646,
3 REQUIRED ④
REMOVE TANG AFTER
INSERTION
SURFACE "T"
SURFACE "P"
SURFACE "S"
SURFACE "R"
A
B
.7500 GAGE BALL, SEE NOTE 5
IDENTIFICATION MARK
SEE NOTE 4
5.250 REF.
7.954
BASIC
C
SEE NOTE 8 ③
3 REQD.
-N-
-Z-
B
7.538
SEE NOTE 7
32°-31'-03"
32°-31'-43"
-M-
⌒ .0005
SEE
NOTE 7
4 REQD ②
①
C
SECTION A-A

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 DATE

			8		6	1010628-2	SCREW FLAT HEAD, SELF LOCK
			8		5	MS-171494	PIN, SPRING
			3		4	MS21209-F4-15	(1897059-204) INSERT, LOCKING
			3		3	1899965	INSERT - OPTICS MOUNTING
			4		2	2899968	PAD, MOUNTING
			1		1	2899981	BASE, NAVIGATION INSEP. ASSY.
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

2899950-011	2899950-011	011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.005 ±.02 ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Kolm DATE 30 SEP 64
CHECKED C. Pruefer 26 OCT 64
APPROVAL E. Lambert 26 OCT 64
APPROVAL 26 OCT 64
NASA APPROVAL W. J. R 11-4-64
R. W. Dean MIT APPROVAL W. Kupfer

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

NAVIGATION BASE ASSEMBLY
(FINAL MACHINING)

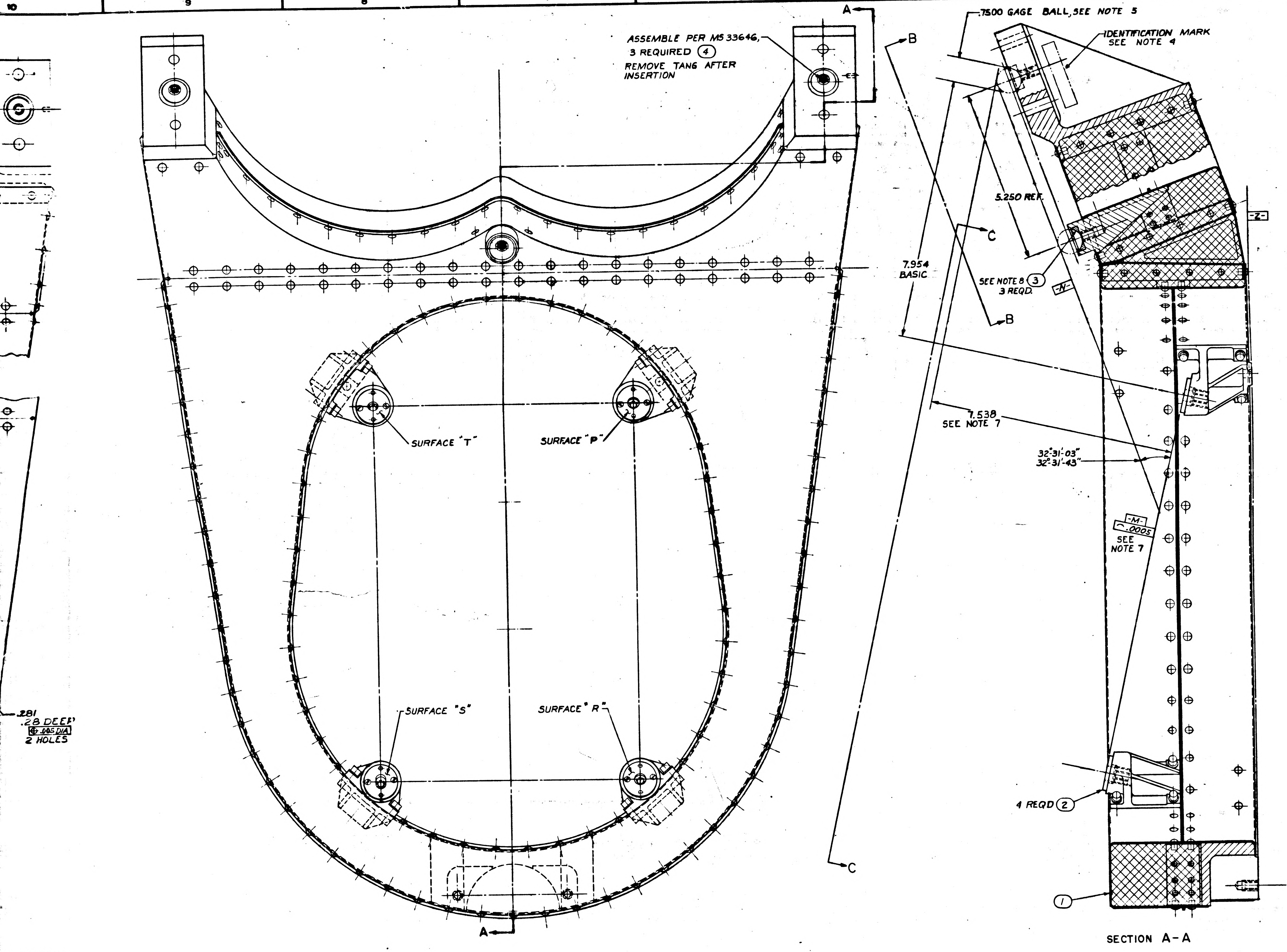
CODE IDENT NO. SIZE J 2899982
SCALE FULL SHEET 1 OF 1

(31)

2899982

E-3

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD


ASSEMBLE PER MS 33646,
3 REQUIRED ④
REMOVE TANG AFTER INSERTION
SURFACE "T"
SURFACE "P"
SURFACE "S"
SURFACE "R"
.281
.28 DEEP
⌖ .005 DIA
2 HOLES
CD. TORQUE
5 TO 40-50
8 PLACES
A
A
B
B
C
C
.7500 GAGE BALL, SEE NOTE 5
IDENTIFICATION MARK SEE NOTE 4
5.250 REF.
7.954 BASIC
SEE NOTE 8 ③ 3 REQD.
-N-
-Z-
7.538 SEE NOTE 7
32°31'-03"
32°31'-43"
-M-
.0005
SEE NOTE 7
4 REQD ②
①
SECTION A-A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 DATE

			8		6	1010628-2	SCREW [illegible] HEAD, SELF LOCK
			8		5	MS-171434	PIN [illegible]
			3		4	MS21209-F4-15	(1897059 [illegible] INSERT, LOCKING
			3		3	1899965	INSERT [illegible] MOUNTING
			4		2	2899968	PAD, [illegible]
			1		1	2899981	BASE, N[illegible] ASSY
			011	EFFEC-TIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2899950-011	2899950-011	011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + - | DECIMALS ±.005 ±.02 | ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

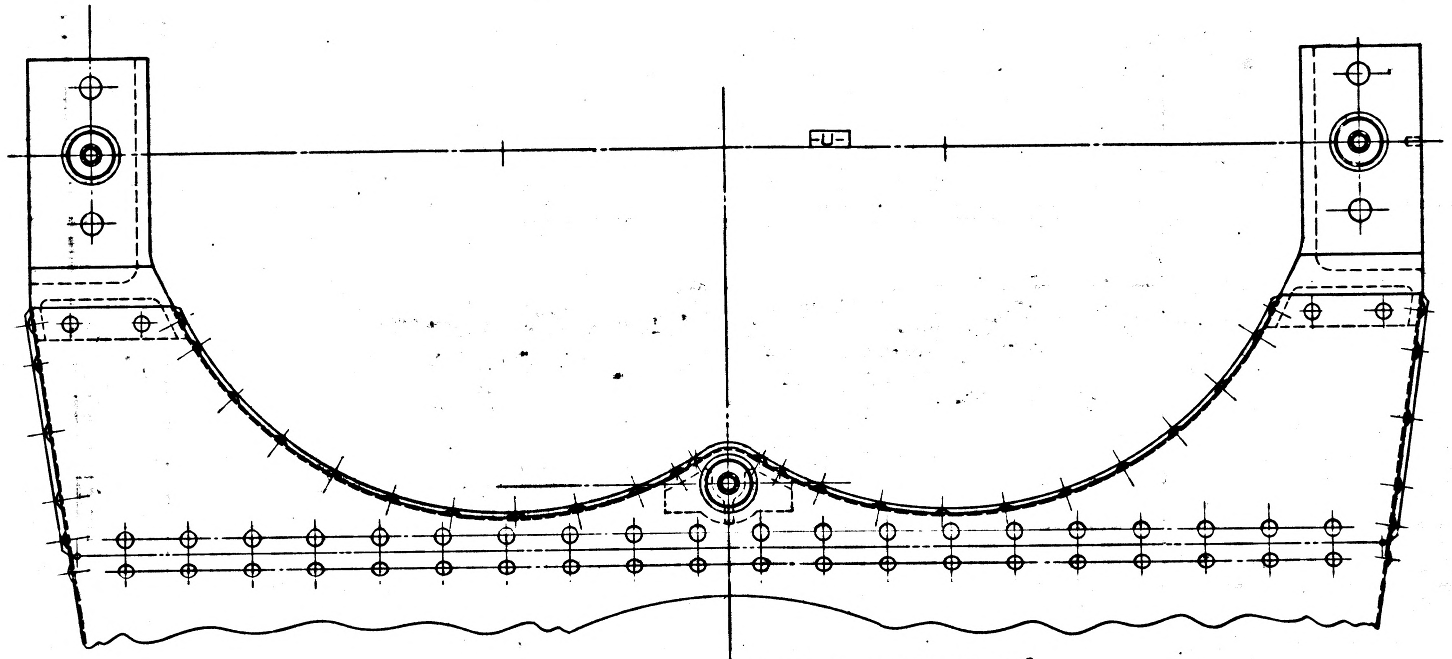
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN [illegible] DATE 30 SEP 64
CHECKED C. Prydt 26 OCT 64
APPROVAL E. [illegible] 26 OCT 64
APPROVAL [illegible] 26 OCT 64
NASA APPROVAL W. J. [illegible] 11-4-64
R. W. [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

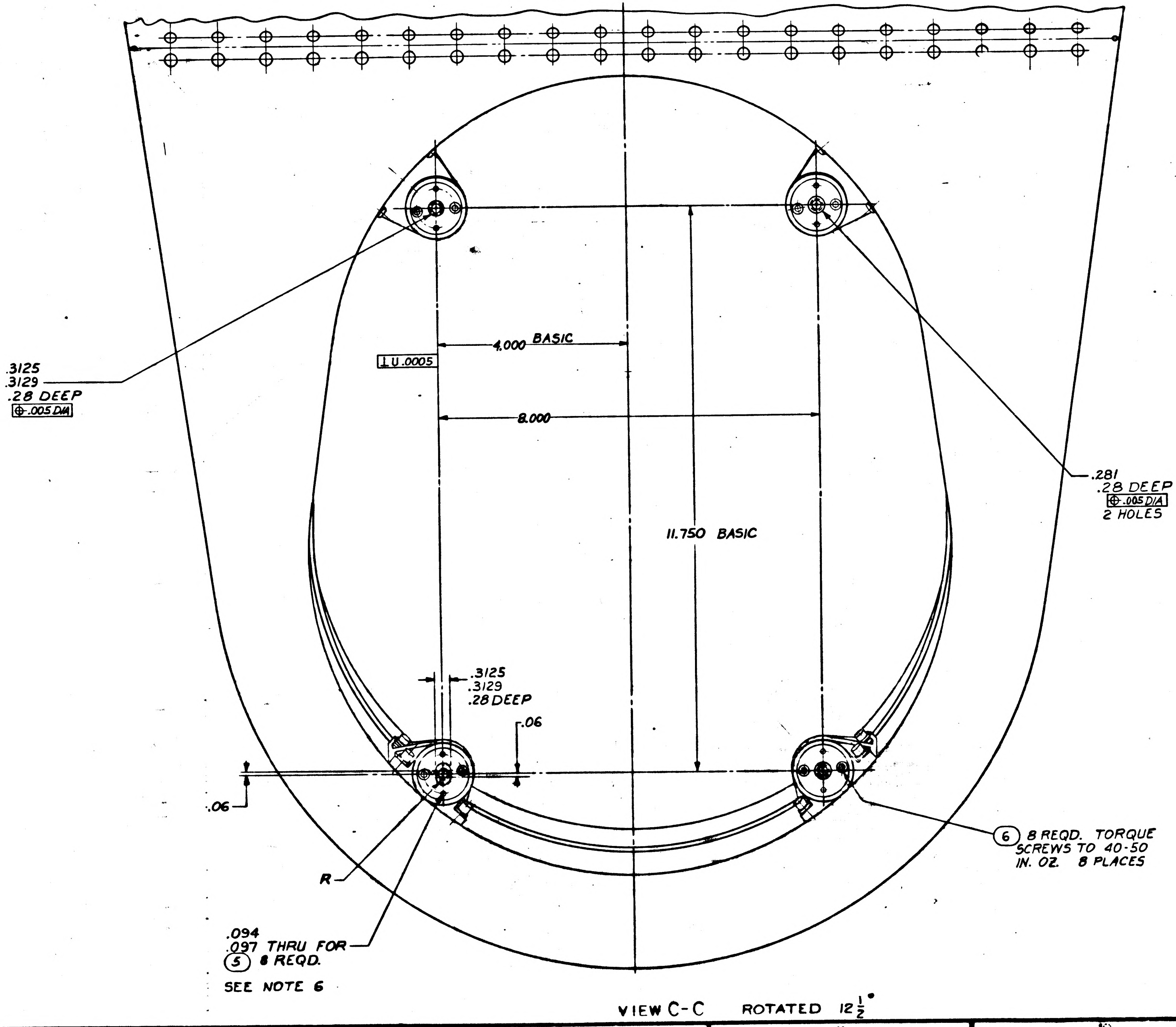
NAVIGATION BASE ASSEMBLY
(FINAL [illegible])

CODE IDENT NO. | SIZE J | 2899982
SCALE FULL | SHEET 1 OF 1

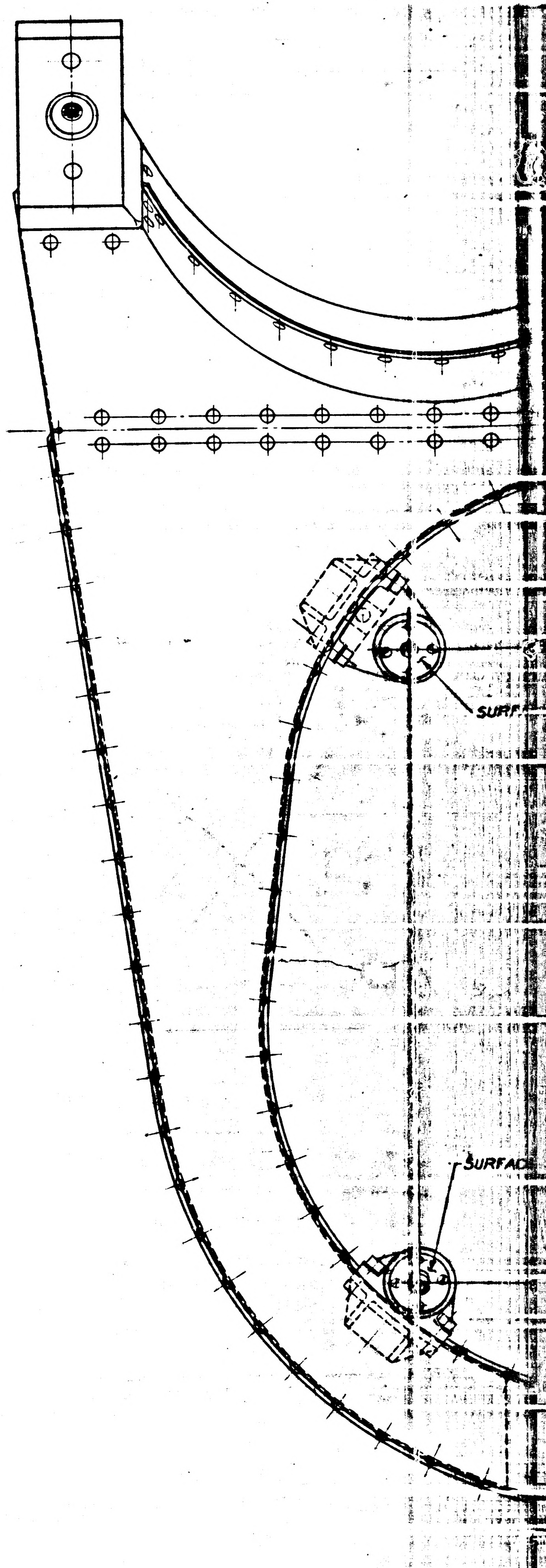
NOTES
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. UNLESS OTHERWISE SPECIFIED:
   a. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
   b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   c. MUST BE FREE OF BURRS.
3. ALL DIMENSIONS MUST BE WITHIN SPECIFIED LIMITS AT A UNIFORM PART TEMPERATURE OF 65° TO 75°F.
4. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NO. AND REVISION LETTER PER ND-1002023.
5. THE SIZE AND SPHERICITY OF THE 3 GAGE BALLS MUST BE WITHIN A .000010 TOLERANCE ZONE.
6. INSERT PINS ITEM ⑤ .04 BELOW SURFACES "S" & "T" PRIOR TO FINISH MACHINING OF THESE SURFACES.
7. SURFACES P, R, S & T ESTABLISH DATUM "M" WHEREIN ALL POINTS ON EACH SURFACE MUST LIE WITHIN .0005 INCH.
8. ITEM ③ TO BE SUBJECTED TO 500 LBS. AXIAL PRELOAD AFTER ASSEMBLY AND PRIOR TO FINAL MACHINING OF SURFACES P, R, S & T.



VIEW B-B ROTATED 20°

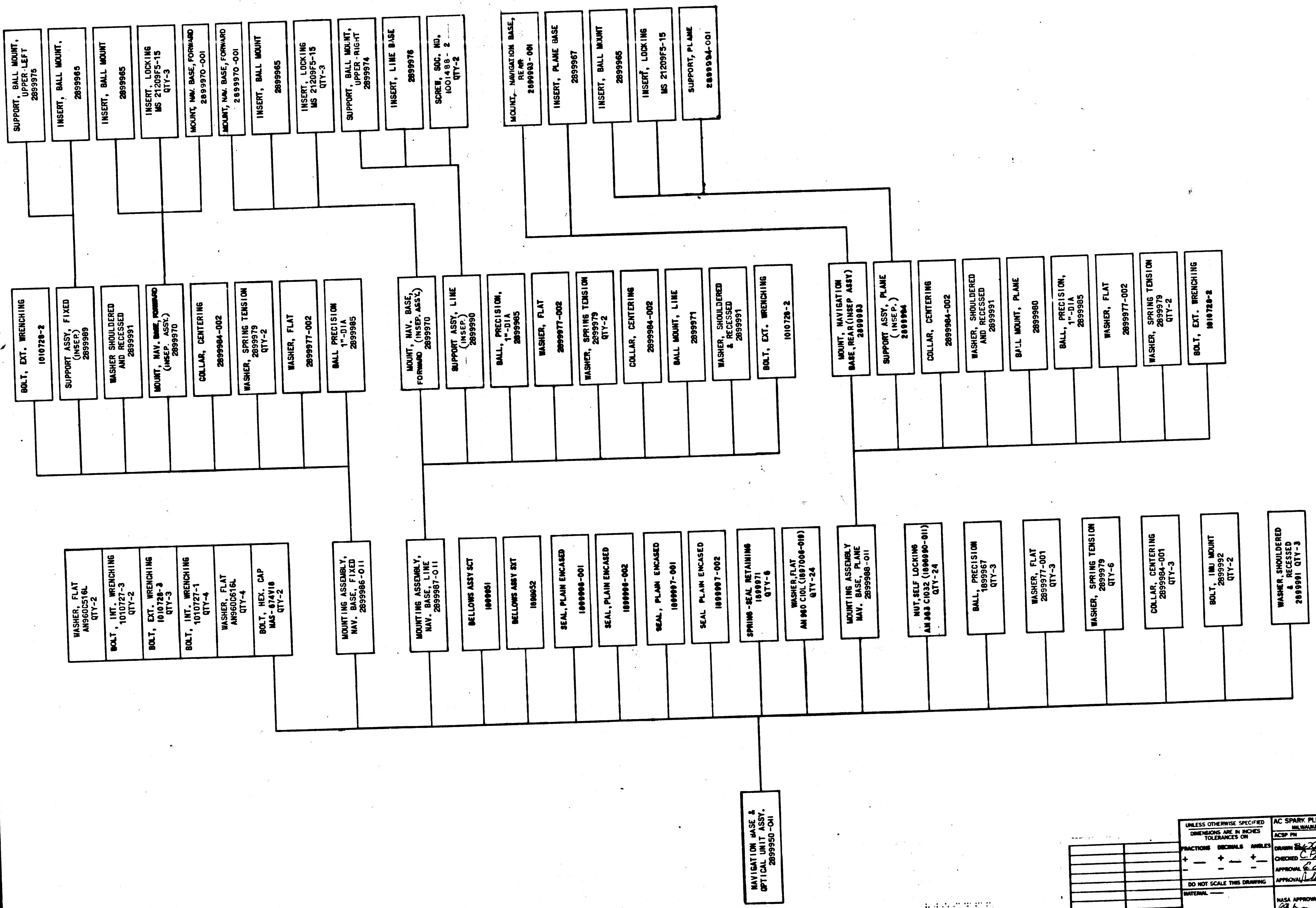

.3125
.3129
.28 DEEP
⊕ .005 DIA
⊥ U .0005
4.000 BASIC
8.000
11.750 BASIC
.281
.28 DEEP
⊕ .005 DIA
2 HOLES
.3125
.3129
.28 DEEP
.06
.06
R
.094
.097 THRU FOR
⑤ 8 REQD.
SEE NOTE 6
⑥ 8 REQD. TORQUE SCREWS TO 40-50 IN. OZ. 8 PLACES

VIEW C-C ROTATED 12½°


SURF
SURFAC

2899982

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		REVISED PER MXC 200342	–	1? MAY	EF
B		UPGRADED TO CLASS A PER TDRR 17815	–	15 MAR	[illegible]



SUPPORT, BALL MOUNT, UPPER-LEFT 2899975
INSERT, BALL MOUNT, 2899965
INSERT, BALL MOUNT 2899965
INSERT, LOCKING MS 21209F5-15 QTY-3
MOUNT, NAV. BASE, FORWARD 2899970-001
MOUNT, NAV. BASE, FORWARD 2899970-001
INSERT, BALL MOUNT 2899965
INSERT, LOCKING MS 21209F5-15 QTY-3
SUPPORT, BALL MOUNT, UPPER-RIGHT 2899974
INSERT, LINE BASE 2899976
SCREW, SOC. HD. 1001488-2 QTY-2
MOUNT, NAVIGATION BASE, REAR 2899993-001
INSERT, PLANE BASE 2899967
INSERT, BALL MOUNT 2899965
INSERT, LOCKING MS 21209F5-15
SUPPORT, PLANE 2899994-001
BOLT, EXT. WRENCHING 1010728-2
SUPPORT ASSY, FIXED (INSEP.) 2899989
WASHER SHOULDERED AND RECESSED 2899991
MOUNT, NAV. BASE, FORWARD (INSEP. ASSY) 2899970
COLLAR, CENTERING 2899984-002
WASHER, SPRING TENSION 2899979 QTY-2
WASHER, FLAT 2899977-002
BALL PRECISION 1"-DIA 2899985
MOUNT, NAV. BASE, FORWARD (INSEP. ASSY) 2899970
SUPPORT ASSY, LINE (INSEP.) 2899990
BALL, PRECISION, 1"-DIA 2899985
WASHER, FLAT 2899977-002
WASHER, SPRING TENSION 2899979 QTY-2
COLLAR, CENTERING 2899984-002
BALL MOUNT, LINE 2899971
WASHER, SHOULDERED & RECESSED 2899991
BOLT, EXT. WRENCHING 1010728-2
MOUNT, NAVIGATION BASE, REAR (INSEP ASSY) 2899993
SUPPORT ASSY, PLANE (INSEP.) 2899994
COLLAR, CENTERING 2899984-002
WASHER, SHOULDERED AND RECESSED 2899991
BALL MOUNT, PLANE 2899980
BALL, PRECISION, 1"-DIA 2899985
WASHER, FLAT 2899977-002
WASHER, SPRING TENSION 2899979 QTY-2
BOLT, EXT. WRENCHING 1010728-2
WASHER, FLAT AN960C516L QTY-2
BOLT, INT. WRENCHING 1010727-3 QTY-2
BOLT, EXT. WRENCHING 1010728-3 QTY-3
BOLT, INT. WRENCHING 1010727-1 QTY-4
WASHER, FLAT AN960C616L QTY-4
BOLT, HEX. CAP NAS-674A16 QTY-2
MOUNTING ASSEMBLY, NAV. BASE, FIXED 2899986-011
MOUNTING ASSEMBLY, NAV. BASE, LINE 2899987-011
BELLOWS ASSY SCT 1006051
BELLOWS ASSY SXT 1006052
SEAL, PLAIN ENCASED 1006006-001
SEAL, PLAIN ENCASED 1006006-002
SEAL, PLAIN ENCASED 1006007-001
SEAL PLAIN ENCASED 1006007-002
SPRING-SEAL RETAINING 1006071 QTY-6
WASHER, FLAT AN 960 C10L (1007006-010) QTY-24
MOUNTING ASSEMBLY NAV. BASE, PLANE 2899988-011
NUT, SELF LOCKING AN 363 C1032 (1006090-011) QTY-24
BALL, PRECISION 1899967 QTY-3
WASHER, FLAT 2899977-001 QTY-3
WASHER, SPRING TENSION 2899979 QTY-6
COLLAR, CENTERING 2899984-001 QTY-3
BOLT, IMU MOUNT 2899992 QTY-2
WASHER, SHOULDERED & RECESSED 2899991 QTY-3
NAVIGATION BASE & OPTICAL UNIT ASSY. 2899950-011

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9 497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN [illegible] DATE 6 NOV 64
CHECKED C. Pirzk 13 NOV 64
APPROVAL E. Lambert 13 NOV 64
APPROVAL [illegible] 13 NOV 64
NASA APPROVAL W. J. [illegible] 11-13-64
P. H. Bruns
MIT APPROVAL [illegible] 11/17/64

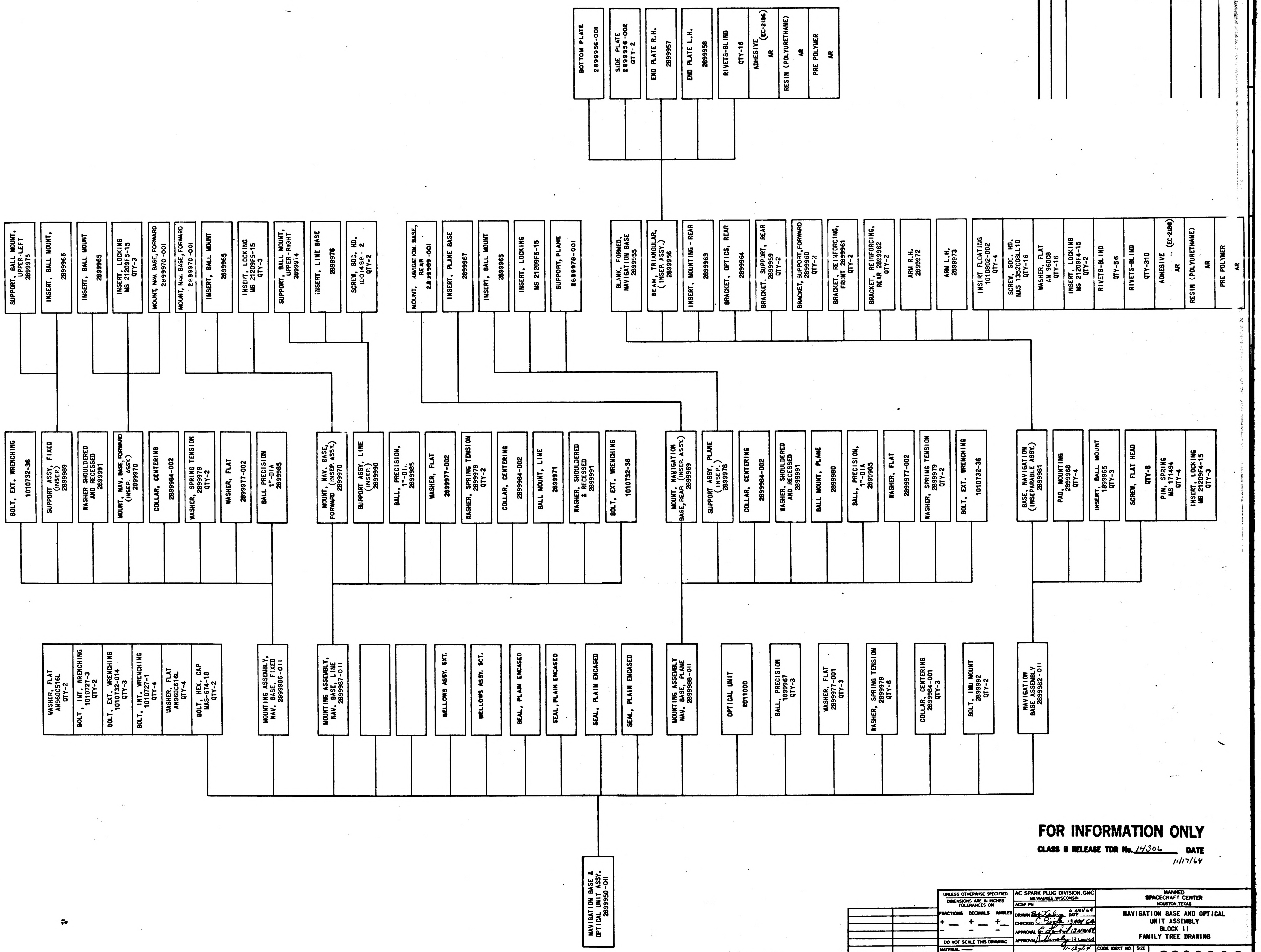
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

NAV. BASE OPTICAL UNIT & BELLOWS INSTALLATION KIT- FAMILY TREE DRAWING

CODE IDENT NO.
SIZE E
2899983
SCALE NONE
SHEET 1 OF 1

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

REVISIONS


BOTTOM PLATE 2899956-001
SIDE PLATE 2899956-002 QTY-2
END PLATE R.H. 2899957
END PLATE L.H. 2899958
RIVETS-BLIND QTY-16
ADHESIVE (EC-2186) AR
RESIN (POLYURETHANE) AR
PRE POLYMER AR
SUPPORT, BALL MOUNT, UPPER-LEFT 2899975
INSERT, BALL MOUNT, 2899965
INSERT, BALL MOUNT 2899965
INSERT, LOCKING MS 21209F5-15 QTY-3
MOUNT, NAV. BASE, FORWARD 2899970-001
MOUNT, NAV. BASE, FORWARD 2899970-001
INSERT, BALL MOUNT 2899965
INSERT, LOCKING MS 21209F5-15 QTY-3
SUPPORT, BALL MOUNT, UPPER-RIGHT 2899974
INSERT, LINE BASE 2899976
SCREW, SOC. HD. 1001488-2 QTY-2
MOUNT, NAVIGATION BASE, REAR 2899969-001
INSERT, PLANE BASE 2899967
INSERT, BALL MOUNT 2899965
INSERT, LOCKING MS 21209F5-15
SUPPORT, PLANE 2899978-001
BLANK, FORMED, NAVIGATION BASE 2899955
BEAM, TRIANGULAR, (INSEP. ASSY.) 2899956
INSERT, MOUNTING - REAR 2899963
BRACKET, OPTICS, REAR 2899964
BRACKET, SUPPORT, REAR 2899959 QTY-2
BRACKET, SUPPORT, FORWARD 2899960 QTY-2
BRACKET, REINFORCING, FRONT 2899961 QTY-2
BRACKET, REINFORCING, REAR 2899962 QTY-2
ARM R.H. 2899972
ARM L.H. 2899973
INSERT FLOATING 1010802-002 QTY-4
SCREW, SOC. HD. NAS 1352C08LL10 QTY-16
WASHER, FLAT AN 960C8 QTY-16
INSERT, LOCKING MS 21209F4-15 QTY-2
RIVETS-BLIND QTY-56
RIVETS-BLIND QTY-310
ADHESIVE (EC-2186) AR
RESIN (POLYURETHANE) AR
PRE POLYMER AR
BOLT, EXT. WRENCHING 1010732-36
SUPPORT ASSY, FIXED (INSEP.) 2899989
WASHER SHOULDERED AND RECESSED 2899991
MOUNT, NAV. BASE, FORWARD (INSEP. ASSY.) 2899970
COLLAR, CENTERING 2899984-002
WASHER, SPRING TENSION 2899979 QTY-2
WASHER, FLAT 2899977-002
BALL PRECISION 1"-DIA 2899985
MOUNT, NAV. BASE, FORWARD (INSEP. ASSY.) 2899970
SUPPORT ASSY, LINE (INSEP.) 2899990
BALL, PRECISION, 1"-DI. 2899985
WASHER, FLAT 2899977-002
WASHER, SPRING TENSION 2899979 QTY-2
COLLAR, CENTERING 2899984-002
BALL MOUNT, LINE 2899971
WASHER, SHOULDERED & RECESSED 2899991
BOLT, EXT. WRENCHING 1010732-36
MOUNT, NAVIGATION BASE, REAR (INSEP. ASSY.) 2899969
SUPPORT ASSY, PLANE (INSEP.) 2899978
COLLAR, CENTERING 2899984-002
WASHER, SHOULDERED AND RECESSED 2899991
BALL MOUNT, PLANE 2899980
BALL, PRECISION, 1"-DIA 2899985
WASHER, FLAT 2899977-002
WASHER, SPRING TENSION 2899979 QTY-2
BOLT, EXT. WRENCHING 1010732-36
BASE, NAVIGATION (INSEPARABLE ASSY.) 2899981
PAD, MOUNTING 2899968 QTY-4
INSERT, BALL MOUNT 1899965 QTY-3
SCREW, FLAT HEAD QTY-8
PIN, SPRING MS 171494 QTY-4
INSERT, LOCKING MS 21209F4-15 QTY-3
WASHER, FLAT AN960C516L QTY-2
BOLT, INT. WRENCHING 1010727-3 QTY-2
BOLT, EXT. WRENCHING 1010732-014 QTY-3
BOLT, INT. WRENCHING 1010727-1 QTY-4
WASHER, FLAT AN960C616L QTY-4
BOLT, HEX. CAP NAS-674-18 QTY-2
MOUNTING ASSEMBLY, NAV. BASE, FIXED 2899986-011
MOUNTING ASSEMBLY, NAV. BASE, LINE 2899987-011
BELLOWS ASSY. SXT.
BELLOWS ASSY. SCT.
SEAL, PLAIN ENCASED
SEAL, PLAIN ENCASED
SEAL, PLAIN ENCASED
SEAL, PLAIN ENCASED
MOUNTING ASSEMBLY NAV. BASE, PLANE 2899988-011
OPTICAL UNIT 2011000
BALL, PRECISION 1899967 QTY-3
WASHER, FLAT 2899977-001 QTY-3
WASHER, SPRING TENSION 2899979 QTY-6
COLLAR, CENTERING 2899984-001 QTY-3
BOLT, IMU MOUNT 2899992 QTY-2
NAVIGATION BASE ASSEMBLY 2899982-011
NAVIGATION BASE & OPTICAL UNIT ASSY. 2899950-011

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14306 DATE 11/17/64

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN 6 NOV 64 DATE
CHECKED 13 NOV 64
APPROVAL 13 NOV 64
APPROVAL 13 NOV 64
NASA APPROVAL 11-12-64
MIT APPROVAL 11-12-64

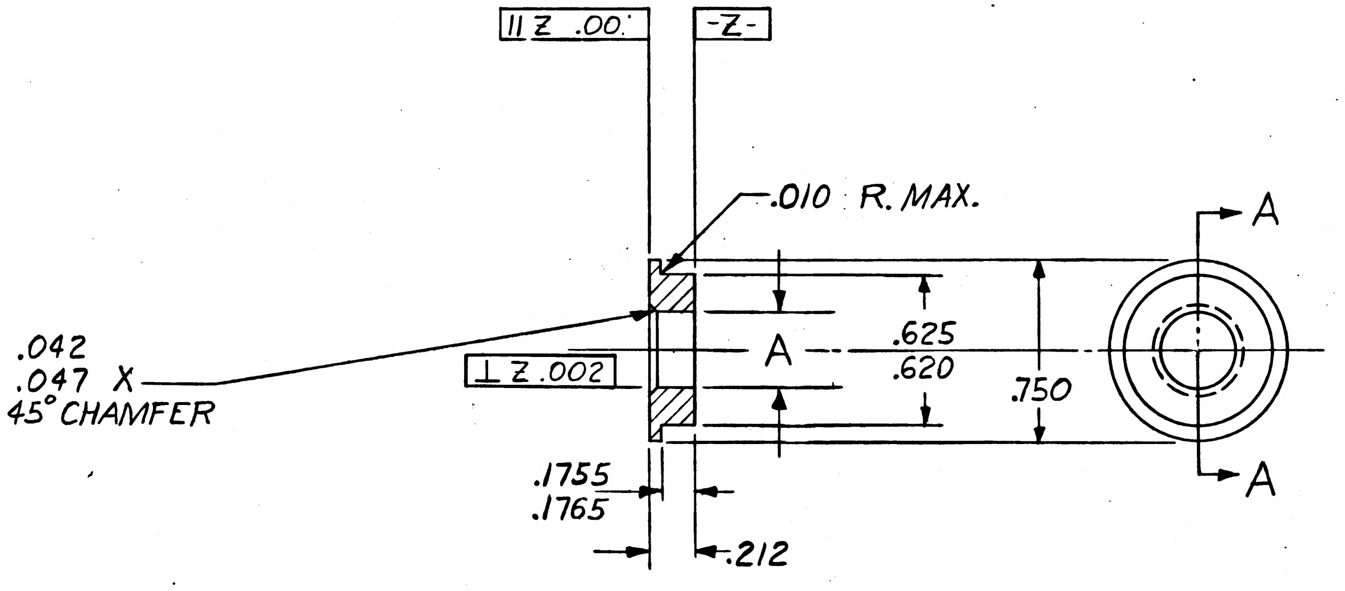
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

NAVIGATION BASE AND OPTICAL
UNIT ASSEMBLY
BLOCK II
FAMILY TREE DRAWING

CODE IDENT NO. SIZE E 2899983
SCALE NONE SHEET 1 OF 1

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: STAINLESS STEEL PER AMS-5643, TYPE 17-4 PH. (ES-2102).
3. HEAT TREAT PER MIL-H-6875, TYPE 17-4 PH, CONDITION H-900. (ES-2011-1).
4. UNLESS OTHERWISE SPECIFIED:
   a. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
   b. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
   c. MUST BE FREE FROM BURRS AND SHARP CORNERS.
5. FINISH: PASSIVATE PER MIL-F-14072 (SIG C) FINISH E-300 (ES-585).
6. IDENTIFY USING DRAWING NUMBER WITH APPLICABLE DASH NUMBER AND REVISION LETTER PER ND1002019.



SECTION A-A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 **DATE**

PART NO.	A DIA.
2899984-001	.255-.260
2899984-002	.315-.320

NEXT ASSY	USED ON
2899950-011	2899950-011
2899988-011	2899950-011
2899987-011	2899950-011
2899986-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
±	±.005 ±.02	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bob Carling DATE 15 OCT 64
CHECKED C. Pizzola 3NOV64
APPROVAL E. Lenkeul 3 NOV. 64
APPROVAL A. Henally 3NOV64
NASA APPROVAL W. J. Rhine 11-4-64
R. H. Bras
MIT APPROVAL W. Kupfer 4NOV64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

COLLAR, CENTERING

CODE IDENT NO.
SIZE C
2899984
SCALE 2:1
SHEET 1 OF 1

Charlentis 2 NOV. 64

INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

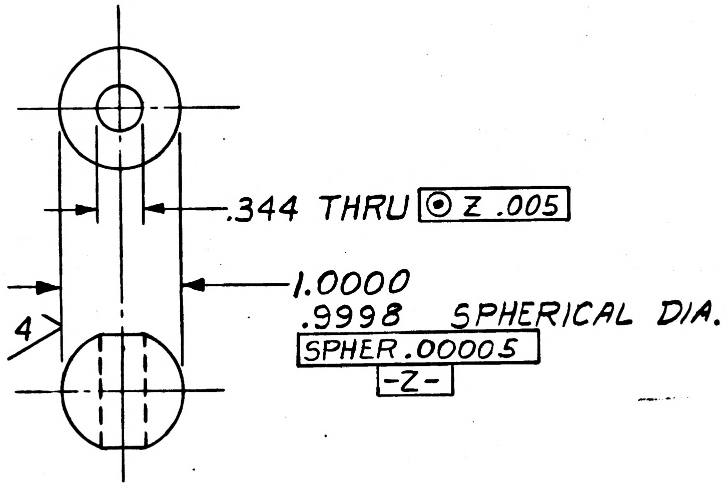
2. MATERIAL: STAINLESS STEEL PER QQ-S-763, CLASS 440 C, CONDITION ACF (ES-373, 440C)

3. UNLESS OTHERWISE SPECIFIED:
   a. ALL CORNERS TO BE .005 TO .015 R. OR CHAMFER.
   b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   c. MUST BE FREE FROM BURRS.

4. HEAT TREAT PER MIL-H-6875 TO Rc 58-62 (ES-2020-3).

5. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.

6. PACKING AND SHIPPING SHALL BE IN ACCORDANCE WITH MIL-P-116 SUB-METHOD IA-13.



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 **DATE**

2899988-011	2899950-011
2899987-011	2899950-011
2899986-011	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS ±.005
ANGLES ±1°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bob Kosling DATE 6 OCT 64
CHECKED C. Pozda 3 NOV 64
APPROVAL E. Lemkuil 3 NOV 64
APPROVAL D. Hensley 3 NOV 64
NASA APPROVAL W. J. Rhine 11-4-64
R.H. Grass
MIT APPROVAL W. Kupfer 4 Nov 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BALL, PRECISION

CODE IDENT NO.
SIZE C
2899985
SCALE FULL
SHEET 1 OF 1

Charleston 2 Nov. 64

MIL 1077C—P

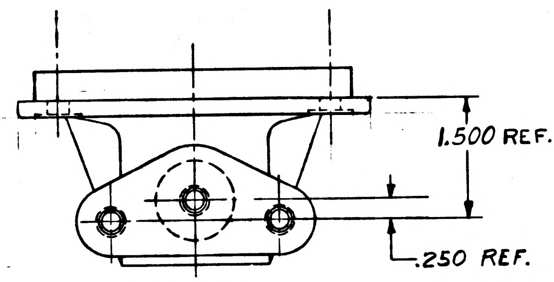
INCHES 0 2 PHOTOGRAPHIC SCALE ONLY

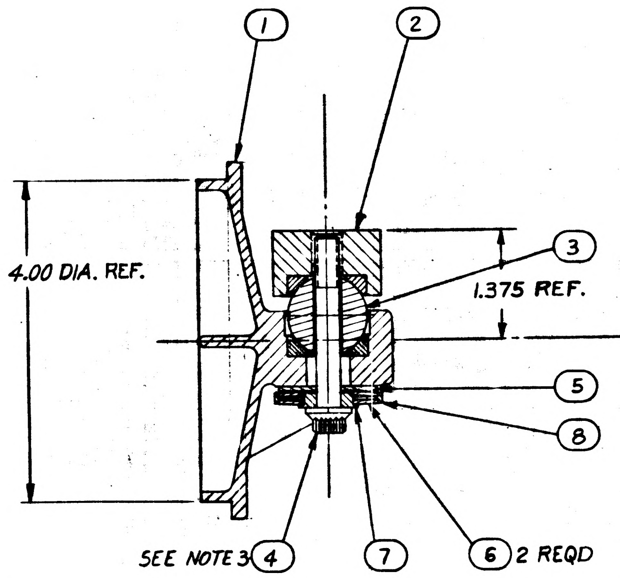
2899986 B

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
B		UPGRADED TO CLASS A PER TDRR 17018	—	VA2 65	8 a.

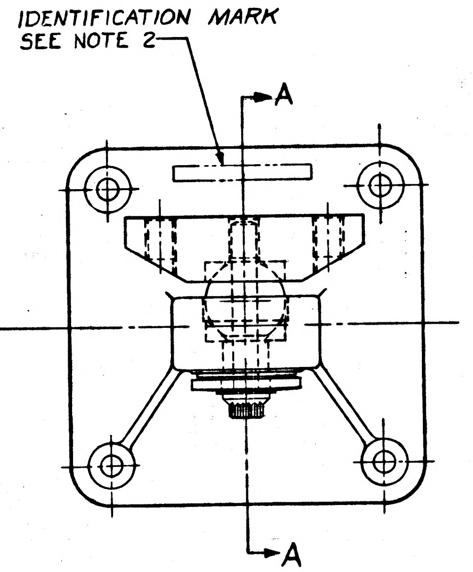
REVISIONS 14020

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY." WITH APPLICABLE DASH NUMBER AND REVISION LETTER PER ND1002019.
3. ITEM ④ TO BE TORQUED TO 70-80 IN. LBS, THEN BACKED OFF 70°±2° TO ALLOW CLEARANCE BETWEEN ITEM ⑤ AND ⑦.
4. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.





SECTION A-A



SEE NOTE 4

						ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				1		8	2899991	WASHER, SHOULDERED & RECESSED
				1		7	2899984-002	COLLAR, CENTERING
				2		6	2899979	WASHER-SPRING TENSION
				1		5	2899977-002	WASHER-FLAT, LUB.
				1		4	1010728-2	BOLT, EXTERNAL WRENCHING
				1		3	2899985	BALL, PRECISION
				1		2	2899970	MOUNT, NAV. BASE, FORWARD
				1		1	2899989	SUPPORT ASSY, FIXED
QUANTITY REQUIRED				011	EFFECTIVITY		LIST OF PARTS AND MATERIALS	

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2899950-011	2899950-011	011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bob Harding DATE 19 OCT 64
CHECKED C. Piojda 2 NOV 64
APPROVAL E. Lambert 2 NOV 64
APPROVAL 2 NOV 64
NASA APPROVAL 11-4-64
MIT APPROVAL 4 Nov 64

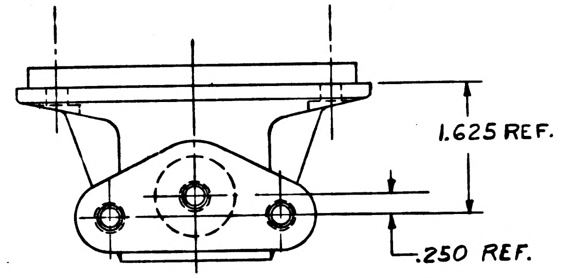
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

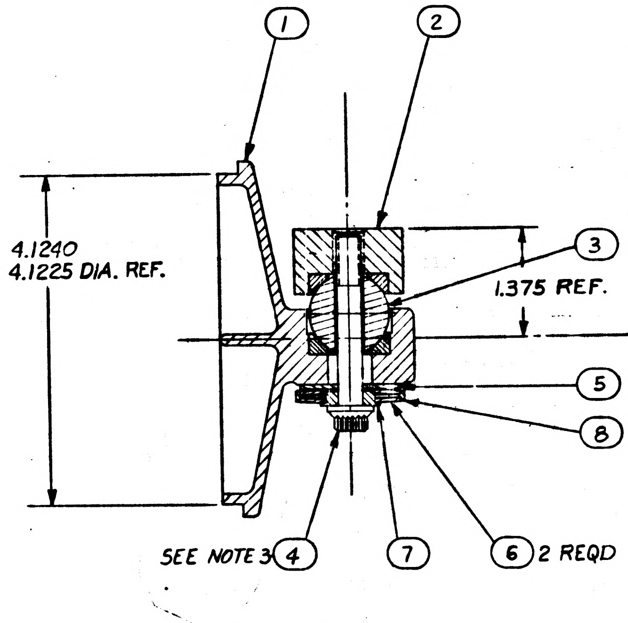
MOUNTING ASSEMBLY,
NAVIGATION BASE,
FIXED

CODE IDENT NO.
SIZE D
2899986
SCALE FULL
SHEET 1 OF 1

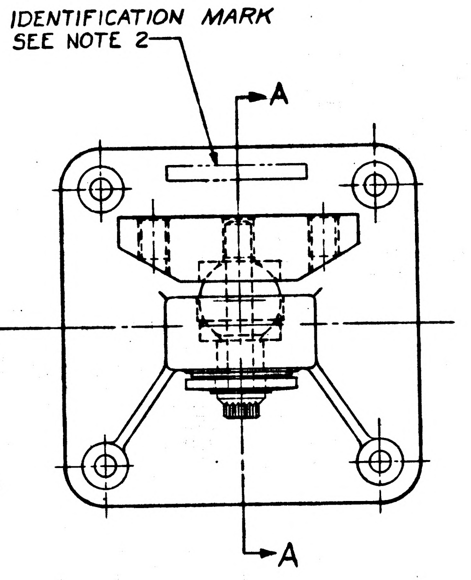
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

NOTES :
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY." WITH APPLICABLE DASH NUMBER AND REVISION LETTER PER ND1002019.
3. ITEM ④ TO BE TORQUED TO 70-80 IN. LBS, THEN BACKED OFF 70° REF. TO ALLOW CLEARANCE BETWEEN ITEM ⑤ AND ⑦.
4. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.





SECTION A-A



SEE NOTE 4

FOR INFORMATION ONLY
CLASS B RELEASE TDR No. 1402 DATE

QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			011				
			1		8	2899991	WASHER, SHOULDERED & RECESSED
			1		7	2899984-002	COLLAR, CENTERING
			2		6	2899979	WASHER-SPRING TENSION
			1		5	2899977-002	WASHER-FLAT, LUB.
			1		4	1010732-36	BOLT, EXTERNAL WRENCHING
			1		3	2899985	BALL, PRECISION
			1		2	2899970	MOUNT, NAV. BASE, FORWARD
			1		1	2899989	SUPPORT ASSY, FIXED

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2899950-011	2899950-011	011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 19 OCT 64
CHECKED C. Pigoda 2 NOV 64
APPROVAL E. Lemkent 2 NOV 64
APPROVAL 2 NOV 64
NASA APPROVAL W. J. Rhine 11-4-64
MIT APPROVAL R. W. Gras 4 Nov 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MOUNTING ASSEMBLY,
NAVIGATION BASE,
FIXED

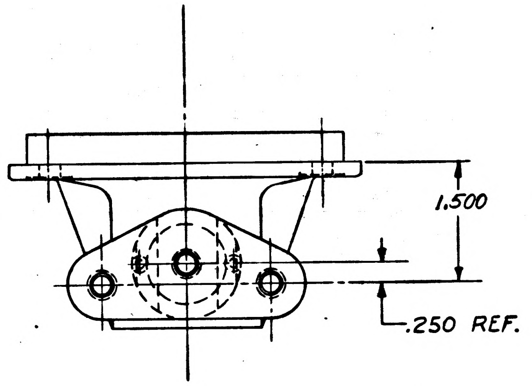
CODE IDENT NO.
SIZE D
2899986
SCALE FULL
SHEET 1 OF 1

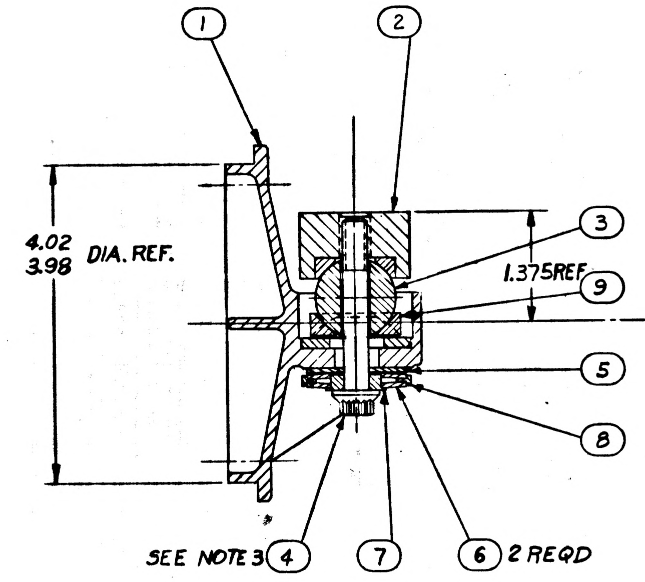
2899987 B

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
		REVISIONS 14020			
B		UPGRADED TO CLASS A PER TDRR 17021		MAR 65	

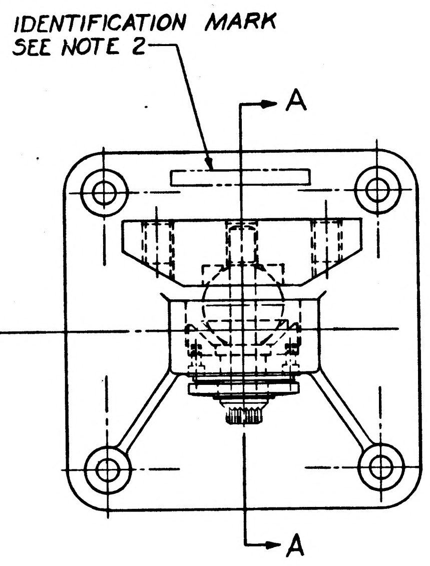
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY." WITH APPLICABLE DASH NUMBER AND REVISION LETTER PER ND1002019.
3. ITEM ④ TO BE TORQUED TO 70-80 IN. LBS., THEN BACKED OFF 70° ± 2° TO ALLOW CLEARANCE BETWEEN ITEM ⑤ AND ⑦.
4. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.





SECTION A-A



SEE NOTE 4

			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			1		9	2899971	BALL MOUNT, LINE
			1		8	2899991	WASHER, SHOULDERED & RECESSED
			1		7	2899984-002	COLLAR, CENTERING
			2		6	2899979	WASHER - SPRING TENSION
			1		5	2899977-002	WASHER - FLAT, LUBRICATED
			1		4	1010728-2	BOLT, TENSION, EXT. WRENCHING
			1		3	2899985	BALL, PRECISION
			1		2	2899970	MOUNT, NAV. BASE, FORWARD
			1		1	2899990	SUPPORT ASSY, LINE
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2899950-011	2899950-011	011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 20 OCT 64
CHECKED C. Pjojda 2 NOV 64
APPROVAL 2 NOV 64
APPROVAL 2 NOV 64
NASA APPROVAL 11-4-64
MIT APPROVAL 4 Nov 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

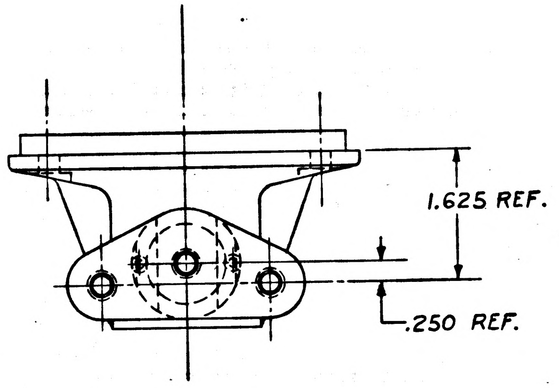
MOUNTING ASSEMBLY, NAVIGATION BASE, LINE

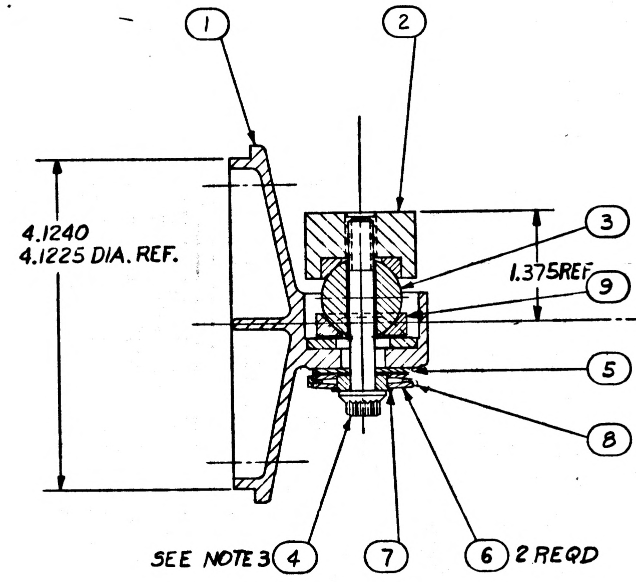
CODE IDENT NO.
SIZE D
2899987
SCALE FULL
SHEET 1 OF 1

2899987

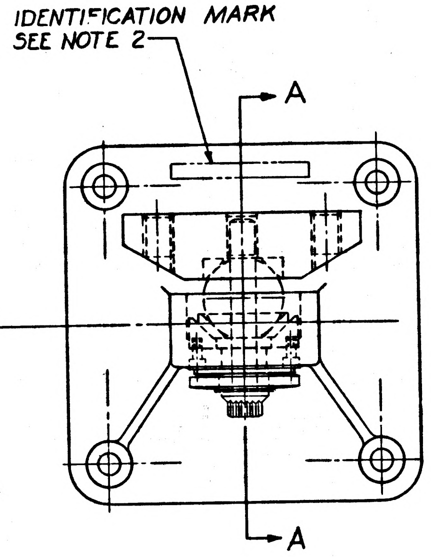
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
		REVISIONS			

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY." WITH APPLICABLE DASH NUMBER AND REVISION LETTER PER ND1002019.
3. ITEM ④ TO BE TORQUED TO 70-80 IN. LBS., THEN BACKED OFF 70° REF. TO ALLOW CLEARANCE BETWEEN ITEM ⑤ AND ⑦.
4. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.





SECTION A-A



SEE NOTE 4

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 DATE

QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			011				
			1		9	2899971	BALL MOUNT, LINE
			1		8	2899991	WASHER, SHOULDERED & RECESSED
			1		7	2899984-002	COLLAR, CENTERING
			2		6	2899979	WASHER-SPRING TENSION
			1		5	2899977-002	WASHER-FLAT, LUBRICATED
			1		4	1010732-36	BOLT, TENSION, EXT. WRENCHING
			1		3	2899985	BALL, PRECISION
			1		2	2899970	MOUNT, NAV. BASE, FORWARD
			1		1	2899990	SUPPORT ASSY, LINE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2899950-011	2899950-011	011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS ± —
ANGLES ± —

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN DATE 20 OCT 64
CHECKED C. Pjojda 2 NOV 64
APPROVAL 2 NOV 64
APPROVAL 2 NOV 64
NASA APPROVAL W. J. 11-4-64
R.W. MIT APPROVAL 4 Nov 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MOUNTING ASSEMBLY,
NAVIGATION BASE,
LINE

CODE IDENT NO.
SIZE D
2899987

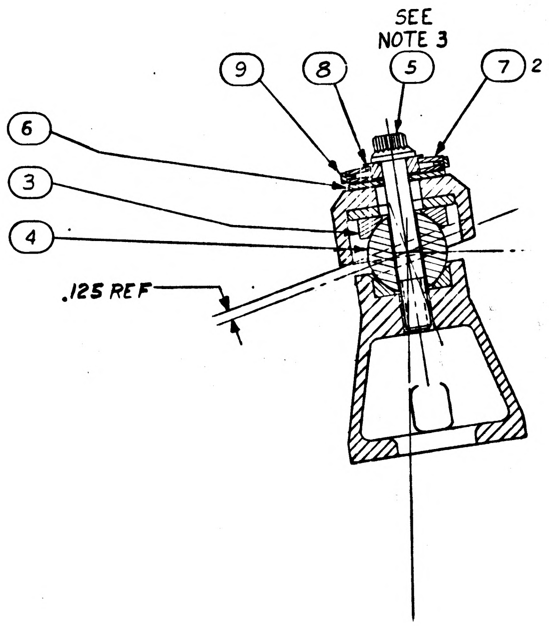
SCALE FULL
SHEET 1 OF 1

MIL 10760—P

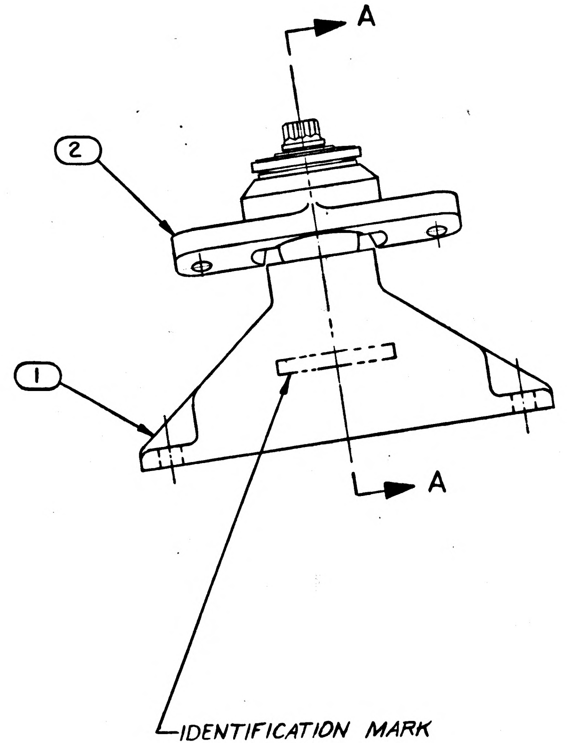
REVISIONS 14020					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
B		UPGRADED TO CLASS A PER TDRR 17011		1 MAR 65	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY." WITH APPLICABLE DASH NUMBER AND REVISION LETTER PER ND1002019.
3. ITEM ⑤ TO BE TORQUED TO 70-80 IN. LB., THEN BACKED OFF 70° ± 2° TO ALLOW CLEARANCE BETWEEN ITEM ⑥ AND ⑧.
4. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.



SECTION A-A



SEE NOTE 4

QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
1		9	2899991	WASHER, SHOULDERED & RECESSED
1		8	2899984-002	COLLAR, CENTERING
2		7	2899979	WASHER, SPRING TENSION
1		6	2899977-002	WASHER, FLAT, LUBRICATED
1		5	1010728-2	BOLT, EXTERNAL WRENCHING
1		4	2899985	BALL, PRECISION
1		3	2899980	BALL MOUNT, PLANE
1		2	2899993	MOUNT, NAV. BASE, REAR
1		1	2899994	SUPPORT ASSY, PLANE

LIST OF PARTS AND MATERIALS

APPLICATION: NEXT ASSY	APPLICATION: USED ON	APPLICABLE DASH NO.
2899950-011	2899950-011	011

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 21 OCT 64
CHECKED C. Pizzida 2 NOV 64
APPROVAL E. 2 NOV 64
APPROVAL 2 NOV 64
NASA APPROVAL W. J. 11-4-64
MIT APPROVAL R. H. 4 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

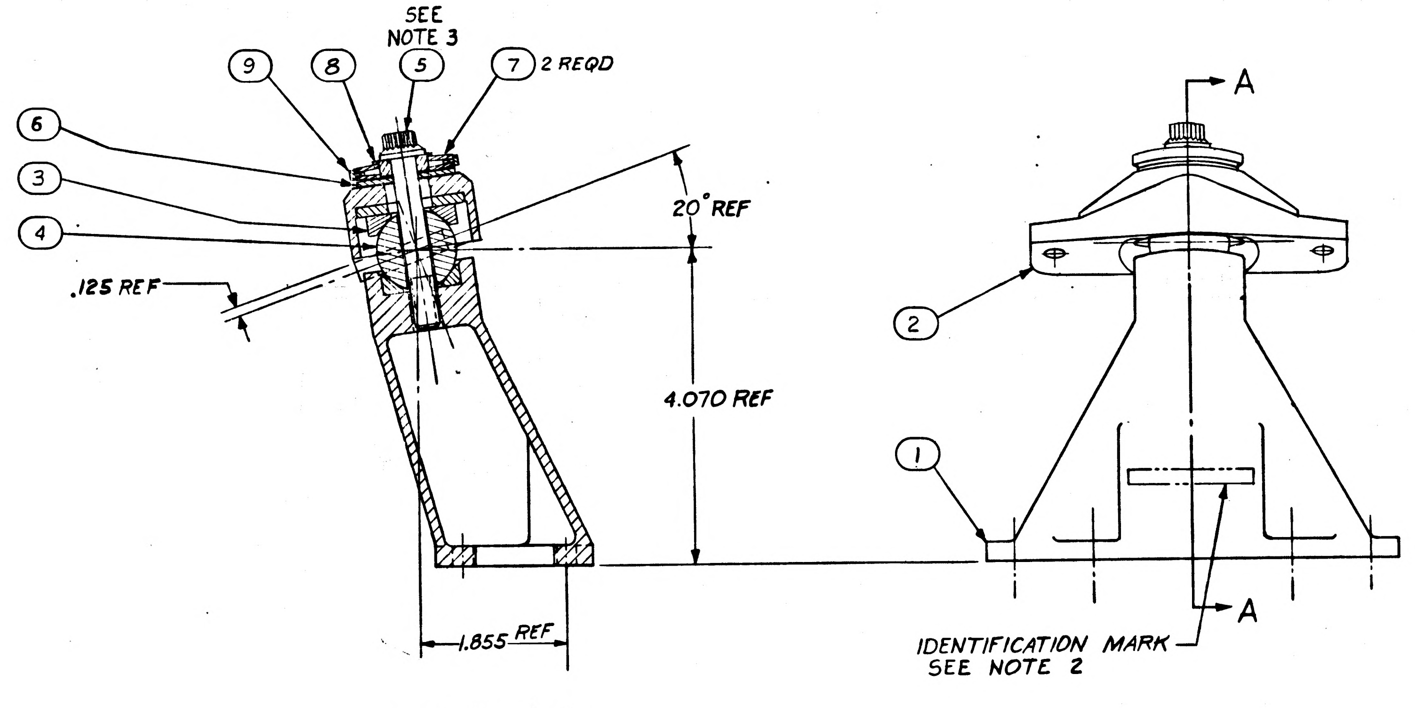
MOUNTING ASSEMBLY,
NAVIGATION BASE,
PLANE

CODE IDENT NO. SIZE D 2899988
SCALE FULL SHEET 1 OF 1

2899988

SYM	ZONE	REVISIONS DESCRIPTION	CHG NO.	DATE	APPD.

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER AND REVISION LETTER PER ND1002019.
3. ITEM ⑤ TO BE TORQUED TO 70-80 IN. LB., THEN BACKED OFF 70° REF. TO ALLOW CLEARANCE BETWEEN ITEM ⑥ AND ⑧.
4. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.



SECTION A-A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 1402 DATE

SEE NOTE 4

QUANTITY REQUIRED				EFFEC-TIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			011				
			1		9	2899991	WASHER, SHOULDERED & RECESSED
			1		8	2899984-002	COLLAR, CENTERING
			2		7	2899979	WASHER, SPRING TENSION
			1		6	2899977-002	WASHER, FLAT, LUBRICATED
			1		5	1010732-36	BOLT, EXTERNAL WRENCHING
			1		4	2899985	BALL, PRECISION
			1		3	2899980	BALL MOUNT, PLANE
			1		2	2899969	MOUNT, NAV. BASE, REAR
			1		1	2899978	SUPPORT ASSY, PLANE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2899950-011	2899950-011	011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — DECIMALS + — ANGLES + —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN [illegible] DATE 21 OCT 64
CHECKED C. Pizzida 2 NOV 64
APPROVAL E. [illegible] 2 NOV 64
APPROVAL [illegible] 2 NOV 64
NASA APPROVAL W. J. [illegible] 11-4-64
MIT APPROVAL R. H. [illegible] 4 Nov 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MOUNTING ASSEMBLY,
NAVIGATION BASE,
PLANE

CODE IDENT NO. SIZE D 2899988
SCALE FULL SHEET 1 OF 1

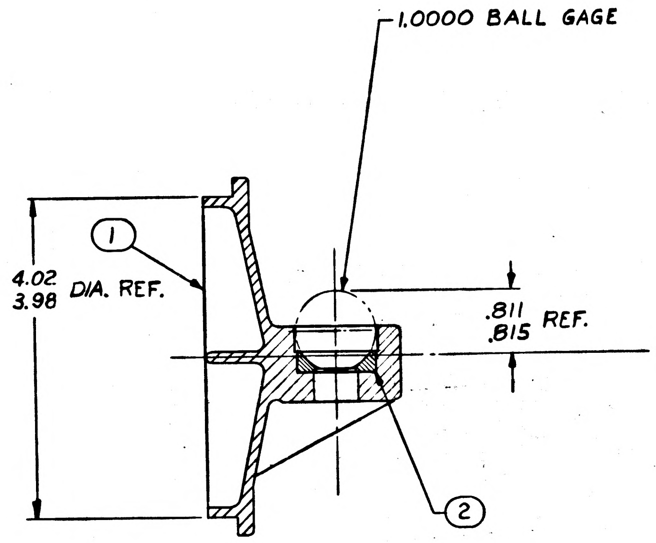
MIL 10780-F

INCHES 0 2

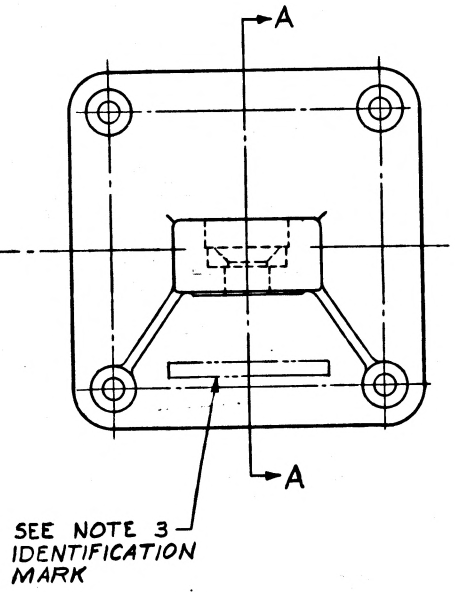
B 2899989

REVISIONS 14020					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
B		UPGRADED TO CLASS A PER TDRR 17012		MAR 65	S.a. / JW

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ITEM ② TO BE SUBJECTED TO 500-525 POUNDS AXIAL PRELOAD AFTER INSTALLATION.
3. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND1002019.



SECTION A-A



2	1	2899965	INSERT, BALL MOUNT,
1	1	2899975	SUPPORT, BALL MOUNT, UPPER LEFT
ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2899986-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — − | DECIMALS + — − | ANGLES + — −
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bob Lorkey DATE 13 OCT 64
CHECKED C. Piojda 2 NOV 64
APPROVAL E. Lemkau 2 NOV 64
APPROVAL 2 NOV 64
NASA APPROVAL W. J. Rhine 11-4-64
R.W. Bass
MIT APPROVAL W Ruyper 4 Nov 64

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SUPPORT ASSEMBLY,
FIXED -
(INSEPARABLE)

CODE IDENT NO. | SIZE D | 2899989
SCALE FULL | SHEET 1 OF 1

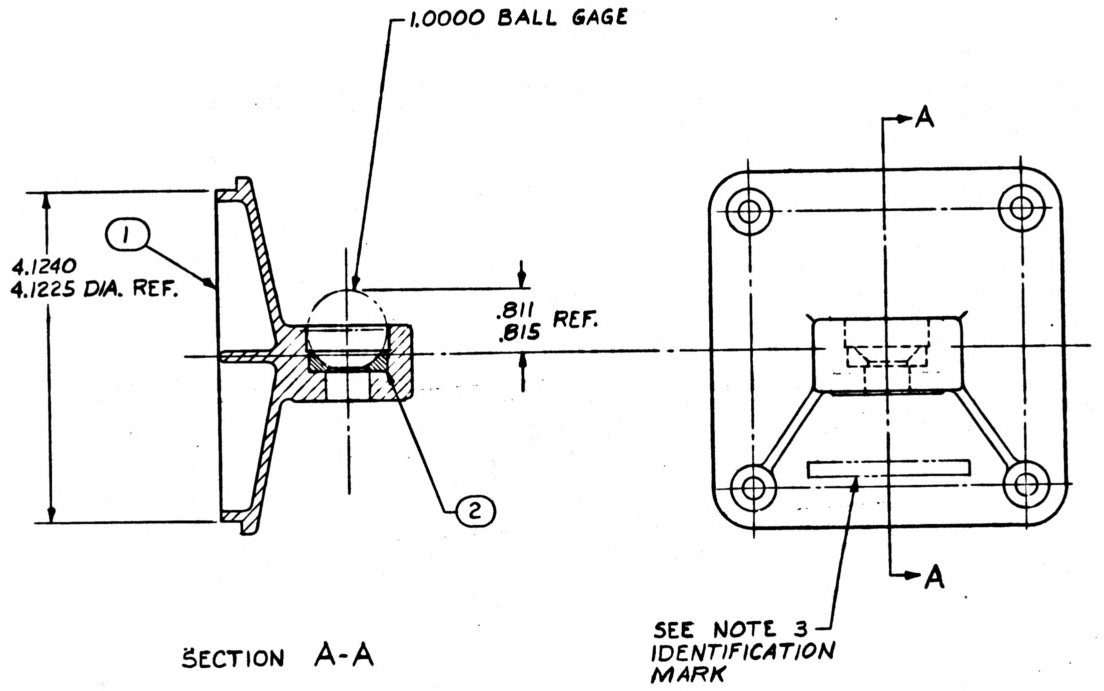
MASTER

2899989

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ITEM ② TO BE SUBJECTED TO 500-525 POUNDS AXIAL PRELOAD AFTER INSTALLATION.
3. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND1002019.



SECTION A-A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 **DATE**

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	1	2899965	INSERT, BALL MOUNT,
1	1	2899975	SUPPORT, BALL MOUNT, UPPER LEFT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2899986-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 13 OCT 64
CHECKED C. Piojda 2 NOV 64
APPROVAL E. Lemkent 2 NOV 64
APPROVAL 2 NOV 64
NASA APPROVAL W. J. 11-4-64
MIT APPROVAL R. W. Bass W

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SUPPORT ASSEMBLY,
FIXED -
(INSEPARABLE)

CODE IDENT NO.
SIZE D
2899989
SCALE FULL
SHEET 1 OF 1

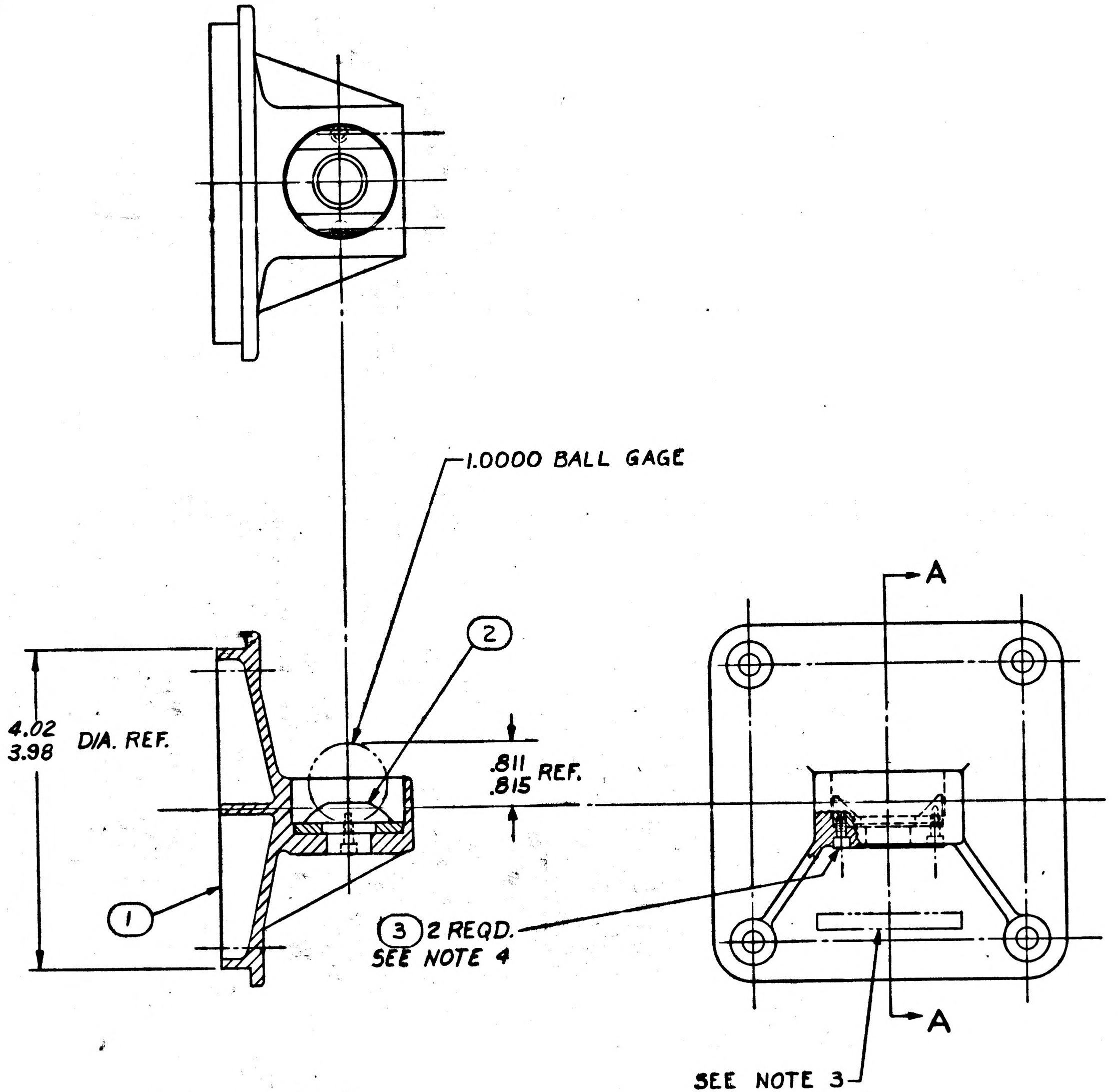
MASTER

2899990 B

REVISIONS 14020					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.
B		UPGRADED TO CLASS A PER TDRR 17017		4 MAR 65	S.A./

NOTES :

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ITEM ② TO BE SUBJECTED TO 500-525 POUNDS AXIAL PRELOAD AFTER INSTALLATION.
3. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.
4. TORQUE ITEM ③ TO 6.4 - 7.0 POUND INCHES.



SECTION A-A

3	2	1001488-2	SCREW, SOCKET HEAD, CAP
2	1	2899976	INSERT, LINE BASE
1	1	2899974	SUPPORT, BALL MOUNT, UPPER RIGHT
ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2899987-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9 - 497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN [illegible] DATE 14 OCT 64
CHECKED C. Pijida 2 NOV 64
APPROVAL E. Lembert 2 NOV 64
APPROVAL [illegible] 2 NOV 64
NASA APPROVAL W. J. [illegible] 11-4-64
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SUPPORT ASSEMBLY, LINE (INSEPARABLE)

CODE IDENT NO.
SIZE D
2899990
SCALE FULL
SHEET 1 OF 1

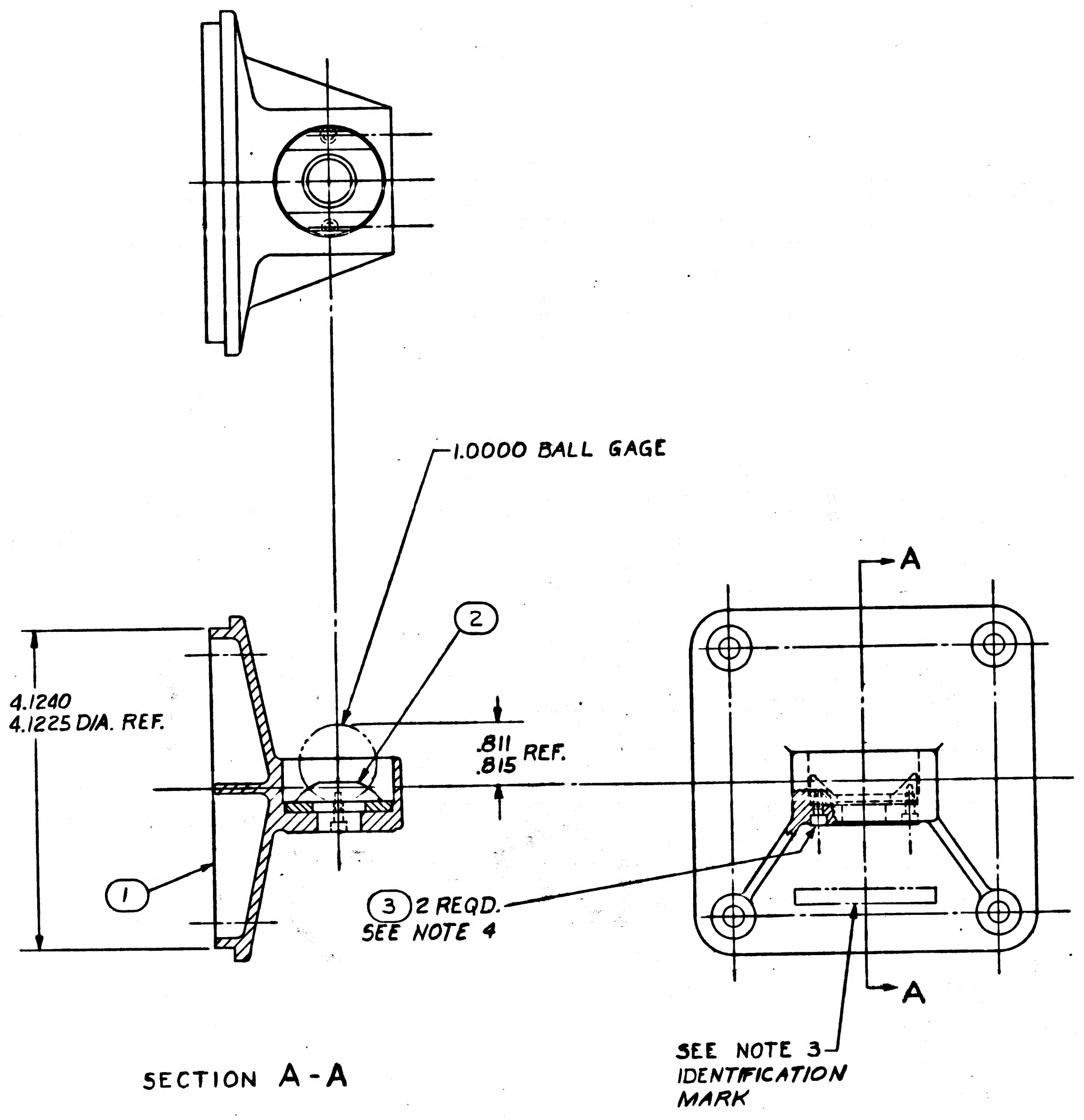
MASTER

2899990

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

NOTES :
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ITEM ② TO BE SUBJECTED TO 500-525 POUNDS AXIAL PRELOAD AFTER INSTALLATION.
3. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.
4. TORQUE ITEM ③ TO 6.4 - 7.0 POUND INCHES.



FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 **DATE**

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
3	2	1001488-2	SCREW, SOCKET HEAD, CAP
2	1	2899976	INSERT, LINE BASE
1	1	2899974	SUPPORT, BALL MOUNT, UPPER RIGHT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2899987-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9 - 497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 14 OCT 64
CHECKED C. Pizida 2 NOV 64
APPROVAL 2 NOV 64
APPROVAL 2 NOV 64
NASA APPROVAL 11-4-64
MIT APPROVAL 4/16/65

~~MANNED~~ SPACECRAFT CENTER
HOUSTON, TEXAS

SUPPORT ASSEMBLY, LINE
(INSEPARABLE)

CODE IDENT NO. SIZE D 2899990
SCALE FULL SHEET 1 OF 1

MASTER

NOTE:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

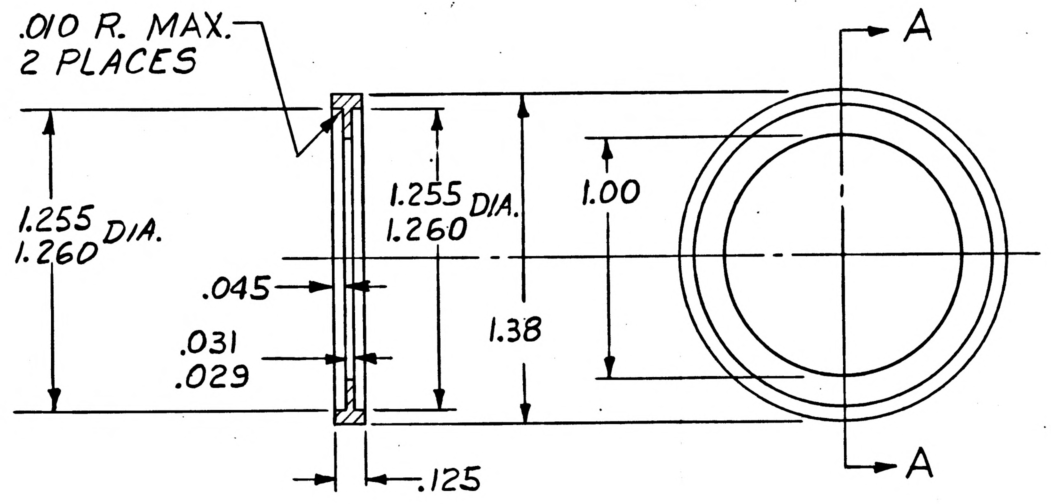
2. MATERIAL: STAINLESS STEEL PER AMS-5643, TYPE 17-4 PH (ES-2102).
3. HEAT TREAT PER MIL-H-6875, TYPE 17-4 PH, CONDITION H-900 (ES-2011-1).

4. UNLESS OTHERWISE SPECIFIED:
   a. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
   b. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
   c. MUST BE FREE FROM BURRS.

5. FINISH: PASSIVATE PER MIL-F-14072 (S1G-C) FINISH E-300 (ES-585).

6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.



SECTION A-A

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020. **DATE**

2899950-011	2899950-011	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + — − DECIMALS ±.005 ±.02 ANGLES ± 1°	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
2899988-011	2899950-011	DO NOT SCALE THIS DRAWING	ACSP PN	WASHER, SHOULDERED AND RECESSED
2899987-011	2899950-011	MATERIAL SEE NOTE 2	DRAWN DATE 16 OCT 64 CHECKED 3 NOV 64 APPROVAL 3 NOV 64 APPROVAL 3 NOV 64	CODE IDENT NO.
2899986-011	2899950-011	CONTRACT NAS 9-497	NASA APPROVAL 11-4-64 MIT APPROVAL 4 Nov 64	SIZE C 2899991
NEXT ASSY	USED ON			SCALE 2:1 SHEET 1 OF 1
APPLICATION				

Charleston 2 NOV 64

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		UPGRADED TO CLASS A PER TDRR 16951		1MAR 65	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

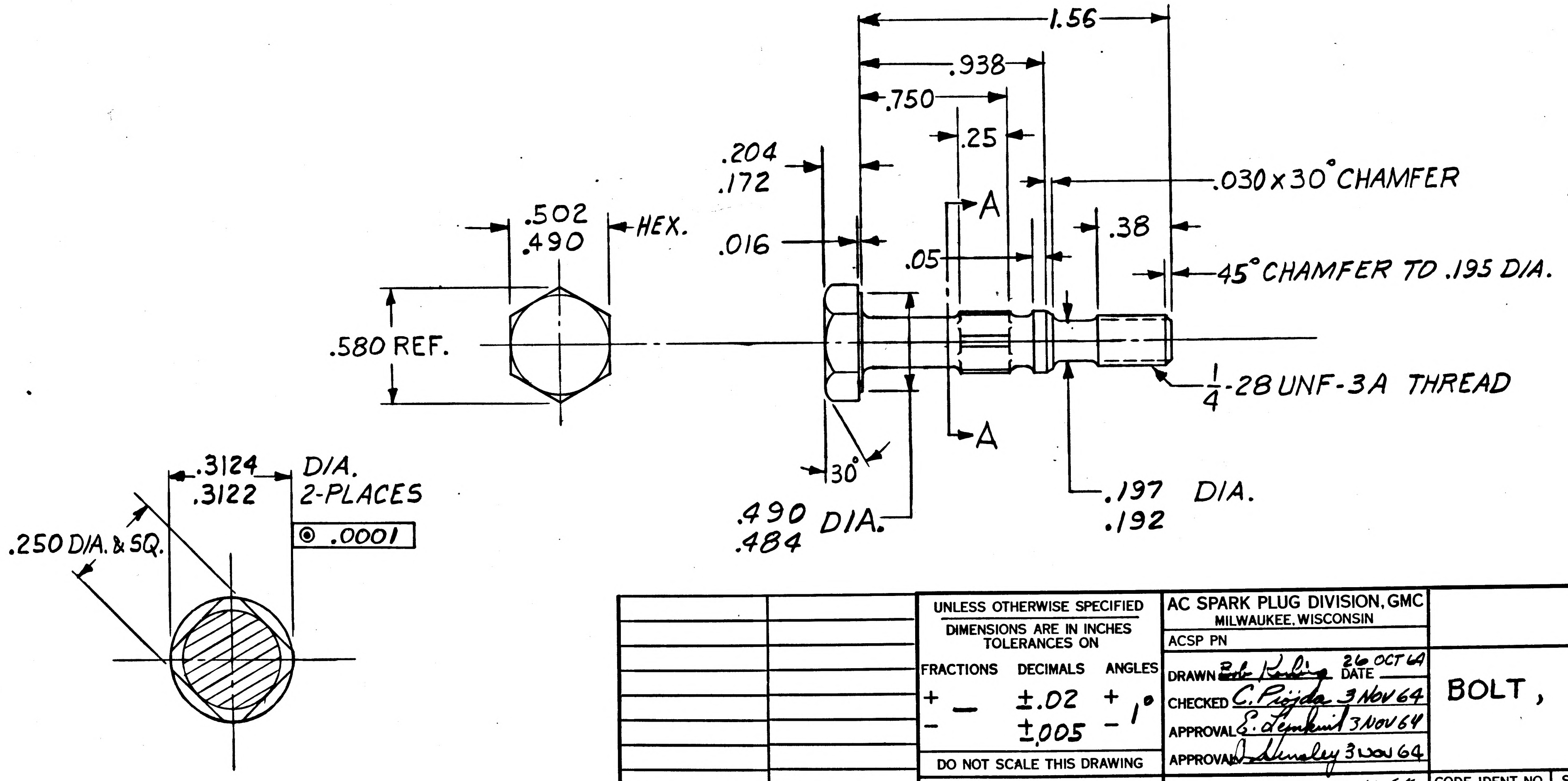
2. MATERIAL: TITANIUM ALLOY PER MIL-T-9047 CLASS 6 (4AL-4MN ALLOY).

3. UNLESS OTHERWISE SPECIFIED:
   a. ALL DIAMETERS OF BOLT TO BE CONCENTRIC WITHIN .005 DIA.
   b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
   c. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
   d. ALL FILLET RADII TO BE .040 .
4. MUST BE FREE FROM BURRS.

5. CENTERS ARE PERMITTED.

6. THREADS AND FILLET RADII TO BE 16√.

7. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND1002019.
8. ANGLE OF UNDERSIDE OF HEAD TO SHANK TO BE 90°0' TO 90°30'.


1.56
.938
.750
.25
.204
.172
.016
.030 x 30° CHAMFER
A
.38
.502
.490
HEX.
.05
45° CHAMFER TO .195 DIA.
.580 REF.
$\frac{1}{4}$-28 UNF-3A THREAD
A
30°
.490
.484
DIA.
.197 DIA.
.192
.3124
.3122
DIA.
2-PLACES
⊚ .0001
.250 DIA. & SQ.

SECTION A-A
SCALE 4:1

2899950-011	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ — −	±.02 ±.005	+ 1° −

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN Bob Kosling DATE 26 OCT 64
CHECKED C. Pijda 3 NOV 64
APPROVAL E. Lemkuil 3 NOV 64
APPROVAL Dunaley 3 NOV 64
NASA APPROVAL 11-4-64
R.H. Geas
MIT APPROVAL 4 Nov 64
Charleston 2 NOV. 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BOLT, IMU MOUNT

CODE IDENT NO. | SIZE C | 2899992

SCALE 2:1 | SHEET 1 OF 1

MIL 1077C-P

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. MATERIAL: TITANIUM ALLOY PER MIL-T-9047 CLASS 6 (4AL-4MN ALLOY).

3. UNLESS OTHERWISE SPECIFIED:
  a. ALL DIAMETERS OF BOLT TO BE CONCENTRIC WITHIN .005 DIA.
  b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
  c. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
  d. ALL FILLET RADII TO BE .040 .
4. MUST BE FREE FROM BURRS.

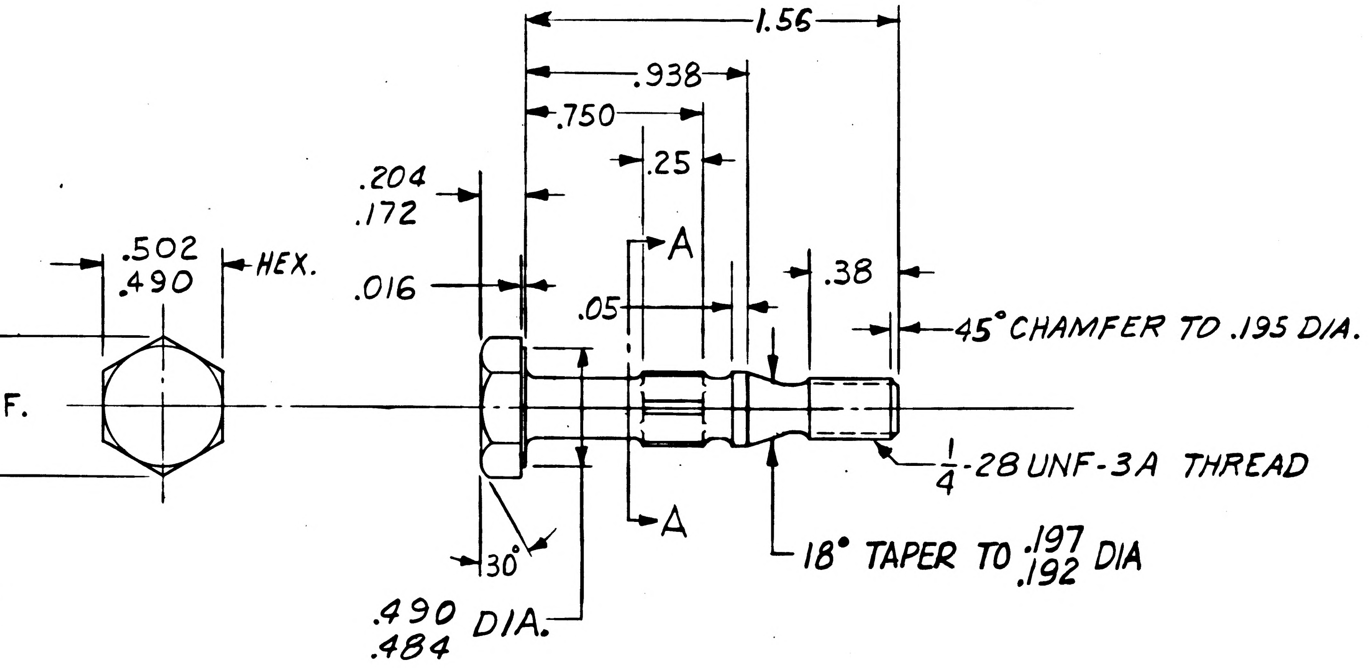
5. CENTERS ARE PERMITTED.

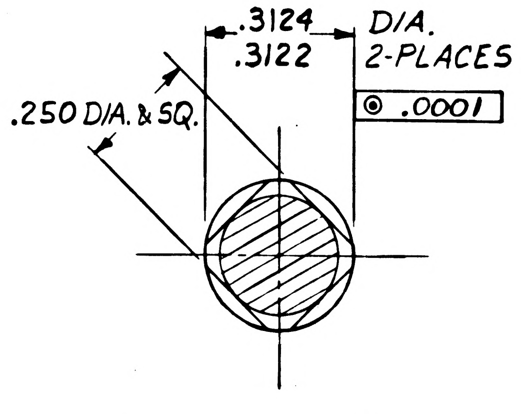
6. THREADS AND FILLET RADII TO BE 16√.

7. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.
8. ANGLE OF UNDERSIDE OF HEAD TO SHANK TO BE 90°0' TO 90°30'.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		UPGRADED TO CLASS A PER TDRR 16951		1 MAR 65	S.G.
B		REVISED PER TDRR 19949		14 JUN 65	RJU


1.56
.938
.750
.25
.204
.172
.502
.490
HEX.
.016
A
.05
.38
45° CHAMFER TO .195 DIA.
.580 REF.
1/4-28 UNF-3A THREAD
A
30°
18° TAPER TO .197/.192 DIA
.490
.484 DIA.


.3124
.3122
DIA.
2-PLACES
◎ .0001
.250 DIA. & SQ.

SECTION A-A
SCALE 4:1

2899950-011	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
± —	±.02 ±.005	± 1°

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

CONTRACT NAS 9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE, MASS
DWG. NO. CONTRACT

DRAWN Bob Kerling DATE 26 OCT 64
CHECKED C. Pirjda 3 NOV 64
APPROVAL E. Lemkuil 3 NOV 64
APPROVAL J. Hensley 3 NOV 64
NASA APPROVAL 11-4-64
R.H. Geas
MIT APPROVAL 4 NOV 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BOLT, IMU MOUNT

CODE IDENT NO.	SIZE	
80230	C	2899992
SCALE 2:1		SHEET 1 OF 1

Charleston 2 NOV. 64

2899992 | B

MIL 1077C—P

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. MATERIAL: TITANIUM ALLOY PER MIL-T-9047 CLASS 6 (4AL-4MN ALLOY).

3. UNLESS OTHERWISE SPECIFIED:
a. ALL DIAMETERS OF BOLT TO BE CONCENTRIC WITHIN .005 DIA.
b. SURFACE ROUGHNESS MUST NOT EXCEED 63√.
c. ALL CORNERS MUST BE .005 TO .015 R. OR CHAMFER.
d. ALL FILLET RADII TO BE .040 .
4. MUST BE FREE FROM BURRS.

5. CENTERS ARE PERMITTED.

6. THREADS AND FILLET RADII TO BE 16√.

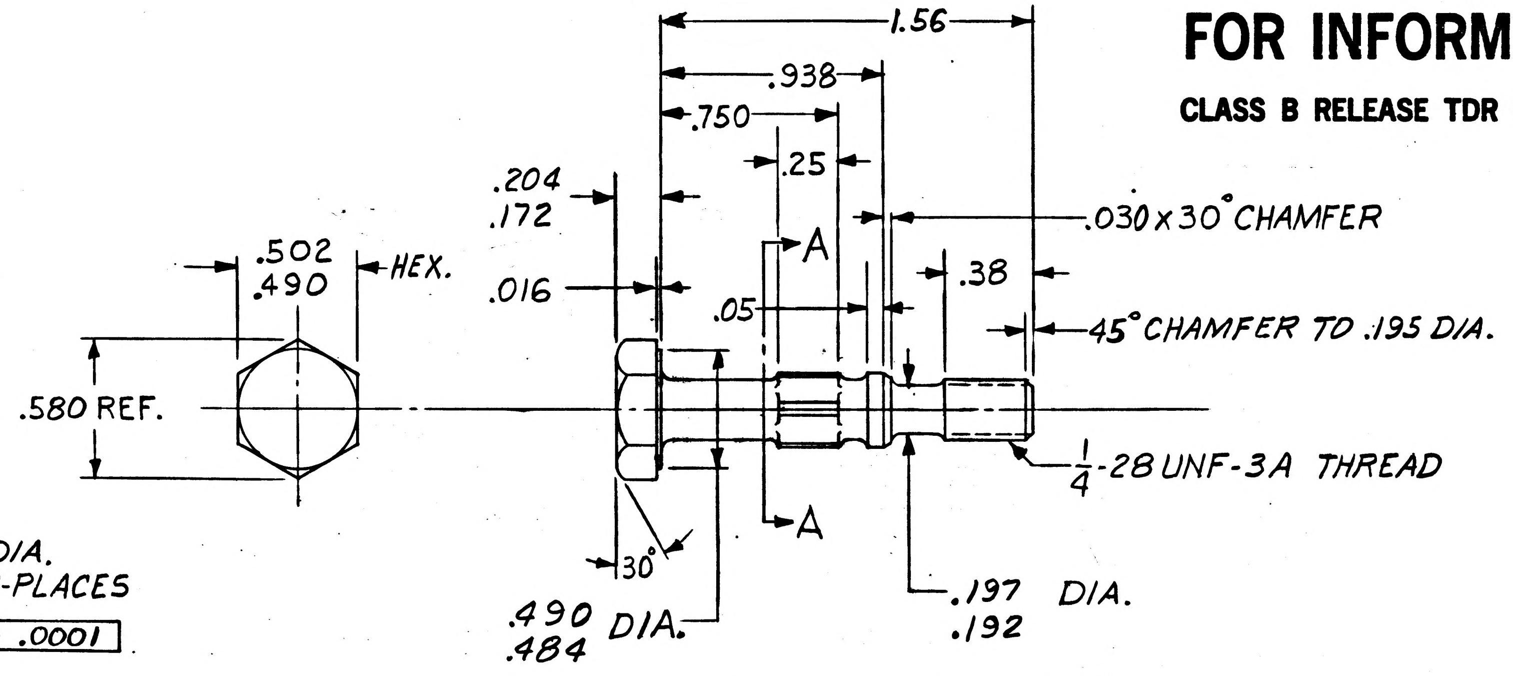
7. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND 1002019.

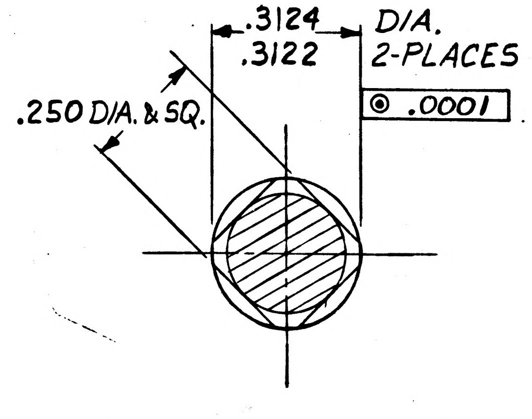
8. ANGLE OF UNDERSIDE OF HEAD TO SHANK TO BE 90°0' TO 90°30'.

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 14020 **DATE**


1.56
.938
.750
.25
.204
.172
.030 x 30° CHAMFER
.502
.490
HEX.
.016
A
.05
.38
45° CHAMFER TO .195 DIA.
.580 REF.
1/4-28 UNF-3A THREAD
A
30°
.490
.484
DIA.
.197
.192
DIA.


.3124
.3122
DIA.
2-PLACES
◎ .0001
.250 DIA. & SQ.

SECTION A-A
SCALE 4:1

2899950-011	2899950-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — −; DECIMALS ±.02 ±.005; ANGLES +1° −
DO NOT SCALE THIS DRAWING
MATERIAL
SEE NOTE 2
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bob Kosling DATE 26 OCT 64
CHECKED C. Pijda 3 NOV 64
APPROVAL E. Lempkuil 3 NOV 64
APPROVAL D. Dimsley 3 NOV 64
NASA APPROVAL 11-4-64
R. W. Gass
MIT APPROVAL 4 Nov 64
Charleston 2 NOV. 64

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BOLT, IMU MOUNT

CODE IDENT NO.
SIZE C
2899992
SCALE 2:1
SHEET 1 OF 1

MIL 1077C—P

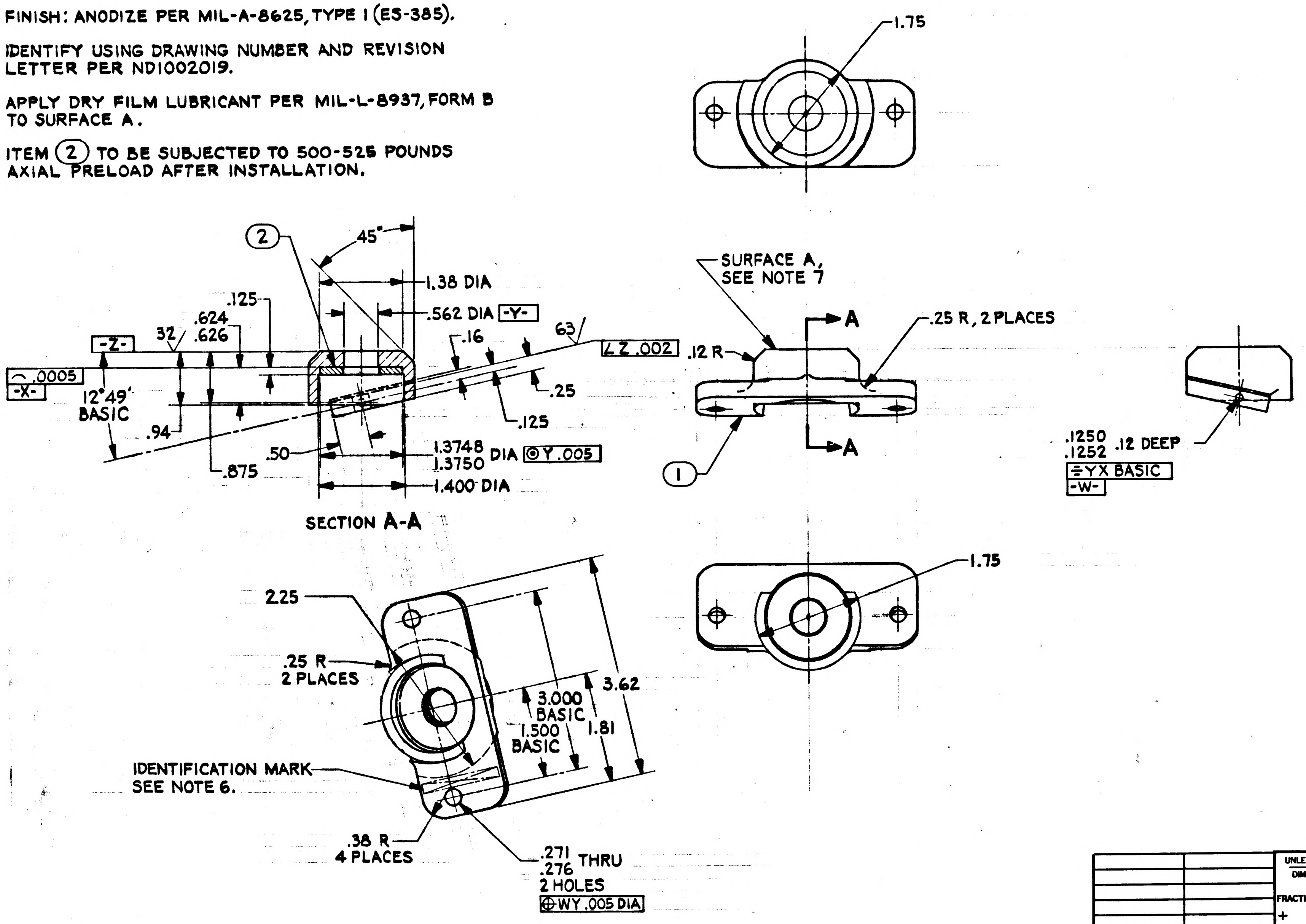
INCHES
0 1 2
PHOTOGRAPHIC SCALE ONLY

2899993 A

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		UPGRADED TO CLASS A PER TDRR 16951		1 MAR 65	L. A. Jw

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PRECISION CAST USING ALUMINUM ALLOY QQ-A-601, COMPOSITION 220, TEMPER T4.
3. UNLESS OTHERWISE SPECIFIED:
   a. SURFACE ROUGHNESS MUST NOT EXCEED 125√.
   b. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
4. MUST BE FREE FROM BURRS.
5. FINISH: ANODIZE PER MIL-A-8625, TYPE I (ES-385).
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND1002019.
7. APPLY DRY FILM LUBRICANT PER MIL-L-8937, FORM B TO SURFACE A.
8. ITEM ② TO BE SUBJECTED TO 500-525 POUNDS AXIAL PRELOAD AFTER INSTALLATION.


1.75
SURFACE A, SEE NOTE 7
A
A
.12 R
.25 R, 2 PLACES
①
②
45°
1.38 DIA
.562 DIA -Y-
.125
.624
.626
32√
-Z-
.16
63√
∠ Z .002
⌒ .0005 -X-
12°49' BASIC
.94
.25
.125
.50
.875
1.3748
1.3750 DIA ◎ Y .005
1.400 DIA
SECTION A-A
.1250
.1252 .12 DEEP
⌯ YX BASIC -W-
1.75
2.25
.25 R 2 PLACES
3.000 BASIC
1.500 BASIC
3.62
1.81
IDENTIFICATION MARK SEE NOTE 6.
.38 R 4 PLACES
.271
.276 THRU 2 HOLES
⊕ WY .005 DIA

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	1	2899967	INSERT, PLANE BASE
1	1	2899993-001	MOUNT, NAV BASE, REAR

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2899988-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+	±.005	+ 1°
−	±.02	−

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2.

CONTRACT NAS9-497

~~AC SPARK PLUG DIVISION, GMC~~
MILWAUKEE, WISCONSIN
ACSP PN

DRAWN C. Long DATE 22 JAN 65
CHECKED 2 FEB 65
APPROVAL 2 FEB 65
APPROVAL 2 FEB 65
NASA APPROVAL 2-9-65 W. J. Rhine
R. W. Bass 2/4/65
MIT APPROVAL 9 Feb 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MOUNT, NAVIGATION BASE, REAR
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. | SIZE D | 2899993

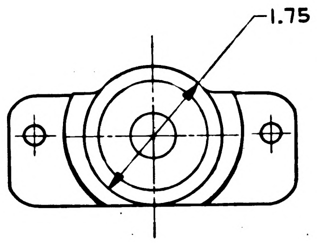
SCALE FULL | SHEET 1 OF 1

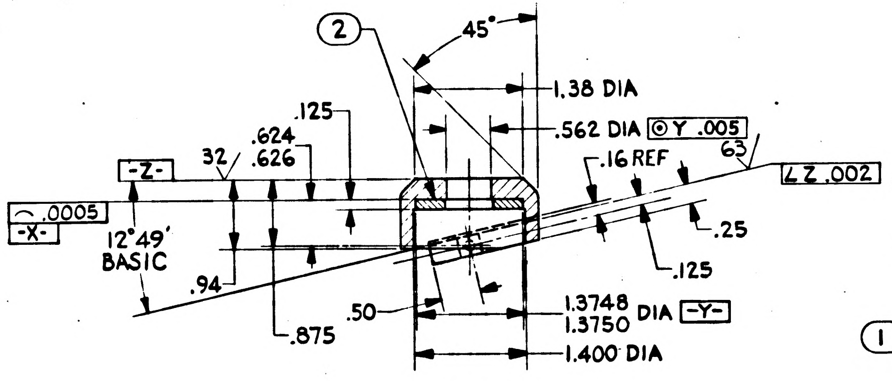
Charles Cox 2 FEB 65

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
A		UPGRADED TO CLASS A PER TDRR 16951		1 MAR 65	
B		REVISED PER TDRR 21177		2 AUG 65	WJR

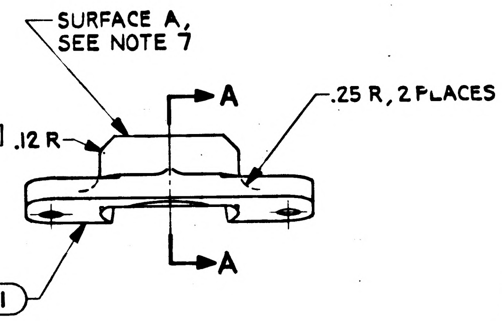
NOTES:

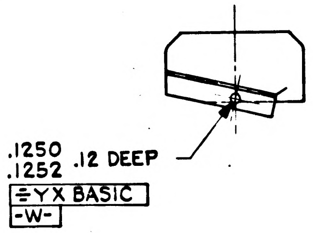
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PRECISION CAST USING ALUMINUM ALLOY QQ-A-601, COMPOSITION 220, TEMPER T4.
3. UNLESS OTHERWISE SPECIFIED:
   a. SURFACE ROUGHNESS MUST NOT EXCEED 125/.
   b. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
4. MUST BE FREE FROM BURRS.
5. FINISH: ANODIZE PER MIL-A-8625, TYPE I (ES-385).
6. IDENTIFY USING DRAWING NUMBER PER ND1002019
7. APPLY DRY FILM LUBRICANT PER MIL-L-8937, FORM B TO SURFACE A.
8. ITEM ② TO BE SUBJECTED TO 500-525 POUNDS AXIAL PRELOAD AFTER INSTALLATION.

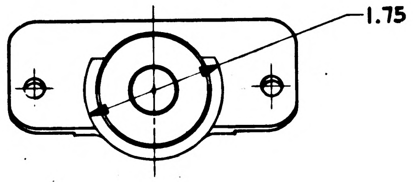


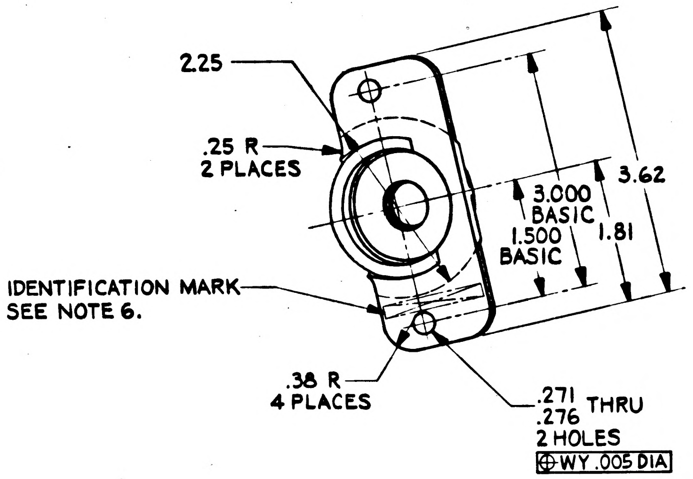

②
45°
1.38 DIA
.562 DIA ⊚Y .005
63
.16 REF
∠Z .002
.125
.624
.626
32
-Z-
⌒ .0005
-X-
12°49' BASIC
.94
.875
.50
.25
.125
1.3748
1.3750 DIA -Y-
1.400 DIA

SECTION A-A


SURFACE A, SEE NOTE 7
.12 R
A
A
.25 R, 2 PLACES
①


.1250
.1252 .12 DEEP
⌯YX BASIC
-W-




2.25
.25 R 2 PLACES
3.000 BASIC
1.500 BASIC
3.62
1.81
IDENTIFICATION MARK SEE NOTE 6.
.38 R 4 PLACES
.271
.276 THRU
2 HOLES
⊕WY .005 DIA

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	1	2899967	INSERT, PLANE BASE
1	1	2899993-001	MOUNT, NAV BASE, REAR

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2899988-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+	±.005	+ 1°
−	±.02	−

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2.

CONTRACT NAS9-497

~~AC SPARK PLUG DIVISION, GMC~~
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN C. Long DATE 22 JAN 65
CHECKED 2 FEB 65
APPROVAL 2 FEB 65
APPROVAL 2 FEB 65
NASA APPROVAL W J Rh 2-9-65
MIT APPROVAL 2/9/65 9 Feb 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MOUNT, NAVIGATION BASE, REAR
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. SIZE D 2899993

SCALE FULL SHEET 1 OF 1

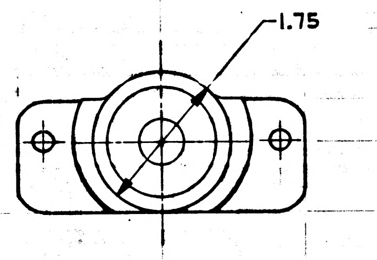
2 FEB 65

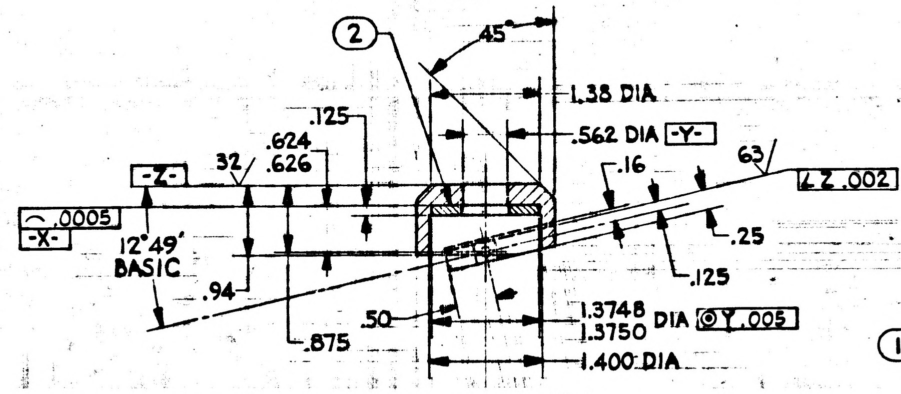
2899993

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

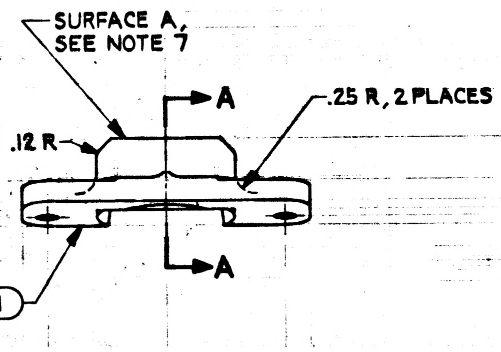
NOTES:

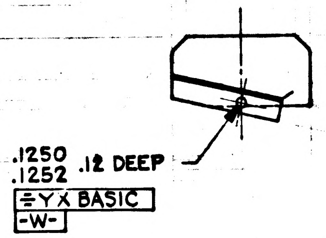
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PRECISION CAST USING ALUMINUM ALLOY QQ-A-601, COMPOSITION 220, TEMPER T4.
3. UNLESS OTHERWISE SPECIFIED:
   a. SURFACE ROUGHNESS MUST NOT EXCEED 125/.
   b. ALL CORNERS TO BE .005 TO .015 R OR CHAMFER.
4. MUST BE FREE FROM BURRS.
5. FINISH: ANODIZE PER MIL-A-8625, TYPE I (ES-385).
6. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND1002019.
7. APPLY DRY FILM LUBRICANT PER MIL-L-8937, FORM B TO SURFACE A.
8. ITEM ② TO BE SUBJECTED TO 500-525 POUNDS AXIAL PRELOAD AFTER INSTALLATION.




②
45°
1.38 DIA
.562 DIA -Y-
.125
.624
.626
32/
-Z-
.16
63/
∠Z .002
⌒ .0005
-X-
12°49′ BASIC
.94
.25
.125
.50
.875
1.3748
1.3750 DIA ◎Y .005
1.400 DIA

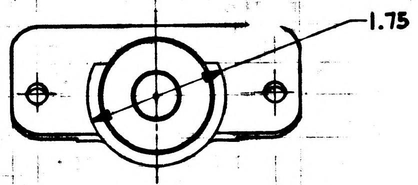
SECTION A-A

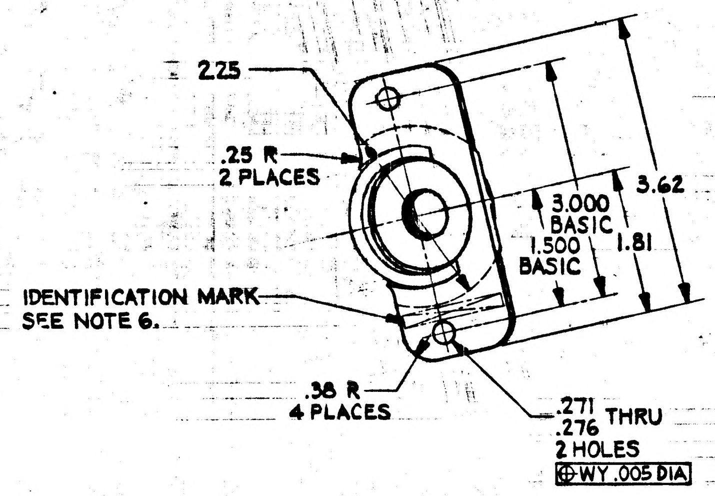

SURFACE A, SEE NOTE 7
.12 R
A
A
.25 R, 2 PLACES
①


.1250
.1252 .12 DEEP
≑YX BASIC
-W-

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 16261 **DATE** 9 Feb 65




2.25
.25 R 2 PLACES
3.000 BASIC
1.500 BASIC
3.62
1.81
IDENTIFICATION MARK SEE NOTE 6.
.38 R 4 PLACES
.271
.276 THRU
2 HOLES
⊕WY .005 DIA

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	1	2899967	INSERT, PLANE BASE
1	1	2899993-001	MOUNT, NAV BASE, REAR

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2899988-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS ±.005 ±.02 ANGLES ±1°

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2.

CONTRACT NAS9-497

~~AC SPARK PLUG DIVISION, GMC~~
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN C. Long DATE 22 JAN 65
CHECKED 2 FEB 65
APPROVAL 2 FEB 65
APPROVAL 2 FEB 65
NASA APPROVAL W. J. Rhine 2-9-65
MIT APPROVAL R. M. Bras 2/4/65 9 Feb 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MOUNT, NAVIGATION BASE, REAR
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. SIZE D 2899993
SCALE FULL SHEET 1 OF 1

Charleston 2 FEB 65

MASTER

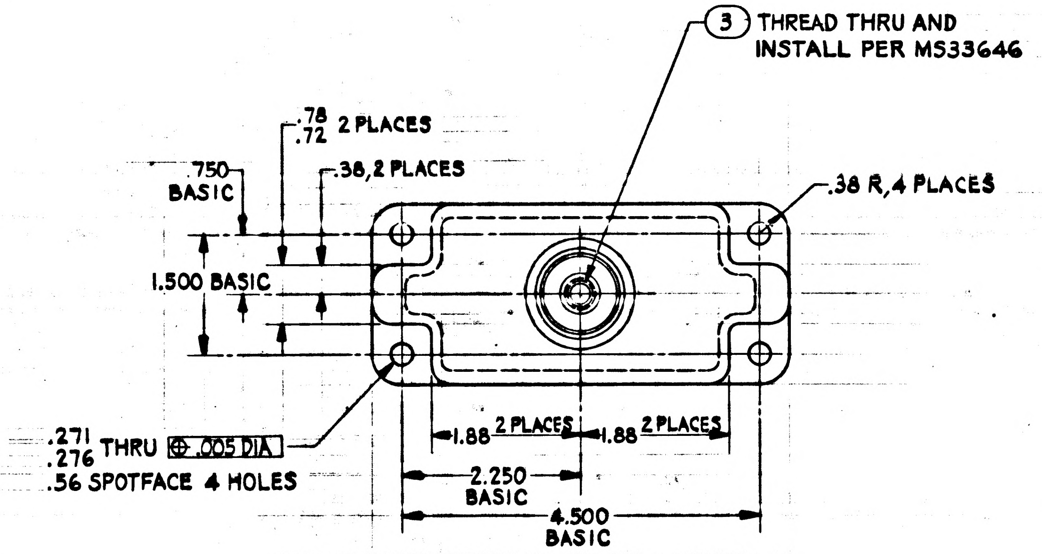
2899994

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

REVISIONS

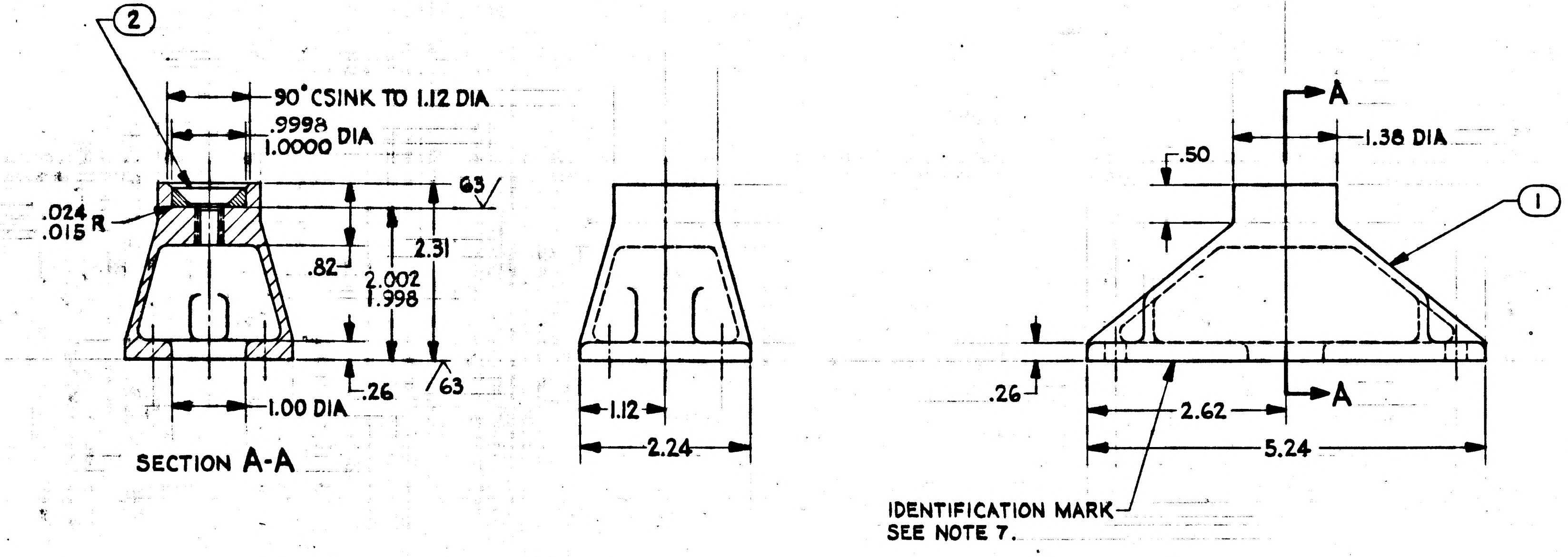
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: PRECISION CAST USING ALUMINUM ALLOY QQ-A-601, COMPOSITION 220, TEMPER T4.
3. UNLESS OTHERWISE SPECIFIED:
   a. ALL CAST RADII TO BE .12.
   b. ALL CAST WALLS TO BE .12 THICK.
   c. SURFACE ROUGHNESS MUST NOT EXCEED 125/.
   d. ALL CORNERS MUST BE .005 TO .015 R OR CHAMFER.
4. MUST BE FREE FROM BURRS.
5. INSPECT PER MIL-C-6021, CLASS 1A, GRADE B.
6. FINISH: ANODIZE PER MIL-A-8625, TYPE I (ES-385) EXCEPT THREADED HOLE.
7. IDENTIFY USING DRAWING NUMBER AND REVISION LETTER PER ND1002019.
8. ITEM ② TO BE SUBJECTED TO 500-525 POUNDS AXIAL PRELOAD AFTER INSTALLATION.


③ THREAD THRU AND INSTALL PER MS33646
.78
.72 2 PLACES
.38, 2 PLACES
.750 BASIC
1.500 BASIC
.38 R, 4 PLACES
.271
.276 THRU ⊕ .005 DIA
.56 SPOTFACE 4 HOLES
1.88 2 PLACES
1.88 2 PLACES
2.250 BASIC
4.500 BASIC

FOR INFORMATION ONLY

CLASS B RELEASE TDR No. 16261 DATE 9Feb65


②
90° CSINK TO 1.12 DIA
.9998
1.0000 DIA
.024
.015 R
63
.82
2.002
1.998
2.31
.26
63
1.00 DIA
1.12
2.24
A
.50
1.38 DIA
①
.26
2.62
5.24
A
IDENTIFICATION MARK SEE NOTE 7.

SECTION A-A

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
3	1	MS21209-F5-15	(1897059-205) INSERT, LOCKING
2	1	2899965	INSERT, BALL MOUNT
1	1	2899994-001	SUPPORT, PLANE

LIST OF PARTS AND MATERIALS

MASTER

NEXT ASSY	USED ON
2899988-011	2899950-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ -	±.005	+ 1°
- -	±.02	-

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN

DRAWN C. Long DATE 19 JAN 65
CHECKED J. Stalong 2 FEB 65
APPROVAL E. Lambert 2 FEB 65
APPROVAL 2 FEB 65
NASA APPROVAL 2-9-65
R.W. Bean 2/9/65
MIT APPROVAL 9 Feb 65

Charleston 2 FEB 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SUPPORT, PLANE
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. | SIZE D | 2899994

SCALE FULL | SHEET 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. UNITS SHALL BE MANUFACTURED IN LOTS USING MATERIAL FROM THE SAME BATCH. A MINIMUM OF 3 UNITS FROM EACH LOT SHALL BE USED FOR DESTRUCTIVE TESTING: ONE FOR EXTREME TEMPERATURE LEAK RATE TEST AND RUPTURE TEST PER NOTE 7, AND ONE FOR LIFE CYCLING AND MATERIAL TESTING PER NOTE 8, AND ONE FOR TEAR AND PUNCTURE TESTING PER NOTES 9 AND 10.
3. MATERIAL SPECIFICATIONS: THE MATERIAL SHALL BE A PROPRIETARY MOLDED THERMOPLASTIC URETHANE RUBBER PRODUCED BY B.F. GOODRICH AS ESTANE 58102 COMPOUND, NATURAL -021.
4. ONLY DIMENSIONS MARKED * REQUIRE FINAL ACCEPTANCE INSPECTION USING FIXED TOOLING. OTHER DIMENSIONS ARE FOR MOLD PURPOSES.
5. UNITS SHALL BE SHIPPED AND STORED WITH A SUPPORTING DEVICE WHICH SHALL MAINTAIN SHAPE OF UNIT PER DRAWING WITHIN 1/16 INCH. EACH UNIT AND SUPPORTING DEVICE SHALL BE INDIVIDUALLY SEALED IN A POLYETHYLENE BAG AND BOXED. DATE OF MANUFACTURE, NASA DRAWING NUMBER, AND MANUFACTURER'S SYMBOL IN ACCORDANCE WITH ND 1002019 SHALL APPEAR ON EACH BAG IN ADDITION TO SERIALIZATION PER ND 1002023.
6. EACH UNIT SHALL MEET THE FOLLOWING REQUIREMENTS:
   A. A MAXIMUM OF 5 INCLUSIONS OR VOIDS NO LARGER THAN .030 DIA. AND NOT WITHIN 1.00 MIN OF EACH OTHER SHALL BE APPARENT TO THE NAKED EYE ON FILM EXPOSED TO X-RAY ANALYSIS UNDER THE FOLLOWING CONDITIONS:

   VOLTAGE, 70 KV.

   CURRENT, 2ma

   TIME OF EXPOSURE, 3 MINUTES (SUCH EXPOSURE SHALL GIVE AN H-D CONTRAST RATIO OF 1.8 -3.1)

   DISTANCE TO TARGET, 58 INCH

   FILM, SUPER FINE GRAIN

   FOCAL SPOT, 2.1 mm MAX

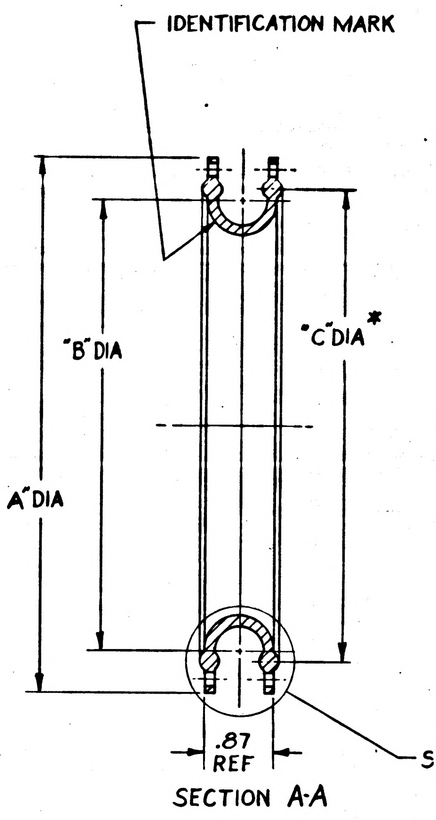
   B. UNIT SHALL BE MOUNTED ON A LEAK AND DEFLECTION TEST FIXTURE CONSISTENT WITH USE OF SEAL. LEAK RATE SHALL NOT EXCEED 3 X 10^{-5} LBS. OF OXYGEN/HR OR EQUIVALENT AT 5 PSI PRESSURE DIFFERENTIAL. AT 15 ± 0.5 PSI PRESSURE DIFFERENTIAL, INSIDE DIAMETER OF SEAL SHALL NOT DECREASE MORE THAN 5/16 INCHES AND DIFFERENCE SHALL BE UNIFORM WITHIN 1/16 INCHES.
7. ONE UNIT FROM EACH LOT SHALL BE MOUNTED ON THE LEAK AND DEFLECTION TEST FIXTURE. LEAK RATE SHALL NOT EXCEED 3 X 10^{-5} LBS OF OXYGEN/HR OR EQUIVALENT AT 5 PSI DIFFERENTIAL AT TEST TEMPERATURE OF -45°F ±5°F, ROOM TEMPERATURE, AND +160°F ± 5°F. AFTER LEAK TEST, PLOT DIAMETRAL DEFLECTION VERSUS PRESSURE FROM 0 TO 100 PSI AT ROOM TEMPERATURE. RUPTURE OF UNIT BELOW 80 PSI CONSTITUTES FAILURE TO PASS TEST. AFTER REMOVAL FROM FIXTURE, UNIT SHALL BE CUT IN TWO PIECES TO PREVENT INADVERTENT END USE.
8. ONE UNIT FROM EACH LOT SHALL BE MOUNTED ON A FIXTURE CONSISTENT WITH USE OF SEAL WHICH ALLOWS RADIAL DEFLECTION OF ONE FLANGE WITH RESPECT TO THE OTHER WHILE BEING SUBJECTED TO AN INITIAL 14.7 ± .3 PSI PRESSURE DIFFERENTIAL. ONE FLANGE IS THEN TO BE VIBRATED RELATIVE TO THE OTHER, IN THE PLANE OF THE FLANGE, WITH THE NOMINAL DISTANCE BETWEEN FLANGES BEING MAINTAINED. VIBRATION INPUT SHALL BE A ±1/8 IN. 0-PEAK DISPLACEMENT, FOR 1 X 10^6 CYCLES: VIBRATION FREQUENCY TO BE IN THE RANGE 50 TO 200 CPS. THE LEAK RATE SHALL BE MONITORED DURING VIBRATION. A LEAK RATE IN EXCESS OF 3 X 10^{-5} LBS OXYGEN/HR OR EQUIVALENT SHALL CONSTITUTE A FAILURE TO PASS TEST.
9. ONE UNIT FROM EACH LOT SHALL BE CUT ON THE INSIDE SURFACE PARALLEL TO AND WITHIN 1/8 INCH OF THE FLASH ON THE INSIDE DIAMETER, 1.00 +.12, -.00, LONG BY ONE-HALF THE MATERIAL THICKNESS. THIS UNIT IS THEN TO BE MOUNTED ON THE LEAK AND DEFLECTION TEST FIXTURE AND SUBJECTED TO 25 ± 0.5 DIFFERENTIAL PRESSURE. THE LEAK RATE SHALL NOT EXCEED 3X10^{-5} LBS OF OXYGEN PER HOUR, OR EQUIVALENT, AT TEST TEMPERATURES OF -45° ±5°F, ROOM TEMPERATURE, AND +160°F ±5°F. UNIT SHALL NOT FAIL, NOR SHALL THE CUT INCREASE IN LENGTH BY MORE THAN 1/8 INCH WHEN SUBJECTED TO A 30 ±0.5 PSI DIFFERENTIAL PRESSURE.
10. THE SAME UNIT AS USED IN NOTE 9 ABOVE SHALL BE REMOVED FROM THE FIXTURE AND BE PUNCTURED BY A SHARP-POINTED TOOL WITH 1/16 INCH DIAMETER 1/8 INCH FROM POINT AND 1/8 INCH DIAMETER 1/2 INCH FROM POINT. THIS PUNCTURE SHALL BE MADE FROM THE OUTSIDE SURFACE AND SHALL ENTER THE PREVIOUS CUT WITHIN 1/4 INCH OF ITS MIDPOINT SUCH THAT THE TOOL POINT REACHES AT LEAST TO THE INSIDE SURFACE BUT NOT MORE THAN 1/16 INCH BEYOND. WITH 25 ± 0.5 PSI DIFFERENTIAL PRESSURE, LEAK RATE SHALL NOT EXCEED 2000 STD CC OF AIR PER SECOND.
11. SUPPLIER SHALL CONFORM TO QUALITY ASSURANCE PROVISIONS SPECIFIED IN ND 1015404 CLASS 2.

PROCURE ONLY FROM APPROVED SOURCES LISTED ON ND 1002034, FOR THIS DRAWING.

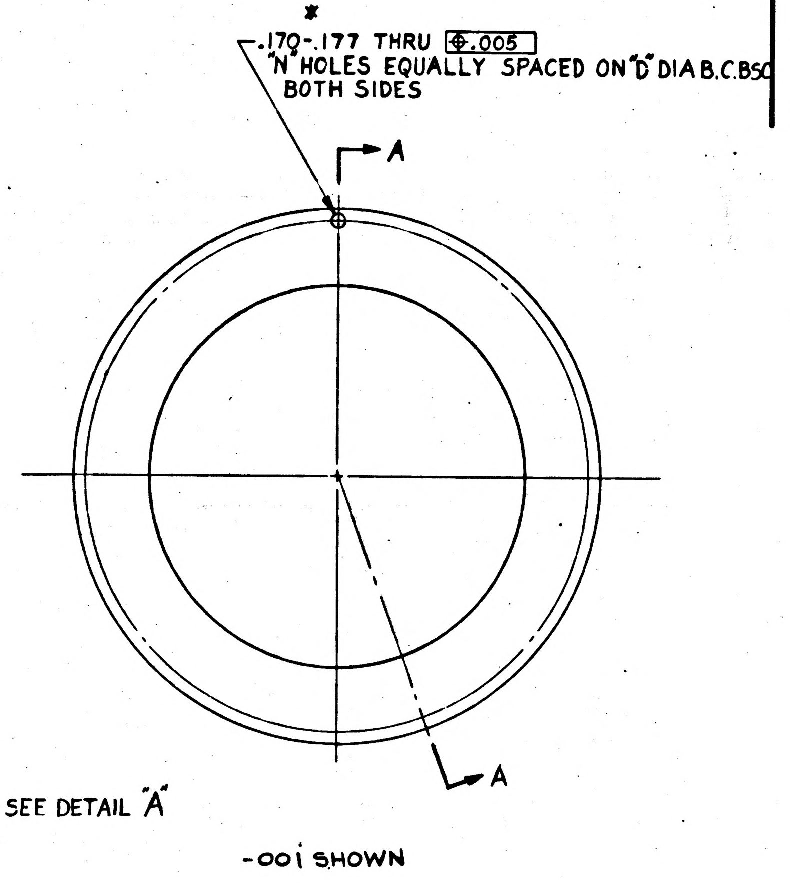
2899997 A

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 26894		4 MAR 66	wK.

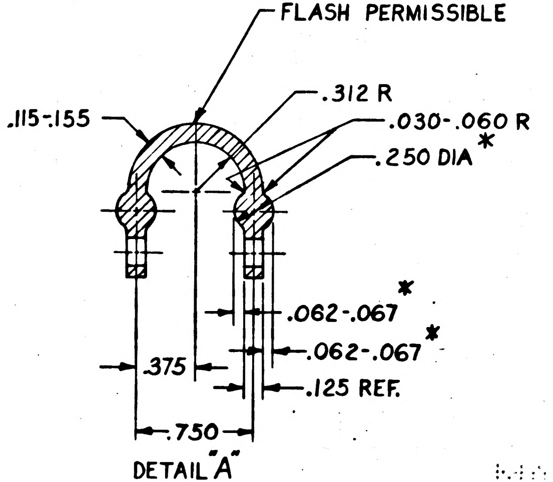
PART NO.	"A" DIA	"B" DIA	"C" DIA	"D" DIA	"N" NO. OF HOLES
2899997-001	6.68	5.62	5.875	6.375	9 HOLES
2899997-002	10.68	9.62	9.875	10.375	15 HOLES



SECTION A-A



-001 SHOWN



DETAIL "A"
SCALE 2:1

MASTER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	±.005	+ —
− —	±.02	− —

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 3

CONTRACT NAS9-497

MIT
INSTRUMENTATION LAB
CAMBRIDGE MASS

DRAWN W. Mynam DATE 24 FEB 66
CHECKED 25 FEB 66
APPROVAL R. Lietz 28 FEB 66
APPROVAL 3/7/66
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SEAL, PRESSURE,
STRAIN ISOLATION
SPECIFICATION CONTROL DRAWING

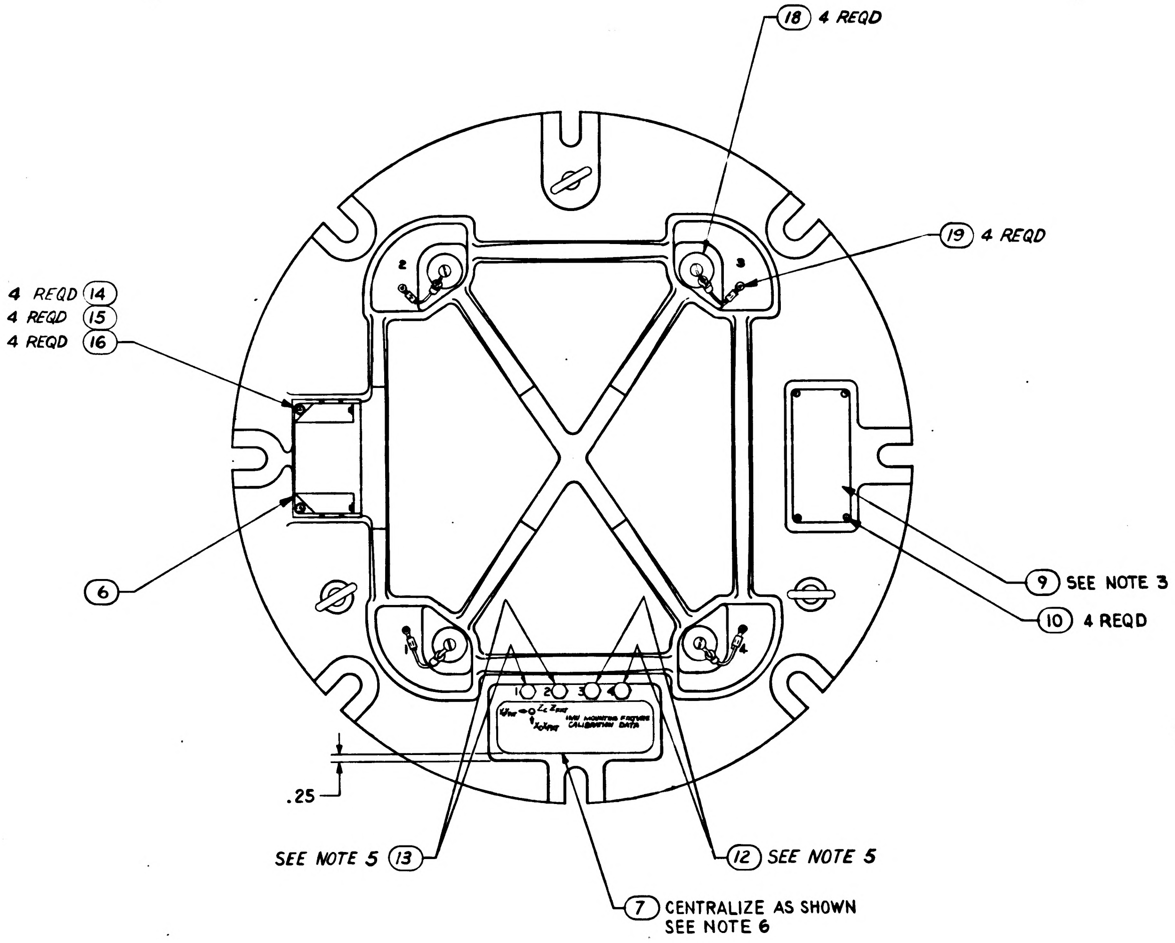
CODE IDENT NO. 80230 SIZE D 2899997

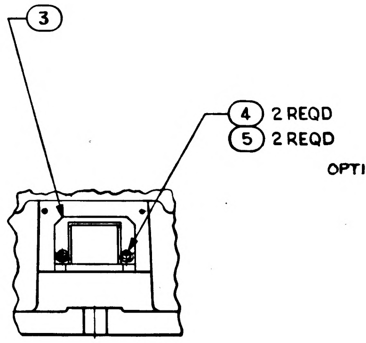
SCALE FULL SHEET 1 OF 1

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
C		INITIAL RELEASE CLASS A PER TDRR 23377		8 SEP 65	

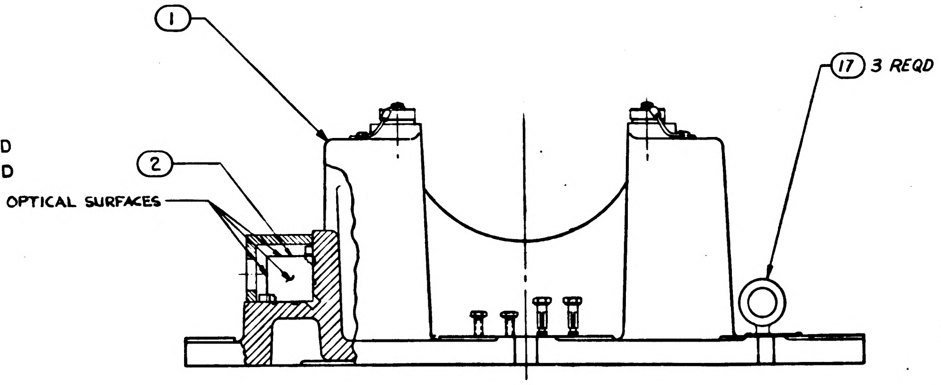
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
3. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (9) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .12 HIGH.
4. ITEM (1) FURNISHED WITH THIS ASSEMBLY AS LOOSE ITEMS.
5. MOUNTING HARDWARE FOR INERTIAL MEASUREMENT UNIT LOCATED HERE. HARDWARE TO BE USED PER MOUNTING PAD IDENTIFICATION.
6. APPROPRIATE DATA TO BE ADDED IN BLANKS OF ITEM (7) BEFORE APPLICATION TO ITEM (1).





ITEM (6) REMOVED
THIS VIEW ONLY



	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 2	4		19	1006783-22	SCREW, BUTTON HD., HEX. SOCKET
	4		18	2900011	COVER, PROTECTIVE
SEE NOTE 2	3		17	1015916-002	BOLT-EYE
	4		16	AN960C4	(1897C06-024) WASHER-FLAT
	4		15	MS35338-78	WASHER, LOCK, SPLIT
	4		14	MS16995-11	SCREW, CAP, CYL. HEAD, HEX SOCKET
	2		13	MS35308-312	SCREW, CAP
	2		12	2899992	BOLT, IMU MOUNTING, PRECISION
SEE NOTE 2 & 4	8		11	1015917-003	BOLT-T, SQUARE HEAD
SEE NOTE 2	4		10	1006783-9	SCREW, BUTTON HD., HEX. SOCKET
	1		9	1901304-231	NAMEPLATE
			8		
	1		7	2900010	DECAL, CALIBRATION
	1		6	2900042	COVER, OPTICAL CUBE
	2		5	MS16996-14	SCREW, CAP, SOCKET HEAD
	2		4	AN960C10	(1897006-017) WASHER-FLAT
	1		3	2900003	CLAMP, OPTICAL CUBE (INSEP ASSY)
SEE NOTE 2	1		2	1897196-006	OPTICAL CUBE
	1		1	2900001	FIXTURE-IMU MTG. ROTARY TABLE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900000-011	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — − —
DECIMALS + — − —
ANGLES + — − —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R A Blake DATE 28 DEC 64
CHECKED C Wilson 2 FEB 65
APPROVAL P C Hettinack 2 FEB 65
APPROVAL 4-30-65
NASA APPROVAL
MIT APPROVAL
Charleston 2 FEB 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MOUNTING FIXTURE ASSEMBLY
12.5 IMU TO ROTARY TABLE

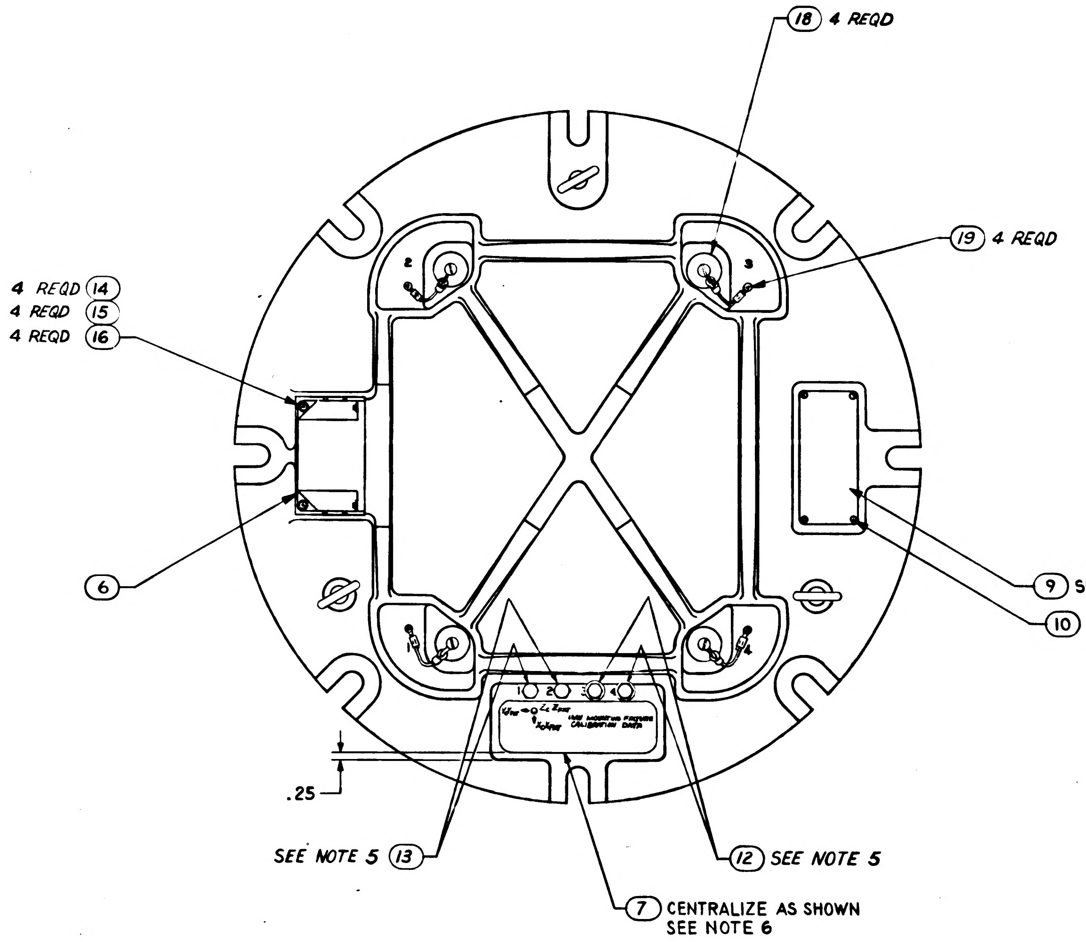
CODE IDENT NO. 99974
SIZE E
2900000
SCALE 1:2
SHEET 1 OF 1

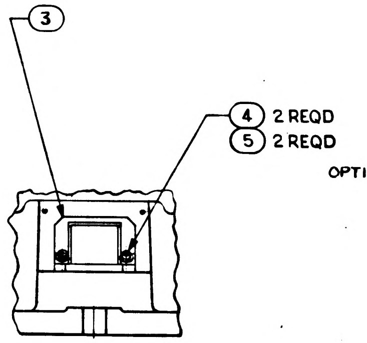
2900000 C

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
C		INITIAL RELEASE CLASS A PER TDRR 23377		8 SEP 65	
D		REVISED PER TDRR 25838		5 FEB 66	J.H.P.

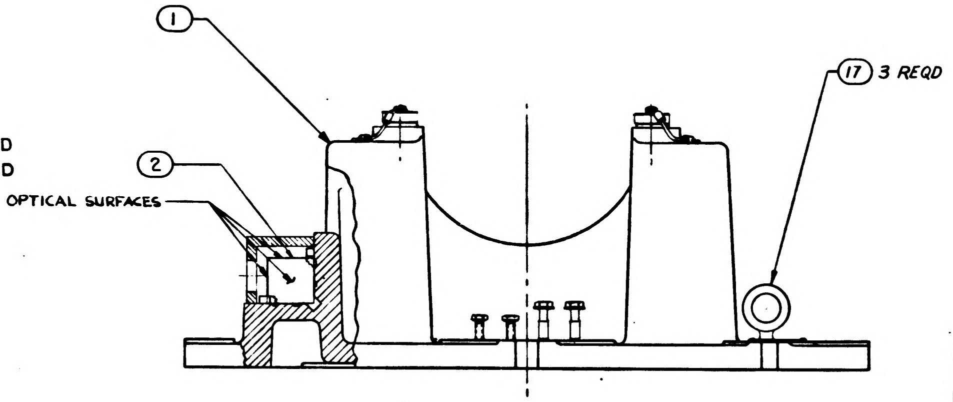
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.
3. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM ⑨ IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .12 HIGH.
4. ITEM (11) FURNISHED WITH THIS ASSEMBLY AS LOOSE ITEMS.
5. MOUNTING HARDWARE FOR INERTIAL MEASUREMENT UNIT LOCATED HERE. HARDWARE TO BE USED PER MOUNTING PAD IDENTIFICATION.
6. APPROPRIATE DATA TO BE ADDED IN BLANKS OF ITEM ⑦ BEFORE APPLICATION TO ITEM ①.





ITEM ⑥ REMOVED
THIS VIEW ONLY



	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
SEE NOTE 2				4		19	1006783-22	SCREW, BUTTON HD., HEX. SOCKET
				4		18	2900011	COVER, PROTECTIVE
SEE NOTE 2				3		17	1015916-002	BOLT-EYE
				4		16	AN960C4	(1897006-024) WASHER-FLAT
				4		15	MS35338-78	WASHER, LOCK, SPLIT
				4		14	MS16995-11	SCREW, CAP, CYL. HEAD, HEX SOCKET
				2		13	MS35308-312	SCREW, CAP
				2		12	2900944	BOLT, SHOULDER
SEE NOTE 2 & 4				8		11	1015917-003	BOLT-T, SQUARE HEAD
SEE NOTE 2				4		10	1006783-9	SCREW, BUTTON HD., HEX. SOCKET
				1		9	1901304-231	NAMEPLATE
						8		
				1		7	2900010	DECAL, CALIBRATION
				1		6	2900042	COVER, OPTICAL CUBE
				2		5	MS16996-14	SCREW, CAP, SOCKET HEAD
				2		4	AN960C10	(1897006-017) WASHER-FLAT
				1		3	2900003	CLAMP, OPTICAL CUBE (INSEP ASSY)
SEE NOTE 2				1		2	1897196-006	OPTICAL CUBE
				1		1	2900001	FIXTURE-IMU MTG. ROTARY TABLE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900000-011	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — − — DECIMALS + — − — ANGLES + — − —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.
DRAWN Bell DATE 28 DEC 64
CHECKED C Wilson 2 FEB 65
APPROVAL 2 FEB 65
APPROVAL 1-30-65
NASA APPROVAL
MIT APPROVAL
2 FEB 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MOUNTING FIXTURE ASSEMBLY
12.5 IMU TO ROTARY TABLE

CODE IDENT NO 99974
SIZE E
2900000
SCALE 1:2
SHEET 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. MATERIAL: FRONT PANEL - AL ALLOY QQ-A-250/8 TEMPER H32 .18 THICK.

3. INSPECTION & ACCEPTANCE:

A. DIMENSION "A" SHALL BE EQUAL TO DIMENSION "B" WITHIN .040.

B. SIDES OF CHASSIS LOCATED BY 17 INCH DIMENSION MUST BE PARALLEL WITHIN .031 AND PERPENDICULAR TO THE REAR SURFACE OF THE FRONT PANEL WITHIN .062.

C. BORDER AREA WITHIN .56 OF PANEL EDGE ON THE REAR SURFACE OF THE FRONT PANEL SHALL BE CO-PLANER AND FREE OF PROTRUSIONS.

D. THERE SHALL BE NO PROTRUSIONS OUTSIDE OF THE CHASSIS IN THIS AREA.

E. ALLOW .50 CLEARANCE BEHIND EACH HOLE, MINIMUM.

F. ALLOW .12 CLEARANCE BEHIND EACH HOLE, MINIMUM.

4. ALL KNOBS SHALL BE PER MS91528 TYPE F AND K WHERE PRACTICAL. ALL KNOBS SHALL BE FLAT BLACK EXCEPT WHERE THE KNOB IS PART OF A COLOR CODE.

5. FINISH: APPLY FINISH P513 OF MIL-F-14072 TO ENTIRE PANEL. APPLY MIL-P-8585 PRIMER AND 2 COATS OF TT-E-529 CLASS B SEMI-GLOSS ENAMEL, LIGHT GRAY, COLOR 26440 OF FED-STD-595 TO FRONT AND EDGES OF PANEL ONLY.

6. SILK SCREEN CHARACTERS ON FRONT PANEL PER ND1002112, .12 HIGH UNLESS OTHERWISE SPECIFIED, USING SEMI-GLOSS ENAMEL PER ND1002111, COLOR INSTRUMENT BLACK NO. 514 OF ANA-157. CHARACTER STYLE FUTURA DEMI-BOLD PER ND1002122, TYPE I. CENTRALIZE AS SHOWN.

7. EXCEPT THAT 2900006 SHALL BE SUBSTITUTED FOR 2900007 THE EQUIPMENT SHALL COMPLY WITH ALL "REQUIREMENTS" AND SHALL PASS ALL "TESTS" IN PS 2900007 UNDER THE "TEST CONDITIONS" CALLED OUT IN PS 2900007. NO PART OF PS 2900007 IS APPLICABLE OTHER THAN THOSE SECTIONS SPECIFIED.

8. MANUALS: TWO COPIES OF THE SERVICE MANUAL CONTAINING A SPARE PARTS LIST, SCHEMATIC DIAGRAM, OPERATING INSTRUCTIONS, MAINTENANCE INSTRUCTIONS AND CALIBRATION INSTRUCTIONS WHICH ARE ADAQUATE FOR COMPLETE MAINTENANCE AND OPERATION OF DVM SHALL BE SUPPLIED WITH EACH UNIT. ONE COPY OF INSPECTION TEST DATA SHALL BE SUPPLIED WITH EACH UNIT.

9. THE SUPPLIERS NAME, ADDRESS AND NASA PART NUMBER SHALL BE PLACED ON THE OUTSIDE SURFACE OF THE REAR PLATE PER ND1002019. THIS INFORMATION SHALL NOT APPEAR ON THE FRONT PANEL.

10. THE DIGITAL INTERFACE BETWEEN THE DIGITAL VOLTMETER AND PRINTER 1900063-011 SHALL BE SUCH THAT THE PRINTER IS CAUSED TO PROPERLY PRINT THE DIGITAL VOLTMETER READINGS WHENEVER THE PRINT COMMAND IS INITIATED.

11. A BOARD EXTENDER SHALL BE PROVIDED WITHIN EACH DVM.

12. THIS DIMENSION IS TO THE CENTERLINE OF THE CAPTIVE NUT MOUNTING HOLE CLUSTER.

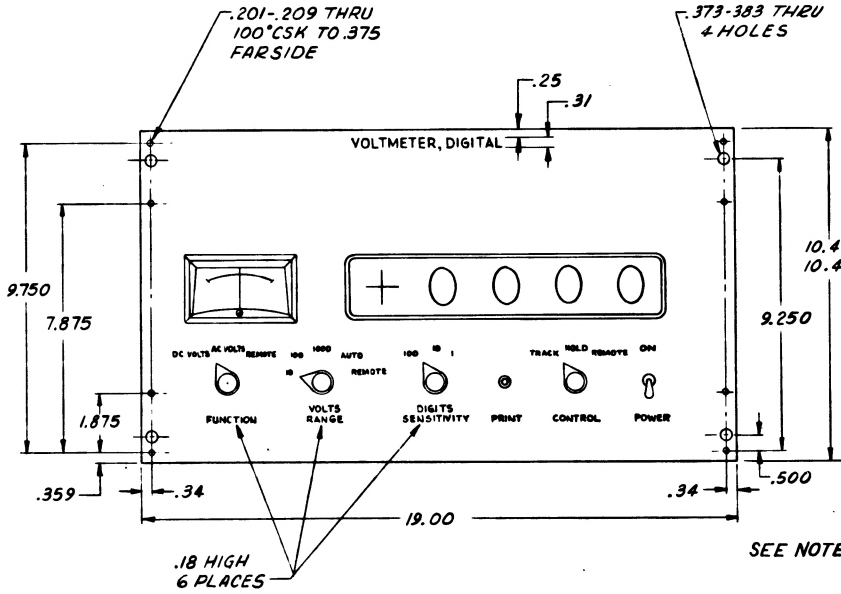
13. ALL CHARACTERS ON THE OUTSIDE SURFACE OF THE REAR PANEL SHALL BE PER ND1002019, EXCEPT CHARACTER STYLE NEED NOT BE FUTURA DEMI-BOLD.

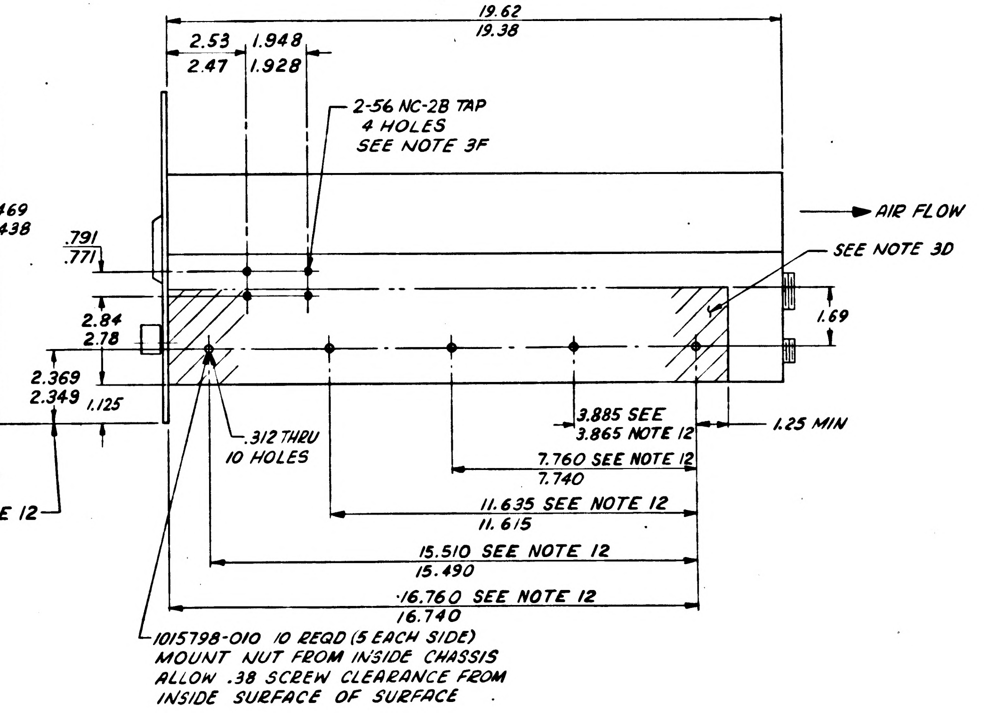
CONNECTOR IDENTIFICATION	FUNCTION	PIN	PIN USE	REMARKS
J1 MS3112E-10-6P	SIGNAL INPUT	B C E A, D, F	SIGNAL INPUT HI SIGNAL INPUT LO GUARD SPARE	
J2 MS3112E-20-41S	OUTPUT BCD CODE	B C D F	1 2 4 8 } BCD UNITS (L.S.D.)	
		H J K L	1 2 4 8 } BCD TENS	
		M P S V	1 2 4 8 } BCD HUNDREDS	
		W X Z a	1 2 4 8 } BCD THOUSANDS	
	SYMBOL INDICATION	f g h	1 2 4 } BCD SYMBOL	
		j m n	PRINT COMMAND (TO PRINTER) INHIBIT RESET (FROM PRINTER) LOGIC GROUND	 CONNECTED TO J6-B,F,H
	FUNCTION SWITCH REMOTE	T U Y	Vc COMMON DC MODE AC MODE	CONNECTED TO J6-B,F,H
	10 LINE DECIMAL CODE	b c d e	1 2 3 4 } DECIMAL POINT	
		A,E,G,N,R,h i,p,q,r,s,t	SPARE	

CONNECTOR IDENTIFICATION	FUNCTION	PIN	PIN USE	REMARKS
J5 MS3112E-16-8P	POWER	A D E B,C,F G,H	CHASSIS INPUT POWER HI INPUT POWER LO } SPARE	
J6 MS3112E-14-19S	REMOTE CONTROL	B,F,H C D E J K,L M N	REMOTE COMMON HOLD TRACK SINGLE PRINT AUTO RANGE 10V RANGE 100V RANGE 1000V RANGE	CONNECTED J2-n AND T
		A,G,P,R, S,T,U,V	} SPARE	

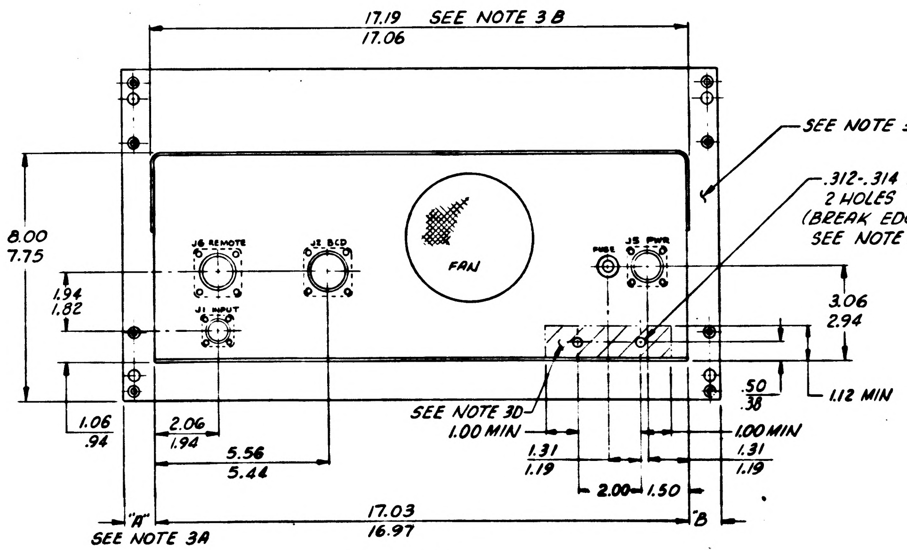
REVISIONS 23376

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.O. 60137		2 MAR 65	C.O
B		REVISED PER MXC 201201		7 MAY 65	JRS
C		REVISED PER MXC-202920		2-JUL-65	
D		REVISED PER MXC-204705		13 SEP 65	
E		INITIAL RELEASE CLASS A PER TDRR 23376		18 OCT 65	


.201-.209 THRU 100°CSK TO .375 FARSIDE
.373-383 THRU 4 HOLES
.25
.31
VOLTMETER, DIGITAL
+0000
DC VOLTS
AC VOLTS
REMOTE
100
1000
AUTO
10
REMOTE
100
10
1
TRACK
HOLD
REMOTE
ON
FUNCTION
VOLTS RANGE
DIGITS SENSITIVITY
PRINT
CONTROL
POWER
9.750
7.875
1.875
.359
.34
.34
19.00
10.469
10.438
9.250
.500
.18 HIGH 6 PLACES
SEE NOTE 12


19.62
19.38
2.53
2.47
1.948
1.928
2-56 NC-2B TAP 4 HOLES SEE NOTE 3F
AIR FLOW
SEE NOTE 3D
.791
.771
2.84
2.78
2.369
2.349
1.125
1.69
.312 THRU 10 HOLES
3.885 SEE
3.865 NOTE 12
1.25 MIN
7.760 SEE NOTE 12
7.740
11.635 SEE NOTE 12
11.615
15.510 SEE NOTE 12
15.490
16.760 SEE NOTE 12
16.740
1015798-010 10 REQD (5 EACH SIDE) MOUNT NUT FROM INSIDE CHASSIS ALLOW .38 SCREW CLEARANCE FROM INSIDE SURFACE OF SURFACE

DATA SOURCE
AUTO DATA DIVISION
HOUSTON INSTRUMENT CORP (15217)
BULLETIN 2641P3
SAN DIEGO, CALIFORNIA


17.19 SEE NOTE 3B
17.06
SEE NOTE 3C
.312-.314 THRU 2 HOLES (BREAK EDGES) SEE NOTE 3E
J6 REMOTE
J2 BCD
J1 INPUT
FAN
FUSE
J5 PWR
8.00
7.75
1.94
1.82
3.06
2.94
.50
.38
1.12 MIN
SEE NOTE 3D
1.00 MIN
1.00 MIN
1.31
1.19
1.31
1.19
2.00
1.50
1.06
.94
2.06
1.94
5.56
5.44
17.03
16.97
"A"
SEE NOTE 3A
"B"

REAR VIEW

SEE NOTE 7

			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			X		2	PS2900007	SPECIFICATION
			1		1		DIGITAL VOLTMETER (MODEL 2641P3)

QUANTITY REQUIRED
LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900007-011	2900007-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — − — DECIMALS ±.005 ±.02 ANGLES +1° −1°
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Le Blanc DATE 26 FEB 65
CHECKED Ed Foster 4 MAR 65
APPROVAL E. Engelhardt 4 MAR 65
APPROVAL Jakimow 10/14/65
NASA APPROVAL G.L.
MIT APPROVAL W. Cooper 20 Aug

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

VOLTMETER, DIGITAL
ALTERED ITEM

CODE IDENT NO. 99974
SIZE E
2900006
SCALE —
SHEET 1 OF 1

4 MAR 65

2900006 E

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. SHIM BOTH SIDES TO FIT USING QUANTITY AS REQUIRED. PEEL OFF EXCESS SHIM STOCK.

3. TORQUE ITEM ⑦ TO 33-36 INCH POUNDS AT INSTALLATION.

4. SECURE SCREWS USING ITEM ⑫ .

5. MARK WEIGHT PER ND1002123 (55 LBS).

~~6. SERIALIZE PER ND1002023.~~

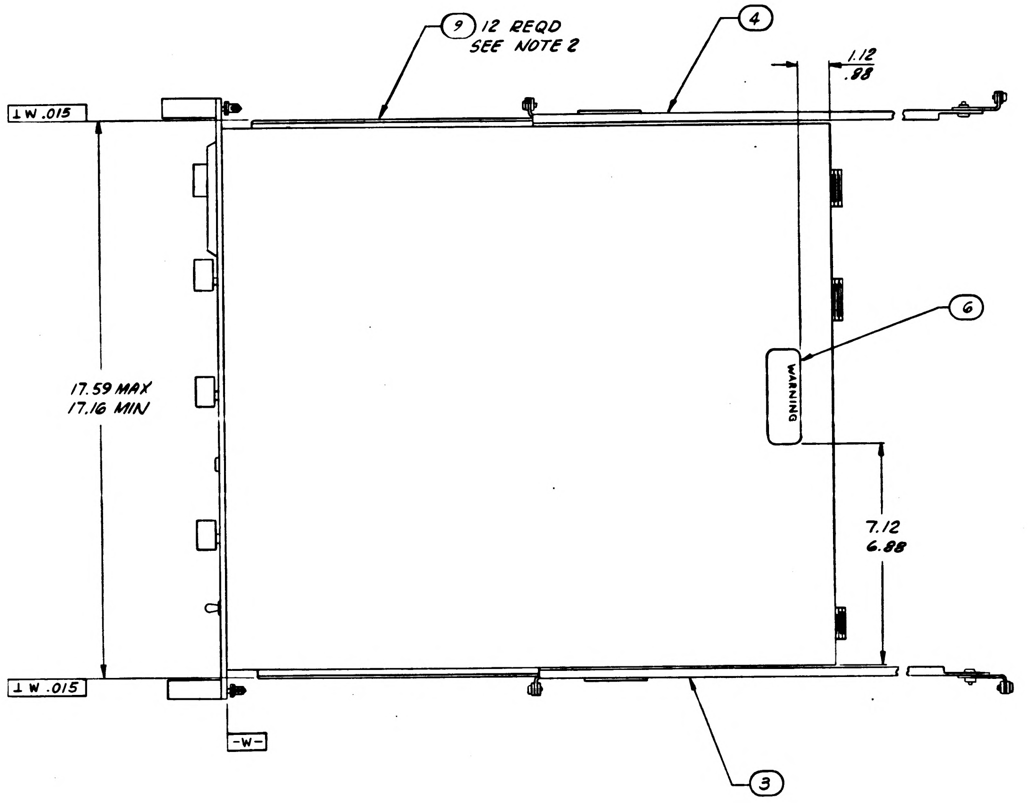
7. MARK APPLICABLE CONTRACT NO. AND SERIAL NO. ON ITEM ⑤ IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERIALS TO BE .06 HIGH.

8. THIS SPECIFICATION APPLIES ONLY WHEN THIS EQUIPMENT IS SOLD INDEPENDENTLY FROM ITS HIGHER ASSEMBLY.

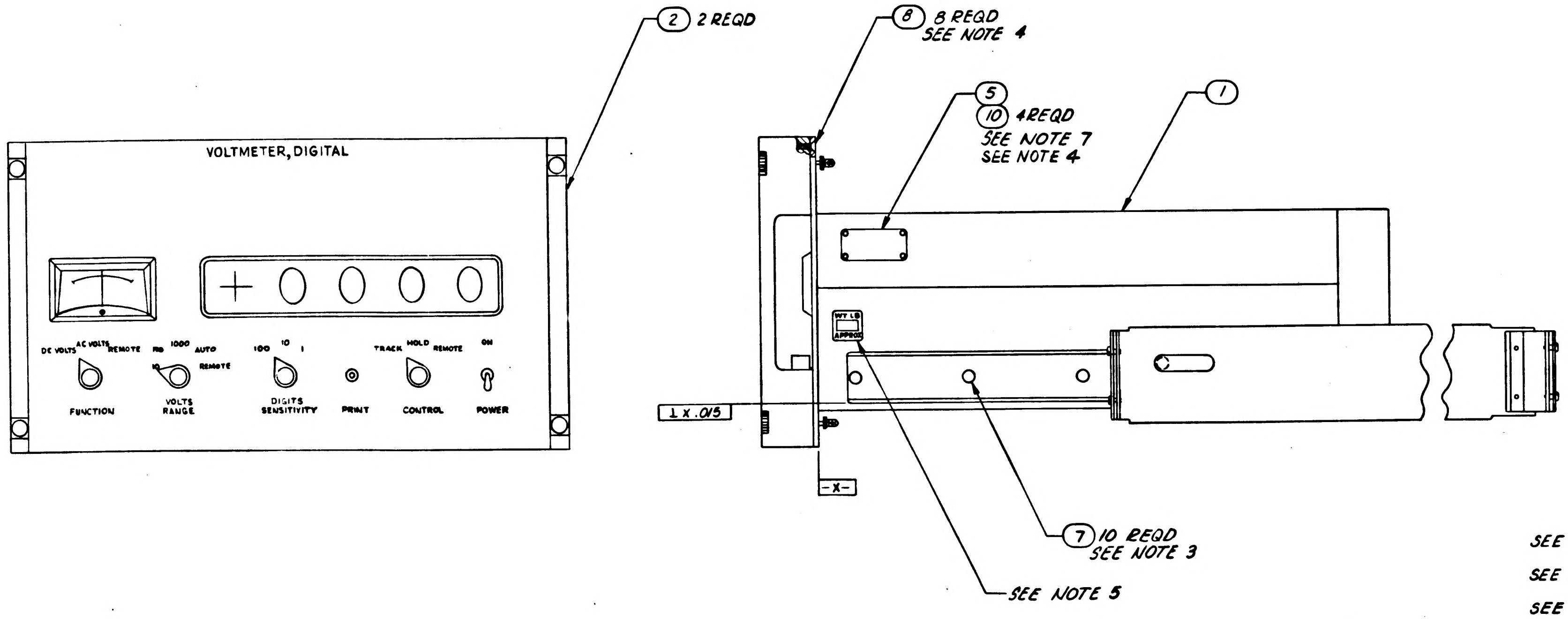
9. VENDOR ITEM: SEE SPECIFICATION CONTROL DRAWING.

REVISIONS 23376

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC 205602		9 OCT 65	
B		INITIAL RELEASE CLASS A PER TDRR 23376		8 OCT 65	WRB



9 12 REQD
SEE NOTE 2
4
1.12
.88
⊥ W .015
17.59 MAX
17.16 MIN
WARNING
6
7.12
6.88
⊥ W .015
-W-
3



2 2 REQD
VOLTMETER, DIGITAL
DC VOLTS
AC VOLTS
REMOTE
1000
AUTO
REMOTE
100
10
1
TRACK
HOLD
REMOTE
ON
FUNCTION
VOLTS RANGE
DIGITS SENSITIVITY
PRINT
CONTROL
POWER
8 8 REQD
SEE NOTE 4
5
10 4REQD
SEE NOTE 7
SEE NOTE 4
1
WT LB APPROX
⊥ X .015
-X-
7 10 REQD
SEE NOTE 3
SEE NOTE 5

2900007 B

				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				AR		12	MIL S-22473 GR H	SEALING COMPOUND (ES 2544-5)
SEE NOTE 8				X		11	PS2900007	PROCUREMENT SPECIFICATION
				4		10	MS35233-2	SCREW, PAN HD SLOTTED
SEE NOTE 9				12		9	1016005-1	SHIM, LAMINATED
				8		8	AN507C832R12	(1897003-568) SCREW, FL HD, 100°
SEE NOTE 9				10		7	1015826-300	SCREW, FLAT HD HEX SOCKET
				1		6	1900953-001	PLATE, INSTRUCTION
				1		5	1004260-102	NAMEPLATE
SEE NOTE 9				1		4	1015791-010	SLIDE ASSEMBLY, QUICK RELEASE, LH
SEE NOTE 9				1		3	1015791-009	SLIDE ASSEMBLY, QUICK RELEASE, RH
				2		2	1900015-061	HANDLE ASSEMBLY
				1		1	2900006	VOLTMETER, DIGITAL

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

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TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. La Bue DATE 25 FEB 65
CHECKED Ed Foster 4 MAR 65
APPROVAL 4 MAR 65
APPROVAL 4/4/65
NASA APPROVAL
MIT APPROVAL 20 Oct 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

VOLTMETER, DIGITAL
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900007
SCALE —
SHEET 1 OF 1

4 MAR 65

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	SYM	DESCRIPTION	DATE	APPROVAL
2900075-011	2900029-011	A	① REVISED PER MXC 202277	16 JUN 65	J.W
		B	INITIAL RELEASE CLASS A PER TDRR 23556	18OCT 65	FE

Charleston 20AUG 65

	REV									
	SHEET									
REV STATUS	REV			B	B	B	B	B	B	B
OF SHEETS	SHEET			1	2	3	4	5	6	7

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

ACSP PN

DRAWN J Wolski DATE 6APR65
CHECKED 19APR65
RE APPROVAL 20 APR. 65
APPROVAL M. Watson 10-25-65

WIRE LIST AA - FLIP FLOP

NASA APPROVAL
MIT APPROVAL

CODE IDENT NO.	SIZE		REV
99974	A	2900018	B

CONTRACT NAS 9-497

SCALE NONE

SHEET 1 OF 7

NOTE NUMBER	GENERAL NOTES DESCRIPTION
1	NOT APPLICABLE
2	INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
3	MARK LEAD IDENTIFICATION PER ND1002019.
4	LENGTHS SPECIFIED ARE FOR LEADS BEFORE ATTACHING TO AN ACCESSORY.
5	SOLDER PER MIL-S-6872(ES2505-1) USING ITEM 4, OR ITEMS 2 AND 3.
6	WIRING TO BE DONE ON SIDE OPPOSITE THE CONNECTOR.

TOLERANCE CHART, UNLESS OTHERWISE SPECIFIED ---

APPLICABLE LENGTH FOR WIRE OR CABLE, STRIP WIRE, STRIP JACKET, CUT WIRE OR CUT SHIELD.	TOLERANCE WIRE OR CABLE	STRIP WIRE	STRIP JACKET	CUT WIRE	CUT SHIELD
UNDER 1 INCH	+ .06-.00	+.03-.00	+.06-.06	+.06-.06	+.06-.06
1 INCH TO 6 INCHES	+ .50-.00	+.06-.00	+.25-.25	+.25-.25	+.25-.25
6 INCHES TO 6 FEET	+1.00-.00		+.50-.50	+.50-.50	+.50-.50
OVER 6 FEET	+2.00-.00				

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A
2900018
SCALE - NONE
REV LTR B
SHEET 2 OF 7

MIL 2084 4-63

LIST OF MATERIALS

SBE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2900018-001	WIRE, ND1002181 CLASS 1, TYPE 1, 24AWG, WHITE 9 FT 4 INCHES TOTAL LENGTH
	2	AR	SN60WS	SOLDER QQ-S-571 (ES2175-1)
	3	AR	MIL-F-14256	TYPE A OR W FLUX (ES2798)
	4	AR	SN60WRAP	SOLDER QQ-S-571 (ES2175-3)

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A
2900018
SCALE - NONE
REV LTR B
SHEET 3 OF 7

MIL 2084 4-63

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 1	1	1.37	TERM.1 TERM.6					.25 .25	YES YES			
AA 2	1	3.25	TERM.6 TERM.31					.25 .25	YES YES			
AA 3	1	2.65	TERM.2 TERM.20					.25 .25	YES YES			
AA 4	1	1.25	TERM.3 TERM.11					.25 .25	YES YES			
AA 5	1	1.88	TERM.11 TERM.22					.25 .25	YES YES			
AA 6	1	2.20	TERM.22 TERM.49					.25 .25	YES YES			
AA 7	1	1.60	TERM.49 TERM.51					.25 .25	YES YES			
AA 8	1	3.80	TERM.4 TERM.35					.25 .25	YES YES			
AA 9	1	2.30	TERM.9 TERM.16					.25 .25	YES YES			
AA 10	1	1.70	TERM.9 TERM.14					.25 .25	YES YES			
AA 11	1	1.50	TERM.14 TERM.23					.25 .25	YES YES			
AA 12	1	2.15	TERM.23 TERM.34					.25 .25	YES YES			

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A
2900018
SCALE - NONE
REV LTR B
SHEET 4 OF 7

MIL 2084 4-63

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 13	1	2.00	TERM.34 TERM.32					.25 .25	YES YES			
AA 14	1	1.15	TERM.18 TERM.33					.25 .25	YES YES			
AA 15	1	2.20	TERM.33 TERM.47					.25 .25	YES YES			
AA 16	1	1.55	TERM.19 TERM.40					.25 .25	YES YES			
AA 17	1	1.60	TERM.21 TERM.43					.25 .25	YES YES			
AA 18	1	2.00	TERM.43 TERM.40					.25 .25	YES YES			
AA 19	1	1.75	TERM.40 TERM.37					.25 .25	YES YES			
AA 20	1	1.10	TERM.44 TERM.54					.25 .25	YES YES			
AA 21	1	1.70	TERM.54 TERM.53					.25 .25	YES YES			
AA 22	1	2.50	TERM.46 TERM.50					.25 .25	YES YES			
AA 23	1	1.90	TERM.6 TERM.11					.25 .25	YES YES			SEE NOTE 6
AA 24	1	2.00	TERM.25 TERM.28					.25 .25	YES YES			SEE NOTE 6

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A
2900018
SCALE - NONE
REV LTR B
SHEET 5 OF 7

MIL 2084 4-63

WIRE LIST AA 2900018 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 25	1	2.15	TERM.28 TERM.55					.25 .25	YES YES			SEE NOTE 6
AA 26	1	1.90	TERM.52 P1-F					.25 .25	YES YES			
AA 27	1	5.30	TERM.16 P1-H					.25 .25	YES YES			
AA 28	1	2.40	TERM.37 P1-J					.25 .25	YES YES			
AA 29	1	2.35	TERM.50 P1-K					.25 .25	YES YES			
AA 30	1	2.70	TERM.32 P1-L					.25 .25	YES YES			
AA 31	1	2.80	TERM.32 P1-M					.25 .25	YES YES			
AA 32	1	1.90	TERM.39 P1-N					.25 .25	YES YES			
AA 33	1	2.70	TERM.33 P1-P					.25 .25	YES YES			
AA 34	1	1.50	TERM.54 P1-T					.25 .25	YES YES			
AA 35	1	3.70	TERM.20 P1-U					.25 .25	YES YES			
AA 36	1	1.50	TERM.55 P1-V					.25 .25	YES YES			

MANNED SPACECRAFT CENTER HOUSTON, TEXAS	SIZE A	2900018
SCALE-NONE	REV LTR B	SHEET 6 OF 7

MIL 2084 4-63

WIRE LIST AA 2900018 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 37	1	2.75	TERM.34 P1-W					.25 .25	YES YES			
AA 38	1	2.25	TERM.42 P1-X					.25 .25	YES YES			
AA 39	1	2.40	TERM.35 P1-Z					.25 .25	YES YES			
AA 40	1	1.80	TERM.16 TP-1					.25 .25	YES YES			SEE NOTE 6
AA 41	1	5.00	TERM.50 TP-2					.25 .25	YES YES			
AA 42	1	3.30	TERM.33 TP-3					.25 .25	YES YES			SEE NOTE 6
AA 43	1	3.70	TERM.39 TP-4					.25 .25	YES YES			SEE NOTE 6
AA 44	1	3.00	TERM.25 TP-5					.25 .25	YES YES			
AA 45	1	2.50	TERM.20 TP-6					.25 .25	YES YES			SEE NOTE 6
AA 46	1	3.80	TERM.42 TP-7					.25 .25	YES YES			
AA 47	1	3.50	TERM.35 TP-8					.25 .25	YES YES			SEE NOTE 6

MANNED SPACECRAFT CENTER HOUSTON, TEXAS	SIZE A	2900018
SCALE-NONE	REV LTR B	SHEET 7 OF 7

MIL 2084 4-63

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ALL PART NUMBERS ARE FOR REFERENCE ONLY.
3. DRAWINGS FOR REFERENCE:
   A. 2900075-011 ASSEMBLY DRAWING
4. UNLESS OTHERWISE SPECIFIED:
   A. VALUES ARE IN KILOHMS AND PICOFARADS.

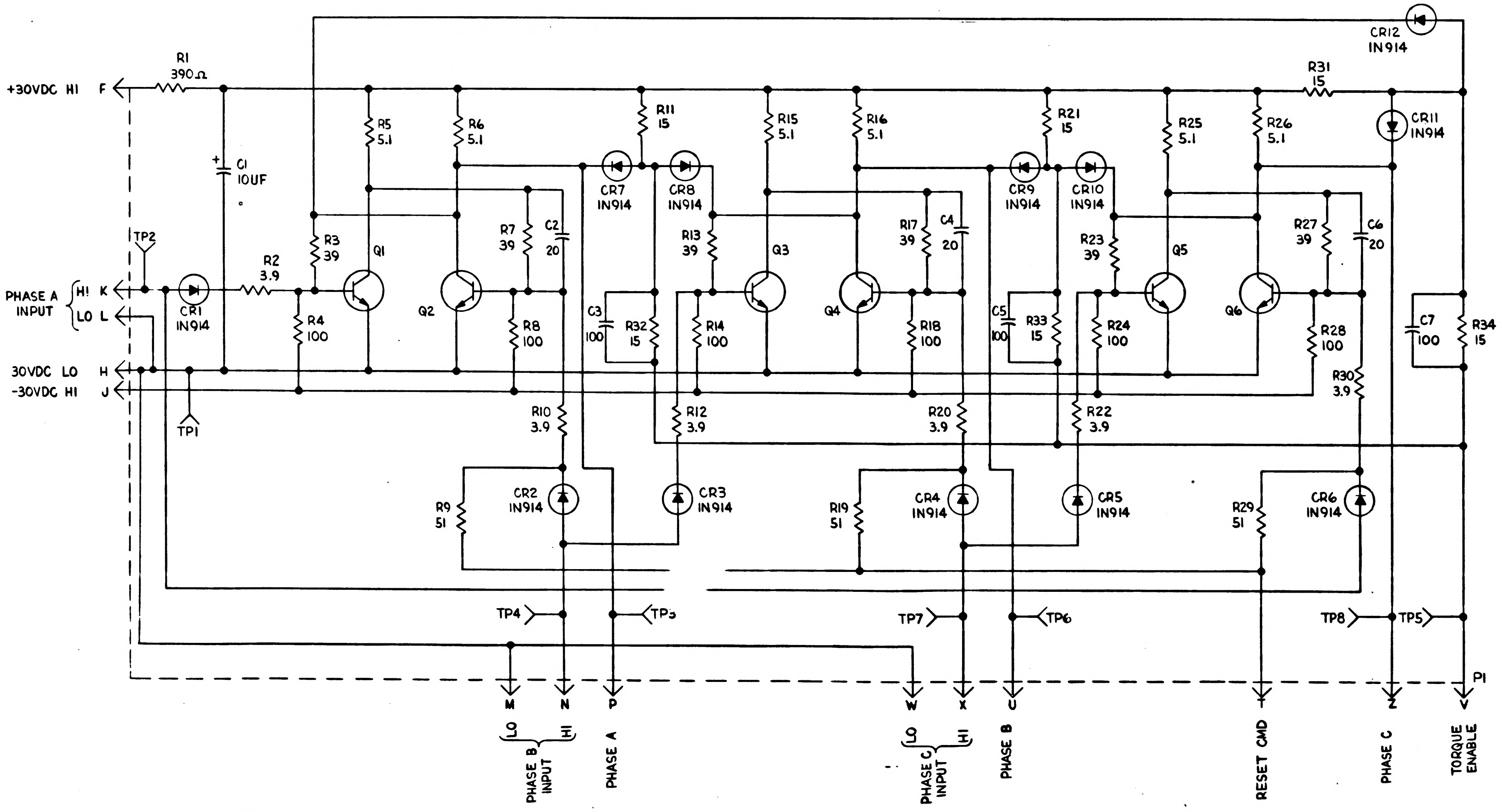
REF DES	PART NUMBER	DESCRIPTION	SCHEMATIC DIA OR VALUE, TOLERANCE RATING
R12	RC07GF392J	RESISTOR, MIL-R-11/8	
R13	RC07GF393J	↕	
R14	RC07GF104J	↕	
R15	RC07GF512J	↕	
R16	RC07GF512J	↕	
R17	RC07GF393J	↕	
R18	RC07GF104J	↕	
R19	RC07GF513J	↕	
R20	RC07GF392J	↕	
R21	RC07GF153J	↕	
R22	RC07GF392J	↕	
R23	RC07GF393J	↕	
R24	RC07GF104J	↕	
R25	RC07GF512J	↕	
R26	RC07GF512J	↕	
R27	RC07GF393J	↕	
R28	RC07GF104J	↕	
R29	RC07GF513J	↕	
R30	RC07GF392J	↕	
R31	RC07GF153J	↕	
R32	RC07GF153J	↕	
R33	RC07GF153J	↕	
R34	RC07GF153J	RESISTOR, MIL-R-11/8	
TP1	1016347-003	JACK, MINIATURE	BLK
TP2	↕ -010	↕	GRY
TP3	↕ -008	↕	BLU
TP4	↕ -010	↕	GRY
TP5	↕ -008	↕	BLU
TP6	↕ -008	↕	BLU
TP7	↕ -010	↕	GRY
TP8	1016347-008	JACK, MINIATURE	BLU

REF DES	PART NUMBER	DESCRIPTION	SCHEMATIC DIA OR VALUE, TOLERANCE, RATING
C1	CS13AG100K	CAPACITOR, MIL-C-26655/2C	
C2	CM15C200J03	↕ MIL-C-5/1	
C3	CM15C101J03	↕	
C4	CM15C200J03	↕	
C5	CM15C01J03	↕	
C6	CM15C200J03	↕	
C7	CM15C101J03	CAPACITOR MIL-C-5/1	
CR1	IN914	SEMICONDUCTOR, MIL-S-19500/116	
CR2	↕	↕	
CR3	↕	↕	
CR4	↕	↕	
CR5	↕	↕	
CR6	↕	↕	
CR7	↕	↕	
CR8	↕	↕	
CR9	↕	↕	
CR10	↕	↕	
CR11	↕	↕	
CR12	IN914	SEMICONDUCTOR, MIL-S-19500/116	
Q1	1015928-001	TRANSISTOR	2N2193 SPL
Q2	↕	↕	↕
Q3	↕	↕	↕
Q4	↕	↕	↕
Q5	↕	↕	↕
Q6	1015928-001	TRANSISTOR	2N2193 SPL
P1	1015956-167	CONNECTOR	21 PIN
R1	RC32GF391J	RESISTOR, MIL-R-11/6	
R2	RC07GF392J	↕ 11/8	
R3	RC07GF393J	↕ 11/8	
R4	RC07GF104J	↕ 11/8	
R5	RC07GF512J	↕ 11/8	
R6	RC07GF512J	↕ 11/8	
R7	RC07GF393J	↕ 11/8	
R8	RC07GF104J	↕ 11/8	
R9	RC07GF513J	↕ 11/8	
R10	RC07GF392J	↕ 11/8	
R11	RC07GF153J	RESISTOR, MIL-R 11/8	

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR 23556		8 Oct 65	

UNUSED TERMINALS

REF DES	TERMINAL NO.
P1	B,C,D,E,R,S AND Y



+30VDC HI F
R1 390Ω
C1 10UF
TP2
PHASE A INPUT
HI K
LO L
CR1 IN914
R2 3.9
R3 39
R4 100
30VDC LO H
-30VDC HI J
TP1
R5 5.1
R6 5.1
Q1
Q2
R7 39
C2 20
R8 100
R10 3.9
R9 51
CR2 IN914
R11 15
CR7 IN914
CR8 IN914
C3 100
R32 15
R13 39
R14 100
R12 3.9
CR3 IN914
Q3
Q4
R15 5.1
R16 5.1
R17 39
C4 20
R18 100
R20 3.9
R19 51
CR4 IN914
R21 15
CR9 IN914
CR10 IN914
C5 100
R33 15
R23 39
R24 100
R22 3.9
CR5 IN914
Q5
Q6
R25 5.1
R26 5.1
R27 39
C6 20
R28 100
R30 3.9
R29 51
CR6 IN914
R31 15
CR11 IN914
CR12 IN914
C7 100
R34 15
TP4
TP5
TP7
TP6
TP8
TP5
P1
M
N
P
W
X
U
Z
V
LO
HI
PHASE B INPUT
PHASE A
LO
HI
PHASE C INPUT
PHASE B
RESET CMD
PHASE C
TORQUE ENABLE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES +— +— +— -— -— -—	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN	SCHEMATIC DIAGRAM, ELECTRICAL- FLIP FLOP
	DRAWN E. Miller DATE 6 APR 65 CHECKED 19 APR 65 APPROVAL 20 APR 65 APPROVAL 10-22-65	
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 / SIZE E / 2900019
CONTRACT NAS9-497	MIT APPROVAL	SCALE — / SHEET 1 OF 1

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. NO CONFIGURATION REQUIRED.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
F		REPLACES REV(E) WITH CHANGE PER MXC 204687 WAS "D" SIZE		13 SEP 65	RP
G		REVISED PER MXC 206260		20 OCT 65	DLC
H		INITIAL RELEASE CLASS A PER TDRR 23772		20 OCT 65	DLC

			X			PS 2900022	PROCUREMENT SPECIFICATION
			1			2900024-011	DISTRIBUTION BOX-GSE
			1			2900025-011	CABLE SET, INTERCONNECT (BASIC)
			1			1902134-021	CONSOLE, COOLANT & POWER, G & N
			1			2900023-011	ANALYZER, OPTICS, INERTIAL
			1			1900000-021	CONSOLE, OSCILLOGRAPH
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED						LIST OF PARTS AND MATERIALS	

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030	1900030	

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN A.E. Olson DATE 24 MAR 65
CHECKED Ed Foster 24 MAR 65
APPROVAL D. Carpenter 24 MAR 65
APPROVAL L. Jeltman
NASA APPROVAL A. C. METZGER
MIT APPROVAL W. Kupfer 3 Nov 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS INERTIAL TEST SET

CODE IDENT NO. 99974
SIZE C
2900022
SCALE —
SHEET 1 OF 1

MIL 1078C-P

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. NO CONFIGURATION REQUIRED.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
F		REPLACES REV(E) WITH CHANGE PER MXC 204687 WAS "D" SIZE		13 SEP 65	RLP / EF
G		REVISED PER MXC 206260		20 OCT 65	DLC / Aud
H		INITIAL RELEASE CLASS A PER TDRR 23772		20 OCT 65	DLC / CW
J		REVISED PER TDRR 27575		6-APR 66	M.G. / EF

		X			11		PROCUREMENT SPECIFICATION
		1			10	2900024-021	DISTRIBUTION BOX-GSE
		1			9	2900025-021	CABLE SET, INTERCONNECT (BASIC)
		1			8	1902134-031	CONSOLE, COOLANT AND PWR, G&N
		1			7	2900023-021	ANALYZER, OPTICS INERTIAL
			X		6	PS 2900022	PROCUREMENT SPECIFICATION
			1		5	2900024-011	DISTRIBUTION BOX-GSE
			1		4	2900025-011	CABLE SET, INTERCONNECT (BASIC)
			1		3	1902134-021	CONSOLE, COOLANT & POWER, G&N
			1		2	2900023-011	ANALYZER, OPTICS, INERTIAL
		1	1		1	1900000-021	CONSOLE, OSCILLOGRAPH
		021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030	1900030	

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS +— − DECIMALS +— − ANGLES +— −
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.
DRAWN R L Olson DATE 24 MAR 65
CHECKED Ed Foster 24 MAR 65
APPROVAL D Carpenter 24 MAR 65
APPROVAL L Jedeman 10/20/65
NASA APPROVAL A. C. METZGER 3 NOV 65
MIT APPROVAL W Kupfer

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS INERTIAL TEST SET

CODE IDENT NO. 99974
SIZE C
2900022
SCALE —
SHEET 1 OF 1

MIL 1078C—P

2900022

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. NO CONFIGURATION REQUIRED.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
F		REPLACES REV(E) WITH CHANGE PER MXC 204687 WAS "D" SIZE		13 SEP 65	RLP EF
G		REVISED PER MXC 206260		20 OCT 65	DLC
H		INITIAL RELEASE CLASS A PER TDRR 23772		20 OCT 65	DLC
J		REVISED PER TDRR 27575		6-APR 66	
K		REVISED PER TDRR 28890		23 MAY 66	RLP

2900022 | K

LIST OF PARTS AND MATERIALS

QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
		021	011				
		X			11	PS 2016113	PROCUREMENT SPECIFICATION
		1			10	2900024-021	DISTRIBUTION BOX-GSE
		1			9	2900025-021	CABLE SET, INTERCONNECT (BASIC)
		1			8	1902134-031	CONSOLE, COOLANT AND PWR, G&N
		1			7	2900023-021	ANALYZER, OPTICS INERTIAL
			X		6	PS 2900022	PROCUREMENT SPECIFICATION
			1		5	2900024-011	DISTRIBUTION BOX-GSE
			1		4	2900025-011	CABLE SET, INTERCONNECT (BASIC)
			1		3	1902134-021	CONSOLE, COOLANT & POWER, G&N
			1		2	2900023-011	ANALYZER, OPTICS, INERTIAL
		1	1		1	1900000-021	CONSOLE, OSCILLOGRAPH

APPLICATION		
NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030	1900030	

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — DECIMALS + — ANGLES + —
DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.

DRAWN A. L. Olsen DATE 24 MAR 65
CHECKED Ed Foster 24 MAR 65
APPROVAL 24 MAR 65
APPROVAL L. Jedeman
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS INERTIAL TEST SET

CODE IDENT NO. 99974
SIZE C
2900022
SCALE —
SHEET 1 OF 1

MIL 1078L P

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. NO CONFIGURATION REQUIRED.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
F		REPLACES REV(E) WITH CHANGE PER MXC 204687 WAS "D" SIZE		13 SEP 65	RLP EF
G		REVISED PER MXC 206260		20 OCT 65	DLC
H		INITIAL RELEASE CLASS A PER TDRR 23772		20 OCT 65	DLC
J		REVISED PER TDRR 27575		6-APR-66	W.G. E.
K		REVISED PER TDRR 28890		23 MAY 66	RLP PF
L		REVISED PER TDRR 28764		24 MAY 66	PHG CP

	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1				16	2900023-031	ANALYSER, OPTICS INERTIAL
	X				15	PS2016123	PROCUREMENT SPECIFICATION
	1				14	2900024-031	DISTRIBUTION BOX - GSE
	1				13	2900025-031	CABLE SET, INTERCONNECT (BASIC)
					12		
		X			11	PS2016113	PROCUREMENT SPECIFICATION
		1			10	2900024-021	DISTRIBUTION BOX - GSE
		1			9	2900025-021	CABLE SET, INTERCONNECT (BASIC)
	1	1			8	1902134-031	CONSOLE, COOLANT AND PWR, G&N
		1			7	2900023-021	ANALYZER, OPTICS INERTIAL
			X		6	PS 2900022	PROCUREMENT SPECIFICATION
			1		5	2900024-011	DISTRIBUTION BOX-GSE
			1		4	2900025-011	CABLE SET, INTERCONNECT (BASIC)
			1		3	1902134-021	CONSOLE, COOLANT & POWER, G&N
			1		2	2900023-011	ANALYZER, OPTICS, INERTIAL
	1	1	1		1	1900000-021	CONSOLE, OSCILLOGRAPH
QUANTITY REQUIRED						LIST OF PARTS AND MATERIALS	

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030	1900030	
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.

DRAWN A. L. Olsen DATE 24 MAR 65
CHECKED Ed Foster 24 MAR 65
APPROVAL D. C. Justin 24 MAR 65
APPROVAL L. Jodeman
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS INERTIAL TEST SET

CODE IDENT NO. 99974
SIZE C
2900022
SCALE —
SHEET 1 OF 1

L | 2900022 | B

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. NO CONFIGURATION REQUIRED.

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
F		REPLACES REV(E) WITH CHANGE PER MXC 204687 WAS "D" SIZE		13 SEP 65	RLP EF
G		REVISED PER MXC 206260		20 OCT 65	DLC
H		INITIAL RELEASE CLASS A PER TDRR 23772		20 OCT 65	DLC CW
J		REVISED PER TDRR 27575		6-APR 66	M.G. EI
K		REVISED PER TDRR 28890		23 MAY 66	RLP PJ
L		REVISED PER TDRR 28764		24 MAY 66	PHG CP
M		REVISED PER TDRR 28888		25-MAY-66	B. JAC

	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1	—	—		16	2900023-031	ANALYSER, OPTICS INERTIAL
	☒	—	—		15	PS2016123	PROCUREMENT SPECIFICATION
	1	—	—		14	2900024-031	DISTRIBUTION BOX - GSE
	1	—	—		13	2900025-031	CABLE SET, INTERCONNECT (BASIC)
	—	☒	☒		12	2901077	GSE SIGNAL SELECTION LIST
	—	☒	—		11	PS2016113	PROCUREMENT SPECIFICATION
	—	1	—		10	2900024-021	DISTRIBUTION BOX - GSE
	—	1	—		9	2900025-021	CABLE SET, INTERCONNECT (BASIC)
	1	1	—		8	1902134-031	CONSOLE, COOLANT AND PWR, G&N
	—	1	—		7	2900023-021	ANALYZER, OPTICS INERTIAL
	—	—	☒		6	PS 2900022	PROCUREMENT SPECIFICATION
	—	—	1		5	2900024-011	DISTRIBUTION BOX - GSE
	—	—	1		4	2900025-011	CABLE SET, INTERCONNECT (BASIC)
	—	—	1		3	1902134-021	CONSOLE, COOLANT & POWER, G&N
	—	—	1		2	2900023-011	ANALYZER, OPTICS, INERTIAL
	1	1	1		1	1900000-021	CONSOLE, OSCILLOGRAPH
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030	1900030	

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.

DRAWN A G Olson DATE 24 MAR 65
CHECKED Ed Foster 24 MAR 65
APPROVAL D Carpenter 24 MAR 65
APPROVAL L Jedman 10/20/65
NASA APPROVAL A. C. METZ
MIT APPROVAL W Kupfer 3 NOV 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS INERTIAL TEST SET

CODE IDENT NO. 99974
SIZE C
2900022
SCALE —
SHEET 1 OF 1

MIL 1078C—P

2900022 M

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. NO CONFIGURATION REQUIRED.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
F		REPLACES REV(E) WITH CHANGE PER MXC 204687 WAS "D" SIZE		13 SEP 65	RLP / EF
G		REVISED PER MXC 206260		20 OCT 65	DLC / Dust
H		INITIAL RELEASE CLASS A PER TDRR 23772		20 OCT 65	DLC / CW
Ⓜ J		REVISED PER TDRR 27575		6-APR 66	M.G. / EF
K		REVISED PER TDRR 28890		23 MAY 66	RLP / PJ
L		REVISED PER TDRR 28764		24 MAY 66	PHG / CP
Ⓜ M		REVISED PER TDRR 28888		25-MAY-66	B. / JAC
N		REVISED PER TDRR 32134		3 DEC 66	T.D. / 888

041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
1	-	-	-		18	PS2016127	PROCUREMENT SPECIFICATION
1	-	-	-		17	2900023-041	ANALYSER, OPTICS INERTIAL
—	1	—	—		16	2900023-031	ANALYZER, OPTICS INERTIAL
—	☒	—	—		15	PS2016123	PROCUREMENT SPECIFICATION
1	1	—	—		14	2900024-031	DISTRIBUTION BOX - GSE
1	1	—	—		13	2900025-031	CABLE SET, INTERCONNECT (BASIC)
-	—	☒	☒		12	2901077	GSE SIGNAL SELECTION LIST
-	—	☒	—		11	PS2016113	PROCUREMENT SPECIFICATION
-	—	1	—		10	2900024-021	DISTRIBUTION BOX - GSE
-	—	1	—		9	2900025-021	CABLE SET, INTERCONNECT (BASIC)
1	1	1	—		8	1902134-031	CONSOLE, COOLANT AND PWR, G&N
—	—	1	—		7	2900023-021	ANALYZER, OPTICS INERTIAL
—	—	—	☒		6	PS 2900022	PROCUREMENT SPECIFICATION
-	—	—	1		5	2900024-011	DISTRIBUTION BOX - GSE
-	—	—	1		4	2900025-011	CABLE SET, INTERCONNECT (BASIC)
-	—	—	1		3	1902134-021	CONSOLE, COOLANT & POWER, G&N
-	—	—	1		2	2900023-011	ANALYZER, OPTICS, INERTIAL
1	1	1	1		1	1900000-021	CONSOLE, OSCILLOGRAPH

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030	1900030	

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.

DRAWN Atkinson DATE 24 MAR 65
CHECKED Ed Foster 24 MAR 65
APPROVAL D Carpenter 24 MAR 65
APPROVAL L Jafman 11/2/65
NASA APPROVAL A. C. METZGER
MIT APPROVAL W Kupfer 3 NOV 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS INERTIAL TEST SET

CODE IDENT NO. 99974
SIZE C
2900022
SCALE —
SHEET 1 OF 1

MIL 1078C—P

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. NO CONFIGURATION REQUIRED.

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
F		REPLACES REV(E) WITH CHANGE PER MXC 204687 WAS "D" SIZE		13 SEP 65	RLP EF
G		REVISED PER MXC 206260		20 OCT 65	DLC Aust
H		INITIAL RELEASE CLASS A PER TDRR 23772		20 OCT 65	DLC CW
Ⓜ J		REVISED PER TDRR 27575		6-APR 66	M.G. EF
K		REVISED PER TDRR 28890		23 MAY 66	RLP PJ
L		REVISED PER TDRR 28764		24 MAY 66	PHG CP
Ⓜ M		REVISED PER TDRR 28888		25-MAY-66	B. JAC
N		REVISED PER TDRR 32134		3 DEC 66	T.D. 688

QUANTITY REQUIRED							
041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
1	-	-	-		18	PS2016127	PROCUREMENT SPECIFICATION
1	-	-	-		17	2900023-041	ANALYSER, OPTICS INERTIAL
—	1	—	—		16	2900023-031	ANALYZER, OPTICS INERTIAL
—	☒	—	—		15	PS2016123	PROCUREMENT SPECIFICATION
1	1	—	—		14	2900024-031	DISTRIBUTION BOX - GSE
1	1	—	—		13	2900025-031	CABLE SET, INTERCONNECT (BASIC
—	—	☒	☒		12	2901077	GSE SIGNAL SELECTION LIST
—	—	☒	—		11	PS2016113	PROCUREMENT SPECIFICATION
—	—	1	—		10	2900024-021	DISTRIBUTION BOX- GSE
—	—	1	—		9	2900025-021	CABLE SET, INTERCONNECT (BASIC
1	1	1	—		8	1902134-031	CONSOLE, COOLANT AND PWR, G&N
—	—	1	—		7	2900023-021	ANALYZER, OPTICS INERTIAL
—	—	—	☒		6	PS 2900022	PROCUREMENT SPECIFICATION
—	—	—	1		5	2900024-011	DISTRIBUTION BOX-GSE
—	—	—	1		4	2900025-011	CABLE SET, INTERCONNECT (BASIC)
—	—	—	1		3	1902134-021	CONSOLE, COOLANT & POWER, G&N
—	—	—	1		2	2900023-011	ANALYZER, OPTICS, INERTIAL
1	1	1	1		1	1900000-021	CONSOLE, OSCILLOGRAPH

LIST OF PARTS AND MATERIALS

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1900030	1900030	

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FRACTIONS ± — DECIMALS ± — ANGLES ± —
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MATERIAL —.
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.
DRAWN R L Olson DATE 24 MAR 65
CHECKED Ed Foster 24 MAR 65
APPROVAL D Carpenter 24 MAR 65
APPROVAL L Jediman 10/12/65
NASA APPROVAL A. C. METZGER
MIT APPROVAL W Kupfer 3 NOV 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS INERTIAL TEST SET

CODE IDENT NO. 99974
SIZE C
2900022
SCALE —
SHEET 1 OF 1

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. NO CONFIGURATION REQUIRED.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
F		REPLACES REV(E) WITH CHANGE PER MXC 204687 WAS "D" SIZE		13 SEP 65	RLP EF
G		REVISED PER MXC 206260		20 OCT 65	DLC
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L		REVISED PER TDRR 28764		24 MAY 66	PHG CP
M		REVISED PER TDRR 28888		25-MAY-66	B. JAC
N		REVISED PER TDRR 32134		3 DEC 66	T.D.
P		REVISED PER TDRR 36752		10 SEP 68	

051	041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
X	—	—	—	—		20	2901640	GSE SIGNAL SELECTION LIST
1	—	—	—	—		19	2900023-051	ANALYZER, OPTICS INERTIAL
1	1	—	—	—		18	PS2016127	PROCUREMENT SPECIFICATION
—	1	—	—	—		17	2900023-041	ANALYSER, OPTICS INERTIAL
—	—	1	—	—		16	2900023-031	ANALYZER, OPTICS INERTIAL
—	—	X	—	—		15	PS2016123	PROCUREMENT SPECIFICATION
1	1	1	—	—		14	2900024-031	DISTRIBUTION BOX - GSE
1	1	1	—	—		13	2900025-031	CABLE SET, INTERCONNECT (BASIC)
—	X	X	X	X		12	2901077	GSE SIGNAL SELECTION LIST
—	—	—	X	—		11	PS2016113	PROCUREMENT SPECIFICATION
—	—	—	1	—		10	2900024-021	DISTRIBUTION BOX- GSE
—	—	—	1	—		9	2900025-021	CABLE SET, INTERCONNECT (BASIC)
1	1	1	1	—		8	1902134-031	CONSOLE, COOLANT AND PWR, G&N
—	—	—	1	—		7	2900023-021	ANALYZER, OPTICS INERTIAL
—	—	—	—	X		6	PS 2900022	PROCUREMENT SPECIFICATION
—	—	—	—	1		5	2900024-011	DISTRIBUTION BOX-GSE
—	—	—	—	1		4	2900025-011	CABLE SET, INTERCONNECT (BASIC)
—	—	—	—	1		3	1902134-021	CONSOLE, COOLANT & POWER, G&N
—	—	—	—	1		2	2900023-011	ANALYZER, OPTICS, INERTIAL
1	1	1	1	1		1	1900000-021	CONSOLE, OSCILLOGRAPH

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030	1900030	

APPLICATION

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DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS
DRAWN R L Olson DATE 24 MAR 65
CHECKED Ed Foster 24 MAR 65
APPROVAL D Carpenter 24 MAR 65
APPROVAL
NASA APPROVAL A. C. METZGER 3 Nov 65
MIT APPROVAL

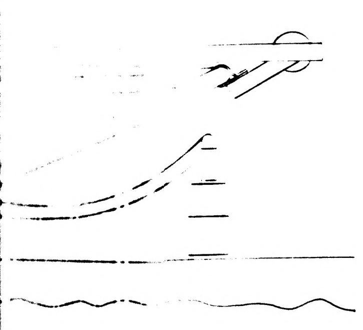
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS INERTIAL TEST SET

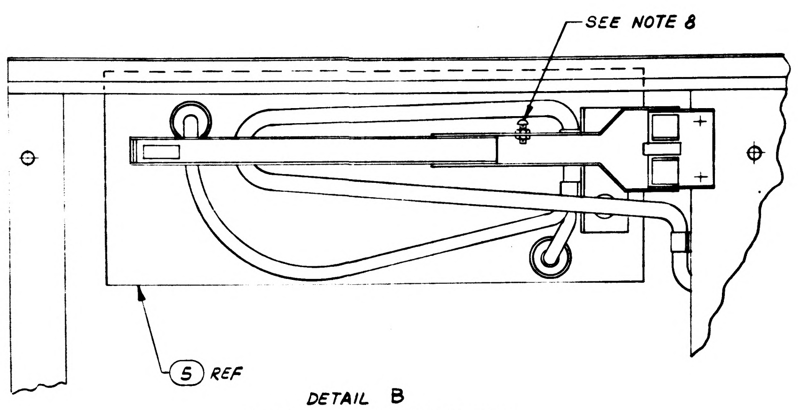
CODE IDENT NO. 99974
SIZE C
2900022
SCALE —
SHEET 1 OF 1

MIL 1078C—P

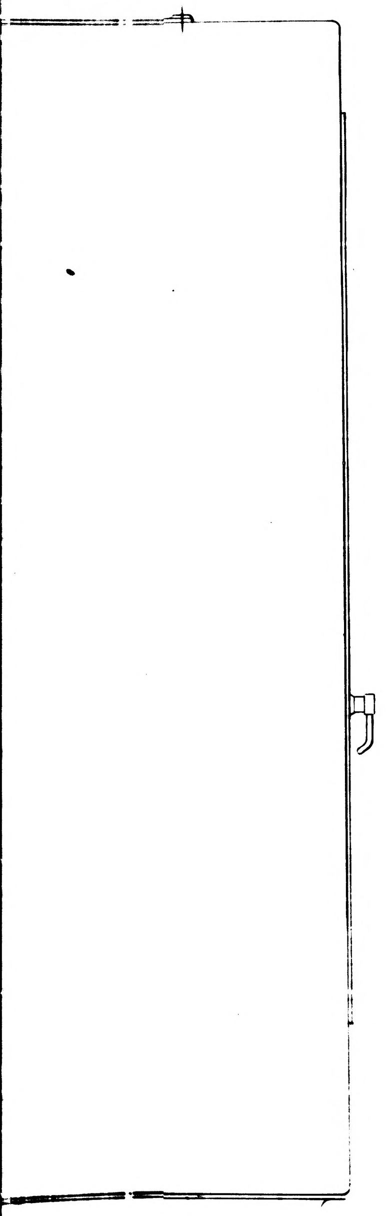
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
H		REPLACE REV. "G" WITH CHANGE PER MXC 202820		8-JULY 65	GM
J		REVISED PER MXC 203259		23 JUL 65	
K		REVISED PER MXC 203443		2 AUG 65	
L		REVISED PER MXC 204240		26 AUG 65	
M		REVISED PER MXC 205204		SEP 65	
N		INITIAL RELEASE CLASS A PER TDRR 23919		65	

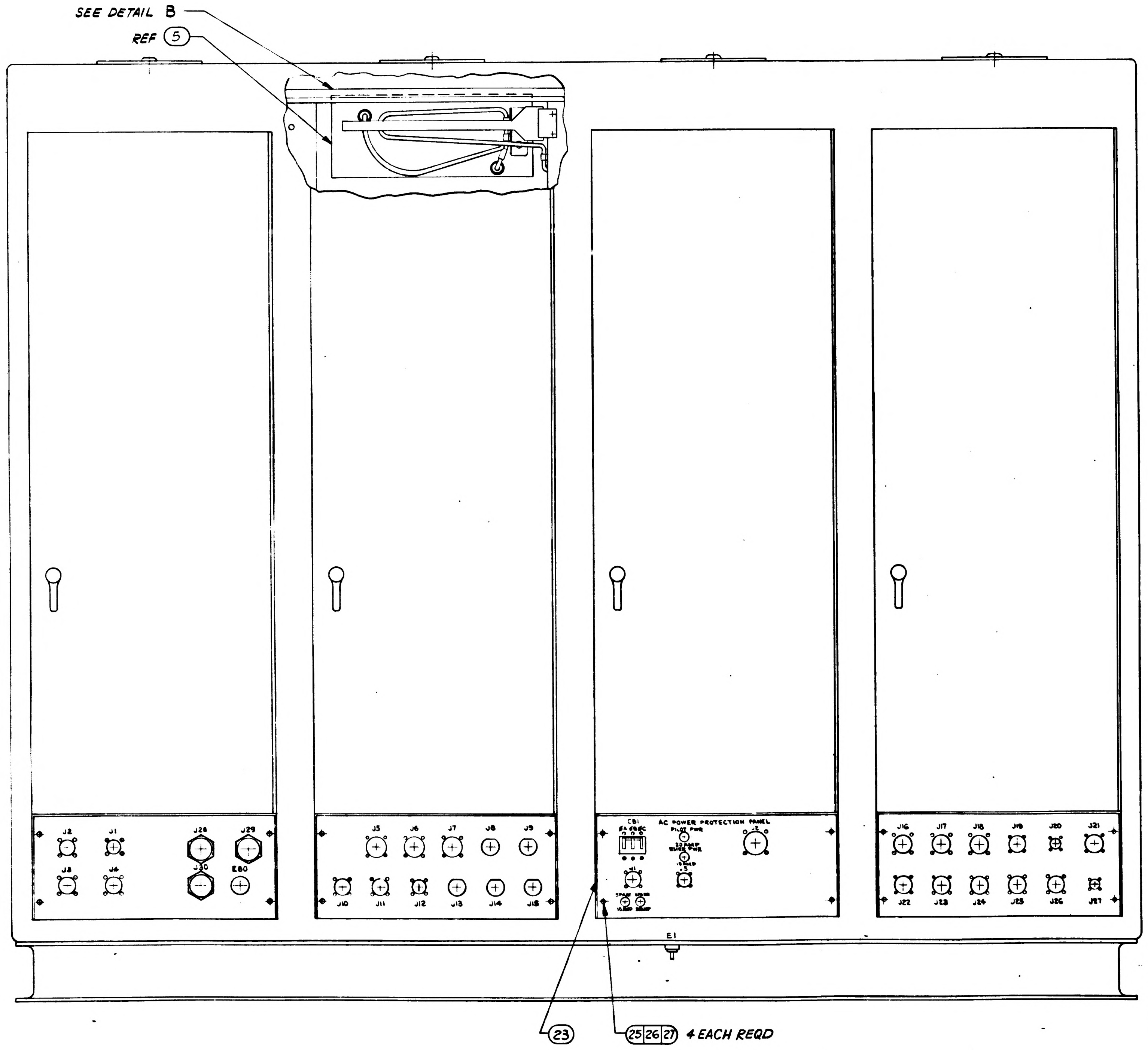


DETAIL A
SCALE 1:2
ESS SUSPENSION
LAR TO MOST
ER INSTALLATIONS



DETAIL B
HARNESS ARRANGEMENT FOR
ALL DRAWERS SIMILAR
SCALE 1:2 SEE NOTE 8





	QUANTITY REQUIRED			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				1		40	2900029-011	CAGING ELECTRONICS, GYRO, ASSY
				1		39	2900027-011	CONTROL, TEST ASSY
				1		38	2900026-011	TEMPERATURE MONITOR & CONTROL ASSY
						37		
						36		
SEE NOTE 7				X		35	2900322	INSTALLATION DRAWING, OIA
SEE NOTE 3				AR		34	MIL-I-8660	ELEC INSULATING & SEALING COMPOUND
				4		33	MS35233-2	SCREW, MACHINE, PAN HD
SEE NOTE 9				1		32	1004260-142	NAMEPLATE, APOLLO G&N
						31		
SEE NOTE 5				2		30	1015796-001	SPACER, BAR
SEE NOTE 5				2		29	1015790-001	NUT-BAR
				28		28	1900934	SPACER, BAR
				252		27	AN960C10L	(1897006-019) WASHER-FLAT
				252		26	MS35338-81	WASHER, LOCK
SEE NOTE 5				252		25	1006783-44	SCREW, BUTTON HD-HEX SOCKET
				1		23	1902017-011	AC POWER PROTECTION PANEL ASSY
				1		22	2900032-011	CABINET ASSY, ELECTRICAL EQUIP, ASSY
				1		21	1900049-031	POWER SUPPLY RELAY & LAMP ASSY
				1		20	1900043-011	GENERATOR, SIGNAL ASSY
				1		19	2900034-011	SELECTOR, SIGNAL, OSCILLOGRAPH, ASSY
				1		18	1900041-011	COUNTER ASSY
				1		17	1900036-011	VOLTMETER, PHASE ANGLE ASSY
SEE NOTE 12				1		16	2900007-011	VOLTMETER, DIGITAL, ASSY
				1		15	1900048-011	SWITCH, CROSSBAR ASSY
				1		14	2900030-011	PANEL, AUXILIARY INPUT, ASSY
				1		13	2900035-011	SELECTOR, SIGNAL, PRIMARY, ASSY
				1		12	1900037-011	OSCILLOSCOPE, DUAL BEAM ASSY
				1		11	2900012-011	POWER SUPPLY, ELECTRONICS ASSY
				1		10	1900052-011	RECORDER, DIGITAL ASSY
				1		9	1900163-011	PHASE SHIFT ASSY
				1		8	2900028-011	SELECTOR, TEST, ASSY
						7		
				1		6	2900036-011	CONTROL, GIMBAL POSITION, ASSY
				2		5	1900038-011	OSCILLOSCOPE, MONITOR ASSY
				2		4	1900350-011	FAN, CENTRIFUGAL ASSY
				1		3	2900033-011	POWER SUPPLY & LOAD PANEL ASSY
						2		
				1		1	2900031-011	MONITOR PANEL ASSY

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900008-011	2900008-011	-011
APPLICATION		

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DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION. GMC
MILWAUKEE. WISCONSIN
ACSP PN
DRAWN Hetchler DATE 24/MAR/65
CHECKED J. GRIEB 24/MAR/65
APPROVAL G. Stoddard 24/MAR/65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON. TEXAS

OPTICS - INERTIAL
ANALYZER

CODE IDENT NO. 99974
SIZE J2
2900023
SCALE 1:4
SHEET 1 OF 2

2900023 N

2900023

27 2900023

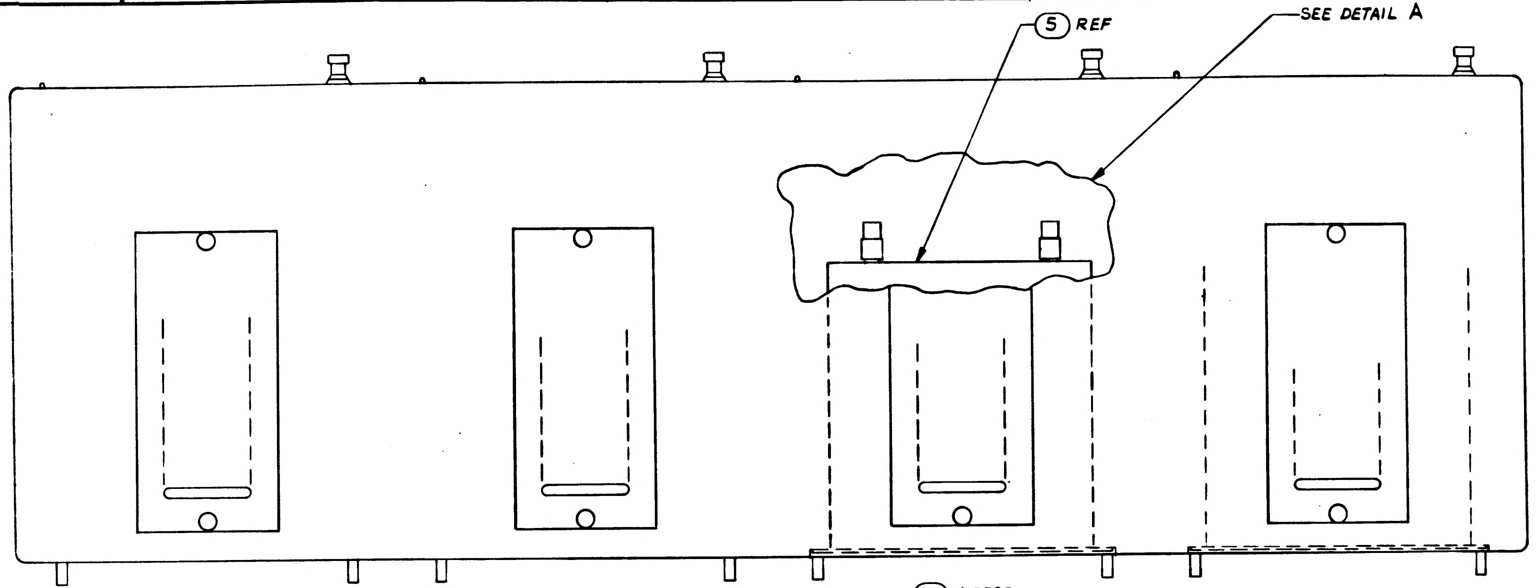
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SPACING BETWEEN FRONT PANELS IN EACH VERTICAL ROW IS TO BE BALANCED THRU DIMENSION SHOWN. A MINIMUM SPACING OF .030 IS TO BE MAINTAINED BETWEEN ANY TWO FRONT PANELS.
3. APPLY ITEM (34) TO SURFACE "A".
4. APPLY TIGHTENING TORQUE TO SCREWS AS FOLLOWS:
   ITEM (25) 28.5 TO 31.7 IN.LBS.
5. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING
6. DISPOSE OF EXCESS DRAWER MOUNTING HARDWARE IN AN APPROVED MANNER.
7. BEFORE AND AFTER DRAWER INSTALLATION CONSOLE MUST BE ATTACHED TO THE FLOOR TO INSURE PERSONNEL AND EQUIPMENT SAFETY. SEE ITEM (35) FOR INSTALLATION ONLY, NOT FOR CONFIGURATION.
8. HARNESS GROUPS THAT ARE DISCONNECTED WHEN A DRAWER IS REMOVED FROM THE CABINET ARE TO BE HUNG BY SLIPPING THE HANGER LOOP OF THE HARNESS OVER THE HANGER SCREWS AT 2 PLACES AS SHOWN, WITH THE OPTION OF FORWARD OR BACK HANGING.
9. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (32) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .12 HIGH.

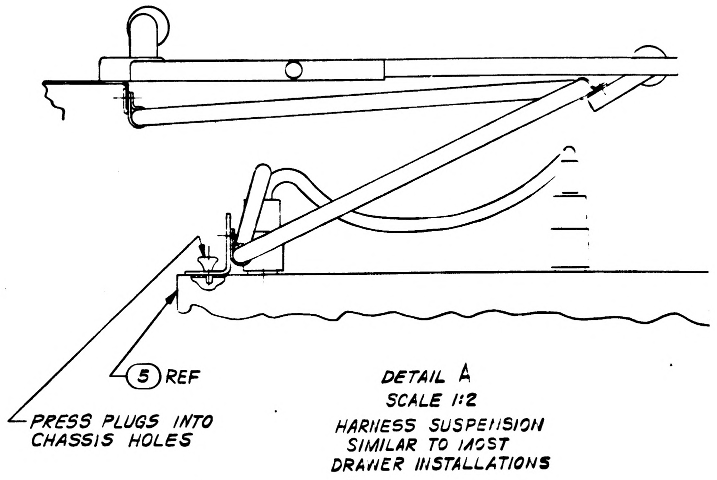
12. PART NO. 2900007-011 IS INTERCHANGEABLE WITH PART NO. 1900042-031 WHICH APPEARS IN EARLIER EQUIPMENT UPDATED BY RETROFIT.
13. ITEM 15 TO BE LOCATED SO THAT ITS HANDLE STRIKES THE PAD ON THE BACK OF THE CROSSBAR SWITCH COMPARTMENT PANEL APPROXIMATELY CENTER.

SECTIONS APPEAR ON SHEETS AS FOLLOWS:

A-A	SH 2	ZONE	C 13
B-B	↓	2	C 10
C-C		2	C 3
D-D		1	A 16
E-E		2	C 4
F-F		2	C 6
G-G		2	A 8
H-H		2	C 14

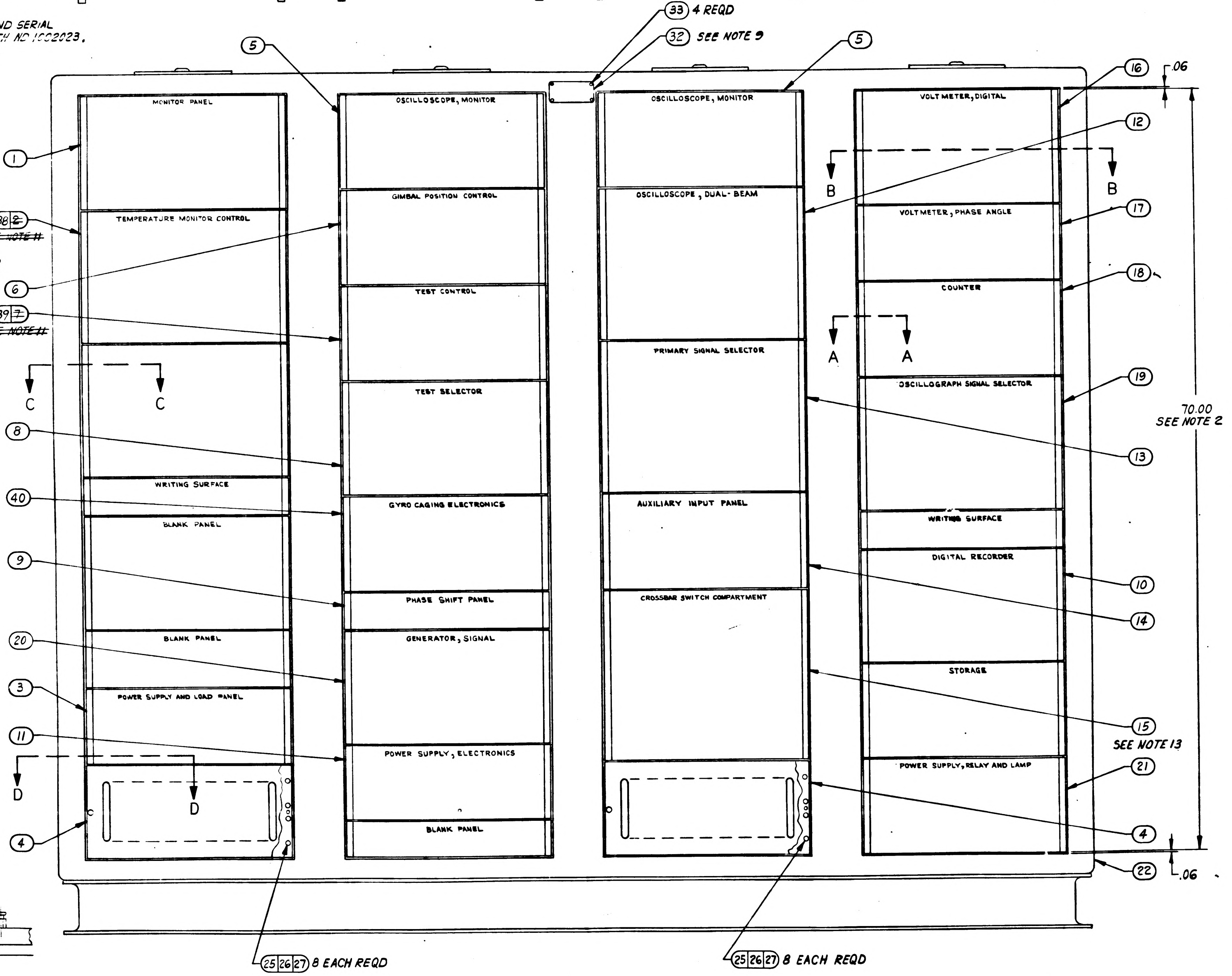


(5) REF
SEE DETAIL A

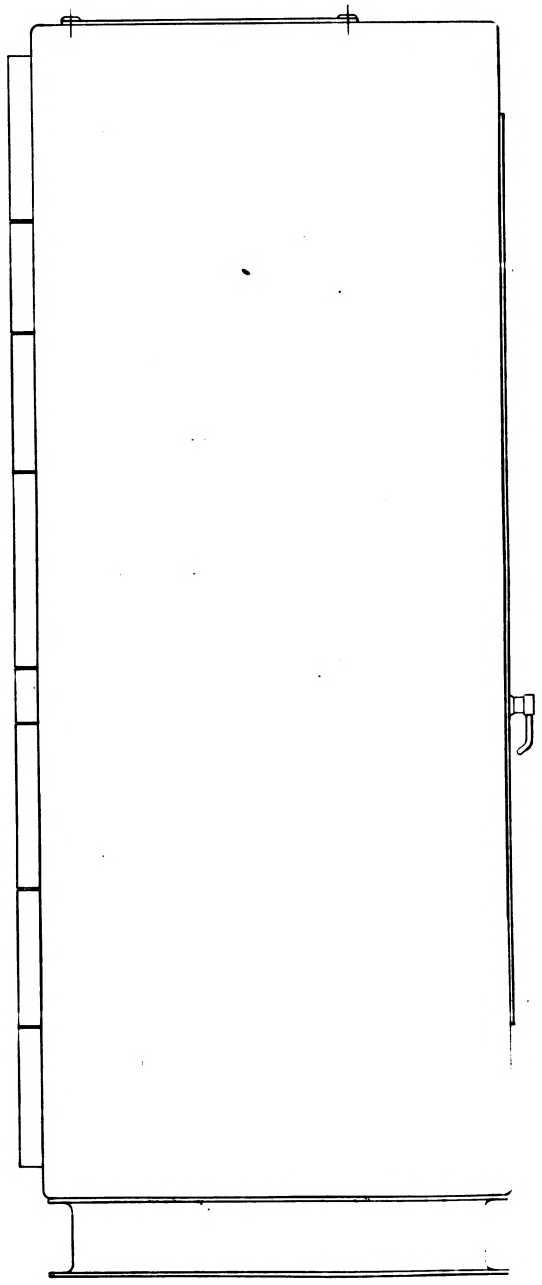


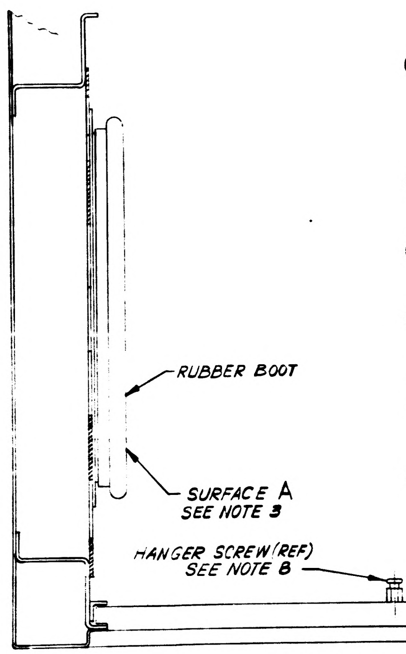
(5) REF
PRESS PLUGS INTO CHASSIS HOLES

DETAIL A
SCALE 1:2
HARNESS SUSPENSION SIMILAR TO MOST DRAWER INSTALLATIONS



(33) 4 REQD
(32) SEE NOTE 9
(5)
(5)
(16)
.06
(12)
MONITOR PANEL
TEMPERATURE MONITOR CONTROL
WRITING SURFACE
BLANK PANEL
BLANK PANEL
POWER SUPPLY AND LOAD PANEL
OSCILLOSCOPE, MONITOR
GIMBAL POSITION CONTROL
TEST CONTROL
TEST SELECTOR
GYRO CAGING ELECTRONICS
PHASE SHIFT PANEL
GENERATOR, SIGNAL
POWER SUPPLY, ELECTRONICS
BLANK PANEL
OSCILLOSCOPE, MONITOR
OSCILLOSCOPE, DUAL-BEAM
PRIMARY SIGNAL SELECTOR
AUXILIARY INPUT PANEL
CROSSBAR SWITCH COMPARTMENT
VOLTMETER, DIGITAL
VOLTMETER, PHASE ANGLE
COUNTER
OSCILLOGRAPH SIGNAL SELECTOR
WRITING SURFACE
DIGITAL RECORDER
STORAGE
POWER SUPPLY, RELAY AND LAMP
(1)
(38) ~~2~~ ~~SEE NOTE 11~~
(6)
(39) ~~7~~ ~~SEE NOTE 11~~
C C
(8)
(40)
(9)
(20)
(3)
(11)
D D
(4)
B B
A A
(17)
(18)
(19)
(13)
(10)
(14)
(15) SEE NOTE 13
(21)
(4)
(22)
.06
70.00 SEE NOTE 2
(25)(26)(27) 8 EACH REQD
(25)(26)(27) 8 EACH REQD





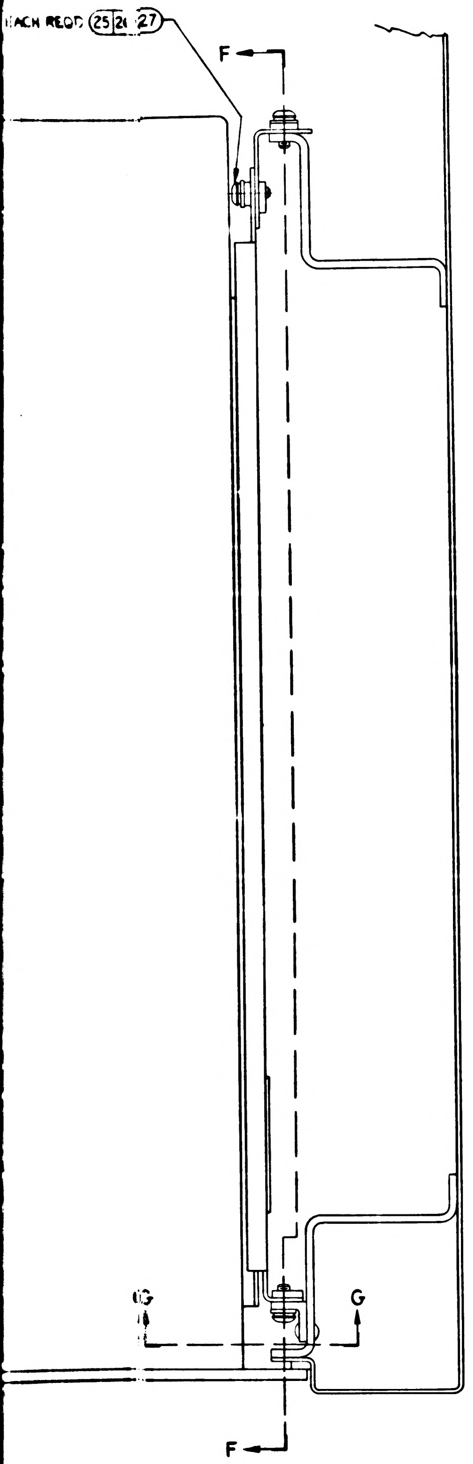
RUBBER BOOT
SURFACE A SEE NOTE 3
HANGER SCREW (REF) SEE NOTE 8

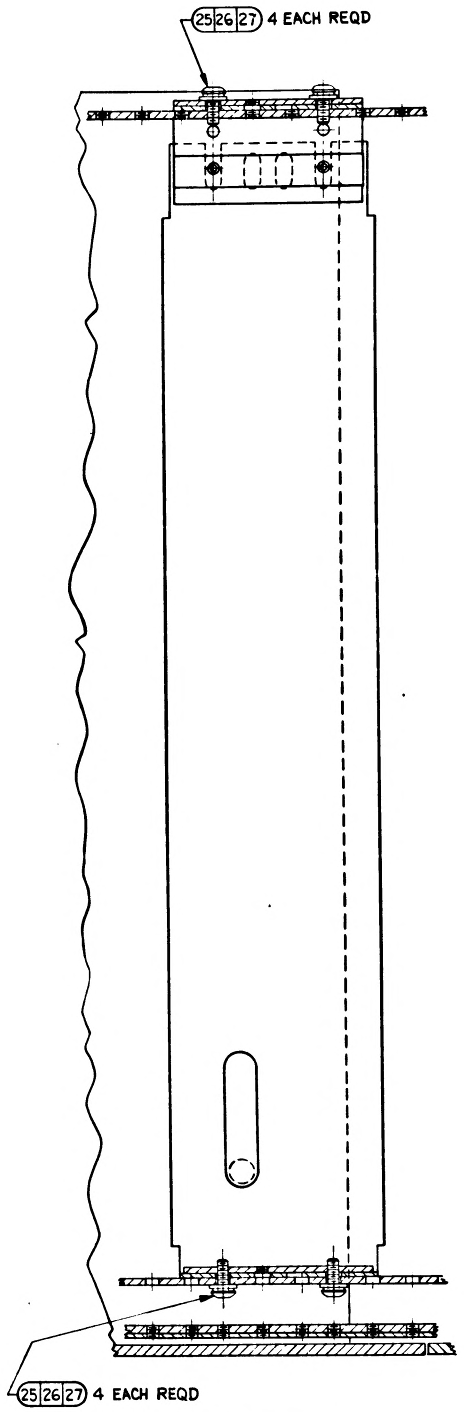
PARTIAL SECTION D-D
4 PLACES
SCALE 1:2

2900023 REV N SH 1

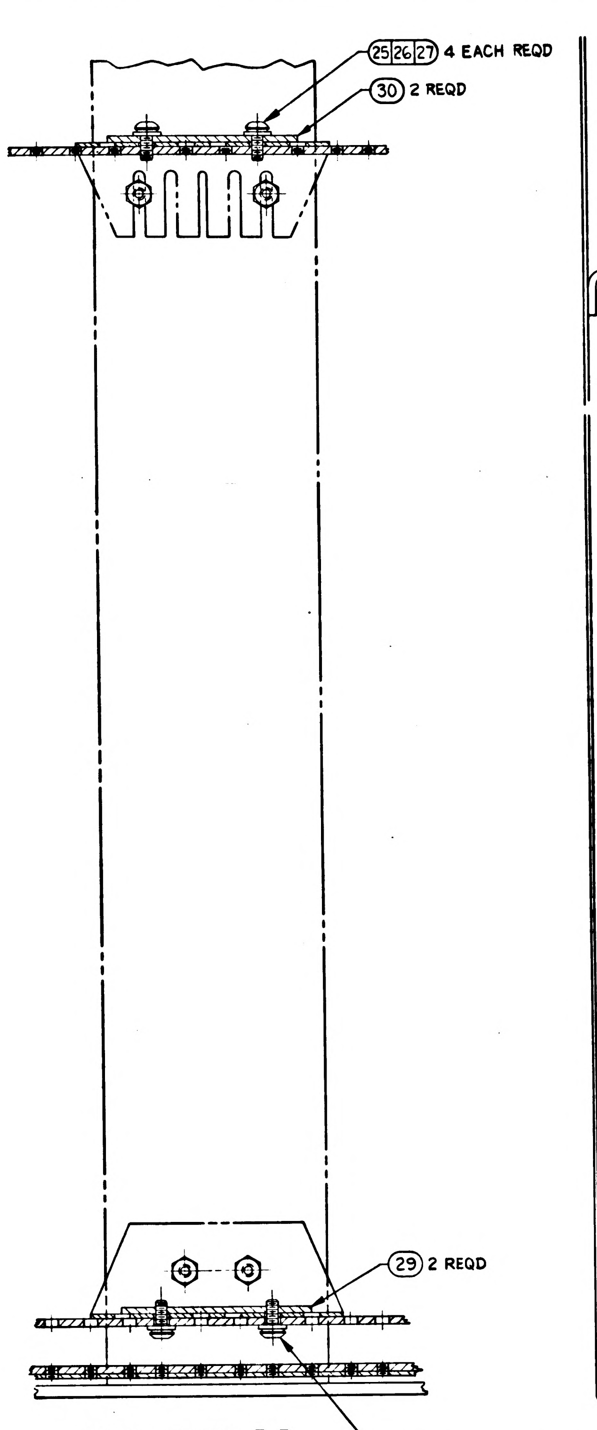
1/2900023

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
H		THIS SH. ADDED PER MIC 202820		8-JULY 65	GM / RKM
J		REVISION STATUS CHANGED		23 JUL 65	RWH
K		REVISION STATUS CHANGED		2 AUG 65	RWH
L		REVISION STATUS CHANGED		26 AUG 65	
M		REVISION STATUS CHANGED		2 SEP 65	
N		INITIAL RELEASE CLASS A PER TDRR 23919		9 OCT 65	

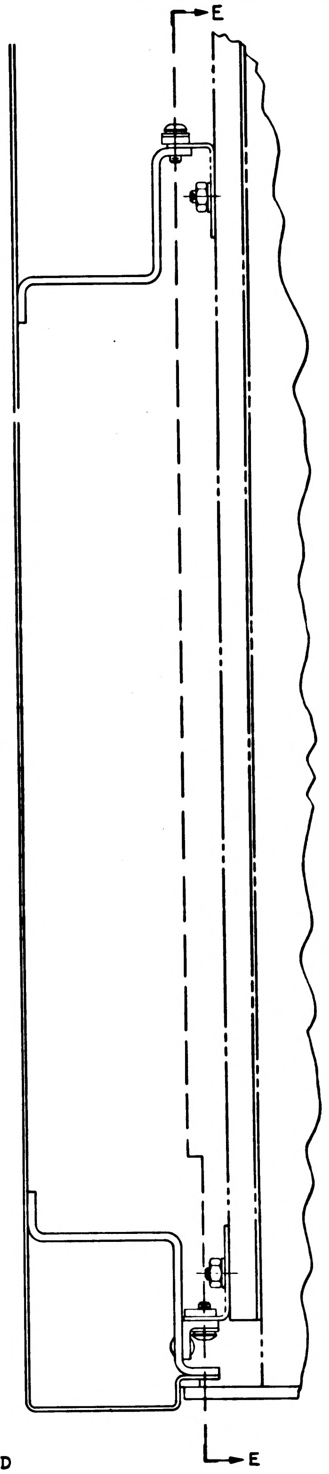




PARTIAL SECTION F-F

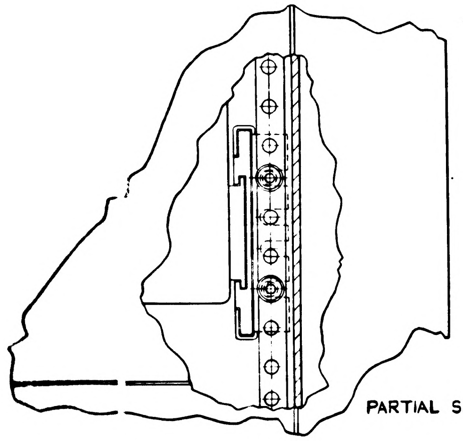


PARTIAL SECTION E-E



PARTIAL SECTION C-C

SCALE 1:1
HARDWARE SHOWN TO BE ATTACHED.
SLIDE MOUNTING SHOWN FOR REF ONLY.
LEFT SIDE SHOWN
RIGHT SIDE SYMMETRICALLY OPPOSITE



PARTIAL SECTION G-G

2900008-011	2900008-011	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

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DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN 24/MAR/65
CHECKED J. GRIEB 24/MAR/65
APPROVAL G. STODDARD 24/MAR/65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

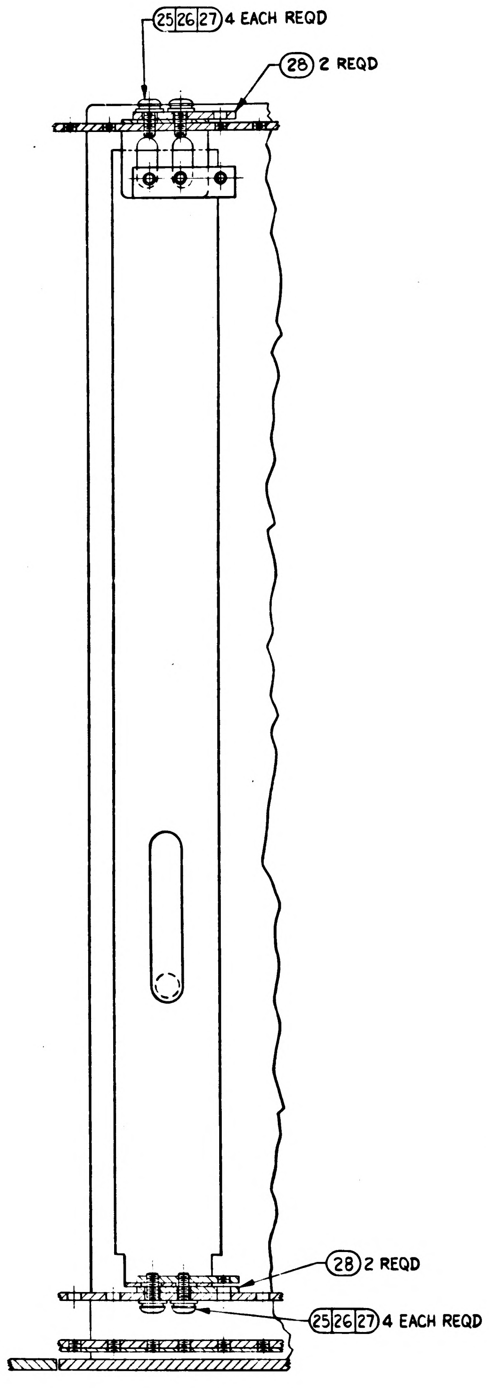
OPTICS-INERTIAL
ANALYZER

CODE IDENT NO 99974
SIZE J_2
2900023
SCALE 1:4
SHEET 2 OF 2

2900023	REV LTR N	SH 2

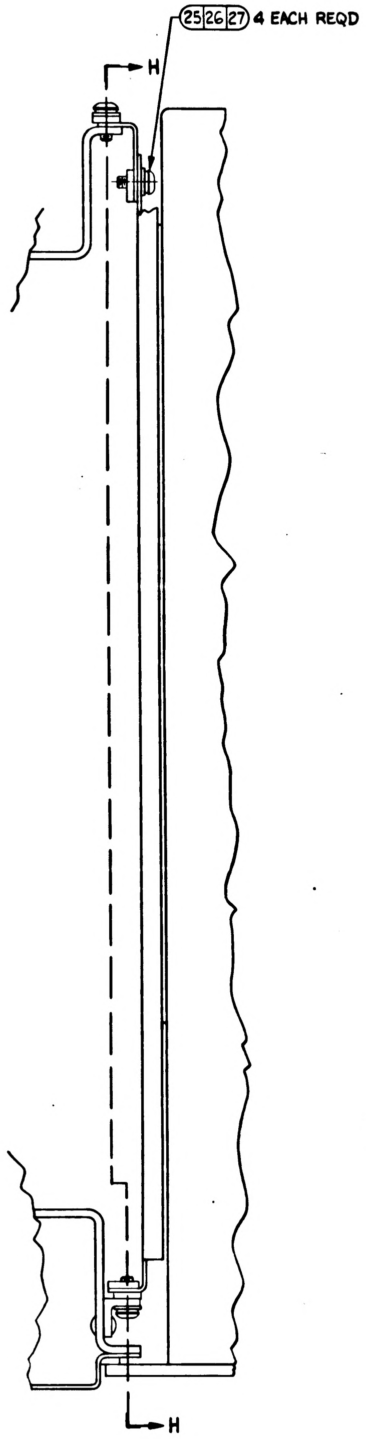
N 2900023

2/2900023



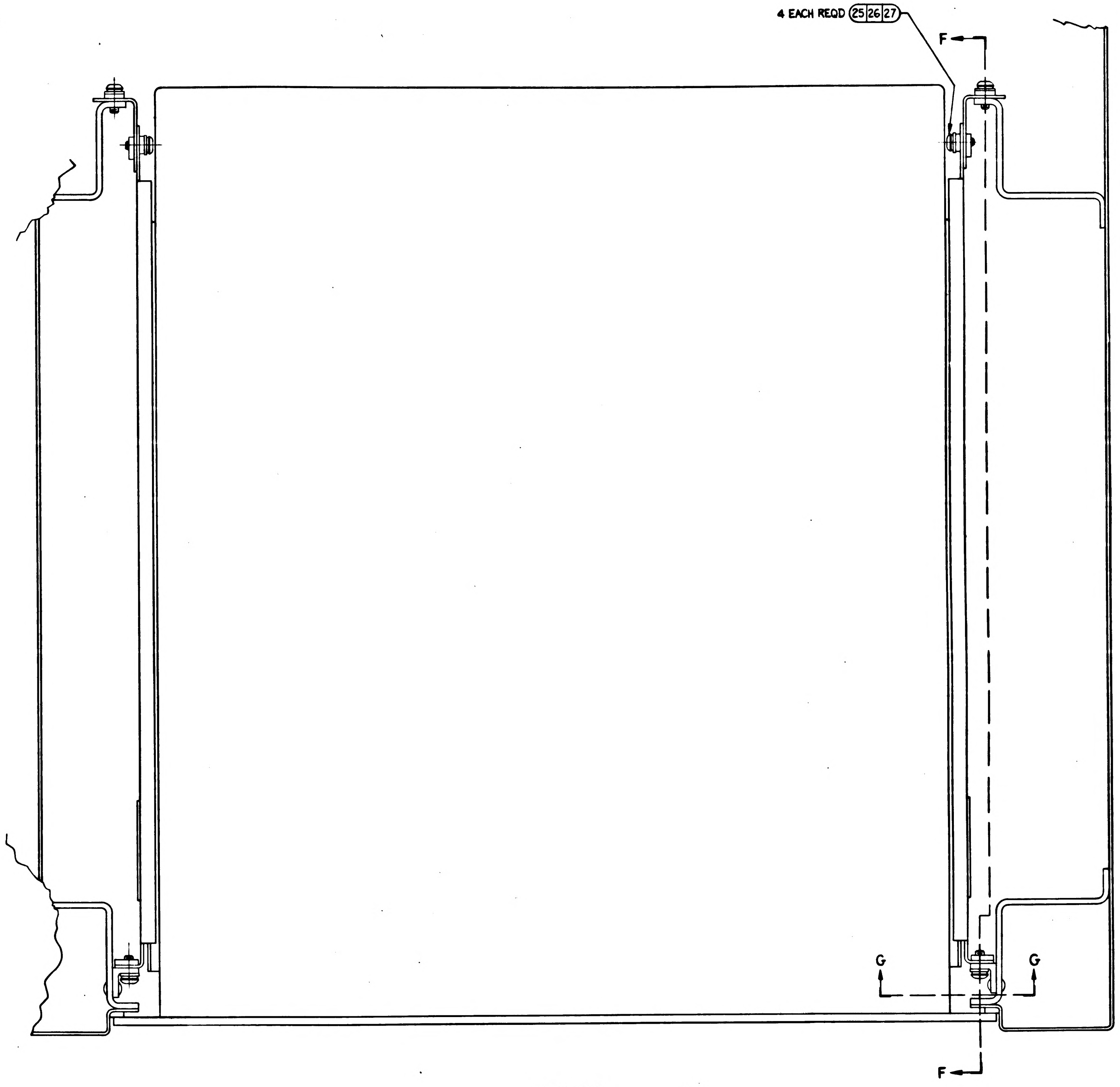
252627 4 EACH REQD
㉘ 2 REQD
㉘ 2 REQD
252627 4 EACH REQD

PARTIAL SECTION H-H



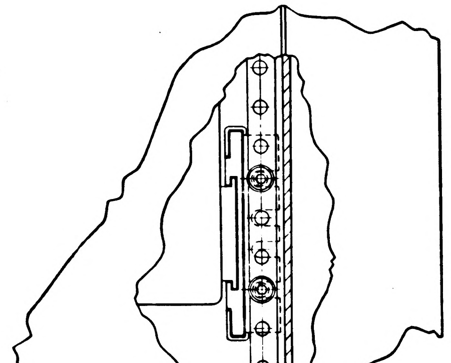
252627 4 EACH REQD
H
H

PARTIAL SECTION A-A
SCALE 1:1
TYPICAL FOR MOUNTING ITEMS ③, ② OR ㊳, ⑦ OR ㊴,
⑧, ⑪, ⑰, AND ⑱
LEFT SIDE SHOWN
RIGHT SIDE SYMMETRICALLY OPPOSITE



4 EACH REQD 252627
F
F
G
G

SECTION B-B
SCALE 1:1
TYPICAL FOR MOUNTING ITEMS ①, ⑤, ⑥, ⑩, ⑫,
⑬, ⑭, ⑮, ⑯, ⑲, ⑳, ㉑, AND ㊵

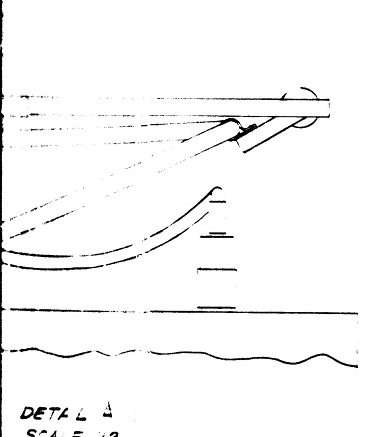


PARTIAL SEC

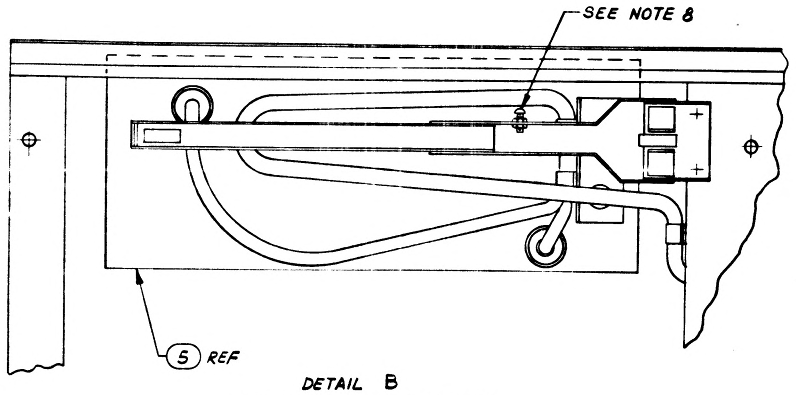
2900023 REV LTR \ SH 2

1 / 2 9 0 0 0 2 3

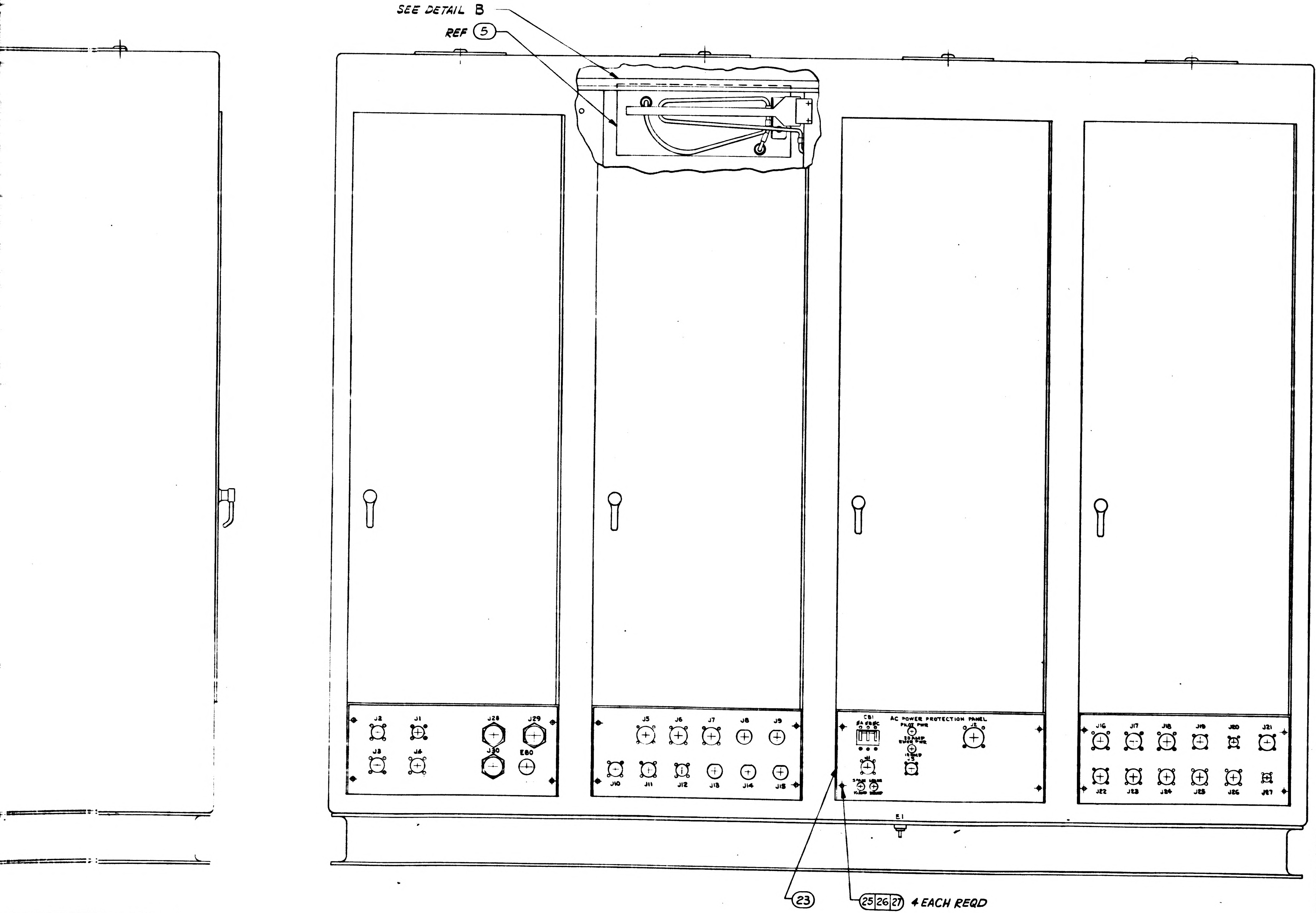
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
H		REPLACE REV. "G" WITH CHANGE PER MXC 202820		8-JULY 65	GM
J		REVISED PER MXC 203259		23 JUL 65	RLP RWH
K		REVISED PER MXC 203443		2 AUG 65	JHP RWH
L		REVISED PER MXC 204240		26 AUG 65	RLP
M		REVISED PER MXC 205204		2 SEP 65	
N		INITIAL RELEASE CLASS A PER TDRR 23919		9 OCT 65	
P		REVISED PER TDRR 27582		APR 66	RWT



DETAIL A
SCALE 1:2
RNESS SUSPENSION
IMILAR TO VOS
WER INSTALLATIONS



DETAIL B
HARNESS ARRANGEMENT FOR
ALL DRAWERS SIMILAR
SCALE 1:2 SEE NOTE 8



	QUANTITY REQUIRED	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1			45	1004260-170	NAMEPLATE, APOLLO G&N
	1			44	2900027-021	CONTROL TEST ASSY.
	1			43	2900032-021	CABINET ASSY, ELECT EQUIPMENT ASSY.
	1			42	2900028-021	SELECTOR, TEST ASSEMBLY
	1			41	2900031-021	MONITOR PANEL ASSEMBLY
	1	1		40	2900029-011	CAGING ELECTRONICS, GYRO, ASSY
	-	1		39	2900027-011	CONTROL, TEST ASSY
	1	1		38	2900026-011	TEMPERATURE MONITOR & CONTROL ASSY
				37		
				36		
SEE NOTE 7	X	X		35	2900322	INSTALLATION DRAWING, OIA
SEE NOTE 3	AR	AR		34	MIL-I-8660	ELEC INSULATING & SEALING COMPOUND
	4	4		33	MS35233-2	SCREW, MACHINE, PAN HD
SEE NOTE 9	-	1		32	1004260-142	NAMEPLATE, APOLLO G&N
				31		
SEE NOTE 5	2	2		30	1015796-001	SPACER, BAR
SEE NOTE 5	2	2		29	1015790-001	NUT-BAR
	28	28		28	1900934	SPACER, BAR
	252	252		27	AN960C10L	(1897006-019) WASHER-FLAT
	252	252		26	MS35338-81	WASHER, LOCK
SEE NOTE 5	252	252		25	1006783-44	SCREW, BUTTON HD-HEX SOCKET
	1	1		23	1902017-011	AC POWER PROTECTION PANEL ASSY
	-	1		22	2900032-011	CABINET ASSY, ELECTRICAL EQUIP, ASSY
	1	1		21	1900049-031	POWER SUPPLY RELAY & LAMP ASSY
	1	1		20	1900043-011	GENERATOR, SIGNAL ASSY
	1	1		19	2900034-011	SELECTOR, SIGNAL, OSCILLOGRAPH, ASSY
	1	1		18	1900041-011	COUNTER ASSY
	1	1		17	1900036-011	VOLTMETER, PHASE ANGLE ASSY
SEE NOTE 12	1	1		16	2900007-011	VOLTMETER, DIGITAL, ASSY
	1	1		15	1900048-011	SWITCH, CROSSBAR ASSY
	1	1		14	2900030-011	PANEL, AUXILIARY INPUT, ASSY
	1	1		13	2900035-011	SELECTOR, SIGNAL, PRIMARY, ASSY
	1	1		12	1900037-011	OSCILLOSCOPE, DUAL BEAM ASSY
	1	1		11	2900012-011	POWER SUPPLY, ELECTRONICS ASSY
	1	1		10	1900052-011	RECORDER, DIGITAL ASSY
	1	1		9	1900163-011	PHASE SHIFT ASSY
	-	1		8	2900028-011	SELECTOR, TEST, ASSY
				7		
	1	1		6	2900036-011	CONTROL, GIMBAL POSITION, ASSY
	2	2		5	1900038-011	OSCILLOSCOPE, MONITOR ASSY
	2	2		4	1900350-011	FAN, CENTRIFUGAL ASSY
	1	1		3	2900033-011	POWER SUPPLY & LOAD PANEL ASSY
				2		
	-	1		1	2900031-011	MONITOR PANEL ASSY

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900022-021	2900022-021	-021
2900022-011	2900022-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Hetchler DATE 24/MAR/65
CHECKED J. GRIEB 24/MAR/65
APPROVAL G. Torou 24/MAR/65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS - INERTIAL
ANALYZER

CODE IDENT NO. 99974
SIZE J2
2900023
SCALE 1:4
SHEET

2900023 P

2900023

2/2900023

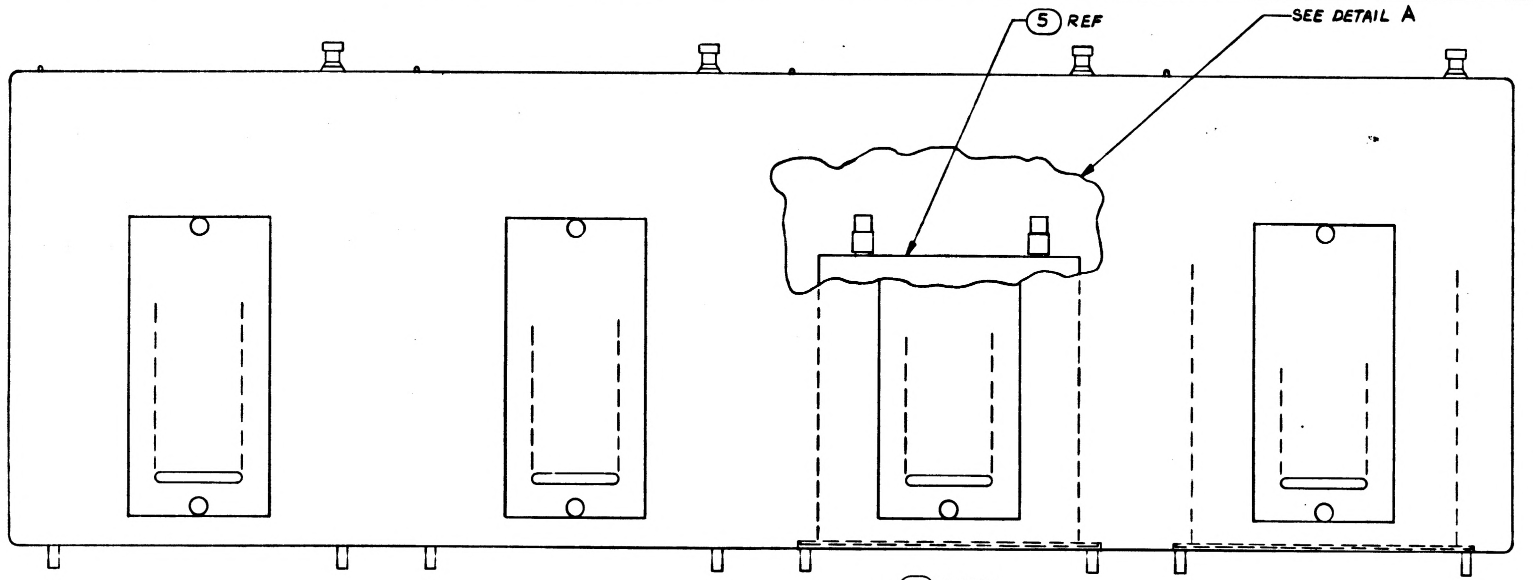
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SPACING BETWEEN FRONT PANELS IN EACH VERTICAL ROW IS TO BE BALANCED THRU DIMENSION SHOWN. A MINIMUM SPACING OF .030 IS TO BE MAINTAINED BETWEEN ANY TWO FRONT PANELS.
3. APPLY ITEM (34) TO SURFACE "A".
4. APPLY TIGHTENING TORQUE TO SCREWS AS FOLLOWS:
   ITEM (25) 28.5 TO 31.7 IN. LBS.
5. VENDOR ITEM-SEE SPECIFICATION CONTROL DRAWING
6. DISPOSE OF EXCESS DRAWER MOUNTING HARDWARE IN AN APPROVED MANNER.
7. BEFORE AND AFTER DRAWER INSTALLATION CONSOLE MUST BE ATTACHED TO THE FLOOR TO INSURE PERSONNEL AND EQUIPMENT SAFETY. SEE ITEM (35) FOR INSTALLATION ONLY, NOT FOR CONFIGURATION.
8. HARNESS GROUPS THAT ARE DISCONNECTED WHEN A DRAWER IS REMOVED FROM THE CABINET ARE TO BE HUNG BY SLIPPING THE HANGER LOOP OF THE HARNESS OVER THE HANGER SCREWS AT 2 PLACES AS SHOWN, WITH THE OPTION OF FORWARD OR BACK HANGING.
9. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (32) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .12 HIGH.

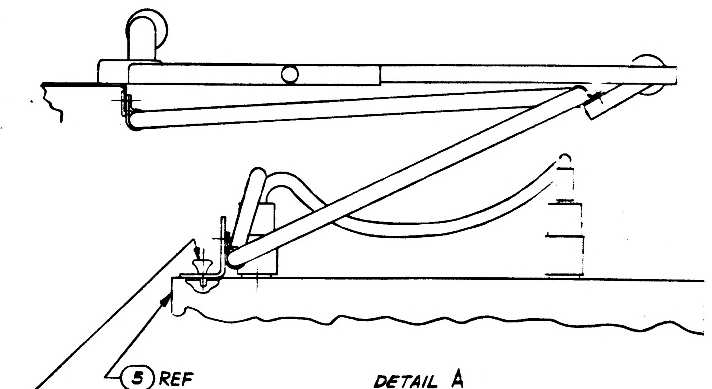
12. PART NO. 2900007-011 IS INTERCHANGEABLE WITH PART NO. 1900042-031 WHICH APPEARS IN EARLIER EQUIPMENT UPDATED BY RETROFIT.
13. ITEM 15 TO BE LOCATED SO THAT ITS HANDLE STRIKES THE PAD ON THE BACK OF THE CROSSBAR SWITCH COMPARTMENT PANEL APPROXIMATELY CENTER.

SECTIONS APPEAR ON SHEETS AS FOLLOWS:

	SH	ZONE
A-A	2	C13
B-B	2	C10
C-C	2	C3
D-D	1	A16
E-E	2	C4
F-F	2	C6
G-G	2	A8
H-H	2	C14

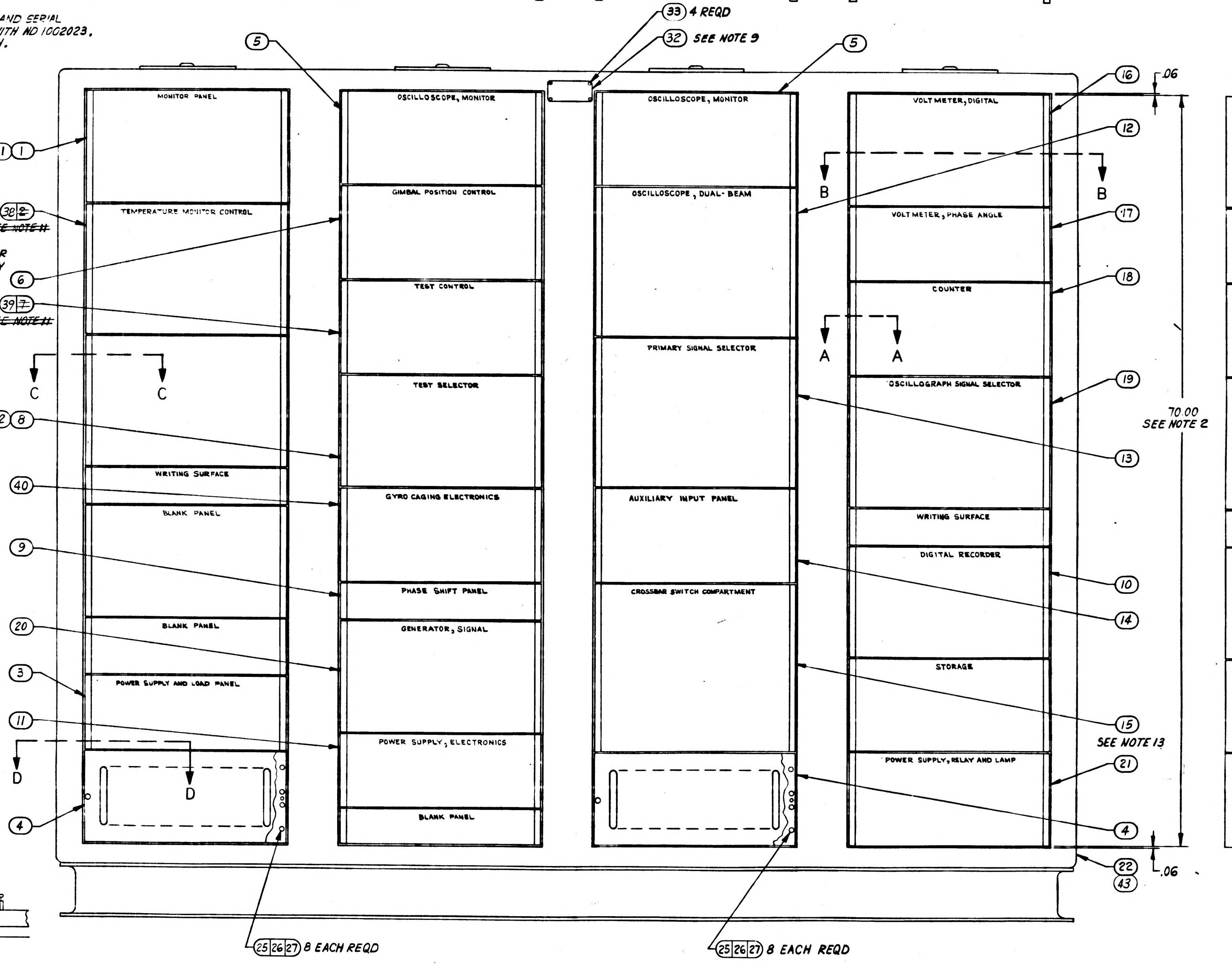


(5) REF
SEE DETAIL A

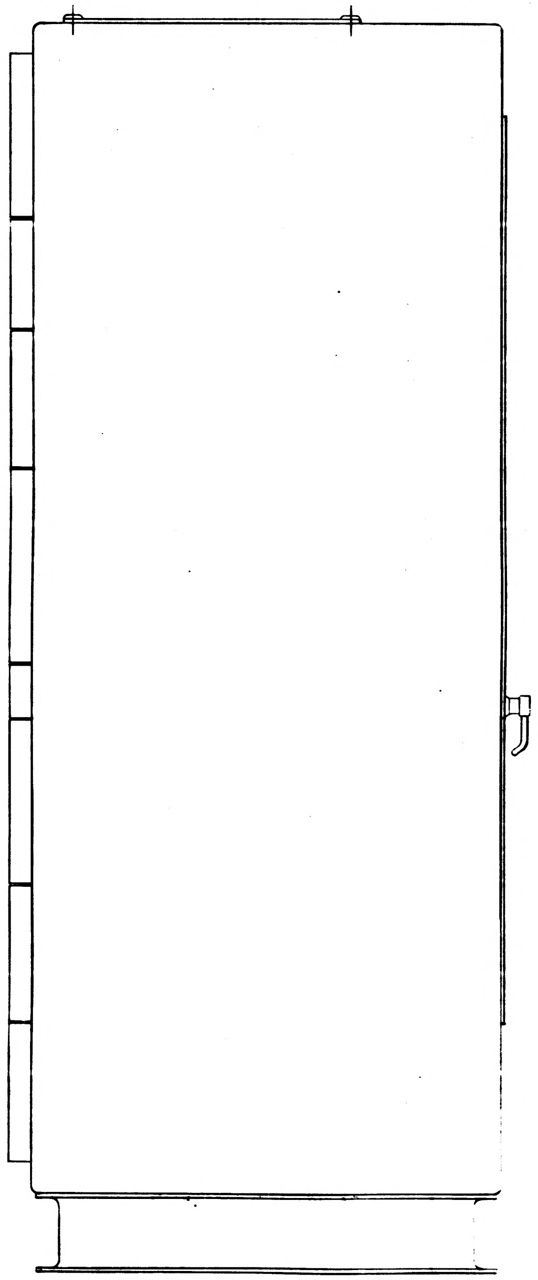


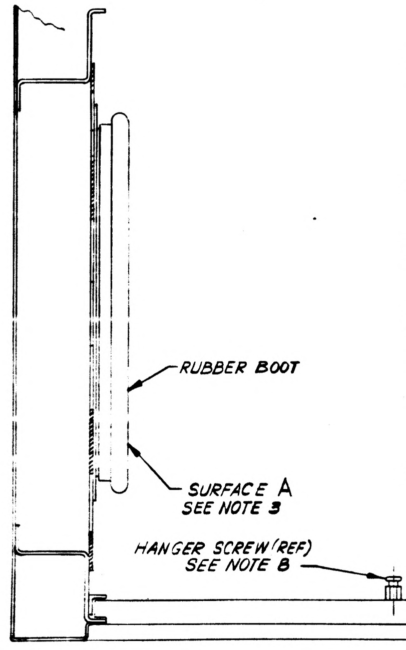
(5) REF
PRESS PLUGS INTO CHASSIS HOLES

DETAIL A
SCALE 1:2
HARNESS SUSPENSION SIMILAR TO MOST DRAWER INSTALLATIONS



(33) 4 REQD
(32) SEE NOTE 9
(5)
(5)
(16)
.06
(12)
B
B
(41)(1)
MONITOR PANEL
OSCILLOSCOPE, MONITOR
OSCILLOSCOPE, MONITOR
VOLTMETER, DIGITAL
(38)~~(2)~~
~~SEE NOTE 11~~
TEMPERATURE MONITOR CONTROL
GIMBAL POSITION CONTROL
OSCILLOSCOPE, DUAL-BEAM
VOLTMETER, PHASE ANGLE
(17)
(6)
(44)(39)~~(7)~~
~~SEE NOTE 11~~
TEST CONTROL
COUNTER
(18)
A
A
C
C
TEST SELECTOR
PRIMARY SIGNAL SELECTOR
OSCILLOGRAPH SIGNAL SELECTOR
(19)
70.00
SEE NOTE 2
(42)(8)
(13)
WRITING SURFACE
(40)
GYRO CAGING ELECTRONICS
AUXILIARY INPUT PANEL
BLANK PANEL
WRITING SURFACE
DIGITAL RECORDER
(9)
PHASE SHIFT PANEL
CROSSBAR SWITCH COMPARTMENT
(10)
(14)
(20)
BLANK PANEL
GENERATOR, SIGNAL
STORAGE
(3)
POWER SUPPLY AND LOAD PANEL
(11)
POWER SUPPLY, ELECTRONICS
(15)
SEE NOTE 13
POWER SUPPLY, RELAY AND LAMP
(21)
D
D
(4)
BLANK PANEL
(4)
.06
(22)
(43)
(25)(26)(27) 8 EACH REQD
(25)(26)(27) 8 EACH REQD



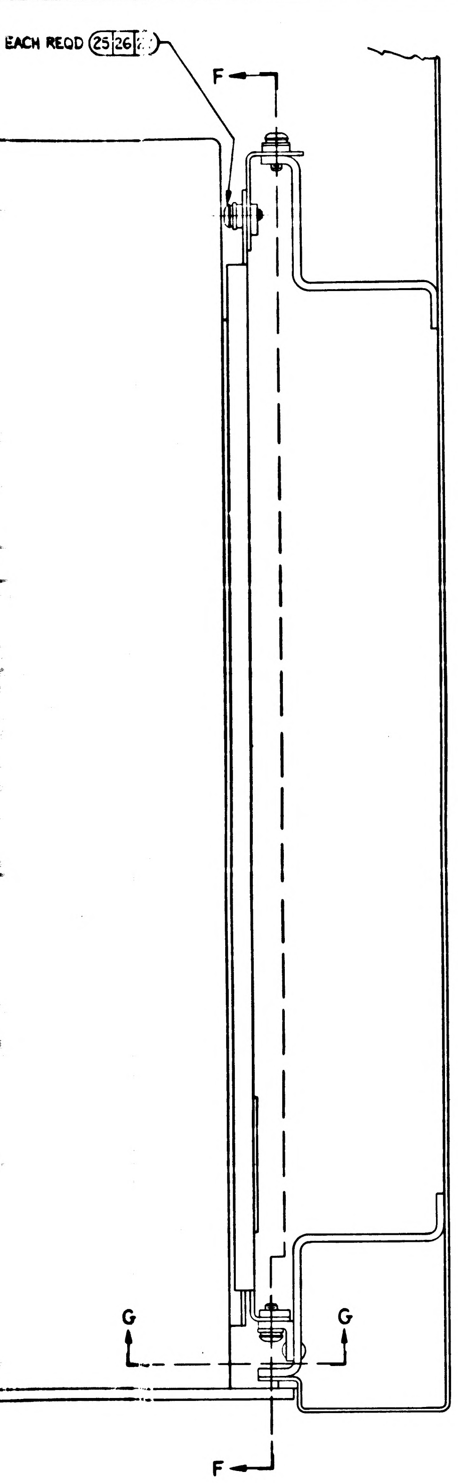


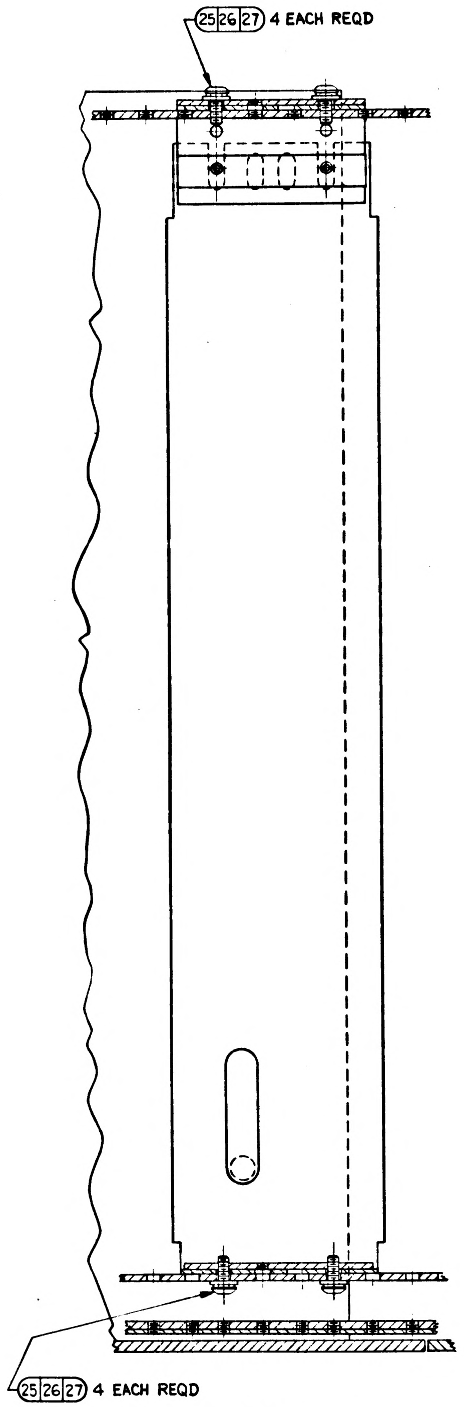
RUBBER BOOT
SURFACE A
SEE NOTE 3
HANGER SCREW (REF)
SEE NOTE 8

PARTIAL SECTION D-D
4 PLACES
SCALE 1:2

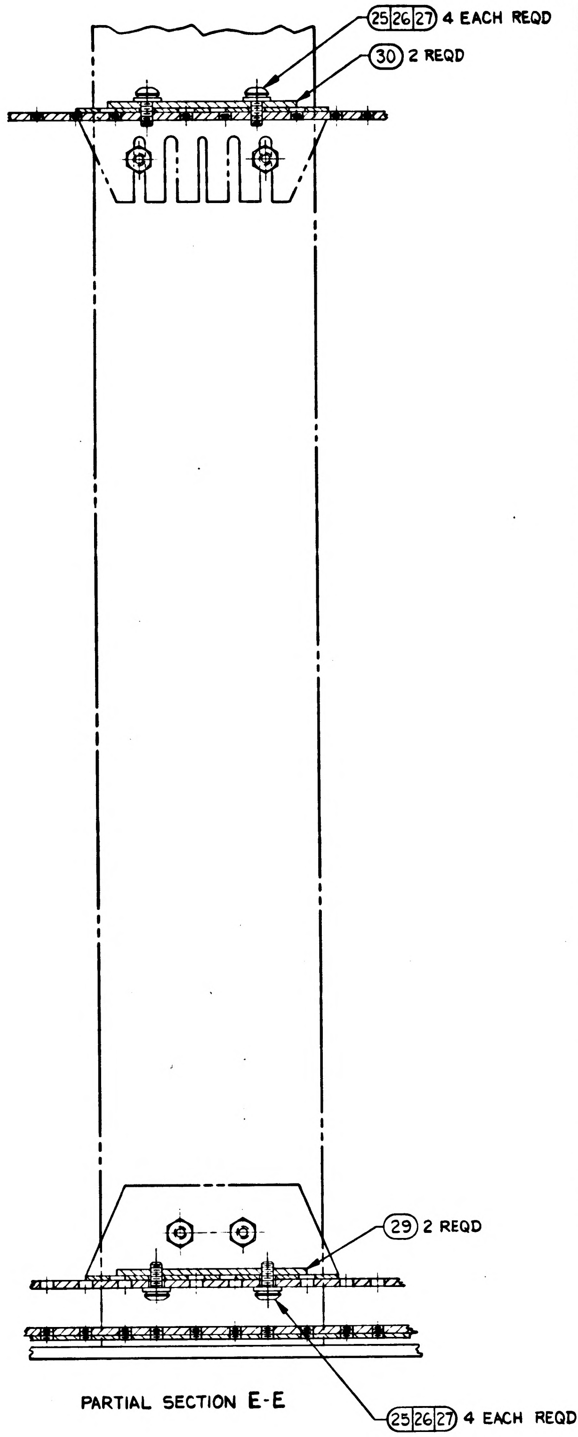
2900023	REV LTR P	SH 1

1/2900023

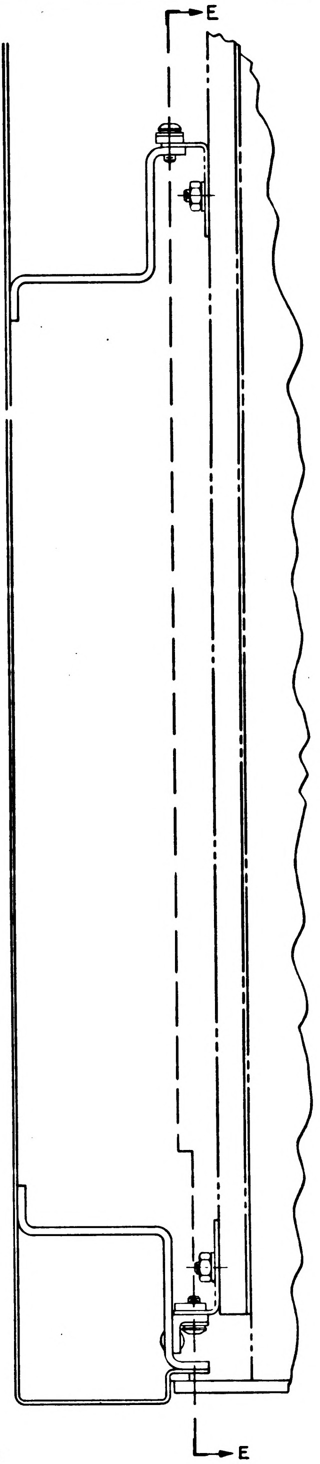




PARTIAL SECTION F-F

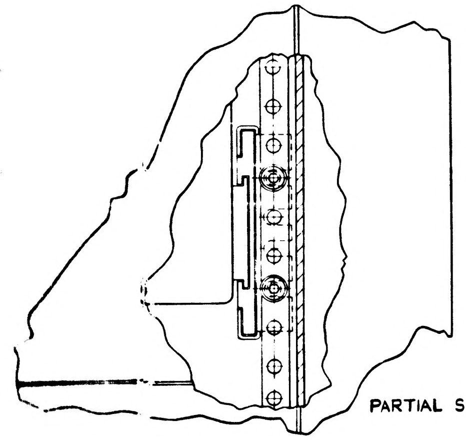


PARTIAL SECTION E-E



PARTIAL SECTION C-C

SCALE 1:1
HARDWARE SHOWN TO BE ATTACHED.
SLIDE MOUNTING SHOWN FOR REF ONLY.
LEFT SIDE SHOWN
RIGHT SIDE SYMMETRICALLY OPPOSITE



PARTIAL SECTION G-G

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
H		THIS SH. ADDED PER MIC 202820		8-JULY 65	GM mkm
J		REVISION STATUS CHANGED		23 JUL 65	RWH
K		REVISION STATUS CHANGED		2 AUG 65	RWH
L		REVISION STATUS CHANGED		26 AUG 65	
M		REVISION STATUS CHANGED		2 SEP 65	
N		INITIAL RELEASE CLASS A PER TDRR 23919		19 OCT 65	
P		REVISED PER TDRR 27582		4 APR 66	

NEXT ASSY	USED ON	APPLICABLE DASH NO
2900022-021	2900022-021	-021
2900022-011	2900022-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN 24/MAR/65 DATE
CHECKED J. GRIEB 24/MAR/65
APPROVAL G. STODDARD 24/MAR/65
APPROVAL
NASA APPROVAL
MIT APPROVAL

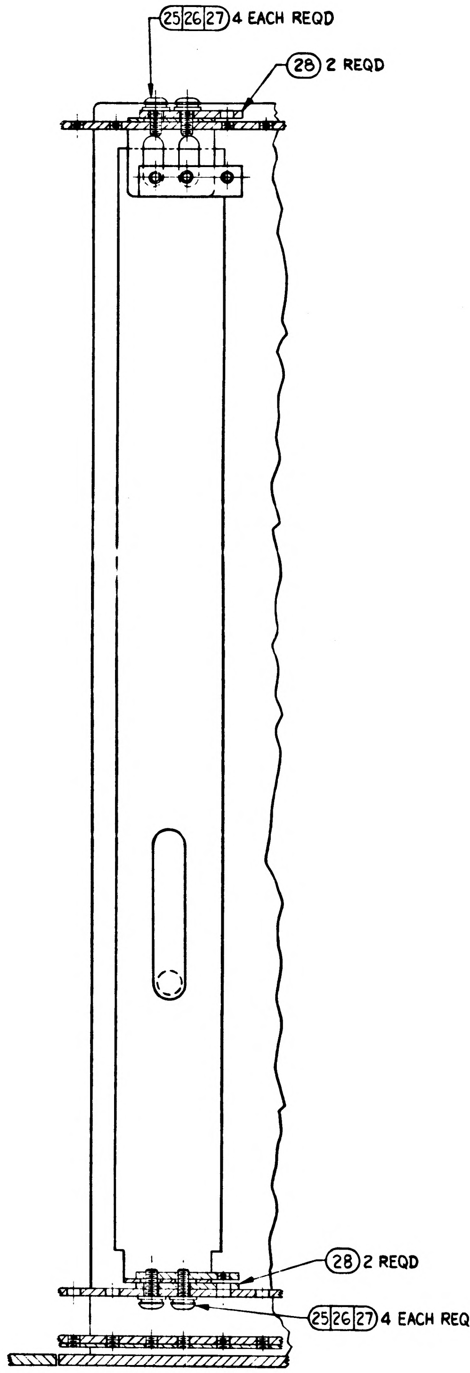
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS-INERTIAL
ANALYZER

CODE IDENT NO 99974
SIZE J_2
2900023
SCALE 1:4
SHEET 2 OF 2

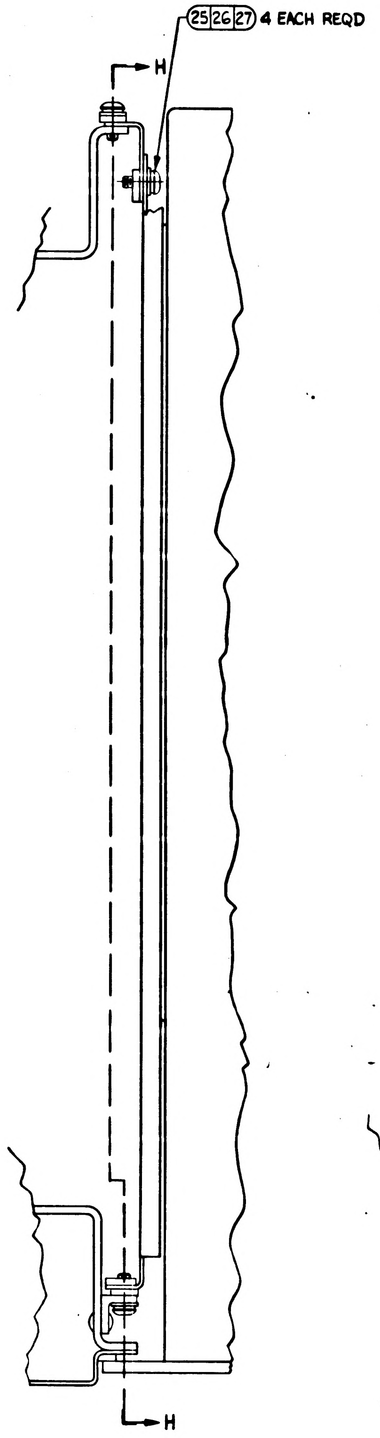
2900023 REV LTR P 2

2/2900023



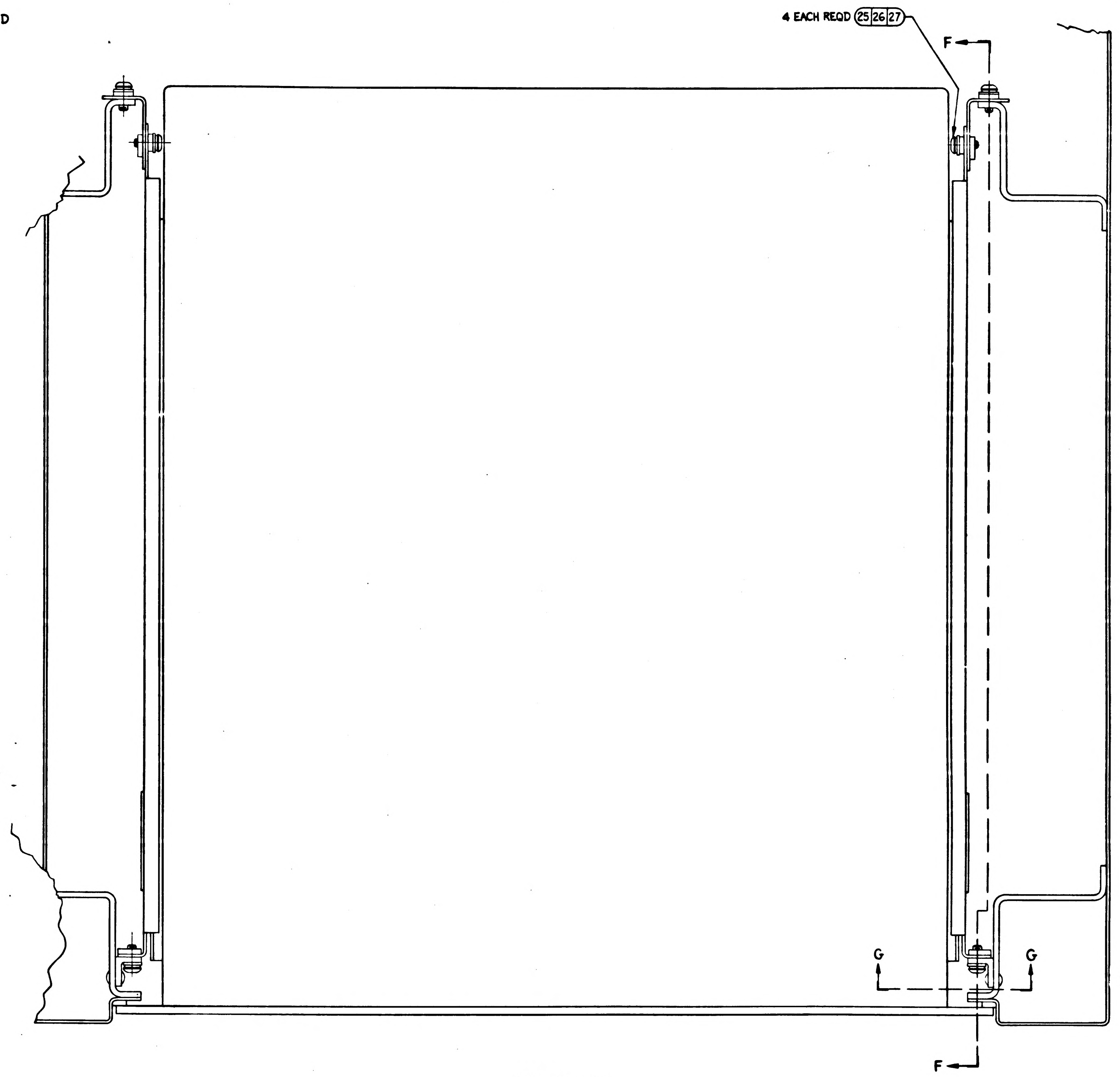
㉕㉖㉗ 4 EACH REQD
㉘ 2 REQD
㉘ 2 REQD
㉕㉖㉗ 4 EACH REQD

PARTIAL SECTION H-H



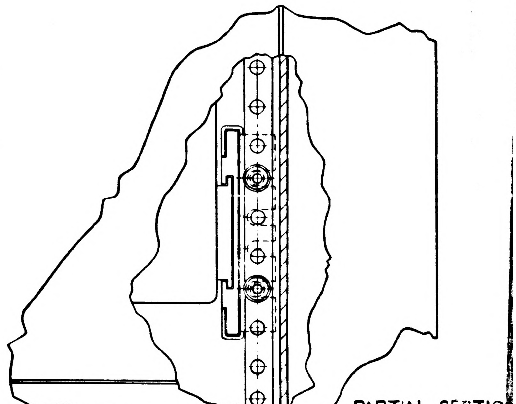
㉕㉖㉗ 4 EACH REQD
H
H

PARTIAL SECTION A-A
SCALE 1:1
TYPICAL FOR MOUNTING ITEMS ③, ㊳, ㊴, ⑧, ⑪, ⑰,
⑱, ㊸, ㊷, AND ㊹



4 EACH REQD ㉕㉖㉗
F
F
G
G

SECTION B-B
SCALE 1:1
TYPICAL FOR MOUNTING ITEMS ①, ⑤, ⑥, ⑩, ⑫,
⑬, ⑭, ⑮, ⑯, ⑲, ⑳, ㉑, ㊵ AND ㊶.



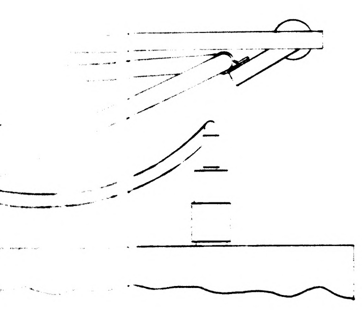
PARTIAL SECTIO

2900023 REV LTR P SH 2

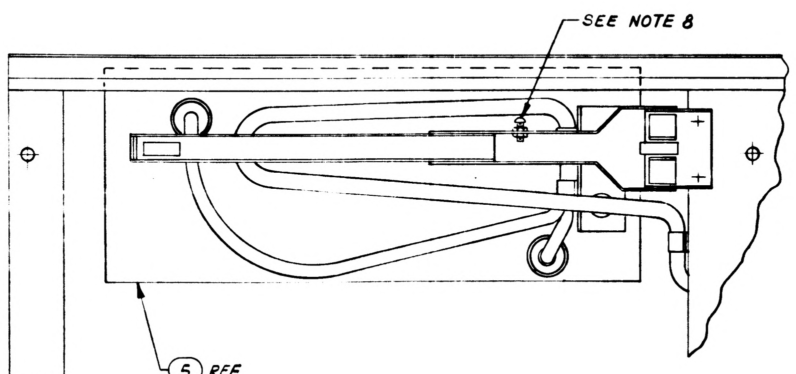
1-/-2900023

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
H		REPLACE REV. "G" WITH CHANGE PER MXC 202820		8-JULY-65	GM
J		REVISED PER MXC 203259		23 JUL 65	RLP
K		REVISED PER MXC 203443		2 AUG 65	UMP
L		REVISED PER MXC 204240		20 AUG 65	RLP
M		REVISED PER MXC 205204		27 SEP 65	
N		INITIAL RELEASE CLASS A PER TDRR 23919			
P		REVISED PER TDRR 27582		APR 66	
R		REVISED PER TDRR 28763		7 JULY 66	

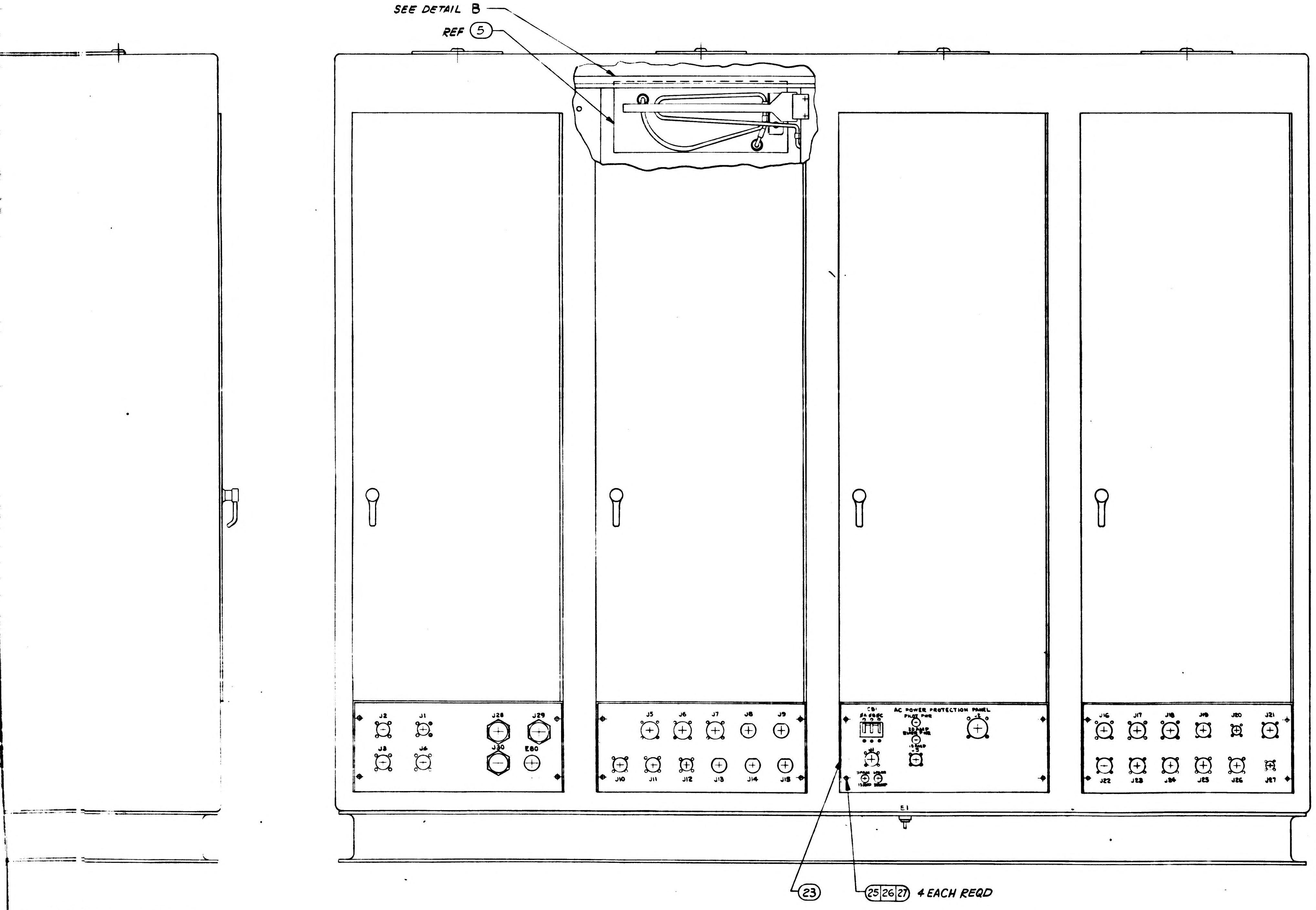
REVISIONS



DETAIL A
SCALE 1:2
NGES SUSPENSION
ILAR TO NOTE
ER INSTALLATIONS



DETAIL B
HARNESS ARRANGEMENT FOR
ALL DRAWERS SIMILAR
SCALE 1:2 SEE NOTE 8



	QUANTITY REQUIRED						
	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1	-	-		53	2900027-031	CONTROL, TEST ASSY
	1	-	-		52	2900032-031	CABINET ASSY, ELECT EQUIP ASSY
	1	-	-		51	2900031-031	MONITOR PANEL ASSY
	1	-	-		50	2900029-021	CAGING ELECTRONICS, GYRO, ASSY
	1	-	-		49	2900026-021	TEMPERATURE MON & CONT ASSY
	1	-	-		48	2900036-021	CONTROL, GIMBAL POSITION, ASSY
	1	-	-		47	2900033-021	POWER SUPPLY & LOAD PANEL
SEE NOTE 9	1	-	-		46	1004260-192	NAMEPLATE, APOLLO G & N
SEE NOTE 9	-	1	-		45	1004260-170	NAMEPLATE, APOLLO G&N
	-	1	-		44	2900027-021	CONTROL TEST ASSY.
	-	1	-		43	2900032-021	CABINET ASSY, ELECT. EQUIPMENT ASSY.
	1	1	-		42	2900028-021	SELECTOR, TEST ASSEMBLY
	-	1	-		41	2900031-021	MONITOR PANEL ASSEMBLY
	-	1	1		40	2900029-011	CAGING ELECTRONICS, GYRO, ASSY
	-	-	1		39	2900027-011	CONTROL, TEST ASSY
	-	1	1		38	2900026-011	TEMPERATURE MONITOR & CONTROL ASSY
					37		
					36		
SEE NOTE 7	╳	╳	╳		35	2900322	INSTALLATION DRAWING, OIA
SEE NOTE 3	AR	AR	AR		34	MIL-I-8660	ELEC INSULATING & SEALING COMPOUND
	4	4	4		33	MS35233-2	SCREW, MACHINE, PAN HD
SEE NOTE 9	-	-	1		32	1004260-142	NAMEPLATE, APOLLO G&N
					31		
SEE NOTE 5	2	2	2		30	1015796-001	SPACER, BAR
SEE NOTE 5	2	2	2		29	1015790-001	NUT-BAR
	28	28	28		28	1900934	SPACER, BAR
	252	252	252		27	AN960C10L	(1897006-019) WASHER-FLAT
	252	252	252		26	MS35338-81	WASHER, LOCK
SEE NOTE 5	252	252	252		25	1006783-44	SCREW, BUTTON HD-HEX SOCKET
	1	1	1		23	1902017-011	AC POWER PROTECTION PANEL ASSY
	-	-	1		22	2900032-011	CABINET ASSY, ELECTRICAL EQUIP, ASSY
	1	1	1		21	1900049-031	POWER SUPPLY RELAY & LAMP ASSY
	1	1	1		20	1900043-011	GENERATOR, SIGNAL ASSY
	1	1	1		19	2900034-011	SELECTOR, SIGNAL, OSCILLOGRAPH, ASSY
	1	1	1		18	1900041-011	COUNTER ASSY
	1	1	1		17	1900036-011	VOLTMETER, PHASE ANGLE ASSY
SEE NOTE 12	1	1	1		16	2900007-011	VOLTMETER, DIGITAL, ASSY
	1	1	1		15	1900048-011	SWITCH, CROSSBAR ASSY
	1	1	1		14	2900030-011	PANEL, AUXILIARY INPUT, ASSY
	1	1	1		13	2900035-011	SELECTOR, SIGNAL, PRIMARY, ASSY
	1	1	1		12	1900037-011	OSCILLOSCOPE, DUAL BEAM ASSY
	1	1	1		11	2900012-011	POWER SUPPLY, ELECTRONICS ASSY
	1	1	1		10	1900052-011	RECORDER, DIGITAL ASSY
	1	1	1		9	1900163-011	PHASE SHIFT ASSY
	-	-	1		8	2900028-011	SELECTOR, TEST, ASSY
					7		
	-	1	1		6	2900036-011	CONTROL, GIMBAL POSITION, ASSY
	2	2	2		5	1900038-011	OSCILLOSCOPE, MONITOR ASSY
	2	2	2		4	1900350-011	FAN, CENTRIFUGAL ASSY
	-	1	1		3	2900033-011	POWER SUPPLY & LOAD PANEL ASSY
					2		
	-	-	1		1	2900031-011	MONITOR PANEL ASSY

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900022-031	2900022-03	-031
2900022-021	2900022-02	-021
2900022-011	2900022-01	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN Hetzler DATE 24/MAR/65
CHECKED J. GRIEB 24/MAR/65
APPROVAL G. Tarum 24/MAR/65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS - INERTIAL
ANALYZER

CODE IDENT NO. 99974
SIZE J2
2900023
SCALE 1:4
SHEET

2900023 R

2900023 REV R SH 1

27/2900023

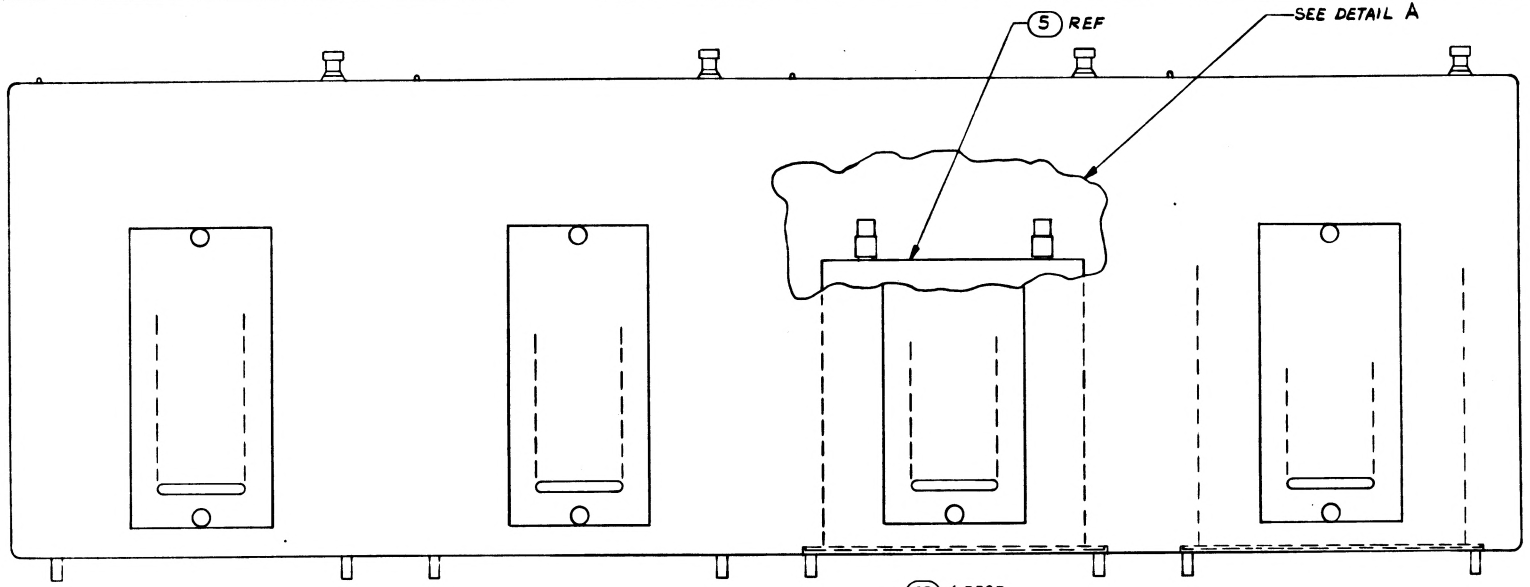
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SPACING BETWEEN FRONT PANELS IN EACH VERTICAL ROW IS TO BE BALANCED THRU DIMENSION SHOWN. A MINIMUM SPACING OF .030 IS TO BE MAINTAINED BETWEEN ANY TWO FRONT PANELS.
3. APPLY ITEM (34) TO SURFACE "A".
4. APPLY TIGHTENING TORQUE TO SCREWS AS FOLLOWS:
   ITEM (25) 28.5 TO 31.7 IN. LBS.
5. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING
6. DISPOSE OF EXCESS DRAWER MOUNTING HARDWARE IN AN APPROVED MANNER.
7. BEFORE AND AFTER DRAWER INSTALLATION CONSOLE MUST BE ATTACHED TO THE FLOOR TO INSURE PERSONNEL AND EQUIPMENT SAFETY. SEE ITEM (33) FOR INSTALLATION ONLY, NOT FOR CONFIGURATION.
8. HARNESS GROUPS THAT ARE DISCONNECTED WHEN A DRAWER IS REMOVED FROM THE CABINET ARE TO BE HUNG BY SLIPPING THE HANGER LOOP OF THE HARNESS OVER THE HANGER SCREWS AT 2 PLACES AS SHOWN, WITH THE OPTION OF FORWARD OR BACK HANGING.
9. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (32) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .12 HIGH.

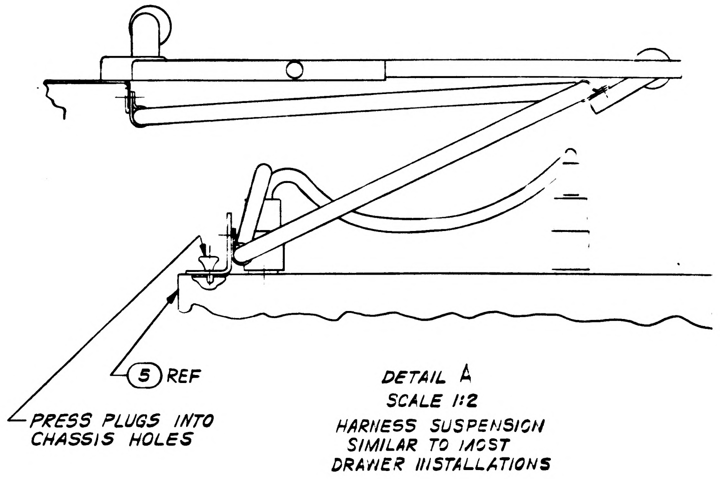
12. PART NO. 2900007-011 IS INTERCHANGEABLE WITH PART NO. 1900042-031 WHICH APPEARS IN EARLIER EQUIPMENT UPDATED BY RETROFIT.
13. ITEM 15 TO BE LOCATED SO THAT ITS HANDLE STRIKES THE PAD ON THE BACK OF THE CROSSBAR SWITCH COMPARTMENT PANEL APPROXIMATELY CENTER.

SECTIONS APPEAR ON SHEETS AS FOLLOWS:

	SH	ZONE
A-A	2	C 13
B-B	2	C 10
C-C	2	C 3
D-D	1	A 16
E-E	2	C 4
F-F	2	C 6
G-G	2	A 8
H-H	2	C 14

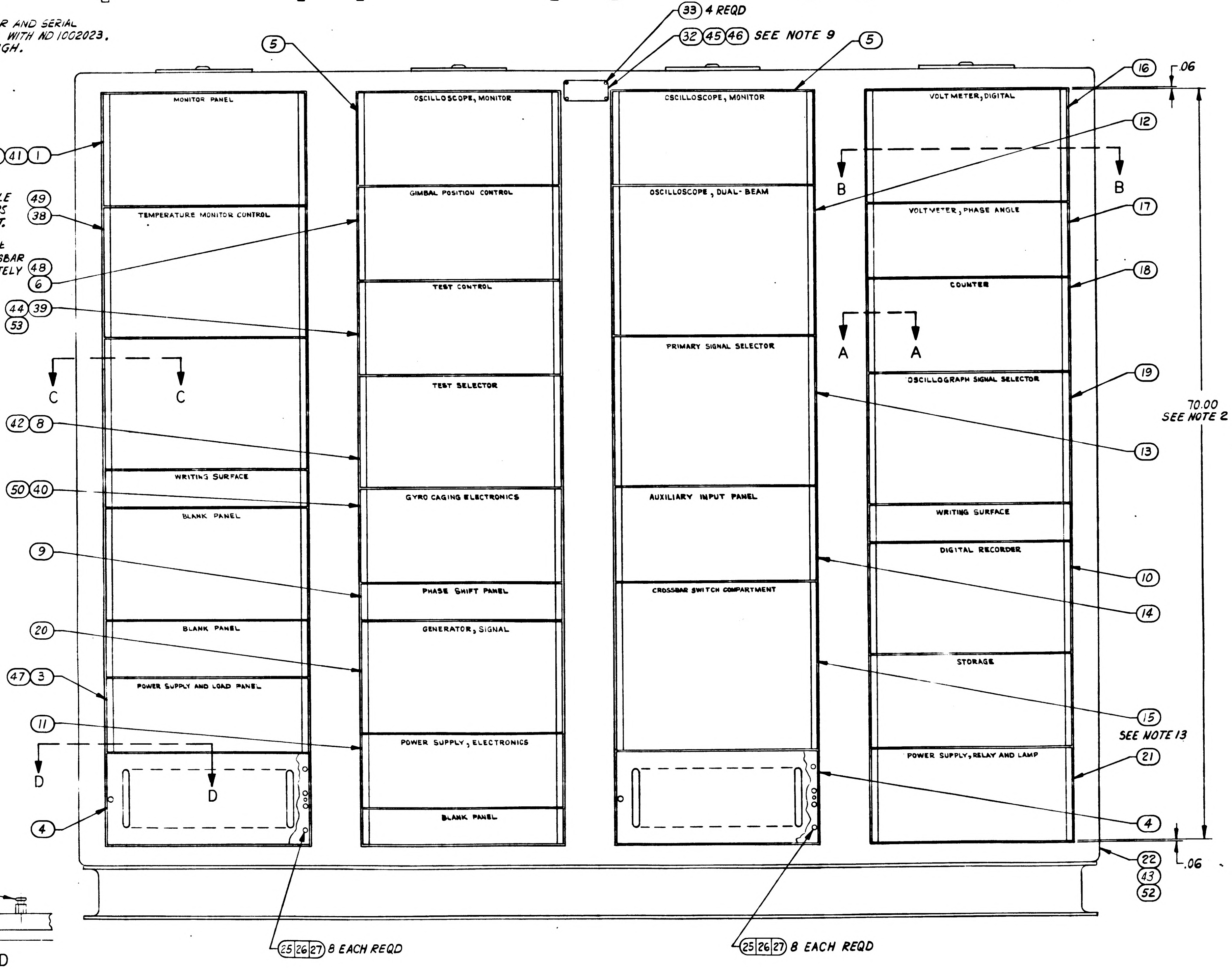


(5) REF
SEE DETAIL A

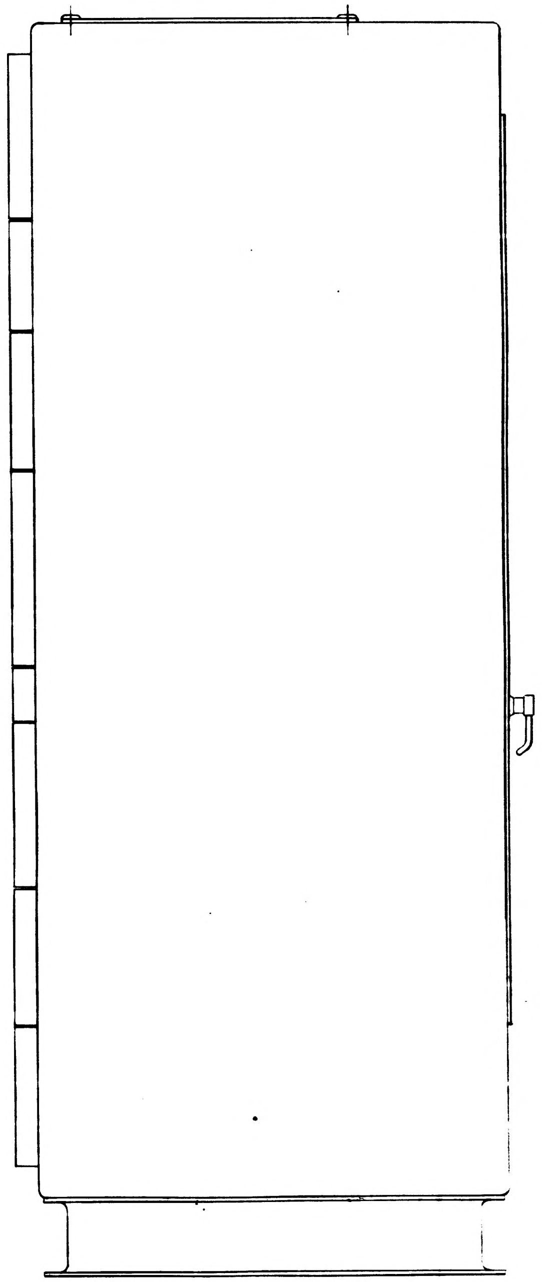


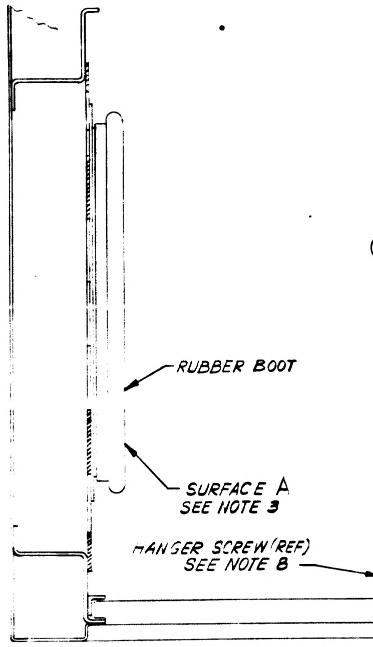
(5) REF
PRESS PLUGS INTO CHASSIS HOLES

DETAIL A
SCALE 1:2
HARNESS SUSPENSION SIMILAR TO MOST DRAWER INSTALLATIONS



(33) 4 REQD
(32)(45)(46) SEE NOTE 9
(5)
(5)
MONITOR PANEL
TEMPERATURE MONITOR CONTROL
WRITING SURFACE
BLANK PANEL
BLANK PANEL
POWER SUPPLY AND LOAD PANEL
OSCILLOSCOPE, MONITOR
GIMBAL POSITION CONTROL
TEST CONTROL
TEST SELECTOR
GYRO CAGING ELECTRONICS
PHASE SHIFT PANEL
GENERATOR, SIGNAL
POWER SUPPLY, ELECTRONICS
BLANK PANEL
OSCILLOSCOPE, MONITOR
OSCILLOSCOPE, DUAL-BEAM
PRIMARY SIGNAL SELECTOR
AUXILIARY INPUT PANEL
CROSSBAR SWITCH COMPARTMENT
VOLTMETER, DIGITAL
VOLTMETER, PHASE ANGLE
COUNTER
OSCILLOGRAPH SIGNAL SELECTOR
WRITING SURFACE
DIGITAL RECORDER
STORAGE
POWER SUPPLY, RELAY AND LAMP
(51)(41)(1)
(49)
(38)
(48)
(6)
(44)(39)
(53)
(42)(8)
(50)(40)
(9)
(20)
(47)(3)
(11)
(4)
C C
D D
B B
A A
(16)
.06
(12)
(17)
(18)
(19)
70.00
SEE NOTE 2
(13)
(10)
(14)
(15)
SEE NOTE 13
(21)
(4)
.06
(22)
(43)
(52)
(25)(26)(27) 8 EACH REQD
(25)(26)(27) 8 EACH REQD





RUBBER BOOT
SURFACE A
SEE NOTE 3
HANGER SCREW (REF)
SEE NOTE 8

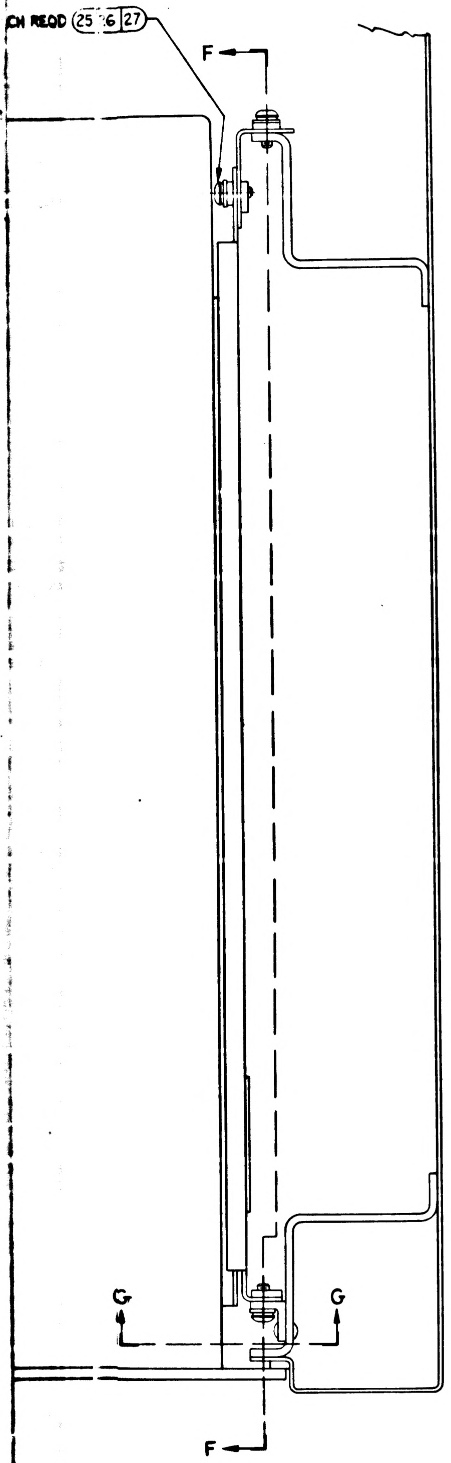
PARTIAL SECTION D-D
4 PLACES
SCALE 1:2

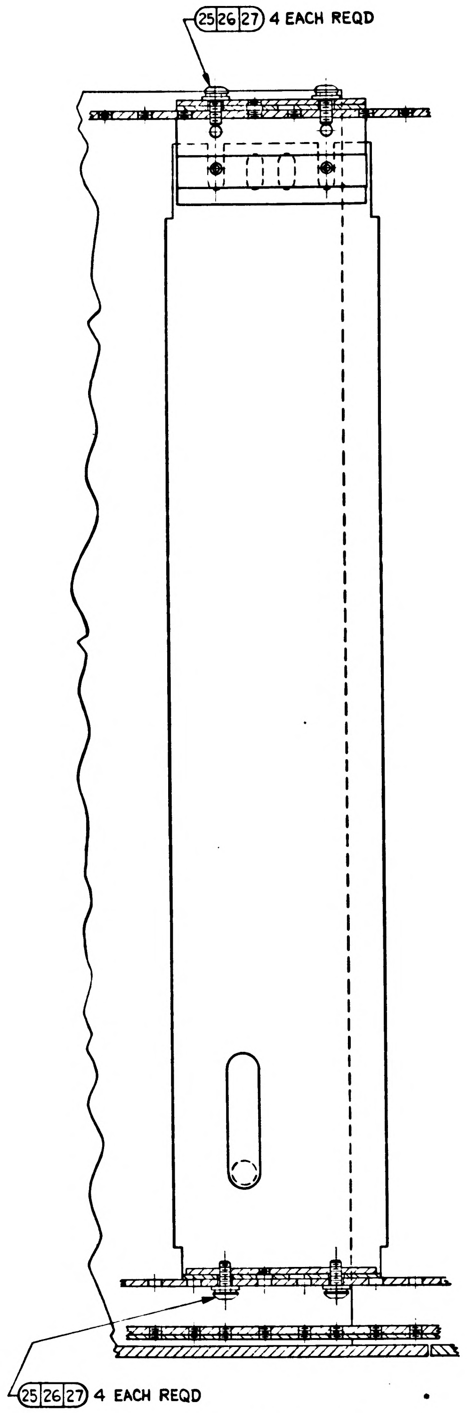
2900023 REV E SH 1

1/2900023

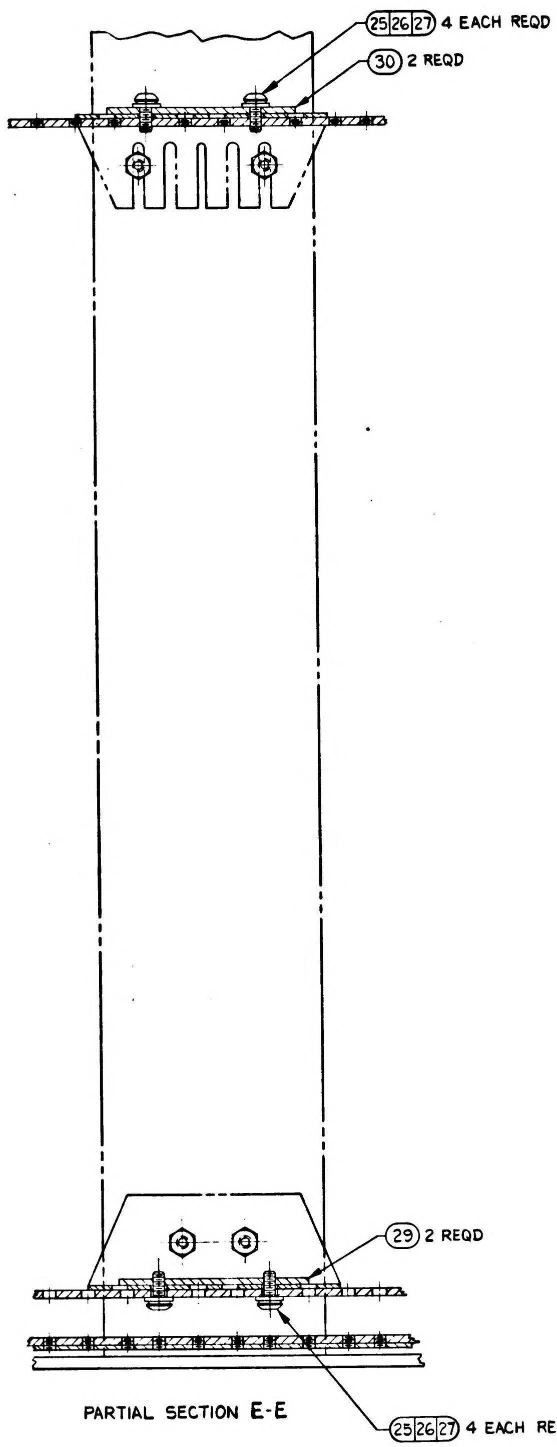
REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
H		THIS SH. ADDED PER MIC 202820		8-JULY 65	GM
J		REVISION STATUS CHANGED		23 JUL 65	RWH
K		REVISION STATUS CHANGED		2 AUG 65	RWH
L		REVISION STATUS CHANGED		26 JUG 65	
M		REVISION STATUS CHANGED		2 SEP 65	
N		INITIAL RELEASE CLASS A PER TDRR 23419		9 OCT 65	
P		REVISED PER TDRR 27582		4 APR 66	
R		REVISED PER TDRR 28763		7 NOV 66	

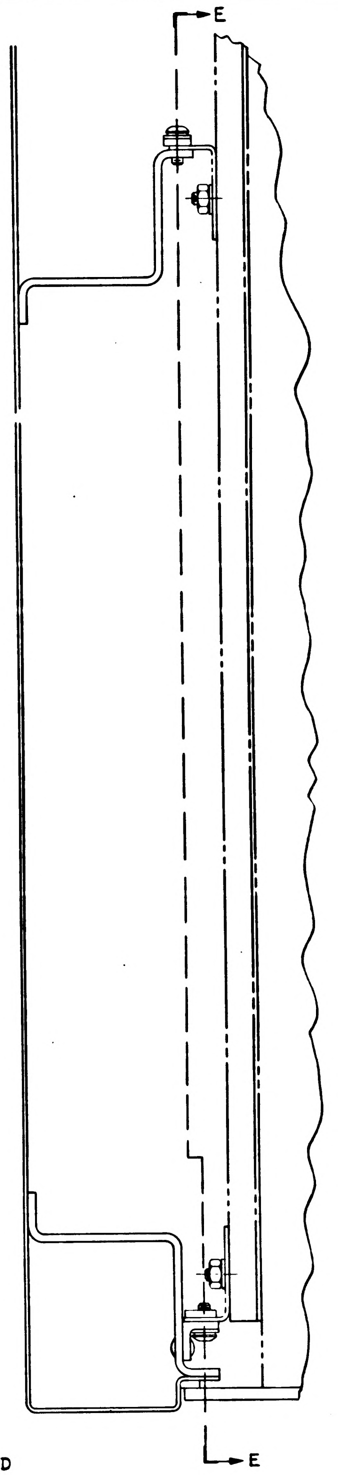




PARTIAL SECTION F-F



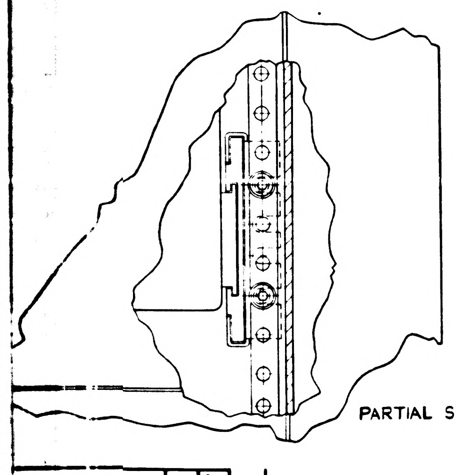
PARTIAL SECTION E-E



PARTIAL SECTION C-C

SCALE 1:1
HARDWARE SHOWN TO BE ATTACHED.
SLIDE MOUNTING SHOWN FOR REF ONLY.
LEFT SIDE SHOWN

RIGHT SIDE SYMMETRICALLY OPPOSITE



PARTIAL SECTION G-G

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900022-021	2900022-021	-021
2900022-011	2900022-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS ±.02
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN 24/MAR/65 DATE
CHECKED J. GRIEB 24/MAR/65
APPROVAL 24/MAR/65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

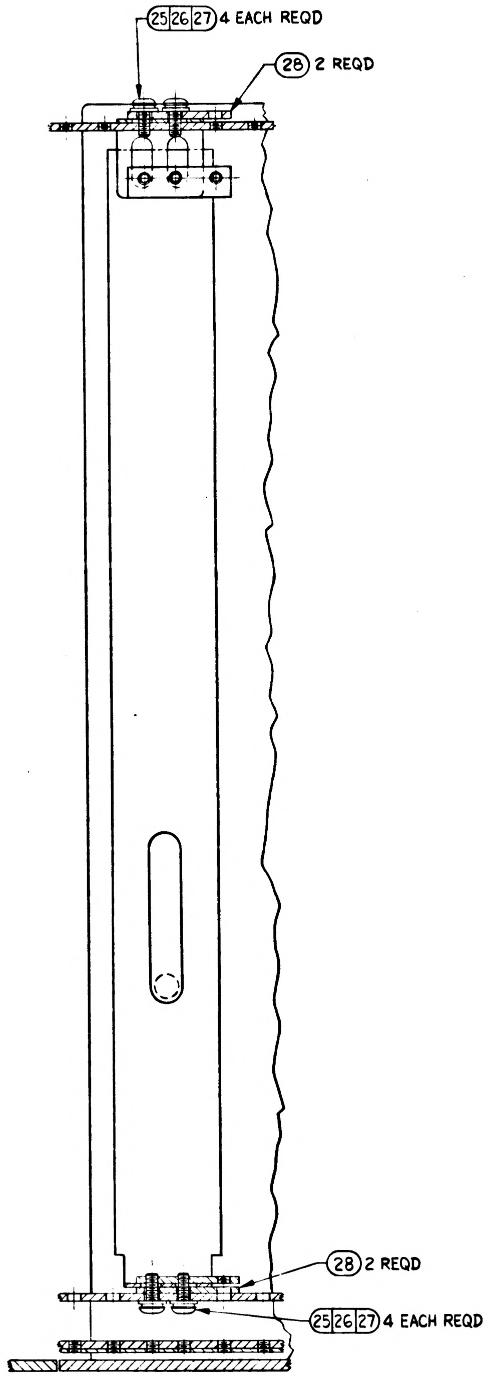
OPTICS-INERTIAL
ANALYZER

CODE IDENT NO 99974
SIZE J2
2900023
SCALE 1:4
SHEET 2 OF 2

900023 REV LTR R SH 2

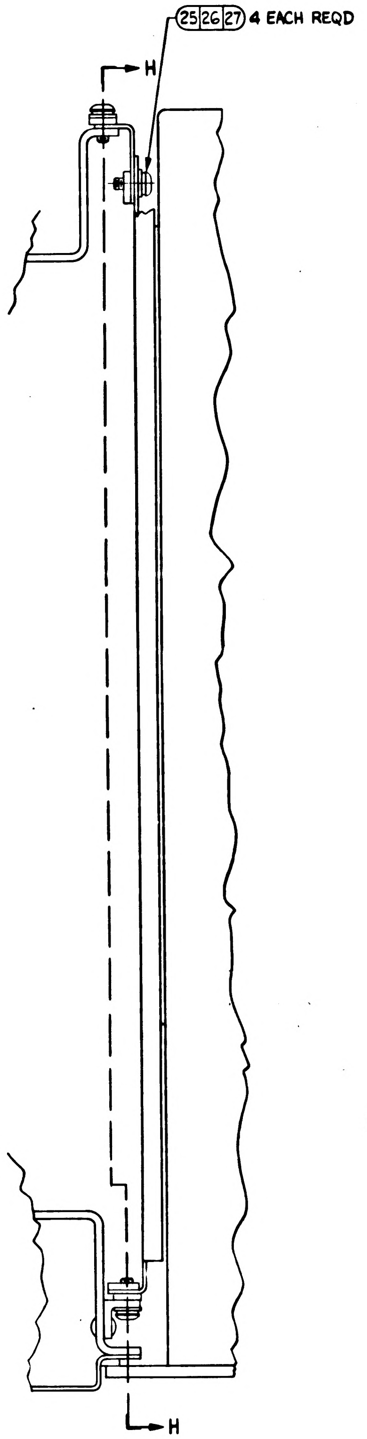
2900023 R

1/2900023



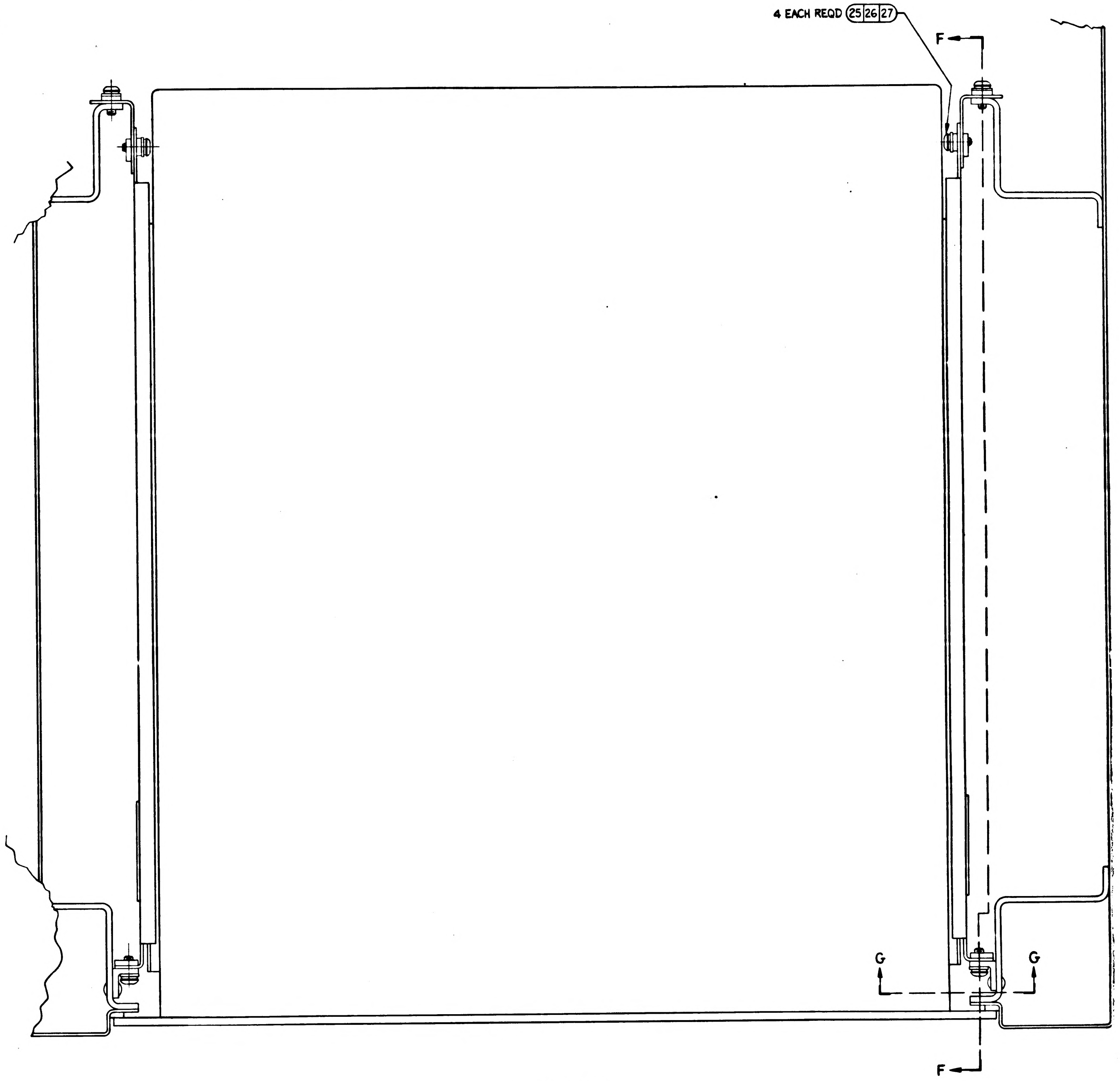
(25)(26)(27) 4 EACH REQD
(28) 2 REQD
(28) 2 REQD
(25)(26)(27) 4 EACH REQD

PARTIAL SECTION H-H



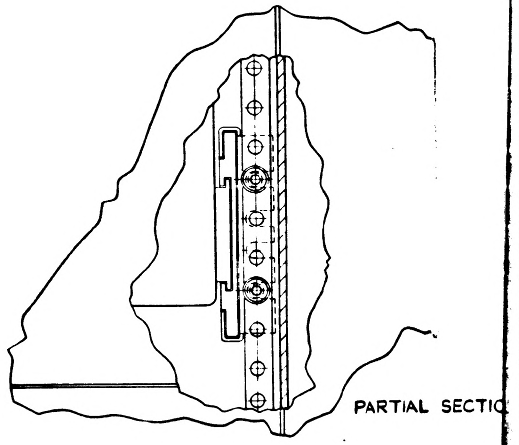
(25)(26)(27) 4 EACH REQD
H
H

PARTIAL SECTION A-A
SCALE 1:1
TYPICAL FOR MOUNTING ITEMS ③, ㊳, ㊴, ⑧, ⑪, ⑰, ⑱, ㊸, ㊷, ㊹, ㊼, ㊾, (52) AND (53).



4 EACH REQD (25)(26)(27)
F
G
G
F

SECTION B-B
SCALE 1:1
TYPICAL FOR MOUNTING ITEMS ①, ⑤, ⑥, ⑩, ⑫, ⑬, ⑭, ⑮, ⑯, ⑲, ⑳, ㉑, ㊵, ㊶, ㊽, ㊿ AND (51).



PARTIAL SECTIC

2900023 REV LTR R SH 2

1/2900023

2900023 SH 1 OF 2

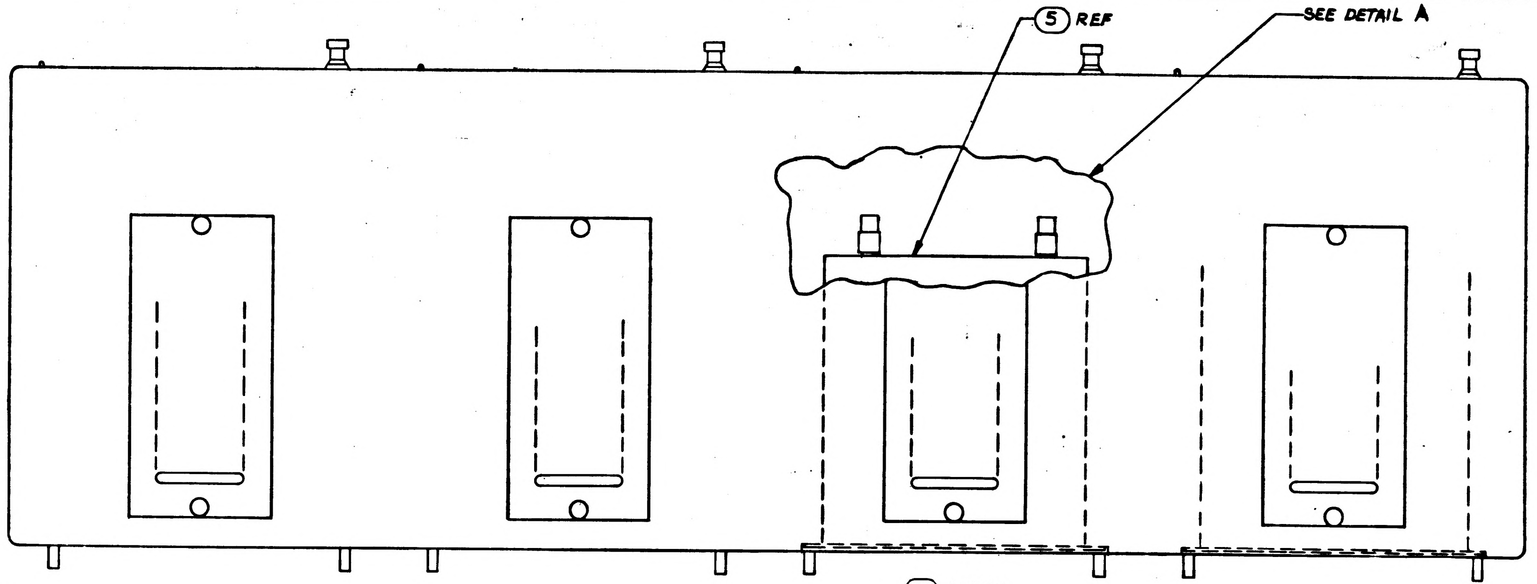
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SPACING BETWEEN FRONT PANELS IN EACH VERTICAL ROW IS TO BE BALANCED THRU DIMENSION SHOWN. A MINIMUM SPACING OF .030 IS TO BE MAINTAINED BETWEEN ANY TWO FRONT PANELS.
3. APPLY ITEM (34) TO SURFACE "A".
4. APPLY TIGHTENING TORQUE TO SCREWS AS FOLLOWS:
   ITEM (25) 28.5 TO 31.7 IN.LBS.
5. VENDOR ITEM-SEE SPECIFICATION CONTROL DRAWING
6. DISPOSE OF EXCESS DRAWER MOUNTING HARDWARE IN AN APPROVED MANNER.
7. BEFORE AND AFTER DRAWER INSTALLATION CONSOLE MUST BE ATTACHED TO THE FLOOR TO INSURE PERSONNEL AND EQUIPMENT SAFETY. SEE ITEM (35) FOR INSTALLATION ONLY, NOT FOR CONFIGURATION.
8. HARNESS GROUPS THAT ARE DISCONNECTED WHEN A DRAWER IS REMOVED FROM THE CABINET ARE TO BE HUNG BY SLIPPING THE HANGER LOOP OF THE HARNESS OVER THE HANGER SCREWS AT 2 PLACES AS SHOWN, WITH THE OPTION OF FORWARD OR BACK HANGING.
9. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (32) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .12 HIGH.

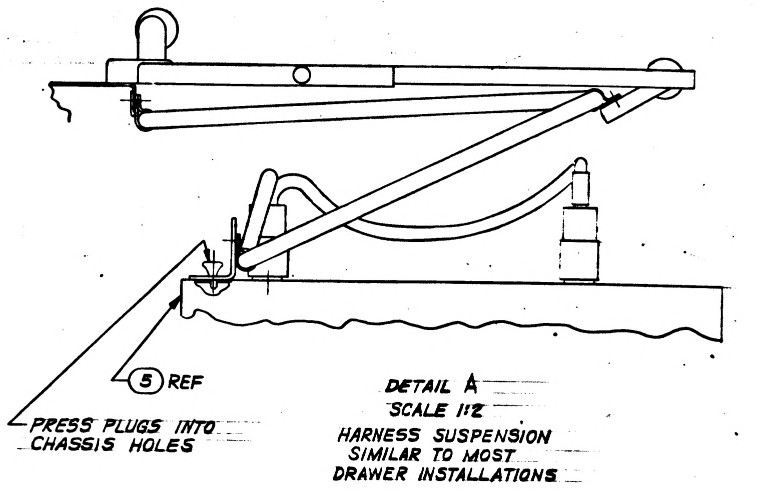
12. PART NO. 2900007-011 IS INTERCHANGEABLE WITH PART NO. 1900042-031 WHICH APPEARS IN EARLIER EQUIPMENT UPDATED BY RETROFIT.
13. ITEM 15 TO BE LOCATED SO THAT ITS HANDLE STRIKES THE PAD ON THE BACK OF THE CROSSBAR SWITCH COMPARTMENT PANEL APPROXIMATELY CENTER.

SECTIONS APPEAR ON SHEETS AS FOLLOWS:

	SH	ZONE
A-A	2	C13
B-B	2	C10
C-C	2	C3
D-D	1	A16
E-E	2	C4
F-F	2	C6
G-G	2	A8
H-H	2	C14

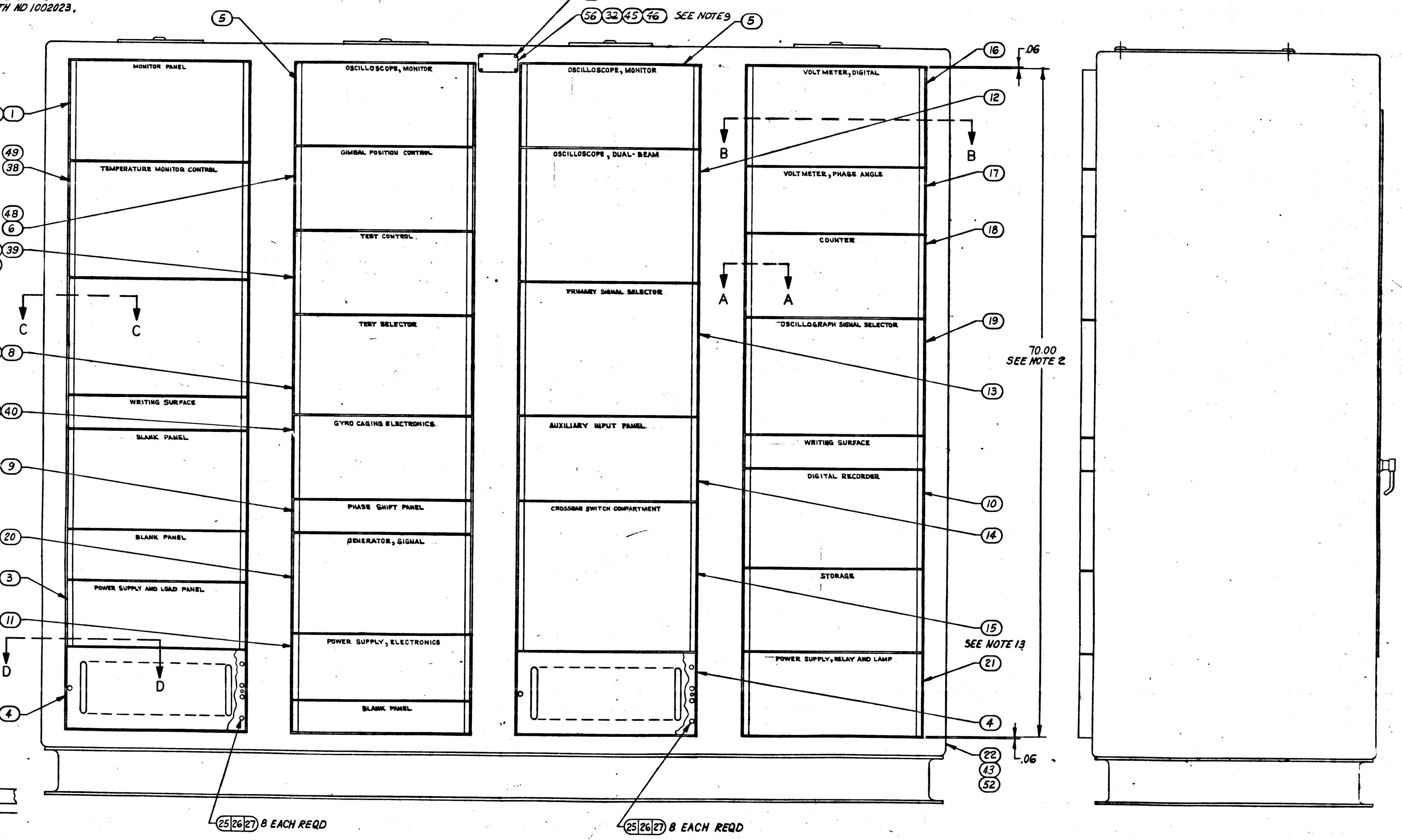


(5) REF
SEE DETAIL A

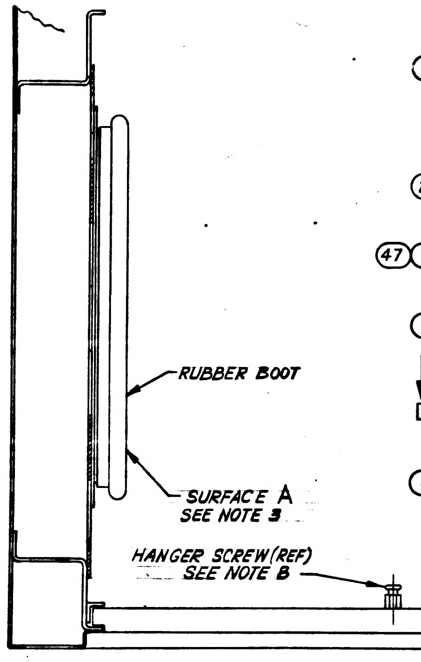


(5) REF
PRESS PLUGS INTO CHASSIS HOLES

DETAIL A
SCALE 1:2
HARNESS SUSPENSION SIMILAR TO MOST DRAWER INSTALLATIONS



(33) 4 REQD
(56)(32)(45)(46) SEE NOTE 9
(5)
(5)
(55)(51)(41)(1)
(49)
(38)
(48)
(6)
(44)(39)
(53)
(54)(42)(8)
(50)(40)
(9)
(20)
(47)(3)
(11)
(4)
(25)(26)(27) 8 EACH REQD
(25)(26)(27) 8 EACH REQD
MONITOR PANEL
TEMPERATURE MONITOR CONTROL
WRITING SURFACE
BLANK PANEL
BLANK PANEL
POWER SUPPLY AND LOAD PANEL
OSCILLOSCOPE, MONITOR
GIMBAL POSITION CONTROL
TEST CONTROL
TEST SELECTOR
GYRO CAGING ELECTRONICS
PHASE SHIFT PANEL
GENERATOR, SIGNAL
POWER SUPPLY, ELECTRONICS
BLANK PANEL
OSCILLOSCOPE, MONITOR
OSCILLOSCOPE, DUAL-BEAM
PRIMARY SIGNAL SELECTOR
AUXILIARY INPUT PANEL
CROSSBAR SWITCH COMPARTMENT
VOLTMETER, DIGITAL
VOLTMETER, PHASE ANGLE
COUNTER
OSCILLOGRAPH SIGNAL SELECTOR
WRITING SURFACE
DIGITAL RECORDER
STORAGE
POWER SUPPLY, RELAY AND LAMP
C C
D D
B B
A A
(16)
(12)
(17)
(18)
(19)
(13)
(10)
(14)
(15)
SEE NOTE 13
(21)
(4)
(22)
(43)
(52)
.06
.06
70.00
SEE NOTE 2



RUBBER BOOT
SURFACE A
SEE NOTE 3
HANGER SCREW (REF)
SEE NOTE 8

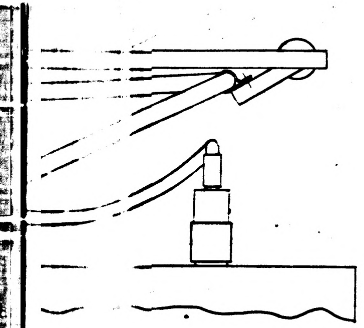
PARTIAL SECTION D-D
4 PLACES
SCALE 1:2

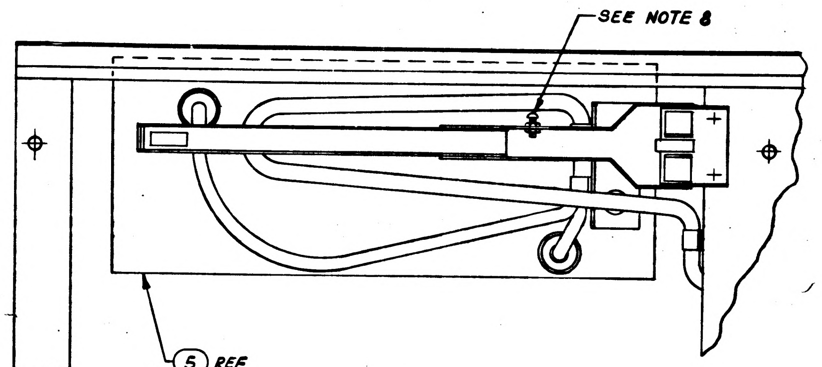
2900023	REV LTR 5	SH 1

1/2900023

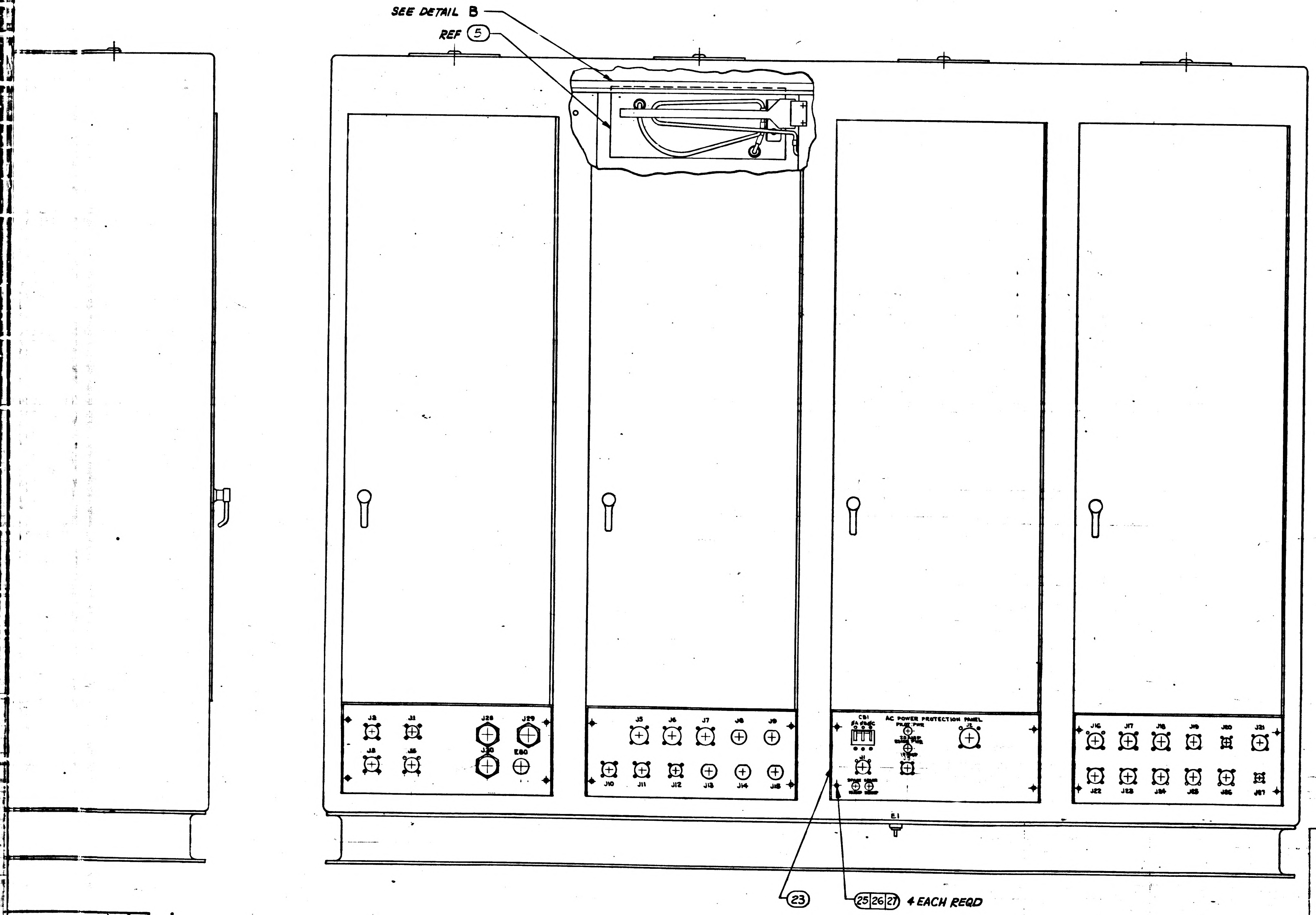
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
H		REPLACE REV. "G" WITH CHANGE PER MXC 202020		8-JULY 65	GW MGM
J		REVISED PER MXC 203259		23 JUL 65	RLP RWH
K		REVISED PER MXC 203443		2 AUG 65	JHP RWH
L		REVISED PER MXC 204240		26 AUG 65	RLP EF
M		REVISED PER MXC 205204		27 SEP 65	RLP EF
N		INITIAL RELEASE CLASS A PER TDRR 23919		19 OCT 65	FE
P		REVISED PER TDRR 27582		4 APR 66	R.W.T.
R		REVISED PER TDRR 28763		17 MAY 66	B.
S		REVISED PER TDRR 32133.		6 DEC 66	SH NW.

23919





DETAIL B
HARNESS ARRANGEMENT FOR
ALL DRAWERS SIMILAR
SCALE 1:2 SEE NOTE 8



	041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1					56	1004260-536	NAMEPLATE
	1					55	2900031-041	MONITOR PANEL ASSY
	1					54	2900028-031	SELECTOR, TEST ASSY
	1	1	-	-		53	2900027-031	CONTROL, TEST ASSY
	1	1	-	-		52	2900032-031	CABINET ASSY, ELECT EQUIP ASSY
	-	1	-	-		51	2900031-031	MONITOR PANEL ASSY
	1	1	-	-		50	2900029-021	CAGING ELECTRONICS, GYRO, ASSY
	1	1	-	-		49	2900026-021	TEMPERATURE MON & CONT ASSY
	1	1	-	-		48	2900036-021	CONTROL. GIMBAL POSITION ASSY
	1	1	-	-		47	2900033-021	POWER SUPPLY & LOAD PANEL
SEE NOTE 9	-	1	-	-		46	1004260-192	NAMEPLATE, APOLLO G & N
SEE NOTE 9	-	-	1	-		45	1004260-170	NAME PLATE, APOLLO G&N
	-	-	1	-		44	2900027-021	CONTROL TEST ASSY.
	-	-	1	-		43	2900032-021	CABINET ASSY. ELECT. EQUIPMENT ASSY.
	-	1	1	-		42	2900028-021	SELECTOR, TEST ASSEMBLY
	-	-	1	-		41	2900031-021	MONITOR PANEL ASSEMBLY
	-	-	1	1		40	2900029-011	CAGING ELECTRONICS, GYRO, ASSY
	-	-	-	1		39	2900027-011	CONTROL, TEST ASSY
	-	-	1	1		38	2900026-011	TEMPERATURE MONITOR & CONTROL ASSY
						37		
						36		
SEE NOTE 7	☒	☒	☒	☒		35	2900322	INSTALLATION DRAWING, OIA
SEE NOTE 3	AR	AR	AR	AR		34	MIL-I-8660	ELEC INSULATING & SEALING COMPOUND
	4	4	4	4		33	MS35233-2	SCREW, MACHINE, PAN HD
SEE NOTE 9	-	-	-	1		32	1004260-142	NAMEPLATE, APOLLO G&N
						31		
SEE NOTE 5	2	2	2	2		30	1015796-001	SPACER, BAR
SEE NOTE 5	2	2	2	2		29	1015790-001	NUT-BAR
	28	28	28	28		28	1900934	SPACER, BAR
	252	252	252	252		27	AN960C10L	(1897006-019) WASHER-FLAT
	252	252	252	252		26	MS35338-81	WASHER, LOCK
SEE NOTE 5	252	252	252	252		25	1006783-44	SCREW, BUTTON HD-HEX SOCKET
	1	1	1	1		23	1902017-011	AC POWER PROTECTION PANEL ASSY
	-	-	-	1		22	2900032-011	CABINET ASSY, ELECTRICAL EQUIP, ASSY
	1	1	1	1		21	1900049-031	POWER SUPPLY RELAY & LAMP ASSY
	1	1	1	1		20	1900043-011	GENERATOR, SIGNAL ASSY
	1	1	1	1		19	2900034-011	SELECTOR, SIGNAL, OSCILLOGRAPH, ASSY
	1	1	1	1		18	1900041-011	COUNTER ASSY
	1	1	1	1		17	1900036-011	VOLTMETER, PHASE ANGLE ASSY
SEE NOTE 12	1	1	1	1		16	2900007-011	VOLTMETER, DIGITAL, ASSY
	1	1	1	1		15	1900048-011	SWITCH, CROSSBAR ASSY
	1	1	1	1		14	2900030-011	PANEL, AUXILIARY INPUT, ASSY
	1	1	1	1		13	2900035-011	SELECTOR, SIGNAL, PRIMARY, ASSY
	1	1	1	1		12	1900037-011	OSCILLOSCOPE, DUAL BEAM ASSY
	1	1	1	1		11	2900012-011	POWER SUPPLY, ELECTRONICS ASSY
	1	1	1	1		10	1900052-011	RECORDER, DIGITAL ASSY
	1	1	1	1		9	1900163-011	PHASE SHIFT ASSY
	-	-	-	1		8	2900028-011	SELECTOR, TEST, ASSY
						7		
	-	-	1	1		6	2900036-011	CONTROL, GIMBAL POSITION, ASSY
	2	2	2	2		5	1900038-011	OSCILLOSCOPE, MONITOR ASSY
	2	2	2	2		4	1900350-011	FAN, CENTRIFUGAL ASSY
	-	-	1	1		3	2900033-011	POWER SUPPLY & LOAD PANEL ASSY
						2		
	-	-	-	1		1	2900031-011	MONITOR PANEL ASSY

QUANTITY REQUIRED
LIST OF PARTS AND MATERIALS

2900023 S

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900022-031	2900022-031	-031
2900022-021	2900022-021	-021
2900022-011	2900022-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS
DRAWN Hetchler DATE 24/MAR/65
CHECKED J. GRIEB 24/MAR/65
APPROVAL G. Stoddart 24/MAR/65
APPROVAL
NASA APPROVAL
MIT APPROVAL

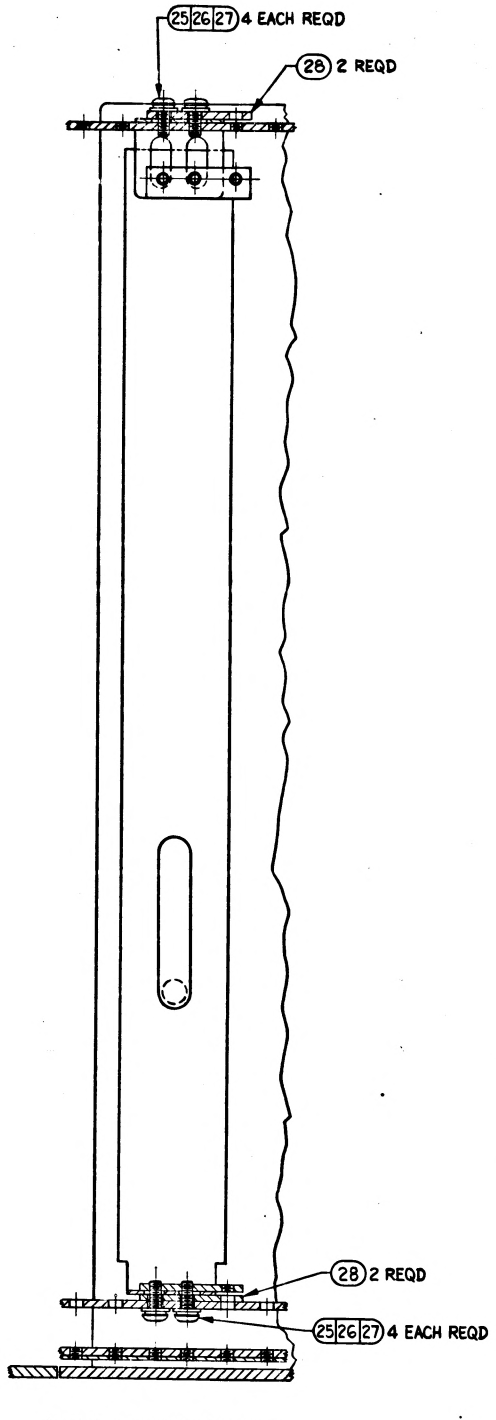
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS - INERTIAL
ANALYZER

CODE IDENT NO. 99974
SIZE J2
2900023
SCALE 1:4
SHEET 1 OF 2

900023 REV LTR S SH 1

27 2900023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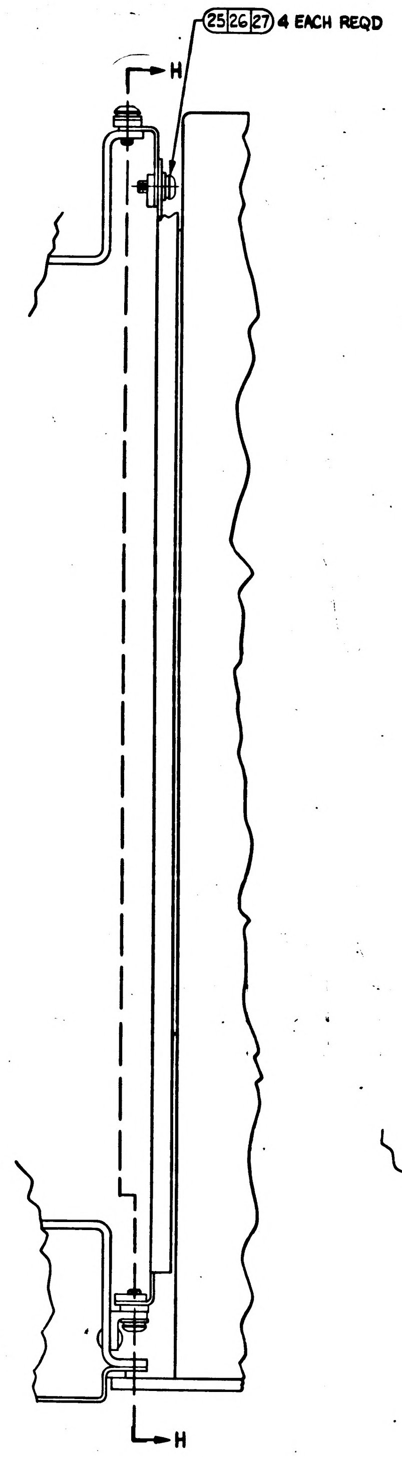
28 2 REQD
28 2 REQD
25 26 27 4 EACH REQD

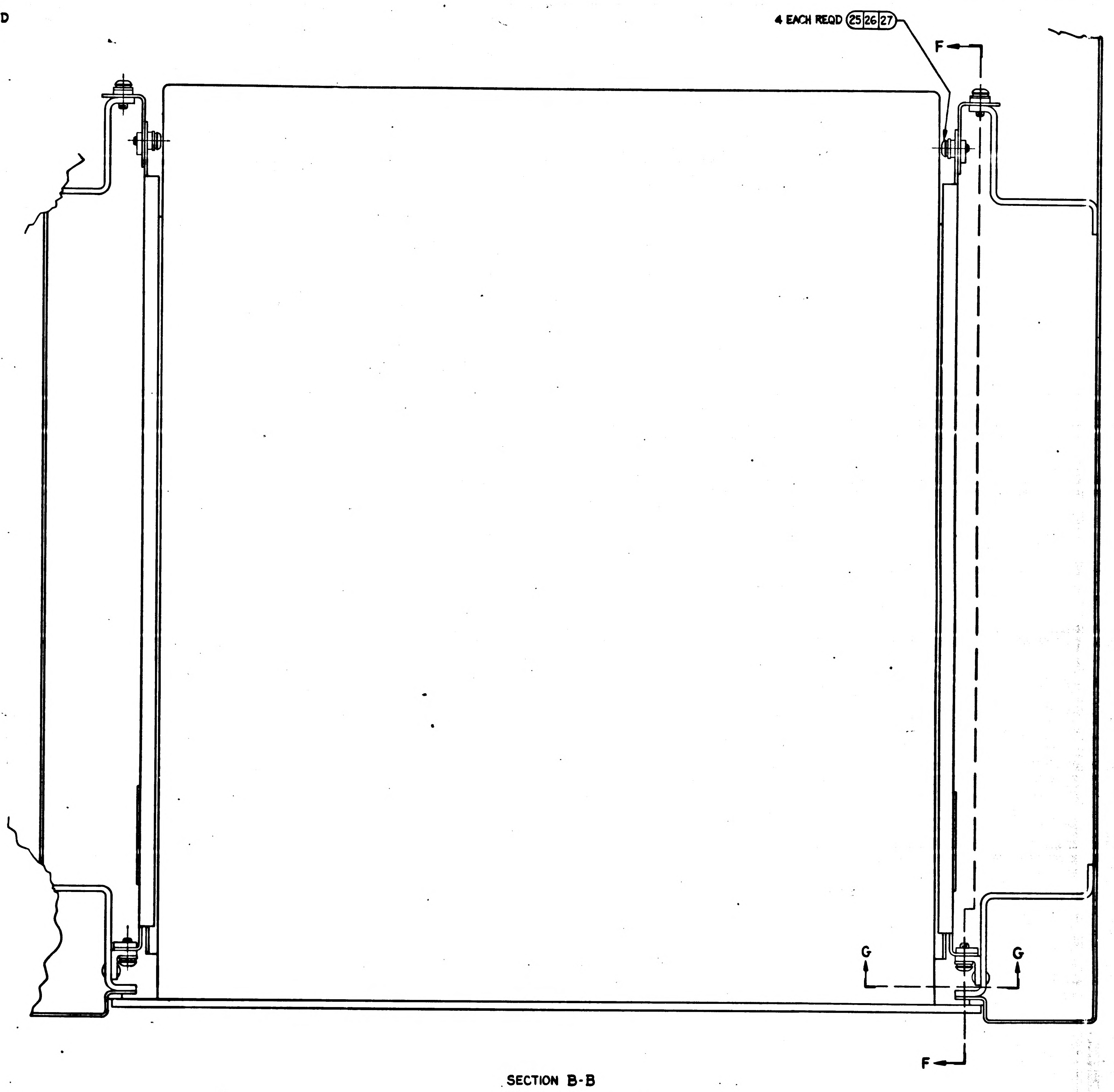
PARTIAL SECTION H-H


25 26 27 4 EACH REQD
H
H

PARTIAL SECTION A-A

SCALE 1:1

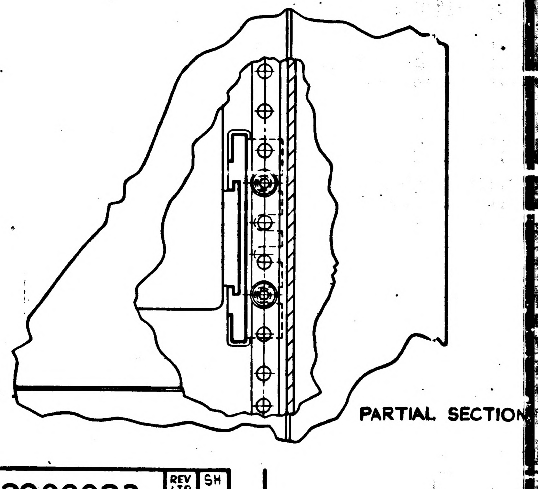
TYPICAL FOR MOUNTING ITEMS ③, ㊳, ㊴, ⑧, ⑪, ⑰, ⑱, ㊸, ㊷, ㊹, ㊼, ㊾, (52) (53) & (54).


4 EACH REQD 25 26 27
F
G
G
F

SECTION B-B

SCALE 1:1

TYPICAL FOR MOUNTING ITEMS ①, ⑤, ⑥, ⑩, ⑫, ⑬, ⑭, ⑮, ⑯, ⑲, ⑳, ㉑, ㊵, ㊶, ㊽, ㊿ (51) AND (55)

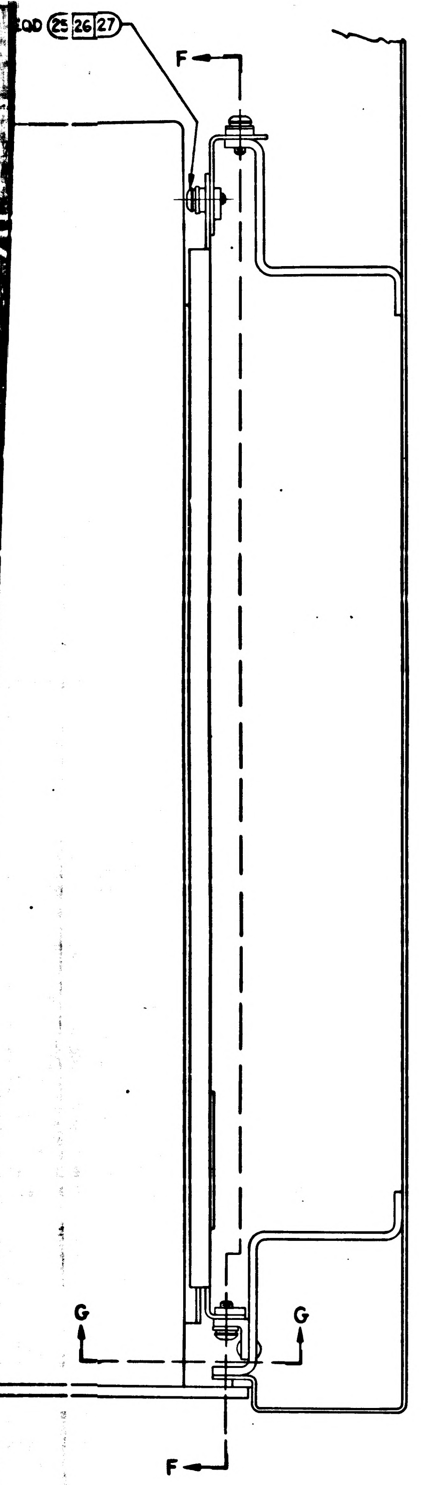


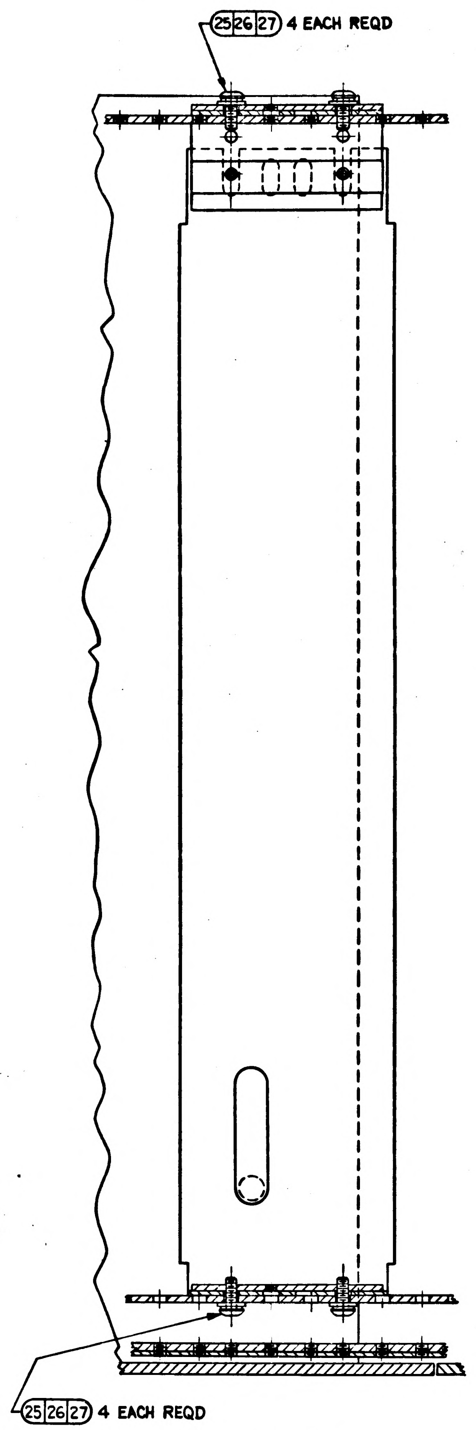
PARTIAL SECTION

2900023 REV LTR S SH 2

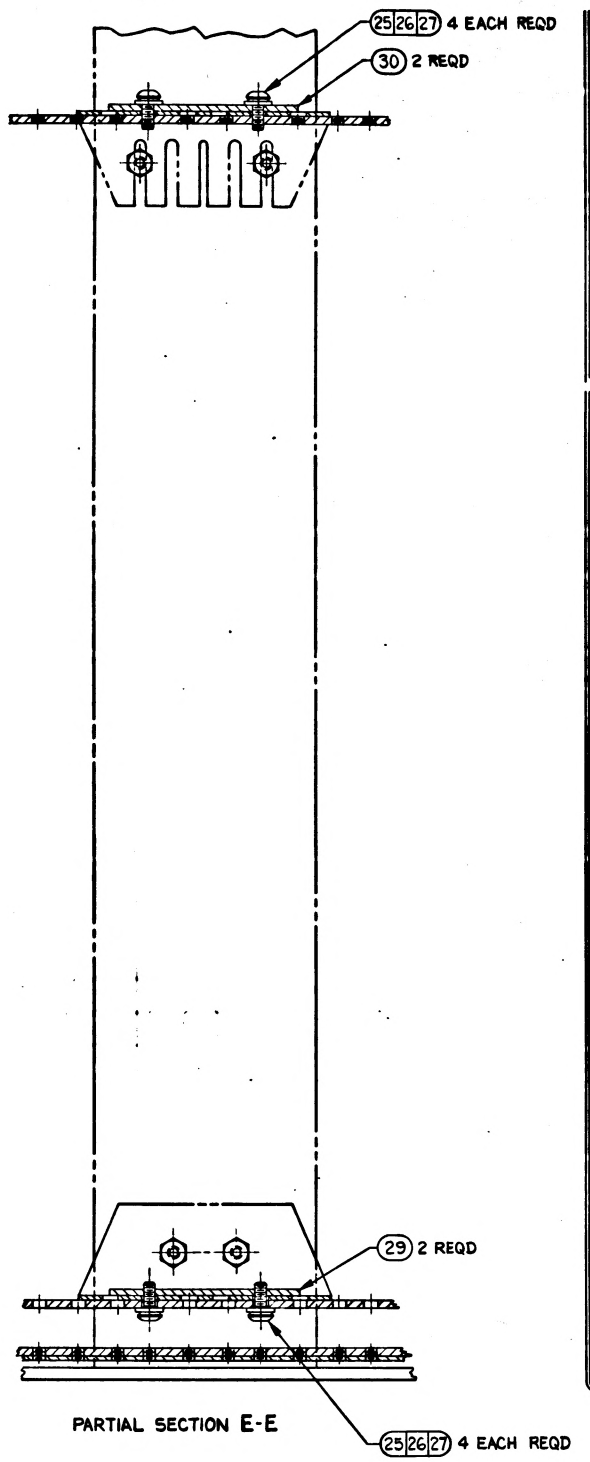
1/2900023

REVISIONS 23919					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
H		THIS SH. ADDED PER MIC 202880		8-JULY 65	mcm
J		REVISION STATUS CHANGED		23 JUL 65	RLP RWH
K		REVISION STATUS CHANGED		2 AUG 65	JNP RWH
L		REVISION STATUS CHANGED		26 AUG 65	RLP EF
M		REVISION STATUS CHANGED		27 SEP 65	RLP EF
N		INITIAL RELEASE CLASS A PER TDRR 23919		19 OCT 65	FE
P		REVISED PER TDRR 27582		4 APR 66	R.W.T.
R		REVISED PER TDRR 28763		17 MAY 66	B.
S		REVISED PER TDRR 32133		6 DEC 66	EH N.W.

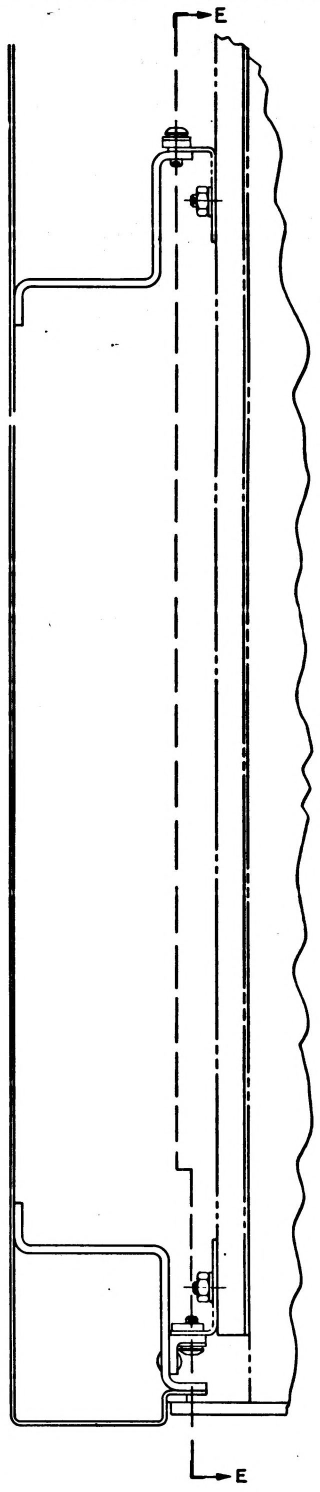




PARTIAL SECTION F-F



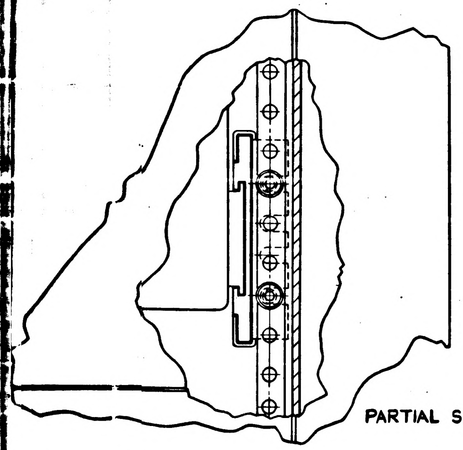
PARTIAL SECTION E-E



PARTIAL SECTION C-C

SCALE 1:1
HARDWARE SHOWN TO BE ATTACHED.
SLIDE MOUNTING SHOWN FOR REF ONLY.
LEFT SIDE SHOWN

RIGHT SIDE SYMMETRICALLY OPPOSITE



PARTIAL SECTION G-G

2900022-021	2900022-021	-021
2900022-011	2900022-011	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN Hetchler DATE 24/MAR/65
CHECKED J. GRIEB 24/MAR/65
APPROVAL G. Stoddard 24/MAR/65
APPROVAL Gelman 10/19/65
NASA APPROVAL 10/20/65
MIT APPROVAL 20 Oct 65

MANNED
SPACECRAFT CENTER,
HOUSTON, TEXAS

OPTICS-INERTIAL
ANALYZER

CODE IDENT NO. 99974
SIZE J_2
2900023
SCALE 1:4
SHEET 2 OF 2

900023 REV LTR S SH 2

2/2900023

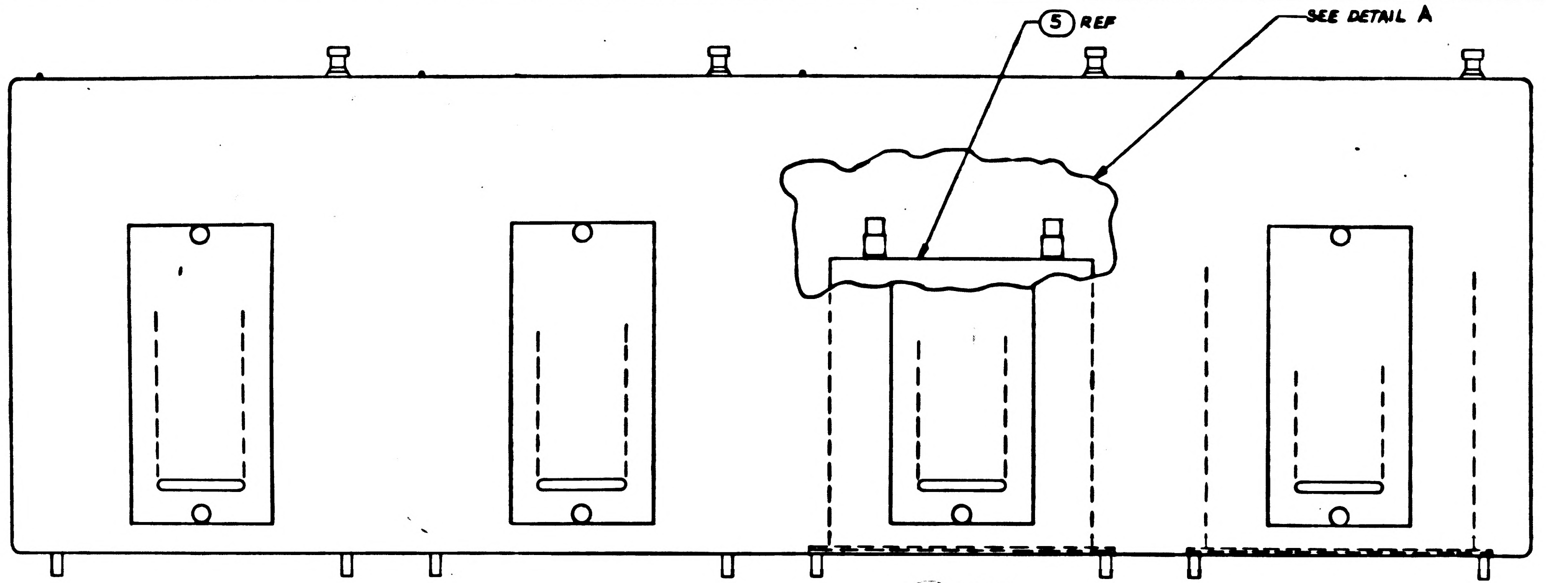
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SPACING BETWEEN FRONT PANELS IN EACH VERTICAL ROW IS TO BE BALANCED THRU DIMENSION SHOWN. A MINIMUM SPACING OF .030 IS TO BE MAINTAINED BETWEEN ANY TWO FRONT PANELS.
3. APPLY ITEM (34) TO SURFACE "A".
4. APPLY TIGHTENING TORQUE TO SCREWS AS FOLLOWS:
   ITEM (25) 28.5 TO 31.7 IN. LBS.
5. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING
6. DISPOSE OF EXCESS DRAWER MOUNTING HARDWARE IN AN APPROVED MANNER.
7. BEFORE AND AFTER DRAWER INSTALLATION CONSOLE MUST BE ATTACHED TO THE FLOOR TO INSURE PERSONNEL AND EQUIPMENT SAFETY. SEE ITEM (35) FOR INSTALLATION ONLY, NOT FOR CONFIGURATION.
8. HARNESS GROUPS THAT ARE DISCONNECTED WHEN A DRAWER IS REMOVED FROM THE CABINET ARE TO BE HUNG BY SLIPPING THE HANGER LOOP OF THE HARNESS OVER THE HANGER SCREWS AT 2 PLACES AS SHOWN, WITH THE OPTION OF FORWARD OR BACK HANGING.
9. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (32) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .12 HIGH.

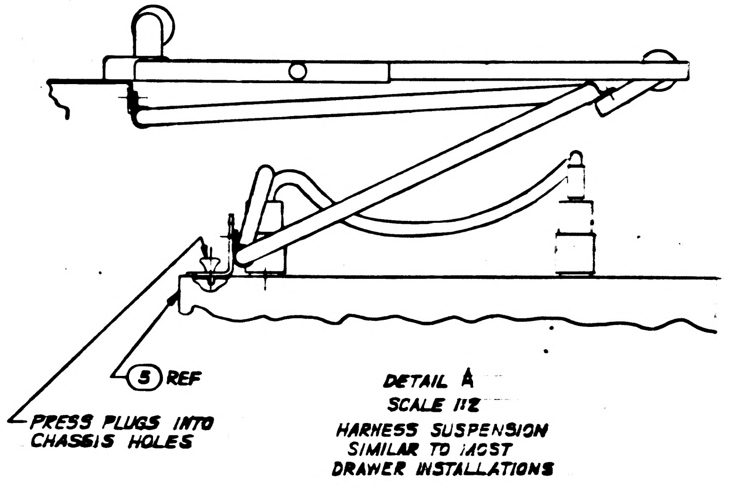
12. PART NO. 2900007-OH IS INTERCHANGEABLE WITH PART NO. 1900042-031 WHICH APPEARS IN EARLIER EQUIPMENT UPDATED BY RETROFIT.
13. ITEM 15 TO BE LOCATED SO THAT ITS HANDLE STRIKES THE PAD ON THE BACK OF THE CROSSBAR SWITCH COMPARTMENT PANEL APPROXIMATELY CENTER.

SECTIONS APPEAR ON SHEETS AS FOLLOWS:

	SH		ZONE
A-A	SH	2	C 13
B-B	↓	2	C 10
C-C	↓	2	C 3
D-D	↓	1	A 16
E-E	↓	2	C 4
F-F	↓	2	C 6
G-G	↓	2	A 8
H-H	↓	2	C 16

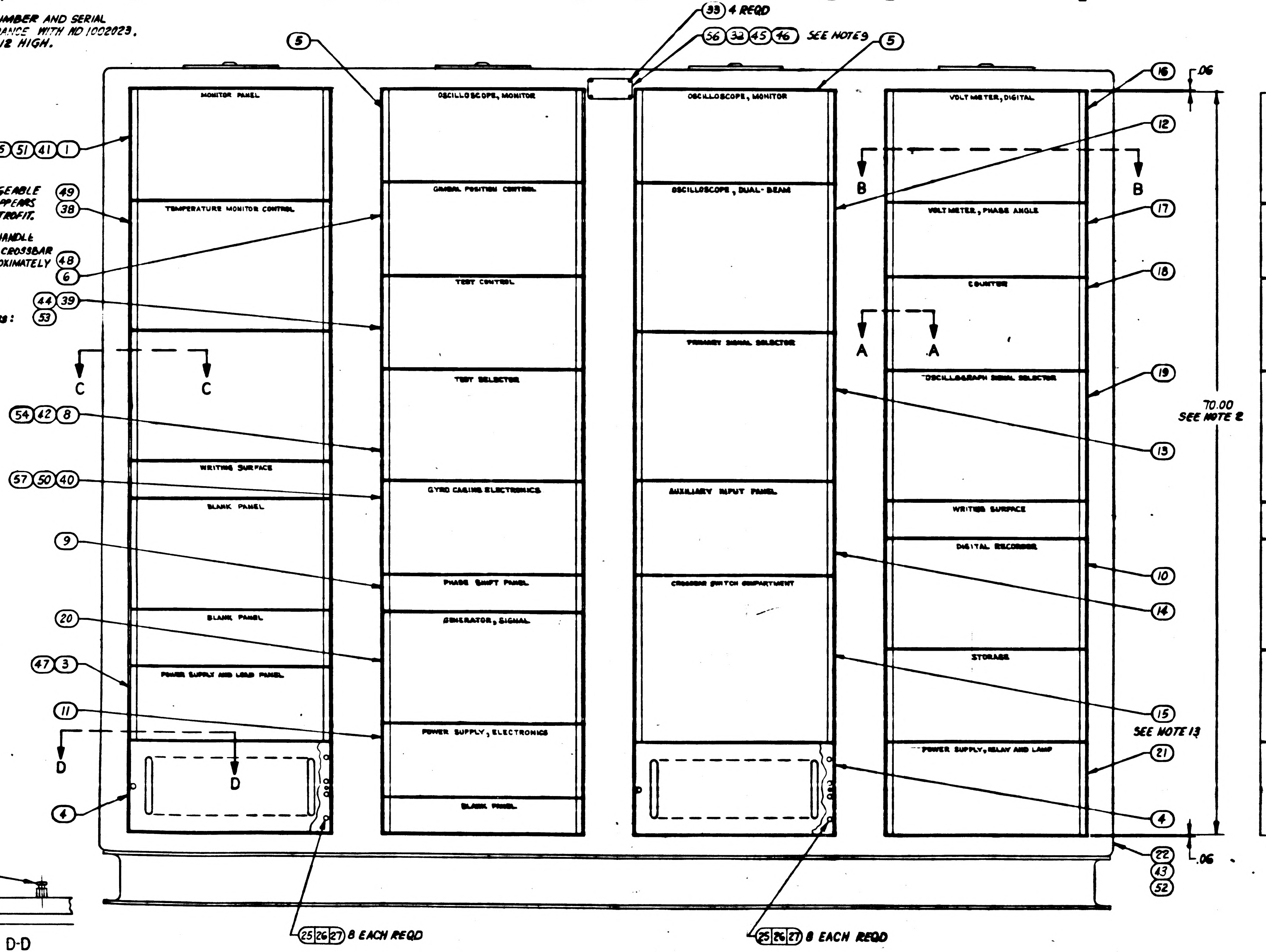


(5) REF
SEE DETAIL A

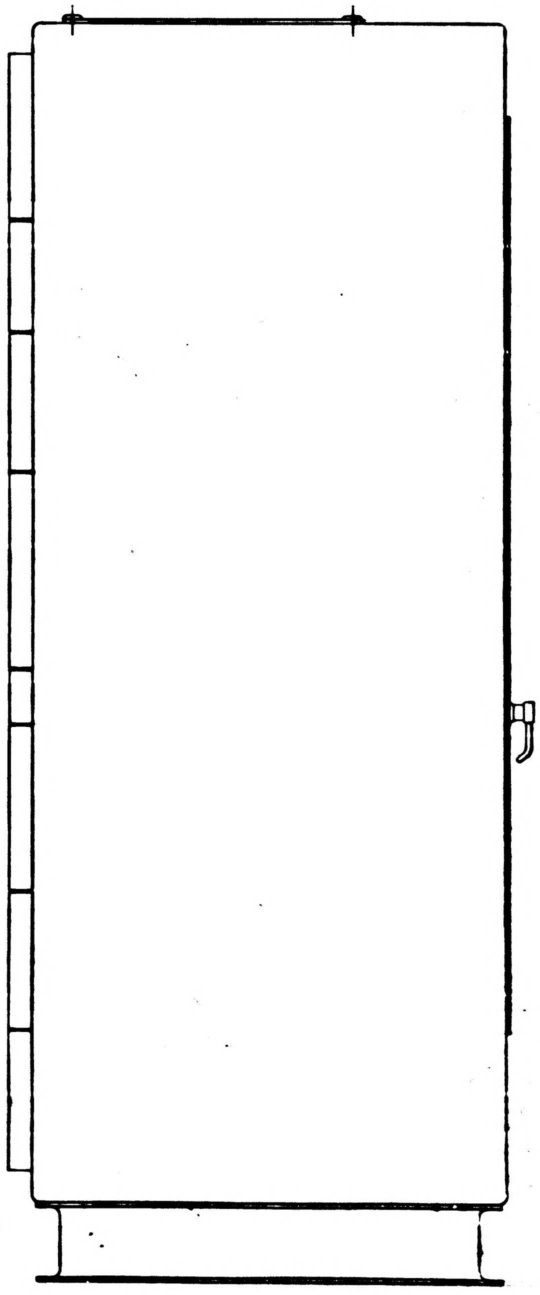


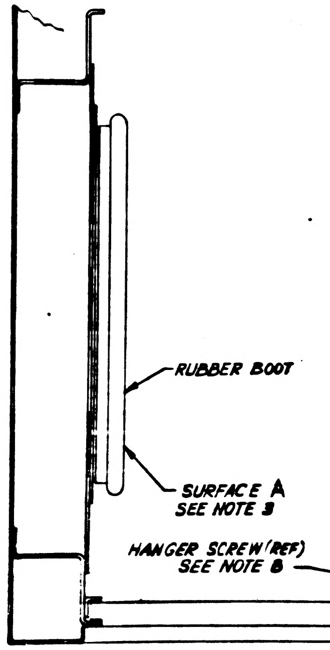
(5) REF
PRESS PLUGS INTO CHASSIS HOLES

DETAIL A
SCALE 1/2
HARNESS SUSPENSION SIMILAR TO MOST DRAWER INSTALLATIONS



(33) 4 REQD
(56)(32)(45)(46) SEE NOTE 9
(5)
(5)
(16)
.06
(12)
B
B
(17)
(18)
A
A
(19)
70.00 SEE NOTE 2
(13)
(10)
(14)
(15) SEE NOTE 13
(21)
(4)
(22)
(43)
(52)
.06
(55)(51)(41)(1)
(49)
(38)
(48)
(6)
(44)(39)
(53)
C
C
(54)(42)(8)
(57)(50)(40)
(9)
(20)
(47)(3)
(11)
D
D
(4)
(25)(26)(27) 8 EACH REQD
(25)(26)(27) 8 EACH REQD
MONITOR PANEL
TEMPERATURE MONITOR CONTROL
WRITING SURFACE
BLANK PANEL
BLANK PANEL
POWER SUPPLY AND LOAD PANEL
OSCILLOSCOPE, MONITOR
GIMBAL POSITION CONTROL
TEST CONTROL
TEST SELECTOR
GYRO CASING ELECTRONICS
PHASE SHIFT PANEL
GENERATOR, SIGNAL
POWER SUPPLY, ELECTRONICS
BLANK PANEL
OSCILLOSCOPE, MONITOR
OSCILLOSCOPE, DUAL-BEAM
PRIMARY SIGNAL SELECTOR
AUXILIARY INPUT PANEL
CROSSBAR SWITCH COMPARTMENT
VOLTMETER, DIGITAL
VOLTMETER, PHASE ANGLE
COUNTER
OSCILLOGRAPH SIGNAL SELECTOR
WRITING SURFACE
DIGITAL RECORDER
STORAGE
POWER SUPPLY, RELAY AND LAMP



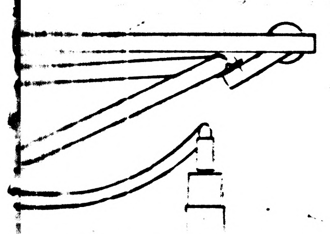


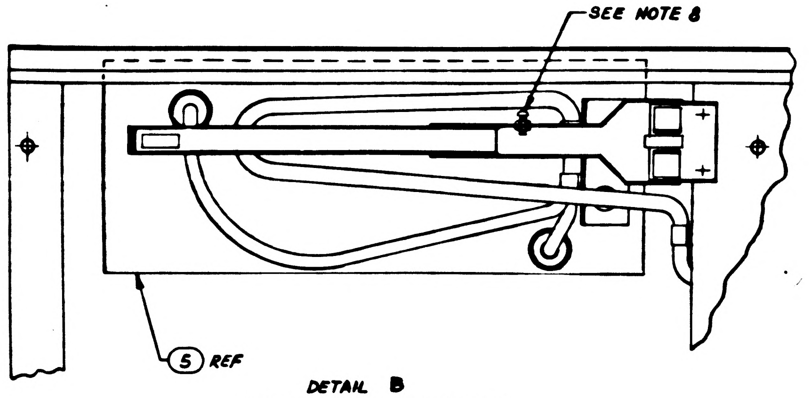
RUBBER BOOT
SURFACE A SEE NOTE 3
HANGER SCREW (REF) SEE NOTE 8

PARTIAL SECTION D-D
4 PLACES
SCALE 1:2

2900023	SH 1

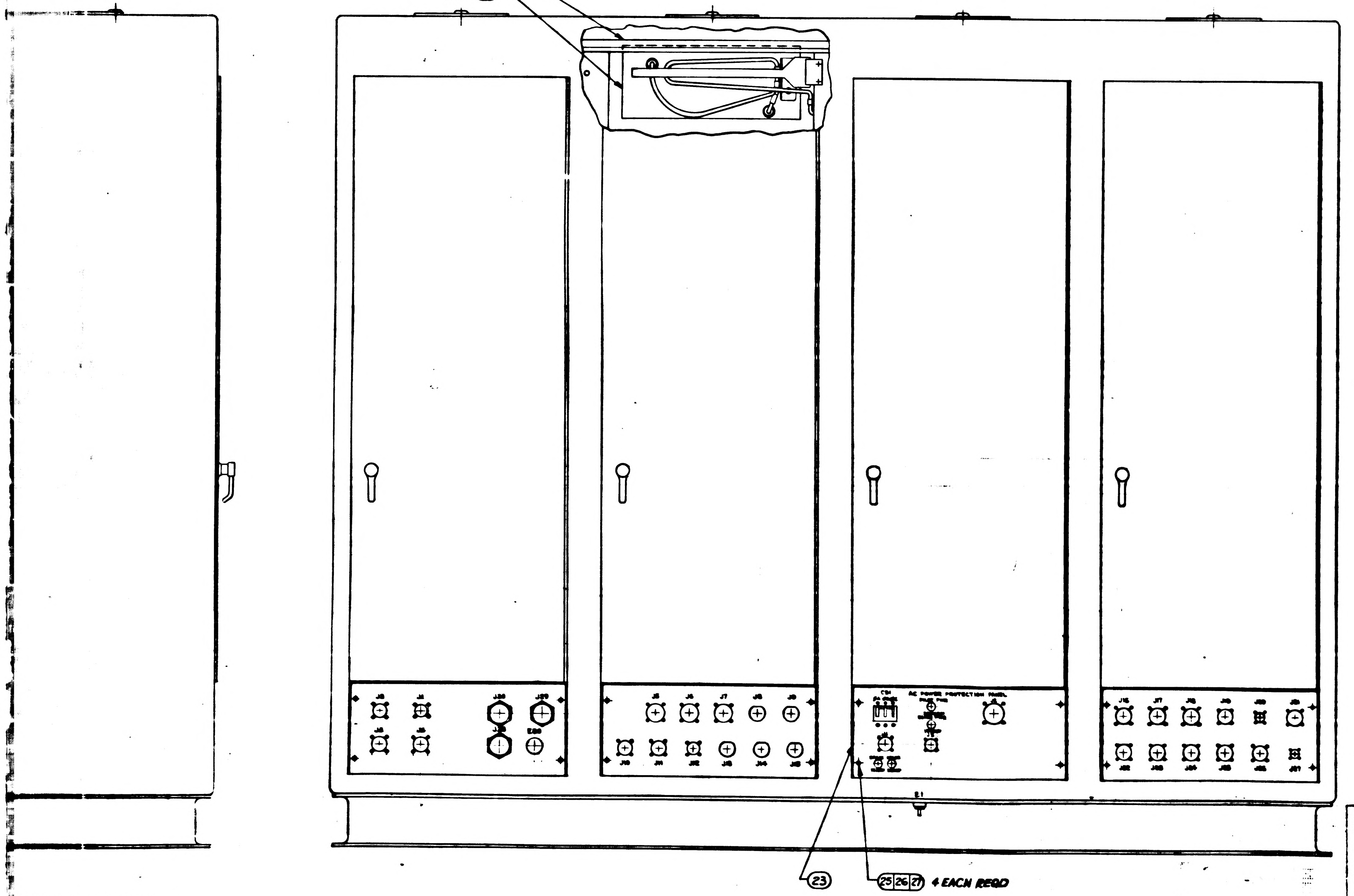
17 2900023





DETAIL B
HARNESS ARRANGEMENT FOR
ALL DRAWERS SIMILAR
SCALE 1:2 SEE NOTE 8

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
H		REPLACE REV. "G" WITH CHANGE PER MXC 203880		8 JULY 65	
J		REVISED PER MXC 203259		23 Jul 65	RWH
K		REVISED PER MXC 203443		2 Aug 65	RWH
L		REVISED PER MXC 204240		65	
M		REVISED PER MXC 205204		2 SEP 65	
N		INITIAL RELEASE CLASS A PER TDRR 23919		65	
P		REVISED PER TDRR 27582		66	
R		REVISED PER TDRR 28763		66	
S		REVISED PER TDRR 32 33.		66	
T		REVISED PER TDRR 33093			



	041	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1	—	—	—		57	2900029-031	CAGING ELECTRONICS, GYRO, ASSEMBLY
	1	—	—	—		56	1004260-536	NAMEPLATE
	1	—	—	—		55	2900031-041	MONITOR PANEL ASSY
	1	—	—	—		54	2900028-031	SELECTOR, TEST ASSY
	1	1	-	-		53	2900027-031	CONTROL, TEST ASSY
	1	1	-	-		52	2900032-031	CABINET ASSY, ELECT EQUIP ASSY
	-	1	-	-		51	2900031-031	MONITOR PANEL ASSY
	-	1	-	-		50	2900029-021	CAGING ELECTRONICS, GYRO, ASSY
	1	1	-	-		49	2900026-021	TEMPERATURE MON & CONT ASSY
	1	1	-	-		48	2900036-021	CONTROL, GIMBAL POSITION, ASSY
	1	1	-	-		47	2900033-021	POWER SUPPLY & LOAD PANEL
SEE NOTE 9	-	1	-	-		46	1004260-192	NAMEPLATE, APOLLO G & N
SEE NOTE 9	-	-	1	-		45	1004260-170	NAMEPLATE, APOLLO G&N
	-	-	1	-		44	2900027-021	CONTROL TEST ASSY.
	-	-	1	-		43	2900032-021	CABINET ASSY, ELECT EQUIPMENT ASSY
	-	1	1	-		42	2900028-021	SELECTOR, TEST ASSEMBLY
	-	-	1	-		41	2900031-021	MONITOR PANEL ASSEMBLY
	-	-	1	1		40	2900029-011	CAGING ELECTRONICS, GYRO, ASSY
	-	-	-	1		39	2900027-011	CONTROL, TEST ASSY
	-	-	1	1		38	2900026-011	TEMPERATURE MONITOR & CONTROL ASSY
						37		
						36		
SEE NOTE 7	╳	╳	╳	╳		35	2900322	INSTALLATION DRAWING, OIA
SEE NOTE 8	AR	AR	AR	AR		34	MIL-I-8660	ELEC INSULATING & SEALING COMPOUND
	4	4	4	4		33	MS35233-2	SCREW, MACHINE, PAN HD
SEE NOTE 9	-	-	-	1		32	1004260-142	NAMEPLATE, APOLLO G&N
						31		
SEE NOTE 5	2	2	2	2		30	1015796-001	SPACER, BAR
SEE NOTE 6	2	2	2	2		29	1015790-001	NUT-BAR
	28	28	28	28		28	1900934	SPACER, BAR
	252	252	252	252		27	AN960C10L	(1097006-019) WASHER-FLAT
	252	252	252	252		26	MS35338-81	WASHER, LOCK
SEE NOTE 6	252	252	252	252		25	1006783-44	SCREW, BUTTON HD-HEX SOCKET
	1	1	1	1		23	1902017-011	AC POWER PROTECTION PANEL ASSY
	-	-	—	1		22	2900032-011	CABINET ASSY, ELECTRICAL EQUIP, ASSY
	1	1	1	1		21	1900049-031	POWER SUPPLY RELAY & LAMP ASSY
	1	1	1	1		20	1900043-011	GENERATOR, SIGNAL ASSY
	1	1	1	1		19	2900034-011	SELECTOR, SIGNAL, OSCILLOGRAPH, ASSY
	1	1	1	1		18	1900041-011	COUNTER ASSY
	1	1	1	1		17	1900036-011	VOLTMETER, PHASE ANGLE ASSY
SEE NOTE 12	1	1	1	1		16	2900007-011	VOLTMETER, DIGITAL, ASSY
	1	1	1	1		15	1900048-011	SWITCH, CROSSBAR ASSY
	1	1	1	1		14	2900030-011	PANEL, AUXILIARY INPUT, ASSY
	1	1	1	1		13	2900035-011	SELECTOR, SIGNAL, PRIMARY, ASSY
	1	1	1	1		12	1900037-011	OSCILLOSCOPE, DUAL BEAM ASSY
	1	1	1	1		11	2900012-011	POWER SUPPLY, ELECTRONICS ASSY
	1	1	1	1		10	1900052-011	RECORDER, DIGITAL ASSY
	1	1	1	1		9	1900163-011	PHASE SHIFT ASSY
	-	-	-	1		8	2900028-011	SELECTOR, TEST, ASSY
						7		
	-	-	1	1		6	2900036-011	CONTROL, GIMBAL POSITION, ASSY
	2	2	2	2		5	1900038-011	OSCILLOSCOPE, MONITOR ASSY
	2	2	2	2		4	1900350-011	FAN, CENTRIFUGAL ASSY
	-	-	1	1		3	2900033-011	POWER SUPPLY & LOAD PANEL ASSY
						2		
	-	-	-	1		1	2900031-011	MONITOR PANEL ASSY

QUANTITY REQUIRED
LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900022-031	2900022-031	-031
2900022-021	2900022-021	-021
2900022-011	2900022-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ±.02 ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN Hatchson DATE
CHECKED J. Gaines 30 ... 65
APPROVAL
APPROVAL
NASA APPROVAL
UNIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

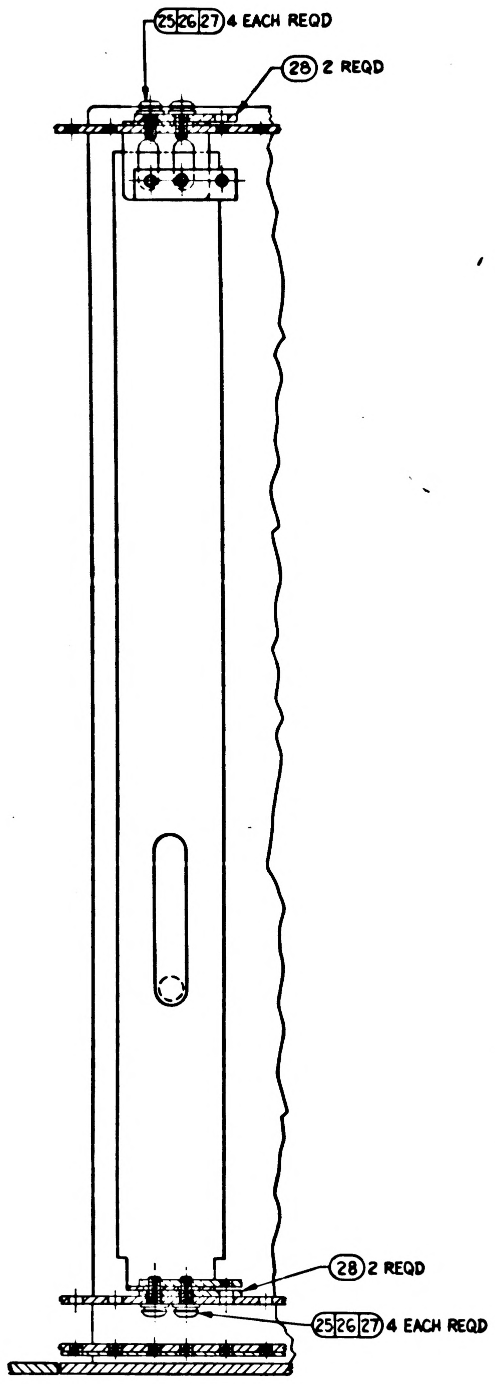
OPTICS - INERTIAL
ANALYZER

CODE IDENT NO. 99974
SIZE J2
2900023
SCALE 1:4
SHEET 1 OF 2

2900023 T

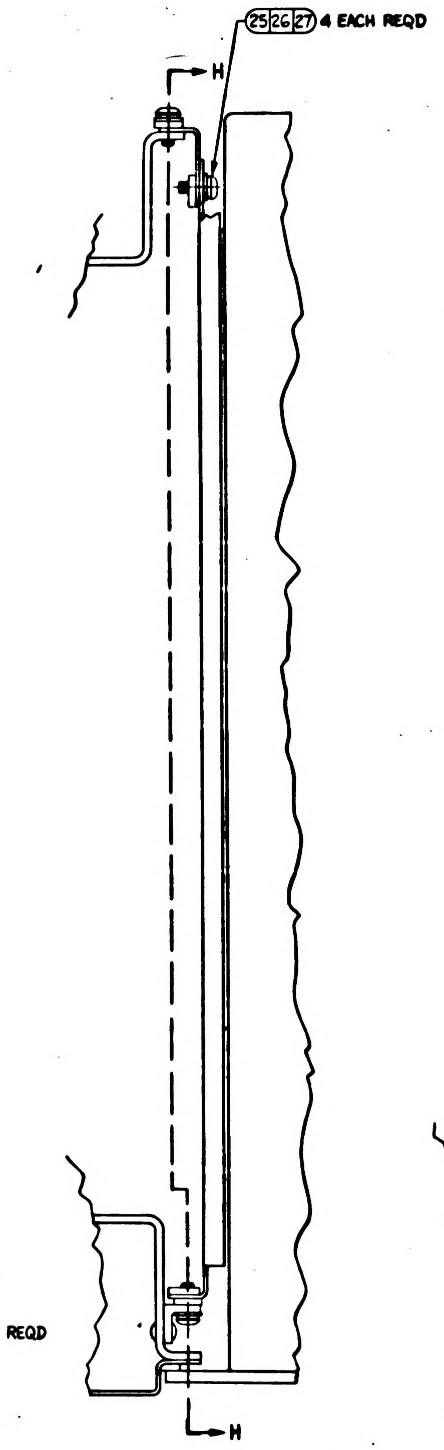
2900023

2/2900023



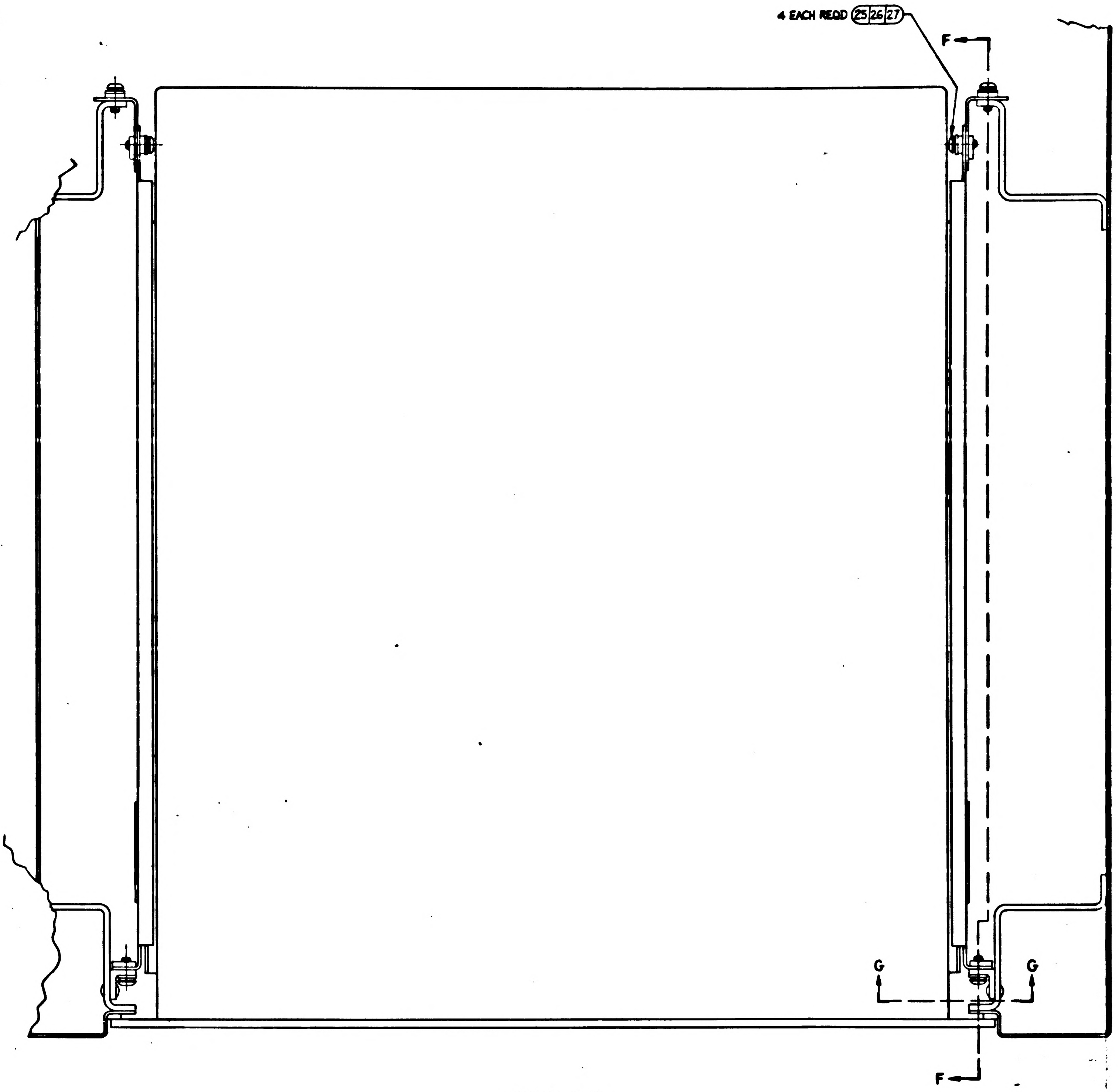
㉕㉖㉗ 4 EACH REQD
㉘ 2 REQD
㉘ 2 REQD
㉕㉖㉗ 4 EACH REQD

PARTIAL SECTION H-H



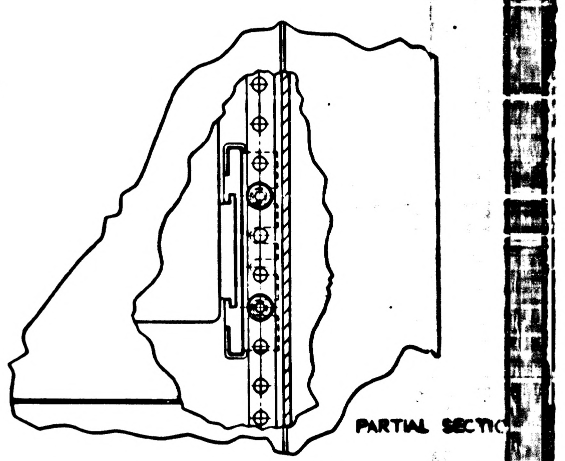
㉕㉖㉗ 4 EACH REQD
H
H

PARTIAL SECTION A-A
SCALE 1:1
TYPICAL FOR MOUNTING ITEMS ③, ㊳, ㊴, ⑧, ⑪, ⑰,
⑱, ㊸, ㊷, ㊹, ㊼, ㊾, (52) (53) & (54).



4 EACH REQD ㉕㉖㉗
F
G
G
F

SECTION B-B
SCALE 1:1
TYPICAL FOR MOUNTING ITEMS ①, ⑤, ⑥, ⑩, ⑫,
⑬, ⑭, ⑮, ⑯, ⑲, ⑳, ㉑, ㊵, ㊶, ㊽,
㊿, (51), (55) AND (57)

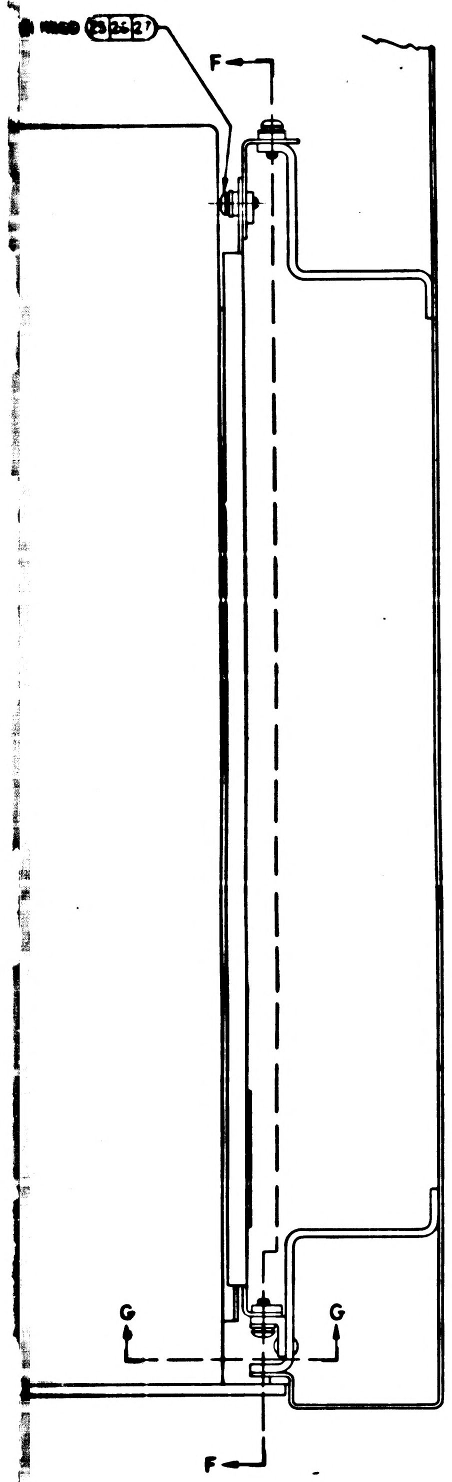


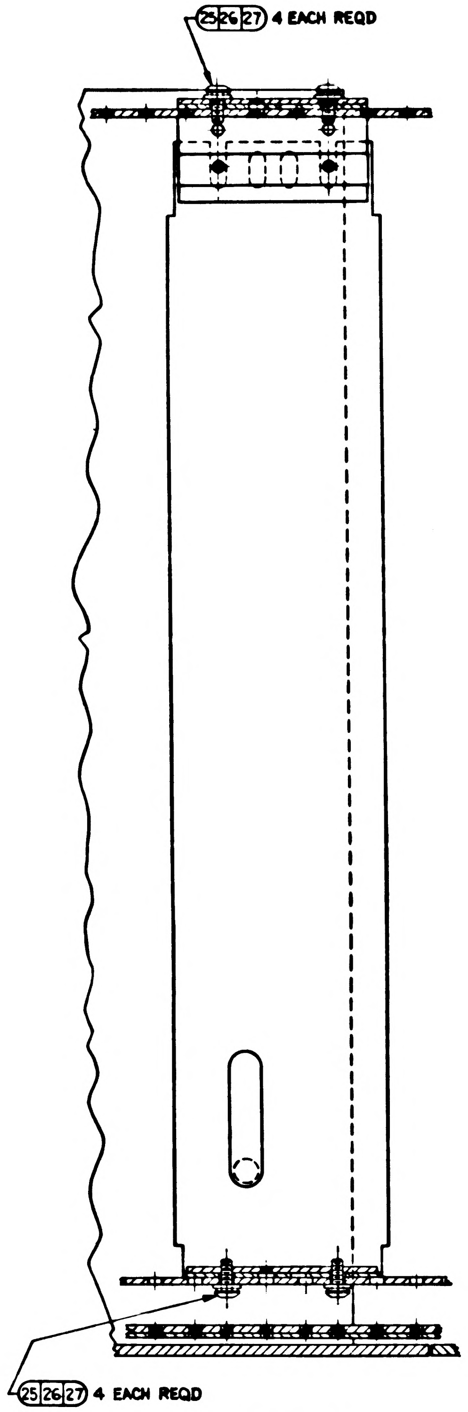
PARTIAL SECTIO

2900023 REV LTR T SH 2

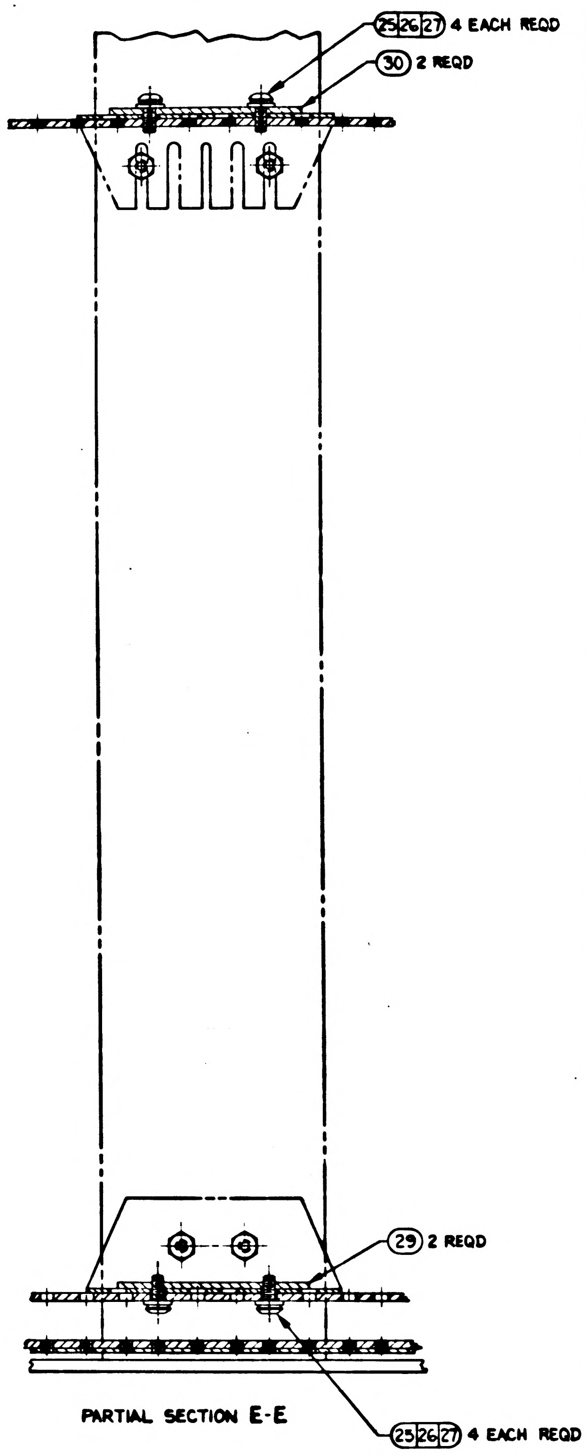
172900023

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
REVISIONS					
H		THIS SH ADDED PER AVC 302880		8 JUN 65	
J		REVISION STATUS CHANGED		28 JUN 65	RLP RWH
K		REVISION STATUS CHANGED		2 AUG 65	UHP RWH
L		REVISION STATUS CHANGED		AUG 65	RLP
M		REVISION STATUS CHANGED		2 SEP 65	RLP
N		INITIAL RELEASE CLASS B PER TDRR 23919		9 OCT 65	
P		REVISED PER TDRR 27582		APR 66	
R		REVISED PER TDRR 28763		7 NOV 66	
S		REVISED PER TDRR 32198		66	
T		REVISED PER TDRR 33099			

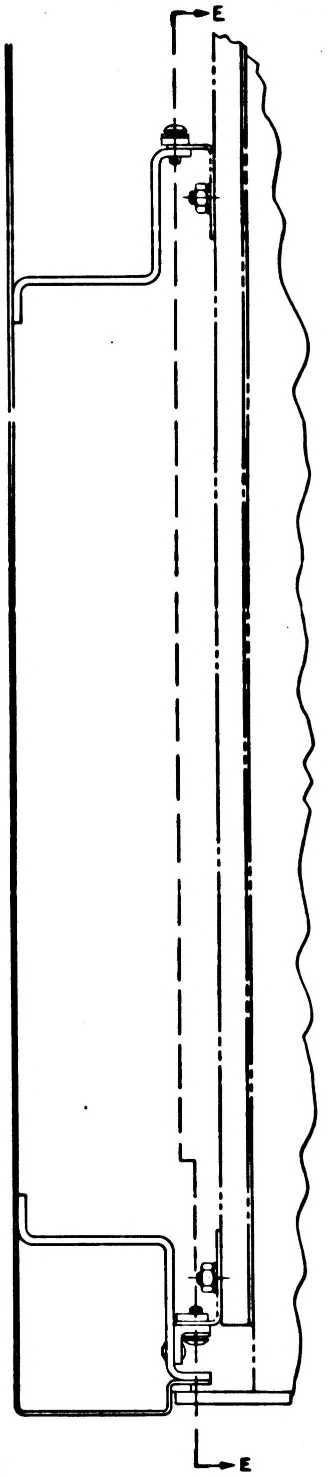




PARTIAL SECTION F-F

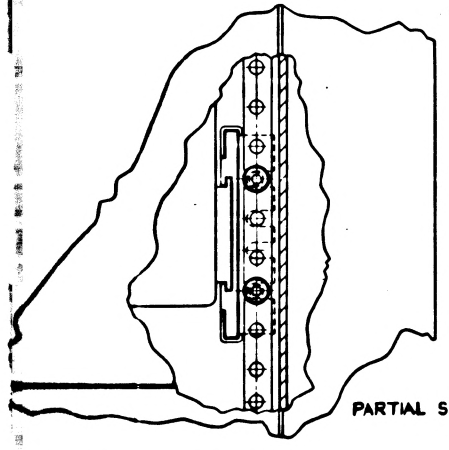


PARTIAL SECTION E-E



PARTIAL SECTION C-C

SCALE 1:1
HARDWARE SHOWN TO BE ATTACHED.
SLIDE MOUNTING SHOWN FOR REF ONLY.
LEFT SIDE SHOWN
RIGHT SIDE SYMMETRICALLY OPPOSITE



PARTIAL SECTION G-G

2900022-021	2900022-021	-021
2900082-011	2900022-011	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± .02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.
DRAWN DATE 65
CHECKED J. GRIEB 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

OPTICS-INERTIAL
ANALYZER

CODE IDENT NO. 99974
SIZE J2
2900023
SCALE 1:4
SHEET 2 OF 2

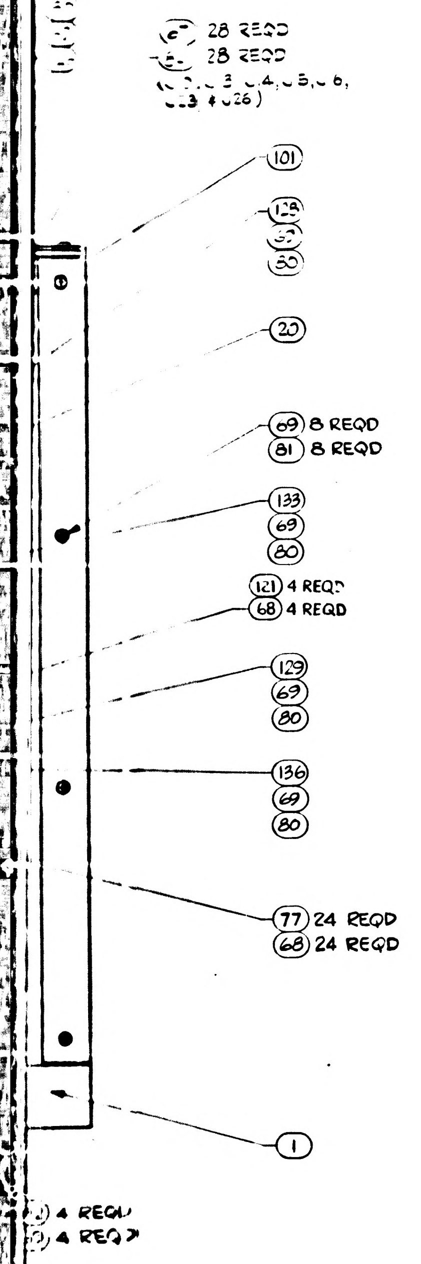
T
2900023

00023 REV LTR 1 SH 2

2/2900023

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
S		REPLACES REV R WITH CHANGE PER MXC 203797		6 AUG 65	JWP
T		REVISED PER MXC 203866		17 AUG 65	DRD
U		REVISED PER MXC 204027		30 AUG 65	LK
V		REVISED PER MXC 204597		10 SEP 65	DWO
W		REVISED PER MXC 204707		14 SEP 65	
Y		REVISED PER MXC 204899		23 SEP 65	
Z		REVISED PER MXC 205451		65	
AA		REVISED PER MXC 206174		16 OC 65	
AB		INITIAL RELEASE CLASS A PER TDRR 23557		21 OC 65	GR



	QUANTITY REQUIRED				EFFECTIVITY	LIST OF PARTS AND MATERIALS		
				011		ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				X			PS 290024	PROCUREMENT SPECIFICATION
				1		146	2900867-011	LIMIT CYCLE LOAD ASSY
				1		145	MS35200-43	SCREW, FLAT HD
				6		144	MS35200-44	SCREW, FLAT HD
				1		143	MS21919DG2 THRU DG4	(1897073-102 THRU-104) CLAMP
						142		
				1		141	MS21919DG29 THRU DG31	(1897073-129 THRU-131) CLAMP
				4		140	MS15795-807	WASHER FLAT
				1		139	MS21919DG23 THRU DG25	(1897073-123 THRU-125) CLAMP
				1		138	MS21919DG19 THRU DG21	(1897073-119 THRU-121) CLAMP
						137		
				2		136	MS21919DG17 THRU DG19	(1897073-117 THRU-119) CLAMP
				1		135	MS21919DG16 THRU DG18	(1897073-116 THRU-118) CLAMP
				2		134	MS21919DG15 THRU DG17	(1897073-115 THRU-117) CLAMP
				1		133	MS21919DG14 THRU DG16	(1897073-114 THRU-116) CLAMP
				2		132	MS21919DG13 THRU DG15	(1897073-113 THRU-115) CLAMP
				1		131	MS21919DG12 THRU DG14	(1897073-112 THRU-114) CLAMP
				5		130	MS21919DG11 THRU DG13	(1897073-111 THRU-113) CLAMP
				1		129	MS21919DG10 THRU DG12	(1897073-110 THRU-112) CLAMP
				1		128	MS21919DG10 THRU DG11	(1897073-109 THRU-111) CLAMP
				6		127	MS21919DG8 THRU DG10	(1897073-108 THRU-110) CLAMP
				3		126	MS21919DG7 THRU DG9	(1897073-107 THRU-109) CLAMP
						125		
				4		124	MS21919DG5 THRU DG7	(1897073-105 THRU-107) CLAMP
				2		123	MS21919DG4 THRU DG6	(1897073-104 THRU-106) CLAMP
				1		122	MS21919DG3 THRU DG5	(1897073-103 THRU-105) CLAMP
				4		121	MS35200-26	SCREW, FLAT HD.
				~~28~~		120	~~MS35200-12~~	~~SCREW, FLAT HD~~
SEE NOTE 2				1		119	1015864-978	INSULATION, 21.00 LONG
SEE NOTE 2				1		118	1016067-022	CHAIN, SAFETY
				1		117	1010498-280	RESISTOR, FIXED
						116		
				2		115	SE20XD01	(1896962-003) STAND OFF MIL-T-55155/20
				2		114	MS35333-70	WASHER, LOCK
				2		113	MS35216-13	SCREW, PAN HD.
				56		112	MS35216-31	SCREW, PAN HD
				1		111	2900761	BRACKET, TRANSFORMER
				1		110	1897334	TRANSFORMER
SEE NOTE 2				9		109	1015802-004	RELAY, ARMATURE
				47		108	MS35216-28	SCREW, PAN HD
				~~5~~		107	~~MS21919WDG9~~	~~(1897073-209) CLAMP, CABLE~~
				4		106	MS15795-807	WASHER, FLAT
SEE NOTE 2				2		105	1016151-010	NUT, SELFLOCKING
				2		104	MS35217-56	SCREW, PAN HD
				1		103	2900731	WIRING HARNESS E
				1		102	2900719	WIRING HARNESS D
				1		101	2900686	WIRING HARNESS C

	QUANTITY REQUIRED				EFFECTIVITY	LIST OF PARTS AND MATERIALS		
				011		ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				1		100	2900653	WIRING HARNESS B
				1		99	2900500	WIRING HARNESS A
SEE NOTE 2				1		98	1010498-158	RESISTOR, FIXED
~~SEE NOTE 2~~				~~1~~		~~97~~	~~1015898-005~~	~~TRANSFORMER~~
				AR		96	MIL-S-22473	SEALING AND RETAINING COMPOUND GRADE H (ES2544-5)
				2		95	MS35200-46	SCREW, FLAT HD
				2		94	MS35200-45	SCREW, FLAT HD
				4		93	2900188-008	WASHER, SHOULDERED
				9		92	MS15795-811	WASHER, FLAT
				12		91	MS15795-805	WASHER, FLAT
				9		90	MS35338-82	WASHER, LOCK
				80		89	MS35338-80	WASHER, LOCK
				131		88	MS35333-71	WASHER, LOCK
				5		87	MS35338-79	WASHER, LOCK
				8		86	AN507C832R12	(1897003-568) SCREW, FLAT HD
				2		85	MS35200-42	SCREW, FLAT HD
				30		84	MS35200-15	SCREW, FLAT HD
				4		83	MS35216-45	SCREW, PAN HD
				8		82	MS35216-44	SCREW, PAN HD
				46		81	MS35216-43	SCREW, PAN HD
				38		80	MS35216-42	SCREW, PAN HD
				80		79	MS35216-40	SCREW, PAN HD
				7		78	MS35216-30	SCREW, PAN HD
				200		77	MS35216-27	SCREW, PAN HD
				75		76	MS35216-26	SCREW, PAN HD
				~~56~~		75	~~MS35216-25~~	~~SCREW, PAN HD~~
				2		74	MS35216-15	SCREW, PAN HD
				8		73	MS35216-6	SCREW, PAN HD
				4		72	MS35216-3	SCREW, PAN HD
				9		71	MS20341-416S	NUT, HEX
SEE NOTE 2				4		70	1016151-012	NUT, SELFLOCKING
				99		69	1016151-008	NUT, SELFLOCKING
				181		68	1016151-006	NUT, SELFLOCKING
				50		67	1016151-004	NUT, SELFLOCKING
SEE NOTE 2				8		66	1016151-002	NUT, SELFLOCKING
				1		65	1004260-103	NAMEPLATE
				10		64	2900188-005	WASHER, SHOULDERED
SEE NOTE 2				3		63	1902370	STUD, SHOULDERED
				45		62	1015852-001	WASHER, RETAINER
				8		61	1015853-017	FASTENER, STUD, FLUSH
				28		60	1015853-021	FASTENER, STUD, FLUSH
				3		59	1015853-008	FASTENER, STUD, OVAL
				6		58	1015853-003	FASTENER, STUD, OVAL
				1		57	1015864-978	INSULATION 11.50 LONG
				1		56	1016067-012	CHAIN, SAFETY
				2		55	1897260-010	RESISTOR VARIABLE
				~~5~~		54	~~1015860-002~~	~~SPACER, FIBRE~~
SEE NOTE 2				~~4~~		~~53~~	~~1016000-013~~	~~STAND-OFF THREADED~~
				20		52	1900391	BRACKET, HOLDER, DOUBLE
				20		51	1900390	BRACKET, HOLDER, SINGLE
				2		50	1900015-071	HANDLE ASSY
SEE NOTE 2				7		49	1016376-24	CONNECTOR, ELECTRICAL
				7		48	1016376-13	CONNECTOR, ELECTRICAL
				2		47	1015894-005	JUMPER, TERMINAL BOARD.
SEE NOTE 2				6		46	1015894-004	JUMPER, TERMINAL BOARD
				5		45	1900838-003	INSULATOR, NYLON STRIP
SEE NOTE 2				1		44	1001666-26	PLATE, DESIGNATOR
SEE NOTE 2				1		43	1015901-004	MARKER STRIP
				5		42	1900837	BUS BAR
SEE NOTE 2				1		41	1001665-26	TERMINAL BOARD

	QUANTITY REQUIRED				EFFECTIVITY	LIST OF PARTS AND MATERIALS		
				011		ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 2				1		40	1015895-004	TERMINAL, BOARD
				2		39	F03A250V12AS	(1897135-106) FUSE, MIL-F-15160/03
				4		38	F03A250V 8AS	(1897135-104) FUSE, MIL-F-15160/03
				3		37	F02A250V ¼AS	(1897099-105) FUSE, MIL-F-15160/02
				3		36	F02A250V 5AS	(1897099-114) FUSE, MIL-F-15160/02
				2		35	F02A250V 4 AS	(1897099-113) FUSE, MIL-F-15160/02
				2		34	F02A 32V15AS	(1897099-117) FUSE, MIL-F-15160/03
				4		33	F02A250V 1 AS	(1897099-109) FUSE, MIL-F-15160/02
				11		32	F02A250V 1/2AS	(1897099-107) FUSE, MIL-F-15160/02
				8		31	MS26572-1	FUSEHOLDER, SPARE
SEE NOTE 2				23		30	1015873-008	FUSEHOLDER, INDICATING
				1		29	1015873-005	FUSEHOLDER, INDICATING
				2		28	1010498-001	RESISTOR, FIXED
SEE NOTE 2				1		27	1016014	SWITCH, STEPPING
				1		26	MS24140-D2	(1896873-002) RELAY, POWER
SEE NOTE 2				1		25	1016031-1	RELAY, SOLENOID
SEE NOTE 2				8		24	1015914-001	RELAY
SEE NOTE 2				35		23	1015837-001	RELAY
				6		22	2900086-011	RESOLVER AMPLIFIER ASSY
				14		21	2900059-011	BUFFER AMPLIFIER ASSY
				1		20	2900490	PANEL, CONNECTOR, REAR
				1		19	2900489	PANEL, CONNECTOR, FRONT
				1		18	2900488	BRACKET, SUPPORT (INSEP ASSY)
				1		17	2900487	PANEL, TOP
				1		16	2900481	PANEL, FRONT, LEFT
				1		15	2900480	PANEL, REAR, LEFT
				1		14	2900479	PANEL, REAR
				1		13	2900760-011	COMPONENT BOARD ASSY
				~~1~~		~~12~~	~~2900475~~	~~COVER~~
				1		11	2900474	BRACKET, TERMINAL BOARD
				1		10	2900473	PANEL, CONNECTOR
				2		9	2900472	BRACKET, STEPPING SWITCH
				3		8	2900471	STRAP
				6		7	2900470	BRACKET, FASTENER
				1		6	2900469	BRACKET, COMPONENT BOARD
				1		5	2900468	HINGE, CONTINUOUS
				1		4	2900467	BRACKET, RELAY (INSEP ASSY)
				1		3	2900320-011	TEMPERATURE INDICATOR ASSY
				1		2	2900465	PANEL, FRONT
				1		1	2900466	FRAME (INSEP ASSY)

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Jonquin 24 MAR 65 DATE
CHECKED J. GRIEB 2 AUG 65
APPROVAL T. FOSS 2 AUG 65
APPROVAL 10.22.65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

DISTRIBUTION BOX
ASSEMBLY

CODE IDENT NO. 99974
SIZE J2
2900024
SCALE 1:2
SHEET 1 OF 2

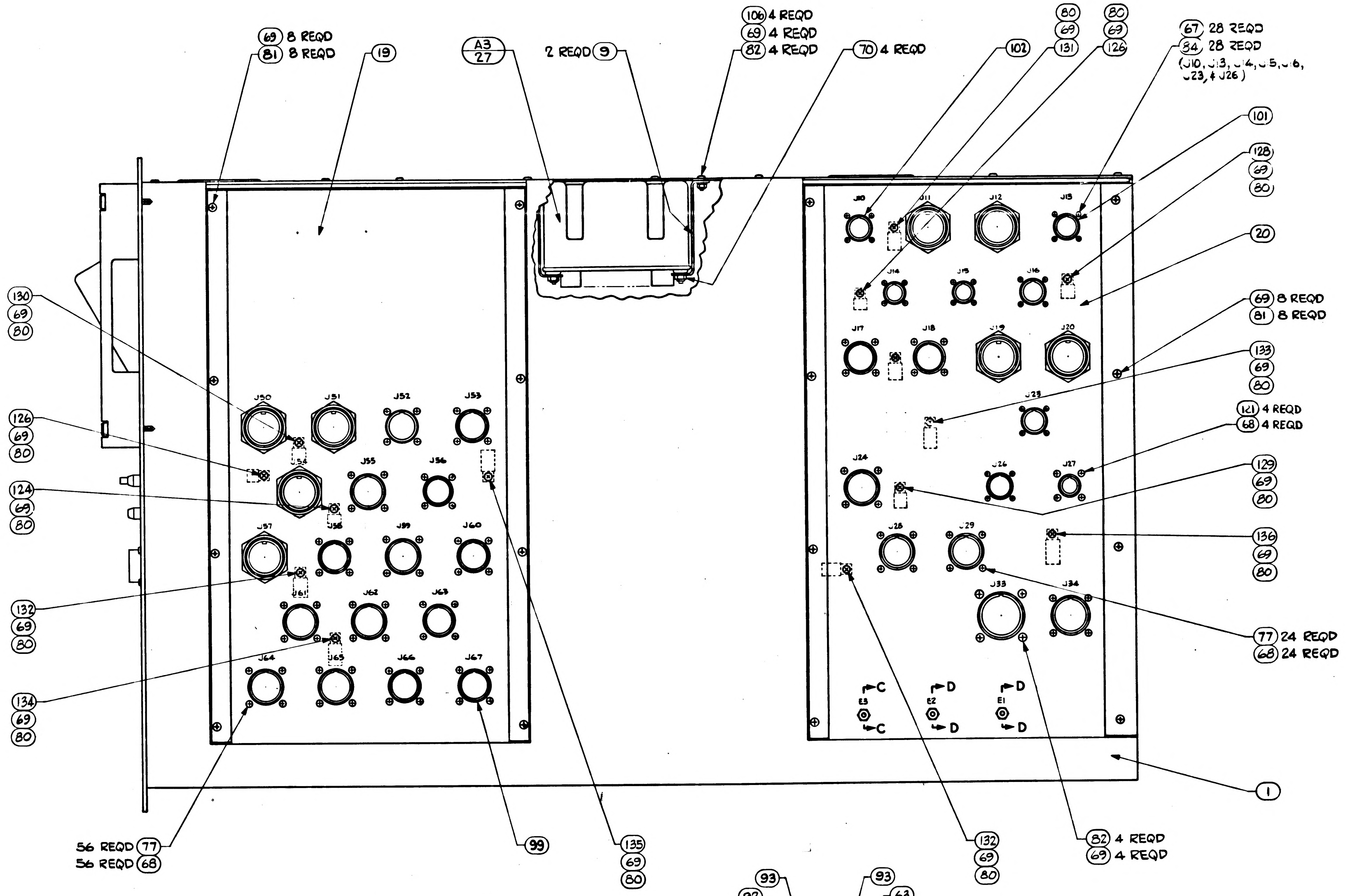
Charlotte
2 AUG 65

2900024 AB

2900024

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM - SEE SPEC CONTROL DRAWING.
3. MARK APPLICABLE CONTRACT NO. AND SERIAL NO. TO ITEM (65) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .04 TO .08 HIGH.
4. MARK WEIGHT OF ASSEMBLY, 200 LBS, PER ND 1002019 ADJACENT TO NAMEPLATE LOCATION.
5. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NO. PER ND 1002019, .07 TO .11 HIGH, BLACK.
6. DIMENSIONS "A" AND "B" MUST BE EQUAL WITHIN .040.
7. SECURE ITEM (81) TO ITEM (42) WITH ITEM (96).


(69) 8 REQD
(81) 8 REQD
(19)
A3/27
2 REQD (9)
(106) 4 REQD
(69) 4 REQD
(82) 4 REQD
(70) 4 REQD
(102)
(80) (69) (131)
(80) (69) (126)
(67) 28 REQD
(84) 28 REQD
(J10, J13, J14, J15, J16, J23, & J26)
(101)
(128) (69) (80)
(20)
(69) 8 REQD
(81) 8 REQD
(133) (69) (80)
(121) 4 REQD
(68) 4 REQD
(129) (69) (80)
(136) (69) (80)
(77) 24 REQD
(68) 24 REQD
(1)
(82) 4 REQD
(69) 4 REQD
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(99)
56 REQD (77)
56 REQD (68)
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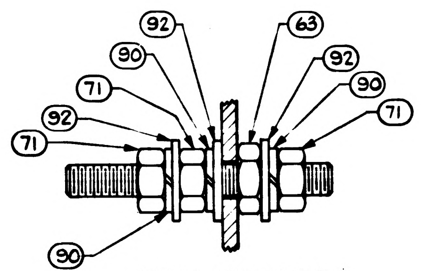
J10 J11 J12 J13 J14 J15 J16 J17 J18 J19 J20 J23 J24 J26 J27 J28 J29 J33 J34
J50 J51 J52 J53 J54 J55 J56 J57 J58 J59 J60 J61 J62 J63 J64 J65 J66 J67
E3 E2 E1
C C D D D D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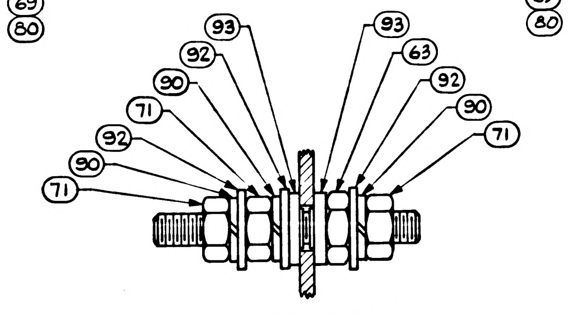
PARTIAL SECTION C-C
SCALE 2:1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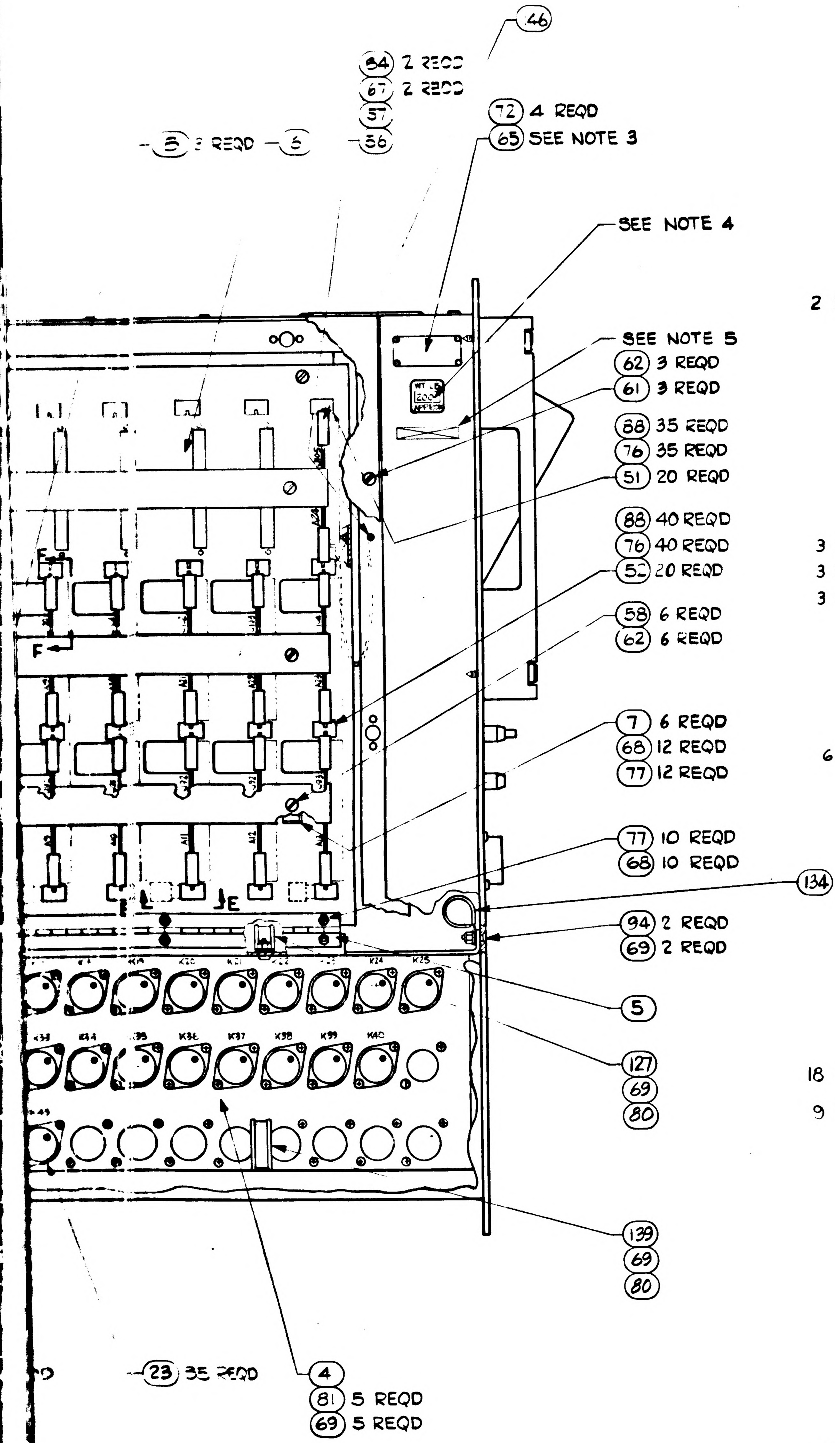
PARTIAL SECTION D-D
2 PLACES
SCALE 2:1

2900024	REV LTR LB	SH 1

1Z2900024

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
S		REPLACES REV R WITH CHANGE PER MXC 203797		5 AUG 65	
T		REVISED PER MXC 203866		17 AUG 65	DKD
U		REVISED PER MXC 204027		30 AUG 65	
V		REVISED PER MXC 204597		10 SEP 65	DKD
W		REVISED PER MXC 204707		14 SEP 65	
Y		REVISED PER MXC 204899		23 SEP 65	RJP J.E.G.
Z		REVISION STATUS CHANGED		1 OCT 65	
AA		REVISED PER MXC 200[illegible]		5 OCT 65	CF
AB		INITIAL RELEASE CLASS A PER TORR 23557		21 OCT 65	DKD CJ



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SEE NOTE 4
SEE NOTE 5
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61 3 REQD
88 35 REQD
76 35 REQD
51 20 REQD
88 40 REQD
76 40 REQD
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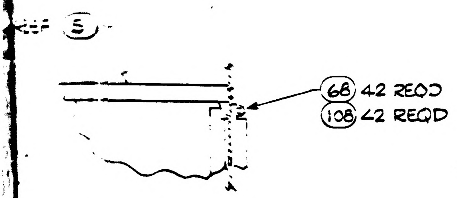

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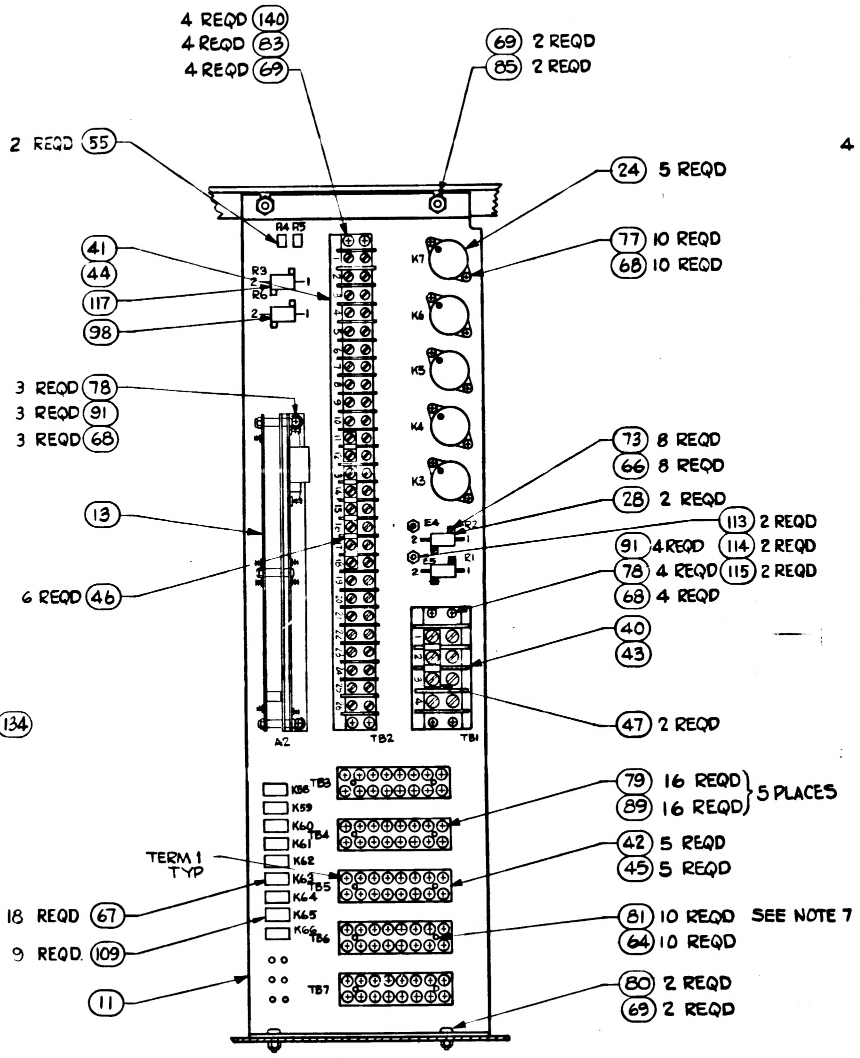
PARTIAL SECTION FF



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R3
R6
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K6
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K4
K3
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K66
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18 REQD 67
9 REQD 109
11
79 16 REQD
89 16 REQD
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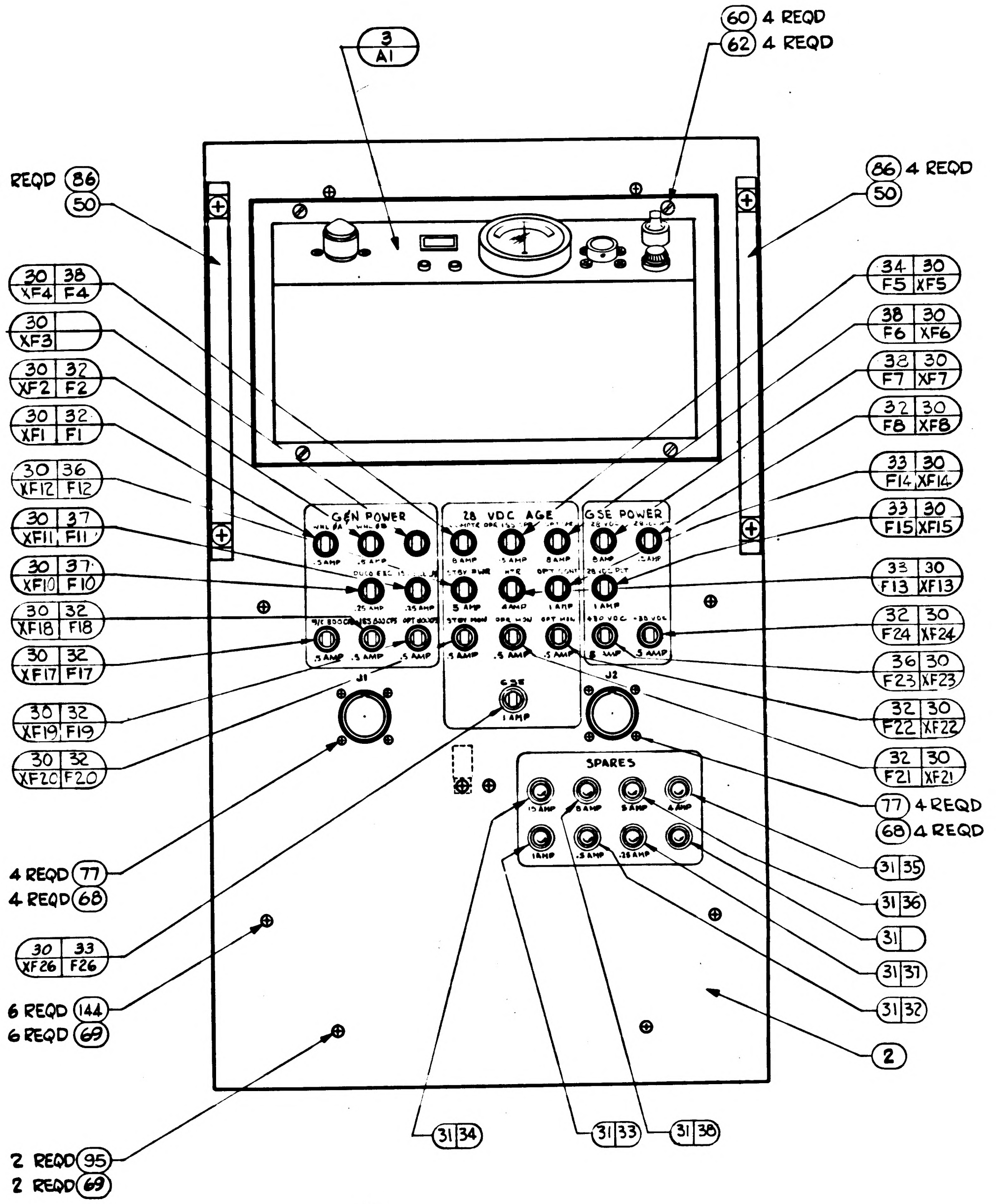
80 2 REQD
69 2 REQD

PARTIAL SECTION B B



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30 37 XF11 F11
30 37 XF10 F10
30 32 XF18 F18
30 32 XF17 F17
30 32 XF19 F19
30 32 XF20 F20
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38 30 F6 XF6
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36 30 F23 XF23
32 30 F22 XF22
32 30 F21 XF21
GEN POWER
28 VDC AGE
GSE POWER
.5 AMP
.25 AMP
5 AMP
4 AMP
1 AMP
8 AMP
STBY PWR
HTR
OPT CONT
STBY MON
OPR MON
OPT MON
+30 VDC
-30 VDC
J1
J2
GSE
1 AMP
SPARES
15 AMP
8 AMP
5 AMP
4 AMP
1 AMP
.5 AMP
.25 AMP
77 4 REQD
68 4 REQD
4 REQD 77
4 REQD 68
30 33 XF26 F26
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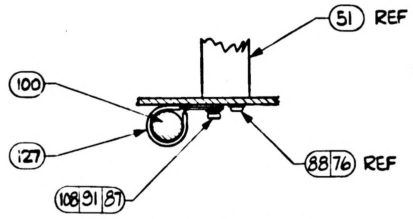


51 REF
100
127
108 91 87
88 76 REF

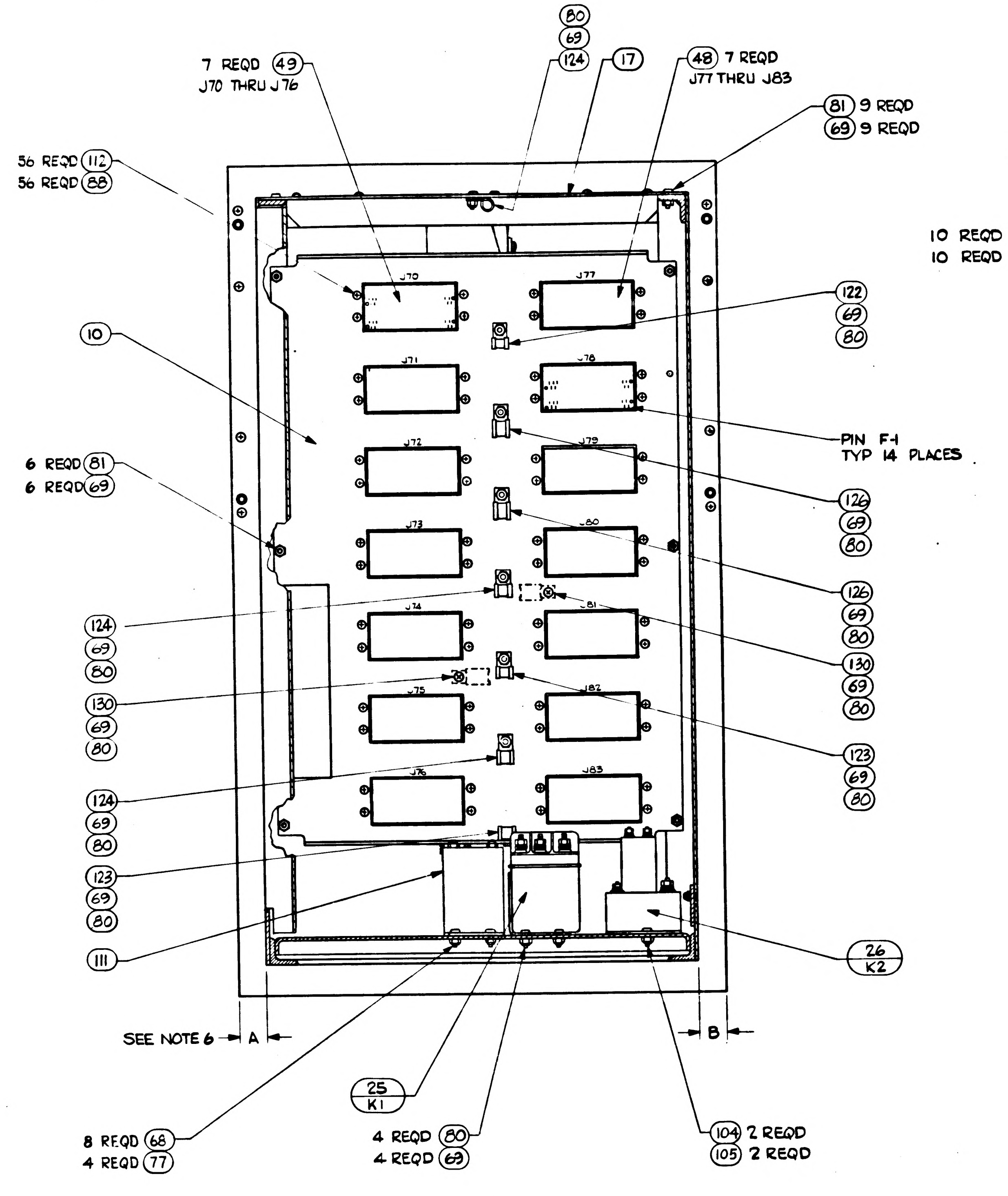
PARTIAL SECTION EE
5 PLACES

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN Junquin DATE 24 MAR 65 CHECKED J. G. WEBB 2 AUG 65 APPROVAL 3 AUG 65 APPROVAL 8-22-65	DISTRIBUTION BOX ASSEMBLY
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 2900024
CONTRACT NAS9-497	MIT APPROVAL	SCALE 1:2 · SHEET 2 OF 2

2900024 AB

2900024 2

27 2900024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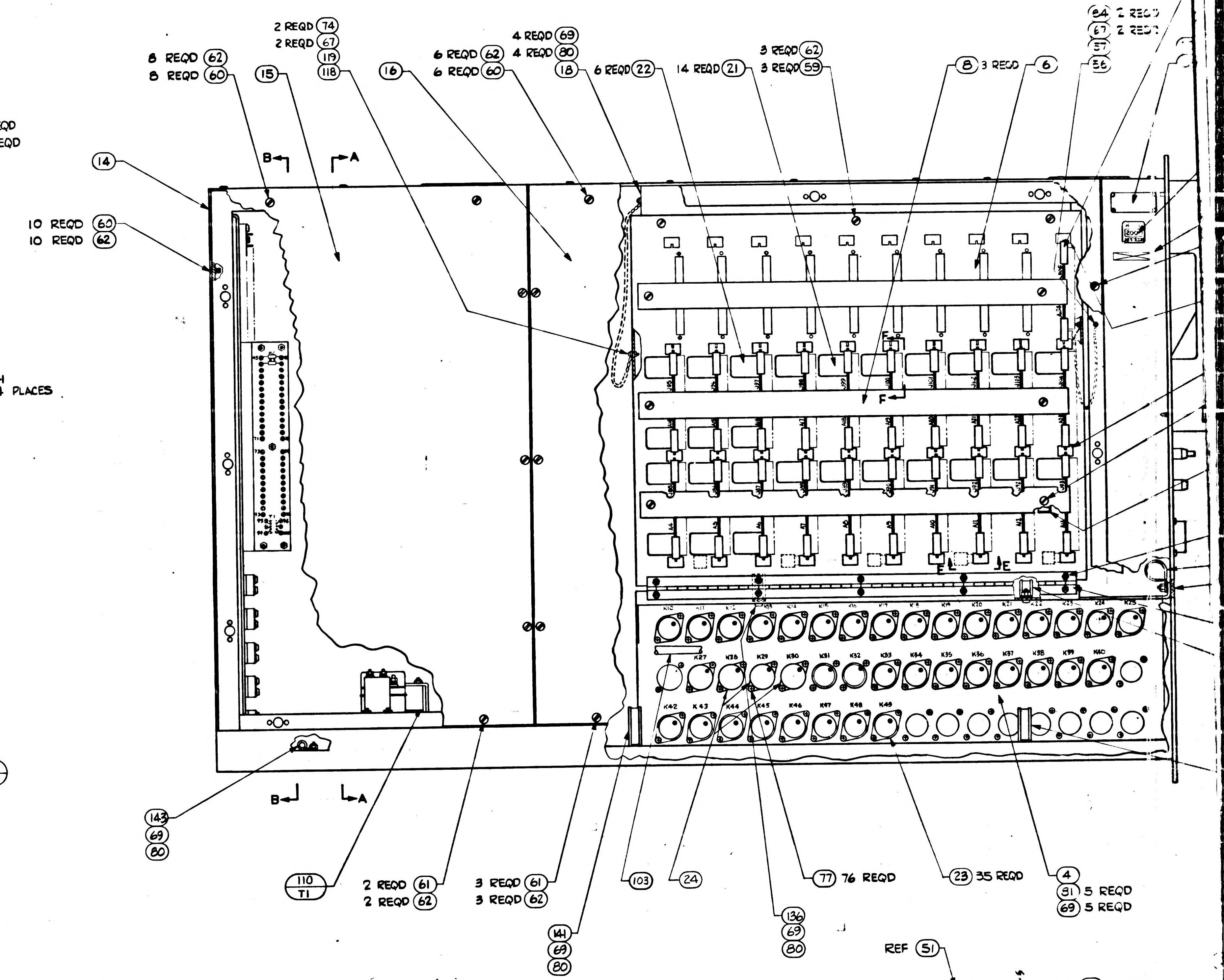
SECTION A-A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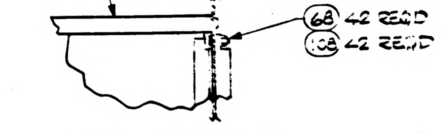
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PARTIAL SECTION FF

2900024 SH 2

17 2900024

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
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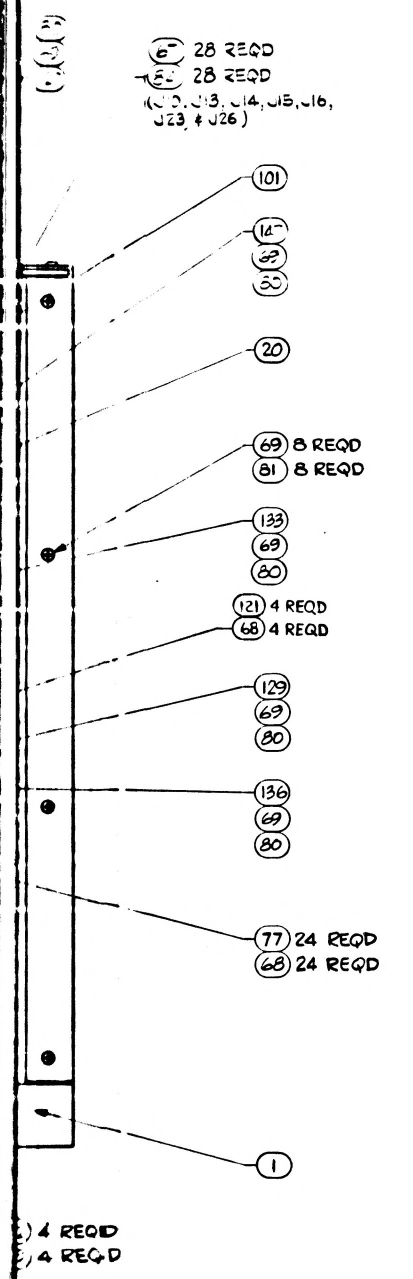
T		REVISED PER MXC 203866		17 AUG 65	OKD AU
U		REVISED PER MXC 204027		30 AUG 65	LK
V		REVISED PER MXC 204597		[illegible] SEP 65	
W		REVISED PER MXC 204707		14 SEP 65	
Y		REVISED PER MXC 204899		23 SEP 65	E.G.
Z		REVISED PER MXC 205451		1 OC 65	
AA		REVISED PER MXC 206174		1 OC 65	CP
AB		INITIAL RELEASE CLASS A PER TDRR 23557		21 OC 65	GR
AC		REVISED PER TDRR 24141		30 NOV 65	

REVISIONS



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				X			PS 2900024	PROCUREMENT SPECIFICATION
				1		147	MS21919DG21 THRU DG23	(1897073-121 THRU-123)CLAMP
				1		146	2900867-011	LIMIT CYCLE LOAD ASSY
				1		145	MS35200-43	SCREW, FLAT HD
				14		144	MS35200-44	SCREW, FLAT HD
				~~1~~		143	~~MS21919DG2 THRU DG4~~	~~(1897073-102 THRU-104) CLAMP~~
						142		
				1		141	MS21919DG29 THRU DG31	(1897073-129 THRU-131)CLAMP
				4		140	MS15795-807	WASHER FLAT
				1		139	MS21919DG23 THRU DG25	(1897073-123 THRU -125)CLAMP
				~~1~~		138	~~MS21919DG19 THRU DG21~~	~~(1897073-119 THRU-121)CLAMP~~
						137		
				2		136	MS21919DG17 THRU DG19	(1897073-117 THRU-119)CLAMP
				3		135	MS21919DG16 THRU DG18	(1897073-116 THRU-118)CLAMP
				~~2~~		134	~~MS21919 DG15 THRU DG 7~~	~~(1897073-115 THRU-117) CLAMP~~
				1		133	MS21919DG14 THRU DG16	(1897073-114 THRU-116) CLAMP
				1		132	MS21919DG13 THRU DG15	(1897073-113 THRU-115)CLAMP
				1		131	MS21919DG12 THRU DG14	(1897073-112 THRU-114) CLAMP
				5		130	MS21919DG11 THRU DG13	(1897073-111 THRU-113)CLAMP
				4		129	MS21919DG10 THRU DG 12	(1897073-110 THRU-112)CLAMP
				~~1~~		128	~~MS21919DG10 THRU DG11~~	~~(1897073-109 THRU-111)CLAMP~~
				7		127	MS21919 DG8 THRU DG10	(1897073-108 THRU-110)CLAMP
				4		126	MS21919DG7 THRU DG9	(1897073-107 THRU-109)CLAMP
				1		125	MS21919DG6 THRU DG8	(1897073-106 THRU-108)CLAMP
				4		124	MS21919 DG5 THRU DG7	(1897073-105 THRU-107)CLAMP
				1		123	MS21919 DG4 THRU DG6	(1897073-104 THRU-106)CLAMP
				1		122	MS21919 DG3 THRU DG5	(1897073-103 THRU-105)CLAMP
				4		121	MS 35200-26	SCREW, FLAT HD.
				~~28~~		120	~~MS35200-12~~	~~SCREW, FLAT HD~~
SEE NOTE 2				1		119	1015864-978	INSULATION, 21.00 LONG
SEE NOTE 2				1		118	1016067-022	CHAIN, SAFETY
				1		117	1010498-280	RESISTOR, FIXED
						116		
				2		115	SE20XD01	(1896962-003)STAND OFF MIL-T-55155/20
				2		114	MS35333-70	WASHER, LOCK
				2		113	MS35216-13	SCREW, PAN HD.
				56		112	MS35216-31	SCREW, PAN HD
				1		111	2900761	BRACKET, TRANSFORMER
				1		110	1897334	TRANSFORMER
SEE NOTE 2				9		109	1015802-004	RELAY, ARMATURE
				47		108	MS35216-28	SCREW, PAN HD
				~~8~~		107	~~MS21919WDG9~~	~~(1897073-209) CLAMP, CABLE~~
				4		106	MS15795-807	WASHER, FLAT
SEE NOTE 2				2		105	1016151-010	NUT, SELFLOCKING
				2		104	MS35217-56	SCREW, PAN HD
				1		103	2900731	WIRING HARNESS E
				1		102	2900719	WIRING HARNESS D
				1		101	2900686	WIRING HARNESS C

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				1		100	2900653	WIRING HARNESS B
				1		99	2900500	WIRING HARNESS A
SEE NOTE 2				1		98	1010498-158	RESISTOR, FIXED
~~SEE NOTE 2~~				~~1~~		~~97~~	~~1015898-005~~	~~TRANSFORMER~~
				AR		96	MIL-S-22473	SEALING AND RETAINING COMPOUND GRADE H (ES2544-5)
				2		95	MS35200-46	SCREW, FLAT HD
				2		94	MS35200-45	SCREW, FLAT HD
				4		93	2900188-008	WASHER, SHOULDERED
				9		92	MS15795-811	WASHER, FLAT
				12		91	MS15795-805	WASHER, FLAT
				9		90	MS35338-82	WASHER, LOCK
				80		89	MS35338-80	WASHER, LOCK
				131		88	MS35333-71	WASHER, LOCK
				5		87	MS35338-79	WASHER, LOCK
				~~8~~		~~86~~	~~AN507C832R12~~	~~(1897003-568) SCREW, FLAT HD~~
				2		85	MS35200-42	SCREW, FLAT HD
				30		84	MS35200-15	SCREW, FLAT HD
				4		83	MS35216-45	SCREW, PAN HD
				8		82	MS35216-44	SCREW, PAN HD
				46		81	MS35216-43	SCREW, PAN HD
				41		80	MS35216-42	SCREW, PAN HD
				80		79	MS35216-40	SCREW, PAN HD
				7		78	MS35216-30	SCREW, PAN HD
				200		77	MS35216-27	SCREW, PAN HD
				75		76	MS35216-26	SCREW, PAN HD
				~~56~~		75	~~MS35216-25~~	~~SCREW, PAN HD~~
				2		74	MS35216-15	SCREW, PAN HD
				8		73	MS35216-6	SCREW, PAN HD
				4		72	MS35216-3	SCREW, PAN HD
				9		71	MS20341-416S	(1897061-305) NUT, HEX
SEE NOTE 2				4		70	1016151-012	NUT, SELFLOCKING
				102		69	1016151-008	NUT, SELFLOCKING
				181		68	1016151-006	NUT, SELFLOCKING
				50		67	1016151-004	NUT, SELFLOCKING
SEE NOTE 2				8		66	1016151-002	NUT, SELFLOCKING
				1		65	1004260-103	NAMEPLATE
				10		64	2900188-005	WASHER, SHOULDERED
SEE NOTE 2				3		63	1902370	STUD, SHOULDERED
				45		62	1015852-001	WASHER, RETAINER
				8		61	1015853-017	FASTENER, STUD, FLUSH
				28		60	1015853-021	FASTENER, STUD, FLUSH
				3		59	1015853-008	FASTENER, STUD, OVAL
				6		58	1015853-003	FASTENER, STUD, OVAL
				1		57	1015864-978	INSULATION 11.50 LONG
				1		56	1016067-012	CHAIN, SAFETY
				2		55	1897260-010	RESISTOR VARIABLE
				~~5~~		54	~~1015860-002~~	~~SPACER, FIBRE~~
SEE NOTE 2				~~4~~		~~53~~	~~1016000-013~~	~~STAND-OFF THREADED~~
				20		52	1900391	BRACKET, HOLDER, DOUBLE
				20		51	1900390	BRACKET, HOLDER, SINGLE
				2		50	1900015-071	HANDLE ASSY
SEE NOTE 2				7		49	1016376-24	CONNECTOR, ELECTRICAL
				7		48	1016376-13	CONNECTOR, ELECTRICAL
				2		47	1015894-005	JUMPER, TERMINAL BOARD.
SEE NOTE 2				6		46	1015894-004	JUMPER, TERMINAL BOARD
				5		45	1900838-003	INSULATOR, NYLON STRIP
SEE NOTE 2				1		44	1001666-26	PLATE, DESIGNATOR
SEE NOTE 2				1		43	1015901-004	MARKER STRIP
				5		42	1900837	BUS BAR
SEE NOTE 2				1		41	1001665-26	TERMINAL BOARD

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 2				1		40	1015895-004	TERMINAL, BOARD
				2		39	F03A250V12AS	(1897135-106) FUSE, MIL-F-15160/03
				4		38	F03A250V 8AS	(1897135-104) FUSE, MIL-F-15160/03
				3		37	F02A250V ¼AS	(1897099-105) FUSE, MIL-F-15160/02
				3		36	F02A250V 5AS	(1897099-114) FUSE, MIL-F-15160/02
				2		35	F02A250V 4 AS	(1897099-113) FUSE, MIL-F-15160/02
				2		34	F02A 32V15AS	(1897099-117) FUSE, MIL-F-15160/03
				4		33	F02A250V 1 AS	(1897099-109) FUSE, MIL-F-15160/02
				11		32	F02A250V 1/2 AS	(1897099-107) FUSE, MIL-F-15160/02
				8		31	MS26572-1	FUSEHOLDER, SPARE
SEE NOTE 2				23		30	1015873-008	FUSEHOLDER, INDICATING
				~~1~~		~~29~~	~~1015873-005~~	~~FUSEHOLDER, INDICATING~~
				2		28	1010498-001	RESISTOR, FIXED
SEE NOTE 2				1		27	1016014	SWITCH, STEPPING
				1		26	MS24140-D2	(1896873-002) RELAY, POWER
SEE NOTE 2				1		25	1016031-1	RELAY, SOLENOID
SEE NOTE 2				8		24	1015914-001	RELAY
SEE NOTE 2				35		23	1015837-001	RELAY
				6		22	2900086-011	RESOLVER AMPLIFIER ASSY
				14		21	2900059-011	BUFFER AMPLIFIER ASSY
				1		20	2900490	PANEL, CONNECTOR, REAR
				1		19	2900489	PANEL, CONNECTOR, FRONT
				1		18	2900488	BRACKET, SUPPORT (INSEP ASSY)
				1		17	2900487	PANEL, TOP
				1		16	2900481	PANEL, FRONT, LEFT
				1		15	2900480	PANEL, REAR, LEFT
				1		14	2900479	PANEL, REAR
				1		13	2900760-011	COMPONENT BOARD ASSY
				~~1~~		~~12~~	~~2900475~~	~~COVER~~
				1		11	2900474	BRACKET, TERMINAL BOARD
				1		10	2900473	PANEL, CONNECTOR
				2		9	2900472	BRACKET, STEPPING SWITCH
				3		8	2900471	STRAP
				6		7	2900470	BRACKET, FASTENER
				1		6	2900469	BRACKET, COMPONENT BOARD
				1		5	2900468	HINGE, CONTINUOUS
				1		4	2900467	BRACKET, RELAY (INSEP ASSY)
				1		3	2900320-011	TEMPERATURE INDICATOR ASSY
				1		2	2900465	PANEL, FRONT
				1		1	2900466	FRAME (INSEP ASSY)

LIST OF PARTS AND MATERIALS

2900024 AC

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Jenquin DATE 24 MAR 65
CHECKED J. Greeb 2 AUG 65
APPROVAL D. Foss 2 AUG 65
APPROVAL 10-22-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

DISTRIBUTION BOX
ASSEMBLY

CODE IDENT NO. 99974
SIZE J2
2900024
SCALE 1:2
SHEET 1 OF 2

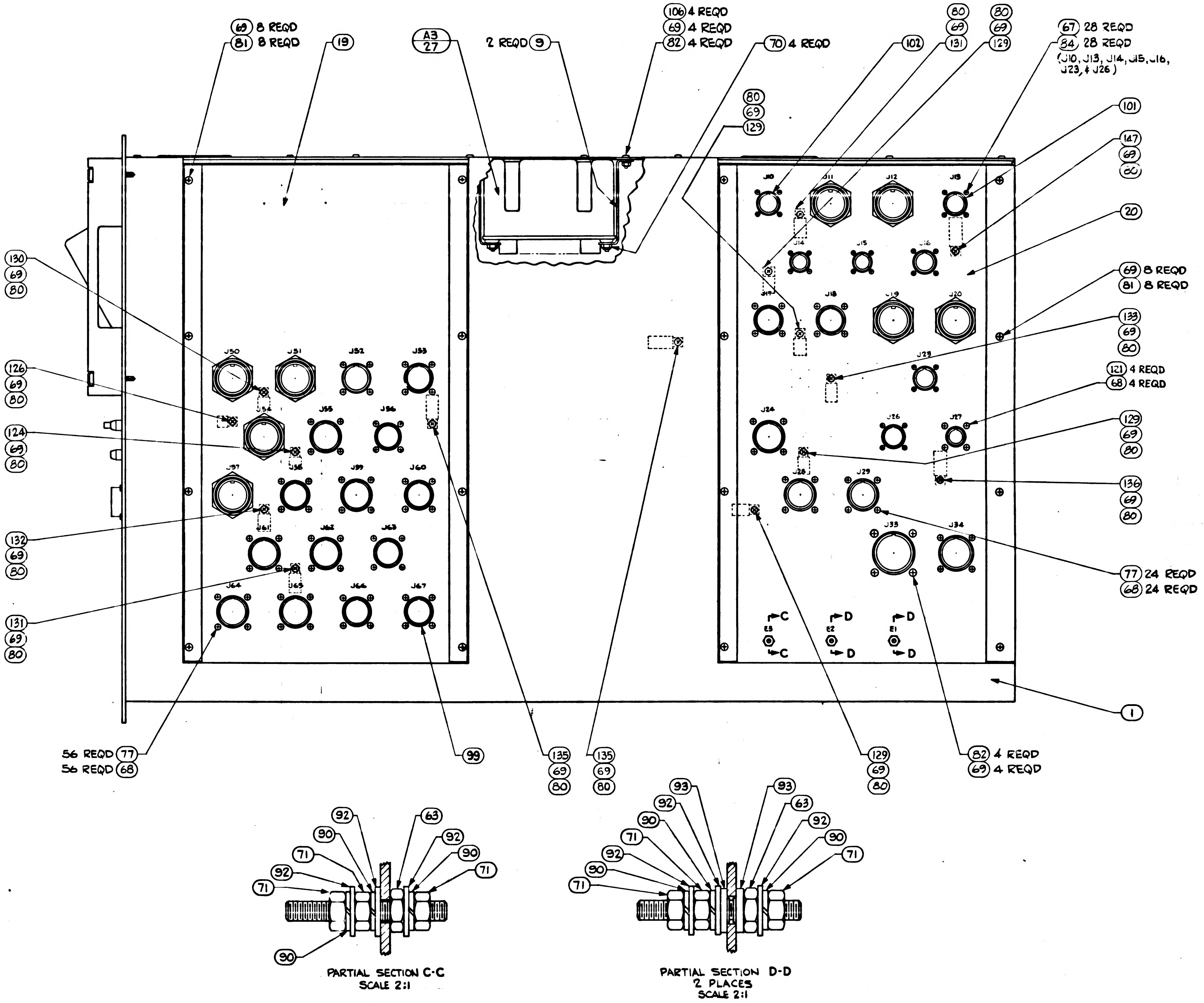
2 Charleston 2 AUG 65

2900024 RE AC SH 1

2729000024

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM- SEE SPEC CONTROL DRAWING.
3. MARK APPLICABLE CONTRACT NO. AND SERIAL NO. TO ITEM (65) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .04 TO .08 HIGH.
4. MARK WEIGHT OF ASSEMBLY, 200 LBS, PER ND 1002019 ADJACENT TO NAMEPLATE LOCATION.
5. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NO. PER ND 1002019, .07 TO .11 HIGH, BLACK.
6. DIMENSIONS "A" AND "B" MUST BE EQUAL WITHIN .040.
7. SECURE ITEM (81) TO ITEM (42) WITH ITEM (96).



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PARTIAL SECTION C-C
SCALE 2:1

PARTIAL SECTION D-D
2 PLACES
SCALE 2:1

2900024 REV LTR LC SH 1

1729000024

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
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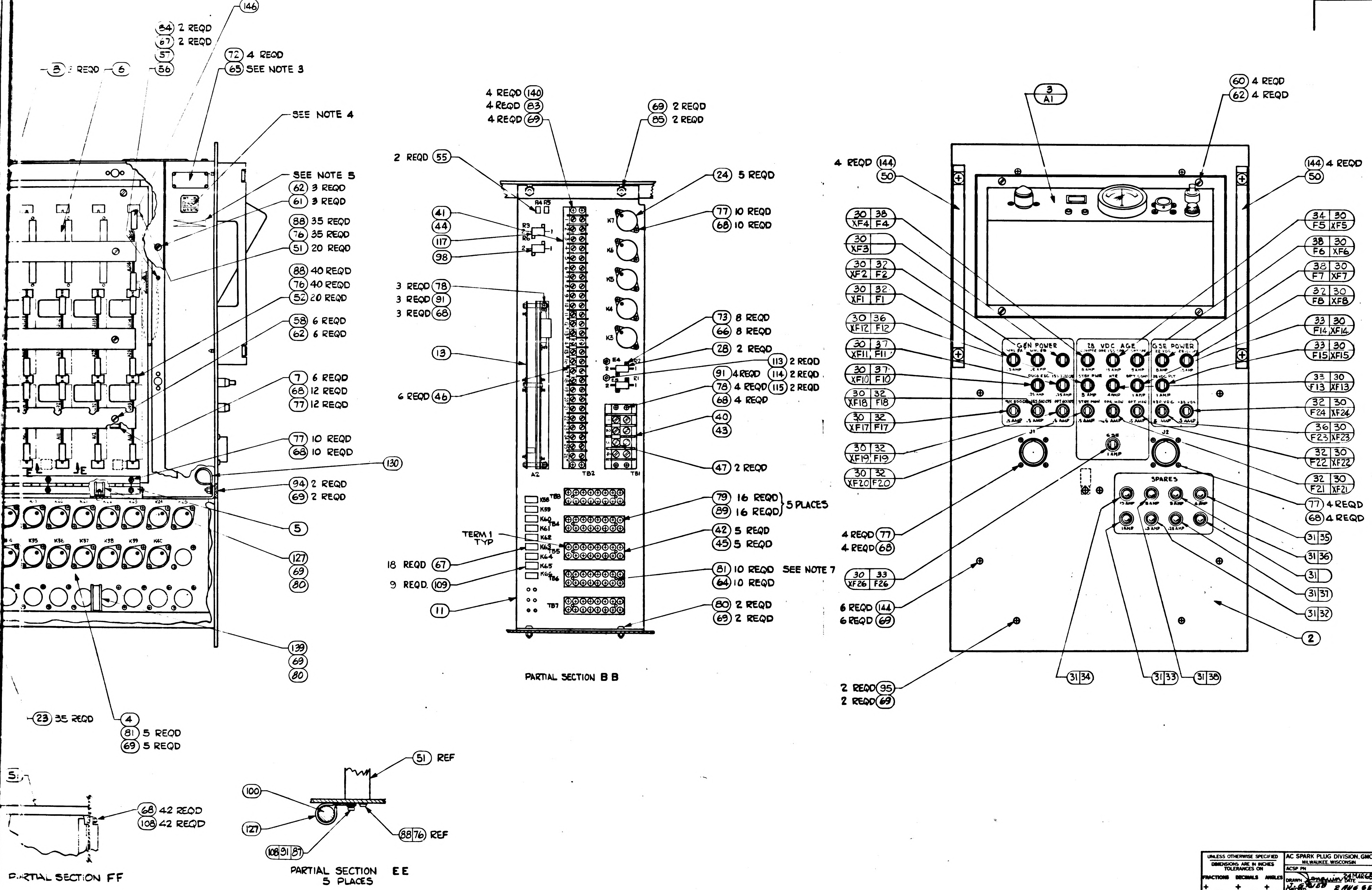
T		REVISED PER MXC 203866		17 AUG 65	DKD
U		REVISED PER MXC 204027		30 AUG 65	
V		REVISED PER MXC 204597		10 SEP 65	
W		REVISED PER MXC 204707		14 SEP 65	
Y		REVISED PER MXC 204899		23 SEP 65	J.E.G.
Z		REVISION STATUS CHANGED		1 OCT 65	WP
AA		REVISED PER MXC 200		19 OCT 65	RJJ CF
AB		INITIAL RELEASE CLASS A PER TORR 23557		21 OCT 65	DKD
AC		REVISED PER TORR 29141		NOV 65	WP



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PARTIAL SECTION FF

00024 2

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Jonquin DATE 24 MAR 65
CHECKED J. C. WEBB 2 AUG 65
APPROVAL 3 AUG 65
APPROVAL 10-22-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
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CODE IDENT NO. 99974
SIZE J_2
2900024
SCALE 1:2
SHEET 2 OF 2

2900024 AC

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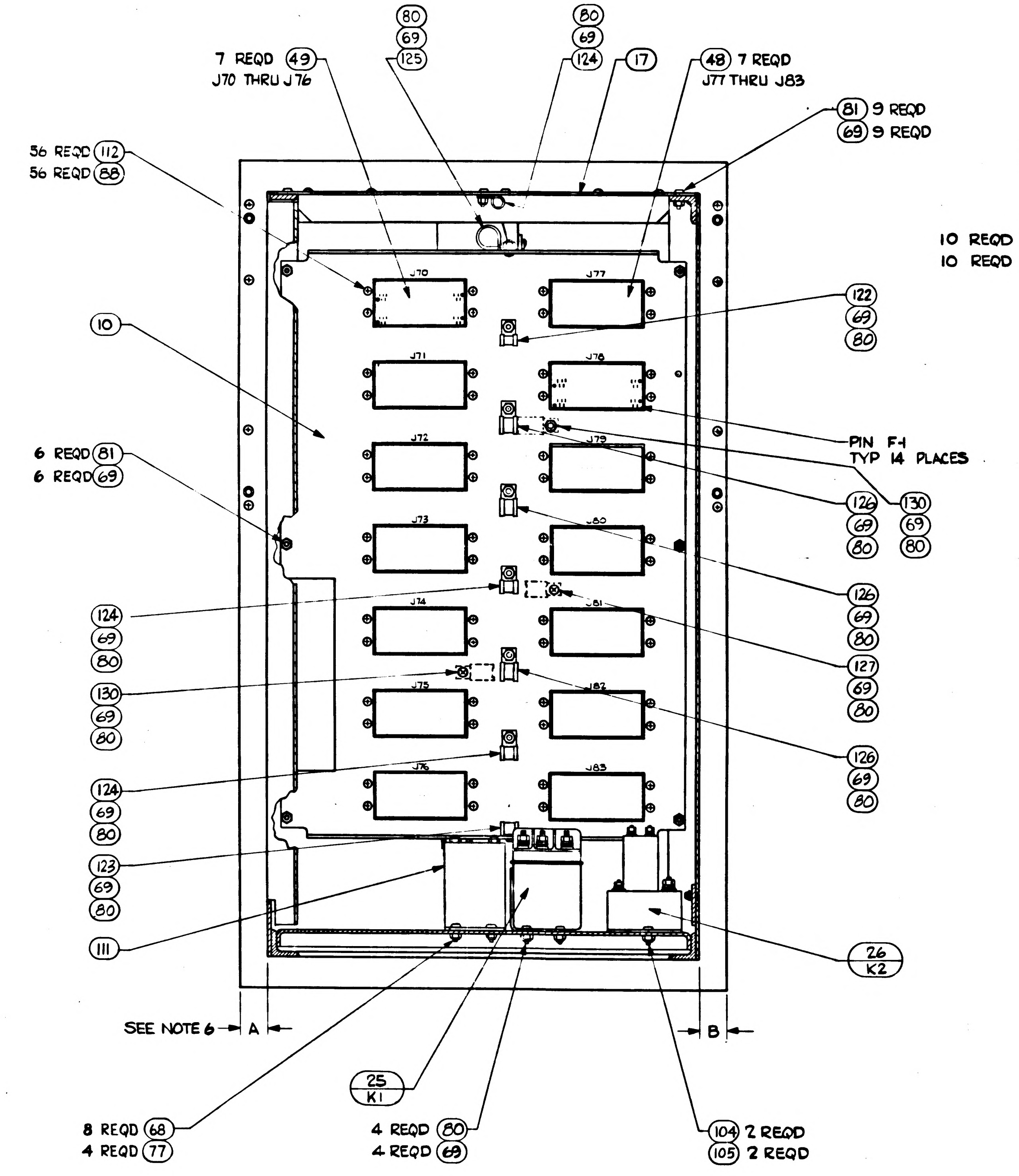
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J80
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K2
SEE NOTE 6
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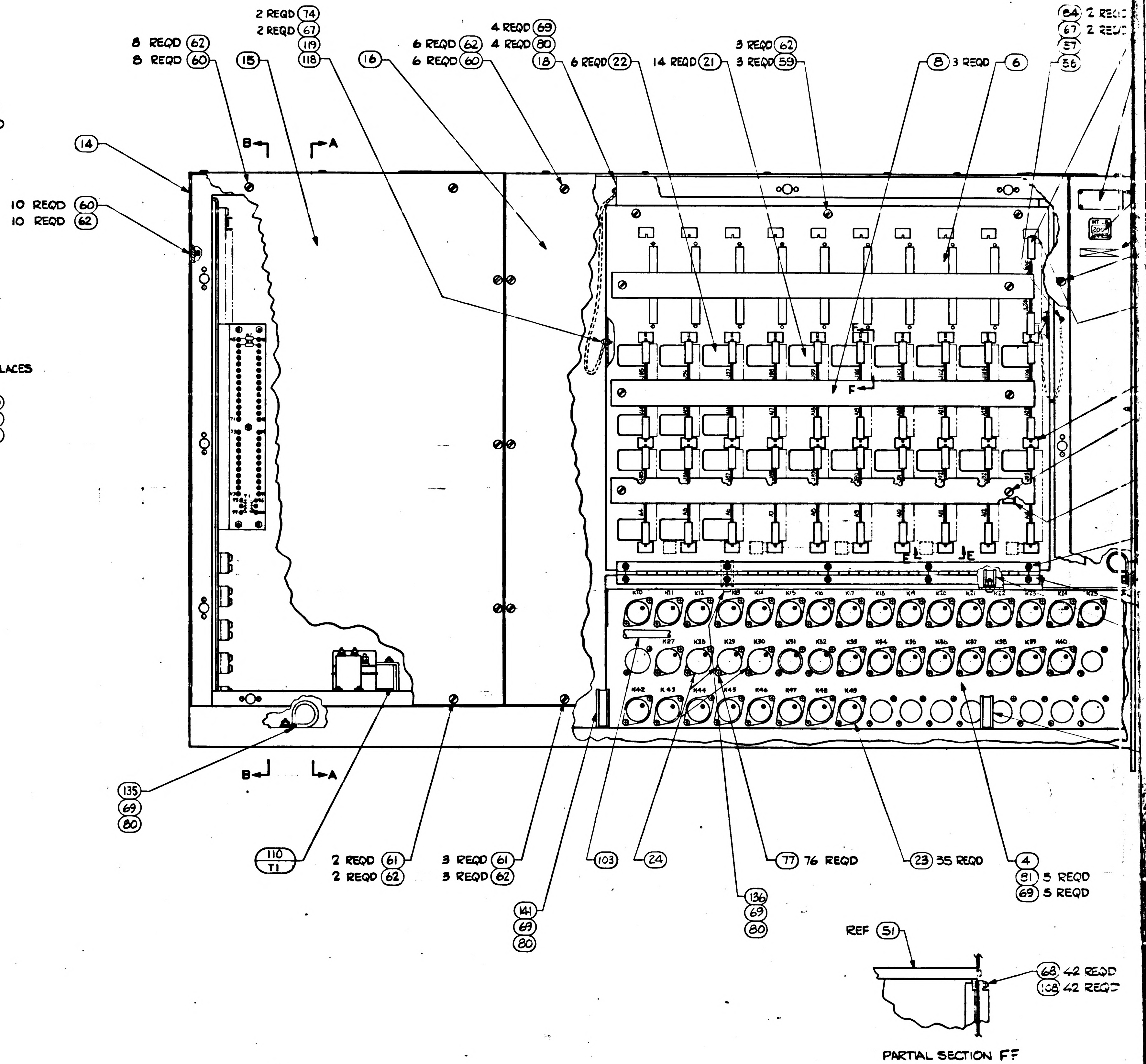
SECTION A-A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77 76 REQD
23 35 REQD
4
91 5 REQD
69 5 REQD
REF 51
68 42 REQD
108 42 REQD

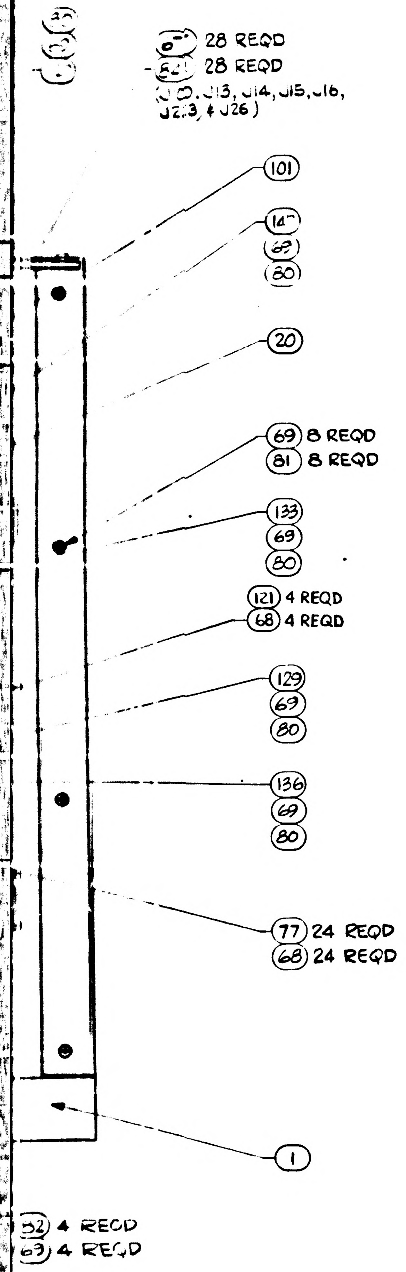
PARTIAL SECTION FF

2900024	REV AC	SH 2

1729000024

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
S		REPLACES REV R WITH CHANGE PER MXC 203797		6 AUG 65	
T		REVISED PER MXC 203866		17 AUG 65	
U		REVISED PER MXC 204027		30 AUG 65	LK
V		REVISED PER MXC 204597		10 SEP 65	
W		REVISED PER MXC 204707		14 SEP 65	
Y		REVISED PER MXC 204899		23 SEP 65	
Z		REVISED PER MXC 205451		[illegible] 65	
AA		REVISED PER MXC 206174		19 [illegible] 65	
AB		INITIAL RELEASE CLASS A PER TDRR 23557		2 [illegible] 65	
AC		REVISED PER TDRR 27191		30 NOV 65	
AD		REVISED PER TDRR 24592		14 DEC 65	



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	X			PS 2900024	PROCUREMENT SPECIFICATION
	1		147	MS21919DG21 THRU DG23	(1897073-121 THRU-123) CLAMP
	1		146	2900867-011	LIMIT CYCLE LOAD ASSY
	1		145	MS35200-43	SCREW, FLAT HD
	14		144	MS35200-44	SCREW, FLAT HD
	~~1~~		143	~~MS21919DG2 THRU DG4~~	~~(1897073-102 THRU-104) CLAMP~~
			142		
	1		141	MS21919DG29 THRU DG31	(1897073-129 THRU-131) CLAMP
	4		140	MS15795-807	WASHER FLAT
	1		139	MS21919DG23 THRU DG25	(1897073-123 THRU -125) CLAMP
	~~1~~		138	~~MS21919DG19 THRU DG21~~	~~(1897073-119 THRU-121) CLAMP~~
			137		
	2		136	MS21919DG17 THRU DG19	(1897073-117 THRU-119) CLAMP
	3		135	MS21919DG16 THRU DG18	(1897073-116 THRU-118) CLAMP
	~~2~~		134	~~MS21919DG15 THRU DG17~~	~~(1897073-115 THRU-117) CLAMP~~
	1		133	MS21919DG14 THRU DG16	(1897073-114 THRU-116) CLAMP
	1		132	MS21919DG13 THRU DG15	(1897073-113 THRU-115) CLAMP
	1		131	MS21919DG12 THRU DG14	(1897073-112 THRU-114) CLAMP
	5		130	MS21919DG11 THRU DG13	(1897073-111 THRU-113) CLAMP
	4		129	MS21919DG10 THRU DG12	(1897073-110 THRU-112) CLAMP
	~~1~~		128	~~MS21919DG10 THRU DG11~~	~~(1897073-109 THRU-111) CLAMP~~
	7		127	MS21919 DG8 THRU DG10	(1897073-108 THRU-110) CLAMP
	4		126	MS21919DG7 THRU DG9	(1897073-107 THRU-109) CLAMP
	1		125	MS21919DG6 THRU DG8	(1897073-106 THRU-108) CLAMP
	4		124	MS21919 DG5 THRU DG7	(1897073-105 THRU-107) CLAMP
	1		123	MS21919 DG4 THRU DG6	(1897073-104 THRU-106) CLAMP
	1		122	MS21919 DG3 THRU DG5	(1897073-103 THRU-105) CLAMP
	4		121	MS 35200-26	SCREW, FLAT HD.
	~~28~~		120	~~MS35200-12~~	~~SCREW, FLAT HD~~
SEE NOTE 2	1		119	1015864-978	INSULATION, 21.00 LONG
SEE NOTE 2	1		118	1016067-022	CHAIN, SAFETY
	1		117	1010498-280	RESISTOR, FIXED
			116		
	2		115	SE20XD01	(1896962-003) STAND OFF MIL-T-55155/20
	2		114	MS35333-70	WASHER, LOCK
	2		113	MS35216-13	SCREW, PAN HD.
	~~56~~		112	~~MS35216-31~~	~~SCREW, PAN HD~~
	1		111	2900761	BRACKET, TRANSFORMER
	1		110	1897334	TRANSFORMER
SEE NOTE 2	9		109	1015802-004	RELAY, ARMATURE
	47		108	MS35216-28	SCREW, PAN HD
	~~5~~		107	~~MS21919WDG9~~	~~(1897073-209) CLAMP, CABLE~~
	4		106	MS15795-807	WASHER, FLAT
SEE NOTE 2	2		105	1016151-010	NUT, SELFLOCKING
	2		104	MS35217-56	SCREW, PAN HD
	1		103	2900731	WIRING HARNESS E
	1		102	2900719	WIRING HARNESS D
	1		101	2900686	WIRING HARNESS C

QUANTITY REQUIRED — LIST OF PARTS AND MATERIALS

	QTY 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1		100	2900653	WIRING HARNESS B
	1		99	2900500	WIRING HARNESS A
SEE NOTE 2	1		98	1010498 -158	RESISTOR, FIXED
~~SEE NOTE 2~~	~~1~~		~~97~~	~~1015898 -005~~	~~TRANSFORMER~~
	AR		96	MIL-S-22473	SEALING AND RETAINING COMPOUND GRADE H (ES25445)
	2		95	MS35200 -46	SCREW, FLAT HD
	2		94	MS35200 -45	SCREW, FLAT HD
	4		93	2900188 -008	WASHER, SHOULDERED
	9		92	MS15795 -811	WASHER, FLAT
	12		91	MS15795 -805	WASHER, FLAT
	9		90	MS35338 -82	WASHER, LOCK
	80		89	MS35338 -80	WASHER, LOCK
	131		88	MS35333 -71	WASHER, LOCK
	5		87	MS35338 -79	WASHER, LOCK
	~~8~~		~~86~~	~~AN507C832R12~~	~~(1897003-568) SCREW, FLAT HD~~
	2		85	MS35200 -42	SCREW, FLAT HD
	30		84	MS35200 -15	SCREW, FLAT HD
	4		83	MS35216-45	SCREW, PAN HD
	8		82	MS35216-44	SCREW, PAN HD
	46		81	MS35216-43	SCREW, PAN HD
	41		80	MS35216-42	SCREW, PAN HD
	80		79	MS35216-40	SCREW, PAN HD
	7		78	MS35216-30	SCREW, PAN HD
	256		77	MS35216-27	SCREW, PAN HD
	75		76	MS35216-26	SCREW, PAN HD
	~~56~~		75	~~MS35216-25~~	~~SCREW, PAN HD~~
	2		74	MS35216 -15	SCREW, PAN HD
	8		73	MS35216 -6	SCREW, PAN HD
	4		72	MS35216 -3	SCREW, PAN HD
	9		71	MS20341 -4165	(1897061-305) NUT, HEX
SEE NOTE 2	4		70	1016151 -012	NUT, SELFLOCKING
	102		69	1016151 -008	NUT, SELFLOCKING
	181		68	1016151 -006	NUT, SELFLOCKING
	50		67	1016151 -004	NUT, SELFLOCKING
SEE NOTE 2	8		66	1016151 -002	NUT, SELFLOCKING
	1		65	1004260-103	NAMEPLATE
	10		64	2900188-005	WASHER, SHOULDERED
SEE NOTE 2	3		63	1902370	STUD, SHOULDERED
	45		62	1015852-001	WASHER, RETAINER
	8		61	1015853 -017	FASTENER, STUD, FLUSH
	28		60	1015853 -021	FASTENER, STUD, FLUSH
	3		59	1015853 -008	FASTENER, STUD, OVAL
	6		58	1015853 -003	FASTENER, STUD, OVAL
	1		57	1015864 -978	INSULATION 11.50 LONG
	1		56	1016067 -012	CHAIN, SAFETY
	2		55	1897260 -010	RESISTOR VARIABLE
	~~5~~		54	~~1015860 -002~~	~~SPACER, FIBRE~~
SEE NOTE 2	~~4~~		~~53~~	~~1016000 -013~~	~~STAND-OFF THREADED~~
	20		52	1900391	BRACKET, HOLDER, DOUBLE
	20		51	1900390	BRACKET, HOLDER, SINGLE
	2		50	1900015-071	HANDLE ASSY
SEE NOTE 2	7		49	1016376 -24	CONNECTOR, ELECTRICAL
	7		48	1016376 -13	CONNECTOR, ELECTRICAL
	2		47	1015894 -005	JUMPER, TERMINAL BOARD
SEE NOTE 2	6		46	1015894 -004	JUMPER, TERMINAL BOARD
	5		45	1900838 -003	INSULATOR, NYLON STRIP
SEE NOTE 2	1		44	1001666 -26	PLATE, DESIGNATOR
SEE NOTE 2	1		43	1015901 -004	MARKER STRIP
	5		42	1900837	BUS BAR
SEE NOTE 2	1		41	1001665 -26	TERMINAL BOARD

QUANTITY REQUIRED — LIST OF PARTS AND MATERIALS

	QTY 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 2	1		40	1015895 -004	TERMINAL, BOARD
	2		39	F03A250V12AS	(1897135-106) FUSE, MIL-F-15160/03
	4		38	F03A250V 8AS	(1897135-104) FUSE, MIL-F-15160/03
	3		37	F02A250V ¼AS	(1897099-105) FUSE, MIL-F-15160/02
	3		36	F02A250V 5AS	(1897099-114) FUSE, MIL-F-15160/02
	2		35	F02A250V 4 AS	(1897099-113) FUSE, MIL-F-15160/02
	2		34	F02A 32V15AS	(1897099-117) FUSE, MIL-F-15160/03
	4		33	F02A250V 1 AS	(1897099-109) FUSE, MIL-F-15160/02
	11		32	F02A250V 1/2 AS	(1897099-107) FUSE, MIL-F-15160/02
	8		31	MS26572 -1	FUSEHOLDER, SPARE
SEE NOTE 2	23		30	1015873 -008	FUSEHOLDER, INDICATING
	~~1~~		~~29~~	~~1015873 -005~~	~~FUSEHOLDER, INDICATING~~
	2		28	1010498 -001	RESISTOR, FIXED
SEE NOTE 2	1		27	1016014	SWITCH, STEPPING
	1		26	MS24140 -D2	(1896873-002) RELAY, POWER
SEE NOTE 2	1		25	1016031 -1	RELAY, SOLENOID
SEE NOTE 2	8		24	1015914 -001	RELAY
SEE NOTE 2	35		23	1015837 -001	RELAY
	6		22	2900086-011	RESOLVER AMPLIFIER ASSY
	14		21	2900059 -011	BUFFER AMPLIFIER ASSY
	1		20	2900490	PANEL, CONNECTOR, REAR
	1		19	2900489	PANEL, CONNECTOR, FRONT
	1		18	2900488	BRACKET, SUPPORT (INSEP ASSY
	1		17	2900487	PANEL, TOP
	1		16	2900481	PANEL, FRONT, LEFT
	1		15	2900480	PANEL, REAR, LEFT
	1		14	2900479	PANEL, REAR
	1		13	2900760-011	COMPONENT BOARD ASSY
	~~1~~		~~12~~	~~2900475~~	~~COVER~~
	1		11	2900474	BRACKET, TERMINAL BOARD
	1		10	2900473	PANEL, CONNECTOR
	2		9	2900472	BRACKET, STEPPING SWITCH
	3		8	2900471	STRAP
	6		7	2900470	BRACKET, FASTENER
	1		6	2900469	BRACKET, COMPONENT BOARD
	1		5	2900468	HINGE CONTINUOUS
	1		4	2900467	BRACKET, RELAY (INSEP ASSY)
	1		3	2900320-011	TEMPERATURE INDICATOR ASSY
	1		2	2900465	PANEL, FRONT
	1		1	2900466	FRAME (INSEP ASSY)

QUANTITY REQUIRED — LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Jonquin DATE 24 MAR 65
CHECKED J. Grieb 2 AUG 65
APPROVAL [illegible] 2 AUG 65
APPROVAL [illegible] 10-22-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

DISTRIBUTION BOX ASSEMBLY

CODE IDENT NO. 99974
SIZE J2
2900024
SCALE 1:2
SHEET 1 OF 2

2 AUG 65

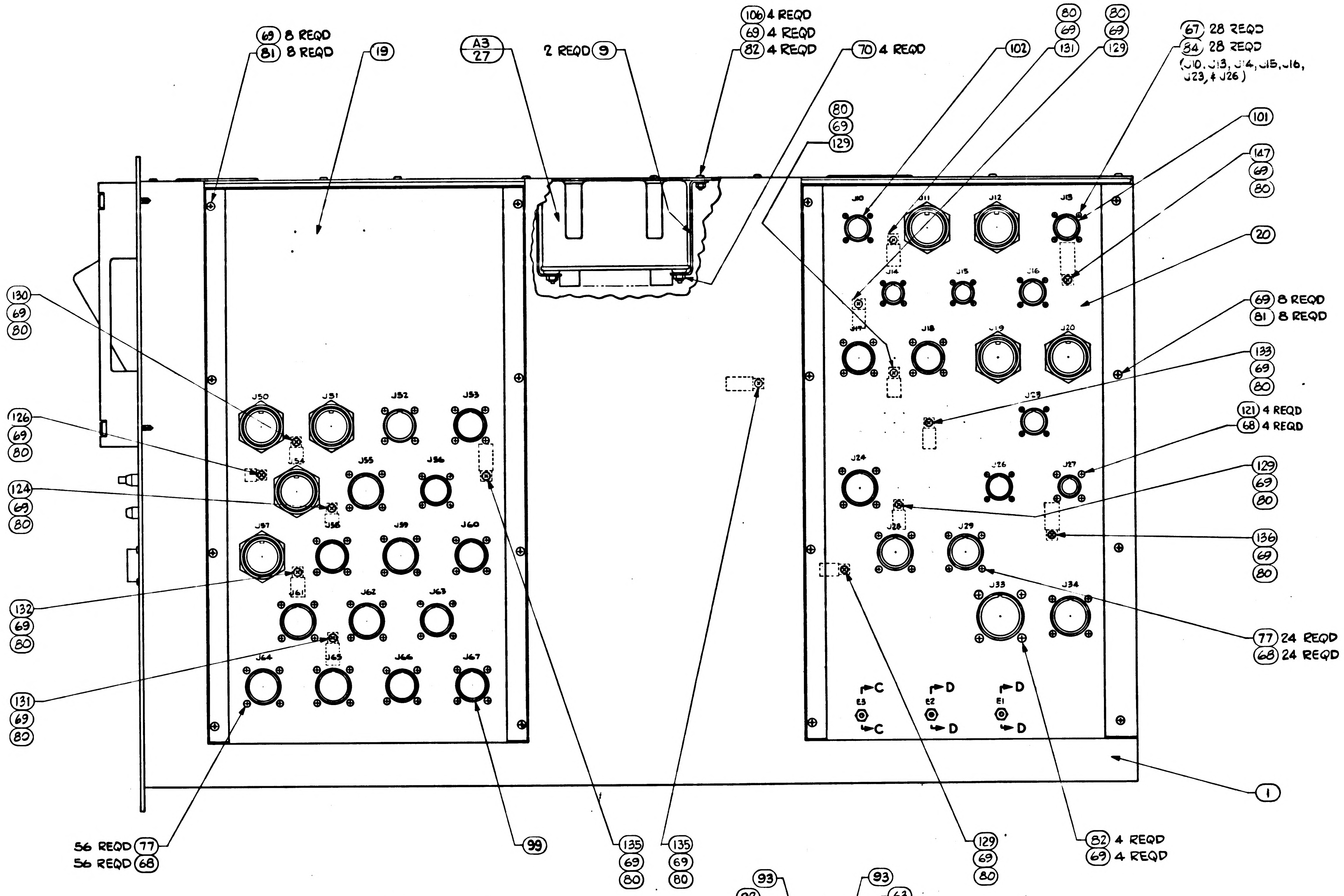
2900024 AD

2900024 AD AL

27 2900024

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM- SEE SPEC CONTROL DRAWING.
3. MARK APPLICABLE CONTRACT NO. AND SERIAL NO. TO ITEM (65) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .04 TO .08 HIGH.
4. MARK WEIGHT OF ASSEMBLY, 200 LBS, PER ND 1002019 ADJACENT TO NAMEPLATE LOCATION.
5. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NO. PER ND 1002019, .07 TO .11 HIGH, BLACK.
6. DIMENSIONS "A" AND "B" MUST BE EQUAL WITHIN .040.
7. SECURE ITEM (81) TO ITEM ㊷ WITH ITEM (96).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⑲
A3 / 27
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(102)
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(J10, J13, J14, J15, J16, J23, & J26)
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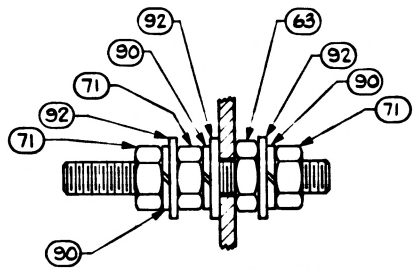
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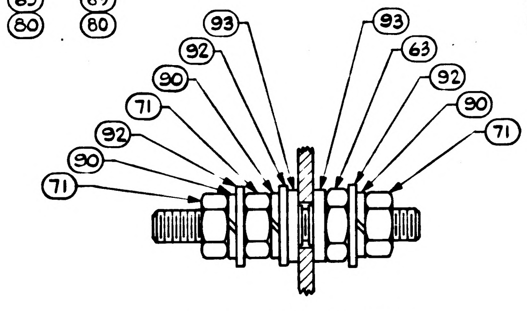
PARTIAL SECTION C-C
SCALE 2:1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PARTIAL SECTION D-D
2 PLACES
SCALE 2:1

2900024 REV LTR LD SH 1

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
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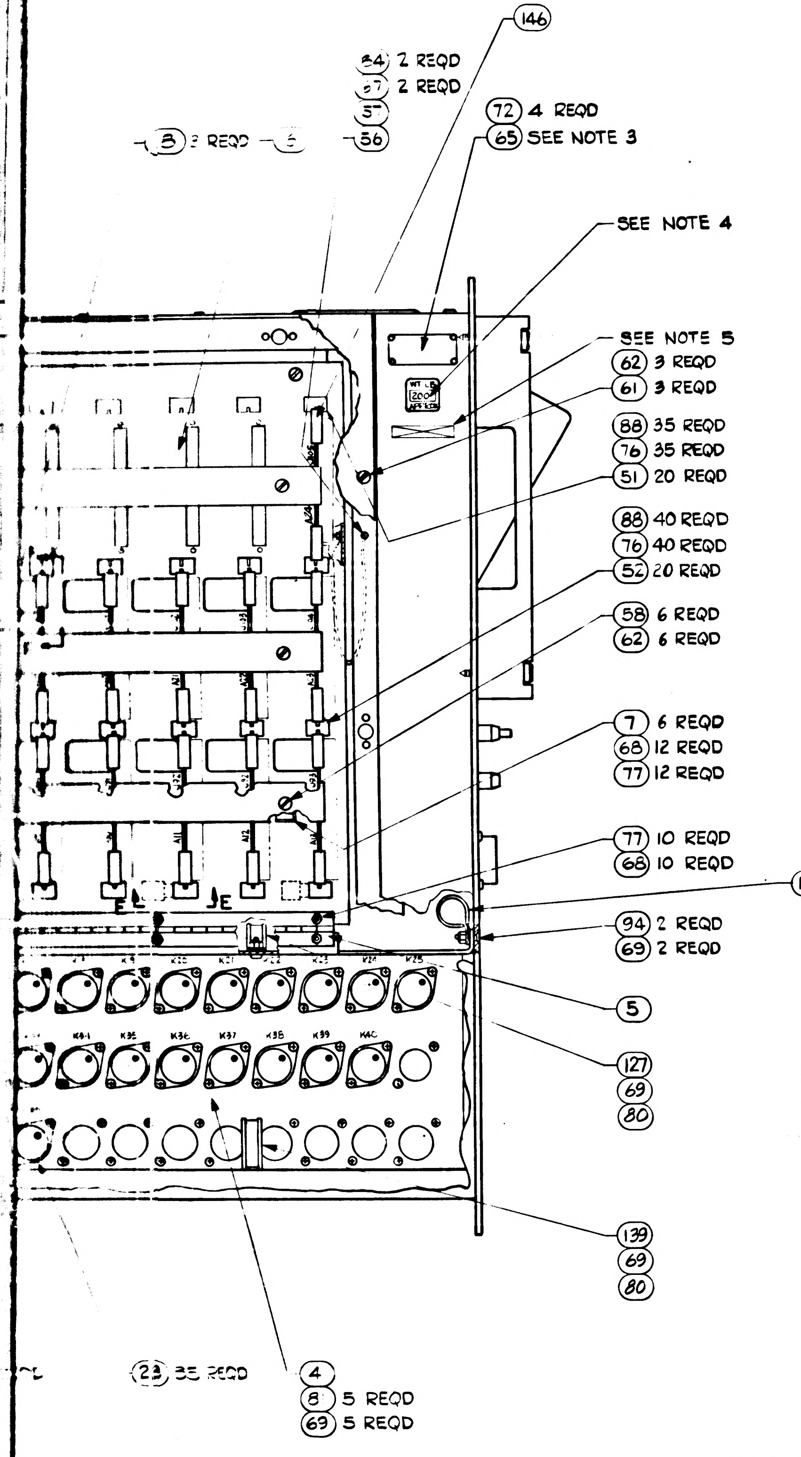
T		REVISED PER MXC203866		17 AUG 65	DKD
U		REVISED PER MXC 204027		30 AUG 65	
V		REVISED PER MXC 204597		SEP 65	
W		REVISED PER MXC 204707		14 SEP 65	
Y		REVISED PER MXC 204899		23 SEP 65	
Z		REVISION STATUS CHANGED		OCT 65	
AA		REVISED PER MXC 200 4		OCT 65	
AB		INITIAL RELEASE CLASS A PER TDRR 23557		21 DEC 65	DKD
AC		REVISED PER TDRR 29141		NOV 65	WP
AD		REVISED PER TDRR 24592		DEC 65	



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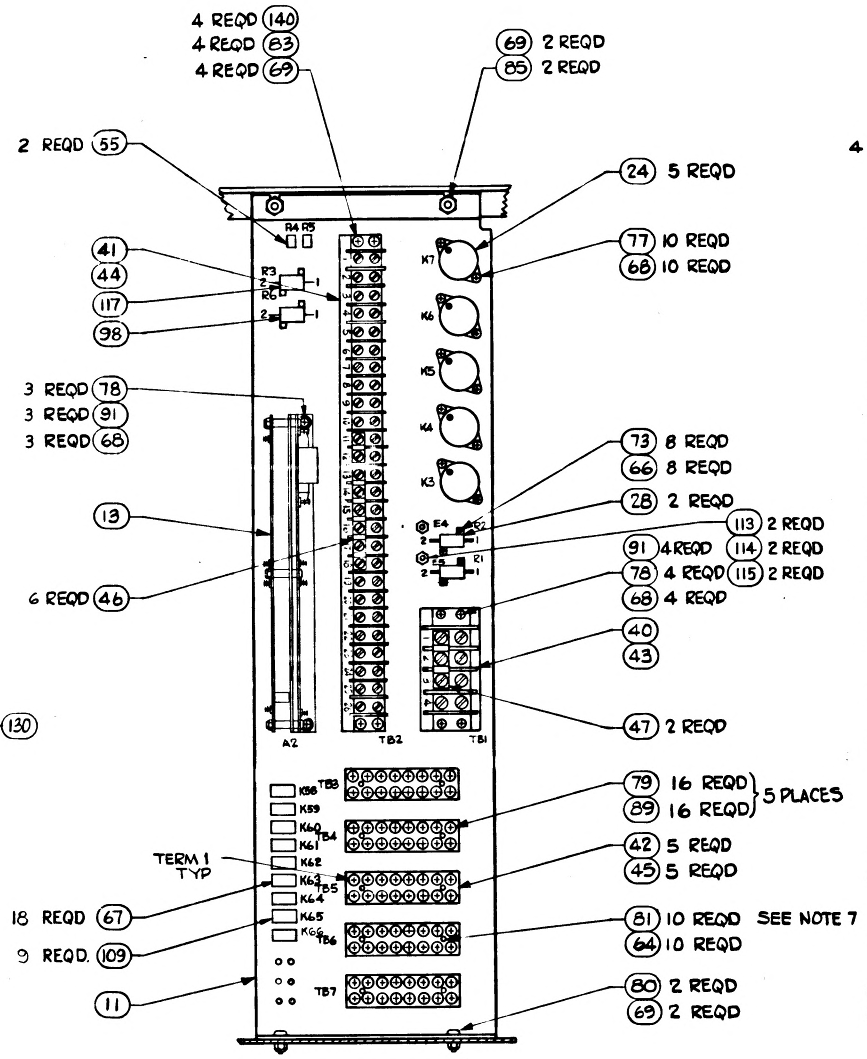

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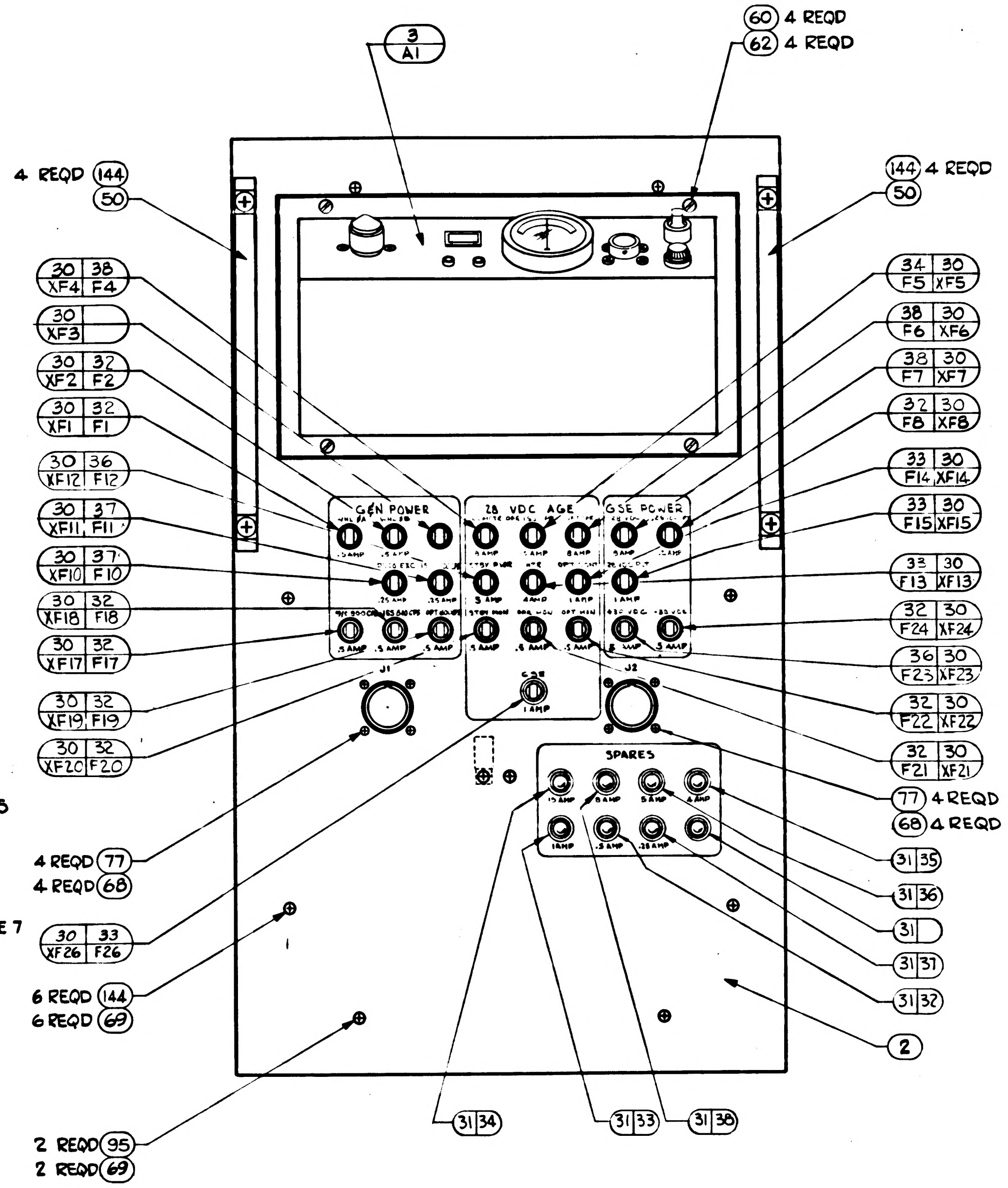
PARTIAL SECTION B B



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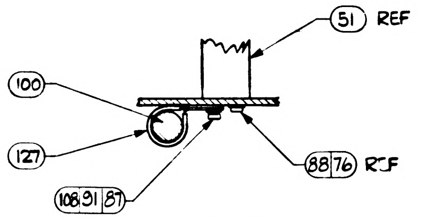

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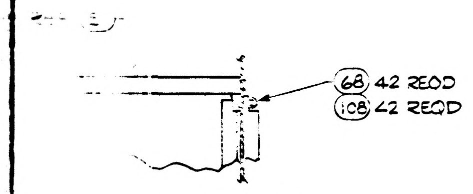
PARTIAL SECTION EE
5 PLACES



68 42 REQD
108 42 REQD

SECTION FF

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
$\pm$ — $\pm$ — $\pm$ —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Jonquin DATE 24 MAR 65
CHECKED J. G. WEB 2 AUG 65
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MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

DISTRIBUTION BOX
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CODE IDENT NO. 99974
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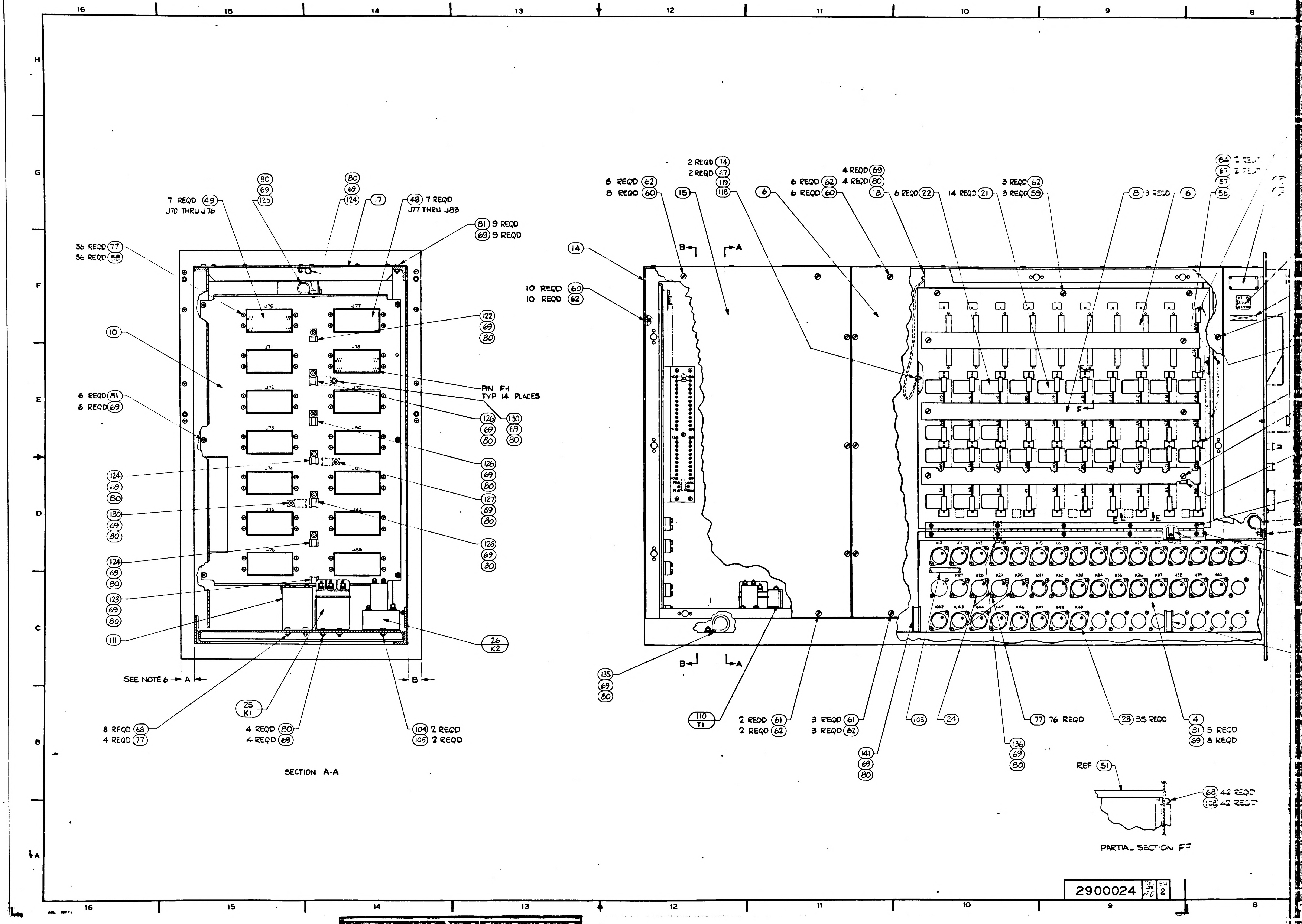

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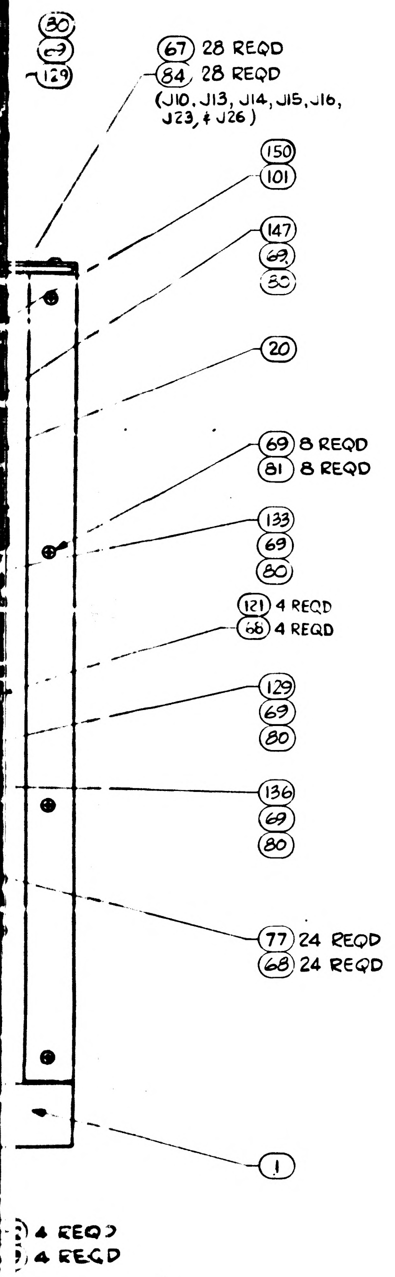
SECTION A-A

PARTIAL SECTION FF

2900024 2

1/2900024

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
REVISIONS					
S		REPLACES REV R WITH CHANGE PER MXC 205747		AUG 65	JW
T		REVISED PER MXC 203866		17 AUG 65	DRD AU
U		REVISED PER MXC 204027		30 AUG 65	LK
V		REVISED PER MXC 204597		65	
W		REVISED PER MXC 204707		14 SEP 65	RLP
Y		REVISED PER MXC 204899		23 SEP 65	RLP J.E.G.
Z		REVISED PER MXC 205451		1 OCT 65	JWP
AA		REVISED PER MXC 206174		19 OCT 65	RJJ CP
		INITIAL RELEASE CLASS A PER TDRR 23557		21 65	
AC		REVISED PER TDRR 24191		30 NOV 65	JW
AD		REVISED PER TDRR 24592		14 DEC 65	J.N.P.
AE		REVISED PER TDRR 26363		22 66	
AF		REVISED PER TDRR 27579		11 APR 66	B RWH
AG		REVISED PER TDRR 28891		23 MAY 66	RLP JHC



			021	011	EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			☒	-		159	PS 2016108	PROCUREMENT SPECIFICATION
			☒	-		158	2900973	SCHEMATIC DIAGRAM
			1	-		157	2900760-021	ELECTRONICS COMPONENT ASS'Y
						156		
			☒	☒		155	PS 2900024	PROCUREMENT SPECIFICATION
			1	-		154	2901142	PANEL, FRONT
			1	-		153	2901102	WIRING HARNESS A
			1	-		152	2901105	E
			1	-		151	2901104	D
			1	-		150	2901103	WIRING HARNESS C
			1	-		149	1004260-171	NAMEPLATE
			☒	☒		148	2900774	SCHEMATIC DIAGRAM, ELECTRICAL
			1	1		147	MS21919DG21 THRU DG23	(1897073-121 THRU-123) CLAMP
			1	1		146	2900867-011	LIMIT CYCLE LOAD ASSY
			1	1		145	MS35200-43	SCREW, FLAT HD
			14	14		144	MS35200-44	SCREW, FLAT HD
				~~1~~		143	~~MS21919DG2 THRU DG4~~	~~(1897073-102 THRU-104) CLAMP~~
						142		
			1	1		141	MS21919DG29 THRU DG31	(1897073-129 THRU-131) CLAMP
			4	4		140	MS15795-807	WASHER FLAT
			1	1		139	MS21919DG23 THRU DG25	(1897073-123 THRU-125) CLAMP
				~~1~~		138	~~MS21919DG19 THRU DG21~~	~~(1897073-119 THRU-121) CLAMP~~
						137		
			2	2		136	MS21919DG17 THRU DG19	(1897073-117 THRU-119) CLAMP
			3	3		135	MS21919DG16 THRU DG18	(1897073-116 THRU-118) CLAMP
				2		134	~~MS21919DG15 THRU DG17~~	~~(1897073-115 THRU-117) CLAMP~~
			1	1		133	MS21919DG14 THRU DG16	(1897073-114 THRU-116) CLAMP
			1	1		132	MS21919DG13 THRU DG15	(1897073-113 THRU-115) CLAMP
			2	2		131	MS21919DG12 THRU DG14	(1897073-112 THRU-114) CLAMP
			4	4		130	MS21919DG11 THRU DG13	(1897073-111 THRU-113) CLAMP
			4	4		129	MS21919DG10 THRU DG12	(1897073-110 THRU-112) CLAMP
				~~1~~		128	~~MS21919DG10 THRU DG11~~	~~(1897073-109 THRU-111) CLAMP~~
			7	7		127	MS21919DG8 THRU DG10	(1897073-108 THRU-110) CLAMP
			4	4		126	MS21919DG7 THRU DG9	(1897073-107 THRU-109) CLAMP
			1	1		125	MS21919DG6 THRU DG8	(1897073-106 THRU-108) CLAMP
			4	4		124	MS21919DG5 THRU DG7	(1897073-105 THRU-107) CLAMP
			1	1		123	MS21919DG4 THRU DG6	(1897073-104 THRU-106) CLAMP
			1	1		122	MS21919DG3 THRU DG5	(1897073-103 THRU-105) CLAMP
			4	4		121	MS35200-26	SCREW, FLAT HD.
				28		120	MS35200-12	SCREW, FLAT HD
SEE NOTE 2			1	1		119	1015864-978	INSULATION, 21.00 LONG
SEE NOTE 2			1	1		118	1016067-022	CHAIN, SAFETY
			1	1		117	1010498-280	RESISTOR, FIXED
						116		
			2	2		115	SE20XD01	(1896962-003) STAND OFF MIL-T-55155/20
			2	2		114	MS35333-70	WASHER, LOCK
			2	2		113	MS35216-13	SCREW, PAN HD.
				~~56~~		112	~~MS35216-31~~	~~SCREW, PAN HD~~
			1	1		111	2900761	BRACKET, TRANSFORMER
			1	1		110	1897334	TRANSFORMER
SEE NOTE 2			9	9		109	1015802-004	RELAY, ARMATURE
			47	47		108	MS35216-28	SCREW, PAN HD
				5		107	MS21919-WDG9	(1897073-209) CLAMP, CABLE
			4	4		106	MS15795-807	WASHER, FLAT
SEE NOTE 2			2	2		105	1016151-010	NUT, SELFLOCKING
			2	2		104	MS35217-56	SCREW, PAN HD
			-	1		103	2900731	WIRING HARNESS E
			-	1		102	2900719	WIRING HARNESS D
			-	1		101	2900686	WIRING HARNESS C
	QUANTITY REQUIRED							

LIST OF PARTS AND MATERIALS

			021	011	EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			1	1		100	2900653	WIRING HARNESS B
			-	1		99	2900500	WIRING HARNESS A
SEE NOTE 2			1	1		98	1010498-158	RESISTOR, FIXED
~~SEE NOTE 2~~				~~1~~		~~97~~	~~1015898-005~~	~~TRANSFORMER~~
			AR	AR		96	MIL-S-22473	SEALING AND RETAINING COMPOUND GRADE H (ES2544-5)
			2	2		95	MS35200-46	SCREW, FLAT HD
			2	2		94	MS35200-45	SCREW, FLAT HD
			4	4		93	2900188-008	WASHER, SHOULDERED
			9	9		92	MS15795-811	WASHER, FLAT
			12	12		91	MS15795-805	WASHER, FLAT
			9	9		90	MS35338-82	WASHER, LOCK
			80	80		89	MS35338-80	WASHER, LOCK
			131	131		88	MS35333-71	WASHER, LOCK
			5	5		87	MS35338-79	WASHER, LOCK
				~~8~~		~~86~~	~~AN507C832R12~~	~~(1897003-568) SCREW, FLAT HD~~
			2	2		85	MS35200-42	SCREW, FLAT HD
			30	30		84	MS35200-15	SCREW, FLAT HD
			4	4		83	MS35216-45	SCREW, PAN HD
			8	8		82	MS35216-44	SCREW, PAN HD
			46	46		81	MS35216-43	SCREW, PAN HD
			41	41		80	MS35216-42	SCREW, PAN HD
			80	80		79	MS35216-40	SCREW, PAN HD
			7	7		78	MS35216-30	SCREW, PAN HD
			256	256		77	MS35216-27	SCREW, PAN HD
			75	75		76	MS35216-26	SCREW, PAN HD
				56		75	MS35216-25	SCREW, PAN HD
			2	2		74	MS35216-15	SCREW, PAN HD
			8	8		73	MS35216-6	SCREW, PAN HD
			4	4		72	MS35216-3	SCREW, PAN HD
			9	9		71	MS20341-416S	(1897061-305) NUT, HEX
SEE NOTE 2			4	4		70	1016151-012	NUT, SELFLOCKING
			102	102		69	1016151-008	NUT, SELFLOCKING
			181	181		68	1016151-006	NUT, SELFLOCKING
			50	50		67	1016151-004	NUT, SELFLOCKING
SEE NOTE 2			8	8		66	1016151-002	NUT, SELFLOCKING
			-	1		65	1004260-103	NAMEPLATE
			10	10		64	2900155-005	WASHER, SHOULDERED
SEE NOTE 2			3	3		63	1902370	STUD, SHOULDERED
			45	45		62	1015852-001	WASHER, RETAINER
			8	8		61	1015853-017	FASTENER, STUD, FLUSH
			28	28		60	1015853-021	FASTENER, STUD, FLUSH
			3	3		59	1015853-008	FASTENER, STUD, OVAL
			6	6		58	1015853-003	FASTENER, STUD, OVAL
			1	1		57	1015864-978	INSULATION 11.50 LONG
			1	1		56	1016067-012	CHAIN, SAFETY
SEE NOTE 2			2	2		55	1897260-010	RESISTOR VARIABLE
				5		54	1015860-002	~~SPACER, FIBRE~~
				~~4~~		~~53~~	~~1016000-013~~	~~STAND-OFF THREADED~~
			20	20		52	1900391	BRACKET, HOLDER, DOUBLE
			20	20		51	1900390	BRACKET, HOLDER, SINGLE
			2	2		50	1900015-071	HANDLE ASSY
SEE NOTE 2			8	7		49	1016376-24	CONNECTOR, ELECTRICAL
			6	7		48	1016376-13	CONNECTOR, ELECTRICAL
			2	2		47	1015894-005	JUMPER, TERMINAL BOARD
SEE NOTE 2			6	6		46	1015894-004	JUMPER, TERMINAL BOARD
			5	5		45	1900838-003	INSULATOR, NYLON STRIP
SEE NOTE 2			1	1		44	1001666-26	PLATE, DESIGNATOR
SEE NOTE 2			1	1		43	1015901-004	MARKER STRIP
			5	5		42	1900837	BUS BAR
SEE NOTE 2			1	1		41	1001665-26	TERMINAL BOARD
	QUANTITY REQUIRED							

LIST OF PARTS AND MATERIALS

			021	011	EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 2			1	1		40	1015895-004	TERMINAL, BOARD
				~~2~~		~~39~~	~~FO3A250V12AS~~	~~(1897135-106) FUSE, MIL-F-15160/03~~
			4	4		38	FO3A250V 8AS	(1897135-104) FUSE, MIL-F-15160/03
			3	3		37	FO2A250V ¼AS	(1897099-105) FUSE, MIL-F-15160/02
			4	3		36	FO2A250V 5AS	(1897099-114) FUSE, MIL-F-15160/02
			3	2		35	FO2A250V 4 AS	(1897099-113) FUSE, MIL-F-15160/02
			2	2		34	FO2A 32V 15AS	(1897099-117) FUSE, MIL-F-15160/03
			6	4		33	FO2A250V 1 AS	(1897099-109) FUSE, MIL-F-15160/02
			9	11		32	FO2A250V ½AS	(1897099-107) FUSE, MIL-F-15160/02
			8	8		31	MS26572-1	FUSEHOLDER, SPARE
SEE NOTE 2			25	23		30	1015873-008	FUSEHOLDER, INDICATING
				~~1~~		~~29~~	~~1015873-006~~	~~FUSEHOLDER, INDICATING~~
SEE NOTE 2			2	2		28	1010498-001	RESISTOR, FIXED
SEE NOTE 2			1	1		27	1016014	SWITCH, STEPPING
			1	1		26	MS24140-D2	(1896873-002) RELAY, POWER
SEE NOTE 2			1	1		25	1016031-1	RELAY, SOLENOID
SEE NOTE 2			8	8		24	1015914-001	RELAY
SEE NOTE 2			35	35		23	1015837-001	RELAY
			6	6		22	2900036-011	RESOLVER AMPLIFIER ASSY
			14	14		21	2900059-011	BUFFER AMPLIFIER ASSY
			1	1		20	2900490	PANEL, CONNECTOR, REAR
			1	1		19	2900489	PANEL, CONNECTOR, FRONT
			1	1		18	2900485	BRACKET, SUPPORT (INSEP ASSY)
			1	1		17	2900487	PANEL, TOP
			1	1		16	2900481	PANEL, FRONT, LEFT
			1	1		15	2900480	PANEL, REAR, LEFT
			1	1		14	2900479	PANEL, REAR
			-	1		13	2900760-011	COMPONENT BOARD ASSY
				~~1~~		~~12~~	~~2900475~~	~~COVER~~
			1	1		11	2900474	BRACKET, TERMINAL BOARD
			1	1		10	2900473	PANEL, CONNECTOR
			2	2		9	2900472	BRACKET, STEPPING SWITCH
			3	3		8	2900471	STRAP
			6	6		7	2900470	BRACKET, FASTENER
			1	1		6	2900469	BRACKET, COMPONENT BOARD
			1	1		5	2900468	HINGE, CONTINUOUS
			1	1		4	2900467	BRACKET, RELAY (INSEP ASSY)
			1	1		3	2900320-011	TEMPERATURE INDICATOR ASSY
			-	1		2	2900465	PANEL, FRONT
			1	1		1	2900466	FRAME (INSEP ASSY)
	QUANTITY REQUIRED							

LIST OF PARTS AND MATERIALS

2900024 AG

NEXT ASSY	USED ON	APPLICABLE DASH NO
2900022-021	2900022-021	-021
2900022-011	2900022-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORPORATION MILWAUKEE, WIS.
DRAWN Jenquin DATE 24 MAR 65
CHECKED J. GRIEB 2 AUG 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

DISTRIBUTION BOX
ASSEMBLY

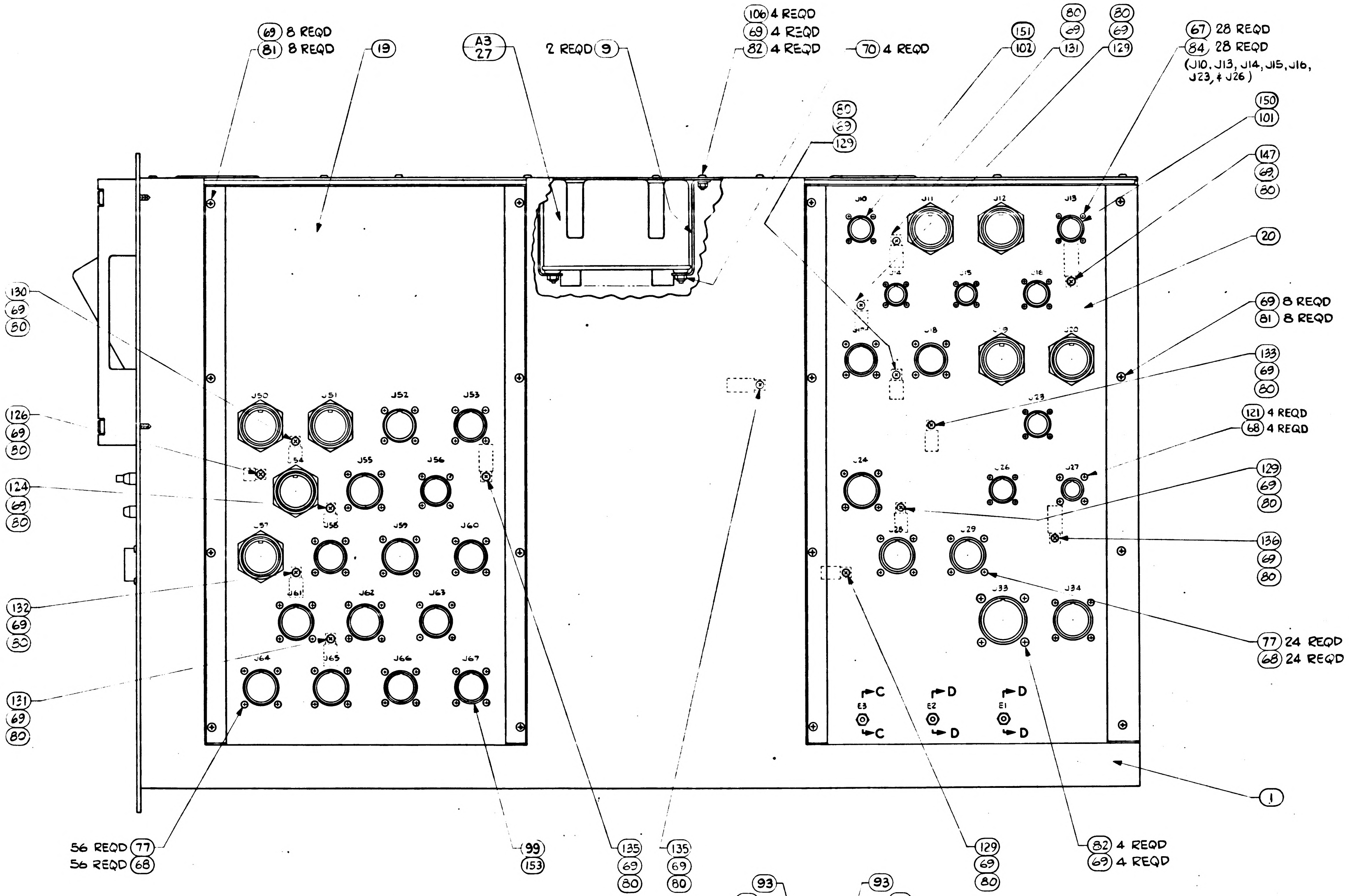
CODE IDENT NO 99974
SIZE J2
2900024
SCALE 1:2
SHEET 1 OF 2

2900024 REV LTR AG SH 1

27/2900024

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM- SEE SPEC CONTROL DRAWING.
3. MARK APPLICABLE CONTRACT NO. AND SERIAL NO. TO ITEM (65) AND (149) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .04 TO .08 HIGH.
4. MARK WEIGHT OF ASSEMBLY, 200 LBS, PER ND 1002?19 AJACENT TO NAMEPLATE LOCATION.
5. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NO. PER ND 1002019, .07 TO .11 HIGH, BLACK.
6. DIMENSIONS "A" AND "B" MUST BE EQUAL WITHIN .040.
7. SECURE ITEM (81) TO ITEM ㊷ WITH ITEM (96).
8. ITEM ㊾ USED ON -021 ONLY, WHILE ITEM ㊽ IS USED ON -011 ONLY



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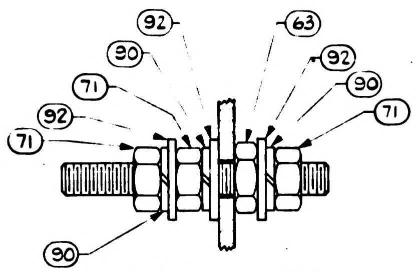

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PARTIAL SECTION C-C
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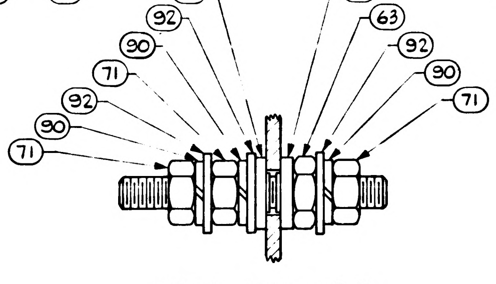

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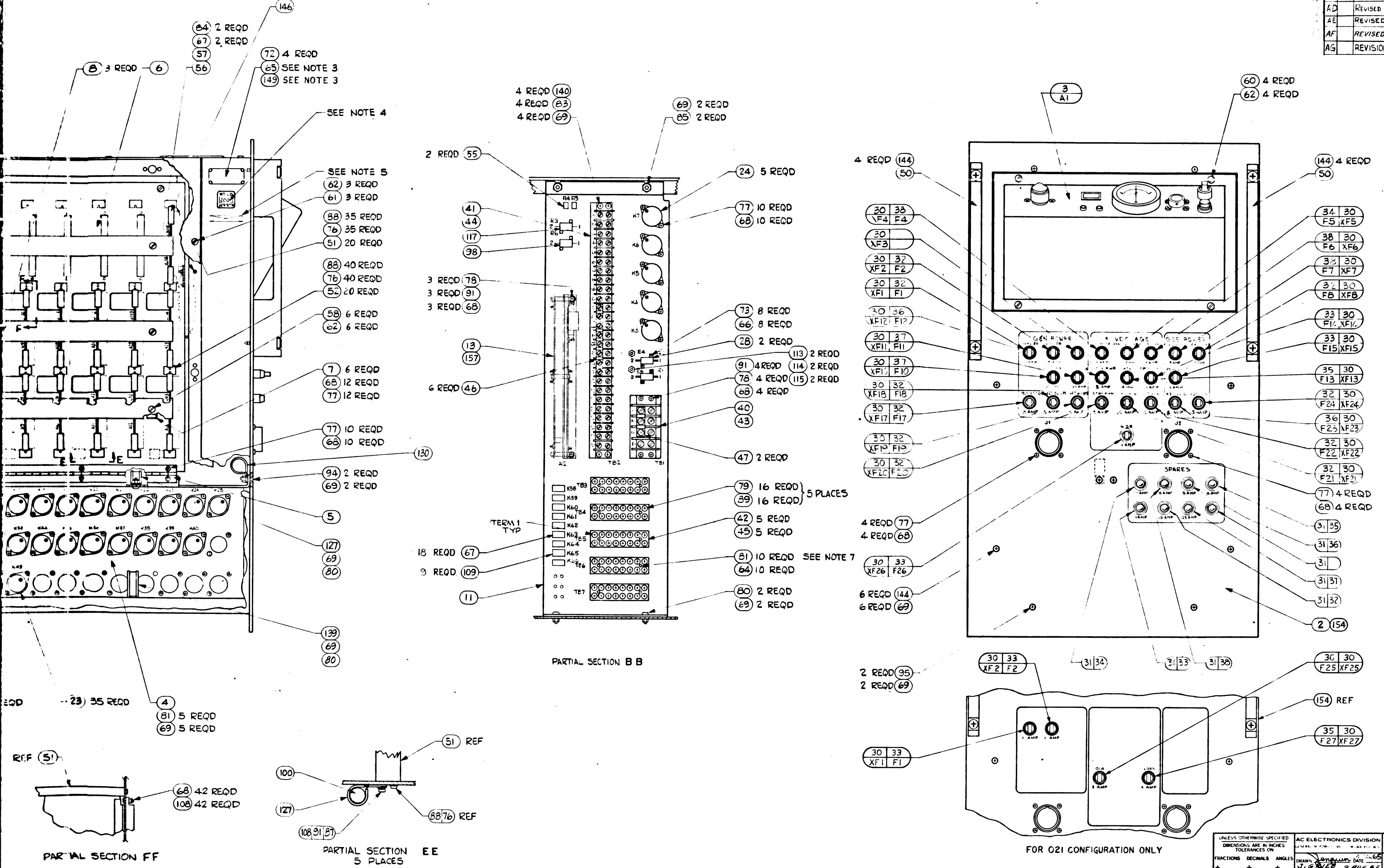
PARTIAL SECTION D-D
2 PLACES
SCALE 2:1

2900024	REV LTR AG	SH 1

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
S		REPLACES REV R WITH CHANCE PER MXC 203747		6 AUG 65	JWP EF
T		REVISED PER MXC203866		17 AUG 65	DKD AU
U		REVISED PER MXC 204027		30 AUG 65	LK
V		REVISED PER MXC 204597		10 SEP 65	JWP
W		REVISED PER MXC 204707		14 SEP 65	RLP EF
Y		REVISED PER MXC 204899		23 SEP 65	RLP J.E.G.
Z		REVISION STATUS CHANGED		1 OCT 65	JWP
AA		REVISED PER MXC 200174		19 OCT 65	RJJ CP
AB		INITIAL RELEASE CLASS A PER TDRR 23557		21 OCT 65	DKD CW
AC		REVISED PER TDRR 29141		30 NOV 65	JWP
AD		REVISED PER TDRR 24592		4 DEC 65	JHP
AE		REVISED PER TDRR 26363		22 FEB 66	
AF		REVISED PER TDRR 27579		11 APR 66	B RWH
AG		REVISION STATUS CHANGED		23 MAY 66	RLP JAC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(81) 10 REQD
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SEE NOTE 7
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9 REQD (109)
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K3 K6 K7 K5 K4
E4
A2 TB2 TB1
TB3 TB4 TB5 TB6 TB7
K58 K59 K60 K61 K62 K63 K64 K65 K66
(3) A1
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4 REQD (144)
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30 38 XF4 F4
30 XF3
30 32 XF2 F2
30 32 XF1 F1
30 36 XF12 F12
30 37 XF11 F11
30 37 XF10 F10
30 32 XF18 F18
30 32 XF17 F17
30 32 XF19 F19
30 32 XF20 F20
34 30 F5 XF5
38 30 F6 XF6
33 30 F7 XF7
34 30 F8 XF8
33 30 F14 XF14
33 30 F15 XF15
35 30 F13 XF13
32 30 F24 XF24
36 30 F23 XF23
32 30 F22 XF22
32 30 F21 XF21
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4 REQD (77)
4 REQD (68)
30 33 XF26 F26
6 REQD (144)
6 REQD (69)
(2)(154)
(31)(34)
(31)(33)
(31)(38)
J1 J2
SPARES
2 REQD (95)
2 REQD (69)
30 33 XF2 F2
36 30 F25 XF25
(154) REF
35 30 F27 XF27
30 33 XF1 F1

PARTIAL SECTION FF

PARTIAL SECTION EE
5 PLACES

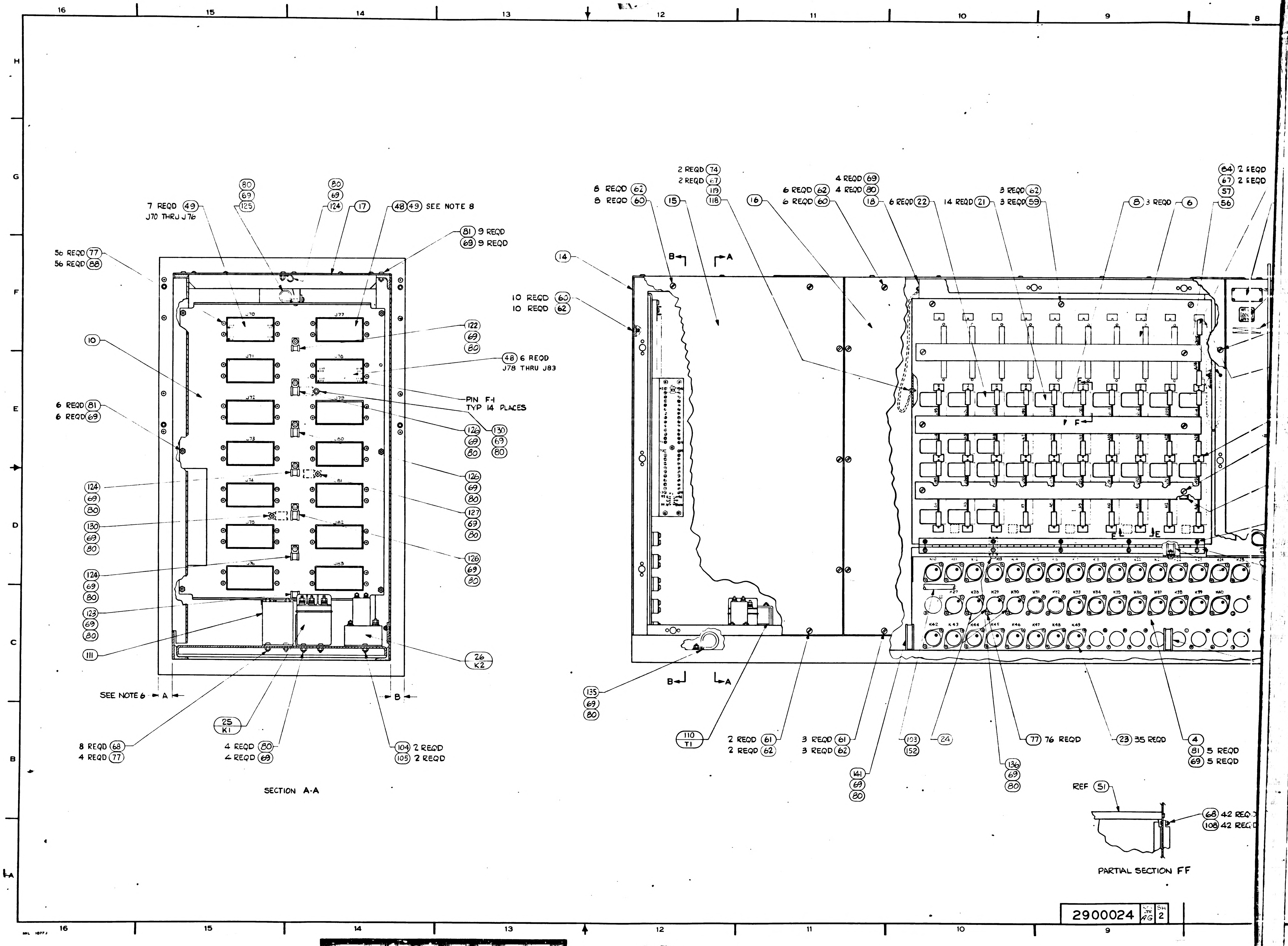
PARTIAL SECTION B B

FOR 021 CONFIGURATION ONLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC ELECTRONICS DIVISION GENERAL MOTORS CORP. MILWAUKEE, WIS.	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Jenquin DATE 65 CHECKED J. GRIEB 2 AUG 65 APPROVAL APPROVAL	DISTRIBUTION BOX ASSEMBLY
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974 | SIZE J2 | 2900024
CONTRACT NAS 9-497	MIT APPROVAL	SCALE 1:2 | SHEET 2 OF 2

2900024 AG 2

272900024


SECTION A-A

PARTIAL SECTION FF

16
15
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G
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E
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C
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A
7 REQD 49
J70 THRU J76
80
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124
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48 49 SEE NOTE 8
81 9 REQD
69 9 REQD
56 REQD 77
56 REQD 88
10
122
69
80
48 6 REQD
J78 THRU J83
PIN F-1
TYP 14 PLACES
6 REQD 81
6 REQD 69
126
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130
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123
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K2
SEE NOTE 6
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K1
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67 2 REQD
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23 35 REQD
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81 5 REQD
69 5 REQD
REF 51
68 42 REQD
108 42 REQD
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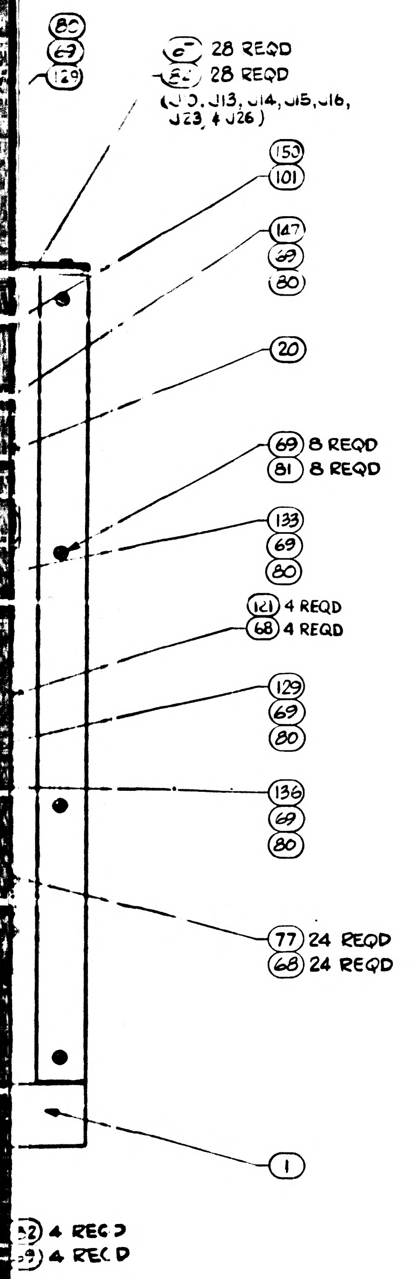
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
REVISIONS					
S		REPLACES REV R WITH CHANGE PER MXC 203797		6 AUG 65	
T		REVISED PER MXC 203866		17 AUG 65	OKD
U		REVISED PER MXC 204027		30 AUG 65	LK
V		REVISED PER MXC 204597		10 SEP 65	
W		REVISED PER MXC 204707		14 SEP 65	
Y		REVISED PER MXC 204899		23 SEP 65	
Z		REVISED PER MXC 205451		OC 65	
AA		REVISED PER MXC 206174		OC 65	
AB		INITIAL RELEASE CLASS A PER TDRR 23557		21 OC 65	
AC		REVISED PER TDRR 24191		30 NOV 65	
AD		REVISED PER TDRR 24592		16 DEC 65	
AE		REVISED PER TDRR 26363		22 FEB 66	
AF		REVISED PER TDRR 27579		11-APR-66	B RWH
AG		REVISED PER TDRR 28891		23 MAY 66	RLP JRC
AH		REVISED PER TDRR 28760		26 MAY 66	



		031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
		1	-	-		167	2901507	WIRING HARNESS A
		☒	-	-		166	2901473	SCHEMATIC DIAGRAM
		1	-	-		165	2900760-031	ELECTRONIC COMPONENT BOARD ASSY
		1	-	-		164	2901459	BRACKET, TERMINAL BOARD
		1	-	-		163	1004260-193	NAMEPLATE
		☒	-	-		162	PS2016121	PROCUREMENT SPEC
		1	-	-		161	2901470	WIRING HARNESS E
		1	-	-		160	2901373	WIRING HARNESS D
		-	☒	-		159	PS 2016108	PROCUREMENT SPECIFICATION
		-	☒	-		158	2900973	SCHEMATIC DIAGRAM
		-	1	-		157	2900760-021	ELECTRONICS COMPONENT ASS'Y
						156		
		-	-	☒		155	PS 2900024	PROCUREMENT SPECIFICATION
		1	1	-		154	2901142	PANEL, FRONT
		-	1	-		153	2901102	WIRING HARNESS A
		-	1	-		152	2901105	E
		-	1	-		151	2901104	D
		1	1	-		150	2901103	WIRING HARNESS C
		-	1	-		149	1004260-171	NAMEPLATE
		-	-	☒		148	2900774	SCHEMATIC DIAGRAM, ELECTRICAL
		1	1	1		147	MS21919DG21 THRU DG23	(1897073-121 THRU-123) CLAMP
		1	1	1		146	2900867-011	LIMIT CYCLE LOAD ASSY
		1	1	1		145	MS35200-43	SCREW, FLAT HD
		14	14	14		144	MS35200-44	SCREW, FLAT HD
				~~1~~		143	~~MS21919DG2 THRU DG4~~	~~(1897073-102 THRU-104) CLAMP~~
						142		
		1	1	1		141	MS21919DG29 THRU DG31	(1897073-129 THRU-131) CLAMP
		4	4	4		140	MS15795-807	WASHER FLAT
		1	1	1		139	MS21919DG23 THRU DG25	(1897073-123 THRU-125) CLAMP
				~~1~~		138	~~MS21919DG19 THRU DG21~~	~~(1897073-119 THRU-121) CLAMP~~
						137		
		2	2	2		136	MS21919DG17 THRU DG19	(1897073-117 THRU-119) CLAMP
		3	3	3		135	MS21919DG16 THRU DG18	(1897073-116 THRU-118) CLAMP
				~~2~~		134	~~MS21919DG15 THRU DG17~~	~~(1897073-115 THRU-117) CLAMP~~
		1	1	1		133	MS21919DG14 THRU DG16	(1897073-114 THRU-116) CLAMP
		1	1	1		132	MS21919DG13 THRU DG15	(1897073-113 THRU-115) CLAMP
		2	2	2		131	MS21919DG12 THRU DG14	(1897073-112 THRU-114) CLAMP
		4	4	4		130	MS21919DG11 THRU DG13	(1897073-111 THRU-113) CLAMP
		4	4	4		129	MS21919DG10 THRU DG12	(1897073-110 THRU-112) CLAMP
				~~1~~		128	~~MS21919DG10 THRU DG11~~	~~(1897073-109 THRU-111) CLAMP~~
		7	7	7		127	MS21919DG8 THRU DG10	(1897073-108 THRU-110) CLAMP
		4	4	4		126	MS21919DG7 THRU DG9	(1897073-107 THRU-109) CLAMP
		1	1	1		125	MS21919DG6 THRU DG8	(1897073-106 THRU-108) CLAMP
		4	4	4		124	MS21919DG5 THRU DG7	(1897073-105 THRU-107) CLAMP
		1	1	1		123	MS21919DG4 THRU DG6	(1897073-104 THRU-106) CLAMP
		1	1	1		122	MS21919DG3 THRU DG5	(1897073-103 THRU-105) CLAMP
		4	4	4		121	MS35200-26	SCREW, FLAT HD.
				~~28~~		120	~~MS35200-12~~	~~SCREW, FLAT HD~~
SEE NOTE 2		1	1	1		119	1015864-978	INSULATION, 21.00 LONG
SEE NOTE 2		1	1	1		118	1016067-022	CHAIN, SAFETY
		1	1	1		117	1010498-280	RESISTOR, FIXED
						116		
		2	2	2		115	SE20XD01	(1896962-003) STAND OFF MIL-T-55155/20
		2	2	2		114	MS35333-70	WASHER, LOCK
		2	2	2		113	MS35216-13	SCREW, PAN HD.
				~~56~~		112	~~MS35216-31~~	~~SCREW, PAN HD~~
		1	1	1		111	2900761	BRACKET, TRANSFORMER
		1	1	1		110	1897334	TRANSFORMER
SEE NOTE 2		10	9	9		109	1015802-004	RELAY, ARMATURE
		47	47	47		108	MS35216-28	SCREW, PAN HD
				~~5~~		107	~~MS21919WDG9~~	~~(1897073-209) CLAMP, CABLE~~
		4	4	4		106	MS15795-807	WASHER, FLAT
SEE NOTE 2		2	2	2		105	1016151-010	NUT, SELFLOCKING
		2	2	2		104	MS35217-56	SCREW, PAN HD
		-	-	1		103	2900731	WIRING HARNESS E
		-	-	1		102	2900719	WIRING HARNESS D
		-	-	1		101	2900686	WIRING HARNESS C
		1	1	1		100	2900653	WIRING HARNESS B
		-	-	1		99	2900500	WIRING HARNESS A
SEE NOTE 2		1	1	1		98	1010498-158	RESISTOR, FIXED
~~SEE NOTE 2~~				~~1~~		~~97~~	~~1015898-005~~	~~TRANSFORMER~~
		AR	AR	AR		96	MIL-S-22473	SEALING AND RETAINING COMPOUND GRADE H (ES2544-5)
		2	2	2		95	MS35200-46	SCREW, FLAT HD
		2	2	2		94	MS35200-45	SCREW, FLAT HD
		4	4	4		93	2900188-008	WASHER, SHOULDERED
		9	9	9		92	MS15795-811	WASHER, FLAT
		12	12	12		91	MS15795-805	WASHER, FLAT
		9	9	9		90	MS35338-82	WASHER, LOCK
		80	80	80		89	MS35338-80	WASHER, LOCK
		131	131	131		88	MS35333-71	WASHER, LOCK
		5	5	5		87	MS35338-79	WASHER, LOCK
				~~8~~		~~86~~	~~AN507C832R12~~	~~(1897003-568) SCREW, FLAT HD~~
		2	2	2		85	MS35200-42	SCREW, FLAT HD
		30	30	30		84	MS35200-15	SCREW, FLAT HD
		4	4	4		83	MS35216-45	SCREW, PAN HD
		8	8	8		82	MS35216-44	SCREW, PAN HD
		46	46	46		81	MS35216-43	SCREW, PAN HD
		41	41	41		80	MS35216-42	SCREW, PAN HD
		80	80	80		79	MS35216-40	SCREW, PAN HD
		7	7	7		78	MS35216-30	SCREW, PAN HD
		256	256	256		77	MS35216-27	SCREW, PAN HD
		75	75	75		76	MS35216-26	SCREW, PAN HD
				~~56~~		75	~~MS35216-25~~	~~SCREW, PAN HD~~
		2	2	2		74	MS35216-15	SCREW, PAN HD
		8	8	8		73	MS35216-6	SCREW, PAN HD
		4	4	4		72	MS35216-3	SCREW, PAN HD
		9	9	9		71	MS20341-416S	(1897061-305) NUT, HEX
SEE NOTE 2		4	4	4		70	1016151-012	NUT, SELFLOCKING
		102	102	102		69	1016151-008	NUT, SELFLOCKING
		181	181	181		68	1016151-006	NUT, SELFLOCKING
		52	50	50		67	1016151-004	NUT, SELFLOCKING
SEE NOTE 2		8	8	8		66	1016151-002	NUT, SELFLOCKING
		-	-	1		65	1004260-103	NAMEPLATE
		10	10	10		64	2900188-005	WASHER, SHOULDERED
SEE NOTE 2		3	3	3		63	1902370	STUD, SHOULDERED
		45	45	45		62	1015852-001	WASHER, RETAINER
		8	8	8		61	1015853-017	FASTENER, STUD, FLUSH
		28	28	28		60	1015853-021	FASTENER, STUD, FLUSH
		3	3	3		59	1015853-008	FASTENER, STUD, OVAL
		6	6	6		58	1015853-003	FASTENER, STUD, OVAL
		1	1	1		57	1015864-978	INSULATION 11.50 LONG
		1	1	1		56	1016067-012	CHAIN, SAFETY
SEE NOTE 2		2	2	2		55	1897260-010	RESISTOR VARIABLE
				~~5~~		54	~~1015860-002~~	~~SPACER, FIBRE~~
				~~4~~		~~53~~	~~1016000-013~~	~~STAND-OFF THREADED~~
		20	20	20		52	1900391	BRACKET, HOLDER, DOUBLE
		20	20	20		51	1900390	BRACKET, HOLDER, SINGLE
		2	2	2		50	1900015-071	HANDLE ASSY
SEE NOTE 2		8	8	7		49	1016376-24	CONNECTOR, ELECTRICAL
		6	6	7		48	1016376-13	CONNECTOR, ELECTRICAL
		2	2	2		47	1015894-005	JUMPER, TERMINAL BOARD
SEE NOTE 2		6	6	6		46	1015894-004	JUMPER, TERMINAL BOARD
		5	5	5		45	1900838-003	INSULATOR, NYLON STRIP
SEE NOTE 2		1	1	1		44	1001666-26	PLATE, DESIGNATOR
SEE NOTE 2		1	1	1		43	1015901-004	MARKER STRIP
		5	5	5		42	1900837	BUS BAR
SEE NOTE 2		1	1	1		41	1001665-26	TERMINAL BOARD
SEE NOTE 2		1	1	1		40	1015895-004	TERMINAL, BOARD
				~~2~~		~~39~~	~~FO3A250V12AS~~	~~(1897135-106) FUSE, MIL-F-15160/03~~
		4	4	4		38	FO3A250V 8AS	(1897135-104) FUSE, MIL-F-15160/03
		3	3	3		37	FO2A250V ¼AS	(1897099-105) FUSE, MIL-F-15160/02
		4	4	3		36	FO2A250V 5AS	(1897099-114) FUSE, MIL-F-15160/02
		3	3	2		35	FO2A250V 4 AS	(1897099-113) FUSE, MIL-F-15160/02
		2	2	2		34	FO2A 32V15AS	(1897099-117) FUSE, MIL-F-15160/03
		6	6	4		33	FO2A250V 1 AS	(1897099-109) FUSE, MIL-F-15160/02
		9	9	11		32	FO2A250V 1/2 AS	(1897099-107) FUSE, MIL-F-15160/02
		8	8	8		31	MS26572-1	FUSEHOLDER, SPARE
SEE NOTE 2		25	25	23		30	1015873-008	FUSEHOLDER, INDICATING
				~~1~~		~~29~~	~~1015878-005~~	~~FUSEHOLDER, INDICATING~~
SEE NOTE 2		2	2	2		28	1010498-001	RESISTOR, FIXED
SEE NOTE 2		1	1	1		27	1016014	SWITCH, STEPPING
		1	1	1		26	MS24140-D2	(1896873-002) RELAY, POWER
SEE NOTE 2		1	1	1		25	1016031-1	RELAY, SOLENOID
SEE NOTE 2		8	8	8		24	1015914-001	RELAY
SEE NOTE 2		35	35	35		23	1015837-001	RELAY
		6	6	6		22	2900086-011	RESOLVER AMPLIFIER ASSY
		14	14	14		21	2900059-011	BUFFER AMPLIFIER ASSY
		1	1	1		20	2900490	PANEL, CONNECTOR, REAR
		1	1	1		19	2900489	PANEL, CONNECTOR, FRONT
		1	1	1		18	2900488	BRACKET, SUPPORT (INSEP ASSY)
		1	1	1		17	2900487	PANEL, TOP
		1	1	1		16	2900481	PANEL, FRONT, LEFT
		1	1	1		15	2900480	PANEL, REAR, LEFT
		1	1	1		14	2900479	PANEL, REAR
		-	-	1		13	2900760-011	COMPONENT BOARD ASSY
				~~1~~		~~12~~	~~2900475~~	~~COVER~~
		-	1	1		11	2900474	BRACKET, TERMINAL BOARD
		1	1	1		10	2900473	PANEL, CONNECTOR
		2	2	2		9	2900472	BRACKET, STEPPING SWITCH
		3	3	3		8	2900471	STRAP
		6	6	6		7	2900470	BRACKET, FASTENER
		1	1	1		6	2900469	BRACKET, COMPONENT BOARD
		1	1	1		5	2900468	HINGE, CONTINUOUS
		1	1	1		4	2900467	BRACKET, RELAY (INSEP ASSY)
		1	1	1		3	2900520-011	TEMPERATURE INDICATOR ASSY
		-	-	1		2	2900465	PANEL, FRONT
		1	1	1		1	2900466	FRAME (INSEP ASSY)

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900022-031	2900022-031	-031
2900022-021	2900022-021	-021
2900022-011	2900022-011	-011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN Jenquin DATE 24 MAR 65
CHECKED J. GRIEB 2 AUG 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

DISTRIBUTION BOX
ASSEMBLY

CODE IDENT NO. 99974
SIZE J_2
2900024
SCALE 1:2
SHEET 1 OF 2

2 AUG 65

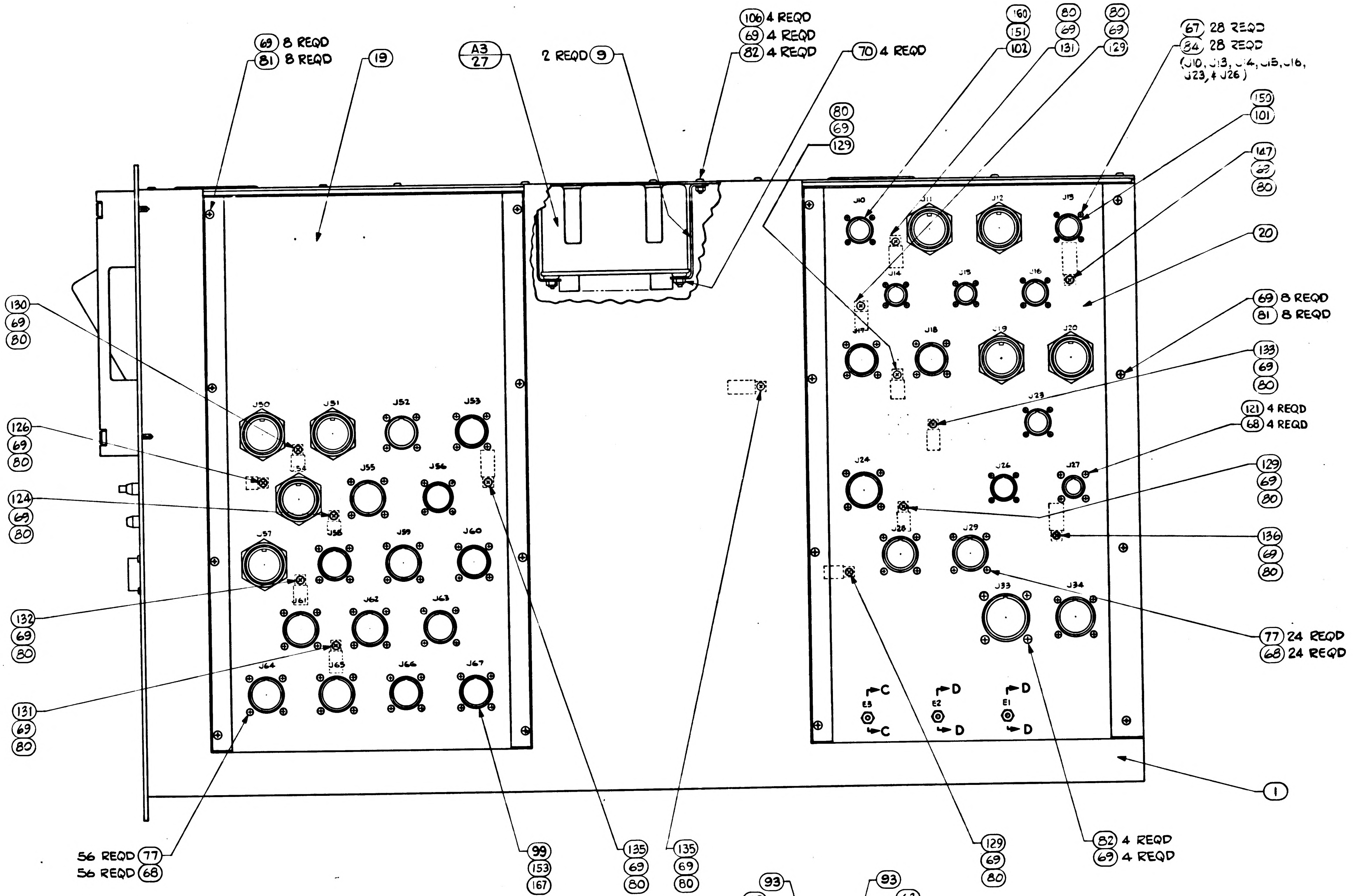
2900024 AH

2900024 | A | S

242900024

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM- SEE SPEC CONTROL DRAWING.
3. MARK APPLICABLE CONTRACT NO. AND SERIAL NO. TO ITEM (65) AND (149) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .04 TO .08 HIGH.
4. MARK WEIGHT OF ASSEMBLY, 200 LBS, PER ND 1002019 ADJACENT TO NAMEPLATE LOCATION.
5. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NO. PER ND 1002019, .07 TO .11 HIGH, BLACK.
6. DIMENSIONS "A" AND "B" MUST BE EQUAL WITHIN .040.
7. SECURE ITEM (81) TO ITEM (42) WITH ITEM (96).
8. ITEM (49) USED ON -021 ONLY, WHILE ITEM (48) IS USED ON -011 ONLY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(160) (151) (102)
(80) (69) (131)
(80) (69) (129)
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(84) 28 REQD
(J10, J13, J14, J15, J16, J23, & J26)
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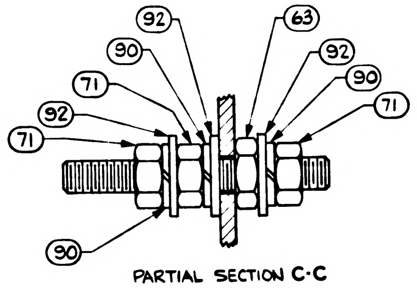
E3
E2
E1
C
D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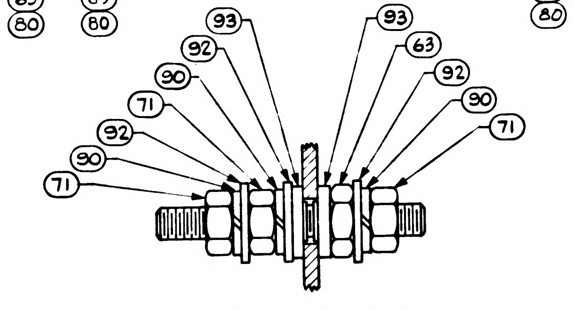
PARTIAL SECTION C-C
SCALE 2:1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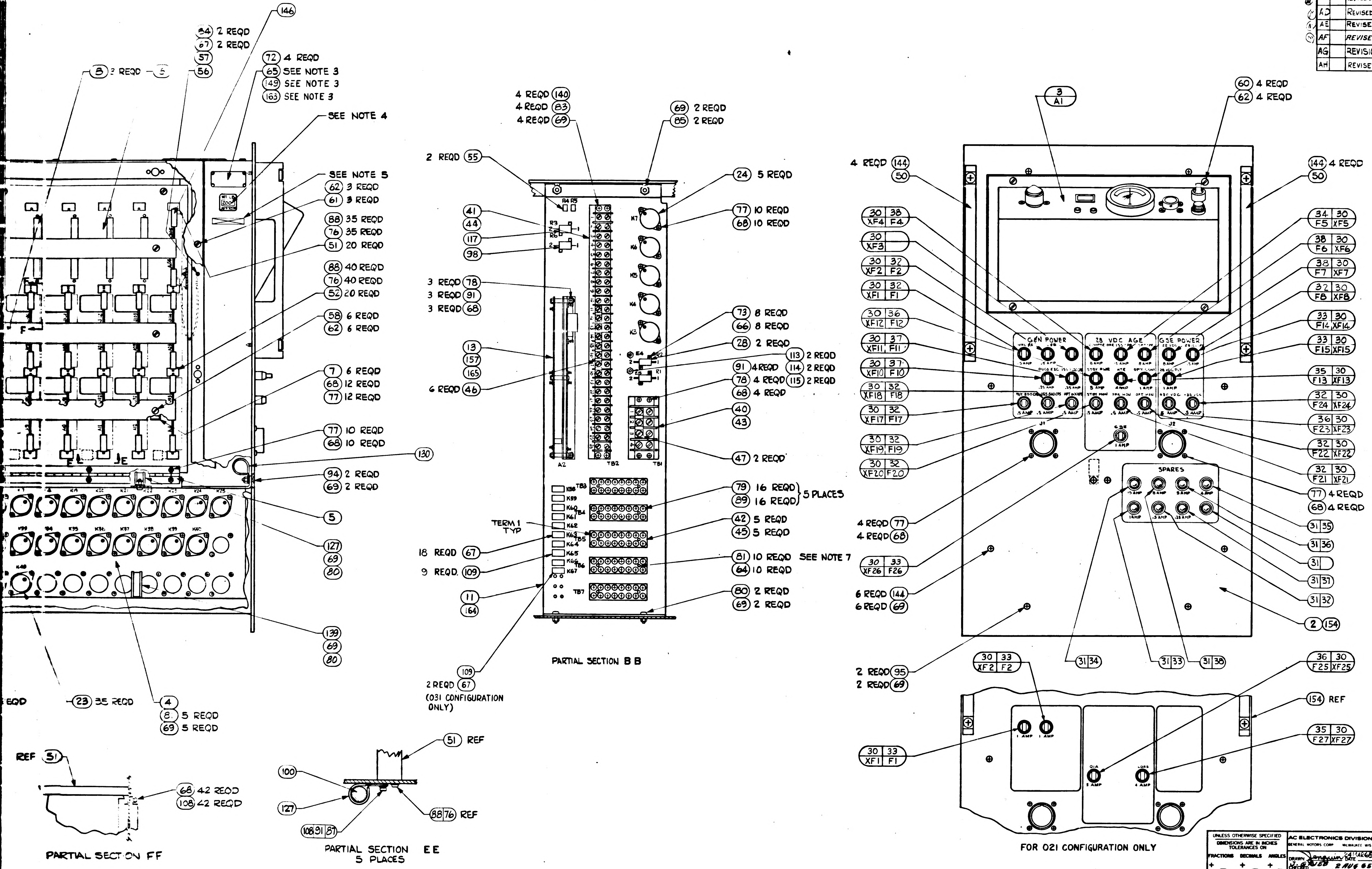
(90)
(71)

PARTIAL SECTION D-D
2 PLACES
SCALE 2:1

2900024 | REV LTR AH | SH

1-2900024

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
S		REPLACES REV R WITH CHANGE PER MXC 203747		5 AUG 65	
T		REVISED PER MXC 203866		17 AUG 65	DKD
U		REVISED PER MXC 204027		30 AUG 65	
V		REVISED PER MXC 204597		10 SEP 65	
W		REVISED PER MXC 204707		14 SEP 65	
Y		REVISED PER MXC 204800		23 SEP 65	
Z		REVISION STATUS CHANGED		1 OCT 65	NP
AA		REVISED PER MXC 200		65	CF
AB		INITIAL RELEASE CLASS A PER TDRR 23557		21 OCT 65	DKD CW
AC		REVISED PER TDRR 29141		65	WP
AD		REVISED PER TDRR 24592		6 DEC 65	
AE		REVISED PER TDRR 26363		22 FEB 66	
AF		REVISED PER TDRR 27579		11-APR-66	B. RWH
AG		REVISION STATUS CHANGED		23 MAY 66	JAC
AH		REVISED PER TDRR 28760		26 MAY 66	

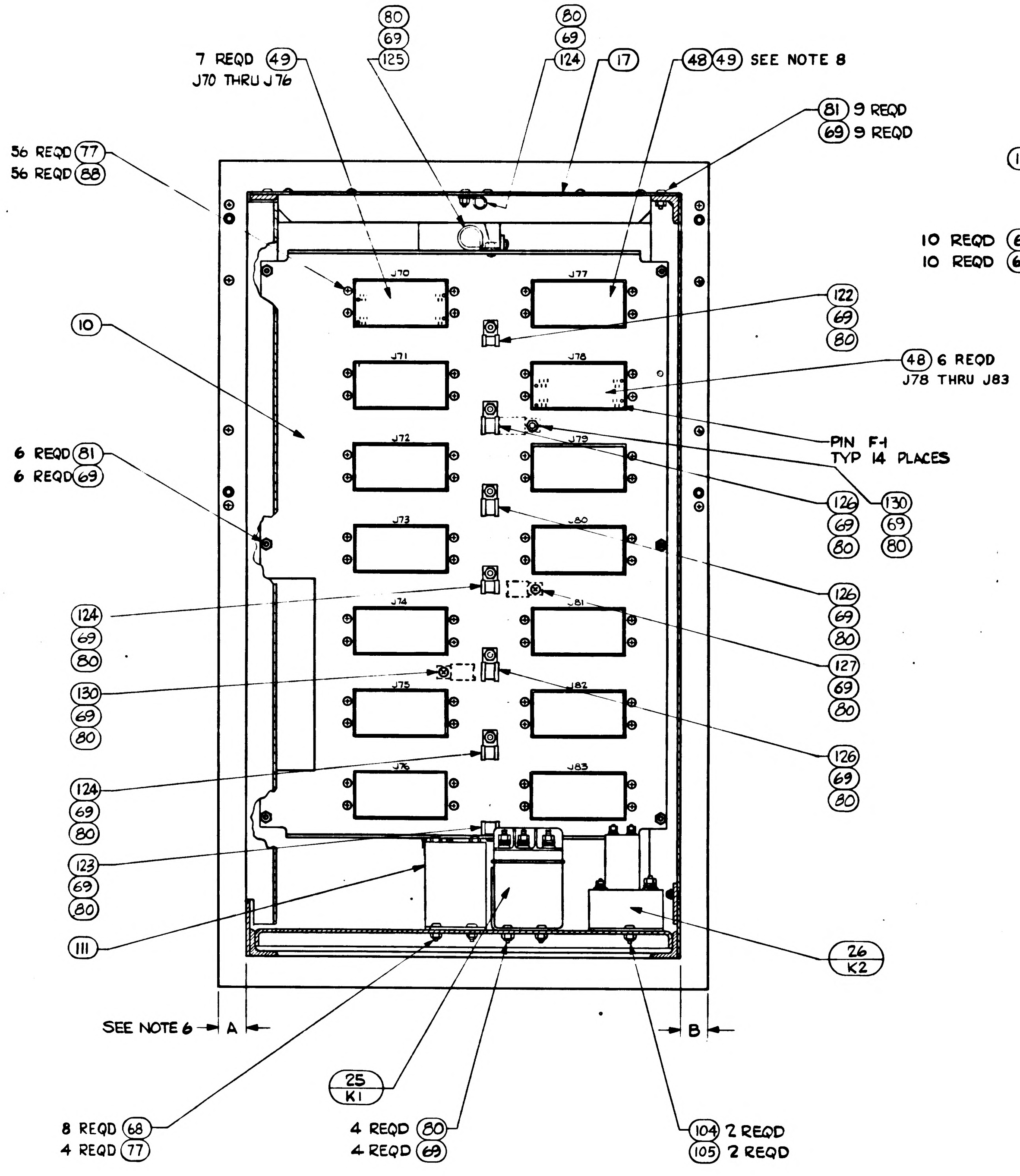


146
54 2 REQD
67 2 REQD
57
56
5 2 REQD
72 4 REQD
65 SEE NOTE 3
149 SEE NOTE 3
163 SEE NOTE 3
SEE NOTE 4
SEE NOTE 5
62 3 REQD
61 3 REQD
88 35 REQD
76 35 REQD
51 20 REQD
88 40 REQD
76 40 REQD
52 20 REQD
58 6 REQD
62 6 REQD
7 6 REQD
68 12 REQD
77 12 REQD
77 10 REQD
68 10 REQD
130
94 2 REQD
69 2 REQD
5
127
69
80
139
69
80
23 35 REQD
4
8 5 REQD
69 5 REQD
REF 51
68 42 REQD
108 42 REQD
PARTIAL SECTION FF
100
127
108 91 87
51 REF
88 76 REF
PARTIAL SECTION EE
5 PLACES
4 REQD 140
4 REQD 83
4 REQD 69
69 2 REQD
85 2 REQD
2 REQD 55
41
44
117
98
3 REQD 78
3 REQD 91
3 REQD 68
13
157
165
6 REQD 46
24 5 REQD
77 10 REQD
68 10 REQD
73 8 REQD
66 8 REQD
28 2 REQD
113 2 REQD
91 4 REQD
114 2 REQD
78 4 REQD
115 2 REQD
68 4 REQD
40
43
47 2 REQD
79 16 REQD
89 16 REQD
5 PLACES
42 5 REQD
45 5 REQD
81 10 REQD SEE NOTE 7
64 10 REQD
80 2 REQD
69 2 REQD
TERM 1 TYP
18 REQD 67
9 REQD 109
11
164
109
2 REQD 67
(031 CONFIGURATION ONLY)
PARTIAL SECTION BB
K7
K6
K5
K4
K3
TB2
TB1
TB3
TB4
TB5
TB6
TB7
A2
3 A1
60 4 REQD
62 4 REQD
4 REQD 144
50
144 4 REQD
50
GEN POWER
28 VDC AGE
GSE POWER
SPARES
J1
J2
30 38 XF4 F4
30 XF3
30 32 XF2 F2
30 32 XF1 F1
30 36 XF12 F12
30 37 XF11 F11
30 37 XF10 F10
30 32 XF18 F18
30 32 XF17 F17
30 32 XF19 F19
30 32 XF20 F20
34 30 F5 XF5
38 30 F6 XF6
38 30 F7 XF7
32 30 F8 XF8
33 30 F14 XF14
33 30 F15 XF15
35 30 F13 XF13
32 30 F24 XF24
36 30 F23 XF23
32 30 F22 XF22
32 30 F21 XF21
77 4 REQD
68 4 REQD
4 REQD 77
4 REQD 68
30 33 XF26 F26
6 REQD 144
6 REQD 69
31 35
31 36
31
31 37
31 32
2 154
31 34
31 33
31 38
2 REQD 95
2 REQD 69
30 33 XF2 F2
36 30 F25 XF25
154 REF
35 30 F27 XF27
30 33 XF1 F1
FOR 021 CONFIGURATION ONLY

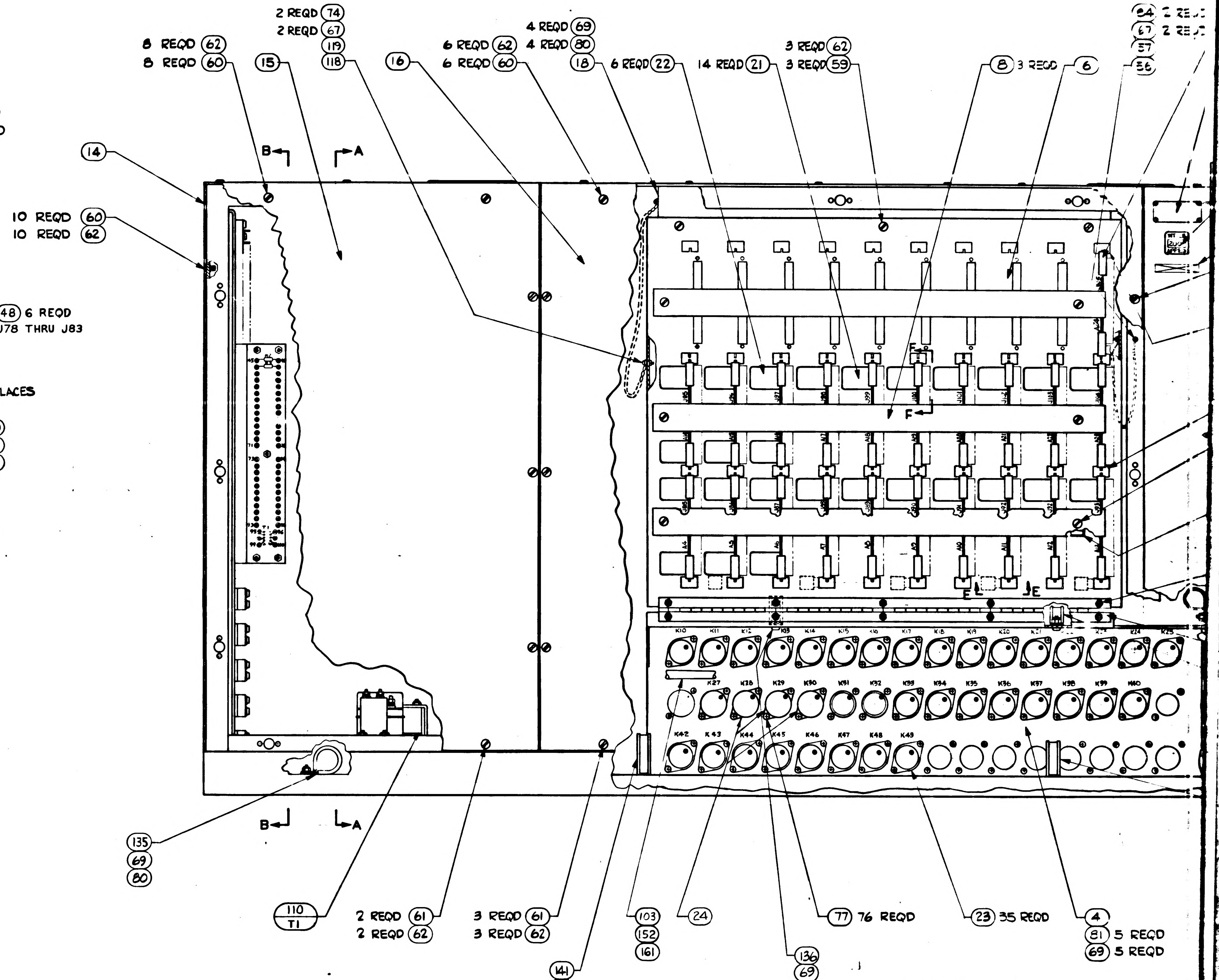
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Joaquin DATE 24 MAR 65 CHECKED J. G... 2 AUG 65 APPROVAL 5 AUG 65 APPROVAL	DISTRIBUTION BOX ASSEMBLY
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 / SIZE J2 / 2900024
CONTRACT NAS 9-497	MIT APPROVAL	SCALE 1:2 / SHEET 2 OF 2

2900024 AH 2

2729000024


80
69
125
80
69
124
17
7 REQD 49
J70 THRU J76
48 49 SEE NOTE 8
81 9 REQD
69 9 REQD
56 REQD 77
56 REQD 88
J70
J77
122
69
80
10
J71
J78
48 6 REQD
J78 THRU J83
PIN F-1
TYP 14 PLACES
J72
J79
6 REQD 81
6 REQD 69
126
69
80
130
69
80
J73
J80
126
69
80
124
69
80
J74
J81
127
69
80
130
69
80
J75
J82
126
69
80
124
69
80
J76
J83
123
69
80
111
26
K2
SEE NOTE 6
A
B
25
K1
8 REQD 68
4 REQD 77
4 REQD 80
4 REQD 69
104 2 REQD
105 2 REQD

SECTION A-A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8 REQD 60
2 REQD 74
2 REQD 67
119
118
15
16
6 REQD 62
6 REQD 60
4 REQD 69
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18
6 REQD 22
14 REQD 21
3 REQD 62
3 REQD 59
8 3 REQD
6
64 2 REQD
67 2 REQD
57
56
14
B
A
10 REQD 60
10 REQD 62
F
E
K10
K11
K12
K13
K14
K15
K16
K17
K18
K19
K20
K21
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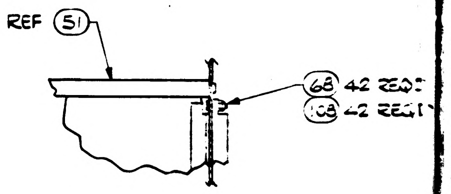
K37
K38
K39
K40
K42
K43
K44
K45
K46
K47
K48
K49
B
A
135
69
80
110
T1
2 REQD 61
2 REQD 62
3 REQD 61
3 REQD 62
141
69
80
103
152
161
24
136
69
80
77 76 REQD
23 35 REQD
4
81 5 REQD
69 5 REQD


REF 51
68 42 REQD
108 42 REQD

PARTIAL SECTION FF

2900024 REV LTR AH SH 2

17/2900024

2900025 AA

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. NO CONFIGURATION REQUIRED.

REVISIONS 23392					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
V		REPLACES REV. (U) WITH CHANGE PER MXC 204688		14 SEP 65	RLP / JWL
W		REVISED PER MXC 205708		14 OCT 65	J.H.P. / C7P
Y		INITIAL RELEASE CLASS A PER TDRR 23392		10-18-65	MPC / FC
Z		REVISED PER TDRR 27578		6 APR 66	R / EF
AA		REVISED PER TDRR 28781		18 MAY 66	GM / JAC

CABLE USAGE TABLE (FOR REF)

DESIG. NO.	G.S.E.	SERIES 100			LEM		BLOCK II		
		ISS	OSS	G&N	ISS	G&N	ISS	OSS	G&N
W1	X	X	X	X	X	X	X	X	X
W2	X	X	X	X	X	X	X	X	X
W3	X	X	X	X	X	X	X	X	X
W4	X	X	X	X	X	X	X	X	X
W19	X	X	X	X	X	X	X	X	X
W22				X		X			X
W26	X	X	X	X	X	X	X	X	X
W27	X	X	X	X	X	X	X	X	X
W28	X	X	X	X	X	X	X	X	X
W33	X	X	X	X	X	X	X	X	X
W37		X	X	X	X	X	X	X	X
W64		X	X	X	X	X	X	X	X
W65	X	X		X	X	X	X		X
W66		X	X	X					X
W68			X					X	
W85	X	X	X	X	X	X	X	X	X
W97			X					X	
W120					X	X	X		X
W121	X				X	X	X	X	X
W122	X				X	X	X	X	X
W123	X				X	X	X	X	X
W124	X				X	X	X	X	X
W125	X				X	X	X	X	X
W126	X				X	X	X	X	X
W127	X	X	X	X	X	X	X	X	X
W128	X				X	X	X	X	X
W129	X				X	X	X	X	X
W130	X	X	X	X	X	X	X	X	X
W132					X	X	X		
W134					X	X	X		
W136					X	X	X	X	
W140	X				X	X	X	X	X
W141					X	X	X	X	
W146					X		X		
W168									

QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	031	021	011				
	1	-	-			2901153	CABLE ASSY, ELECT (W141)
	1	-	-			2901237	(W134)
	1	-	-			2901238	(W132)
	1	-	-			2901389	(W125)
	1	-	-			1902610	(W22)
	1	1	-			2901130	(W168)
	1	1	-			2901032	(W136)
	1	1	1			2900351	(W146)
	-	1	1			2900591	(W141)
	1	1	1			2900457	(W140)
	1	-	1			2900461	(W136)
	-	1	1			2900588	(W134)
	-	1	1			2900497	(W132)
	1	1	1			2900460	(W130)
	1	2	2			2900459	(W129)
	1	2	2			2900458	(W128)
	1	2	2			2900327	CABLE ASSY, ELECT (W127)

LIST OF PARTS AND MATERIALS

QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	031	021	011				
	1	1	1			2900381	CABLE ASSY, ELECT (W126)
	-	1	1			2900186	(W125)
	1	1	1			2900380	(W124)
	1	1	1			2900379	(W123)
	1	1	1			2900378	(W122)
	1	1	1			2900257	(W121)
	1	1	1			2900456	(W120)
	1	1	1			1902381	(W97)
	1	1	1			1901960	(W85)
	1	1	1			1902284	(W68)
	1	1	1			1901677	(W66)
	1	1	1			1900739	(W65)
	1	1	1			1901676	(W64)
	1	1	1			1901662	(W37)
	1	1	1			1901404	(W33)
	1	1	1			1900872	(W28)
	1	1	1			1900871	(W27)
	1	1	1			1900921	(W26)
	-	1	1			1900959	(W22)
	1	1	1			1900873	(W19)
	1	1	1			1900671	(W4)
	1	1	1			1900670	(W3)
	1	1	1			1900669	(W2)
	1	1	1			1900886	CABLE ASSY, ELECT (W1)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900022-021		-021
2900022-011	2900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN 24 MAR 65 DATE
CHECKED Ed Foster 24 MAR 65
APPROVAL 24 MAR 65
APPROVAL 9/21/65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE SET,
INTERCONNECT
(BASIC)

CODE IDENT NO. 99974
SIZE D
2900025
SCALE —
SHEET 1 OF 1

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. NO CONFIGURATION REQUIRED.

CABLE USAGE TABLE (FOR REF)

DESIG. NO.	G.S.E.	SERIES 100 ISS	SERIES 100 OSS	SERIES 100 G&N	LEM ISS	LEM G&N	BLOCK II ISS	BLOCK II OSS	BLOCK II G&N
W1	X	X	X	X	X	X	X	X	X
W2	X	X	X	X	X	X	X	X	X
W3	X	X	X	X	X	X	X	X	X
W4	X	X	X	X	X	X	X	X	X
W19	X	X	X	X	X	X	X	X	X
W22				X		X			X
W26	X	X	X	X	X	X	X	X	X
W27	X	X	X	X	X	X	X	X	X
W28	X	X	X	X	X	X	X	X	X
W33	X	X	X	X	X	X	X	X	X
W37		X	X	X	X	X	X	X	X
W64		X	X	X	X	X	X	X	X
W65	X	X		X	X	X	X		X
W66		X	X	X					X
W68			X					X	
W85	X	X	X	X	X	X	X	X	X
W97			X					X	
W120					X	X	X		X
W121	X				X	X	X	X	X
W122	X				X	X	X	X	X
W123	X				X	X	X	X	X
W124	X				X	X	X	X	X
W125	X				X	X	X	X	X
W126	X				X	X	X	X	X
W127	X	X	X	X	X	X	X	X	X
W128	X				X	X	X	X	X
W129	X				X	X	X	X	X
W130	X	X	X	X	X	X	X	X	X
W132					X	X	X		
W134					X	X	X		
W136					X	X	X	X	
W140	X				X	X	X	X	X
W141					X	X	X	X	
W146					X		X		

LIST OF PARTS AND MATERIALS

QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
1			2900351	CABLE ASSY, ELECT (W146)
1			2900591	(W141)
1			2900457	(W140)
1			2900461	(W136)
1			2900588	(W134)
1			2900497	(W132)
1			2900460	(W130)
2			2900459	(W129)
2			2900458	(W128)
2			2900327	CABLE ASSY, ELECT (W127)

LIST OF PARTS AND MATERIALS

QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
1			2900381	CABLE ASSY, ELECT (W126)
1			2900186	(W125)
1			2900380	(W124)
1			2900379	(W123)
1			2900378	(W122)
1			2900257	(W121)
1			2900456	(W120)
1			1902381	(W97)
1			1901960	(W85)
1			1902284	(W68)
1			1901677	(W66)
1			1900739	(W65)
1			1901676	(W64)
1			1901662	(W37)
1			1901404	(W33)
1			1900872	(W28)
1			1900871	(W27)
1			1900921	(W26)
1			1900959	(W22)
1			1900873	(W19)
1			1900671	(W4)
1			1900670	(W3)
1			1900669	(W2)
1			1900886	CABLE ASSY, ELECT (W1)

2900025 Y

REVISIONS 23392

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
V		REPLACES REV. (U) WITH CHANGE PER MXC 204688		14 SEP 65	RLP
W		REVISED PER MXC 205708		14 OCT 65	J.H.P. C7P
Y		INITIAL RELEASE CLASS A PER TDRR 23392		10-18-65	MPC

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900022-011	2900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN 24 MAR 65 DATE
CHECKED Ed Foster 24 MAR 65
APPROVAL 24 MAR 65
APPROVAL 4/20/65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE SET,
INTERCONNECT
(BASIC)

CODE IDENT NO. 99974
SIZE D
2900025
SCALE —
SHEET 1 OF 1

Z 2900025

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. NO CONFIGURATION REQUIRED.

REVISIONS 23392

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
V		REPLACES REV.(U) WITH CHANGE PER MXC 204688		14 SEP 65	RLP
W		REVISED PER MXC 205708		14 OCT 65	J.H.P. / C7P
Y		INITIAL RELEASE CLASS A PER TDRR 23392		10-18-65	MPC / FC
Z		REVISED PER TDRR 27578		6 APR 66	E F

CABLE USAGE TABLE (FOR REF)

DESIG. NO.	G.S.E.	SERIES 100			LEM		BLOCK II		
		ISS	OSS	G&N	ISS	G&N	ISS	OSS	G&N
W1	X	X	X	X	X	X	X	X	X
W2	X	X	X	X	X	X	X	X	X
W3	X	X	X	X	X	X	X	X	X
W4	X	X	X	X	X	X	X	X	X
W19	X	X	X	X	X	X	X	X	X
W22				X		X			X
W26	X	X	X	X	X	X	X	X	X
W27	X	X	X	X	X	X	X	X	X
W28	X	X	X	X	X	X	X	X	X
W33	X	X	X	X	X	X	X	X	X
W37		X	X	X	X	X	X	X	X
W64		X	X	X	X	X	X	X	X
W65	X	X		X	X	X	X		X
W66		X	X	X					X
W68			X					X	
W85	X	X	X	X	X	X	X	X	X
W97			X					X	
W120					X	X	X		X
W121	X				X	X	X	X	X
W122	X				X	X	X	X	X
W123	X				X	X	X	X	X
W124	X				X	X	X	X	X
W125	X				X	X	X	X	X
W126	X				X	X	X	X	X
W127	X	X	X	X	X	X	X	X	X
W128	X				X	X	X	X	X
W129	X				X	X	X	X	X
W130	X	X	X	X	X	X	X	X	X
W132					X	X	X		
W134					X	X	X		
W136					X	X	X	X	
W140	X				X	X	X	X	X
W141					X	X	X	X	
W146					X		X		
W168									

QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
		021	011				
		1	-			2901130	CABLE ASSY, ELECT (W168)
		1	-			2901032	(W136)
		1	1			2900351	(W146)
		1	1			2900591	(W141)
		1	1			2900457	(W140)
		-	1			2900461	(W136)
		1	1			2900588	(W134)
		1	1			2900497	(W132)
		1	1			2900460	(W130)
		2	2			2900459	(W129)
		2	2			2900458	(W128)
		2	2			2900327	CABLE ASSY, ELECT (W127)

LIST OF PARTS AND MATERIALS

QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
		021	011				
		1	1			2900381	CABLE ASSY, ELECT (W126)
		1	1			2900186	(W125)
		1	1			2900380	(W124)
		1	1			2900379	(W123)
		1	1			2900378	(W122)
		1	1			2900257	(W121)
		1	1			2900456	(W120)
		1	1			1902381	(W97)
		1	1			1901960	(W85)
		1	1			1902284	(W68)
		1	1			1901677	(W66)
		1	1			1900739	(W65)
		1	1			1901676	(W64)
		1	1			1901662	(W37)
		1	1			1901404	(W33)
		1	1			1900872	(W28)
		1	1			1900871	(W27)
		1	1			1900921	(W26)
		1	1			1900959	(W22)
		1	1			1900873	(W19)
		1	1			1900671	(W4)
		1	1			1900670	(W3)
		1	1			1900669	(W2)
		1	1			1900886	CABLE ASSY, ELECT (W1)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900022-021		-021
2900022-011	2900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS

DRAWN 24 MAR 65 DATE
CHECKED Ed Foster 24 MAR 65
APPROVAL 24 MAR 65
APPROVAL 4/21/65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE SET,
INTERCONNECT
(BASIC)

CODE IDENT NO 99974 SIZE D 2900025
SCALE — SHEET 1 OF 1

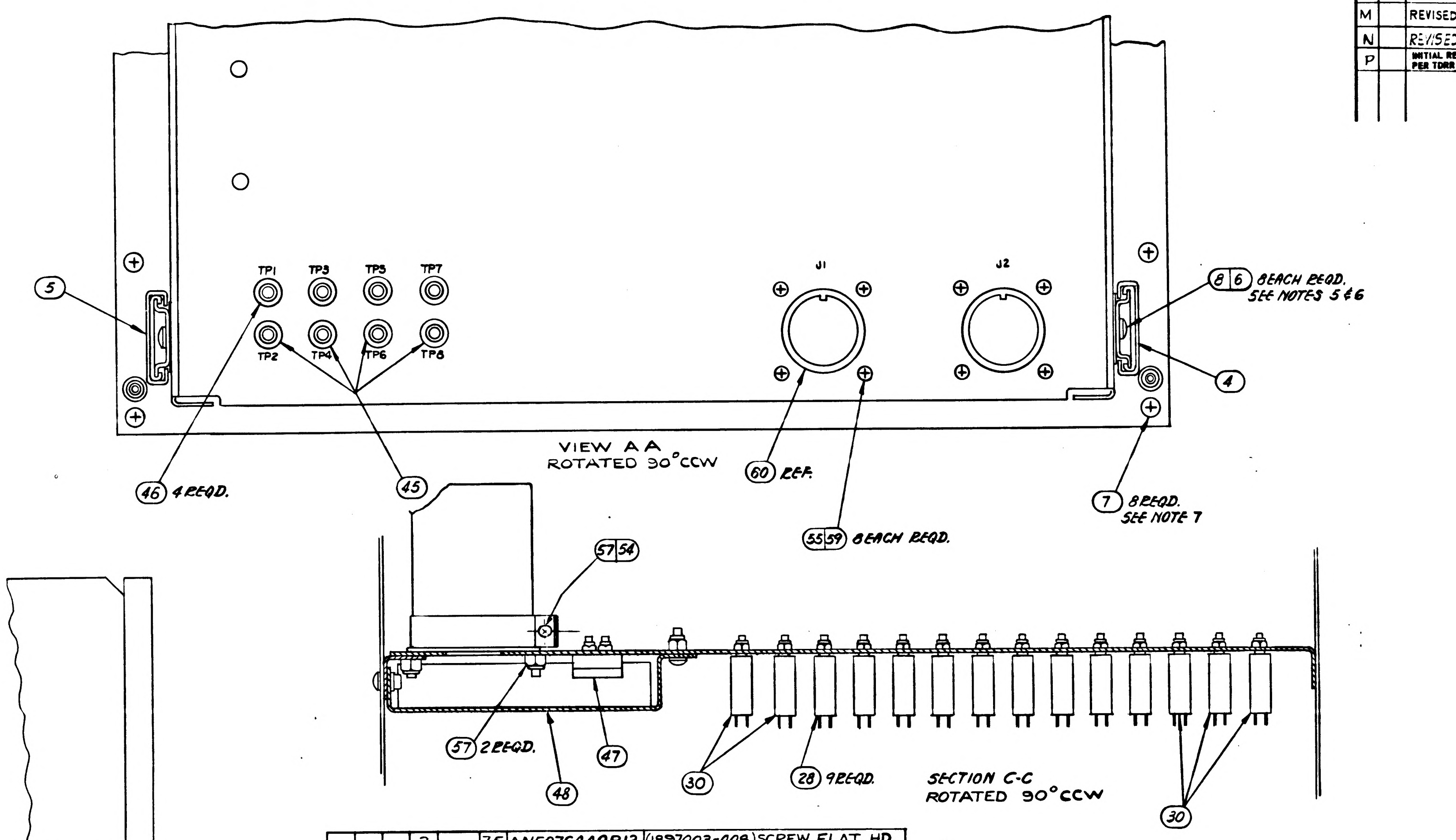
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
J		REPLACES REV "H" WITH CHANGE PER MXC 203779 WAS D SIZE		11 AUG 65	
K		REVISED PER MXC 204275		3 SEP 65	A.N.
L		REVISED PER MXC 204549		13 SEP 65	
M		REVISED PER MXC 205209		30 SEP 65	A.N.
N		REVISED PER MXC 206042		19 OCT 65	
P		INITIAL RELEASE CLASS A PER TDRR 23555		20 OCT 65	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. DIMENSION "A" SHALL BE EQUAL TO DIM. "B" WITHIN .040.
3. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEMS (61) & (62) OR ITEM (63).
4. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
5. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.
6. DRAWER SLIDE MOUNTING SCREWS & FRONT PANEL MOUNTING SCREWS SHALL BE SUBJECTED TO A TORQUE OF 33-36.2 IN-LB AT INSTALLATION.
7. SECURE SCREWS USING ITEM (64)

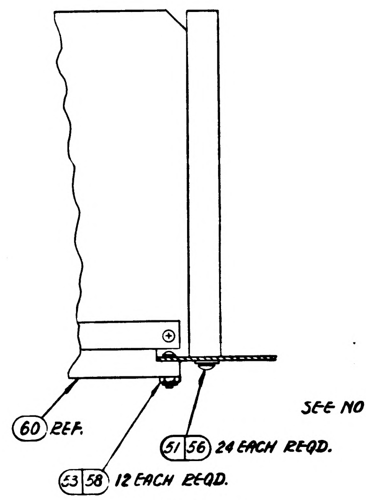
9. POSITIONING OF RELAYS INDICATED BY DOT AS VIEWED FROM TOP OF CHASSIS.
10. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. PREFIX WITH UNIT NO. OR ASSEMBLY DESIGNATION OR BOTH FOR COMPLETE DESIGNATION.
11. MATING SURFACES OF ITEM (2) AND ITEMS (33) (34) & (35) TO BE COATED WITH ITEM (65) REMOVE EXCESS GREASE.
12. MARK APPLICABLE PART NO, TITLE, CONTRACT NO, & SERIAL NO. ON ITEM (11) IN ACCORDANCE WITH ND1002023, LETTERS & NUMERALS TO BE .06 HIGH.
13. MARK WEIGHT OF ASSEMBLY (65 LBS) PER ND1002123 ADJACENT TO NAMEPLATE.
14. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH COLOR BLACK.

16. TORQUE ITEM (34) TO 75 IN LBS.
17. TORQUE ITEM (35) TO 15 IN LBS.
18. THE FOLLOWING ARE PARTS OF THIS ASSEMBLY.
    - LEAD SET ITEM (67).
    - WIRING HARNESS "A" ITEM (60).
    - TERMINAL LUG ITEM (52).
19. THESE PARTS TO BE SELECTED FOR BEST FIT.

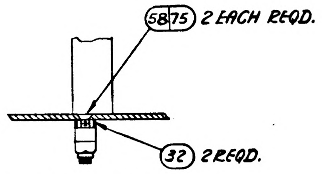


VIEW AA
ROTATED 90° CCW

SECTION C-C
ROTATED 90° CCW



PARTIAL SECTION A-A



PARTIAL SECTION D D
ROTATED 90° CW

CONDUCTOR CHART				
CKT PT		STRIP	TIN	ACCESSORY ITEM
FROM	TO			
T1-BLK	TB1-1	.25	NO	1015902-45
T1-BLK	TB1-2			
T1-GRN	TB1-3			
T1-GRN	TB1-4			
T1-RED	TB1-5			
T1-RED	TB1-6	.25	NO	1015902-45

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
SEE NOTE 4				2		75	AN507C440R12	(1897003-008) SCREW, FLAT HD.
				1		74	AN960C416	(1897006-042) WASHER, FLAT
				4		73	MS35275-15	SCREW, FIL. HD.
				2		72	MS35216-25	SCREW, PAN HD.
				4		71	MS35216-70	SCREW, PAN HD.
SEE NOTE 4				4		70	1016151-013	NUT, SELF-LOCK
				X		69	PS2900026	PROCUREMENT SPECIFICATION
				X		68		RUNNING LIST
				1		67	2900710	LEAD SET A-A
				X		66	2900628	SCHEMATIC DIAGRAM
				AR		65	MIL-S-8660	SILICON GREASE (ES2311)
				AR		64	MIL-S-22473 GRADE H	SEALING COMPOUND (ES2544-5)
				AR		63	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
				AR		62	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
				AR		61	SN60WS	SOLDER QQ-S-571 (ES2175-1)
				1		60	2900604	WIRING HARNESS A
SEE NOTE 4				22		59	1016151-006	NUT SELF LOCK
SEE NOTE 4				46		58	1016151-004	NUT SELF LOCK
SEE NOTE 4				26		57	1016151-008	NUT SELF LOCK
				24		56	MS35333-71	WASHER LOCK INT. TOOTH
				20		55	MS35216-27	SCREW, PAN HD.
				5		54	MS35216-41	SCREW, PAN HD.
				12		53	MS35216-17	SCREW, PAN HD.
SEE NOTE 4				6		52	1015902-45	TERMINAL LUG
				24		51	MS35216-26	SCREW, PAN HD.
				2		50	AN507C832R6	(1897003-564) SCREW, FL. HD.
				1		49	MS35490-13	GROMMET RUBBER
				1		48	2900353	COVER PROTECTIVE
SEE NOTE 4				1		47	1016325-007	TERMINAL BOARD
SEE NOTE 4				4		46	1897302-001	JACK, TIP-BANANA (RED)
SEE NOTE 4				4		45	1897302-002	JACK, TIP-BANANA (BLACK)
				1		44	MS91528-2K2B	KNOB
SEE NOTE 4				1		43	1015869-779	LIGHT INDICATOR
				1		42	1015869-778	LIGHT INDICATOR
				1		41	1015869-780	LIGHT INDICATOR
				1		40	1015869-786	LIGHT INDICATOR
				1		39	1015869-366	LIGHT & SWITCH ASSY.
				1		38	1015869-367	LIGHT & SWITCH ASSY.
				1		37	1015869-368	LIGHT & SWITCH ASSY.
SEE NOTE 4				1		36	1015825-035	SWITCH ROTARY

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
				1		35	2N1774A	SEMI-CONDUCTOR MIL-S-19500/168
SEE NOTE 4				1		34	1897277-001	SEMI-CONDUCTOR DEVICE, DIODE
SEE NOTE 4				4		33	1897211-004	POWER MODULE-SOLID STATE
SEE NOTE 4				2		32	1015860-025	SPACER
SEE NOTE 4				1		31	1897292	TRANSFORMER REGULATING ASSY.
SEE NOTE 4				5		30	1015802-004	RELAY
				2		29	1015914-001	RELAY
				9		28	1015984-003	RELAY
				4		27	1015837-002	RELAY
SEE NOTE 4				~~1~~		~~26~~	~~1015832-318~~	~~RELAY~~
				3		25	F02A250V4A	(1897099-013) FUSE MIL-F-15160/02
				4		24	F02A250V3A	(1897099-012) FUSE MIL-F-15160/02
				2		23	MS26572-1	FUSE HOLDER, SPARE
SEE NOTE 4				3		22	1015873-001	FUSE HOLDER
SEE NOTE 4				2		21	1015873-008	FUSE HOLDER
				1		20	2900255-021	TEMP. ALARM AMPL.
				12		19	1900390	BRACKET HOLDER, SINGLE
SEE NOTE 4				1		18	1897294	TEMP. CONTROLLER ASSY.
				1		17	2900256-011	BRIDGE EXCITATION DET.
				1		16	2900254-011	ELECT. COMP. ASSY.
				1		15	2900255-011	TEMP. ALARM AMPL.
				1		14	2900301-011	TEMP. IND. AMPL.
				1		13	2900301-021	TEMP. IND. AMPL.
				4		12	MS35216-1	SCREW, PAN HD.
				1		11	1004260-104	NAMEPLATE
SEE NOTE 4				6		10	1016151-010	NUT, SELF LOCKING
SEE NOTE 4				6		9	1006783-45	SCREW, BUTTON HD.
SEE NOTE 4				8		8	1006783-44	SCREW, BUTTON HD.
				8		7	AN507C832R12	(1897003-568) SCREW FLAT HD.
SEE NOTES 4 & 5				8		6	1016005-001	SHIM-LAMINATED
SEE NOTE 4				1		5	1015785-009	SLIDE ASSY. R.H.
SEE NOTE 4				1		4	1015785-010	SLIDE ASSY. L.H.
				2		3	1900015-071	HANDLE ASSY.
				1		2	2900352	CHASSIS (INSEP. ASSY.)
				1		1	2900371	FRONT PANEL

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
				5		81	MS35216-42	SCREW, PAN HD.
SEE NOTE 19				1		80	MS21919-6 THRU -8	CLAMP, CABLE, CUSHIONED
				1		79	MS21919-5 THRU -7	
				1		78	MS21919-4 THRU -6	
				1		77	MS21919-3 THRU -5	
SEE NOTE 19				1		76	MS21919-2 THRU -4	CLAMP, CABLE, CUSHIONED

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 6 JULY 1965
CHECKED 30 JUL 65
30 JUL 65
APPROVAL
APPROVAL 10-22-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TEMPERATURE MONITOR
CONTROL ASSEMBLY

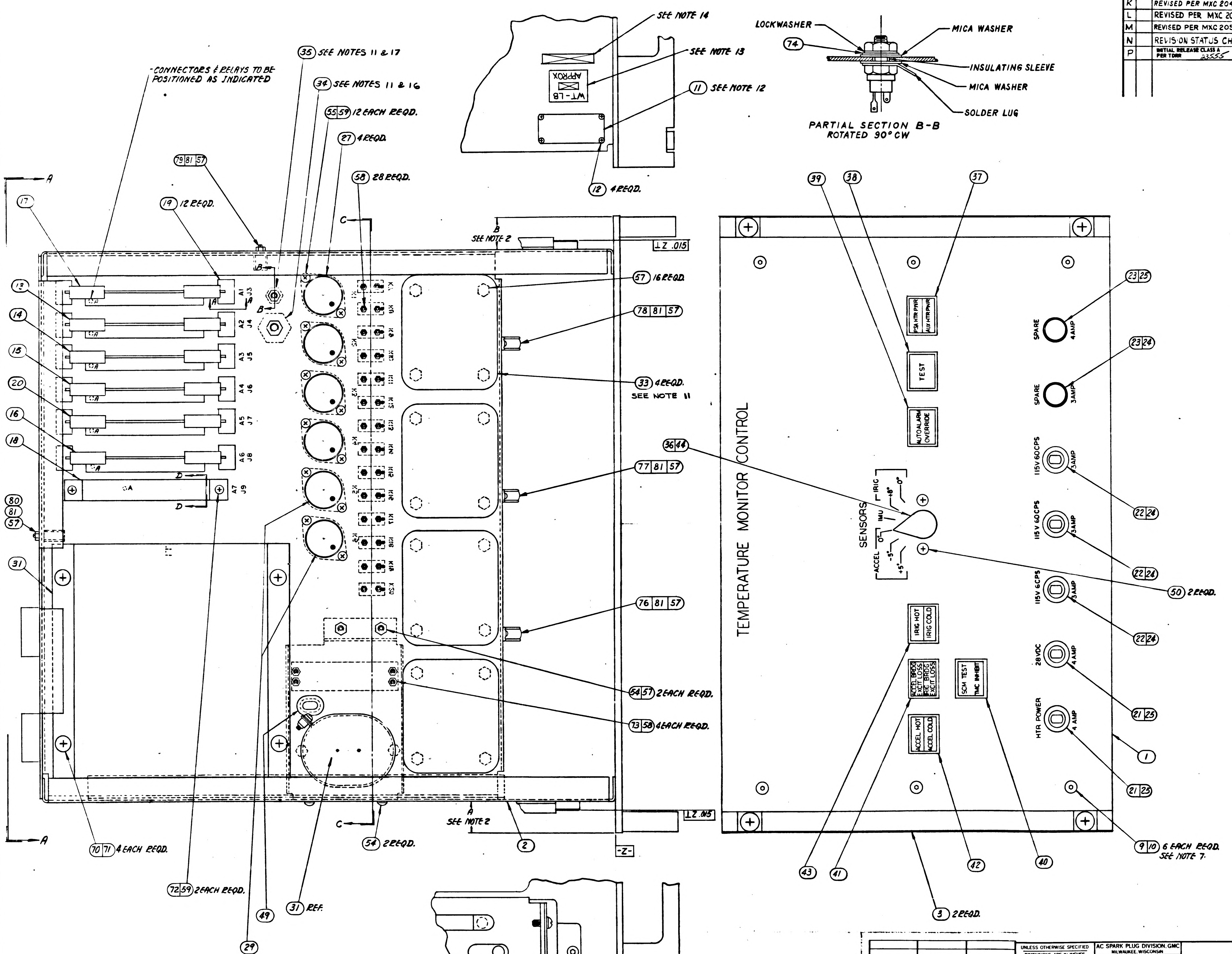
CODE IDENT NO. 99974
SIZE E
2900026
SCALE 1:1
SHEET 1 OF 2

2900026 P

30 JUL 65

580058

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
J		THIS SHEET ADDED PER MXC 203779		11 AUG 65	
K		REVISED PER MXC 204275		3 SEP 65	A.N.
L		REVISED PER MXC 204549		13 SEP 65	RL
M		REVISED PER MXC 205209		30 SEP 65	A.N.
N		REVISION STATUS CHANGED		19 OCT 65	RWH
P		INITIAL RELEASE CLASS A PER TDRR 23555		20 OCT 65	R-D CW


-CONNECTORS & RELAYS TO BE POSITIONED AS INDICATED
35 SEE NOTES 11 & 17
34 SEE NOTES 11 & 16
55 59 12 EACH REQD.
27 4 REQD.
58 28 REQD.
79 81 57
19 12 REQD.
17
13
14
15
20
16
18
80 81 57
31
A
B
C
D
A1 J3
A2 J4
A3 J5
A4 J6
A5 J7
A6 J8
A7 J9
SEE NOTE 14
SEE NOTE 13
WT-LB APPROX
11 SEE NOTE 12
12 4 REQD.
B SEE NOTE 2
⊥Z .015
57 16 REQD.
78 81 57
33 4 REQD. SEE NOTE 11
36 44
77 81 57
76 81 57
54 57 2 EACH REQD.
73 58 4 EACH REQD.
A SEE NOTE 2
2
54 2 REQD.
70 71 4 EACH REQD.
72 59 2 EACH REQD.
29
49
31 REF.
-Z-
LOCKWASHER
74
MICA WASHER
INSULATING SLEEVE
MICA WASHER
SOLDER LUG
PARTIAL SECTION B-B ROTATED 90° CW
39
38
37
TEMPERATURE MONITOR CONTROL
PSA HTR PWR
AUX HTR PWR
TEST
AUTO ALARM OVERRIDE
SENSORS
IRIG
IMU
ACCEL
+8°
0°
-5°
+5°
IRIG HOT
IRIG COLD
ACCEL BRDG EXCIT LOSS
IRIG BRDG EXCIT LOSS
SCM TEST
TMC INHIBIT
ACCEL HOT
ACCEL COLD
SPARE 4AMP
SPARE 3AMP
115V 60CPS 3AMP
115V 60CPS 3AMP
115V 6CPS 3AMP
28VDC 4AMP
HTR POWER 4 AMP
23 25
23 24
22 24
22 24
22 24
21 25
21 25
50 2 REQD.
1
9 10 6 EACH REQD. SEE NOTE 7.
43
41
42
40
3 2 REQD.

2900023-011	2900023-011	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ ± ___ ± ___
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 9 JULY 1965
CHECKED 30 JUL 65
APPROVAL RUDOLPH 30 JUL 65
APPROVAL 10-22-65
NASA APPROVAL
MIT APPROVAL 29 OCT 65

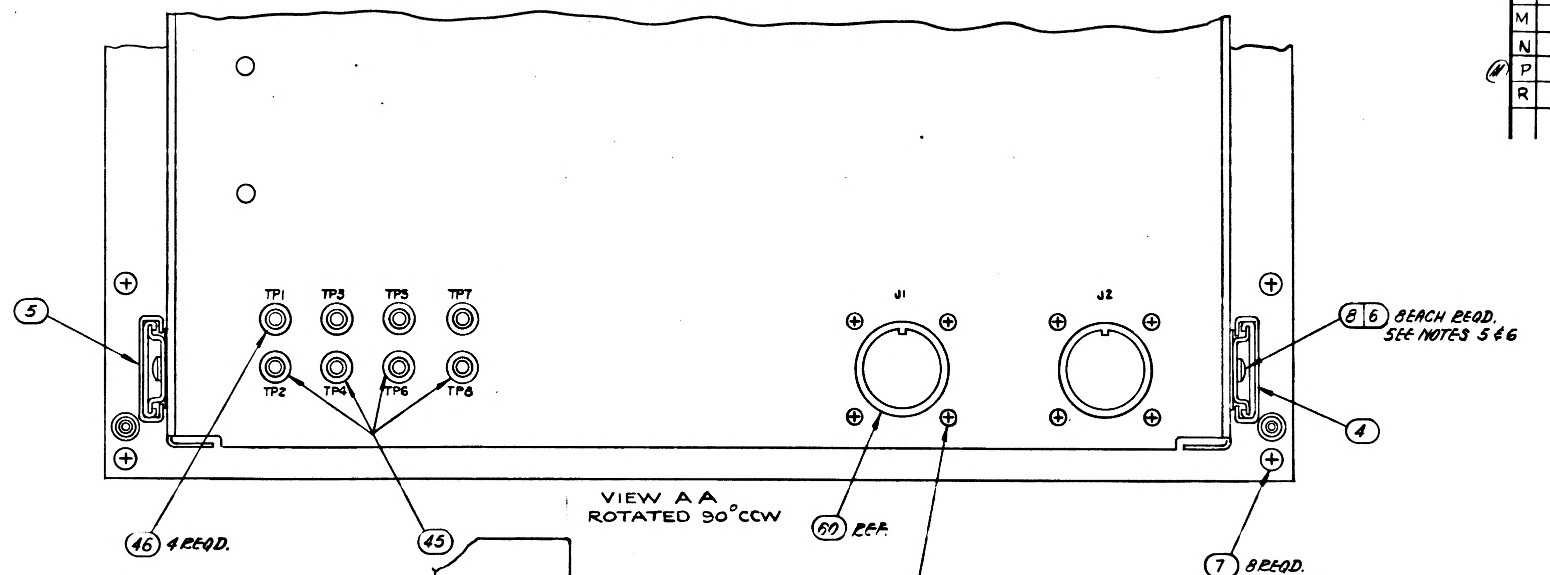
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TEMPERATURE MONITOR
CONTROL ASSEMBLY

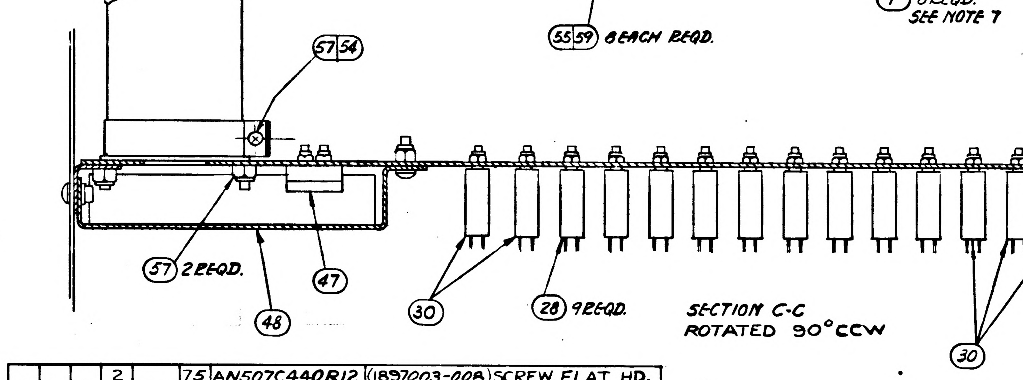
CODE IDENT NO. 99974
SIZE E
2900026
SCALE 1:1
SHEET 2 OF 2

NOTES:

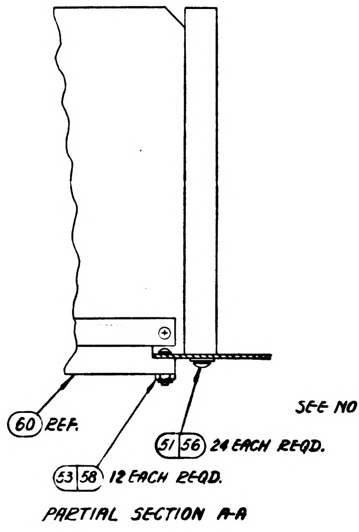
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. DIMENSION "A" SHALL BE EQUAL TO DIM. "B" WITHIN .040.
3. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEMS (61) & (62) OR ITEM (63).
4. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
5. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.
6. DRAWER SLIDE MOUNTING SCREWS & FRONT PANEL MOUNTING SCREWS SHALL BE SUBJECTED TO A TORQUE OF 33-36.2 IN-LB AT INSTALLATION.
7. SECURE SCREWS USING ITEM (64)
9. POSITIONING OF RELAYS INDICATED BY DOT AS VIEWED FROM TOP OF CHASSIS.
10. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. PREFIX WITH UNIT NO. OR ASSEMBLY DESIGNATION OR BOTH FOR COMPLETE DESIGNATION.
11. MATING SURFACES OF ITEM (2) AND ITEMS (33) (34) & (35) TO BE COATED WITH ITEM (65) REMOVE EXCESS GREASE.
12. MARK APPLICABLE PART NO, TITLE, CONTRACT NO, & SERIAL NO. ON ITEM (11) IN ACCORDANCE WITH ND1002023, LETTERS & NUMERALS TO BE .06 HIGH.
13. MARK WEIGHT OF ASSEMBLY (65 LBS) PER ND1002123 ADJACENT TO NAMEPLATE.
14. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH COLOR BLACK.
16. TORQUE ITEM (34) TO 75 IN LBS.
17. TORQUE ITEM (35) TO 15 IN LBS.
18. THE FOLLOWING ARE PARTS OF THIS ASSEMBLY.
    LEAD SET ITEM (67).
    WIRING HARNESS "A" ITEM (60).
    TERMINAL LUG ITEM (52).
19. THESE PARTS TO BE SELECTED FOR BEST FIT.



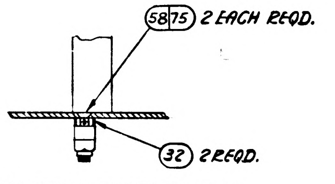
VIEW A A
ROTATED 90° CCW



SECTION C-C
ROTATED 90° CCW



PARTIAL SECTION A-A



PARTIAL SECTION D D
ROTATED 90° CW

CONDUCTOR CHART

CKT PT FROM	CKT PT TO	STRIP	TIN	ACCESSORY ITEM
T1-BLK	TB1-1	.25	NO	1897342-003
T1-BLK	TB1-2			
T1-GRN	TB1-3			
T1-GRN	TB1-4			
T1-RED	TB1-5			
T1-RED	TB1-6	.25	NO	1897342-003

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	2		75	AN507C440R12	(1897003-008) SCREW, FLAT HD.
	1		74	AN960C416	(1897006-042) WASHER, FLAT
	4		73	MS35275-15	SCREW, FIL. HD.
	2		72	MS35216-25	SCREW, PAN HD.
	4		71	MS35216-70	SCREW, PAN HD.
SEE NOTE 4	4		70	1016151-013	NUT, SELF-LOCK
	X		69	PS2900026	PROCUREMENT SPECIFICATION
	X		68		RUNNING LIST
	1		67	2900710	LEAD SET A-A
	X		66	2900628	SCHEMATIC DIAGRAM
	AR		65	MIL-S-8660	SILICON GREASE (ES2311)
	AR		64	MIL-S-22473 GRADE H	SEALING COMPOUND (ES2544-5)
	AR		63	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
	AR		62	MIL-F-14256 TYPE A OR W	FLUX (ES 2798)
	AR		61	SN 60 WS	SOLDER QQ-S-571 (ES 2175-1)
	1		60	2900604	WIRING HARNESS A
SEE NOTE 4	22		59	1016151-006	NUT SELF LOCK
SEE NOTE 4	46		58	1016151-004	NUT SELF LOCK
SEE NOTE 4	26		57	1016151-008	NUT SELF LOCK
	24		56	MS35333-71	WASHER LOCK INT. TOOTH
	20		55	MS35216-27	SCREW, PAN HD.
	5		54	MS35216-41	SCREW, PAN HD.
	12		53	MS35216-17	SCREW, PAN HD.
SEE NOTE 4	6		52	1897342-003	TERMINAL LUG
	24		51	MS35216-26	SCREW, PAN HD.
	2		50	AN507C832R6	(1897003-564) SCREW, FL. HD.
	1		49	MS35490-13	GROMMET RUBBER
	1		48	2900353	COVER PROTECTIVE
SEE NOTE 4	1		47	1016325-007	TERMINAL BOARD
SEE NOTE 4	4		46	1897302-001	JACK, TIP-BANANA (RED)
SEE NOTE 4	4		45	1897302-002	JACK, TIP-BANANA (BLACK)
	1		44	MS91528-2K2B	KNOB
SEE NOTE 4	1		43	1015869-779	LIGHT INDICATOR
	1		42	1015869-778	LIGHT INDICATOR
	1		41	1015869-780	LIGHT INDICATOR
	1		40	1015869-786	LIGHT INDICATOR
	1		39	1015869-366	LIGHT & SWITCH ASSY.
	1		38	1015869-367	LIGHT & SWITCH ASSY.
	1		37	1015869-368	LIGHT & SWITCH ASSY.
SEE NOTE 4	1		36	1015825-035	SWITCH ROTARY

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1		35	2N1774A	SEMI-CONDUCTOR MIL-S-19500/168
SEE NOTE 4	1		34	1897277-001	SEMI-CONDUCTOR DEVICE, DIODE
SEE NOTE 4	4		33	1897211-004	POWER MODULE-SOLID STATE
SEE NOTE 4	2		32	1015860-025	SPACER
SEE NOTE 4	1		31	1897292	TRANSFORMER REGULATING ASSY.
SEE NOTE 4	5		30	1015802-004	RELAY
	2		29	1015914-001	RELAY
	9		28	1015984-003	RELAY
	4		27	1015837-002	RELAY
SEE NOTE 4	~~1~~		~~26~~	~~1015832-318~~	~~RELAY~~
	3		25	F02A250V4A	(1897099-013) FUSE MIL-F-15160/02
	4		24	F02A250V3A	(1897099-012) FUSE MIL-F-15160/02
	2		23	MS26572-1	FUSE HOLDER, SPARE
SEE NOTE 4	3		22	1015873-001	FUSE HOLDER
SEE NOTE 4	2		21	1015873-008	FUSE HOLDER
	1		20	2900255-021	TEMP. ALARM AMPL.
	12		19	1900390	BRACKET HOLDER, SINGLE
SEE NOTE 4	1		18	1897294	TEMP. CONTROLLER ASSY.
	1		17	2900256-011	BRIDGE EXCITATION DET.
	1		16	2900254-011	ELECT. COMP. ASSY.
	1		15	2900255-011	TEMP. ALARM AMPL.
	1		14	2900301-011	TEMP. IND. AMPL.
	1		13	2900301-021	TEMP. IND. AMPL.
	4		12	MS35216-1	SCREW, PAN HD.
	1		11	1004260-104	NAMEPLATE
SEE NOTE 4	6		10	1016151-010	NUT, SELF LOCKING
SEE NOTE 4	6		9	1006783-45	SCREW, BUTTON HD.
SEE NOTE 4	8		8	1006783-44	SCREW, BUTTON HD.
	8		7	AN507C832R12	(1897003-568) SCREW FLAT HD.
SEE NOTES 4 & 5	8		6	1016005-001	SHIM-LAMINATED
SEE NOTE 4	1		5	1015785-009	SLIDE ASSY. R.H.
SEE NOTE 4	1		4	1015785-010	SLIDE ASSY. L.H.
	2		3	1900015-071	HANDLE ASSY.
	1		2	2900352	CHASSIS (INSEP. ASSY.)
	1		1	2900371	FRONT PANEL

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	5		81	MS35216-42	SCREW, PAN HD.
SEE NOTE 19	1		80	MS21919-6 THRU-8	CLAMP, CABLE, CUSHIONED
	1		79	MS21919-5 THRU-7	
	1		78	MS21919-4 THRU-6	
	1		77	MS21919-3 THRU-5	
SEE NOTE 19	1		76	MS21919-2 THRU-4	CLAMP, CABLE, CUSHIONED

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
J		REPLACES REV "H" WITH CHANGE PER MXC 203779 WAS D SIZE		11 AUG 65	
K		REVISED PER MXC 204275		3 SEP 65	A.N.
L		REVISED PER MXC 204549		13 SEP 65	
M		REVISED PER MXC 205209		30 SEP 65	A.N.
N		REVISED PER MXC 206042		10 OCT 65	
P		INITIAL RELEASE CLASS A PER TDRR 23555		20 OCT 65	
R		REVISED PER TDRR 24876		29 DEC 65	

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS + − ANGLES + −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 6 JULY 1965
CHECKED 30 JUL 65
30 JUL 65
APPROVAL
APPROVAL 10-22-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

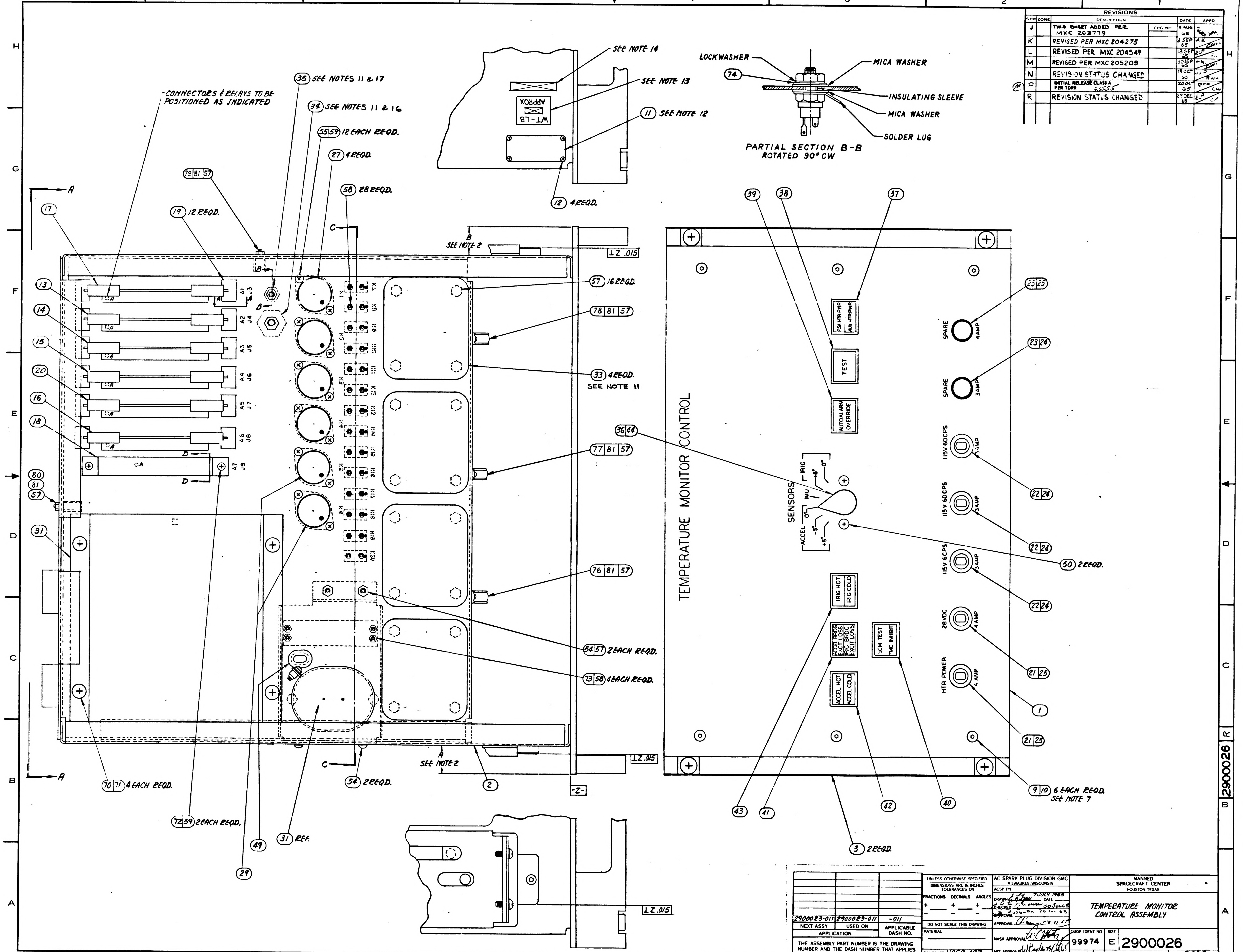
TEMPERATURE MONITOR
CONTROL ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900026
SCALE 1:1
SHEET 1 OF 2

30 JUL 65

2900026 K

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
J		THIS SHEET ADDED PER MXC 203779		11 AUG 65	
K		REVISED PER MXC 204275		3 SEP 65	A.N.
L		REVISED PER MXC 204549		13 SEP 65	
M		REVISED PER MXC 205209		30 SEP 65	A.N.
N		REVISION STATUS CHANGED		19 OCT 65	RWH
P		INITIAL RELEASE CLASS A PER TDRR 23555		20 OCT 65	CW
R		REVISION STATUS CHANGED		29 DEC 65	CF


CONNECTORS & RELAYS TO BE POSITIONED AS INDICATED
35 SEE NOTES 11 & 17
34 SEE NOTES 11 & 16
55 59 12 EACH REQD.
27 4 REQD.
58 28 REQD.
79 81 57
19 12 REQD.
17
13
14
15
20
16
18
80
81
57
31
A
B
C
D
SEE NOTE 2
Z .015
A1 J3
A2 J4
A3 J5
A4 J6
A5 J7
A6 J8
A7 J9
57 16 REQD.
78 81 57
33 4 REQD. SEE NOTE 11
77 81 57
76 81 57
54 57 2 EACH REQD.
73 58 4 EACH REQD.
54 2 REQD.
2
-Z-
70 71 4 EACH REQD.
72 59 2 EACH REQD.
29
49
31 REF.
SEE NOTE 14
SEE NOTE 13
WT-LB APPROX
11 SEE NOTE 12
12 4 REQD.
LOCKWASHER
MICA WASHER
74
INSULATING SLEEVE
MICA WASHER
SOLDER LUG
PARTIAL SECTION B-B ROTATED 90° CW
39
38
37
TEMPERATURE MONITOR CONTROL
PSA HTR PWR
AUX HTR PWR
TEST
AUTO ALARM OVERRIDE
SENSORS
IRIC
IMU
ACCEL
-18°
0°
-5°
+5°
36 44
50 2 REQD.
IRIG HOT
IRIG COLD
ACCEL BRDG EXCIT LOSS
IRIG BRDG EXCIT LOSS
SCM TEST
TMC INHIBIT
ACCEL HOT
ACCEL COLD
SPARE 4 AMP
23 25
SPARE 3 AMP
23 24
115V 60CPS 5 AMP
22 24
115V 60CPS 3 AMP
22 24
115V 6CPS 3 AMP
22 24
28 VDC 4 AMP
21 25
HTR POWER 4 AMP
21 25
1
9 10 6 EACH REQD. SEE NOTE 7
43
41
42
40
3 2 REQD.
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
2900026 R

2900023-011	2900023-011	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ + +
− − −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 9 JULY 1965
CHECKED 30 JUL 65
APPROVAL RUDOLPH 30 JUL 65
APPROVAL
NASA APPROVAL
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MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TEMPERATURE MONITOR
CONTROL ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900026
SCALE 1:1
SHEET 2 OF 2

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. DIMENSION "A" SHALL BE EQUAL TO DIM. "B" WITHIN .040.
3. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEMS (61) & (62) OR ITEM (63).
4. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
5. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.
6. DRAWER SLIDE MOUNTING SCREWS & FRONT PANEL MOUNTING SCREWS SHALL BE SUBJECTED TO A TORQUE OF 33-36.2 IN-LB AT INSTALLATION.
7. SECURE SCREWS USING ITEM (64)

9. POSITIONING OF RELAYS INDICATED BY DOT AS VIEWED FROM TOP OF CHASSIS.
10. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. PREFIX WITH UNIT NO. OR ASSEMBLY DESIGNATION OR BOTH FOR COMPLETE DESIGNATION.
11. MATING SURFACES OF ITEM (2) AND ITEMS (33) (34) & (35) TO BE COATED WITH ITEM (65) REMOVE EXCESS GREASE.
12. MARK APPLICABLE PART NO, TITLE, CONTRACT NO, & SERIAL NO. ON ITEM (11) IN ACCORDANCE WITH ND1002023, LETTERS & NUMERALS TO BE .06 HIGH.
13. MARK WEIGHT OF ASSEMBLY (65 LBS) PER ND1002123 ADJACENT TO NAMEPLATE.
14. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH COLOR BLACK.

16. TORQUE ITEM (34) TO 75 IN LBS.
17. TORQUE ITEM (35) TO 15 IN LBS.
18. THE FOLLOWING ARE PARTS OF THIS ASSEMBLY.

    LEAD SET ITEM (67).

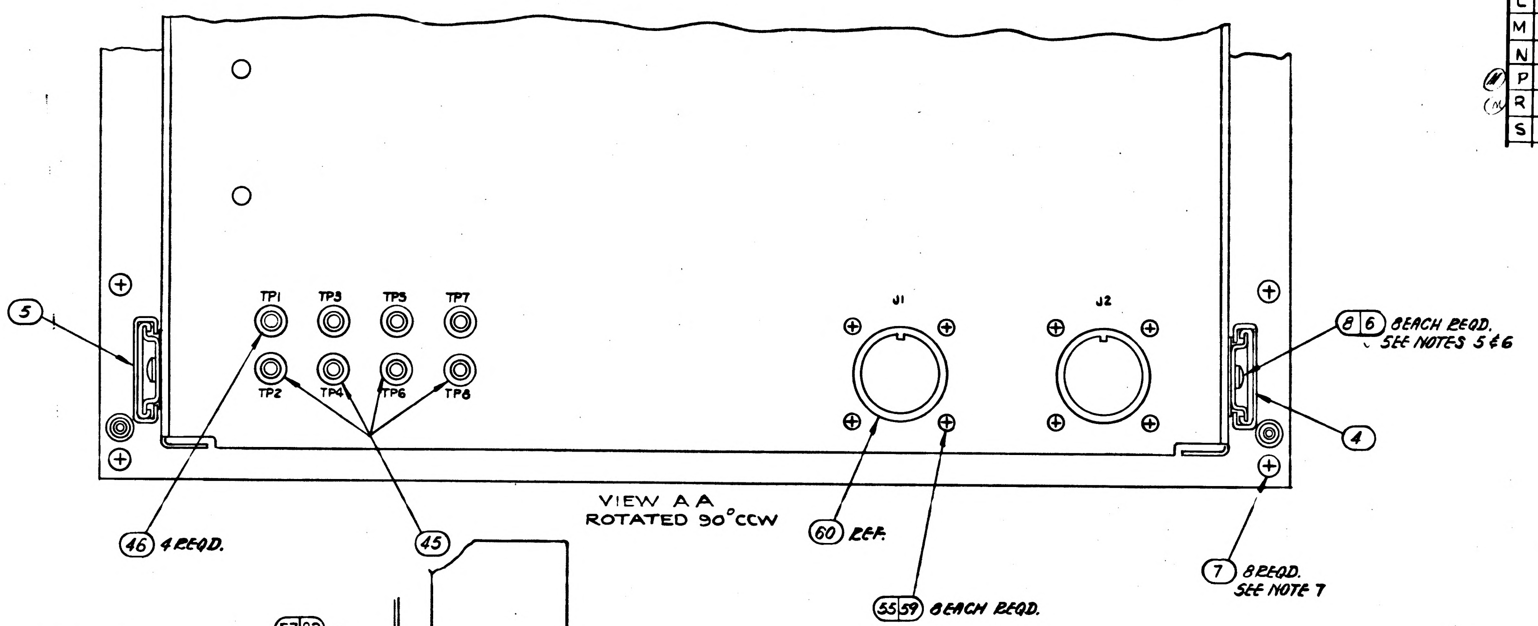
    WIRING HARNESS "A" ITEM (60).

    TERMINAL LUG ITEM (52).

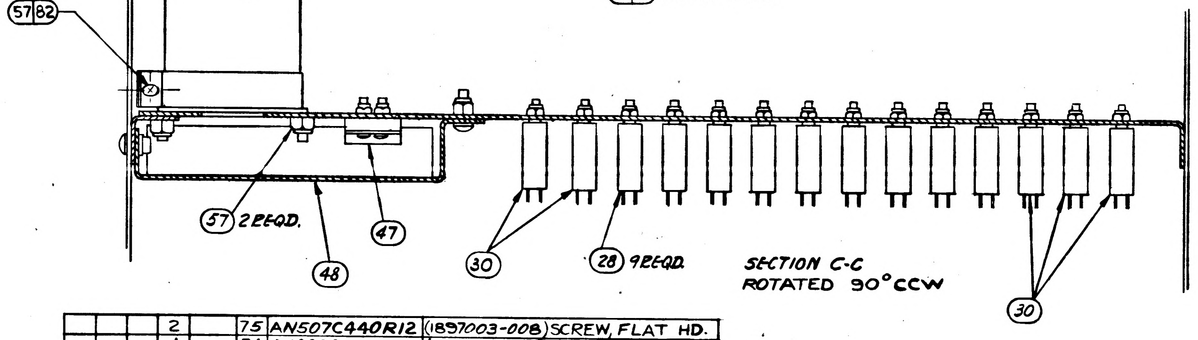
19. THESE PARTS TO BE SELECTED FOR BEST FIT.

REVISIONS

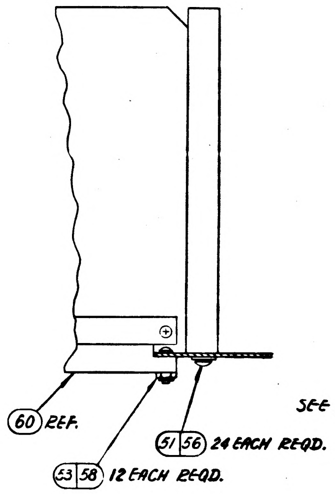
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
J		REPLACES REV "H" WITH CHANGE PER MXC 203779 WAS D SIZE		11 AUG 65	RwB
K		REVISED PER MXC 204275		3 SEP 65	A.N.
L		REVISED PER MXC 204549		13 SEP 65	RL
M		REVISED PER MXC 205209		30 SEP 65	A.N.
N		REVISED PER MXC 206042		19 OCT 65	Rwm
P		INITIAL RELEASE CLASS A PER TDRR 23555		20 OCT 65	
R		REVISED PER TDRR 24876		29 DEC 65	RL
S		REVISED PER TDRR 25589		2 FEB	



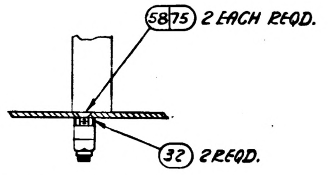
VIEW A A
ROTATED 90° CCW



SECTION C-C
ROTATED 90° CCW



PARTIAL SECTION A-A



PARTIAL SECTION D D
ROTATED 90° CW

CONDUCTOR CHART

CKT PT FROM	CKT PT TO	STRIP	TIN	ACCESSORY ITEM
TI-BLK	TB1-1	.25	NO	1897342-003
TI-BLK	TB1-2			
TI-GRN	TB1-3			
TI-GRN	TB1-4			
TI-RED	TB1-5			
TI-RED	TB1-6	.25	NO	1897342-003

	QUANTITY REQUIRED			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				2		75	AN507C440R12	(1897003-008) SCREW, FLAT HD.
				1		74	AN960C10	(1897006-017) WASHER, FLAT
				4		73	MS35216-16	SCREW, PAN HD.
				2		72	MS35216-25	SCREW, PAN HD.
				4		71	MS35216-70	SCREW, PAN HD.
SEE NOTE 4				4		70	1016151-013	NUT, SELF LOCK
				X		69	PS2900026	PROCUREMENT SPECIFICATION
				X		68		RUNNING LIST
				1		67	2900710	LEAD SET A-A
				X		66	2900628	SCHEMATIC DIAGRAM
				AR		65	MIL-S-8660	SILICON GREASE (ES2311)
				AR		64	MIL-S-22473 GRADE H	SEALING COMPOUND (ES 2544-5)
				AR		63	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
				AR		62	MIL-F-14256 TYPE A OR W	FLUX (ES 2798)
				AR		61	SN 60 WS	SOLDER QQ-S-571 (ES 2175-1)
				1		60	2900604	WIRING HARNESS A
SEE NOTE 4				22		59	1016151-006	NUT SELF LOCK
SEE NOTE 4				46		58	1016151-004	NUT SELF LOCK
SEE NOTE 4				26		57	1016151-008	NUT SELF LOCK
				24		56	MS35333-71	WASHER LOCK INT. TOOTH
				20		55	MS35216-27	SCREW, PAN HD.
				4		54	MS35216-41	SCREW, PAN HD.
				12		53	MS35216-17	SCREW, PAN HD.
SEE NOTE 4				6		52	1897342-003	TERMINAL LUG
				24		51	MS35216-26	SCREW, PAN HD.
				2		50	AN507C832R6	(1897003-564) SCREW, FL. HD.
				1		49	MS35490-13	GROMMET RUBBER
				1		48	2900353	COVER PROTECTIVE
SEE NOTE 4				1		47	1016325-007	TERMINAL BOARD
SEE NOTE 4				4		46	1897302-001	JACK, TIP-BANANA (RED)
SEE NOTE 4				4		45	1897302-002	JACK, TIP-BANANA (BLACK)
				1		44	MS91528-2K2B	KNOB
SEE NOTE 4				1		43	1015869-779	LIGHT INDICATOR
				1		42	1015869-778	LIGHT INDICATOR
				1		41	1015869-780	LIGHT INDICATOR
				1		40	1015869-786	LIGHT INDICATOR
				1		39	1015869-366	LIGHT & SWITCH ASSY.
				1		38	1015869-367	LIGHT & SWITCH ASSY.
				1		37	1015869-368	LIGHT & SWITCH ASSY.
SEE NOTE 4				1		36	1015825-035	SWITCH ROTARY

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				1		35	2N1774A	SEMI-CONDUCTOR MIL-S-19500/168
SEE NOTE 4				1		34	1897277-001	SEMI-CONDUCTOR DEVICE, DIODE
SEE NOTE 4				4		33	1897211-004	POWER MODULE-SOLID STATE
SEE NOTE 4				2		32	1015860-025	SPACER
SEE NOTE 4				1		31	1897292	TRANSFORMER REGULATING ASSY.
SEE NOTE 4				5		30	1015802-004	RELAY
				2		29	1015914-001	RELAY
				9		28	1015984-003	RELAY
				4		27	1015837-002	RELAY
SEE NOTE 4				~~1~~		~~26~~	~~1015832-318~~	~~RELAY~~
				3		25	F02A250V4A	(1897099-013) FUSE MIL-F-15160/02
				4		24	F02A250V3A	(1897099-012) FUSE MIL-F-15160/02
				2		23	MS26572-1	FUSE HOLDER, SPARE
SEE NOTE 4				3		22	1015873-001	FUSE HOLDER
SEE NOTE 4				2		21	1015873-008	FUSE HOLDER
				1		20	2900255-021	TEMP. ALARM AMPL.
				12		19	1900390	BRACKET HOLDER, SINGLE
SEE NOTE 4				1		18	1897294	TEMP. CONTROLLER ASSY.
				1		17	2900256-011	BRIDGE EXCITATION DET.
				1		16	2900254-011	ELECT. COMP. ASSY.
				1		15	2900255-011	TEMP. ALARM AMPL.
				1		14	2900301-011	TEMP. IND. AMPL.
				1		13	2900301-021	TEMP. IND. AMPL.
				4		12	MS35216-1	SCREW, PAN HD.
				1		11	1004260-104	NAMEPLATE
SEE NOTE 4				6		10	1016151-010	NUT, SELF LOCKING
SEE NOTE 4				6		9	1006783-45	SCREW, BUTTON HD.
SEE NOTE 4				8		8	1006783-44	SCREW, BUTTON HD.
				8		7	AN507C832R12	(1897003-568) SCREW FLAT HD.
SEE NOTES 4 & 5				8		6	1016005-001	SHIM-LAMINATED
SEE NOTE 4				1		5	1015785-009	SLIDE ASSY. R.H.
SEE NOTE 4				1		4	1015785-010	SLIDE ASSY. L.H.
				2		3	1900015-071	HANDLE ASSY.
				1		2	2900352	CHASSIS (INSEP. ASSY.)
				1		1	2900371	FRONT PANEL

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				2		83	1897322-001	PLATE, TERMINAL BOARD
				1		82	MS35216-43	SCREW, PAN HD.
				5		81	MS35216-42	SCREW, PAN HD.
SEE NOTE 19				1		80	MS21919DG-6 THRU -8	(1897073-106 THRU -108) CLAMP, CABLE
				1		79	-5 -7	(-105 -107)
				1		78	-4 -6	(-104 -106)
				1		77	-3 -5	(-103 -105)
SEE NOTE 19				1		76	MS21919DG-2 THRU -4	(1897073-102 THRU -104) CLAMP, CABLE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

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DIMENSIONS ARE IN INCHES
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FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN DATE 6 JULY 1965
CHECKED 30 JUL 65
APPROVAL 30 JUL 65
APPROVAL 10-22-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

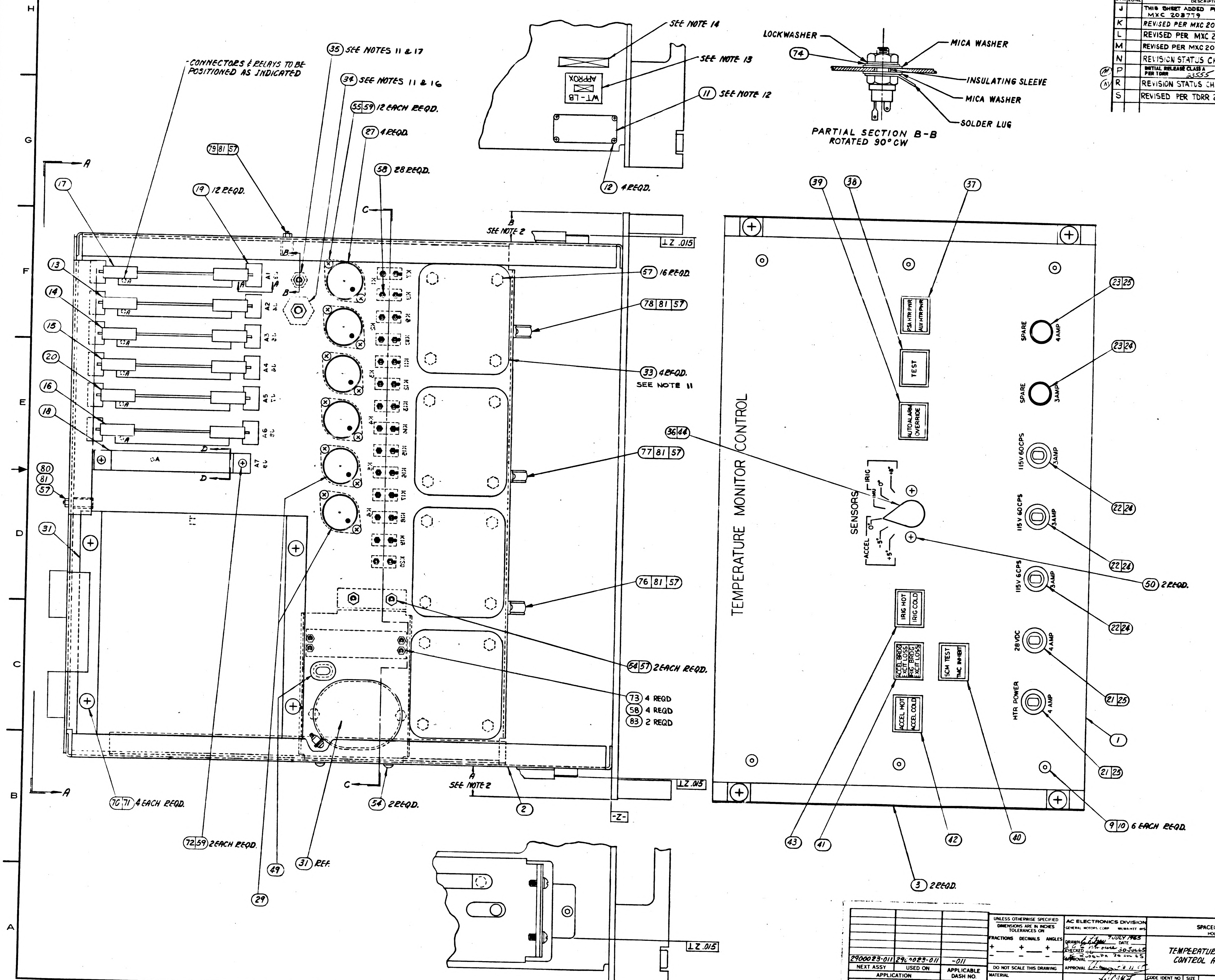
TEMPERATURE MONITOR AND CONTROL ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900026
SCALE 1:1
SHEET 1 OF 2

30 JUL 65

2900026

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
REVISIONS					
J		THIS SHEET ADDED PER MXC 203779		11 AUG 65	
K		REVISED PER MXC 204275		3 SEP 65	A.N.
L		REVISED PER MXC 204549		13 SEP 65	
M		REVISED PER MXC 205209		30 SEP 65	A.N.
N		REVISION STATUS CHANGED		19 OCT 65	RWH
P		INITIAL RELEASE CLASS A PER TDRR 23555		20 OCT 65	CW
R		REVISION STATUS CHANGED		29 DEC 65	CF
S		REVISED PER TDRR 25589		2 FEB 66	



SEE NOTE 14
SEE NOTE 13
WT-LB APPROX
11 SEE NOTE 12
12 4 REQD.
LOCKWASHER
74
MICA WASHER
INSULATING SLEEVE
MICA WASHER
SOLDER LUG
PARTIAL SECTION B-B ROTATED 90° CW
-CONNECTORS & RELAYS TO BE POSITIONED AS INDICATED
35 SEE NOTES 11 & 17
34 SEE NOTES 11 & 16
55 59 12 EACH REQD.
27 4 REQD.
58 28 REQD.
79 81 57
19 12 REQD.
17
13
14
15
20
16
18
A
B
C
D
B SEE NOTE 2
⊥Z .015
57 16 REQD.
78 81 57
33 4 REQD. SEE NOTE 11
77 81 57
76 81 57
54 57 2 EACH REQD.
73 4 REQD
58 4 REQD
83 2 REQD
80
81
57
31
70 71 4 EACH REQD.
72 59 2 EACH REQD.
49
29
31 REF.
54 2 REQD.
A SEE NOTE 2
2
-Z-
A1
A2
A3
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A6
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K1
K2
K3
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K5
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K18
K19
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36 44
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IRIG HOT
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ACCEL PROC EXCIT LOSS
IRIG PROC EXCIT LOSS
SCM TEST
TMC INHIBIT
ACCEL HOT
ACCEL COLD
28 VDC 4 AMP
21 25
HTR POWER 4 AMP
21 25
1
9 10 6 EACH REQD.
43
41
42
40
3 2 REQD.
⊥Z .015

2900023-011	2900023-011	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

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AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN DATE 9 JULY 1965
CHECKED 30 JUL 65
APPROVAL R. RUDOLPH 30 JUL 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TEMPERATURE MONITOR AND CONTROL ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900026
SCALE 1:1
SHEET 2 OF 2

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
REVISIONS					
J		REPLACES REV 'H' WITH CHANGE PER MXC 203779 WAS D SIZE		11 AUG 65	
K		REVISED PER MXC 204275		3 SEP 65	A.N.
L		REVISED PER MXC 204549		13 SEP 65	
M		REVISED PER MXC 205209		30 SEP 65	A.N.
N		REVISED PER MXC 206042		19 OCT 65	RWH
P		INITIAL RELEASE CLASS A PER TDRR 23555		20 OCT 65	
R		REVISED PER TDRR 24876		29 DEC 65	CP
S		REVISED PER TDRR 25589		2 FEB 66	MEM
T		REVISED PER TDRR 27268		23 MAR 66	B.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. DIMENSION "A" SHALL BE EQUAL TO DIM. "B" WITHIN .040.
3. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEMS (61) & (62) OR ITEM (63).
4. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
5. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.
6. DRAWER SLIDE MOUNTING SCREWS & FRONT PANEL MOUNTING SCREWS SHALL BE SUBJECTED TO A TORQUE OF 33 - 36.2 IN-LB AT INSTALLATION.
7. SECURE SCREWS USING ITEM (64)

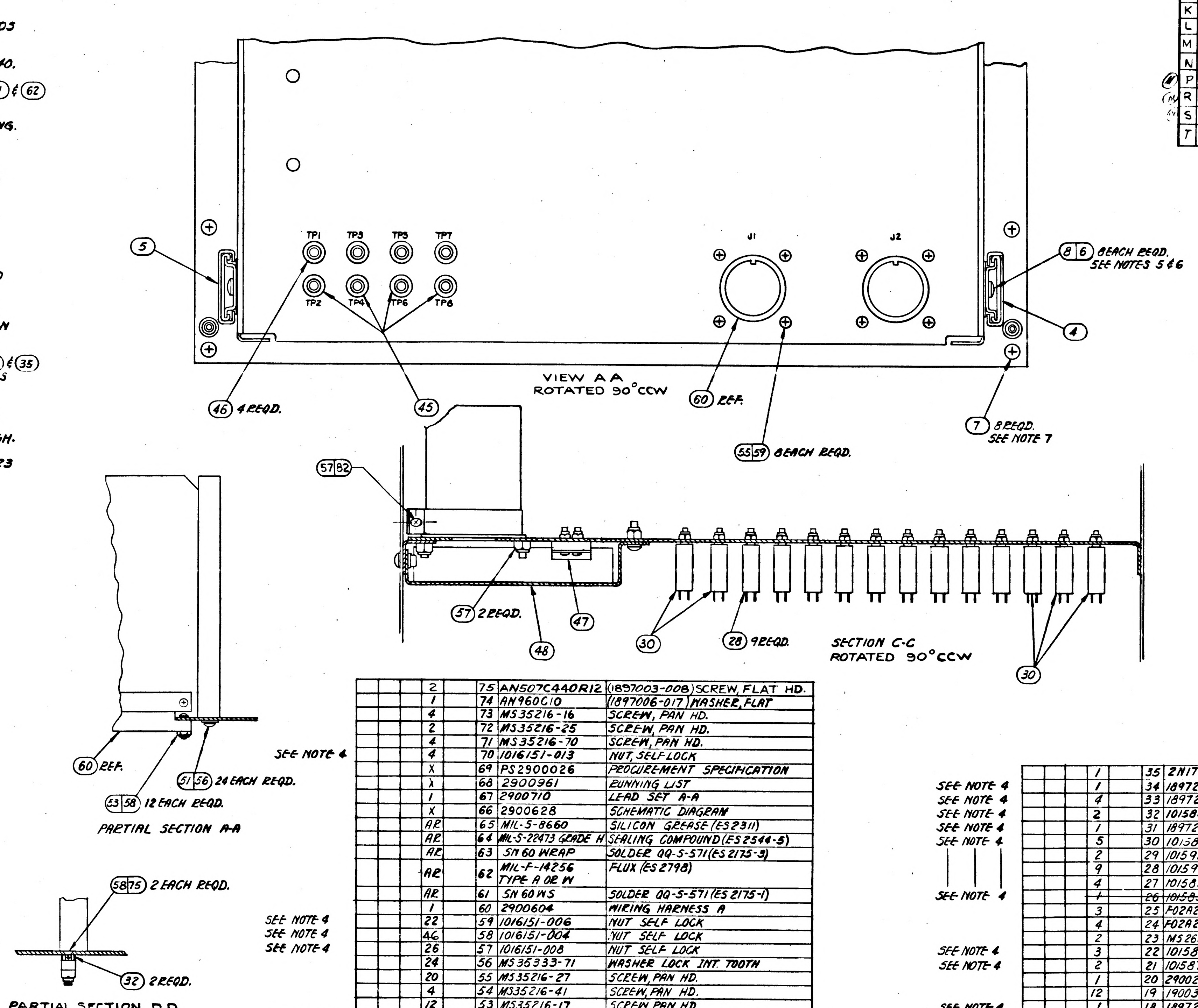
9. POSITIONING OF RELAYS INDICATED BY DOT AS VIEWED FROM TOP OF CHASSIS.
10. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. PREFIX WITH UNIT NO. OR ASSEMBLY DESIGNATION OR BOTH FOR COMPLETE DESIGNATION.
11. MATING SURFACES OF ITEM (2) AND ITEMS (33) (34) & (35) TO BE COATED WITH ITEM (65) REMOVE EXCESS GREASE.
12. MARK APPLICABLE PART NO, TITLE, CONTRACT NO, & SERIAL NO. ON ITEM (11) IN ACCORDANCE WITH ND1002023, LETTERS & NUMERALS TO BE .06 HIGH.
13. MARK WEIGHT OF ASSEMBLY (65 LBS) PER ND1002123 ADJACENT TO NAMEPLATE.
14. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH COLOR BLACK.

16. TORQUE ITEM (34) TO 75 IN LBS.
17. TORQUE ITEM (35) TO 15 IN LBS.
18. THE FOLLOWING ARE PARTS OF THIS ASSEMBLY.

    LEAD SET ITEM (67).

    WIRING HARNESS "A" ITEM (60).

    TERMINAL LUG ITEM (52).
19. THESE PARTS TO BE SELECTED FOR BEST FIT.



VIEW A A
ROTATED 90° CCW

SECTION C-C
ROTATED 90° CCW

PARTIAL SECTION A-A

PARTIAL SECTION D D
ROTATED 90° CW

CONDUCTOR CHART				
CKT PT FROM	CKT PT TO	STRIP	TIN	ACCESSORY ITEM
T1-BLK	TB1-1	.25	NO	1897342-003
T1-BLK	TB1-2			
T1-GRN	TB1-3			
T1-GRN	TB1-4			
T1-RED	TB1-5			
T1-RED	TB1-6	.25	NO	1897342-003

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
				2		75	AN507C440R12	(1897003-008) SCREW, FLAT HD.
				1		74	AN960C10	(1897006-017) WASHER, FLAT
				4		73	MS35216-16	SCREW, PAN HD.
				2		72	MS35216-25	SCREW, PAN HD.
				4		71	MS35216-70	SCREW, PAN HD.
SEE NOTE 4				4		70	1016151-013	NUT, SELF LOCK
				X		69	PS2900026	PROCUREMENT SPECIFICATION
				X		68	2900961	RUNNING LIST
				1		67	2900710	LEAD SET A-A
				X		66	2900628	SCHEMATIC DIAGRAM
				AR		65	MIL-S-8660	SILICON GREASE (ES2311)
				AR		64	MIL-S-22473 GRADE H	SEALING COMPOUND (ES2544-5)
				AR		63	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
				AR		62	MIL-F-14256 TYPE A OR W	FLUX (ES 2798)
				AR		61	SN 60 WS	SOLDER QQ-S-571 (ES 2175-1)
				1		60	2900604	WIRING HARNESS A
SEE NOTE 4				22		59	1016151-006	NUT SELF LOCK
SEE NOTE 4				46		58	1016151-004	NUT SELF LOCK
SEE NOTE 4				26		57	1016151-008	NUT SELF LOCK
				24		56	MS35333-71	WASHER LOCK INT. TOOTH
				20		55	MS35216-27	SCREW, PAN HD.
				4		54	MS35216-41	SCREW, PAN HD.
				12		53	MS35216-17	SCREW, PAN HD.
SEE NOTE 4				6		52	1897342-003	TERMINAL LUG
				24		51	MS35216-26	SCREW, PAN HD.
				2		50	AN507C832R6	(1897003-564) SCREW, FL. HD.
				1		49	MS35490-13	GROMMET RUBBER
				1		48	2900353	COVER PROTECTIVE
SEE NOTE 4				1		47	1016325-007	TERMINAL BOARD
SEE NOTE 4				4		46	1897302-001	JACK, TIP-BANANA (RED)
SEE NOTE 4				4		45	1897302-002	JACK, TIP-BANANA (BLACK)
				1		44	MS91528-2K2B	KNOB
SEE NOTE 4				1		43	1015869-779	LIGHT INDICATOR
				1		42	1015869-778	LIGHT INDICATOR
				1		41	1015869-780	LIGHT INDICATOR
				1		40	1015869-786	LIGHT INDICATOR
				1		39	1015869-366	LIGHT & SWITCH ASSY.
				1		38	1015869-367	LIGHT & SWITCH ASSY.
				1		37	1015869-368	LIGHT & SWITCH ASSY.
SEE NOTE 4				1		36	1015825-035	SWITCH ROTARY

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
				1		35	2N1774A	SEMI-CONDUCTOR MIL-S-19500/168
SEE NOTE 4				1		34	1897277-001	SEMI-CONDUCTOR DEVICE, DIODE
SEE NOTE 4				4		33	1897211-004	POWER MODULE-SOLID STATE
SEE NOTE 4				2		32	1015860-025	SPACER
SEE NOTE 4				1		31	1897292	TRANSFORMER REGULATING ASSY.
SEE NOTE 4				5		30	1015802-004	RELAY
				2		29	1015914-001	RELAY
				9		28	1015984-003	RELAY
				4		27	1015837-002	RELAY
SEE NOTE 4				~~1~~		~~26~~	~~1015832-318~~	~~RELAY~~
				3		25	F02A250V4A	(1897099-013) FUSE MIL-F-15160/02
				4		24	F02A250V3A	(1897099-012) FUSE MIL-F-15160/02
				2		23	MS26572-1	FUSE HOLDER, SPARE
SEE NOTE 4				3		22	1015873-001	FUSE HOLDER
SEE NOTE 4				2		21	1015873-008	FUSE HOLDER
				1		20	2900255-021	TEMP. ALARM AMPL.
				12		19	1900390	BRACKET HOLDER, SINGLE
SEE NOTE 4				1		18	1897294	TEMP. CONTROLLER ASSY.
				1		17	2900256-011	BRIDGE EXCITATION DET.
				1		16	2900254-011	ELECT. COMP. ASSY.
				1		15	2900255-011	TEMP. ALARM AMPL.
				1		14	2900301-011	TEMP. IND. AMPL.
				1		13	2900301-021	TEMP. IND. AMPL.
				4		12	MS35216-1	SCREW PAN HD.
				1		11	1004260-104	NAMEPLATE
SEE NOTE 4				6		10	1016151-010	NUT, SELF LOCKING
SEE NOTE 4				6		9	1006783-45	SCREW, BUTTON HD.
SEE NOTE 4				8		8	1006783-44	SCREW, BUTTON HD.
				8		7	AN507C832R12	(1897003-568) SCREW FLAT HD
SEE NOTES 4 & 5				8		6	1016005-001	SHIM-LAMINATED
SEE NOTE 4				1		5	1015785-009	SLIDE ASSY. R.H.
SEE NOTE 4				1		4	1015785-010	SLIDE ASSY. L.H.
				2		3	1900015-071	HANDLE ASSY.
				1		2	2900352	CHASSIS (INSEP. ASSY.)
				1		1	2900371	FRONT PANEL

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
				2		83	1897322-001	PLATE, TERMINAL BOARD
				1		82	MS35216-43	SCREW, PAN HD.
				5		81	MS35216-42	SCREW, PAN HD.
SEE NOTE 19				1		80	MS21919DG-6 THRU -8	(1897073-106 THRU -108) CLAMP, CABLE
				1		79	-5 -7	(-105 -107)
				1		78	-4 -6	(-104 -106)
				1		77	-3 -5	(-103 -105)
SEE NOTE 19				1		76	MS21919DG-2 THRU -4	(1897073-102 THRU -104) CLAMP, CABLE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS.
DRAWN DATE 6 JULY 1965
CHECKED 30 JUL 65
APPROVAL 30 JUL 65
APPROVAL 10-22 65
NASA APPROVAL
MIT APPROVAL

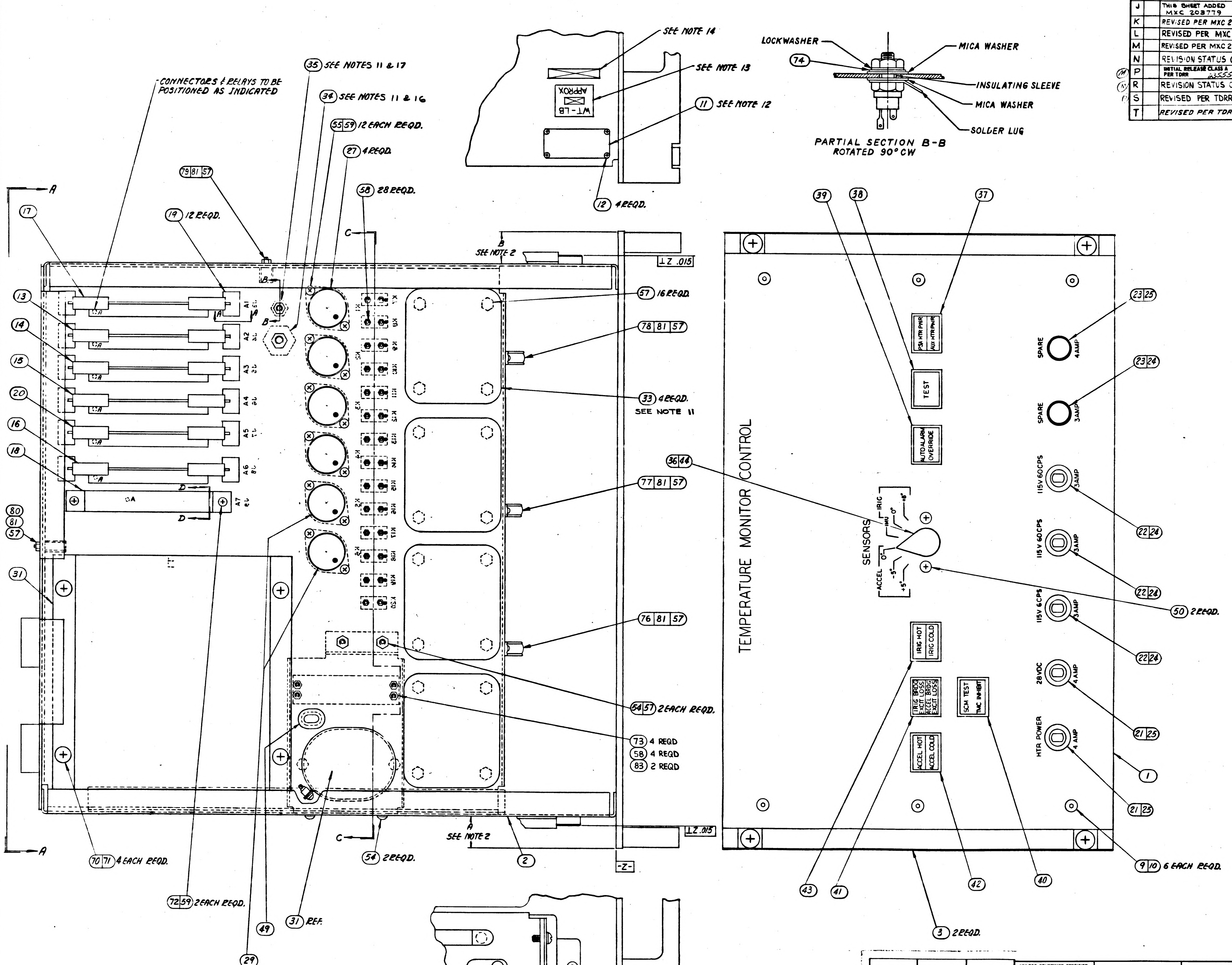
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TEMPERATURE MONITOR AND CONTROL ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900026
SCALE 1:1
SHEET 1 OF 2

30 JUL 65

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
J		THIS SHEET ADDED PER MXC 203779		11 AUG 65	
K		REVISED PER MXC 204275		3 SEP 65	A.N.
L		REVISED PER MXC 204549		13 SEP 65	
M		REVISED PER MXC 205209		30 SEP 65	A.N.
N		REVISION STATUS CHANGED		19 OCT 65	RWH
P		INITIAL RELEASE CLASS A PER TDRR 23555		20 OCT 65	CW
R		REVISION STATUS CHANGED		29 DEC 65	CP
S		REVISED PER TDRR 25589		2 FEB 66	
T		REVISED PER TDRR 27268		23-MAR-66	B



8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
SEE NOTE 14
SEE NOTE 13
APPROX
WT - LB
(11) SEE NOTE 12
(12) 4 REQD.
LOCKWASHER
(74)
MICA WASHER
INSULATING SLEEVE
MICA WASHER
SOLDER LUG
PARTIAL SECTION B-B
ROTATED 90° CW
(35) SEE NOTES 11 & 17
(34) SEE NOTES 11 & 16
(55)(59) 12 EACH REQD.
(27) 4 REQD.
(58) 28 REQD.
CONNECTORS & RELAYS TO BE POSITIONED AS INDICATED
(79)(81)(57)
(19) 12 REQD.
(17)
(13)
(14)
(15)
(20)
(16)
(18)
(80)
(81)
(57)
(31)
A
B
C
D
A1
A2
A3
A4
A5
A6
A7
B
SEE NOTE 2
⊥ Z .015
(57) 16 REQD.
(78)(81)(57)
(33) 4 REQD.
SEE NOTE 11
(77)(81)(57)
(76)(81)(57)
(54)(57) 2 EACH REQD.
(73) 4 REQD
(58) 4 REQD
(83) 2 REQD
A
SEE NOTE 2
(54) 2 REQD.
(2)
-Z-
(70)(71) 4 EACH REQD.
(72)(59) 2 EACH REQD.
(31) REF.
(49)
(29)
⊥ Z .015
(39)
(38)
(37)
PSA HTR PWR
AUX HTR PWR
TEST
AUTO ALARM OVERRIDE
TEMPERATURE MONITOR CONTROL
(36)(44)
SENSORS
IRIG
IMU
0°
+8°
ACCEL
0°
-5°
+5°
IRIG HOT
IRIG COLD
IRIG BRDG EXCIT LOSS
ACCEL BRDG EXCIT LOSS
SCM TEST
TMC INHIBIT
ACCEL HOT
ACCEL COLD
SPARE 4AMP
SPARE 3AMP
115V 60CPS 3AMP
115V 60CPS 3AMP
115V 6CPS 3AMP
28VDC 4AMP
HTR POWER 4 AMP
(23)(25)
(23)(24)
(22)(24)
(22)(24)
(50) 2 REQD.
(22)(24)
(21)(25)
(1)
(21)(25)
(9)(10) 6 EACH REQD.
(43)
(41)
(42)
(40)
(3) 2 REQD.

2900023-011	2900023-011	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN DATE 9 JULY 1965
CHECKED 30 JUL 65
APPROVAL RUDOLPH 30 JUL 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TEMPERATURE MONITOR AND
CONTROL ASSEMBLY

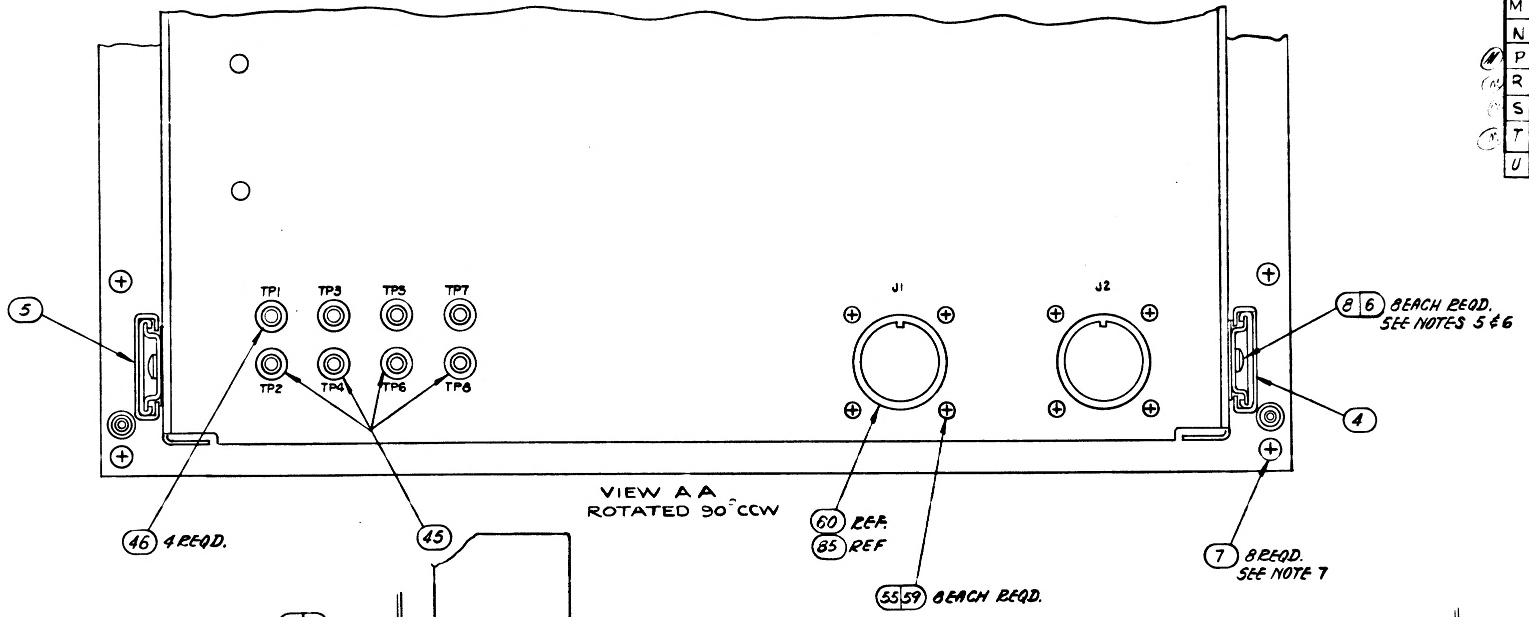
CODE IDENT NO. 99974
SIZE E
2900026
SCALE 1:1
SHEET 2 OF 2

2900026 T

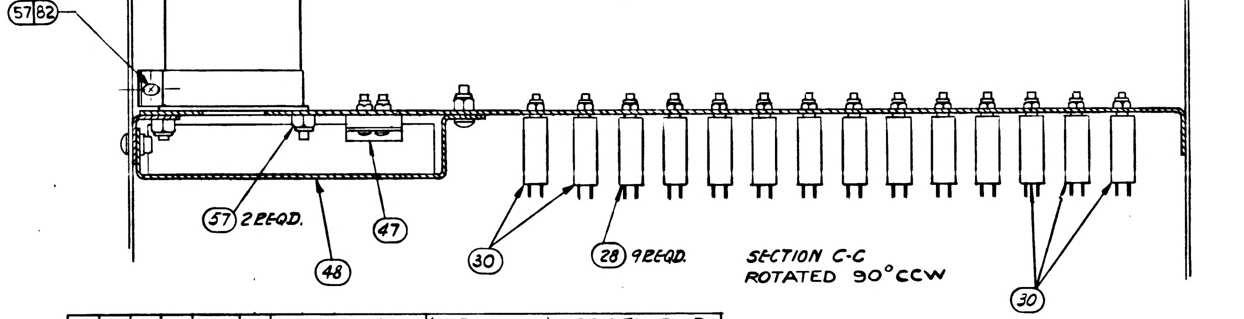
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. DIMENSION "A" SHALL BE EQUAL TO DIM. "B" WITHIN .040.
3. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEMS (61) & (62) OR ITEM (63).
4. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
5. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.
6. DRAWER SLIDE MOUNTING SCREWS & FRONT PANEL MOUNTING SCREWS SHALL BE SUBJECTED TO A TORQUE OF 33-36.2 IN-LB AT INSTALLATION.
7. SECURE SCREWS USING ITEM (64)
9. POSITIONING OF RELAYS INDICATED BY DOT AS VIEWED FROM TOP OF CHASSIS.
10. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. PREFIX WITH UNIT NO. OR ASSEMBLY DESIGNATION OR BOTH FOR COMPLETE DESIGNATION.
11. MATING SURFACES OF ITEM (2) AND ITEMS (33) (34) & (35) TO BE COATED WITH ITEM (65) REMOVE EXCESS GREASE.
12. MARK APPLICABLE PART NO, TITLE, CONTRACT NO, & SERIAL NO. ON ITEM (11) IN ACCORDANCE WITH ND1002023, LETTERS & NUMERALS TO BE .06 HIGH.
13. MARK WEIGHT OF ASSEMBLY (65 LBS) PER ND1002123 ADJACENT TO NAMEPLATE.
14. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH COLOR BLACK.
16. TORQUE ITEM (34) TO 75 IN LBS.
17. TORQUE ITEM (35) TO 15 IN LBS.
18. THE FOLLOWING ARE PARTS OF THIS ASSEMBLY.
    - LEAD SET ITEM (67) (86)
    - WIRING HARNESS "A" ITEM (60) (85)
    - TERMINAL LUG ITEM (52).
19. THESE PARTS TO BE SELECTED FOR BEST FIT.

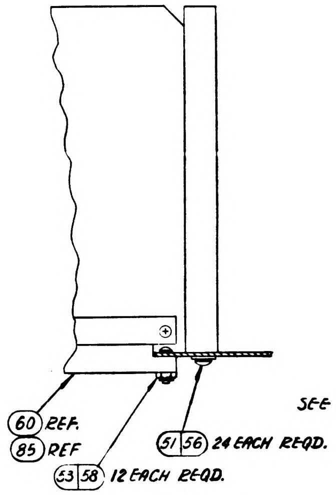
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
J		REPLACES REV 'H' WITH CHANGE PER MXC 203779 WAS D SIZE		11 AUG 65	RGB /
K		REVISED PER MXC 204275		3 SEP 65	A.N.
L		REVISED PER MXC 204549		13 SEP 65	RLP AJ
M		REVISED PER MXC 205209		30 SEP 65	A.N.
N		REVISED PER MXC 206042		19 OCT 65	J.P. RWM
P		INITIAL RELEASE CLASS A PER TDRR 23555		20 OCT 65	P.P.
R		REVISED PER TDRR 24876		29 DEC 65	RLP CF
S		REVISED PER TDRR 25589		2 FEB 66	RLP MEM
T		REVISED PER TDRR 27268		23 MAR 66	B.
U		REVISED PER TDRR 28769		17 MAY 66	JR



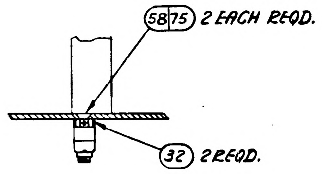
VIEW A A
ROTATED 90° CCW



SECTION C-C
ROTATED 90°CCW



PARTIAL SECTION A-A



PARTIAL SECTION D D
ROTATED 90° CW

CONDUCTOR CHART				
CKT PT		STRIP	TIN	ACCESSORY ITEM
FROM	TO			
T1-BLK	TB1-1	.25	NO	1897342-003
T1-BLK	TB1-2			
T1-GRN	TB1-3			
T1-GRN	TB1-4			
T1-RED	TB1-5			
T1-RED	TB1-6	.25	NO	1897342-003

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			021	011				
			2	2		75	AN507C440R12	(1897003-008) SCREW, FLAT HD.
			1	1		74	AN960C10	(1897006-017) WASHER, FLAT
			4	4		73	MS35216-16	SCREW, PAN HD.
			2	2		72	MS35216-25	SCREW, PAN HD.
			4	4		71	MS35216-70	SCREW, PAN HD.
SEE NOTE 4			4	4		70	1016151-013	NUT, SELF LOCK
				X		69	PS2900026	PROCUREMENT SPECIFICATION
				X		68	2900961	RUNNING LIST
				1		67	2900710	LEAD SET A-A
				X		66	2900628	SCHEMATIC DIAGRAM
			AR	AR		65	MIL-S-8660	SILICON GREASE (ES2311)
			AR	AR		64	MIL-S-22473 GRADE H	SEALING COMPOUND (ES 2544-5)
			AR	AR		63	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
			AR	AR		62	MIL-F-14256 TYPE A OR W	FLUX (ES 2798)
			AR	AR		61	SN 60 WS	SOLDER QQ-S-571 (ES 2175-1)
				1		60	2900604	WIRING HARNESS A
SEE NOTE 4			22	22		59	1016151-006	NUT SELF LOCK
SEE NOTE 4			46	46		58	1016151-004	NUT SELF LOCK
SEE NOTE 4			26	26		57	1016151-008	NUT SELF LOCK
			24	24		56	MS35333-71	WASHER LOCK INT. TOOTH
			20	20		55	MS35216-27	SCREW, PAN HD.
			4	4		54	MS35216-41	SCREW, PAN HD.
			12	12		53	MS35216-17	SCREW PAN HD.
SEE NOTE 4			6	6		52	1897342-003	TERMINAL LUG
			24	24		51	MS35216-26	SCREW, PAN HD.
			2	2		50	AN507C832R6	(1897003-564) SCREW, FL. HD.
			1	1		49	MS35490-13	GROMMET RUBBER
			1	1		48	2900353	COVER PROTECTIVE
SEE NOTE 4			1	1		47	1016325-007	TERMINAL BOARD
SEE NOTE 4			4	4		46	1897302-001	JACK, TIP-BANANA (RED)
SEE NOTE 4			4	4		45	1897302-002	JACK, TIP-BANANA (BLACK)
			1	1		44	MS91528-2K2B	KNOB
SEE NOTE 4			1	1		43	1015869-779	LIGHT INDICATOR
			1	1		42	1015869-778	LIGHT INDICATOR
			1	1		41	1015869-780	LIGHT INDICATOR
			1	1		40	1015869-786	LIGHT INDICATOR
			1	1		39	1015869-366	LIGHT & SWITCH ASSY.
			1	1		38	1015869-367	LIGHT & SWITCH ASSY.
			1	1		37	1015869-368	LIGHT & SWITCH ASSY.
SEE NOTE 4			1	1		36	1015825-035	SWITCH ROTARY

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			021	011				
			1	1		35	2N1774A	SEMI-CONDUCTOR MIL-S-19500/168
SEE NOTE 4			1	1		34	1897277-001	SEMI-CONDUCTOR DEVICE, DIODE
SEE NOTE 4			4	4		33	1897211-004	POWER MODULE-SOLID STATE
SEE NOTE 4			2	2		32	1015860-025	SPACER
SEE NOTE 4			1	1		31	1897292	TRANSFORMER REGULATING ASSY.
SEE NOTE 4			5	5		30	1015802-004	RELAY
			2	2		29	1015914-001	RELAY
			9	9		28	1015984-003	RELAY
			4	4		27	1015837-002	RELAY
SEE NOTE 4				~~1~~		~~26~~	~~1015832-318~~	~~RELAY~~
			3	3		25	F02A250V4A	(1897099-013) FUSE MIL-F-15160/02
			4	4		24	F02A250V3A	(1897099-012) FUSE MIL-F-15160/02
			2	2		23	MS26572-1	FUSE HOLDER, SPARE
SEE NOTE 4			3	3		22	1015873-001	FUSE HOLDER
SEE NOTE 4			2	2		21	1015873-008	FUSE HOLDER
			1	1		20	2900255-021	TEMP. ALARM AMPL.
			12	12		19	1900390	BRACKET HOLDER, SINGLE
SEE NOTE 4			1	1		18	1897294	TEMP. CONTROLLER ASSY.
			1	1		17	2900256-011	BRIDGE EXCITATION DET.
				1		16	2900254-011	ELECT. COMP. ASSY.
			1	1		15	2900255-011	TEMP. ALARM AMPL.
			1	1		14	2900301-011	TEMP. IND. AMPL.
			1	1		13	2900301-021	TEMP. IND. AMPL.
			4	4		12	MS35216-1	SCREW, PAN HD.
			1	1		11	1004260-104	NAMEPLATE
SEE NOTE 4			6	6		10	1016151-010	NUT, SELF LOCKING
SEE NOTE 4			6	6		9	1006783-45	SCREW, BUTTON HD.
SEE NOTE 4			8	8		8	1006783-44	SCREW, BUTTON HD.
			8	8		7	AN507C832R12	(1897003-568) SCREW FLAT HD.
SEE NOTES 4 & 5			8	8		6	1016005-001	SHIM-LAMINATED
SEE NOTE 4			1	1		5	1015785-009	SLIDE ASSY. R.H.
SEE NOTE 4			1	1		4	1015785-010	SLIDE ASSY. L.H.
			2	2		3	1900015-071	HANDLE ASSY.
			1	1		2	2900352	CHASSIS (INSEP. ASSY.)
			1	1		1	2900371	FRONT PANEL

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			021	011				
			1			89	2900254-021	ELECT. COMP. ASSY.
			X			88	2901400	RUNNING LIST
			X			87	2901399	SCHEMATIC DIAGRAM
			1			86	2901398	LEAD SET AA
			1			85	2901397	WIRING HARNESS A
			X			84	PS2016122	PROCUREMENT SPEC
			2	2		83	1897322-001	PLATE, TERMINAL BOARD
			1	1		82	MS35216-43	SCREW, PAN HD.
			5	5		81	MS35216-42	SCREW, PAN HD.
SEE NOTE 19			1	1		80	MS21919DG-6 THRU -8	(1897073-106 THRU -108) CLAMP, CABLE
			1	1		79	-5 -7	(-105 -107)
			1	1		78	-4 -6	(-104 -106)
			1	1		77	-3 -5	(-103 -105)
SEE NOTE 19			1	1		76	MS21919DG-2 THRU -4	(1897073-102 THRU -104) CLAMP, CABLE

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-031	2900023-031	-021
2900023-021	2900023-021	-011
2900023-011	2900023-011	-011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — DECIMALS + — ANGLES + —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN DATE 6 JULY 1965
CHECKED 30 JUL 65
APPROVAL 30 JUL 65
APPROVAL 10-22 65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

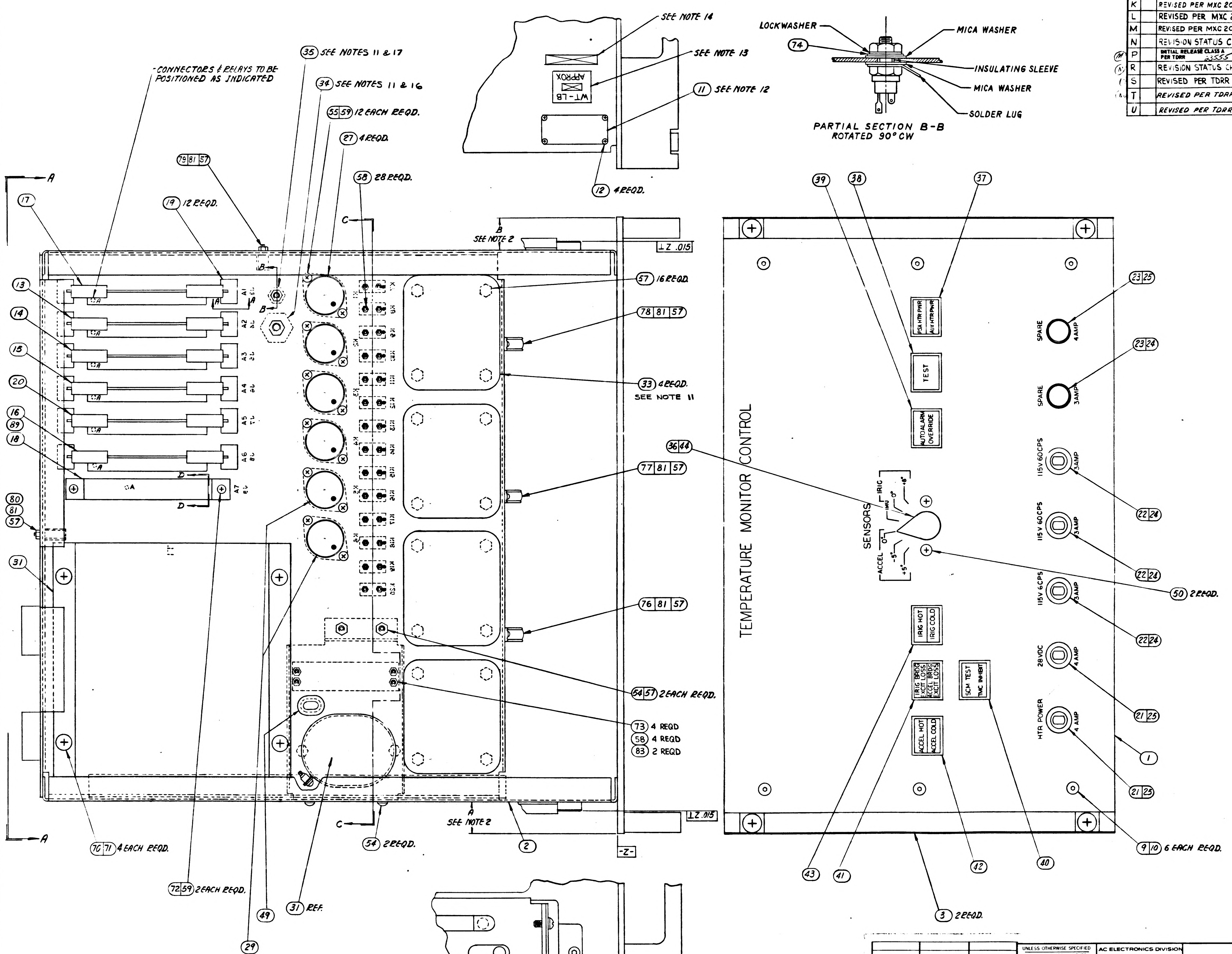
TEMPERATURE MONITOR AND CONTROL ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900026
SCALE 1:1
SHEET 1 OF 2

30 JUL 65

2900026 U

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
REVISIONS					
J		THIS SHEET ADDED PER MXC 203779		11 AUG 65	
K		REVISED PER MXC 204275		3 SEP 65	A.N.
L		REVISED PER MXC 204549		13 SEP 65	RLD
M		REVISED PER MXC 205209		30 SEP 65	A.N.
N		REVISION STATUS CHANGED		19 OCT 65	RWH
P		INITIAL RELEASE CLASS A PER TDRR 23555		20 OCT 65	R-D CW
R		REVISION STATUS CHANGED		29 DEC 65	RLD
S		REVISED PER TDRR 25589		2 FEB 66	RLD
T		REVISED PER TDRR 27268		23 MAR 66	B
U		REVISED PER TDRR 28769		17 MAY 66	JK



8
7
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2
1
H
G
F
E
D
C
B
A
-CONNECTORS & RELAYS TO BE POSITIONED AS INDICATED
35 SEE NOTES 11 & 17
34 SEE NOTES 11 & 16
55 59 12 EACH REQD.
27 4 REQD.
58 28 REQD.
79 81 57
19 12 REQD.
17
13
14
15
20
16
89
18
80
81
57
31
A
B
C
D
A1
A2
A3
A4
A5
A6
A7
SEE NOTE 14
WT-LB APPROX
SEE NOTE 13
11 SEE NOTE 12
12 4 REQD.
B SEE NOTE 2
⊥Z .015
LOCKWASHER
74
MICA WASHER
INSULATING SLEEVE
MICA WASHER
SOLDER LUG
PARTIAL SECTION B-B ROTATED 90° CW
57 16 REQD.
78 81 57
33 4 REQD. SEE NOTE 11
36 44
77 81 57
76 81 57
54 57 2 EACH REQD.
73 4 REQD
58 4 REQD
83 2 REQD
70 71 4 EACH REQD.
72 59 2 EACH REQD.
49
29
31 REF.
54 2 REQD.
SEE NOTE 2
2
-Z-
39
38
37
TEMPERATURE MONITOR CONTROL
PSA HTR PWR
AUX HTR PWR
TEST
AUTO ALARM OVERRIDE
SENSORS
IRIG
IMU
ACCEL
0°
+10°
-5°
+5°
IRIG HOT
IRIG COLD
IRIG BRDG EXCIT LOSS
ACCEL BRDG EXCIT LOSS
SCM TEST
TMC INHIBIT
ACCEL HOT
ACCEL COLD
SPARE 4 AMP
SPARE 3 AMP
115V 60CPS 3 AMP
115V 60CPS 3 AMP
115V 6CPS 3 AMP
28VDC 4 AMP
HTR POWER 4 AMP
23 25
23 24
22 24
22 24
22 24
50 2 REQD.
21 25
21 25
1
9 10 6 EACH REQD.
43
41
42
40
3 2 REQD.

2900023-031	2900023-031	-021
2900023-021	2900023-021	-011
2900023-011	2900023-011	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN DATE 9 JULY 1965
CHECKED 30 JUL 65
APPROVAL RUDOLPH 30 JUL 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

TEMPERATURE MONITOR AND
CONTROL ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900026
SCALE 1:1
SHEET 2 OF 2

U 2900026

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEMS (95) AND (96) OR (97).
3. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.
4. DIMENSION "A" MUST BE EQUAL TO DIMENSION "B" WITHIN .040.
5. DRAWER SLIDE MOUNTING SCREWS AND FRONT PANEL MOUNTING SCREWS, ITEMS (73) AND (74) REF., SHALL BE SUBJECTED TO TORQUE OF 33.0-36.2 IN/LBS AT INSTALLATION.
6. MARK WEIGHT OF ASSEMBLY, (45 LBS), PER ND1002123.
7. MARK "SCHEMATIC" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH, COLOR BLACK, IN LOCATION SHOWN.
8. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (99) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
9. SECURE SCREWS USING ITEM (98).
10. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.

REVISIONS 23416

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
F	-	REPLACES REV (E) WITH CHANGE MXC 202074	—	16 JUN 65	MCR
G		REVISED PER MXC 202430	-	23 JUN 65	
H		REVISION STATUS CHANGED		3 JUL 65	RL
J		REVISED PER MXC 202973		14 JUL 65	
K		REVISED PER MXC 203178		22 JUL 65	JR
L		REVISED PER MXC 203344		29 JUL 65	
M		REVISED PER MXC 203946		AUG 65	JCD
N		REVISED PER MXC 205421		29 SEP 65	
P		REVISED PER MXC 206112		19 OCT 65	LK
R		INITIAL RELEASE CLASS A PER TDRR 23416		65	

	QUANTITY REQUIRED			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				1		106	2900750-011	DIODE BOARD ASSY
				X		105	PS 2900027	PROCUREMENT SPECIFICATION
SEE NOTE 3				13		104	1015986-140	WASHER, SADDLE
SEE NOTE 3				11		103	1015985-008, 010	CABLE CLAMP
SEE NOTE 3				2		102	1015985-007, 009	CABLE CLAMP
				3		101	1900391	BRACKET, HOLDER DOUBLE
				4		100	1900390	BRACKET, HOLDER SINGLE
				1		99	1004260-105	NAMEPLATE
				AR		98	MIL-S-22473 (GR C)	(ES2544-3) SEALING COMPOUND
				AR		97	SN60WRAP	SOLDER QQ-S-571 (ES2175-3)
				AR		96	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
				AR		95	SN60WS	SOLDER QQ-S-571 (ES2175-1)
				1		94		SCHEMATIC DIAGRAM-ELECTRICAL
				1		93	2900114	WIRE LIST BB
				1		92	2900112	WIRE LIST AA
				1		91	2900113	WIRING HARNESS "B"
				1		90	2900111	WIRING HARNESS "A"
				1		89		RUNNING LIST, TEST CONTROL
				14		88	MS35333-71	WASHER, LOCK, INT TOOTH
				2		87	2900044-011	DETECTOR ASSEMBLY
				1		86	2900050-011	DIODE BOARD ASSEMBLY
				1		85	2900053-011	DIODE & RESISTOR BOARD ASSY
SEE NOTE 3				4		84	1016151-010	NUT, SELF LOCKING
				10		83	-008	
				117		82	-006	
SEE NOTE 3				94		81	1016151-004	NUT, SELF LOCKING
				10		80	MS35216-40	SCREW, PAN HD
				86		79	-25	
				4		78	-28	
				41		77	-27	
				4		76	MS35216-1	SCREW, PAN HD
				8		75	AN507C832R12	(1897003-568) SCREW, FLAT HD
SEE NOTE 3				4		74	1006783-45	SCREW, BUTTON HD
				8		73	1006783-44	SCREW, BUTTON HD
				8		72	1016005-1	SHIM, SLIDE LOCATING
SEE NOTE 3				8		71	1015860-025	SPACER
						70		
SEE NOTE 3				1		69	1015869-826	LIGHT, INDICATOR
				1		68	1015869-546	LIGHT, INDICATOR
				1		67	1015869-381	LIGHT, INDICATOR
				1		66	-744	
				1		65	-379	
				1		64	-378	
				1		63	-746	
				1		62	-704	
				1		61	-705	
				1		60	-706	
				1		59	-727	
				1		58	-728	
				1		57	-729	
				1		56	-710	
				1		55	-735	
				1		54	-192	
				1		53	-376	
				1		52	-318	
				1		51	-375	
				1		50	-736	
				1		49	-373	
				1		48	-372	
				1		47	-734	
				1		46	-733	
SEE NOTE 3				1		45	1015869-732	LIGHT, INDICATOR
SEE NOTE 3				1		44	1015869-731	LIGHT, INDICATOR
				1		43	-747	
				1		42	-719	
				1		41	1015869-526	
				1		40	1897337-501	
				1		39	1015869-370	
				1		38	-103	
				1		37	-721	
				1		36	-722	
				1		35	-382	
				1		34	-304	
				1		33	-711	
				1		32	-730	
				1		31	-544	
SEE NOTE 3				11		30	1015869-159	LIGHT, INDICATOR
				2		29	MS90078-7-1	(1897077-107) FUSE
				2		28	MS90078-15-1	(1897077-115) FUSE
				2		27	MS26572-1	FUSE HOLDER
SEE NOTE 3				1		26	1015873-008	FUSE HOLDER
				1		25	1015873-001	FUSE HOLDER
				1		24	1015993-001	KNOB, LOCK
SEE NOTE 3				1		23	1015992-001	KNOB, POINTER
				1		22	1901321	RESISTOR, VARIABLE
SEE NOTE 3				1		21	1015994-001	SWITCH, PUSH
				1		20	1015785-010	SLIDE ASSEMBLY, LH
				1		19	1015785-009	SLIDE ASSEMBLY, RH
				14		18	1015832-318	RELAY, SENSITIVE
				19		17	1015802-004	ARMATURE
				1		16	1016024-001	ARMATURE
				33		15	1015837-001	ARMATURE
				1		14	1016096-011	TIME DELAY
				2		13	-010	
				1		12	-008	
				1		11	-007	
				1		10	-006	
SEE NOTE 3				1		9	1016096-003	RELAY, TIME DELAY
				1		8	2900107	TERMINAL BOARD ASSEMBLY
				1		7	2900105	TERMINAL BOARD ASSEMBLY
				1		6	2900104	BRACKET, MOUNTING
				1		5	2900103	PLATE, MOUNTING CONNECTOR
				1		4	2900102	PLATE, MOUNTING RELAY
				2		3	1900015-051	HANDLE ASSEMBLY
				1		2	2900101	PANEL, FRONT
				1		1	2900100	DRAWER, TEST CONTROL (INSEP ASSY)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN E. Miller DATE 24 MAR 65
CHECKED 24 MAR 65
APPROVAL 24 MAR 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

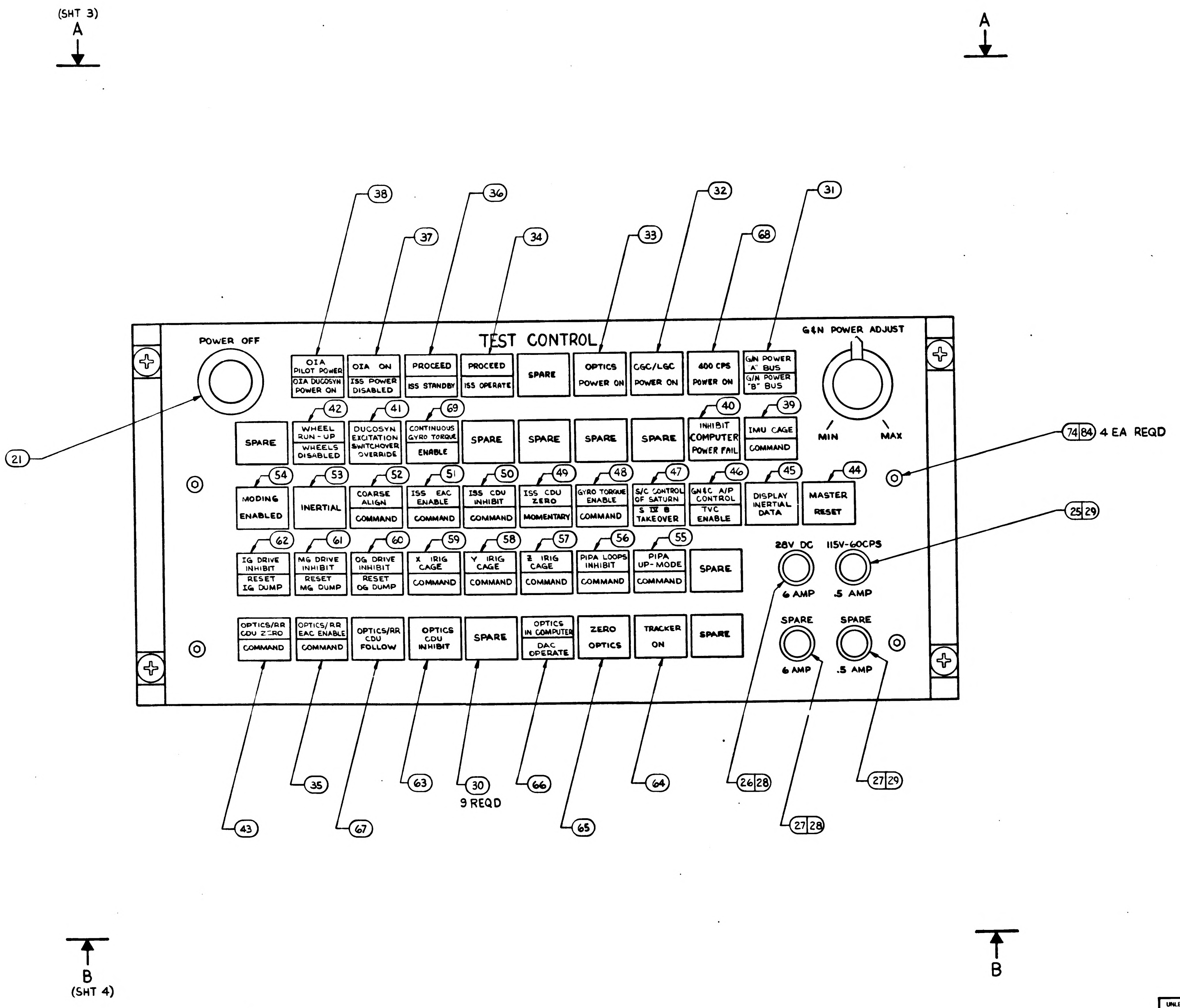
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TEST CONTROL
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900027
SCALE FULL
SHEET 1 OF 4

2900027 P

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
F	-	THIS SHEET ADDED WITH CHANGE MXC20274	-	6 JUN 65	MCR
G	-	REVISED PER MXC 202430	-	23 JUN 65	[illegible]
H		REVISION STATUS CHANGED		3 JUL 65	[illegible]
J		REVISION STATUS CHANGED		[illegible] 65	[illegible]
K		REVISION STATUS CHANGED		[illegible] JUL 65	JR
L		REVISION STATUS CHANGED		29 JUL 65	[illegible]
M		REVISED PER MXC203946		[illegible] AUG 65	[illegible]
N		REVISION STATUS CHANGED		29 SEP 65	[illegible]
P		REVISION STATUS CHANGED		19 OCT 65	[illegible]
R		INITIAL RELEASE CLASS A PER TDRR 23416		9 OCT 65	[illegible]


(SHT 3)
A
A
TEST CONTROL
POWER OFF
OIA PILOT POWER
OIA DUCOSYN POWER ON
OIA ON
ISS POWER DISABLED
PROCEED
ISS STANDBY
PROCEED
ISS OPERATE
SPARE
OPTICS POWER ON
CGC/LGC POWER ON
400 CPS POWER ON
G/N POWER "A" BUS
G/N POWER "B" BUS
G&N POWER ADJUST
MIN
MAX
SPARE
WHEEL RUN-UP
WHEELS DISABLED
DUCOSYN EXCITATION SWITCHOVER OVERRIDE
CONTINUOUS GYRO TORQUE
ENABLE
SPARE
SPARE
SPARE
SPARE
INHIBIT COMPUTER POWER FAIL
IMU CAGE
COMMAND
MODING ENABLED
INERTIAL
COARSE ALIGN
COMMAND
ISS EAC ENABLE
COMMAND
ISS CDU INHIBIT
COMMAND
ISS CDU ZERO
MOMENTARY
GYRO TORQUE ENABLE
COMMAND
S/C CONTROL OF SATURN
S IV B TAKEOVER
GN&C A/P CONTROL
TVC ENABLE
DISPLAY INERTIAL DATA
MASTER RESET
IG DRIVE INHIBIT
RESET IG DUMP
MG DRIVE INHIBIT
RESET MG DUMP
OG DRIVE INHIBIT
RESET OG DUMP
X IRIG CAGE
COMMAND
Y IRIG CAGE
COMMAND
Z IRIG CAGE
COMMAND
PIPA LOOPS INHIBIT
COMMAND
PIPA UP-MODE
COMMAND
SPARE
28V DC
6 AMP
115V-60CPS
.5 AMP
OPTICS/RR CDU ZERO
COMMAND
OPTICS/RR EAC ENABLE
COMMAND
OPTICS/RR CDU FOLLOW
OPTICS CDU INHIBIT
SPARE
OPTICS IN COMPUTER
DAC OPERATE
ZERO OPTICS
TRACKER ON
SPARE
SPARE
6 AMP
SPARE
.5 AMP
38
37
36
34
33
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68
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42
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69
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48
47
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44
62
61
60
59
58
57
56
55
21
74 84 4 EA REQD
25 29
43
35
67
63
30
9 REQD
66
65
64
26 28
27 28
27 29
B
B
(SHT 4)

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN E. Miller DATE 4 MAY 65
CHECKED M. Marmany 26 MAY 65
APPROVAL R. Foss 27 MAY 65
APPROVAL C. Gehman 10/18/65
NASA APPROVAL
MIT APPROVAL

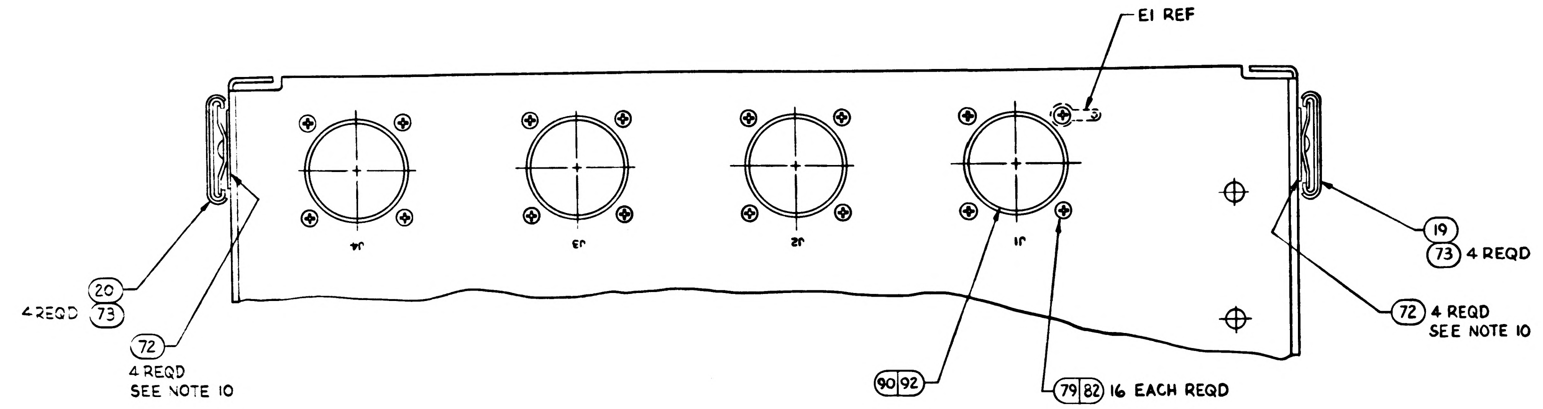
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

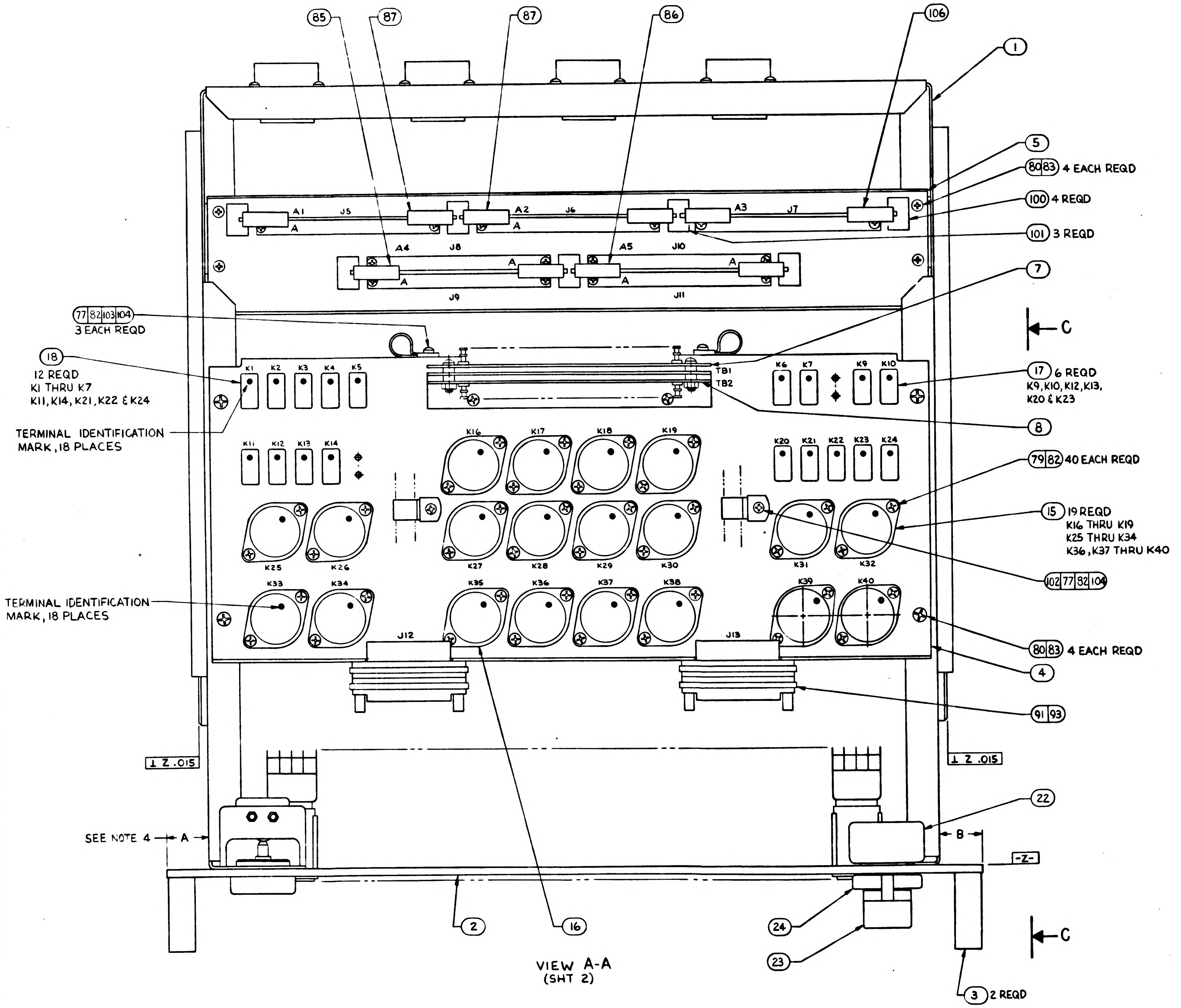
TEST CONTROL
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900027
SCALE FULL
SHEET 2 OF 4

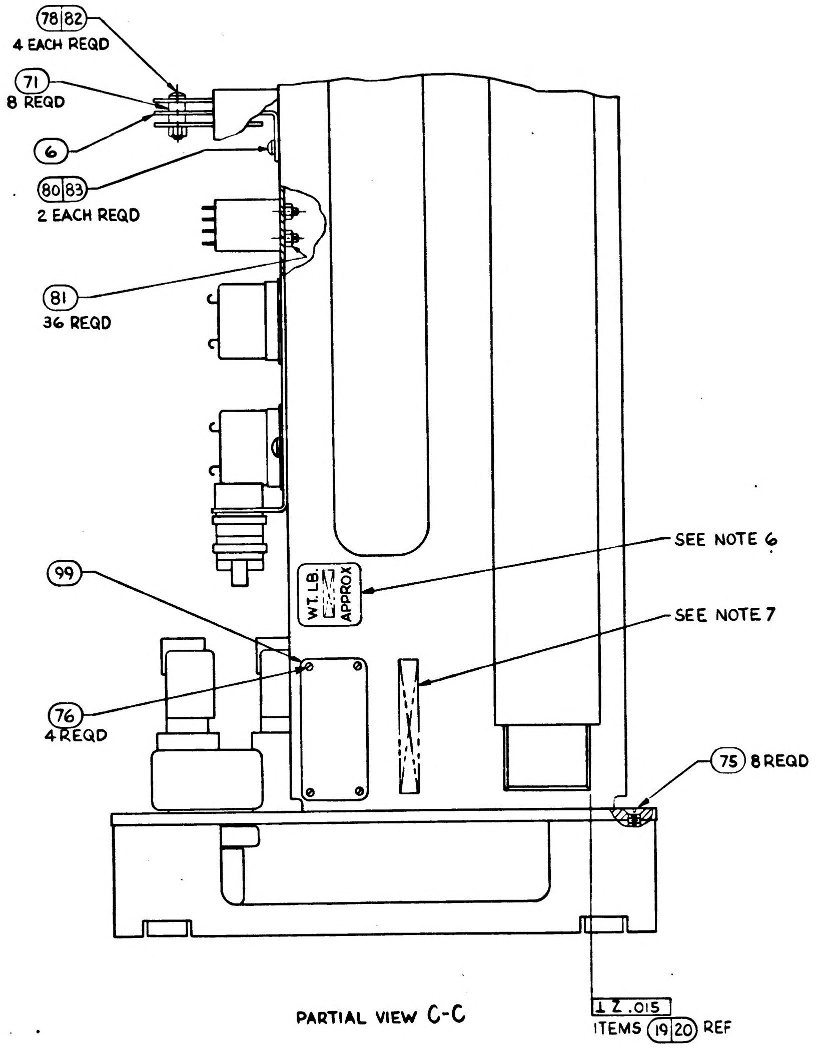
2900027 R

REVISIONS					23416
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
F	-	THIS SHEET ADDED WITH CHANGE MXC 20274	-	16 JUN 65	MCK
G		REVISED PER MXC 202430	-	23 JUN 65	
H		REVISED PER M/C 202685		3 JUL 65	
J		REVISION STATUS CHANGED		4 JUL 65	
K		REVISION STATUS CHANGED		22 JUL 65	
L		REVISION STATUS CHANGED		29 JUL 65	
M		REVISION STATUS CHANGED		AUG 65	
N		REVISED PER MXC 205421		29 SEP 65	
P		REVISION STATUS CHANGED		OCT 65	
R		INITIAL RELEASE CLASS A PER TDRR 23416		19 OCT 65	


E1 REF
J4
J3
J2
J1
20
4 REQD 73
72
4 REQD
SEE NOTE 10
90 92
79 82 16 EACH REQD
19
73 4 REQD
72 4 REQD
SEE NOTE 10


85
87
87
86
106
1
5
80 83 4 EACH REQD
100 4 REQD
101 3 REQD
7
A1 J5 A2 J6 A3 J7
A4 J8 A5 J10
J9 J11
77 82 103 104
3 EACH REQD
18
12 REQD
K1 THRU K7
K11, K14, K21, K22 & K24
TERMINAL IDENTIFICATION MARK, 18 PLACES
K1 K2 K3 K4 K5 K6 K7 K9 K10
TB1
TB2
17 6 REQD
K9, K10, K12, K13, K20 & K23
8
K11 K12 K13 K14 K16 K17 K18 K19 K20 K21 K22 K23 K24
79 82 40 EACH REQD
15 19 REQD
K16 THRU K19
K25 THRU K34
K36, K37 THRU K40
K25 K26 K27 K28 K29 K30 K31 K32
102 77 82 104
TERMINAL IDENTIFICATION MARK, 18 PLACES
K33 K34 K35 K36 K37 K38 K39 K40
J12 J13
80 83 4 EACH REQD
4
91 93
⊥ Z .015
⊥ Z .015
22
SEE NOTE 4 → A
B
-Z-
2
16
24
23
3 2 REQD
C
C

VIEW A-A
(SHT 2)

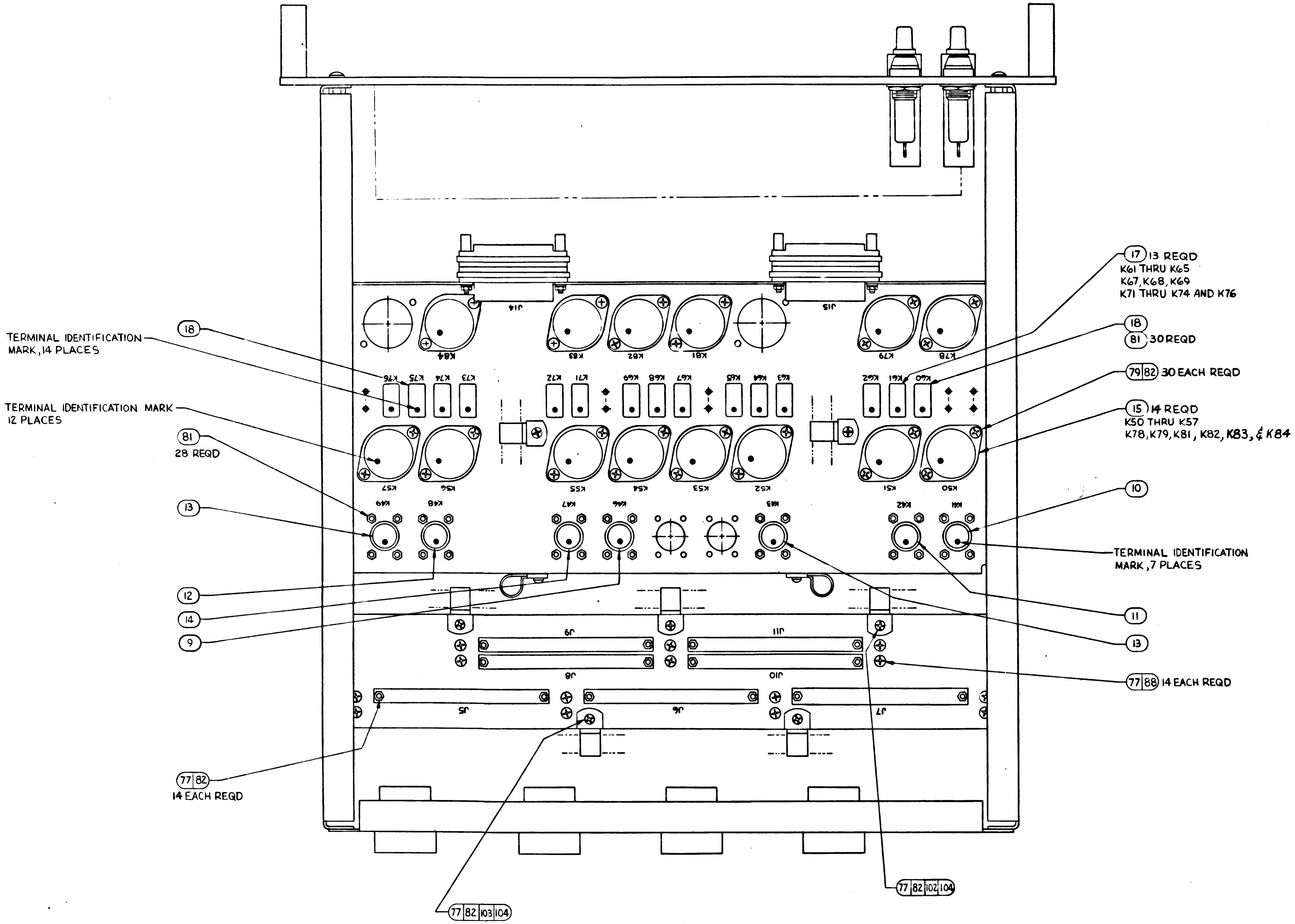

78 82
4 EACH REQD
71
8 REQD
6
80 83
2 EACH REQD
81
36 REQD
WT. LB. APPROX
SEE NOTE 6
SEE NOTE 7
99
76
4 REQD
75 8 REQD
⊥ Z .015
ITEMS 19 20 REF

PARTIAL VIEW C-C

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± — ± — ± — — — — — — —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
	ACSP PN		
	DRAWN E. Miller DATE 5 MAY 65 25 MAY 65 CHECKED APPROVAL 27 MAY 65 APPROVAL	TEST CONTROL ASSEMBLY	
DO NOT SCALE THIS DRAWING			
MATERIAL	NASA APPROVAL	CODE IDENT NO 99974	SIZE E 2900027
CONTRACT NAS9-497	MIT APPROVAL	SCALE FULL	SHEET 3 OF 4

2900027 K

REVISIONS 23416					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
F	-	THIS SHEET ADDED WITH CHANGE MXC20274	—	16 JUN 65	MCR
G		REVISED PER MXC 202430	-	23 JUN 65	
H		REVISION STATUS CHANGED		3 JUL 65	
J		REVISED PER MXC 202973		4 JUL 65	
K		REVISED PER MXC 203178		22 JUL 65	
L		REVISION STATUS CHANGED		29 JUL 65	
M		REVISED PER MXC 203946		AUG 65	
N		REVISED PER MXC 205421		SEP 65	
P		REVISED PER MXC 206112		OCT 65	
R		INITIAL RELEASE CLASS A PER TDRR 23416		19 OCT 65	



J14
J15
K84
K83
K82
K81
K79
K78
K76
K75
K74
K73
K72
K71
K69
K68
K67
K65
K64
K63
K62
K61
K60
K57
K56
K55
K54
K53
K52
K51
K50
K49
K48
K47
K46
K43
K42
K41
J9
J11
J8
J10
J5
J6
J7
TERMINAL IDENTIFICATION MARK, 14 PLACES
18
TERMINAL IDENTIFICATION MARK 12 PLACES
81
28 REQD
13
12
14
9
77 82
14 EACH REQD
77 82 103 104
8 EACH REQD
17 13 REQD
K61 THRU K65
K67, K68, K69
K71 THRU K74 AND K76
18
81 30 REQD
79 82 30 EACH REQD
15 14 REQD
K50 THRU K57
K78, K79, K81, K82, K83, & K84
10
TERMINAL IDENTIFICATION MARK, 7 PLACES
11
13
77 88 14 EACH REQD
77 82 102 104

VIEW B-B
(SHT 2)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± — ± — ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN E. Miller DATE 7 MAY 65 CHECKED M. Manning 25 MAY 65 APPROVAL R. Foss 27 MAY 65 APPROVAL	TEST CONTROL ASSEMBLY
DO NOT SCALE THIS DRAWING		
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE E · 2900027
CONTRACT NAS9-497	MIT APPROVAL	SCALE FULL · SHEET 4 OF 4

2900027 K

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEMS (95) AND (96) OR (97).
3. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.
4. DIMENSION "A" MUST BE EQUAL TO DIMENSION "B" WITHIN .040.
5. DRAWER SLIDE MOUNTING SCREWS AND FRONT PANEL MOUNTING SCREWS, ITEMS (73) AND (74) REF., SHALL BE SUBJECTED TO TORQUE OF 33.0-36.2 IN/LBS AT INSTALLATION.
6. MARK WEIGHT OF ASSEMBLY, (45 LBS), PER ND1002123.
7. MARK "SCHEMATIC" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH, COLOR BLACK, IN LOCATION SHOWN.
8. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (99) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
9. SECURE SCREWS USING ITEM (98).
10. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.

REVISIONS 23416

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
F	-	REPLACES REV (E) WITH CHANGE MXC 202074	—	16 JUN 65	MCE
G		REVISED PER MXC 202430	-	23 JUN 65	
H		REVISION STATUS CHANGED		3 JUL 65	RL
J		REVISED PER MXC 202973		14 JUL 65	RL
K		REVISED PER MXC 203178		22 JUL 65	WJR
L		REVISED PER MXC 203344		29 JUL 65	
M		REVISED PER MXC 203946		7 AUG 65	JCD
N		REVISED PER MXC 205421		29 SEP 65	EP
P		REVISED PER MXC 206112		65	K
R		INITIAL RELEASE CLASS A PER TDRR 23416		9 OCT 65	
S		REVISED PER TDRR 25295		19 JAN 66	JRC

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1		106	2900750-011	DIODE BOARD ASSY
	☒		105	PS 2900027	PROCUREMENT SPECIFICATION
SEE NOTE 3	13		104	1015986-140	WASHER, SADDLE
SEE NOTE 3	11		103	1015985-008,010	CABLE CLAMP
SEE NOTE 3	2		102	1015985-007,009	CABLE CLAMP
	3		101	1900391	BRACKET, HOLDER DOUBLE
	4		100	1900390	BRACKET, HOLDER SINGLE
	1		99	1004260-105	NAMEPLATE
	AR		98	MIL-S-22473 (GR C)	(ES2544-3) SEALING COMPOUND
	AR		97	SN60WRAP	SOLDER QQ-S-571 (ES2175-3)
	AR		96	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
	AR		95	SN60WS	SOLDER QQ-S-571 (ES2175-1)
	☒		94	2900109	SCHEMATIC DIAGRAM-ELECTRICAL
	1		93	2900114	WIRE LIST BB
	1		92	2900112	WIRE LIST AA
	1		91	2900113	WIRING HARNESS "B"
	1		90	2900111	WIRING HARNESS "A"
	☒		89	2900110	RUNNING LIST, TEST CONTROL
	14		88	MS35333-71	WASHER, LOCK, INT TOOTH
	2		87	2900044-011	DETECTOR ASSEMBLY
	1		86	2900050-011	DIODE BOARD ASSEMBLY
	1		85	2900053-011	DIODE & RESISTOR BOARD ASSY
SEE NOTE 3	4		84	1016151-010	NUT, SELF LOCKING
	10		83	-008	
	117		82	-006	
SEE NOTE 3	94		81	1016151-004	NUT, SELF LOCKING
	10		80	MS35216-40	SCREW, PAN HD
	86		79	-25	
	4		78	-28	
	41		77	-27	
	4		76	MS35216-1	SCREW, PAN HD
	8		75	AN507C832R12	(1897003-568) SCREW, FLAT HD
SEE NOTE 3	4		74	1006783-45	SCREW, BUTTON HD
	8		73	1006783-44	SCREW, BUTTON HD
	8		72	1016005-1	SHIM, SLIDE LOCATING
SEE NOTE 3	8		71	1015860-025	SPACER
			70		
SEE NOTE 3	1		69	1015869-826	LIGHT, INDICATOR
	1		68	1015869-546	LIGHT, INDICATOR
	1		67	1015869-381	LIGHT, INDICATOR
	1		66	-744	
	1		65	-379	
	1		64	-378	
	1		63	-746	
	1		62	-704	
	1		61	-705	
	1		60	-706	
	1		59	-727	
	1		58	-728	
	1		57	-729	
	1		56	-710	
	1		55	-735	
	1		54	-192	
	1		53	-376	
	1		52	-318	
	1		51	-375	
	1		50	-736	
	1		49	-373	
	1		48	-372	
	1		47	-734	
	1		46	-733	
SEE NOTE 3	1		45	1015869-732	LIGHT, INDICATOR
SEE NOTE 3	1		44	1015869-731	LIGHT, INDICATOR
	1		43	-747	
	1		42	-719	
	1		41	1015869-526	
	1		40	1897337-501	
	1		39	1015869-370	
	1		38	-103	
	1		37	-721	
	1		36	-722	
	1		35	-382	
	1		34	-304	
	1		33	-711	
	1		32	-730	
	1		31	-544	
SEE NOTE 3	11		30	1015869-159	LIGHT, INDICATOR
	2		29	MS90078-7-1	(1897077-107) FUSE
	2		28	MS90078-15-1	(1897077-115) FUSE
	2		27	MS26572-1	FUSE HOLDER
SEE NOTE 3	1		26	1015873-008	FUSE HOLDER
	1		25	1015873-001	FUSE HOLDER
	1		24	1015993-001	KNOB, LOCK
SEE NOTE 3	1		23	1015992-001	KNOB, POINTER
	1		22	1901321	RESISTOR, VARIABLE
SEE NOTE 3	1		21	1015994-001	SWITCH, PUSH
	1		20	1015785-010	SLIDE ASSEMBLY, LH
	1		19	1015785-009	SLIDE ASSEMBLY, RH
	14		18	1015832-318	RELAY, SENSITIVE
	19		17	1015802-004	ARMATURE
	1		16	1016024-001	ARMATURE
	33		15	1015837-001	ARMATURE
	1		14	1016096-011	TIME DELAY
	2		13	-010	
	1		12	-008	
	1		11	-007	
	1		10	-006	
SEE NOTE 3	1		9	1016096-003	RELAY, TIME DELAY
	1		8	2900107	TERMINAL BOARD ASSEMBLY
	1		7	2900105	TERMINAL BOARD ASSEMBLY
	1		6	2900104	BRACKET, MOUNTING
	1		5	2900103	PLATE, MOUNTING CONNECTOR
	1		4	2900102	PLATE, MOUNTING RELAY
	2		3	1900015-051	HANDLE ASSEMBLY
	1		2	2900101	PANEL, FRONT
	1		1	2900100	DRAWER, TEST CONTROL (INSEP ASSY)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE, WIS.
DRAWN E. Miller DATE 24 MAR 65
CHECKED 24 MAR 65
APPROVAL 24 MAR 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

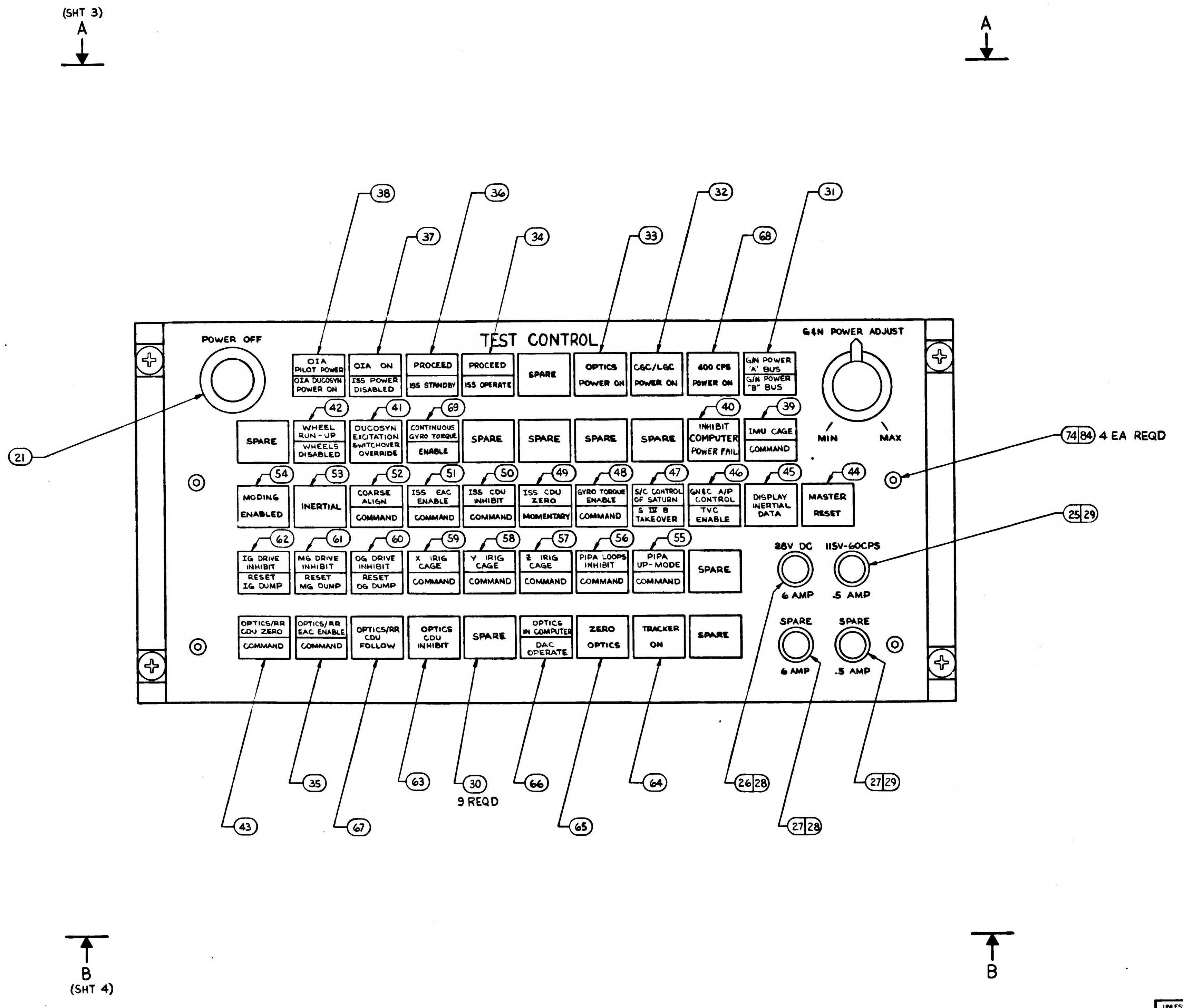
TEST CONTROL
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900027
SCALE FULL
SHEET OF

2900027

REVISIONS 23416

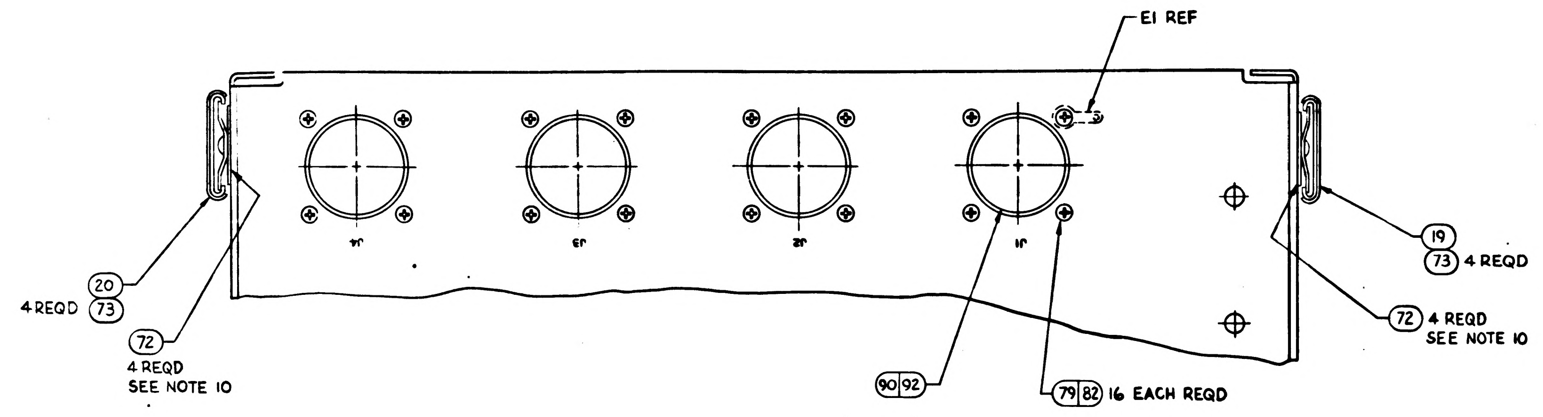
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
F	-	THIS SHEET ADDED WITH CHANGE MXC20274	—	16 JUN 65	MCR
G	-	REVISED PER MXC 202430	—	23 JUN 65	R
H		REVISION STATUS CHANGED		3 JUL 65	GL
J		REVISION STATUS CHANGED		[illegible] JUL 65	
K		REVISION STATUS CHANGED		22 JUL 65	WJR
L		REVISION STATUS CHANGED		29 JUL 65	
M		REVISED PER MXC203946		[illegible] AUG 65	JCD
N		REVISION STATUS CHANGED		29 SEP 65	
P		REVISION STATUS CHANGED		19 OCT 65	LK
R		INITIAL RELEASE CLASS A PER TDRR 23416		9 OCT 65	
S		REVISION STATUS CHANGED		9 JAN 66	JAC



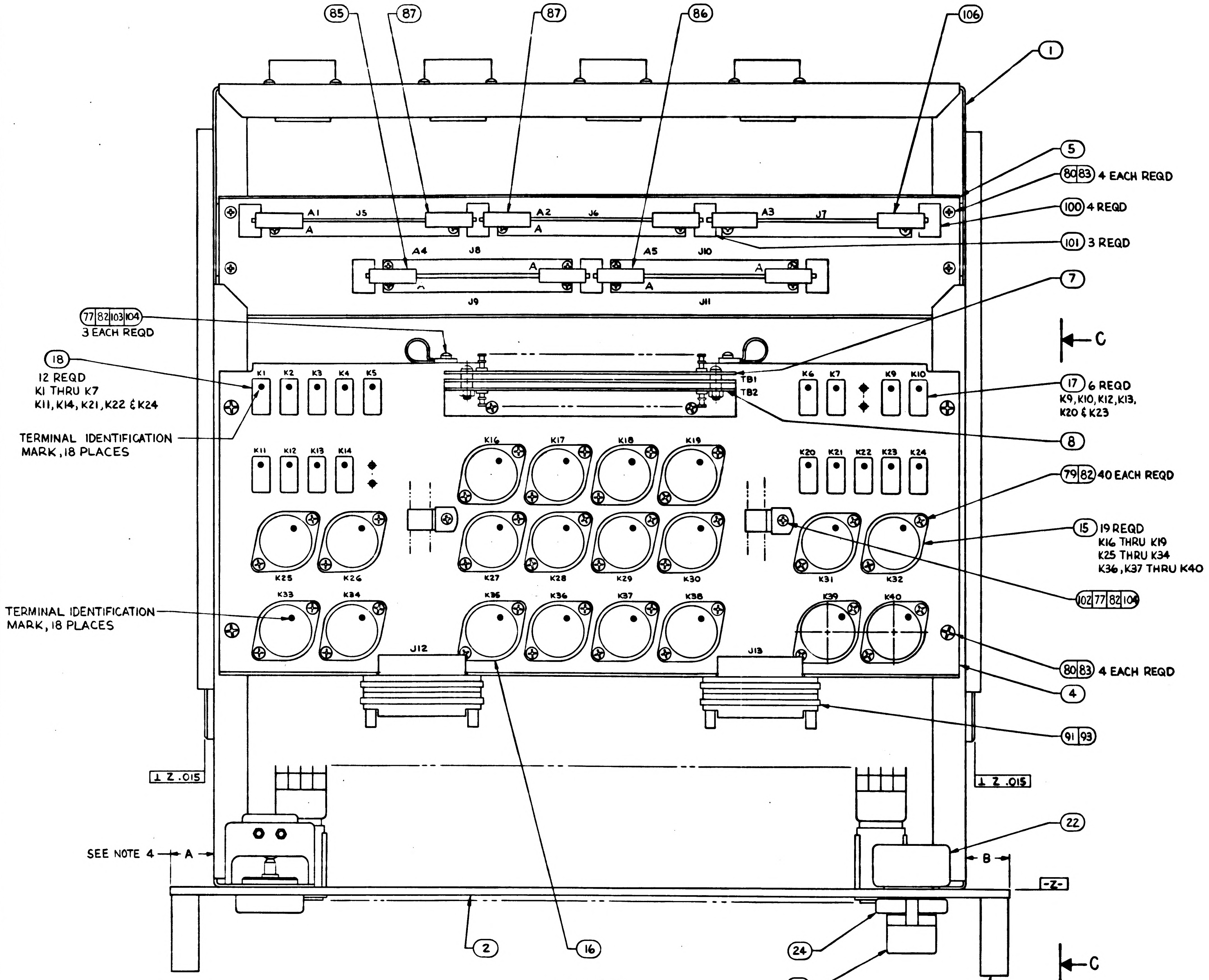
(SHT 3)
A
A
TEST CONTROL
POWER OFF
OIA PILOT POWER
OIA DUCOSYN POWER ON
OIA ON
ISS POWER DISABLED
PROCEED
ISS STANDBY
PROCEED
ISS OPERATE
SPARE
OPTICS POWER ON
CGC/LGC POWER ON
400 CPS POWER ON
G/N POWER "A" BUS
G/N POWER "B" BUS
G&N POWER ADJUST
MIN
MAX
SPARE
WHEEL RUN-UP
WHEELS DISABLED
DUCOSYN EXCITATION SWITCHOVER OVERRIDE
CONTINUOUS GYRO TORQUE ENABLE
SPARE
SPARE
SPARE
SPARE
INHIBIT COMPUTER POWER FAIL
IMU CAGE COMMAND
MODING ENABLED
INERTIAL
COARSE ALIGN COMMAND
ISS EAC ENABLE COMMAND
ISS CDU INHIBIT COMMAND
ISS CDU ZERO MOMENTARY
GYRO TORQUE ENABLE COMMAND
S/C CONTROL OF SATURN
S IV B TAKEOVER
GN&C A/P CONTROL
TVC ENABLE
DISPLAY INERTIAL DATA
MASTER RESET
IG DRIVE INHIBIT
RESET IG DUMP
MG DRIVE INHIBIT
RESET MG DUMP
OG DRIVE INHIBIT
RESET OG DUMP
X IRIG CAGE COMMAND
Y IRIG CAGE COMMAND
Z IRIG CAGE COMMAND
PIPA LOOPS INHIBIT COMMAND
PIPA UP-MODE COMMAND
SPARE
28V DC
6 AMP
115V-60CPS
.5 AMP
SPARE
6 AMP
SPARE
.5 AMP
OPTICS/RR CDU ZERO COMMAND
OPTICS/RR EAC ENABLE COMMAND
OPTICS/RR CDU FOLLOW
OPTICS CDU INHIBIT
SPARE
OPTICS IN COMPUTER
DAC OPERATE
ZERO OPTICS
TRACKER ON
SPARE
38
37
36
34
33
32
68
31
42
41
69
40
39
74 84 4 EA REQD
21
54
53
52
51
50
49
48
47
46
45
44
25 29
62
61
60
59
58
57
56
55
35
63
30
9 REQD
66
64
26 28
27 29
43
67
65
27 28
B
(SHT 4)
B

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + — − — DECIMALS + — − — ANGLES + — − —	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN E. Miller DATE 4 MAY 65 CHECKED 26 MAY 65 APPROVAL 27 MAY 65 APPROVAL	TEST CONTROL ASSEMBLY
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974 · SIZE E · 2900027
CONTRACT NAS9-497	MIT APPROVAL	SCALE FULL · SHEET 2 OF 4

REVISIONS		23416			
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
F	-	THIS SHEET ADDED WITH CHANGE MXC20274	-	16 JUN 65	MCR
G		REVISED PER MXC 202430	-	23 JUN 65	
H		REVISED PER MXC 202685		3 JUL 65	
J		REVISION STATUS CHANGED		JUL 65	
K		REVISION STATUS CHANGED		22 JUL 65	WJR
L		REVISION STATUS CHANGED		29 JUL 65	
M		REVISION STATUS CHANGED		AUG 65	JCD
N		REVISED PER MXC 205421		29 SEP 65	
P		REVISION STATUS CHANGED		19 OCT	LK
Ⓜ R		INITIAL RELEASE CLASS A PER TDRR 23416		19 OCT 65	
S		REVISION STATUS CHANGED		19 JAN 66	JAC

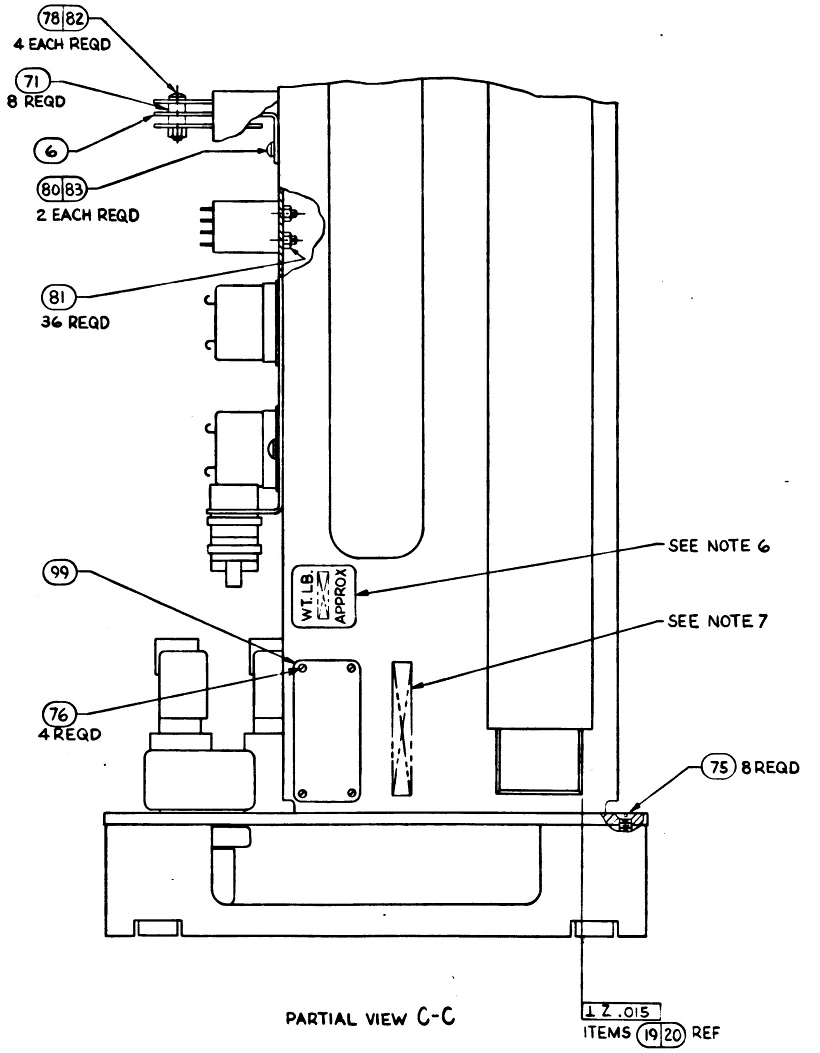


E1 REF
J4
J3
J2
J1
20
4 REQD 73
72
4 REQD
SEE NOTE 10
90 92
79 82 16 EACH REQD
19
73 4 REQD
72 4 REQD
SEE NOTE 10



85
87
87
86
106
1
5
80 83 4 EACH REQD
100 4 REQD
101 3 REQD
7
A1
J5
A2
J6
A3
J7
A
A4
J8
A5
J10
J9
J11
77 82 103 104
3 EACH REQD
18
12 REQD
K1 THRU K7
K11, K14, K21, K22 & K24
TERMINAL IDENTIFICATION MARK, 18 PLACES
K1 K2 K3 K4 K5
TB1
TB2
K6 K7 K9 K10
17 6 REQD
K9, K10, K12, K13, K20 & K23
8
K11 K12 K13 K14
K16 K17 K18 K19
K20 K21 K22 K23 K24
79 82 40 EACH REQD
15 19 REQD
K16 THRU K19
K25 THRU K34
K36, K37 THRU K40
K25 K26 K27 K28 K29 K30 K31 K32
102 77 82 104
TERMINAL IDENTIFICATION MARK, 18 PLACES
K33 K34 K35 K36 K37 K38 K39 K40
J12
J13
80 83 4 EACH REQD
4
91 93
C
C
⊥ Z .015
⊥ Z .015
22
SEE NOTE 4
A
B
-Z-
2
16
24
23
3 2 REQD

VIEW A-A
(SHT 2)



78 82
4 EACH REQD
71
8 REQD
6
80 83
2 EACH REQD
81
36 REQD
99
W.I.L.B. APPROX
SEE NOTE 6
SEE NOTE 7
76
4 REQD
75 8 REQD
⊥ Z .015
ITEMS 19 20 REF

PARTIAL VIEW C-C

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES +— +— +— -— -— -—	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN E. Miller DATE 5 MAY 65 CHECKED 25 MAY 65 APPROVAL 27 MAY 65 APPROVAL	TEST CONTROL ASSEMBLY
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE E · 2900027
CONTRACT NAS9-497	MIT APPROVAL	SCALE FULL · SHEET 3 OF 4

2900027 S

REVISIONS 23416

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
F	-	THIS SHEET ADDED WITH CHANGE MXC20274	—	16 JUN 65	MCR
G		REVISED PER MXC 208430	-	23 JUN 65	
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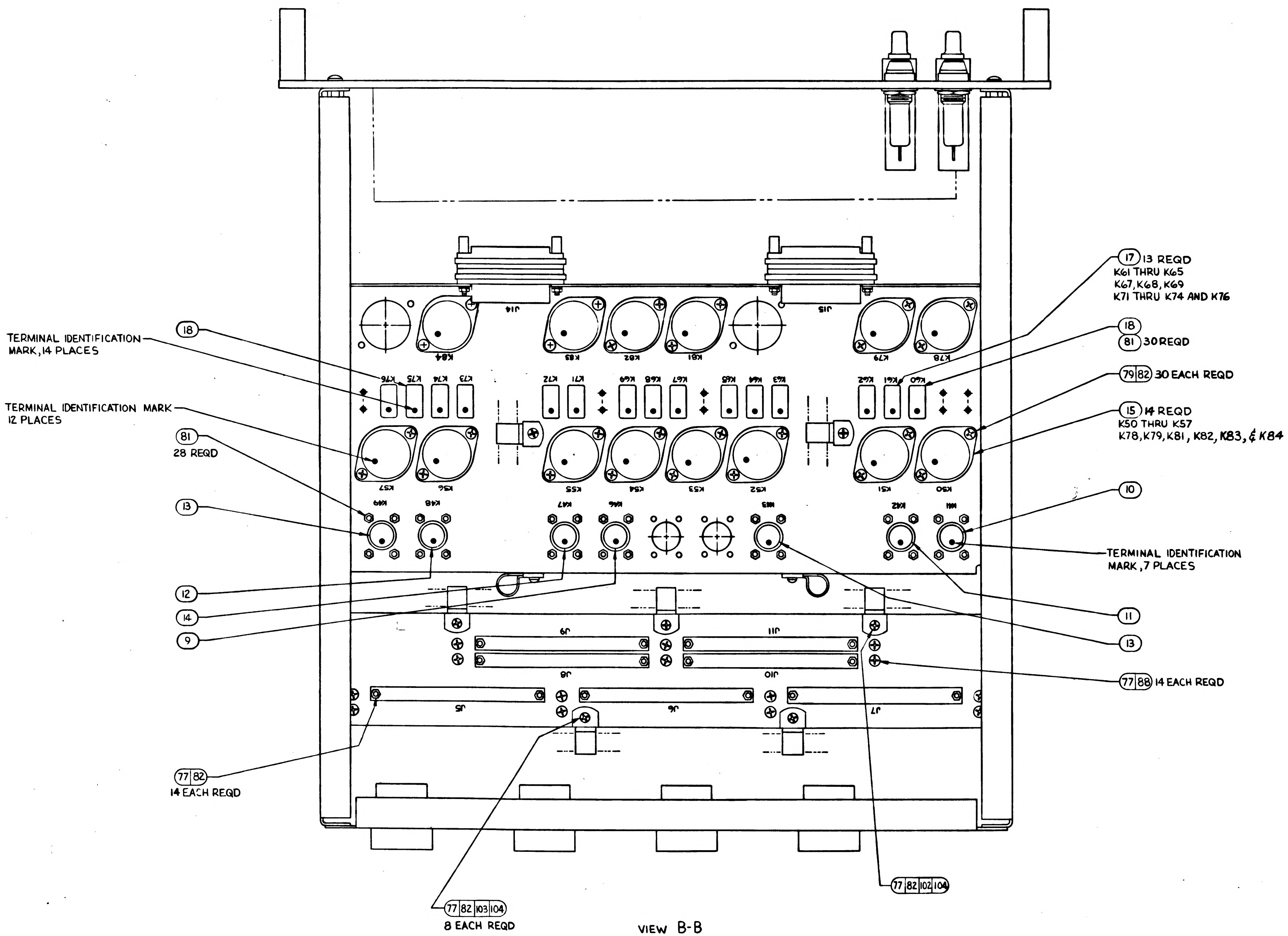
N		REVISED PER MXC 205421		29 SEP 65	
P		REVISED PER MXC 206112		OCT 65	
R		INITIAL RELEASE CLASS A PER TDRR 23416		19 OCT 65	
S		REVISION STATUS CHANGED		18 JAN 66	



TERMINAL IDENTIFICATION MARK, 14 PLACES
(18)
TERMINAL IDENTIFICATION MARK 12 PLACES
(81) 28 REQD
(13)
(12)
(14)
(9)
(77)(82) 14 EACH REQD
(77)(82)(103)(104) 8 EACH REQD
(17) 13 REQD K61 THRU K65 K67, K68, K69 K71 THRU K74 AND K76
(18)
(81) 30 REQD
(79)(82) 30 EACH REQD
(15) 14 REQD K50 THRU K57 K78, K79, K81, K82, K83, & K84
(10)
TERMINAL IDENTIFICATION MARK, 7 PLACES
(11)
(13)
(77)(88) 14 EACH REQD
(77)(82)(102)(104)
J14
J15
K84
K83
K82
K81
K79
K78
K76
K75
K74
K73
K72
K71
K69
K68
K67
K65
K64
K63
K62
K61
K60
K57
K56
K55
K54
K53
K52
K51
K50
K49
K48
K47
K46
K43
K42
K41
J9
J11
J8
J10
J5
J6
J7

VIEW B-B
(SHT 2)

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ — + — + —
− — − — − —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN E. Miller DATE 7 MAY 65
CHECKED 25 MAY 65
APPROVAL 27 MAY 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TEST CONTROL
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900027
SCALE FULL
SHEET 4 OF 4

2900027 (

REVISIONS 23416					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
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Ⓜ R		INITIAL RELEASE CLASS A PER TDRR 23416		9 OCT 65	
Ⓜ S		REVISED PER TDRR 25295		19 JAN 66	JJJ
T		REVISED PER TDRR 27002		15 MAR 66	RLP

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
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4. DIMENSION "A" MUST BE EQUAL TO DIMENSION "B" WITHIN .040.
5. DRAWER SLIDE MOUNTING SCREWS AND FRONT PANEL MOUNTING SCREWS, ITEMS (73) AND (74) REF., SHALL BE SUBJECTED TO TORQUE OF 33.0-36.2 IN/LBS AT INSTALLATION.
6. MARK WEIGHT OF ASSEMBLY, (45 LBS), PER ND1002123.
7. MARK "SCHEMATIC" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH, COLOR BLACK, IN LOCATION SHOWN.
8. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (99) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
9. SECURE SCREWS USING ITEM (98).
10. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.

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SEE NOTE 3	2		102	1015985-007,009	CABLE CLAMP
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	4		100	1900390	BRACKET, HOLDER SINGLE
	1		99	1004260-105	NAMEPLATE
	AR		98	MIL-S-22473(GR C)	(ES2544-3) SEALING COMPOUND
	AR		97	SN60WRAP	SOLDER QQ-S-571 (ES2175-3)
	AR		96	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
	AR		95	SN60WS	SOLDER QQ-S-571, ES2175-1)
	☒		94	2900109	SCHEMATIC DIAGRAM-ELECTRICAL
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	1		92	2900112	WIRE LIST AA
	1		91	2900113	WIRING HARNESS "B"
	1		90	2900111	WIRING HARNESS "A"
	☒		89	2900110	RUNNING LIST, TEST CONTROL
	14		88	MS35333-71	WASHER, LOCK, INT TOOTH
	2		87	2900044-011	DETECTOR ASSEMBLY
	1		86	2900050-011	DIODE BOARD ASSEMBLY
	1		85	2900053-011	DIODE & RESISTOR BOARD ASSY
SEE NOTE 3	4		84	1016151-010	NUT, SELF LOCKING
	10		83	↕ -008	↕
	117		82	↕ -006	↕
SEE NOTE 3	94		81	1016151-004	NUT, SELF LOCKING
	10		80	MS35216-40	SCREW, PAN HD
	86		79	↕ -25	↕
	4		78	↕ -28	↕
	41		77	↕ -27	↕
	4		76	MS35216-1	SCREW, PAN HD
	8		75	AN507C832R12	(1897003-568) SCREW, FLAT HD
SEE NOTE 3	4		74	1006783-45	SCREW, BUTTON HD
	8		73	1006783-44	SCREW, BUTTON HD
	8		72	1016005-1	SHIM, SLIDE LOCATING
SEE NOTE 3	8		71	1015860-025	SPACER
			70		
SEE NOTE 3	1		69	1015869-826	LIGHT, INDICATOR
	1		68	1015869-546	LIGHT, INDICATOR
	1		67	1015869-381	LIGHT, INDICATOR
	1		66	-744	
	1		65	-379	
	1		64	-378	
	1		63	-746	
	1		62	-704	
	1		61	-705	
	1		60	-706	
	1		59	-727	
	1		58	-728	
	1		57	-729	
	1		56	-710	
	1		55	-735	
	1		54	-192	
	1		53	-376	
	1		52	-318	
	1		51	-375	
	1		50	-736	
	1		49	-373	
	1		48	-372	
	1		47	-734	
	1		46	-733	
SEE NOTE 3	1		45	1015869-732	LIGHT, INDICATOR
SEE NOTE 3	1		44	1015869-731	LIGHT, INDICATOR
	1		43	-747	
	1		42	-719	
	1		41	1015869-526	
	1		40	1897337-501	
	1		39	1015869-370	
	1		38	-103	
	1		37	-721	
	1		36	-722	
	1		35	-382	
	1		34	-304	
	1		33	-711	
	1		32	-730	
	1		31	-544	
SEE NOTE 3	9		30	1015869-159	LIGHT, INDICATOR
	2		29	MS90078-7-1	(1897077-107) FUSE
	2		28	MS90078-15-1	(1897077-115) FUSE
	2		27	MS26572-1	FUSE HOLDER
SEE NOTE 3	1		26	1015873-008	FUSE HOLDER
	1		25	1015873-001	FUSE HOLDER
	1		24	1015993-001	KNOB, LOCK
SEE NOTE 3	1		23	1015992-001	KNOB, POINTER
	1		22	1901321	RESISTOR, VARIABLE
SEE NOTE 3	1		21	1015994-001	SWITCH, PUSH
	1		20	1015785-010	SLIDE ASSEMBLY, LH
	1		19	1015785-009	SLIDE ASSEMBLY, RH
	14		18	1015832-318	RELAY, SENSITIVE
	19		17	1015802-004	ARMATURE
	1		16	1016024-001	ARMATURE
	33		15	1015837-001	ARMATURE
	1		14	1016096-011	TIME DELAY
	2		13	-010	
	1		12	-008	
	1		11	-007	
	1		10	-006	
SEE NOTE 3	1		9	1016096-003	RELAY, TIME DELAY
	1		8	2900107	TERMINAL BOARD ASSEMBLY
	1		7	2900105	TERMINAL BOARD ASSEMBLY
	1		6	2900104	BRACKET, MOUNTING
	1		5	2900103	PLATE, MOUNTING CONNECTOR
	1		4	2900102	PLATE, MOUNTING RELAY
	2		3	1900015-051	HANDLE ASSEMBLY
	1		2	2900101	PANEL, FRONT
	1		1	2900100	DRAWER, TEST CONTROL (INSEP ASSY)

LIST OF PARTS AND MATERIALS

APPLICATION		
NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN E. Miller DATE 24 MAR 65
CHECKED 24 MAR 65
APPROVAL 24 MAR 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

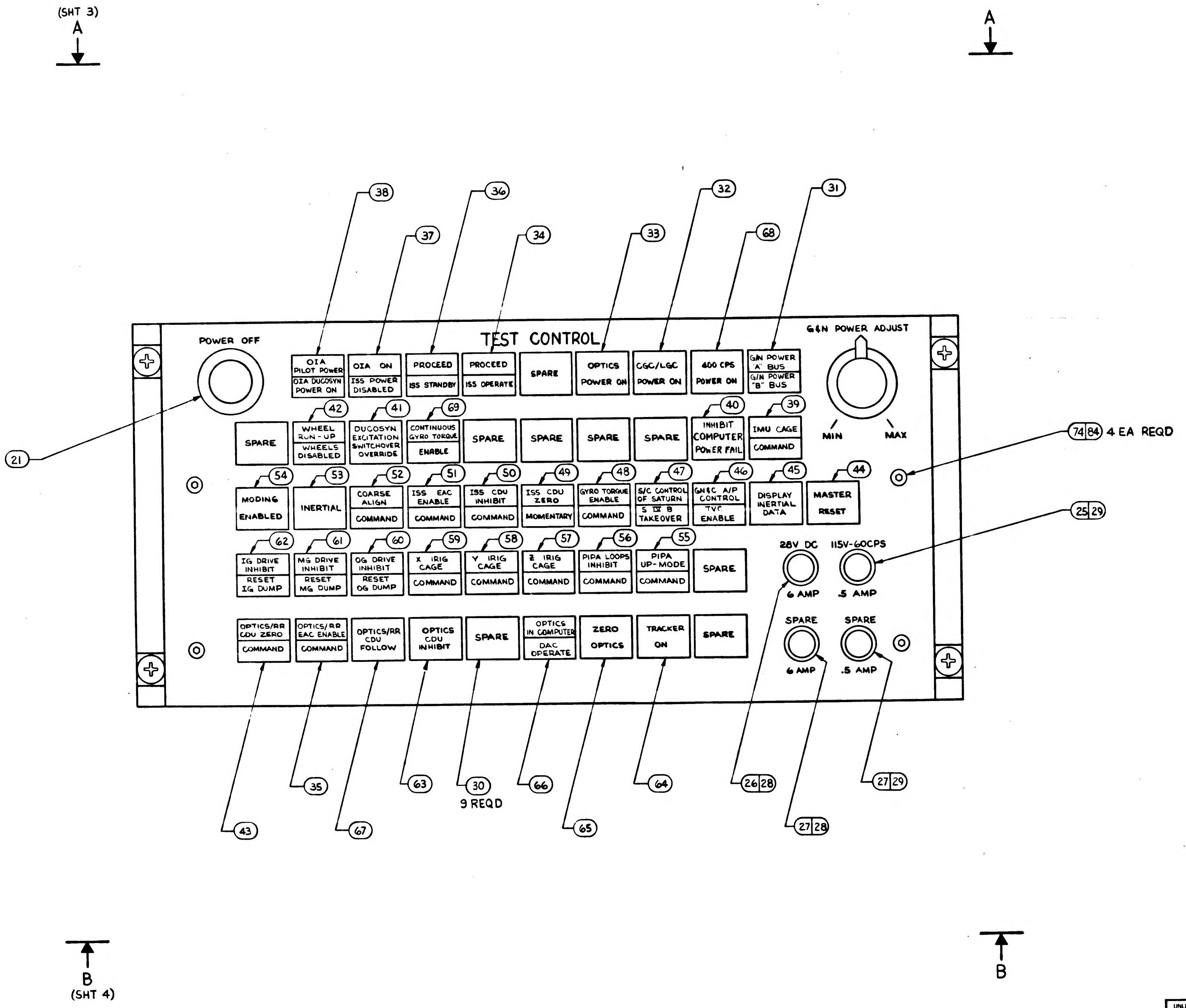
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TEST CONTROL
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900027
SCALE FULL
SHEET 1 OF 2

2900027 T

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
F	-	THIS SHEET ADDED WITH CHANGE MXC20274	—	[illegible] 65	MCR
G	-	REVISED PER MXC 202490	—	23 [illegible] 65	[illegible]
H		REVISION STATUS CHANGED		3 [illegible] 65	[illegible]
J		REVISION STATUS CHANGED		[illegible]	[illegible]
K		REVISION STATUS CHANGED		[illegible] 65	JR
L		REVISION STATUS CHANGED		[illegible] 65	[illegible]
M		REVISED PER MXC203946		[illegible] AUG 65	JCD
N		REVISION STATUS CHANGED		[illegible] SEP 65	[illegible]
P		REVISION STATUS CHANGED		[illegible] OCT 65	LK
(m) R		INITIAL RELEASE CLASS A PER TDRR 23416		9 OCT 65	FE
Ⓜ S		REVISION STATUS CHANGED		9 JAN 66	JAC
T		REVISION STATUS CHANGED		15 MAR 66	RP


(SHT 3)
A
A
TEST CONTROL
POWER OFF
OIA PILOT POWER
OIA DUCOSYN POWER ON
OIA ON
ISS POWER DISABLED
PROCEED
ISS STANDBY
PROCEED
ISS OPERATE
SPARE
OPTICS POWER ON
CGC/LGC POWER ON
400 CPS POWER ON
G/N POWER "A" BUS
G/N POWER "B" BUS
G&N POWER ADJUST
MIN
MAX
SPARE
WHEEL RUN-UP
WHEELS DISABLED
DUCOSYN EXCITATION SWITCHOVER OVERRIDE
CONTINUOUS GYRO TORQUE
ENABLE
SPARE
SPARE
SPARE
SPARE
INHIBIT COMPUTER POWER FAIL
IMU CAGE
COMMAND
MODING ENABLED
INERTIAL
COARSE ALIGN
COMMAND
ISS EAC ENABLE
COMMAND
ISS CDU INHIBIT
COMMAND
ISS CDU ZERO
MOMENTARY
GYRO TORQUE ENABLE
COMMAND
S/C CONTROL OF SATURN
S IV B TAKEOVER
GN&C A/P CONTROL
TVC ENABLE
DISPLAY INERTIAL DATA
MASTER RESET
IG DRIVE INHIBIT
RESET IG DUMP
MG DRIVE INHIBIT
RESET MG DUMP
OG DRIVE INHIBIT
RESET OG DUMP
X IRIG CAGE
COMMAND
Y IRIG CAGE
COMMAND
Z IRIG CAGE
COMMAND
PIPA LOOPS INHIBIT
COMMAND
PIPA UP-MODE
COMMAND
SPARE
28V DC
6 AMP
115V-60CPS
.5 AMP
OPTICS/RR CDU ZERO
COMMAND
OPTICS/RR EAC ENABLE
COMMAND
OPTICS/RR CDU FOLLOW
OPTICS CDU INHIBIT
SPARE
OPTICS IN COMPUTER
DAC OPERATE
ZERO OPTICS
TRACKER ON
SPARE
SPARE
6 AMP
SPARE
.5 AMP
38
37
36
34
33
32
68
31
21
42
41
69
40
39
74 84 4 EA REQD
54
53
52
51
50
49
48
47
46
45
44
25 29
62
61
60
59
58
57
56
55
43
35
67
63
30
9 REQD
66
65
64
26 28
27 28
27 29
B
(SHT 4)
B

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE, WIS.
DRAWN E. Miller DATE 4 MAY 65
CHECKED 26 MAY 65
APPROVAL 27 MAY 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

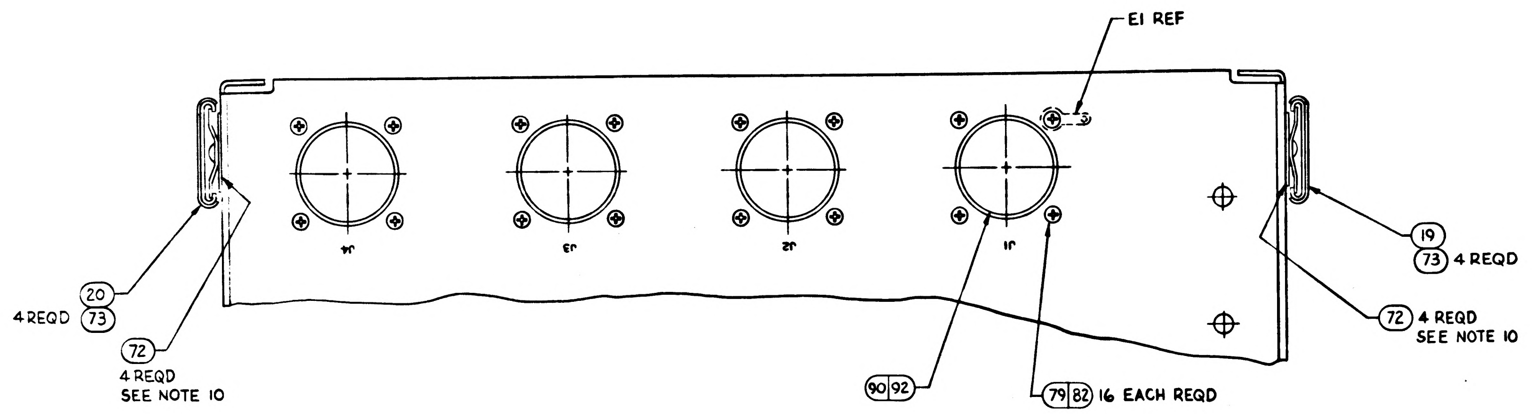
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TEST CONTROL
ASSEMBLY

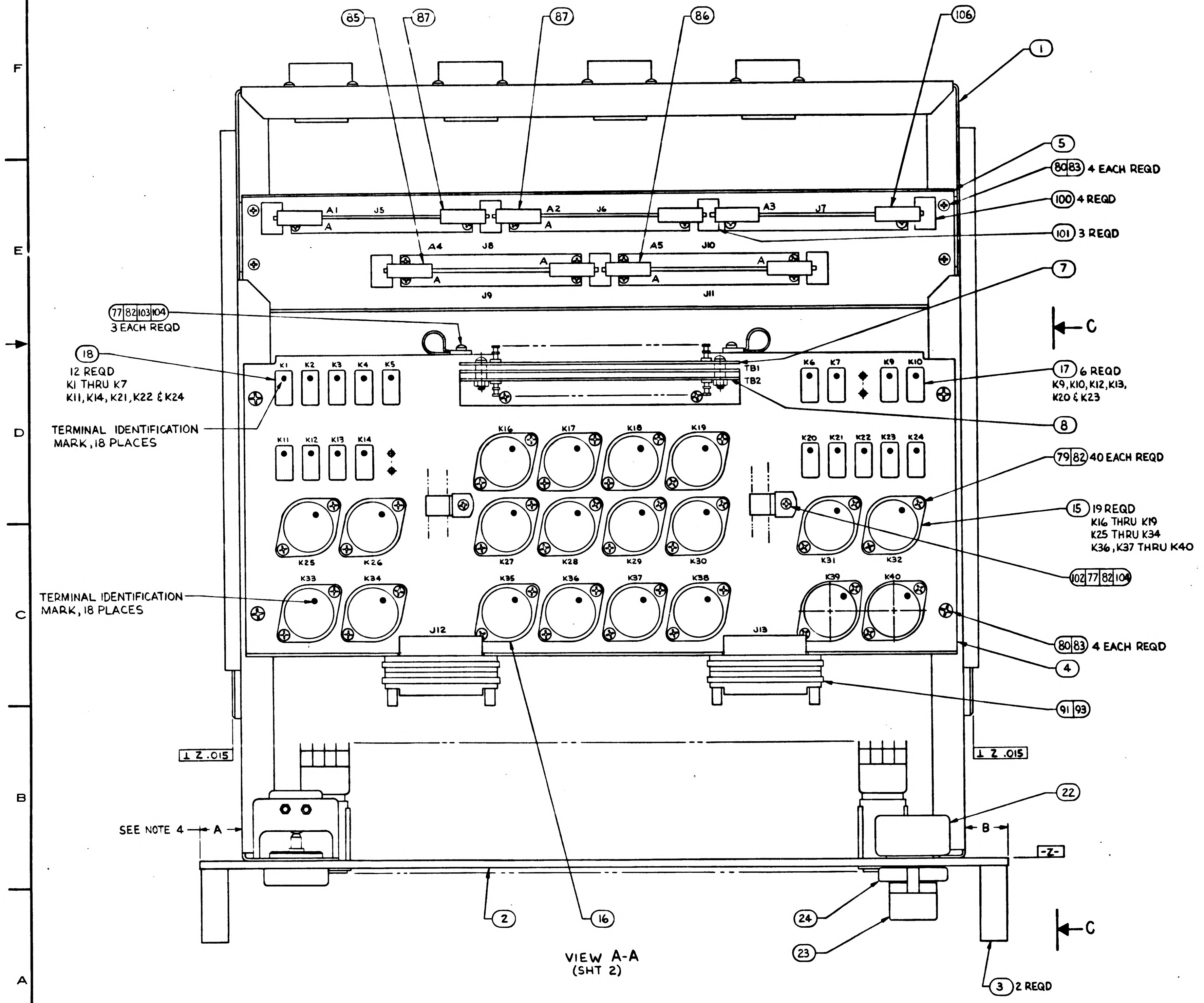
CODE IDENT NO 99974
SIZE E
2900027
SCALE FULL
SHEET 2 OF 4

2900027 T

REVISIONS 23416					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
F	-	THIS SHEET ADDED WITH CHANGE MXC20274	-	16 JUN 65	MCR
G		REVISED PER MXC 202430	-	23 JUN 65	
H		REVISED PER MXC 202685		3 JUL 65	
J		REVISION STATUS CHANGED		14 JUL 65	
K		REVISION STATUS CHANGED		22 JUL 65	WJR
L		REVISION STATUS CHANGED		29 JUL 65	
M		REVISION STATUS CHANGED		AUG 65	JCD
N		REVISED PER MXC 205421		29 SEP 65	
P		REVISION STATUS CHANGED		19 OCT	LK
Ⓜ R		INITIAL RELEASE CLASS A PER TDRR 23416		19 OCT 65	
S		REVISION STATUS CHANGED		19 JAN 66	TAC
T		REVISION STATUS CHANGED		15 MAR 66	RP

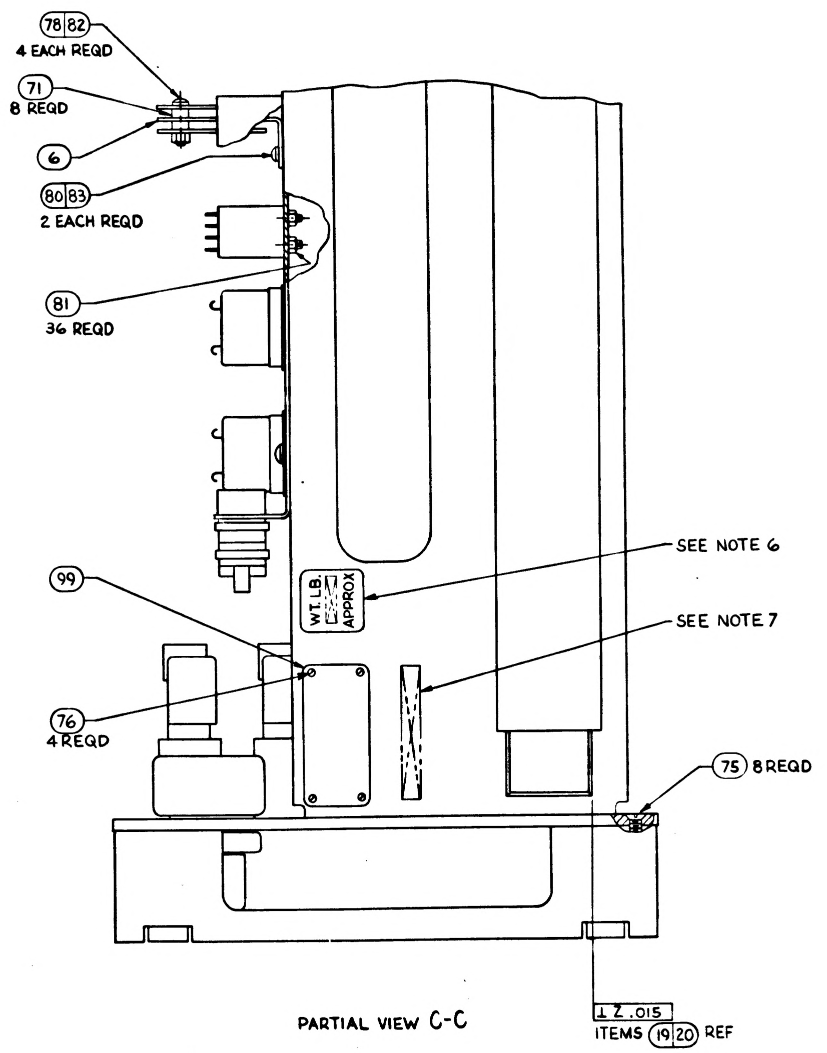


E1 REF
J4
J3
J2
J1
20
4 REQD 73
72
4 REQD
SEE NOTE 10
90 92
79 82 16 EACH REQD
19
73 4 REQD
72 4 REQD
SEE NOTE 10



65
87
87
86
106
1
5
80 83 4 EACH REQD
100 4 REQD
101 3 REQD
7
A1
J5
A2
J6
A3
J7
A
A
J8
A4
A5
J10
J9
J11
77 82 103 104
3 EACH REQD
18
12 REQD
K1 THRU K7
K11, K14, K21, K22 & K24
TERMINAL IDENTIFICATION MARK, 18 PLACES
K1 K2 K3 K4 K5
TB1
TB2
K6 K7 K9 K10
17 6 REQD
K9, K10, K12, K13,
K20 & K23
8
K11 K12 K13 K14
K16 K17 K18 K19
K20 K21 K22 K23 K24
79 82 40 EACH REQD
15 19 REQD
K16 THRU K19
K25 THRU K34
K36, K37 THRU K40
K25 K26 K27 K28 K29 K30 K31 K32
102 77 82 104
TERMINAL IDENTIFICATION MARK, 18 PLACES
K33 K34 K35 K36 K37 K38 K39 K40
J12
J13
80 83 4 EACH REQD
4
91 93
⊥ Z .015
⊥ Z .015
22
SEE NOTE 4 → A
B
-Z-
2
16
24
23
3 2 REQD
C
C

VIEW A-A
(SHT 2)



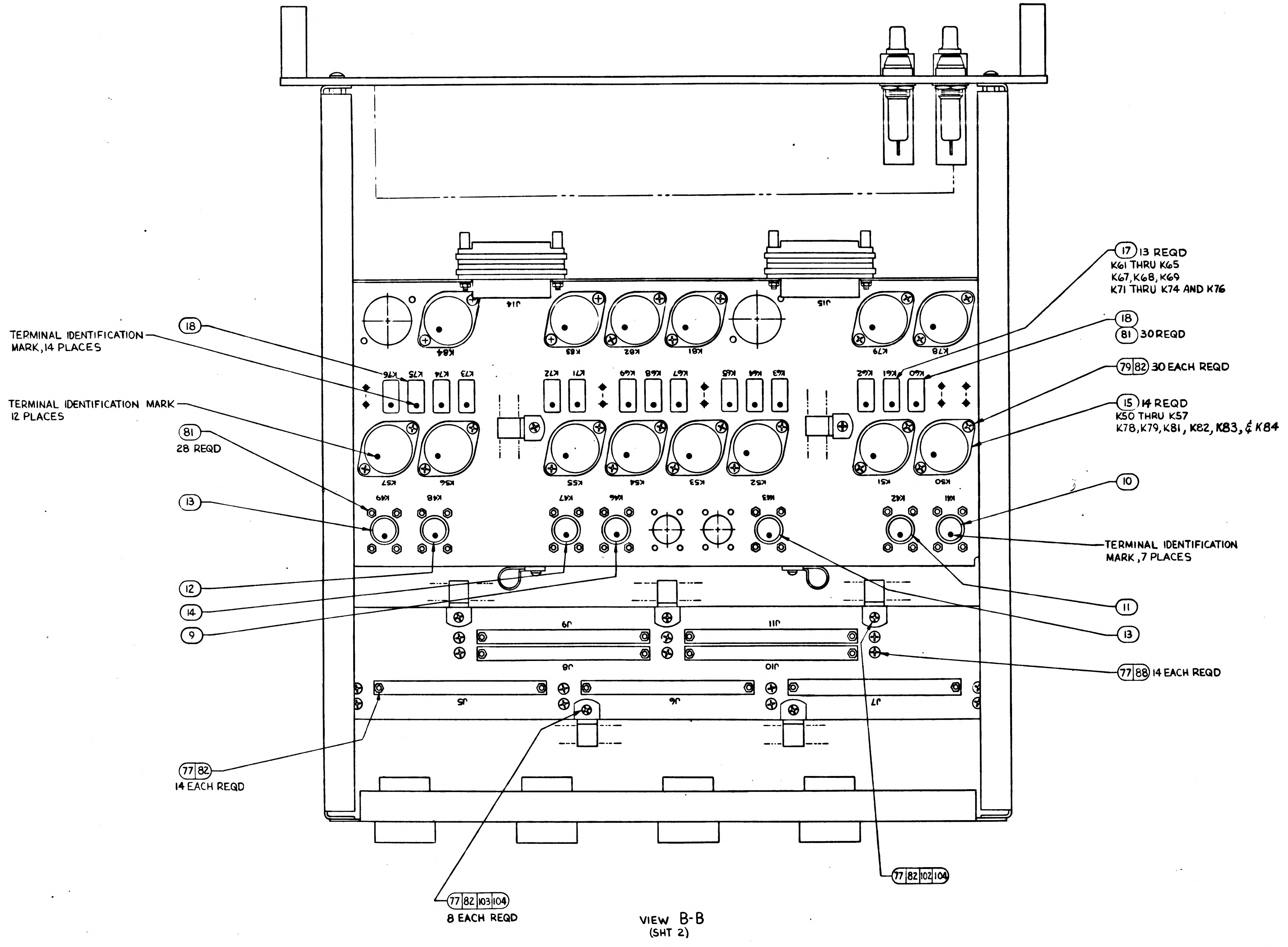
78 82
4 EACH REQD
71
8 REQD
6
80 83
2 EACH REQD
81
36 REQD
WT. LB. APPROX
SEE NOTE 6
SEE NOTE 7
99
76
4 REQD
75 8 REQD
⊥ Z .015
ITEMS 19 20 REF

PARTIAL VIEW C-C

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES +— +— +— -— -— -—	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
DO NOT SCALE THIS DRAWING	DRAWN E. Miller DATE 5 MAY 65 CHECKED 25 MAY 65 APPROVAL 27 MAY 65 APPROVAL Wedeman 7/1965	TEST CONTROL ASSEMBLY	
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974	SIZE E 2900027
CONTRACT NAS9-497	MIT APPROVAL	SCALE FULL	SHEET 3 OF 4

REVISIONS 23416

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
F	-	THIS SHEET ADDED WITH CHANGE MXC20274	—	16 JUN 65	MCR
G		REVISED PER MXC 202430	-	23 JUN 65	
H		REVISION STATUS CHANGED		3 JUL 65	RCP
J		REVISED PER MXC 202973		14 JUL 65	
K		REVISED PER MXC 203178		22 JUL 65	WJR
L		REVISION STATUS CHANGED		29 JUL 65	RCP
M		REVISED PER MXC 203946		17 AUG 65	
N		REVISED PER MXC 205421		29 SEP 65	RCP
P		REVISED PER MXC 206112		19 OCT 65	LK
R		INITIAL RELEASE CLASS A PER TDRR 23416		19 OCT 65	
S		REVISION STATUS CHANGED		18 JAN 66	JJJ
T		REVISION STATUS CHANGED		15 MAR 66	RCP



J14
J15
K84
K83
K82
K81
K79
K78
K76
K75
K74
K73
K72
K71
K69
K68
K67
K65
K64
K63
K62
K61
K60
K57
K56
K55
K54
K53
K52
K51
K50
K49
K48
K47
K46
K43
K42
K41
J9
J11
J8
J10
J5
J6
J7
TERMINAL IDENTIFICATION MARK, 14 PLACES
18
TERMINAL IDENTIFICATION MARK 12 PLACES
81
28 REQD
13
12
14
9
77 82
14 EACH REQD
77 82 103 104
8 EACH REQD
17 13 REQD
K61 THRU K65
K67, K68, K69
K71 THRU K74 AND K76
18
81 30 REQD
79 82 30 EACH REQD
15 14 REQD
K50 THRU K57
K78, K79, K81, K82, K83, & K84
10
TERMINAL IDENTIFICATION MARK, 7 PLACES
11
13
77 88 14 EACH REQD
77 82 102 104

VIEW B-B
(SHT 2)

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN E. Miller DATE 7 MAY 65
CHECKED 25 MAY 65
APPROVAL 27 MAY 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TEST CONTROL
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900027
SCALE FULL
SHEET 4 OF 4

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEMS (95) AND (96) OR (97).
3. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.
4. DIMENSION "A" MUST BE EQUAL TO DIMENSION "B" WITHIN .040.
5. DRAWER SLIDE MOUNTING SCREWS AND FRONT PANEL MOUNTING SCREWS, ITEMS (73) AND (74) REF., SHALL BE SUBJECTED TO TORQUE OF 33.0-36.2 IN/LBS AT INSTALLATION.
6. MARK WEIGHT OF ASSEMBLY, (45 LBS), PER ND1002123.
7. MARK "SCHEMATIC" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH, COLOR BLACK, IN LOCATION SHOWN.
8. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (99) OR (111) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
9. SECURE SCREWS USING ITEM (98).
10. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.

REVISIONS 23416

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
F	-	REPLACES REV (E) WITH CHANGE MXC 202074	—	16 JUN 65	MCR
G		REVISED PER MXC 202430	-	23 JUN 65	TR
H		REVISION STATUS CHANGED		3 JUL 65	RLP
J		REVISED PER MXC 202973		14 JUL 65	RLP
K		REVISED PER MXC 203178		22 JUL 65	WJR
L		REVISED PER MXC 203344		29 JUL 65	RLP
M		REVISED PER MXC 203946		7 AUG 65	JCD
N		REVISED PER MXC 205421		29 SEP 65	RLP
P		REVISED PER MXC 206112		19 OCT 65	LK
Ⓜ R		INITIAL RELEASE CLASS A PER TDRR 23416		9 OCT 65	FE
Ⓜ S		REVISED PER TDRR 25295		19 JAN 66	JJJ JAC
Ⓜ T		REVISED PER TDRR 27002		15 MAR 66	RLP
U		REVISED PER TDRR 27586		5 APR 66	M.G.H.

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			021	011				
			1			111	1004260-167	NAMEPLATE
			☒			110	PS2016109	PROCUREMENT SPEC
			☒			109	2901133	RUNNING LIST, TEST CONTROL
			1			108	2901132	WIRING HARNESS A
			☒			107	2901131	SCHEMATIC DIAGRAM, ELECTRICAL
			1	1		106	2900750-011	DIODE BOARD ASSY
				☒		105	PS 2900027	PROCUREMENT SPECIFICATION
SEE NOTE 3			13	13		104	1015986-140	WASHER, SADDLE
SEE NOTE 3			11	11		103	1015985-008,010	CABLE CLAMP
SEE NOTE 3			2	2		102	1015985-007,009	CABLE CLAMP
			3	3		101	1900391	BRACKET, HOLDER DOUBLE
			4	4		100	1900390	BRACKET, HOLDER SINGLE
				1		99	1004260-105	NAMEPLATE
			AR	AR		98	MIL-S-22473(GR C)	(ES2544-3) SEALING COMPOUND
			AR	AR		97	SN60WRAP	SOLDER QQ-S-571 (ES2175-3)
			AR	AR		96	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
			AR	AR		95	SN60WS	SOLDER QQ-S-571 (ES2175-1)
				☒		94	2900109	SCHEMATIC DIAGRAM-ELECTRICAL
			1	1		93	2900114	WIRE LIST BB
			1	1		92	2900112	WIRE LIST AA
			1	1		91	2900113	WIRING HARNESS "B"
				1		90	2900111	WIRING HARNESS "A"
				☒		89	2900110	RUNNING LIST, TEST CONTROL
			14	14		88	MS35333-71	WASHER, LOCK, INT TOOTH
			2	2		87	2900044-011	DETECTOR ASSEMBLY
			1	1		86	2900050-011	DIODE BOARD ASSEMBLY
			1	1		85	2900053-011	DIODE & RESISTOR BOARD ASSY
SEE NOTE 3			4	4		84	1016151-010	NUT, SELF LOCKING
			10	10		83	-008	
			117	117		82	-006	
SEE NOTE 3			94	94		81	1016151-004	NUT, SELF LOCKING
			10	10		80	MS35216-40	SCREW, PAN HD
			86	86		79	-25	
			4	4		78	-28	
			41	41		77	-27	
			4	4		76	MS35216-1	SCREW, PAN HD
			8	8		75	AN507C832R12	(1897003-568) SCREW, FLAT HD
SEE NOTE 3			4	4		74	1006783-45	SCREW, BUTTON HD
			8	8		73	1006783-44	SCREW, BUTTON HD
			8	8		72	1016005-1	SHIM, SLIDE LOCATING
SEE NOTE 3			8	8		71	1015860-025	SPACER
						70		
SEE NOTE 3			1	1		69	1015869-826	LIGHT, INDICATOR
			1	1		68	1015869-546	LIGHT, INDICATOR
			1	1		67	1015869-381	LIGHT, INDICATOR
			1	1		66	-744	
			1	1		65	-379	
			1	1		64	-378	
			1	1		63	-746	
			1	1		62	-704	
			1	1		61	-705	
			1	1		60	-706	
			1	1		59	-727	
			1	1		58	-728	
			1	1		57	-729	
			1	1		56	-710	
			1	1		55	-735	
			1	1		54	-192	
			1	1		53	-376	
			1	1		52	-318	
			1	1		51	-375	
			1	1		50	-736	
			1	1		49	-373	
			1	1		48	-372	
			1	1		47	-734	
			1	1		46	-733	
SEE NOTE 3			1	1		45	1015869-732	LIGHT, INDICATOR

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			021	011				
SEE NOTE 3			1	1		44	1015869-731	LIGHT, INDICATOR
			1	1		43	-747	
			1	1		42	-719	
			1	1		41	1015869-526	
			1	1		40	1897337-501	
			1	1		39	1015869-370	
			1	1		38	-103	
			1	1		37	-721	
			1	1		36	-722	
			1	1		35	-382	
			1	1		34	-304	
			1	1		33	-711	
			1	1		32	-730	
			1	1		31	-544	
SEE NOTE 3			9	9		30	1015869-159	LIGHT, INDICATOR
			2	2		29	MS90078-7-1	(1897077-107) FUSE
			2	2		28	MS90078-15-1	(1897077-115) FUSE
			2	2		27	MS26572-1	FUSE HOLDER
SEE NOTE 3			1	1		26	1015873-008	FUSE HOLDER
			1	1		25	1015873-001	FUSE HOLDER
			1	1		24	1015993-001	KNOB, LOCK
SEE NOTE 3			1	1		23	1015992-001	KNOB, POINTER
			1	1		22	1901321	RESISTOR, VARIABLE
SEE NOTE 3			1	1		21	1015994-001	SWITCH, PUSH
			1	1		20	1015785-010	SLIDE ASSEMBLY, LH
			1	1		19	1015785-009	SLIDE ASSEMBLY, RH
			14	14		18	1015832-318	RELAY, SENSITIVE
			19	19		17	1015802-004	ARMATURE
			1	1		16	1016024-001	ARMATURE
			33	33		15	1015837-001	ARMATURE
			1	1		14	1016096-011	TIME DELAY
			2	2		13	-010	
			1	1		12	-008	
			1	1		11	-007	
			1	1		10	-006	
SEE NOTE 3			1	1		9	1016096-003	RELAY, TIME DELAY
			1	1		8	2900107	TERMINAL BOARD ASSEMBLY
			1	1		7	2900105	TERMINAL BOARD ASSEMBLY
			1	1		6	2900104	BRACKET, MOUNTING
			1	1		5	2900103	PLATE, MOUNTING CONNECTOR
			1	1		4	2900102	PLATE, MOUNTING RELAY
			2	2		3	1900015-051	HANDLE ASSEMBLY
			1	1		2	2900101	PANEL, FRONT
			1	1		1	2900100	DRAWER, TEST CONTROL (INSEP ASSY)

LIST OF PARTS AND MATERIALS

APPLICATION: NEXT ASSY	APPLICATION: USED ON	APPLICABLE DASH NO.
2900023-021	2900023-021	-021
2900023-011	2900023-011	-011

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — — —
DECIMALS + — — —
ANGLES + — — —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN E. Miller DATE 24 MAR 65
CHECKED 24 MAR 65
APPROVAL 24 MAR 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

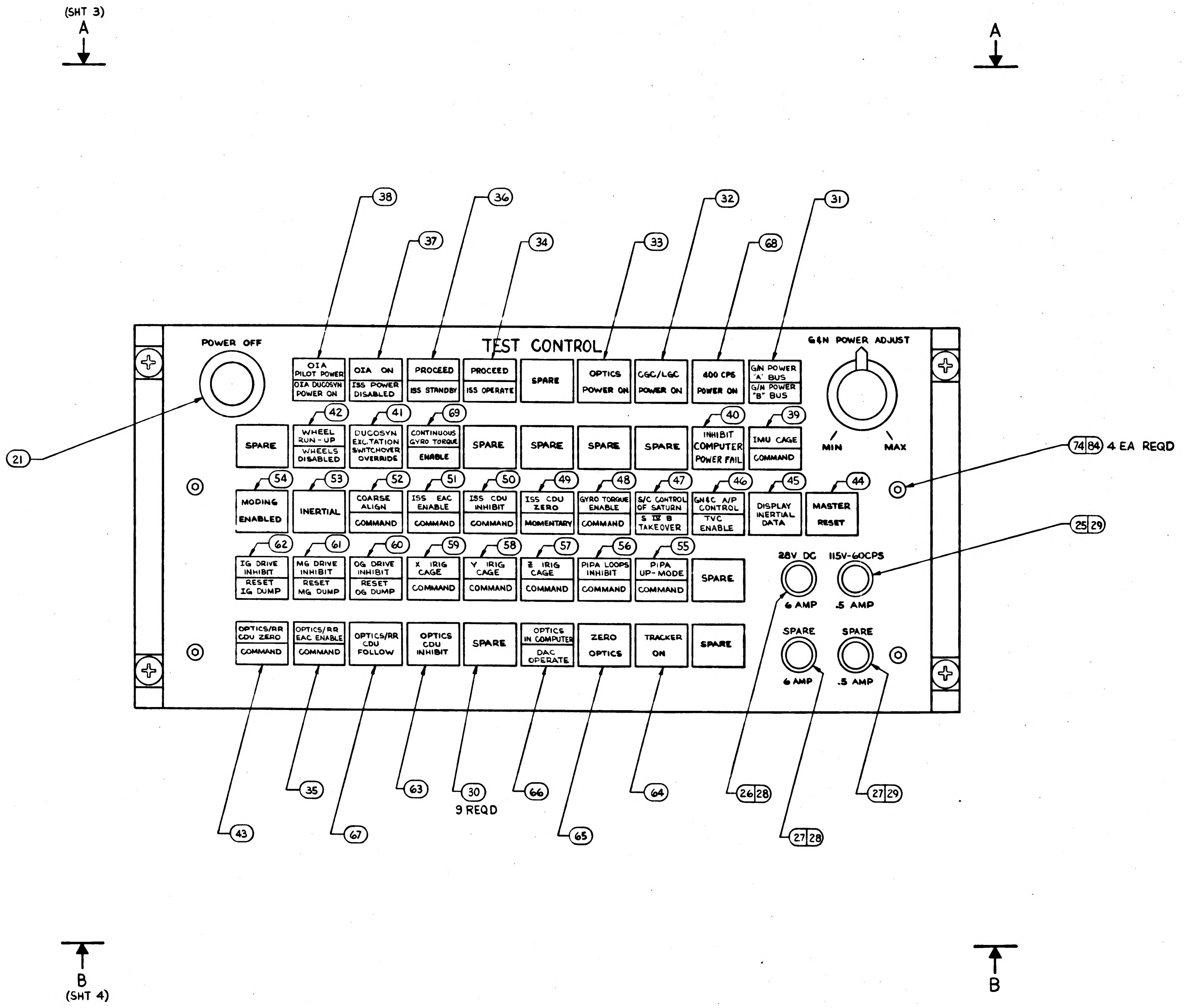
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TEST CONTROL
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900027
SCALE FULL
SHEET 1 OF 4

REVISIONS 23416

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
F	-	THIS SHEET ADDED WITH CHANGE MXC20274	-	16 JUN 65	MCR
G	-	REVISED PER MXC 202480	-	23 JUN 65	
H		REVISION STATUS CHANGED		3 JUL 65	RLP
J		REVISION STATUS CHANGED		14 JUL 65	RLP
K		REVISION STATUS CHANGED		22 JUL 65	WJR
L		REVISION STATUS CHANGED		29 JUL 65	
M		REVISED PER MXC203946		17 AUG 65	JCD EF
N		REVISION STATUS CHANGED		29 SEP 65	RLP AU
P		REVISION STATUS CHANGED		14 OCT 65	LK
(M) R		INITIAL RELEASE CLASS A PER TDRR 23416		9 OCT 65	PE
(M) S		REVISION STATUS CHANGED		9 JAN 66	JAC
(M) T		REVISION STATUS CHANGED		15 MAR 66	RLP
U		REVISION STATUS CHANGED		8 APR 66	


(SHT 3)
A
A
TEST CONTROL
POWER OFF
OIA PILOT POWER
OIA DUCOSYN POWER ON
OIA ON
ISS POWER DISABLED
PROCEED
ISS STANDBY
PROCEED
ISS OPERATE
SPARE
OPTICS POWER ON
CGC/LGC POWER ON
400 CPS POWER ON
G/N POWER "A" BUS
G/N POWER "B" BUS
G&N POWER ADJUST
MIN
MAX
SPARE
WHEEL RUN-UP
WHEELS DISABLED
DUCOSYN EXCITATION SWITCHOVER OVERRIDE
CONTINUOUS GYRO TORQUE
ENABLE
SPARE
SPARE
SPARE
SPARE
INHIBIT COMPUTER POWER FAIL
IMU CAGE
COMMAND
MODING ENABLED
INERTIAL
COARSE ALIGN
COMMAND
ISS EAC ENABLE
COMMAND
ISS CDU INHIBIT
COMMAND
ISS CDU ZERO
MOMENTARY
GYRO TORQUE ENABLE
COMMAND
S/C CONTROL OF SATURN
S IV B TAKEOVER
GN&C A/P CONTROL
TVC ENABLE
DISPLAY INERTIAL DATA
MASTER RESET
IG DRIVE INHIBIT
RESET IG DUMP
MG DRIVE INHIBIT
RESET MG DUMP
OG DRIVE INHIBIT
RESET OG DUMP
X IRIG CAGE
COMMAND
Y IRIG CAGE
COMMAND
Z IRIG CAGE
COMMAND
PIPA LOOPS INHIBIT
COMMAND
PIPA UP-MODE
COMMAND
SPARE
28V DC
6 AMP
115V-60CPS
.5 AMP
OPTICS/RR CDU ZERO
COMMAND
OPTICS/RR EAC ENABLE
COMMAND
OPTICS/RR CDU FOLLOW
OPTICS CDU INHIBIT
SPARE
OPTICS IN COMPUTER
DAC OPERATE
ZERO OPTICS
TRACKER ON
SPARE
SPARE
6 AMP
SPARE
.5 AMP
38
37
36
34
33
32
68
31
21
42
41
69
40
39
74|84 4 EA REQD
54
53
52
51
50
49
48
47
46
45
44
25|29
62
61
60
59
58
57
56
55
43
35
67
63
30
9 REQD
66
65
64
26|28
27|28
27|29
B
(SHT 4)
B

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — — — DECIMALS + — — — ANGLES + — — —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE, WIS.
DRAWN E. Miller DATE 4 MAY 65
CHECKED 26 MAY 65
APPROVAL 27 MAY 65
APPROVAL Coleman 6/8/65
NASA APPROVAL
MIT APPROVAL

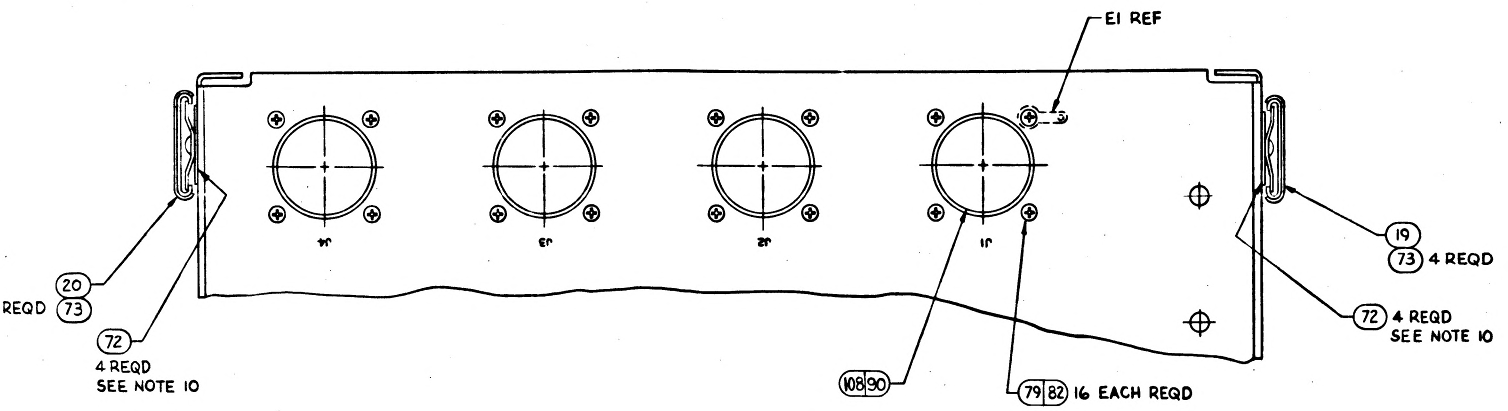
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

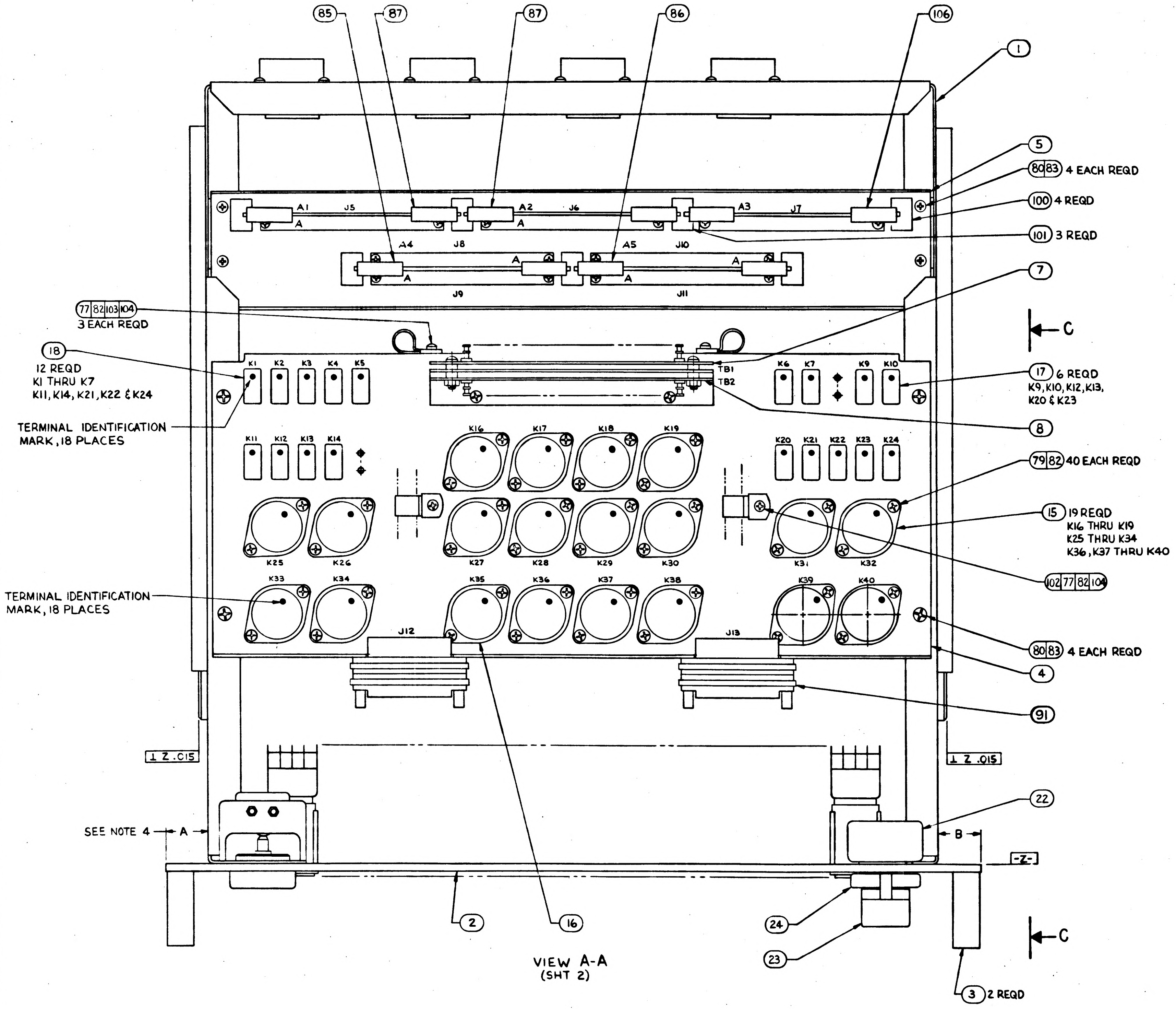
TEST CONTROL
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900027
SCALE FULL
SHEET 2 OF 4

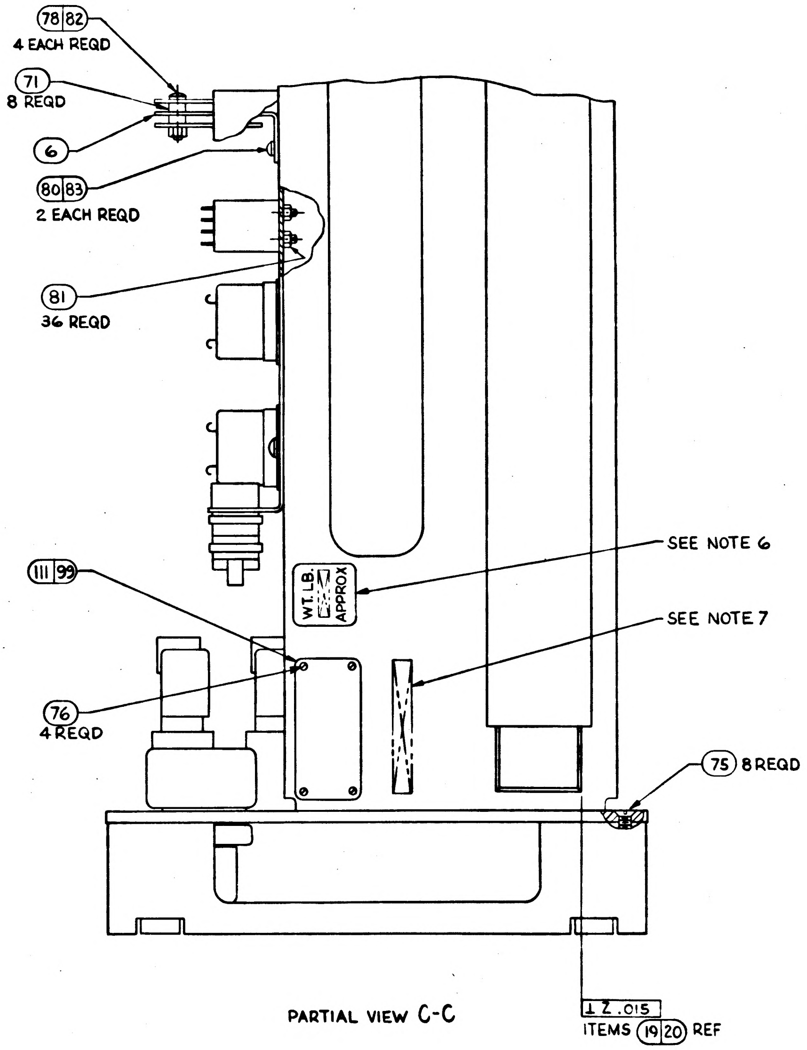
2900027 U

REVISIONS		23416			
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
F	-	THIS SHEET ADDED WITH CHANGE MXC 20274	–	16 JUN 65	MCR
G		REVISED PER MXC 202430	–	23 JUN 65	
H		REVISED PER MXC 202685		3 JUL 65	
J		REVISION STATUS CHANGED		14 JUL	
K		REVISION STATUS CHANGED		22 JUL 65	WJR
L		REVISION STATUS CHANGED		29 JUL 65	
M		REVISION STATUS CHANGED		AUG 65	JCD
N		REVISED PER MXC 205421		29 SEP 65	
P		REVISION STATUS CHANGED		19 OCT	LK
R		INITIAL RELEASE CLASS A PER TDRR 23416		19 OCT 65	
S		REVISION STATUS CHANGED		19 JAN 66	JAC
T		REVISION STATUS CHANGED		15 MAR 66	
U		REVISED PER TDRR 27586		5-APR 66	M.G.


E1 REF
20
73
4 REQD
72
4 REQD
SEE NOTE 10
108 90
79 82 16 EACH REQD
19
73 4 REQD
72 4 REQD
SEE NOTE 10


85
87
87
86
106
1
5
80 83 4 EACH REQD
100 4 REQD
101 3 REQD
A1
J5
A2
J6
A3
J7
A4
J8
A5
J10
J9
J11
7
77 82 103 104
3 EACH REQD
18
12 REQD
K1 THRU K7
K11, K14, K21, K22 & K24
TERMINAL IDENTIFICATION
MARK, 18 PLACES
K1
K2
K3
K4
K5
TB1
TB2
K6
K7
K9
K10
17 6 REQD
K9, K10, K12, K13,
K20 & K23
8
K11
K12
K13
K14
K16
K17
K18
K19
K20
K21
K22
K23
K24
79 82 40 EACH REQD
15 19 REQD
K16 THRU K19
K25 THRU K34
K36, K37 THRU K40
K25
K26
K27
K28
K29
K30
K31
K32
102 77 82 104
TERMINAL IDENTIFICATION
MARK, 18 PLACES
K33
K34
K35
K36
K37
K38
K39
K40
J12
J13
80 83 4 EACH REQD
4
91
⊥ Z .015
⊥ Z .015
22
SEE NOTE 4
A
B
-Z-
2
16
24
23
3 2 REQD
C
C

VIEW A-A
(SHT 2)

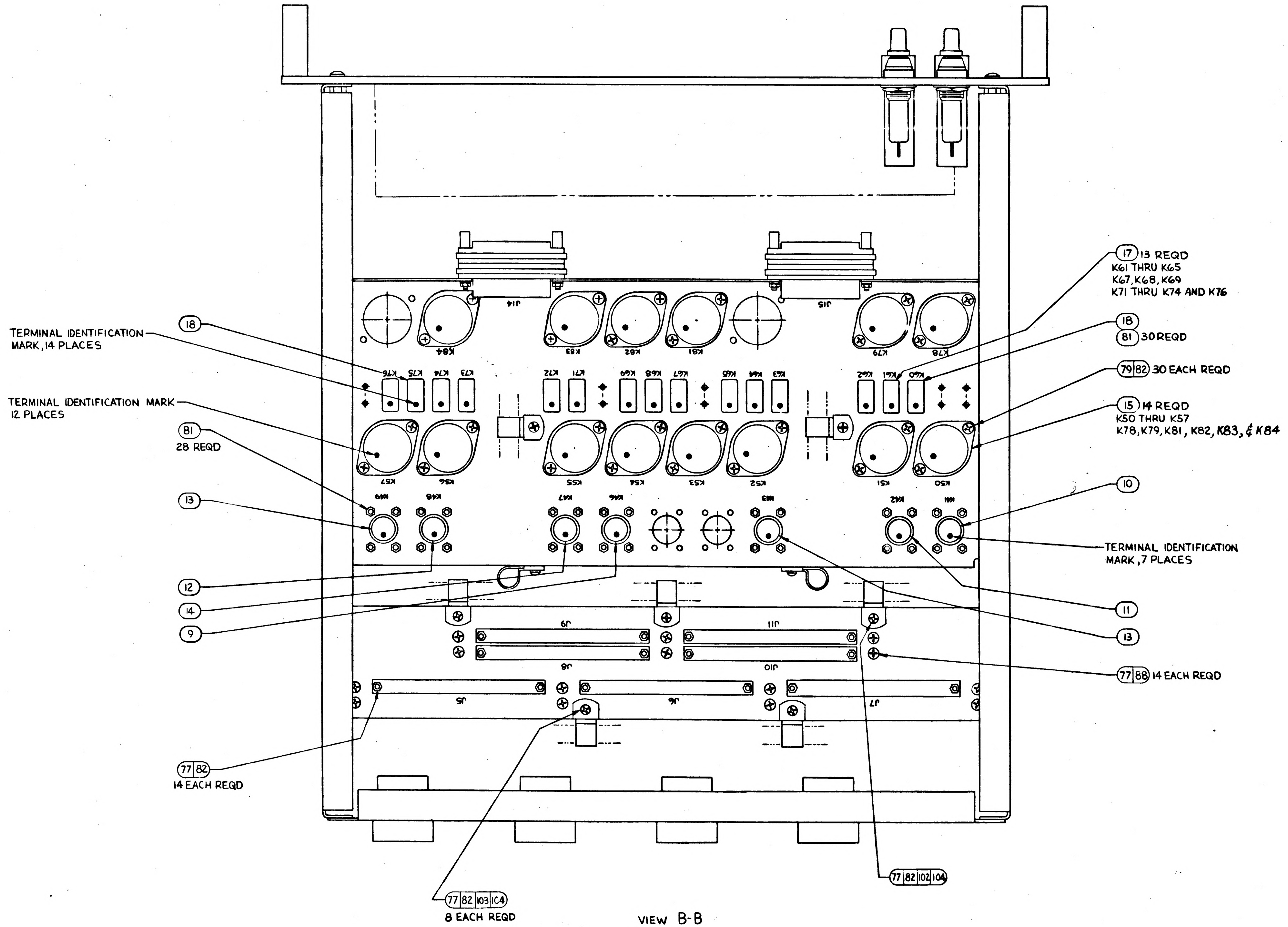

78 82
4 EACH REQD
71
8 REQD
6
80 83
2 EACH REQD
81
36 REQD
SEE NOTE 6
WT. LB. APPROX
SEE NOTE 7
111 99
76
4 REQD
75 8 REQD
⊥ Z .015
ITEMS 19 20 REF

PARTIAL VIEW C-C

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± — ± — ± —	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS		
	DRAWN E. Miller 5 MAY 65 DATE CHECKED 25 MAY 65 APPROVAL 27 MAY 65 APPROVAL	TEST CONTROL ASSEMBLY		
DO NOT SCALE THIS DRAWING				
MATERIAL ———	NASA APPROVAL	CODE IDENT NO. 99974	SIZE E	2900027
CONTRACT NAS9-497	MIT APPROVAL	SCALE FULL		SHEET 3 OF 4

2900027 U
B

REVISIONS 23416					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
F	-	THIS SHEET ADDED WITH CHANGE MXC20274	-	16 JUN 65	MCR
G		REVISED PER MXC 202430	-	23 JUN 65	[illegible]
H		REVISION STATUS CHANGED		3 JUL 65	RP
J		REVISED PER MXC 202973		14 JUL 65	RP
K		REVISED PER MXC 203178		22 JUL 65	WJR
L		REVISION STATUS CHANGED		29 JUL 65	RP
M		REVISED PER MXC 203946		17 AUG 65	JCD
N		REVISED PER MXC 205421		29 SEP 65	RP AU
P		REVISED PER MXC 206112		19 OCT 65	LK
Ⓜ R		INITIAL RELEASE CLASS A PER TDRR 23416		19 OCT 65	FE
Ⓜ S		REVISION STATUS CHANGED		18 JAN 66	JJJ JAC
Ⓜ T		REVISION STATUS CHANGED		15 MAR 66	RP
U		REVISION STATUS CHANGED		5 APR 66	[illegible]


TERMINAL IDENTIFICATION MARK, 14 PLACES
TERMINAL IDENTIFICATION MARK 12 PLACES
(18)
(81) 28 REQD
(13)
(12)
(14)
(9)
(77)(82) 14 EACH REQD
(77)(82)(103)(104) 8 EACH REQD
(77)(82)(102)(104)
(17) 13 REQD
K61 THRU K65
K67, K68, K69
K71 THRU K74 AND K76
(18)
(81) 30 REQD
(79)(82) 30 EACH REQD
(15) 14 REQD
K50 THRU K57
K78, K79, K81, K82, K83, & K84
(10)
TERMINAL IDENTIFICATION MARK, 7 PLACES
(11)
(13)
(77)(88) 14 EACH REQD
J14
J15
K84
K83
K82
K81
K79
K78
K76
K75
K74
K73
K72
K71
K69
K68
K67
K65
K64
K63
K62
K61
K60
K57
K56
K55
K54
K53
K52
K51
K50
K49
K48
K47
K46
K43
K42
K41
J9
J11
J8
J10
J5
J6
J7

VIEW B-B
(SHT 2)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± — DO NOT SCALE THIS DRAWING	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS DRAWN E. Miller DATE 7 MAY 65 CHECKED M. [illegible] 25 MAY 65 APPROVAL R. [illegible] 27 MAY 65 APPROVAL [illegible]	MANNED SPACECRAFT CENTER HOUSTON, TEXAS TEST CONTROL ASSEMBLY
MATERIAL — CONTRACT NAS9-497	NASA APPROVAL [illegible] MIT APPROVAL [illegible]	CODE IDENT NO. 99974 SIZE E 2900027 SCALE FULL SHEET 4 OF 4

2900027 U

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM (72), OR (70) AND (71).
3. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.
4. DIMENSION "A" MUST BE EQUAL TO DIMENSION "B" WITHIN .040.
5. DRAWER SLIDE MOUNTING SCREWS AND FRONT PANEL MOUNTING SCREWS, ITEMS (56) AND (57) REF., SHALL BE SUBJECTED TO TORQUE OF 33.0 –36.2 IN/LBS AT INSTALLATION.
6. MARK WEIGHT OF ASSEMBLY, (   ), PER ND 1002123.
7. MARK "SCHEMATIC" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH, COLOR BLACK, IN LOCATION SHOWN.
8. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (49) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
9. SECURE SCREWS USING ITEM (73).
10. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.
11. THE FOLLOWING ARE PART OF THIS ASSEMBLY.

WIRE LIST AA	ITEM 68
WIRE LIST BB	ITEM 69
WIRING HARNESS A	ITEM 65
WIRING HARNESS B	ITEM 66

12. DRAWINGS FOR REFERENCE.

SCHEMATIC DIAGRAM	ITEM 75
RUNNING LIST	ITEM 76

REVISIONS 23412

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		REPLACES REV D WITH CHANGE PER MXC 202278	—	24 JUN 65	JJJ
F		REVISION STATUS CHANGED	—	8 JUL 65	JJJ
G		REVISED PER MXC202974	—	14 JUL 65	RS
H		REVISED PER MXC203051	—	22 JUL 65	MCE
J		REVISED PER MXC 203179	—	29 JUL 65	
K		*REVISED PER MXC 203956*	—	17 AUG 65	JCD
L		REVISED PER MXC 205249		27 SEP 65	
M		REVISED PER MXC 205427		5 OCT 65	
N		*REVISED PER MXC-205702*		19-OCT-65	B.
P		*REVISED PER MXC 205970*		19-OCT-65	B
R		INITIAL RELEASE CLASS A PER TDRR 23412		20 OCT 65	

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	4		50	MS35216-1	SCREW, PAN HD
	1		49	1004260-106	NAMEPLATE
			48		
	7		47	MS35333-71	WASHER-LOCK
	1		46	AN960-C6	(1897006-026) WASHER-FLAT
	8		45	AN507C832 R12	(1897003-568) SCREW
SEE NOTE 3	8		44	1016005-1	SHIM, SLIDE LOCATING
SEE NOTE 3	1		43	1015785-009	SLIDE ASSEMBLY, RH
SEE NOTE 3	1		42	1015785-010	SLIDE ASSEMBLY, LH
	1		41	2900239-011	TERMINAL BOARD ASSEMBLY
	1		40	2900181-011	TERMINAL BOARD ASSEMBLY
	1		39	1900391	BRACKET HOLDER, DOUBLE
	2		38	1900390	BRACKET HOLDER, SINGLE
SEE NOTE 3	2		37	1015995-11	REACTOR
	1		36	1016096-013	RELAY, TIME DELAY
	29		35	1015837-001	| ARMATURE
	6		34	1015802-004	| ARMATURE
	8		33	1015832-318	RELAY, SENSITIVE
SEE NOTE 3	3		32	1016004-008	CLAMP
	1		31	MS91528-2F1B	(1897080-125) KNOB
SEE NOTE 3	8		30	1015986-140	WASHER, SADDLE
	6		29	MS91528-2K2B	(1897080-023) KNOB
	2		28	MS90078-15-1	(1897077-115) FUSE
	1		27	MS26572-1	FUSEHOLDER
SEE NOTE 3	1		26	1015873-008	FUSEHOLDER
	8		25	1015985-007 THRU -010	CABLE CLAMP
	1		24	1015959	RESISTOR, VARIABLE
	1		23	1015825-020	SWITCH, ROTARY
	1		22	1015825-018	SWITCH, ROTARY
SEE NOTE 3	4		21	1015825-017	SWITCH, ROTARY
	1		20	1900220	SPACER, READOUT DIGITAL
SEE NOTE 3	1		19	1015943-001	BEZEL
SEE NOTE 3	1		18	1015844-001	READOUT, DIGITAL
SEE NOTE 3	1		17	1015869-325	LIGHT INDICATOR
	1		16	| -326	| |
	1		15	| -737	| |
	1		14	| -738	| |
	1		13	| -739	| |
	1		12	| -517	| |
	1		11	| -740	| |
	1		10	| -329	| |
	1		9	| -703	| |
	1		8	| -702	| |
	1		7	| -328	| |
SEE NOTE 3	1		6	1015869-743	LIGHT INDICATOR
	1		5	2900292	PLATE, MOUNTING, CONNECTOR
	1		4	2900291	PLATE, MOUNTING, RELAY
	2		3	90005-061	HANDLE ASSEMBLY
	1		2	2900289	PANEL, FRONT
	1		1	2900290	DRAWER, TEST SELECT (INSEP ASSY)

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	X		76	2900678	*RUNNING LIST - TEST SELECTOR*
	X		75	2900295	SCHEMATIC DIAGRAM, ELECT.
	X		74	PS 2900028	PROCUREMENT SPECIFICATION
	AR		73	MIL-S-22473 (GRC)	(ES2544-3) SEALING COMPOUND
	AR		72	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
	AR		71	MIL-F-14256 TYPE AORW	FLUX (ES2798)
	AR		70	SN60WS	SOLDER QQ-S-571 (ES2175-1)
	1		69	2900297	WIRE LIST BB
	1		68	2900296	WIRE LIST AA
			67		
	1		66	2900294	WIRING HARNESS B
	1		65	2900293	WIRING HARNESS A
SEE NOTE 3	4		64	1016151-010	NUT, SELF LOCKING
	8		63	| -008	| | |
	90		62	| -006	| | |
	40		61	1016151-004	NUT, SELF LOCKING
	2		60	1015912-193	SCREW
SEE NOTE 3	3		59	1000093-14	|
	12		58	MS35200-40	|
SEE NOTE 3	4		57	1006783-45	| BUTTON HD
SEE NOTE 3	8		56	1006783-44	| BUTTON HD
	8		55	MS35216-40	| PAN HD
	22		54	| -27	| |
	16		53	| -26	| |
	59		52	MS 35216-25	SCREW, PAN HD
	~~58~~		~~51~~	~~MS35216-24~~	~~SCREW, PAN HD~~

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

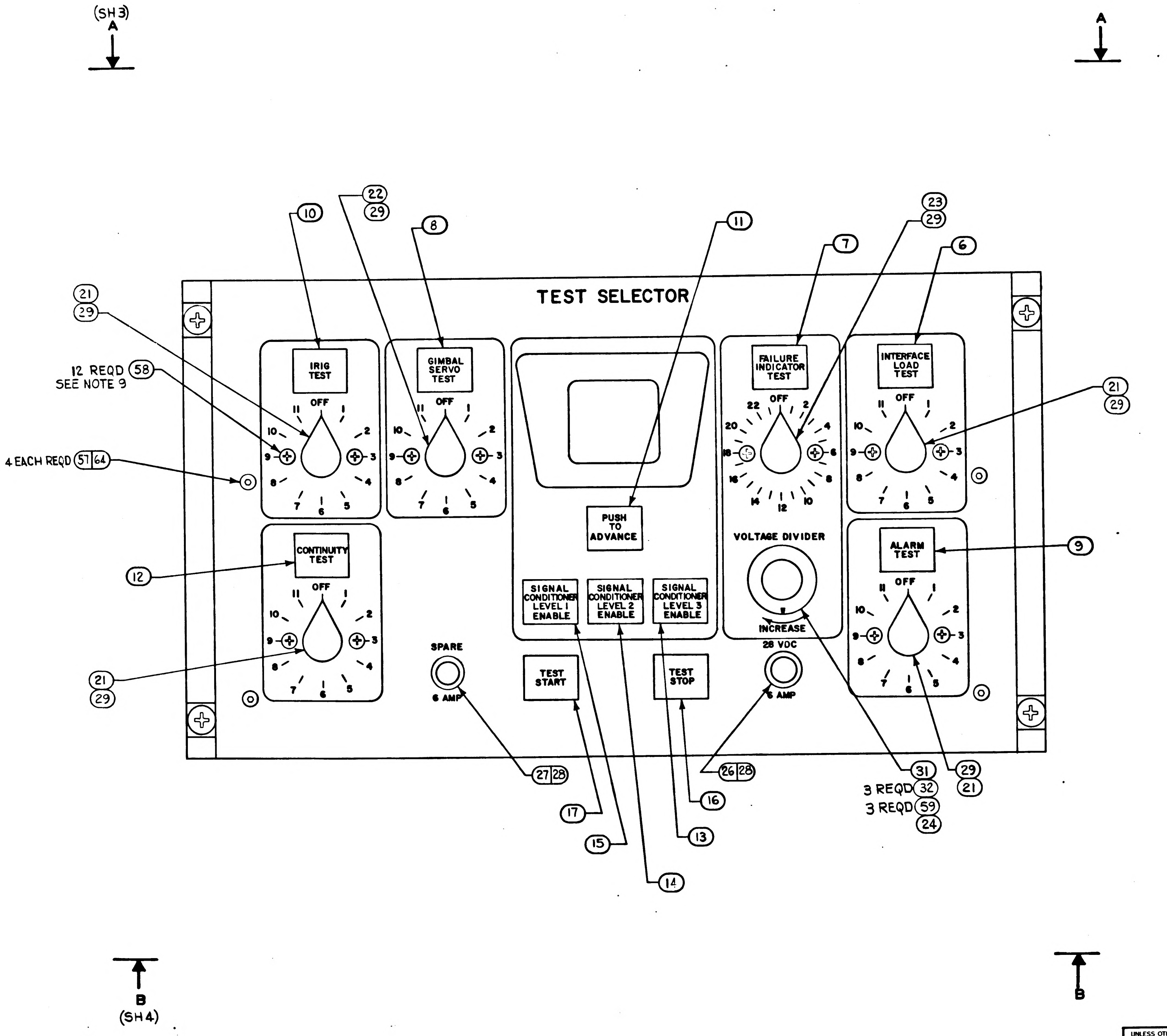
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN M. Graber DATE 24 MAR 65
CHECKED S. Stelma 24 MAR 65
APPROVAL R. Foss 24 MAR 65
APPROVAL J. M. Watson 10-13-65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TEST SELECTOR ASSEMBLY

CODE IDENT NO. 99974 SIZE E 2900028
SCALE FULL SHEET 1 OF 4

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 202278	—	24 JUN 65	
F		REVISION STATUS CHANGED	—	8 JUL 65	JJS
G		REVISION STATUS CHANGED	—	14 JUL 65	RS
H		REVISION STATUS CHANGED	—	22 JUL 65	MCE
J		REVISION STATUS CHANGED	—	29 JUL 65	
K		REVISION STATUS CHANGED	—	17 AUG 65	
L		REVISION STATUS CHANGED		27 SEP 65	
M		REVISION STATUS CHANGED		5 OCT 65	
N		REVISION STATUS CHANGED		19 OCT 65	B.
P		REVISION STATUS CHANGED		19 [illegible] 65	B
R		INITIAL RELEASE CLASS A PER TDRR 23412		[illegible] 65	


(SH3)
A
A
TEST SELECTOR
IRIG TEST
GIMBAL SERVO TEST
CONTINUITY TEST
PUSH TO ADVANCE
SIGNAL CONDITIONER LEVEL 1 ENABLE
SIGNAL CONDITIONER LEVEL 2 ENABLE
SIGNAL CONDITIONER LEVEL 3 ENABLE
TEST START
TEST STOP
SPARE
6 AMP
28 VDC
6 AMP
FAILURE INDICATOR TEST
INTERFACE LOAD TEST
VOLTAGE DIVIDER
INCREASE
ALARM TEST
OFF
10
22
29
8
11
23
29
7
6
21
29
12 REQD 58
SEE NOTE 9
4 EACH REQD 57 64
21
29
9
12
21
29
27 28
17
15
14
13
16
26 28
31
3 REQD 32
3 REQD 59
24
29
21
B
(SH4)
B

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN M. Grabnis DATE 24 MAR 65
CHECKED J. Sterme 24 MAR 65
APPROVAL V. Foss 24 MAR 65
APPROVAL J. McWalter 10-13-65
NASA APPROVAL
MIT APPROVAL

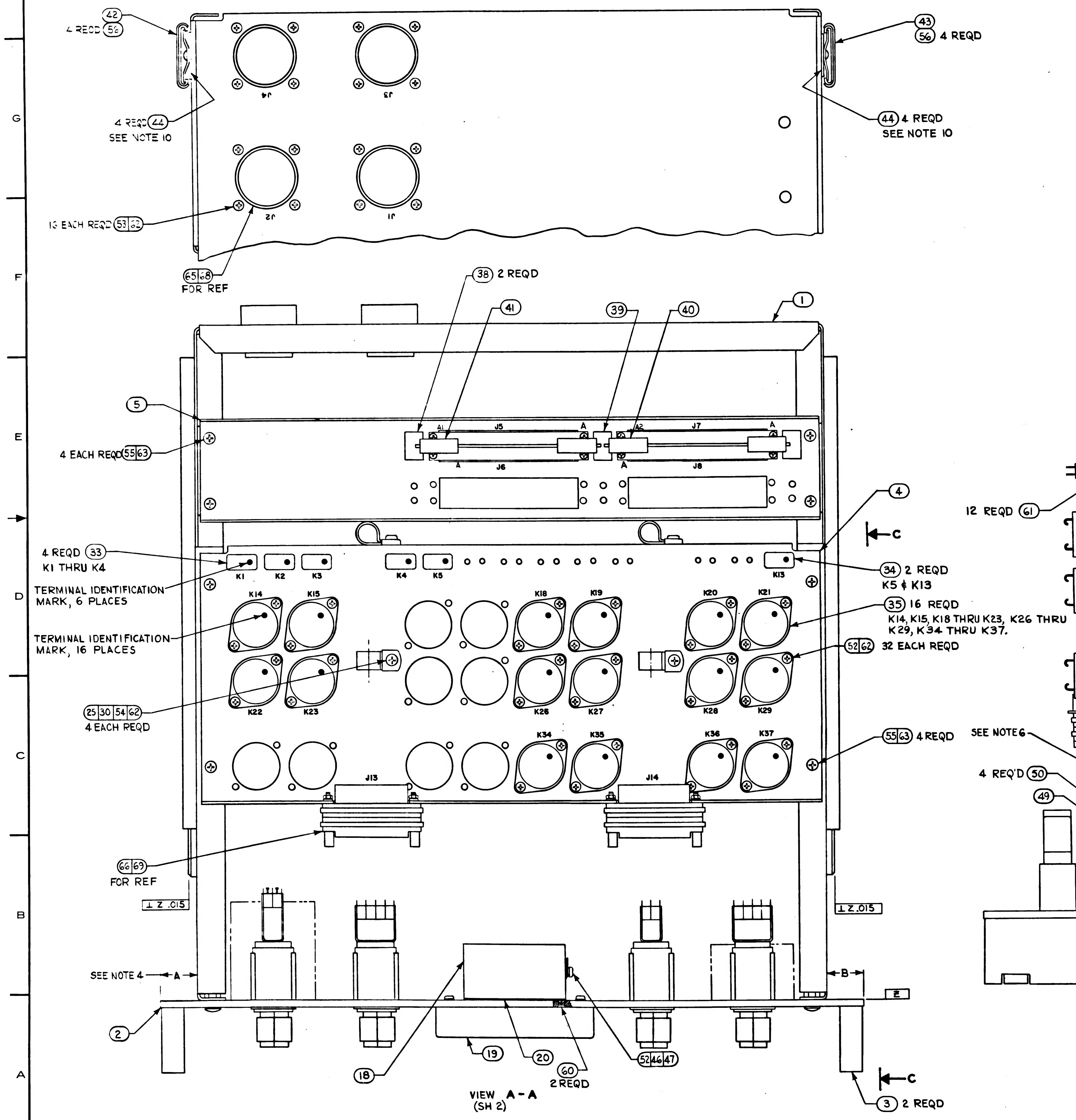
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TEST SELECTOR
ASSEMBLY

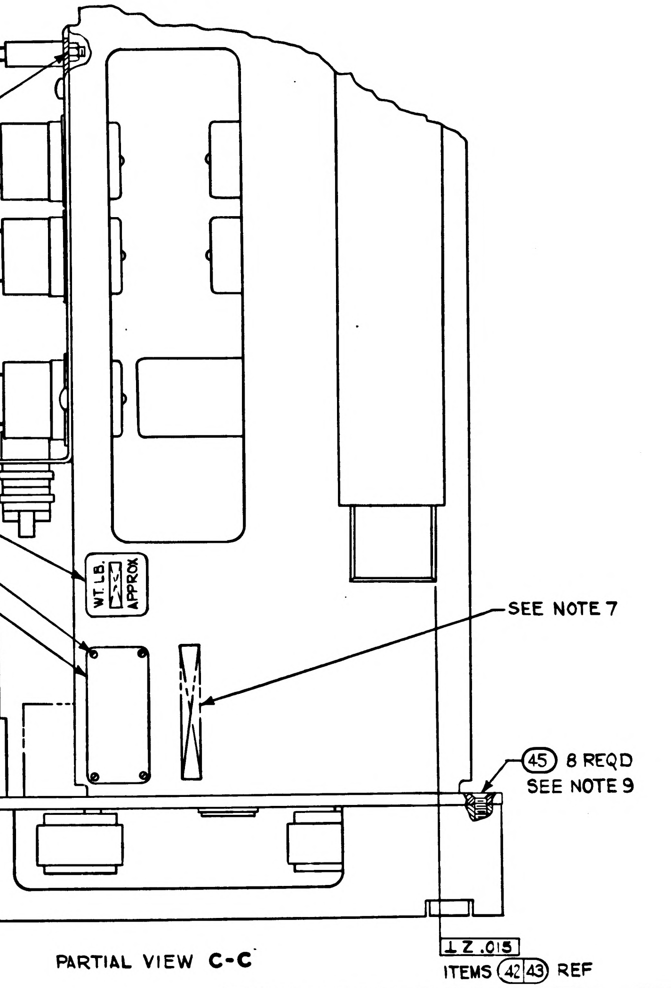
CODE IDENT NO. 99974
SIZE E
2900028
SCALE FULL
SHEET 2 OF 4

2900028

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 202278	—	[illegible] 65	[illegible]
F		REVISED PER MXC 202736	—	8 JUL 65	[illegible]
G		REVISION STATUS CHANGED	—	14 JUL 65	RS
H		REVISION STATUS CHANGED	—	22 JUL 65	[illegible]
J		REVISION STATUS CHANGED	—	29 JUL 65	[illegible]
K		REVISION STATUS CHANGED	—	[illegible] AUG 65	[illegible]
L		REVISED PER MXC205249		27 SEP 65	[illegible]
M		REVISION STATUS CHANGED		[illegible] OCT 65	[illegible]
N		REVISION STATUS CHANGED		19 OCT 65	B.
P		REVISION STATUS CHANGED		[illegible] 65	[illegible]
R		INITIAL RELEASE CLASS A PER TDRR 3412		[illegible] 65	[illegible]


42
4 REQD 56
43
56 4 REQD
4 REQD 44
SEE NOTE 10
44 4 REQD
SEE NOTE 10
J4
J3
J2
J1
16 EACH REQD 53 62
65 68
FOR REF
38 2 REQD
41
39
40
1
5
4 EACH REQD 55 63
A1
J5
A
A2
J7
A
A
J6
A
J8
4
C
4 REQD 33
K1 THRU K4
TERMINAL IDENTIFICATION MARK, 6 PLACES
K1
K2
K3
K4
K5
K13
34 2 REQD
K5 & K13
TERMINAL IDENTIFICATION MARK, 16 PLACES
K14
K15
K18
K19
K20
K21
35 16 REQD
K14, K15, K18 THRU K23, K26 THRU K29, K34 THRU K37.
52 62 32 EACH REQD
K22
K23
K26
K27
K28
K29
25 30 54 62
4 EACH REQD
K34
K35
K36
K37
55 63 4 REQD
J13
J14
66 69
FOR REF
⊥ Z .015
⊥ Z .015
SEE NOTE 4
A
B
Z
2
19
20
60
2 REQD
52 46 47
18
3 2 REQD
C

VIEW A-A
(SH 2)

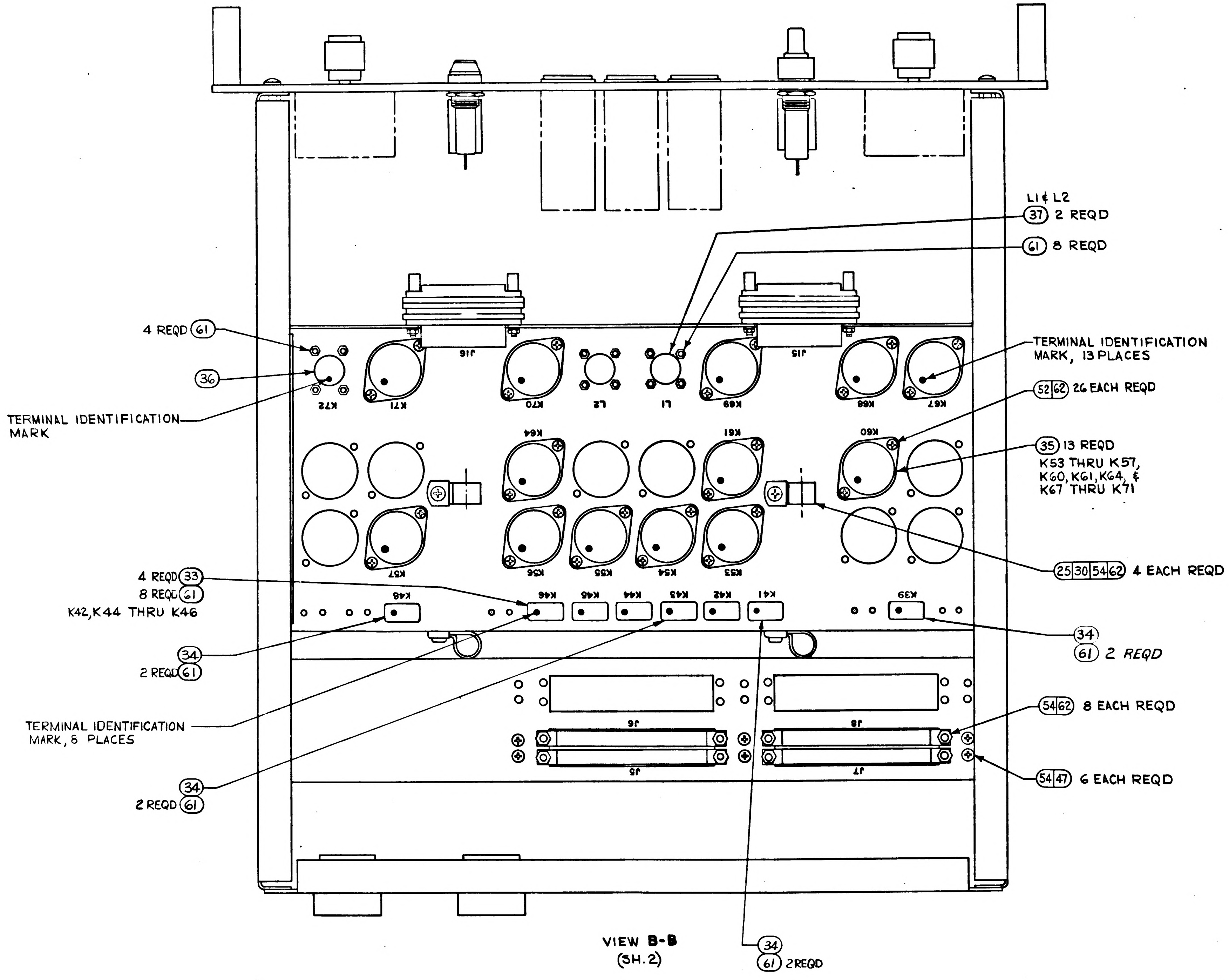

12 REQD 61
SEE NOTE 6
WT. LB. APPROX
4 REQ'D 50
49
SEE NOTE 7
45 8 REQD
SEE NOTE 9
⊥ Z .015
ITEMS 42 43 REF

PARTIAL VIEW C-C

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ±— DECIMALS ±— ANGLES ±—	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS		
	ACSP PN			
	DRAWN M. Gralow DATE 24 MAR 65	TEST SELECTOR ASSEMBLY		
	CHECKED J. Stelman 24 MAR 65			
	APPROVAL R. Foss 24 MAR 65			
DO NOT SCALE THIS DRAWING	APPROVAL J. Watson 10-13-65			
MATERIAL	NASA APPROVAL [illegible]	CODE IDENT NO. 99974	SIZE E	2900028
CONTRACT NAS9-497	MIT APPROVAL [illegible]	SCALE FULL		SHEET 3 OF 4

2900028 K

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 202278	—	[illegible] 65	[illegible]
F		REVISION STATUS CHANGED	—	8 JUL 65	[illegible]
G		REVISED PER MXC202974	—	14 JUL 65	RS
H		REVISED PER MXC203051	—	[illegible]	[illegible]
J		REVISION STATUS CHANGED	—	29 [illegible] 65	[illegible]
K		REVISED PER MXC203956	—	[illegible] 65	[illegible]
L		REVISED PER MXC 205249		27 SEP 65	[illegible]
M		REVISED PER MXC 205427		5 OCT 65	[illegible]
N		REVISION STATUS CHANGED		19 OCT 65	B.
P		REVISION STATUS CHANGED		19 [illegible] 65	B
R		INITIAL RELEASE CLASS A PER TDRR 3912		[illegible]	[illegible]



L1 & L2
37 2 REQD
61 8 REQD
4 REQD 61
36
TERMINAL IDENTIFICATION MARK
TERMINAL IDENTIFICATION MARK, 13 PLACES
52 62 26 EACH REQD
35 13 REQD K53 THRU K57, K60, K61, K64, & K67 THRU K71
25 30 54 62 4 EACH REQD
4 REQD 33
8 REQD 61
K42, K44 THRU K46
34
2 REQD 61
34
61 2 REQD
TERMINAL IDENTIFICATION MARK, 8 PLACES
34
2 REQD 61
54 62 8 EACH REQD
54 47 6 EACH REQD
34
61 2REQD
J16
J15
K72
K71
K70
L2
L1
K69
K68
K67
K64
K61
K60
K57
K56
K55
K54
K53
K48
K46
K45
K44
K43
K42
K41
K39
J6
J5
J8
J7

VIEW B-B
(SH.2)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + — + — + — — — — — — —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	TEST SELECTOR ASSEMBLY
	DRAWN M. Gruber DATE 24 MAR 65 CHECKER J. Stelma 24 MAR 65 APPROVAL J. Foss 24 MAR 65 APPROVAL J. M. Watson 10-13-65	
DO NOT SCALE THIS DRAWING		
MATERIAL —	NASA APPROVAL [illegible]	CODE IDENT NO 99974 · SIZE E · 2900028
CONTRACT NAS-497	MIT APPROVAL [illegible]	SCALE FULL · SHEET 4 OF 4

2900028

REVISIONS 23412					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
E		REPLACES REV D WITH CHANGE PER MXC 202278	—	24 JUN 65	J J J
F		REVISION STATUS CHANGED	—	8 JUL 65	J J J
G		REVISED PER MXC202974	—	14 JUL 65	RS
H		REVISED PER MXC203051	—	22 JUL 65	WCR
J		REVISED PER MXC 203179	—	29 JUL 65	RLP
K		*REVISED PER MXC 203956*	—	17 AUG 65	JCD
L		REVISED PER MXC 205249		27 SEP 65	H.N.
M		REVISED PER MXC 205427		5 OCT 65	RLP
N		*REVISED PER MXC-205702*		19-OCT-65	B.
P		*REVISED PER MXC 205970*		19-OCT-65	B.
R		INITIAL RELEASE CLASS A PER TDRR 23412		20 OCT 65	WCB
S		REVISION STATUS CHANGED		29 NOV 65	RLP

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM (72), OR (70) AND (71).
3. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.
4. DIMENSION "A" MUST BE EQUAL TO DIMENSION "B" WITHIN .040.
5. DRAWER SLIDE MOUNTING SCREWS AND FRONT PANEL MOUNTING SCREWS, ITEMS (56) AND (57) REF., SHALL BE SUBJECTED TO TORQUE OF 33.0 – 36.2 IN/LBS AT INSTALLATION.
6. MARK WEIGHT OF ASSEMBLY, (   ), PER ND 1002123.
7. MARK "SCHEMATIC" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH, COLOR BLACK, IN LOCATION SHOWN.
8. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM ㊾ IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
9. SECURE SCREWS USING ITEM (73).
10. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.
11. THE FOLLOWING ARE PART OF THIS ASSEMBLY.

WIRE LIST AA	ITEM 68
WIRE LIST BB	ITEM 69
WIRING HARNESS A	ITEM 65
WIRING HARNESS B	ITEM 66

12. DRAWINGS FOR REFERENCE.

SCHEMATIC DIAGRAM	ITEM 75
RUNNING LIST	ITEM 76

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	☒		76	*2900678*	*RUNNING LIST- TEST SELECTOR*
	☒		75	2900295	SCHEMATIC DIAGRAM, ELECT.
	☒		74	PS 2900028	PROCUREMENT SPECIFICATION
	AR		73	MIL-S-22473(GRC)	(ES2544-3) SEALING COMPOUND
	AR		72	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
	AR		71	MIL-F-14256 TYPE AORW	FLUX (ES2798)
	AR		70	SN60WS	SOLDER QQ-S-571 (ES2175-1)
	1		69	2900297	WIRE LIST BB
	1		68	2900296	WIRE LIST AA
			67		
	1		66	2900294	WIRING HARNESS B
	1		65	2900293	WIRING HARNESS A
SEE NOTE 3	4		64	1016151 -010	NUT, SELF LOCKING
	8		63	-008	
	90		62	-006	
	40		61	1016151 -004	NUT, SELF LOCKING
	2		60	1015912-193	SCREW
SEE NOTE 3	3		59	1000093-14	
	12		58	MS35200-40	
SEE NOTE 3	4		57	1006783-45	BUTTON HD
SEE NOTE 3	8		56	1006783-44	BUTTON HD
	8		55	MS35216-40	PAN HD
	22		54	-27	
	16		53	-26	
	59		52	MS 35216-25	SCREW, PAN HD
	~~58~~		~~51~~	~~MS35216-24~~	~~SCREW, PAN HD~~

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	4		50	MS35216-1	SCREW, PAN HD
	1		49	1004260-106	NAMEPLATE
			48		
	7		47	MS35333-71	WASHER-LOCK
	1		46	AN960-C6	(1897006-026) WASHER-FLAT
	8		45	AN507C832 R12	(1897003-568) SCREW
SEE NOTE 3	8		44	1016005-1	SHIM, SLIDE LOCATING
SEE NOTE 3	1		43	1015785-009	SLIDE ASSEMBLY, RH
SEE NOTE 3	1		42	1015785-010	SLIDE ASSEMBLY, LH
	1		41	2900239-011	TERMINAL BOARD ASSEMBLY
	1		40	2900181 -011	TERMINAL BOARD ASSEMBLY
	1		39	1900391	BRACKET HOLDER, DOUBLE
	2		38	1900390	BRACKET HOLDER, SINGLE
SEE NOTE 3	2		37	1015995-11	REACTOR
	1		36	1016096-013	RELAY, TIME DELAY
	29		35	1015837-001	ARMATURE
	6		34	1015802-004	ARMATURE
	8		33	1015832-318	RELAY, SENSITIVE
SEE NOTE 3	3		32	1016004-008	CLAMP
	1		31	MS91528-2F1B	(1897080-125) KNOB
SEE NOTE 3	8		30	1015986-140	WASHER, SADDLE
	6		29	MS91528-2K2B	(1897080-023) KNOB
	2		28	MS90078-15-1	(1897077-115) FUSE
	1		27	MS26572-1	FUSEHOLDER
SEE NOTE 3	1		26	1015873-008	FUSEHOLDER
	8		25	1015985-007 *THRU -010*	*CABLE CLAMP*
	1		24	1015959	RESISTOR, VARIABLE
	1		23	1015825-020	SWITCH, ROTARY
	1		22	1015825-018	SWITCH, ROTARY
SEE NOTE 3	4		21	1015825-017	SWITCH, ROTARY
	1		20	1900220	SPACER, READOUT DIGITAL
SEE NOTE 3	1		19	1015943-001	BEZEL
SEE NOTE 3	1		18	1015844-001	READOUT, DIGITAL
SEE NOTE 3	1		17	1015869-325	LIGHT INDICATOR
	1		16	-326	
	1		15	-737	
	1		14	-738	
	1		13	-739	
	1		12	-517	
	1		11	-740	
	1		10	-329	
	1		9	-703	
	1		8	-702	
	1		7	-328	
SEE NOTE 3	1		6	1015869-743	LIGHT INDICATOR
	1		5	2900292	PLATE, MOUNTING, CONNECTOR
	1		4	2900291	PLATE, MOUNTING, RELAY
	2		3	900015-061	HANDLE ASSEMBLY
	1		2	2900289	PANEL, FRONT
	1		1	2900290	DRAWER, TEST SELECT. (INSEP ASSY)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

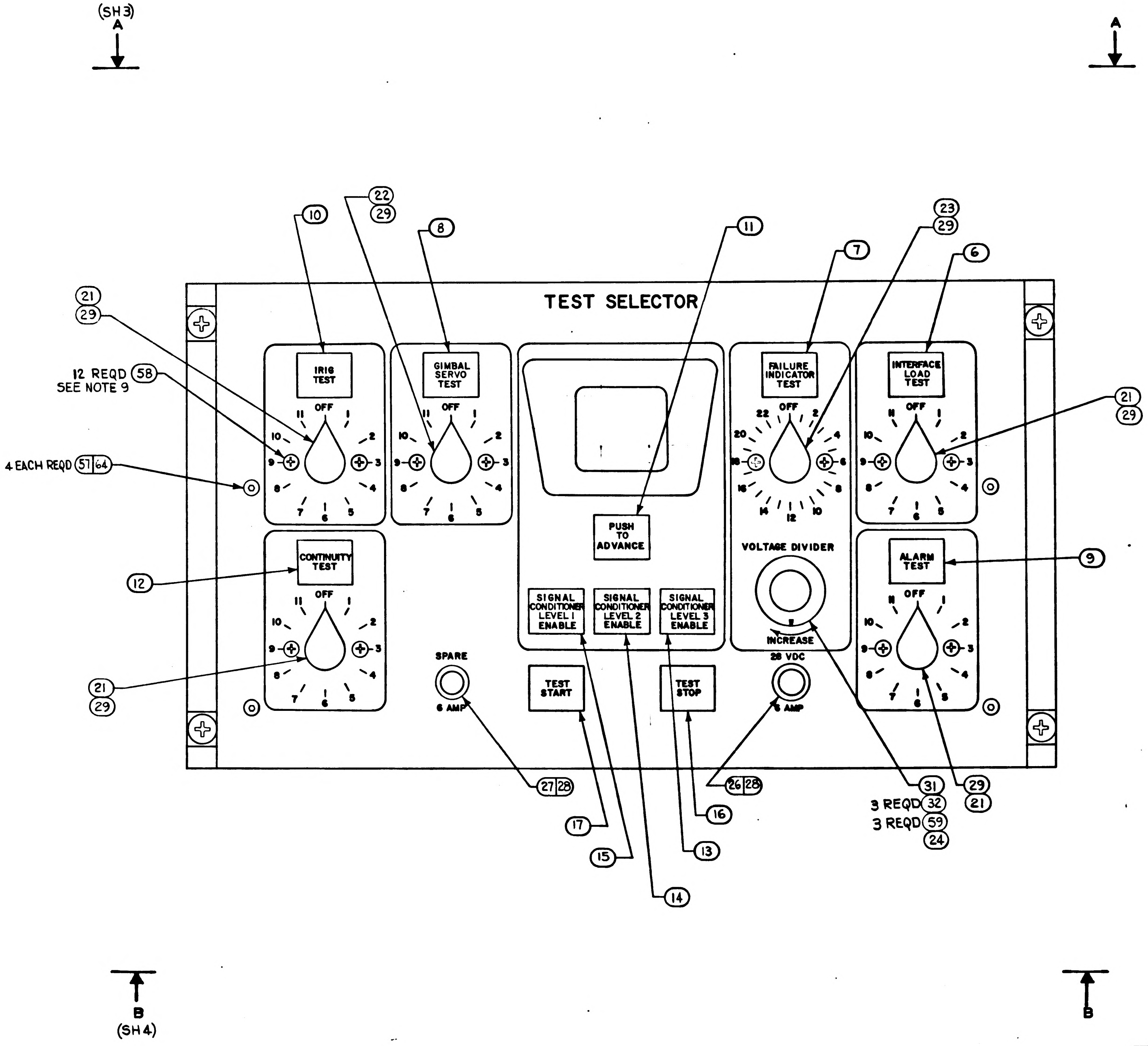
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN 24 MAR 65 DATE
CHECKED 24 MAR 65
APPROVAL 24 MAR 65
APPROVAL 10-13-65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TEST SELECTOR
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900028
SCALE FULL
SHEET 1 OF 4

REVISIONS 23412					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 202278	—	2 JUN 65	J J J
F		REVISION STATUS CHANGED	—	8 JUL 65	J J J MEA
G		REVISION STATUS CHANGED	—	[illegible] JUL 65	RS
H		REVISION STATUS CHANGED	—	22 JUL 65	MCR
J		REVISION STATUS CHANGED	—	29 JUL 65	RL RWH
K		REVISION STATUS CHANGED	—	17 AUG 65	[illegible]
L		REVISION STATUS CHANGED		27 SEP 65	[illegible]
M		REVISION STATUS CHANGED		5 OCT 65	RL
N		REVISION STATUS CHANGED		19 OCT 65	[illegible]
P		REVISION STATUS CHANGED		19 OCT 65	[illegible]
R		INITIAL RELEASE CLASS A PER TDRR 23412		20 OC 65	[illegible]
S		REVISION STATUS CHANGED		29 [illegible] 65	[illegible]


(SH 3)
A
A
TEST SELECTOR
IRIG TEST
GIMBAL SERVO TEST
CONTINUITY TEST
OFF
11
1
2
10
9
3
8
4
7
6
5
PUSH TO ADVANCE
SIGNAL CONDITIONER LEVEL 1 ENABLE
SIGNAL CONDITIONER LEVEL 2 ENABLE
SIGNAL CONDITIONER LEVEL 3 ENABLE
SPARE
6 AMP
TEST START
TEST STOP
FAILURE INDICATOR TEST
22
20
18
16
14
12
10
8
6
4
VOLTAGE DIVIDER
INCREASE
28 VDC
6 AMP
INTERFACE LOAD TEST
ALARM TEST
10
22
29
8
11
7
23
29
6
21
29
12 REQD 58
SEE NOTE 9
4 EACH REQD 57 64
21
29
12
9
21
29
27 28
17
15
14
13
16
26 28
31
3 REQD 32
3 REQD 59
24
29
21
B
(SH 4)
B

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON		
FRACTIONS	DECIMALS	ANGLES
+ — — —	+ — — —	+ — — —

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN M. Gerbner DATE 24 MAR 65
CHECKED F. Stelms 24 MAR 65
APPROVAL V. Foss 24 MAR 65
APPROVAL J. McWalter 4-13-65

NASA APPROVAL

MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

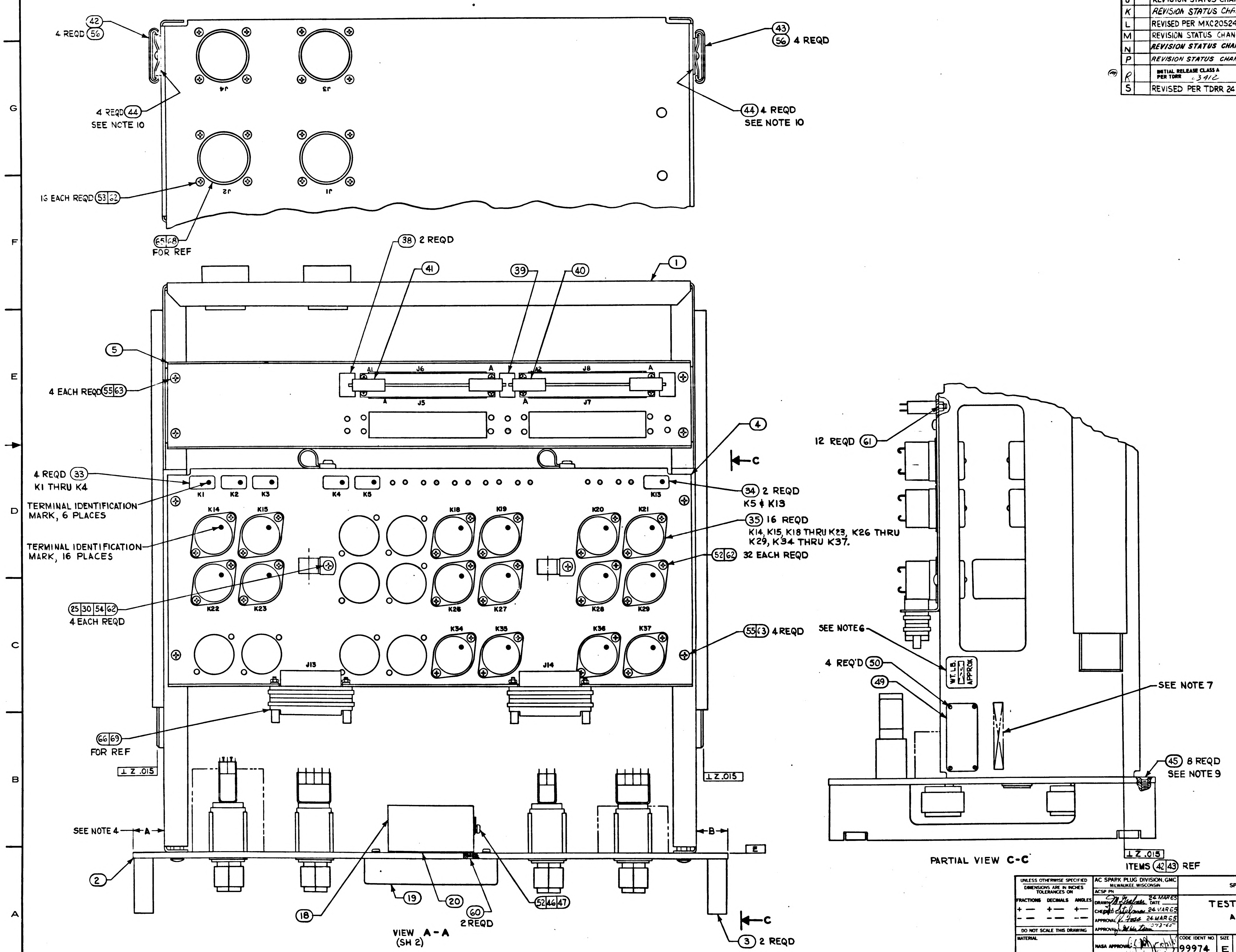
TEST SELECTOR
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900028

SCALE FULL
SHEET 2 OF 4

2900028 S

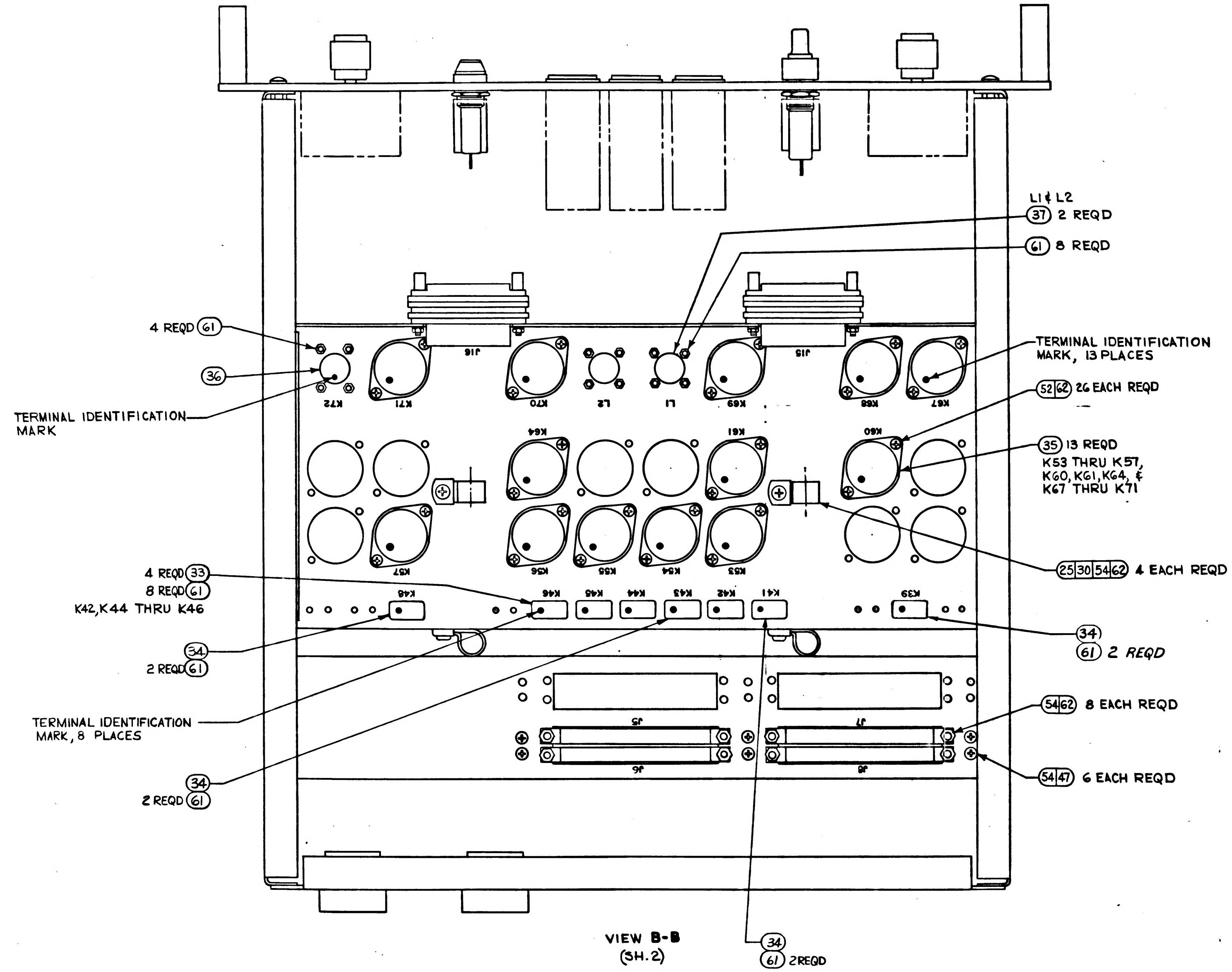
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 202278	—	24 JUN 65	
F		REVISED PER MXC 202736	—	8 JUL 65	
G		REVISION STATUS CHANGED	—	14 JUL 65	RS
H		REVISION STATUS CHANGED	—	22 JUL 65	MCR
J		REVISION STATUS CHANGED	—	29 JUL 65	
K		REVISION STATUS CHANGED	—	7 AUG 65	
L		REVISED PER MXC205249		27 SEP 65	A N
M		REVISION STATUS CHANGED		5 OCT 65	
N		REVISION STATUS CHANGED		19 OCT 65	
P		REVISION STATUS CHANGED		19 OCT 65	
R		INITIAL RELEASE CLASS A PER TDRR 3412		65	
S		REVISED PER TDRR 2449		29 NOV 65	



4 REQD (56) (42)
4 REQD (44) SEE NOTE 10
16 EACH REQD (53)(62)
(65)(68) FOR REF
J4
J3
J2
J1
(43) (56) 4 REQD
(44) 4 REQD SEE NOTE 10
(38) 2 REQD
(41)
(39)
(40)
(1)
(5)
4 EACH REQD (55)(63)
A1 J6 A A2 J8 A
A J5 A J7
(4)
C
4 REQD (33) K1 THRU K4
TERMINAL IDENTIFICATION MARK, 6 PLACES
TERMINAL IDENTIFICATION MARK, 16 PLACES
K1 K2 K3 K4 K5 K13
(34) 2 REQD K5 & K13
(35) 16 REQD K14, K15, K18 THRU K23, K26 THRU K29, K34 THRU K37.
(52)(62) 32 EACH REQD
K14 K15 K18 K19 K20 K21
K22 K23 K26 K27 K28 K29
K34 K35 K36 K37
(25)(30)(54)(62) 4 EACH REQD
(55)(63) 4 REQD
J13 J14
(66)(69) FOR REF
⊥ Z .015
⊥ Z .015
SEE NOTE 4 A
B
(2)
(18)
(19)
(20)
(60) 2 REQD
(52)(46)(47)
(3) 2 REQD
C
VIEW A-A (SH 2)
12 REQD (61)
SEE NOTE 6
WT. LB. APPROX
4 REQ'D (50)
(49)
SEE NOTE 7
(45) 8 REQD SEE NOTE 9
PARTIAL VIEW C-C
⊥ Z .015
ITEMS (42)(43) REF

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN	
	DRAWN M Graham DATE 24 MAR 65 CHECKED Stolman 24 MAR 65 APPROVAL R. Foss 24 MAR 65 APPROVAL J. M Watson 10-13-65	TEST SELECTOR ASSEMBLY
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE E · 2900028
CONTRACT NAS 9-497	MIT APPROVAL	SCALE FULL · SHEET 3 OF 4

REVISIONS					3912
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 202278	—	24 JUN 65	
F		REVISION STATUS CHANGED	—	8 JUL 65	J J
G		REVISED PER MXC202974	—	14 JUL 65	RS
H		REVISED PER MXC203051	—	22 JUL 65	MCR
J		REVISION STATUS CHANGED	—	29 JUL 65	
K		REVISED PER MXC203956	—	AUG 65	
L		REVISED PER MXC 205249		27 SEP 65	
M		REVISED PER MXC 205427		5 OCT 65	
N		REVISION STATUS CHANGED		19 OCT 65	B.
P		REVISION STATUS CHANGED		19 OCT 65	B. J.L.G.
R		INITIAL RELEASE CLASS A PER TDRR 3912			
S		REVISED PER TDRR 24149		29 NOV 65	


L1 & L2
37 2 REQD
61 8 REQD
4 REQD 61
36
TERMINAL IDENTIFICATION MARK
TERMINAL IDENTIFICATION MARK, 13 PLACES
52 62 26 EACH REQD
35 13 REQD K53 THRU K57, K60, K61, K64, & K67 THRU K71
25 30 54 62 4 EACH REQD
4 REQD 33
8 REQD 61
K42, K44 THRU K46
34
2 REQD 61
34
61 2 REQD
TERMINAL IDENTIFICATION MARK, 8 PLACES
54 62 8 EACH REQD
54 47 6 EACH REQD
34
2 REQD 61
34
61 2 REQD
K72
K71
J16
K70
L2
L1
K69
J15
K68
K67
K64
K61
K60
K57
K56
K55
K54
K53
K48
K46
K45
K44
K43
K42
K41
K39
J5
J7
J6
J8

VIEW B-B
(SH. 2)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + — - — DECIMALS + — - — ANGLES + — - —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN M. Gruber DATE 24 MAR 65 CHECKED Stelma 24 MAR 65 APPROVAL Foss 24 MAR 65 APPROVAL M. Watson 10-13-65	TEST SELECTOR ASSEMBLY
DO NOT SCALE THIS DRAWING		
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE E · 2900028
CONTRACT NAS-497	MIT APPROVAL	SCALE FULL · SHEET 4 OF 4

2900028 S

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM (72), OR (70) AND (71).
3. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.
4. DIMENSION "A" MUST BE EQUAL TO DIMENSION "B" WITHIN .040.
5. DRAWER SLIDE MOUNTING SCREWS AND FRONT PANEL MOUNTING SCREWS, ITEMS (56) AND (57) REF., SHALL BE SUBJECTED TO TORQUE OF 33.0 – 36.2 IN/LBS AT INSTALLATION.
6. MARK WEIGHT OF ASSEMBLY, (39 LBS), PER ND 1002123.
7. MARK "SCHEMATIC" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH, COLOR BLACK, IN LOCATION SHOWN.
8. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (49) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
9. SECURE SCREWS USING ITEM (73).
10. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.
11. THE FOLLOWING ARE PART OF THIS ASSEMBLY.

WIRE LIST AA	ITEM 68
WIRE LIST BB	ITEM 69
WIRING HARNESS A	ITEM 65
WIRING HARNESS B	ITEM 66

12. DRAWINGS FOR REFERENCE.

SCHEMATIC DIAGRAM	ITEM 75
RUNNING LIST	ITEM 76

REVISIONS 23412

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
E		REPLACES REV D WITH CHANGE PER MXC 202278	—	24 JUN 65	JJJ
F		REVISION STATUS CHANGED	—	8 JUL 65	JJJ
G		REVISED PER MXC202974	—	14 JUL 65	RS PF
H		REVISED PER MXC203051	—	22 JUL 65	HCK
J		REVISED PER MXC 203179	—	29 JUL 65	RWH
K		REVISED PER MXC 203956	—	17 AUG 65	JCD
L		REVISED PER MXC 205249		27 SEP 65	A.N.
M		REVISED PER MXC 205427		5 OCT 65	
N		REVISED PER MXC-205702		19-OCT-65	B.
P		REVISED PER MXC 205970		19-OCT-65	B. J.E.
R		INITIAL RELEASE CLASS A PER TDRR 23412		20 OCT 65	
S		REVISION STATUS CHANGED		29 NOV 65	
T		REVISED PER TDRR 25301		19 JAN 66	PF

	QUANTITY REQUIRED				EFFECTIVITY	LIST OF PARTS AND MATERIALS		
				011		ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				☒		76	2900678	RUNNING LIST- TEST SELECTOR
				☒		75	2900295	SCHEMATIC DIAGRAM, ELECT.
				☒		74	PS 2900028	PROCUREMENT SPECIFICATION
				AR		73	MIL-S-22473(GRC)	(ES2544-3) SEALING COMPOUND
				AR		72	SN60 WRAP	SOLDER QQ-S-571(ES2175-3)
				AR		71	MIL-F-14256 TYPE AORW	FLUX (ES2798)
				AR		70	SN60WS	SOLDER QQ-S-571(ES2175-1)
				1		69	2900297	WIRE LIST BB
				1		68	2900296	WIRE LIST AA
						67		
				1		66	2900294	WIRING HARNESS B
				1		65	2900293	WIRING HARNESS A
SEE NOTE 3				4		64	1016151 -010	NUT, SELF LOCKING
|				8		63	| -008	| | |
|				90		62	| -006	| | |
|				40		61	1016151 -004	NUT, SELF LOCKING
|				2		60	1015912 - 193	SCREW
SEE NOTE 3				3		59	1000093 - 14	|
				12		58	MS35200-40	|
SEE NOTE 3				4		57	1006783 -45	| BUTTON HD
SEE NOTE 3				8		56	1006783 -44	| BUTTON HD
				8		55	MS35216-40	| PAN HD
				22		54	| -27	| |
				16		53	| -26	| |
				59		52	MS 35216-25	SCREW, PAN HD
				~~58~~		~~51~~	~~MS35216-24~~	~~SCREW, PAN HD~~

	QUANTITY REQUIRED				EFFECTIVITY	LIST OF PARTS AND MATERIALS		
				011		ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				4		50	MS35216-1	SCREW, PAN HD
				1		49	1004260-106	NAMEPLATE
						48		
				7		47	MS35333-71	WASHER-LOCK
				1		46	AN960-C6	(1897006-026) WASHER-FLAT
				8		45	AN507C832 R12	(1897003-568) SCREW
SEE NOTE 3				8		44	1016005-1	SHIM, SLIDE LOCATING
SEE NOTE 3				1		43	1015785-009	SLIDE ASSEMBLY, RH
SEE NOTE 3				1		42	1015785-010	SLIDE ASSEMBLY, LH
				1		41	2900239-011	TERMINAL BOARD ASSEMBLY
				1		40	2900181 -011	TERMINAL BOARD ASSEMBLY
				1		39	1900391	BRACKET HOLDER, DOUBLE
				2		38	1900390	BRACKET HOLDER, SINGLE
SEE NOTE 3				2		37	1015995-11	REACTOR
|				1		36	1016096-013	RELAY, TIME DELAY
|				29		35	1015837-001	| ARMATURE
|				6		34	1015802-004	| ARMATURE
|				8		33	1015832-318	RELAY, SENSITIVE
SEE NOTE 3				3		32	1016004-008	CLAMP
				1		31	MS91528-2F1B	(1897080-125) KNOB
SEE NOTE 3				8		30	1015986-140	WASHER, SADDLE
				6		29	MS91528-2K2B	(1897080-023) KNOB
				2		28	MS90078-15-1	(1897077-115) FUSE
				1		27	MS26572-1	FUSEHOLDER
SEE NOTE 3				1		26	1015873-008	FUSEHOLDER
|				8		25	1015985-007 THRU -010	CABLE CLAMP
|				1		24	1015959	RESISTOR, VARIABLE
|				1		23	1015825-020	SWITCH, ROTARY
|				1		22	1015825-018	SWITCH, ROTARY
SEE NOTE 3				4		21	1015825-017	SWITCH, ROTARY
				1		20	1900220	SPACER, READOUT DIGITAL
SEE NOTE 3				1		19	1015943-001	BEZEL
SEE NOTE 3				1		18	1015844-001	READOUT, DIGITAL
SEE NOTE 3				1		17	1015869-325	LIGHT INDICATOR
				1		16	| -326	| |
				1		15	| -737	| |
				1		14	| -738	| |
				1		13	| -739	| |
				1		12	| -517	| |
				1		11	| -740	| |
				1		10	| -329	| |
				1		9	| -703	| |
				1		8	| -702	| |
				1		7	| -328	| |
SEE NOTE 3				1		6	1015869-743	LIGHT INDICATOR
				1		5	2900292	PLATE, MOUNTING, CONNECTOR
				1		4	2900291	PLATE, MOUNTING, RELAY
				2		3	900015-061	HANDLE ASSEMBLY
				1		2	2900289	PANEL, FRONT
				1		1	2900290	DRAWER, TEST SELECT (INSEP ASSY)

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS

DRAWN M. Gabrie 24 MAR 65
CHECKED J. Stelma 24 MAR 65
APPROVAL V. Fosa 24 MAR 65
APPROVAL J. M. Watson 10-13-65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

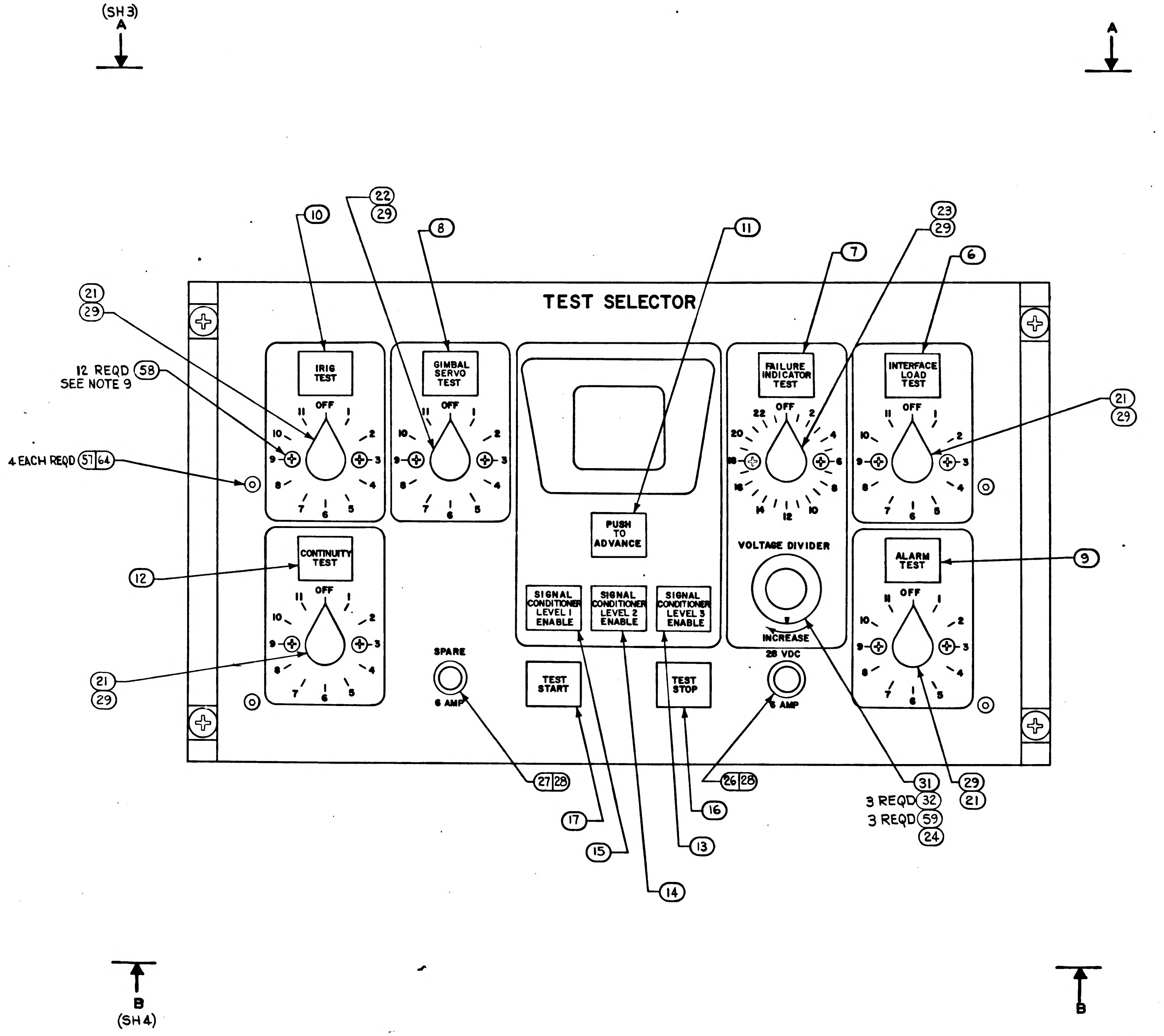
TEST SELECTOR
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900028
SCALE FULL
SHEET 1 OF 4

10 June 65

2900028 T

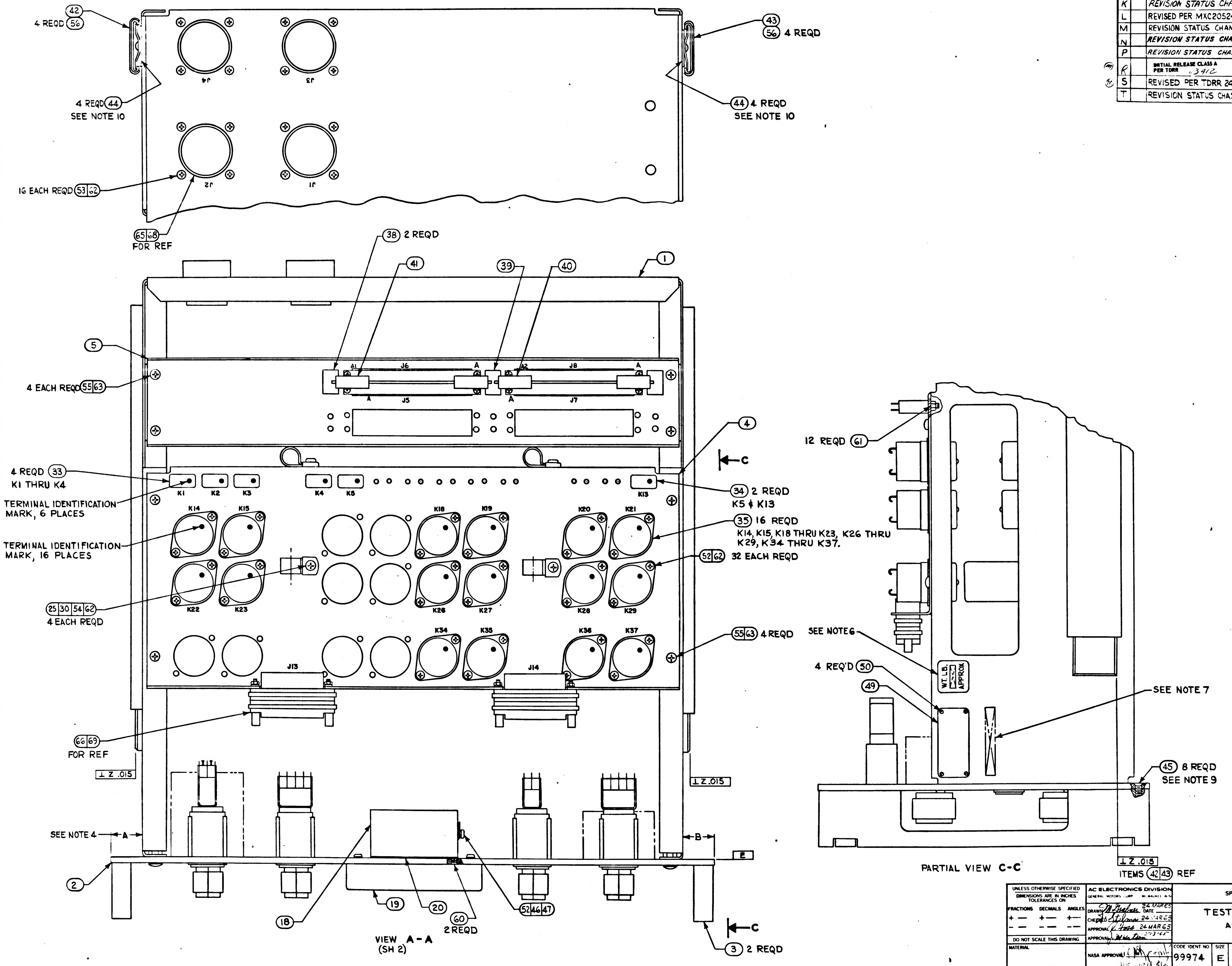
REVISIONS 23412					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 202278	—	24 JUN 65	JJJ
F		REVISION STATUS CHANGED	—	8 JUL 65	JJJ
G		REVISION STATUS CHANGED	—	14 JUL 65	RS
H		REVISION STATUS CHANGED	—	22 JUL 65	HCR
J		REVISION STATUS CHANGED	—	29 JUL 65	RWH
K		REVISION STATUS CHANGED	—	17 AUG 65	
L		REVISION STATUS CHANGED		27 SEP 65	
M		REVISION STATUS CHANGED		5 OCT 65	
N		REVISION STATUS CHANGED		19 OCT 65	
P		REVISION STATUS CHANGED		9 [illegible] 65	
R		INITIAL RELEASE CLASS A PER TDRR 23412		[illegible] 65	
S		REVISION STATUS CHANGED		[illegible] 65	
T		REVISION STATUS CHANGED		9 [illegible] 66	


(SH 3)
A
A
TEST SELECTOR
IRIG TEST
GIMBAL SERVO TEST
PUSH TO ADVANCE
FAILURE INDICATOR TEST
INTERFACE LOAD TEST
CONTINUITY TEST
ALARM TEST
OFF
1
2
3
4
5
6
7
8
9
10
11
22
20
18
16
14
12
VOLTAGE DIVIDER
INCREASE
28 VDC
5 AMP
SPARE
5 AMP
SIGNAL CONDITIONER LEVEL 1 ENABLE
SIGNAL CONDITIONER LEVEL 2 ENABLE
SIGNAL CONDITIONER LEVEL 3 ENABLE
TEST START
TEST STOP
10
22
29
8
11
23
29
7
6
21
29
12 REQD 58
SEE NOTE 9
4 EACH REQD 57 64
21
29
12
9
21
29
27 28
26 28
17
15
14
13
16
31
3 REQD 32
3 REQD 59
24
29
21
B
(SH 4)
B

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
FRACTIONS + — − — DECIMALS + — − — ANGLES + — − —	DRAWN M. [illegible] DATE 24 MAR 65 CHECKED [illegible] 24 MAR 65 APPROVAL V. Fosa 24 MAR 65 APPROVAL J. M. Walsh 0-13-65	TEST SELECTOR ASSEMBLY
DO NOT SCALE THIS DRAWING		
MATERIAL	NASA APPROVAL	CODE IDENT NO 99974 · SIZE E · 2900028
CONTRACT NAS9-497	MIT APPROVAL	SCALE FULL · SHEET 2 OF 4

2900028 T

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
REVISIONS					
E		THIS SHEET ADDED PER MXC 202278	—	24 JUN 65	J J J
F		REVISED PER MXC 202736	—	8 JUL 65	J J
G		REVISION STATUS CHANGED	—	14 JUL 65	RS
H		REVISION STATUS CHANGED	—	22 JUL 65	
J		REVISION STATUS CHANGED	—	29 JUL 65	
K		REVISION STATUS CHANGED	—	AUG 65	
L		REVISED PER MXC205249		27 SEP 65	
M		REVISION STATUS CHANGED		5 OCT 65	
N		REVISION STATUS CHANGED		19 OCT 65	
P		REVISION STATUS CHANGED		65	
R		INITIAL RELEASE CLASS A PER TDRR 3412		65	
S		REVISED PER TDRR 24149		29 NOV 65	
T		REVISION STATUS CHANGED		66	



42
4 REQD 56
43
56 4 REQD
J4
J3
J2
J1
4 REQD 44
SEE NOTE 10
44 4 REQD
SEE NOTE 10
16 EACH REQD 53 62
65 68
FOR REF
38 2 REQD
41
39
40
1
5
4 EACH REQD 55 63
A1
J6
A
A2
J8
A
J5
J7
4
4 REQD 33
K1 THRU K4
K1
K2
K3
K4
K5
K13
34 2 REQD
K5 & K13
TERMINAL IDENTIFICATION MARK, 6 PLACES
TERMINAL IDENTIFICATION MARK, 16 PLACES
K14
K15
K18
K19
K20
K21
35 16 REQD
K14, K15, K18 THRU K23, K26 THRU K29, K34 THRU K37.
52 62 32 EACH REQD
K22
K23
K26
K27
K28
K29
25 30 54 62
4 EACH REQD
K34
K35
K36
K37
55 63 4 REQD
J13
J14
66 69
FOR REF
⊥ Z .015
⊥ Z .015
C
SEE NOTE 4
A
B
E
2
19
20
60
2 REQD
18
52 46 47
VIEW A-A
(SH 2)
C
3 2 REQD
12 REQD 61
SEE NOTE 6
WT. LB. APPROX
4 REQ'D 50
49
SEE NOTE 7
45 8 REQD
SEE NOTE 9
PARTIAL VIEW C-C
⊥ Z .015
ITEMS 42 43 REF

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	+ —	+ —
− —	− —	− —

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS

DRAWN M. Gralow DATE 24 MAR 65
CHECKED Stilman 24 MAR 65
APPROVAL V. Foss 24 MAR 65
APPROVAL J. M. Watson 3-73-65
NASA APPROVAL
MIT APPROVAL

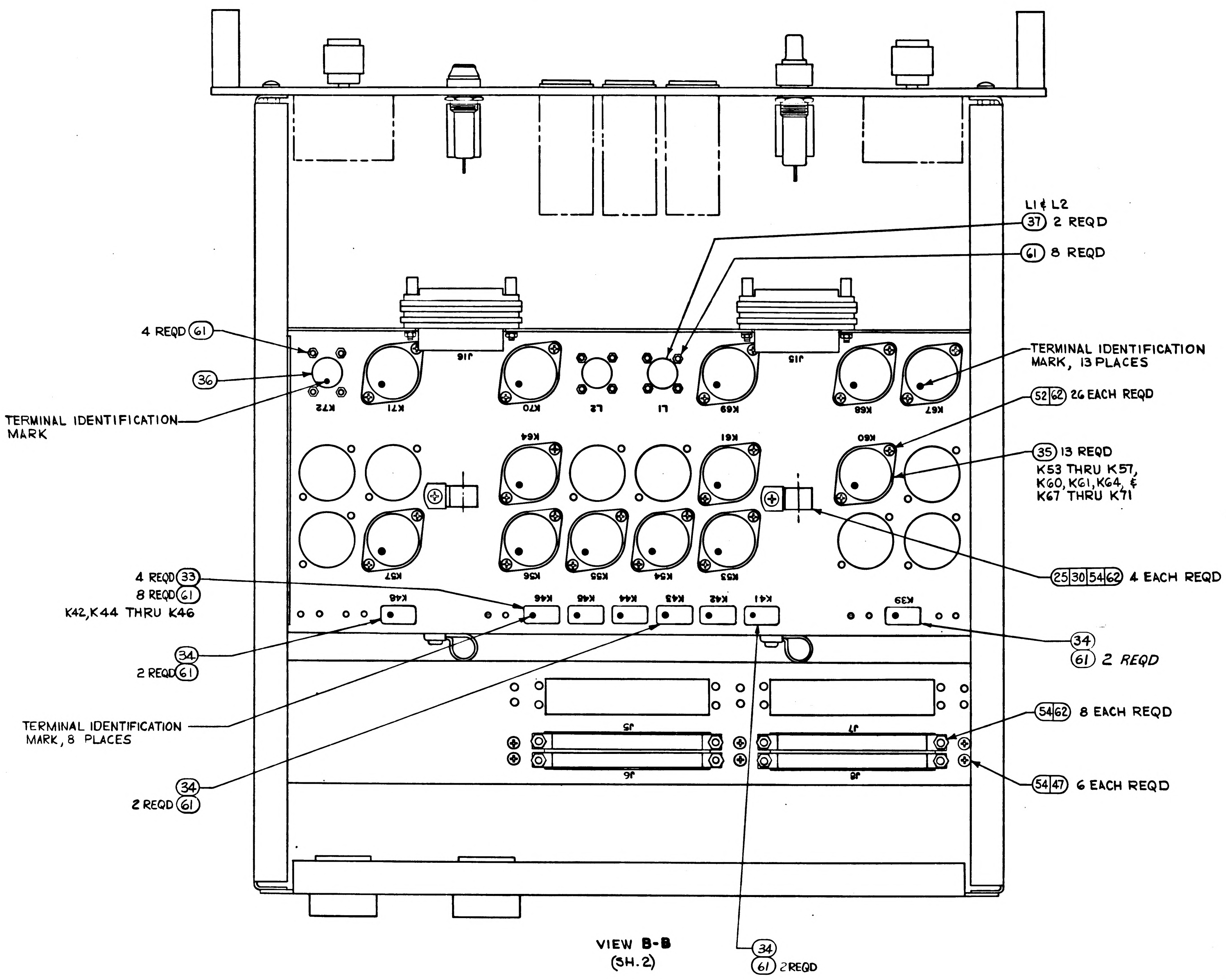
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TEST SELECTOR
ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900028
SCALE FULL
SHEET 3 OF 4

2900028 T

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 202278	—	JUN 65	
F		REVISION STATUS CHANGED	—	8 JUL 65	
G		REVISED PER MXC202974	—	11 JUL 65	RS
H		REVISED PER MXC203051	—	22 JUL 65	
J		REVISION STATUS CHANGED	—	29 JUL 65	
K		REVISED PER MXC203956	—	AUG 65	
L		REVISED PER MXC 205249		27 SEP 65	
M		REVISED PER MXC 205427		5 OCT 65	
N		REVISION STATUS CHANGED		19 OCT. 65	B.
P		REVISION STATUS CHANGED		19 OCT. 65	B
R		INITIAL RELEASE CLASS A PER TDRR 23912			
S		REVISED PER TDRR 24149			
T		REVISION STATUS CHANGED		9 JAN 66	


L1 & L2
37 2 REQD
61 8 REQD
4 REQD 61
36
TERMINAL IDENTIFICATION MARK
TERMINAL IDENTIFICATION MARK, 13 PLACES
52 62 26 EACH REQD
35 13 REQD
K53 THRU K57, K60, K61, K64, & K67 THRU K71
25 30 54 62 4 EACH REQD
4 REQD 33
8 REQD 61
K42, K44 THRU K46
34
2 REQD 61
34
61 2 REQD
TERMINAL IDENTIFICATION MARK, 8 PLACES
54 62 8 EACH REQD
54 47 6 EACH REQD
34
2 REQD 61
34
61 2 REQD
J16
J15
K72
K71
K70
L2
L1
K69
K68
K67
K64
K61
K60
K57
K56
K55
K54
K53
K48
K46
K45
K44
K43
K42
K41
K39
J5
J6
J7
J8

VIEW B-B
(SH. 2)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	AC ELECTRONICS DIVISION GENERAL MOTORS CORP. MILWAUKEE WIS.	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
FRACTIONS + — — — DECIMALS + — — — ANGLES + — — —	DRAWN N. Gruner DATE 22 MAR 65 CHECKER Stelvis 24 MAR 65 APPROVAL Foss 24 MAR 65 APPROVAL M Watson 10-13-65	TEST SELECTOR ASSEMBLY
DO NOT SCALE THIS DRAWING		
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 SIZE E 2900028
CONTRACT NAS-497	MIT APPROVAL	SCALE FULL SHEET 4 OF 4

2900028 T

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM (72), OR (70) AND (71).
3. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.
4. DIMENSION "A" MUST BE EQUAL TO DIMENSION "B" WITHIN .040.
5. DRAWER SLIDE MOUNTING SCREWS AND FRONT PANEL MOUNTING SCREWS, ITEMS (56) AND (57) REF., SHALL BE SUBJECTED TO TORQUE OF 33.0 – 36.2 IN/LBS AT INSTALLATION.
6. MARK WEIGHT OF ASSEMBLY, (39 LBS), PER ND 1002123.
7. MARK "SCHEMATIC" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH, COLOR BLACK, IN LOCATION SHOWN.
8. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (49) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
9. SECURE SCREWS USING ITEM (73).
10. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.
11. THE FOLLOWING ARE PART OF THIS ASSEMBLY.

WIRE LIST AA	ITEM 68
WIRE LIST BB	ITEM 69
WIRING HARNESS A	ITEM 65
WIRING HARNESS B	ITEM 66

12. DRAWINGS FOR REFERENCE.

SCHEMATIC DIAGRAM	ITEM 75
RUNNING LIST	ITEM 76

REVISIONS 23412

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		REPLACES REV D WITH CHANGE PER MXC 202278	—	24 JUN 65	J J J
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P		REVISED PER MXC 205970		18-OCT-65	
R		INITIAL RELEASE CLASS A PER TDRR 23412		20 OCT 65	
S		REVISION STATUS CHANGED		29 NOV 65	
T		REVISED PER TDRR 25301		19 JAN 66	
U		REVISED PER TDRR 25735		7 FEB 66	

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
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	X		74	PS 2900028	PROCUREMENT SPECIFICATION
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	AR		71	MIL-F-14256 TYPE AORW	FLUX (ES2798)
	AR		70	SN60WS	SOLDER QQ-S-571 (ES2175-1)
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	1		68	2900296	WIRE LIST AA
			67		
	1		66	2900294	WIRING HARNESS B
	1		65	2900293	WIRING HARNESS A
SEE NOTE 3	4		64	1016151 -010	NUT, SELF LOCKING
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│	90		62	│ -006	│ │ │
│	40		61	1016151 -004	NUT, SELF LOCKING
│	2		60	1015912-193	SCREW
SEE NOTE 3	3		59	1000093-14	│
	12		58	MS35200-40	│
SEE NOTE 3	4		57	1006783-45	│ BUTTON HD
SEE NOTE 3	8		56	1006783-44	│ BUTTON HD
	8		55	MS35216-40	│ PAN HD
	22		54	│ -27	│ │
	16		53	│ -26	│ │
	61		52	MS 35216-25	SCREW, PAN HD
	~~58~~		~~51~~	~~MS35216-24~~	~~SCREW, PAN HD~~
	4		50	MS35216-1	SCREW, PAN HD
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			48		
	9		47	MS35333-71	WASHER-LOCK
	1		46	AN960-C6	(1897006-026) WASHER-FLAT
	8		45	AN507C832 R12	(1897003-568) SCREW
SEE NOTE 3	8		44	1016005-1	SHIM, SLIDE LOCATING
SEE NOTE 3	1		43	1015785-009	SLIDE ASSEMBLY, RH
SEE NOTE 3	1		42	1015785-010	SLIDE ASSEMBLY, LH
	1		41	2900239-011	TERMINAL BOARD ASSEMBLY
	1		40	2900181 -011	TERMINAL BOARD ASSEMBLY
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	2		38	1900390	BRACKET HOLDER, SINGLE
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│	29		35	1015837-001	│ ARMATURE
│	6		34	1015802-004	│ ARMATURE
│	8		33	1015832-318	RELAY, SENSITIVE
SEE NOTE 3	3		32	1016004-008	CLAMP
	1		31	MS91528-2F1B	(1897080-125) KNOB
SEE NOTE 3	8		30	1015986-140	WASHER, SADDLE
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	2		28	MS90078-15-1	(1897077-115) FUSE
	1		27	MS26572-1	FUSEHOLDER
SEE NOTE 3	1		26	1015873-008	FUSEHOLDER
│	8		25	1015985-007 THRU -010	CABLE CLAMP
│	1		24	1015959	RESISTOR, VARIABLE
│	1		23	1015825-020	SWITCH, ROTARY
│	1		22	1015825-018	SWITCH, ROTARY
SEE NOTE 3	4		21	1015825-017	SWITCH, ROTARY
	1		20	1900220	SPACER, READOUT DIGITAL
SEE NOTE 3	1		19	1015943-001	BEZEL
SEE NOTE 3	1		18	1015844-001	READOUT, DIGITAL
SEE NOTE 3	1		17	1015869-325	LIGHT INDICATOR
	1		16	│ -326	│ │
	1		15	│ -737	│ │
	1		14	│ -738	│ │
	1		13	│ -739	│ │
	1		12	│ -517	│ │
	1		11	│ -740	│ │
	1		10	│ -329	│ │
	1		9	│ -703	│ │
	1		8	│ -702	│ │
	1		7	│ -528	│ │
SEE NOTE 3	1		6	1015869-743	LIGHT INDICATOR
	1		5	2900292	PLATE, MOUNTING, CONNECTOR
	1		4	2900291	PLATE, MOUNTING, RELAY
	2		3	900015-061	HANDLE ASSEMBLY
	1		2	2900289	PANEL, FRONT
	1		1	2900290	DRAWER, TEST SELECT. (INSEPASSY)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.

DRAWN M. Graham 24 MAR 65
CHECKED S. Stelma 24 MAR 65
APPROVAL R. Foss 24 MAR 65
APPROVAL J. M. Watson 10-13-65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

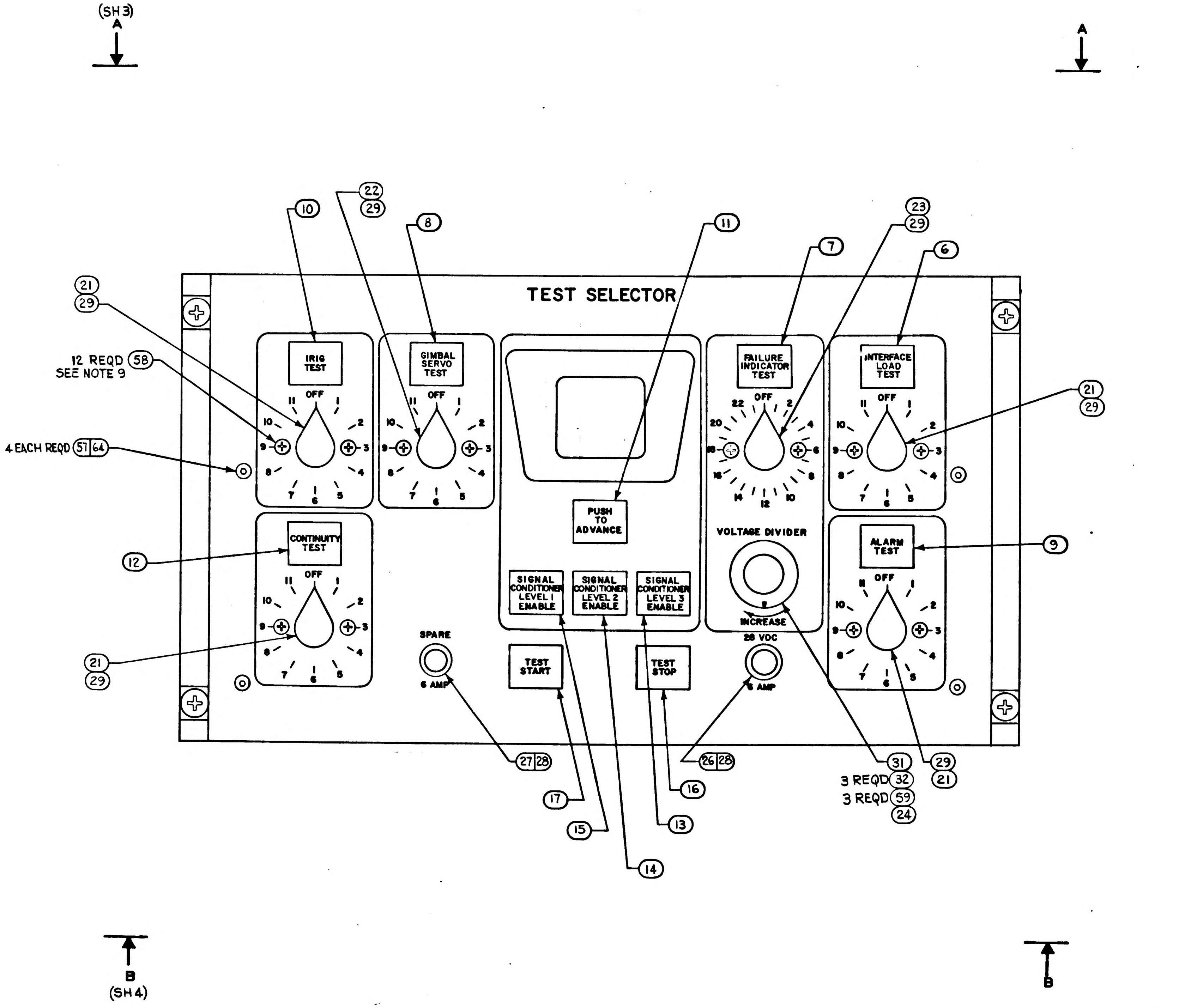
TEST SELECTOR
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900028
SCALE FULL
SHEET 1 OF 4

10 Jun 65

2900028 U

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 203278	—	24 JUN 65	JJJ
F		REVISION STATUS CHANGED	—	8 JUL 65	JJJ
G		REVISION STATUS CHANGED	—	12 JUL 65	RS
H		REVISION STATUS CHANGED	—	22 JUL 65	MCR
J		REVISION STATUS CHANGED	—	29 JUL 65	RWH
K		REVISION STATUS CHANGED	—	17 AUG 65	[illegible]
L		REVISION STATUS CHANGED		27 SEP 65	[illegible]
M		REVISION STATUS CHANGED		5 OCT 65	[illegible]
N		REVISION STATUS CHANGED		19 OCT 65	[illegible]
P		REVISION STATUS CHANGED		[illegible] 65	[illegible]
R		INITIAL RELEASE CLASS A PER TDRR 23412		[illegible] 65	[illegible]
S		REVISION STATUS CHANGED		[illegible] 65	[illegible]
T		REVISION STATUS CHANGED		9 JAN 66	[illegible]
U		REVISION STATUS CHANGED		7 FEB 66	[illegible]


(SH3)
A
A
TEST SELECTOR
IRIG TEST
GIMBAL SERVO TEST
CONTINUITY TEST
FAILURE INDICATOR TEST
INTERFACE LOAD TEST
ALARM TEST
OFF
1
2
3
4
5
6
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9
10
11
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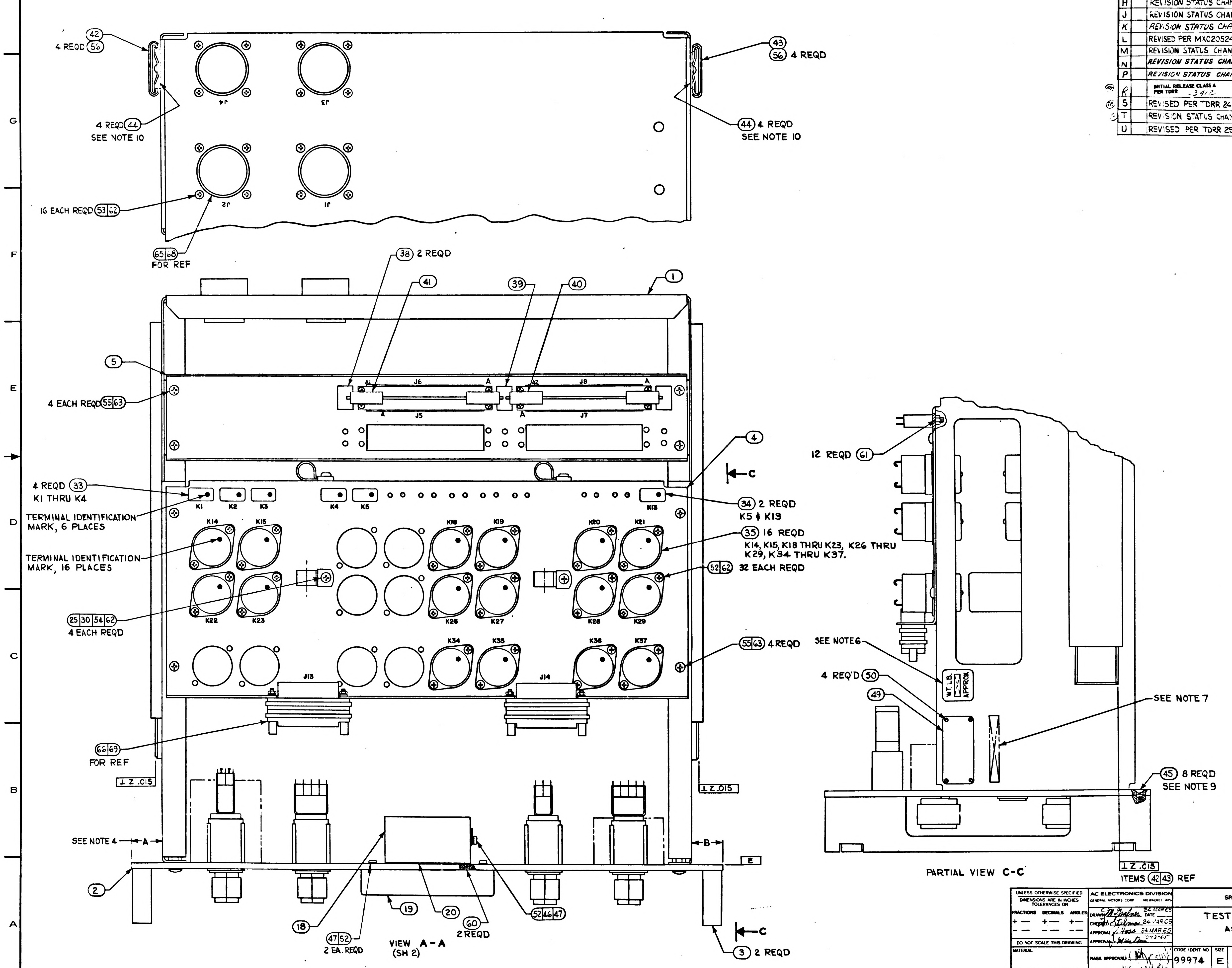
14
16
18
20
22
PUSH TO ADVANCE
SIGNAL CONDITIONER LEVEL 1 ENABLE
SIGNAL CONDITIONER LEVEL 2 ENABLE
SIGNAL CONDITIONER LEVEL 3 ENABLE
TEST START
TEST STOP
SPARE
6 AMP
VOLTAGE DIVIDER
INCREASE
28 VDC
5 AMP
⑩
㉒ ㉙
⑧
⑪
⑦
㉓ ㉙
⑥
㉑ ㉙
12 REQD ㊿8
SEE NOTE 9
4 EACH REQD 57 64
⑫
⑨
27 28
26 28
⑰
⑮
⑭
⑬
⑯
㉛
3 REQD ㉜
3 REQD 59
㉔
㉙ ㉑
B
(SH4)
B

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + — + — + — - — - — - —	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON TEXAS
DO NOT SCALE THIS DRAWING	DRAWN M. Grabner DATE 24 MAR 65 CHECKED J. Sterne 24 MAR 65 APPROVAL J. Foss 24 MAR 65 APPROVAL J. M Walsh 10-13-65	TEST SELECTOR ASSEMBLY
MATERIAL	NASA APPROVAL	CODE IDENT NO 99974 SIZE E 2900028
CONTRACT NAS9-497	MIT APPROVAL	SCALE FULL SHEET 2 OF 4

2900028 U

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 202278	—	24 JUN 65	[illegible]
F		REVISED PER MXC 202736	—	8 JUL 65	[illegible]
G		REVISION STATUS CHANGED	—	14 JUL 65	RS
H		REVISION STATUS CHANGED	—	22 JUL 65	[illegible]
J		REVISION STATUS CHANGED	—	29 JUL 65	[illegible]
K		REVISION STATUS CHANGED	—	[illegible] AUG 65	[illegible]
L		REVISED PER MXC205249		2? SEP 65	[illegible]
M		REVISION STATUS CHANGED		5 OCT 65	[illegible]
N		REVISION STATUS CHANGED		19 OCT 65	B.
P		REVISION STATUS CHANGED		19 [illegible] 65	[illegible]
R		INITIAL RELEASE CLASS A PER TDRR 3412		[illegible] 65	[illegible]
S		REVISED PER TDRR 2449		29 NOV 65	[illegible]
T		REVISION STATUS CHANGED		[illegible] 66	[illegible]
U		REVISED PER TDRR 25735		7 [illegible] 66	[illegible]

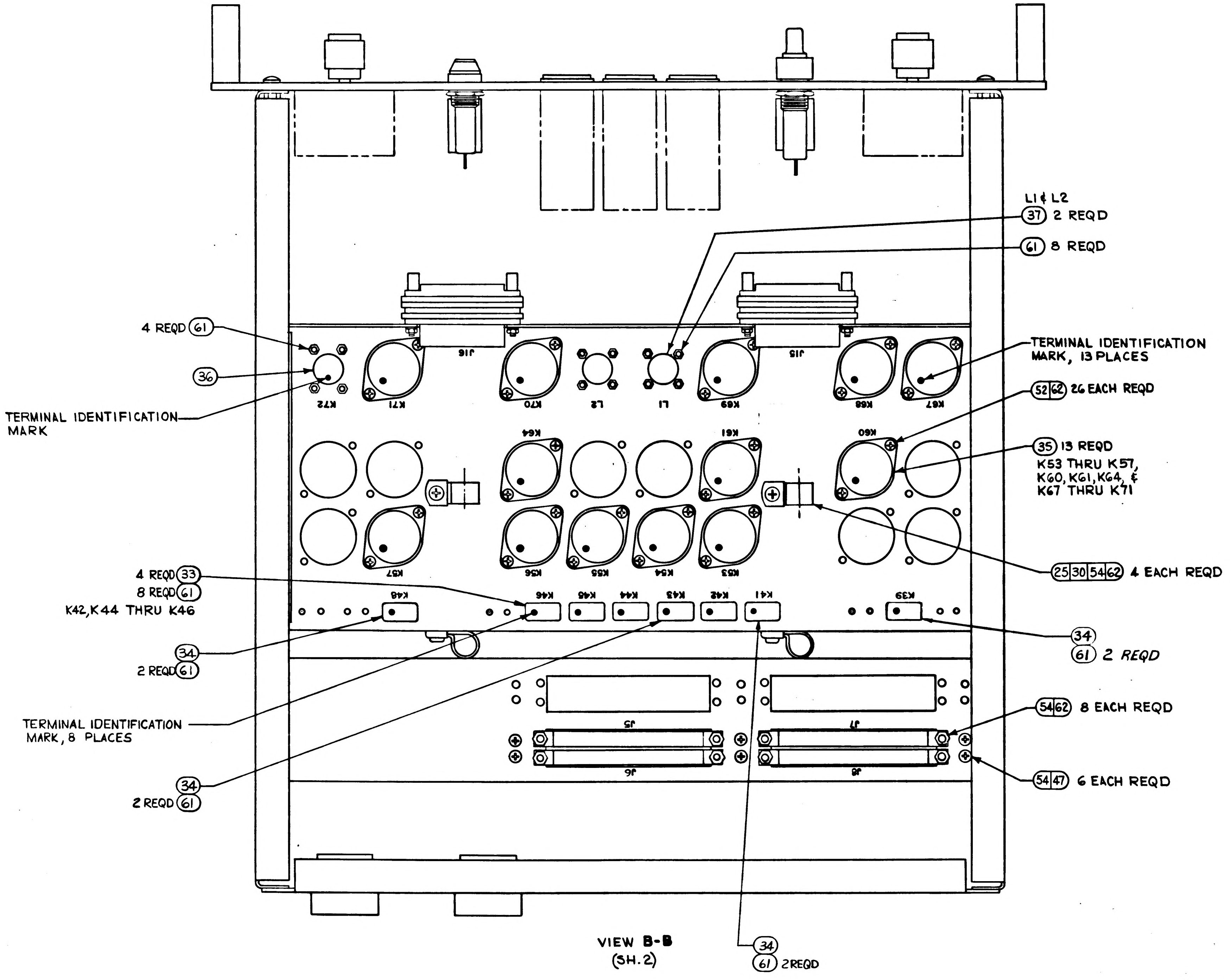


4 REQD 42 56
43 56 4 REQD
J4
J3
J2
J1
4 REQD 44 SEE NOTE 10
44 4 REQD SEE NOTE 10
16 EACH REQD 53 62
65 68 FOR REF
38 2 REQD
41
39
40
1
5
4 EACH REQD 55 63
A1 J6 A
A2 J8 A
A J5
A J7
4
4 REQD 33 K1 THRU K4
K1 K2 K3 K4 K5 K13
34 2 REQD K5 & K13
TERMINAL IDENTIFICATION MARK, 6 PLACES
TERMINAL IDENTIFICATION MARK, 16 PLACES
K14 K15 K18 K19 K20 K21
K22 K23 K26 K27 K28 K29
K34 K35 K36 K37
35 16 REQD K14, K15, K18 THRU K23, K26 THRU K29, K34 THRU K37.
52 62 32 EACH REQD
25 30 54 62 4 EACH REQD
55 63 4 REQD
J13
J14
66 69 FOR REF
⊥ Z .015
⊥ Z .015
SEE NOTE 4 A
B
Z
2
18
19
20
60 2 REQD
52 46 47
47 52 2 EA. REQD
VIEW A-A (SH 2)
3 2 REQD
C
C
12 REQD 61
SEE NOTE 6
WT. LB. APPROX
4 REQ'D 50
49
SEE NOTE 7
45 8 REQD SEE NOTE 9
⊥ Z .015
ITEMS 42 43 REF
PARTIAL VIEW C-C
8 7 6 5 4 3 2 1
H G F E D C B A

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + — + — + — - — - — - —	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON TEXAS
DO NOT SCALE THIS DRAWING	DRAWN M Grabau DATE 24 MAR 65 CHECKED Stelmac 24 MAR 65 APPROVAL J. Foss 24 MAR 65 APPROVAL Watson 10-13-65	TEST SELECTOR ASSEMBLY
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE E · 2900028
CONTRACT NAS9-497	MIT APPROVAL	SCALE FULL · SHEET 3 OF 4

2900028

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 202278	—	[illegible] JUN 65	
F		REVISION STATUS CHANGED	—	8 JUL 65	
G		REVISED PER MXC202974	—	14 JUL 65	RS
H		REVISED PER MXC203051	—	[illegible] JUL 65	
J		REVISION STATUS CHANGED	—	20 JUL 65	
K		REVISED PER MXC203956	—	[illegible] AUG 65	
L		REVISED PER MXC205249		27 SEP 65	
M		REVISED PER MXC 205427		5 OCT 65	
N		REVISION STATUS CHANGED		19 OCT 65	
P		REVISION STATUS CHANGED		19 OCT 65	
R		INITIAL RELEASE CLASS A PER TDRR 23912		[illegible]	
S		REVISED PER TDRR 24149		29 NOV 65	
T		REVISION STATUS CHANGED		5 JAN 66	
U		REVISION STATUS CHANGED		7 FEB 66	



L1 & L2
37 2 REQD
61 8 REQD
4 REQD 61
36
TERMINAL IDENTIFICATION MARK
TERMINAL IDENTIFICATION MARK, 13 PLACES
52 62 26 EACH REQD
35 13 REQD
K53 THRU K57, K60, K61, K64, & K67 THRU K71
25 30 54 62 4 EACH REQD
J16
J15
K72
K71
K70
L2
L1
K69
K68
K67
K64
K61
K60
K57
K56
K55
K54
K53
4 REQD 33
8 REQD 61
K42, K44 THRU K46
K48
K46
K45
K44
K43
K42
K41
K39
34
2 REQD 61
34
61 2 REQD
TERMINAL IDENTIFICATION MARK, 8 PLACES
J5
J7
J6
J8
54 62 8 EACH REQD
54 47 6 EACH REQD
34
2 REQD 61
34
61 2 REQD

VIEW B-B
(SH. 2)

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+— +— +—
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT NAS-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN N. Gruber DATE 22 MAR 65
CHECKER Stelma 24 MAR 65
APPROVAL Foss 24 MAR 65
APPROVAL M. Watson 10-13-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TEST SELECTOR
ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900028
SCALE FULL
SHEET 4 OF 4

2900028 U

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM (72), OR (70) AND (71).
3. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.
4. DIMENSION "A" MUST BE EQUAL TO DIMENSION "B" WITHIN .040.
5. DRAWER SLIDE MOUNTING SCREWS AND FRONT PANEL MOUNTING SCREWS, ITEMS (56) AND (57) REF., SHALL BE SUBJECTED TO TORQUE OF 33.0 – 36.2 IN/LBS AT INSTALLATION.
6. MARK WEIGHT OF ASSEMBLY, (39 LBS), PER ND 1002123.
7. MARK "SCHEMATIC" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH, COLOR BLACK, IN LOCATION SHOWN.
8. MARK CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (49) OR (82) AS APPLICABLE IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
9. SECURE SCREWS USING ITEM (73).
10. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.
11. THE FOLLOWING ARE PART OF THIS ASSEMBLY.

WIRE LIST AA	ITEMS 68,78
WIRE LIST BB	ITEMS 69
WIRING HARNESS A	ITEMS 65,79
WIRING HARNESS B	ITEMS 66

12. DRAWINGS FOR REFERENCE.

SCHEMATIC DIAGRAM	ITEMS 75,77
RUNNING LIST	ITEMS 76,80

REVISIONS 23412					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
E		REPLACES REV D WITH CHANGE PER MXC 202278	—	24 JUN 65	J J J
F		REVISION STATUS CHANGED	—	8 JUL 65	J J J
G		REVISED PER MXC202974	—	14 JUL 65	RS
H		REVISED PER MXC203051	—	22 JUL 65	MCR
J		REVISED PER MXC 203179	—	29 JUL 65	RWH
K		REVISED PER MXC 203956	—	17 AUG 65	JCD
L		REVISED PER MXC 205249		27 SEP 65	
M		REVISED PER MXC 205427		5 OCT 65	
N		REVISED PER MXC-205702		19-OCT-65	B.
P		REVISED PER MXC 205970		19-OCT-65	B.
R		INITIAL RELEASE CLASS A PER TDRR 23412		20 OCT 65	
S		REVISION STATUS CHANGED		29 NOV 65	RWH
T		REVISED PER TDRR 25301		9 JAN 66	
U		REVISED PER TDRR 25735		7 FEB 66	
V		REVISED PER TDRR 27585		7 APR 66	AU

	QUANTITY REQUIRED 021	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1			82	1004260-168	NAMEPLATE
	☒			81		PROCUREMENT SPECIFICATION
	☒			80		RUNNING LIST
	1			79	2901050	WIRING HARNESS "A"
	1			78	2901052	WIRE LIST A-A
	☒			77	2901006	SCHEMATIC DIAGRAM, ELECT.
	—	☒		76	2900678	RUNNING LIST - TEST SELECTOR
	—	☒		75	2900295	SCHEMATIC DIAGRAM, ELECT.
	—	☒		74	PS 2900028	PROCUREMENT SPECIFICATION
	AR	AR		73	MIL-S-22473(GRC)	(ES2544-3) SEALING COMPOUND
	AR	AR		72	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
	AR	AR		71	MIL-F-14256 TYPE AORW	FLUX (ES2798)
	AR	AR		70	SN60WS	SOLDER QQ-S-571 (ES2175-1)
	1	1		69	2900297	WIRE LIST BB
	—	1		68	2900296	WIRE LIST AA
				67		
	1	1		66	2900294	WIRING HARNESS B
	—	1		65	2900293	WIRING HARNESS A
SEE NOTE 3	4	4		64	1016151 -010	NUT, SELF LOCKING
	8	8		63	-008	
	90	90		62	-006	
	40	40		61	1016151 -004	NUT, SELF LOCKING
	2	2		60	1015912-193	SCREW
SEE NOTE 3	3	3		59	1000093-14	
	12	12		58	MS35200-40	
SEE NOTE 3	4	4		57	1006783 -45	BUTTON HD
SEE NOTE 3	8	8		56	1006783 -44	BUTTON HD
	8	8		55	MS35216-40	PAN HD
	22	22		54	-27	
	16	16		53	-26	
	61	61		52	MS 35216-25	SCREW, PAN HD
		~~58~~		~~51~~	~~MS35216-24~~	~~SCREW, PAN HD~~
	4	4		50	MS35216-1	SCREW, PAN HD
	—	1		49	1004260-106	NAMEPLATE
				48		
	9	9		47	MS35333-71	WASHER-LOCK
	1	1		46	AN960-C6	(1897006-026) WASHER-FLAT
	8	8		45	AN507C832 R12	(1897003-568) SCREW
SEE NOTE 3	8	8		44	1016005-1	SHIM, SLIDE LOCATING
SEE NOTE 3	1	1		43	1015785-009	SLIDE ASSEMBLY, RH
SEE NOTE 3	1	1		42	1015785-010	SLIDE ASSEMBLY, LH
	1	1		41	2900239-011	TERMINAL BOARD ASSEMBLY
	1	1		40	2900181 -011	TERMINAL BOARD ASSEMBLY
	1	1		39	1900391	BRACKET HOLDER, DOUBLE
	2	2		38	1900390	BRACKET HOLDER, SINGLE
SEE NOTE 3	2	2		37	1015995-11	REACTOR
	1	1		36	1016096-013	RELAY, TIME DELAY
	29	29		35	1015837-001	ARMATURE
	6	6		34	1015802-004	ARMATURE
	8	8		33	1015832-318	RELAY, SENSITIVE
SEE NOTE 3	3	3		32	1016004-008	CLAMP
	1	1		31	MS91528-2F1B	(1897060-125) KNOB
SEE NOTE 3	8	8		30	1015986-140	WASHER, SADDLE
	6	6		29	MS91528-2K2B	(1897080-023) KNOB
	2	2		28	MS90078-15-1	(1897077-115) FUSE
	1	1		27	MS26572-1	FUSEHOLDER
SEE NOTE 3	1	1		26	1015873-008	FUSEHOLDER
	8	8		25	1015985-007 THRU -010	CABLE CLAMP
	1	1		24	1015959	RESISTOR, VARIABLE
	1	1		23	1015825-020	SWITCH, ROTARY
	1	1		22	1015825-018	SWITCH, ROTARY
SEE NOTE 3	4	4		21	1015825-017	SWITCH, ROTARY
	1	1		20	1900220	SPACER, READOUT DIGITAL
SEE NOTE 3	1	1		19	1015943-001	BEZEL
SEE NOTE 3	1	1		18	1015844-001	READOUT, DIGITAL
SEE NOTE 3	1	1		17	1015869-325	LIGHT INDICATOR
	1	1		16	-326	
	1	1		15	-737	
	1	1		14	-738	
	1	1		13	-739	
	1	1		12	-517	
	1	1		11	-740	
	1	1		10	-329	
	1	1		9	-703	
	1	1		8	-702	
	1	1		7	-328	
SEE NOTE 3	1	1		6	1015869-743	LIGHT INDICATOR
	1	1		5	2900292	PLATE, MOUNTING, CONNECTOR
	1	1		4	2900291	PLATE, MOUNTING, RELAY
	2	2		3	1900015-061	HANDLE ASSEMBLY
	1	1		2	2900289	PANEL, FRONT
	1	1		1	2900290	DRAWER, TEST SELECT. (INSEP ASSY)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN M. Gruber DATE 24 MAR 65
CHECKED J. Stelma 24 MAR 65
APPROVAL V. Foss 24 MAR 65
APPROVAL J. M Watson 10-13-65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

TEST SELECTOR ASSEMBLY

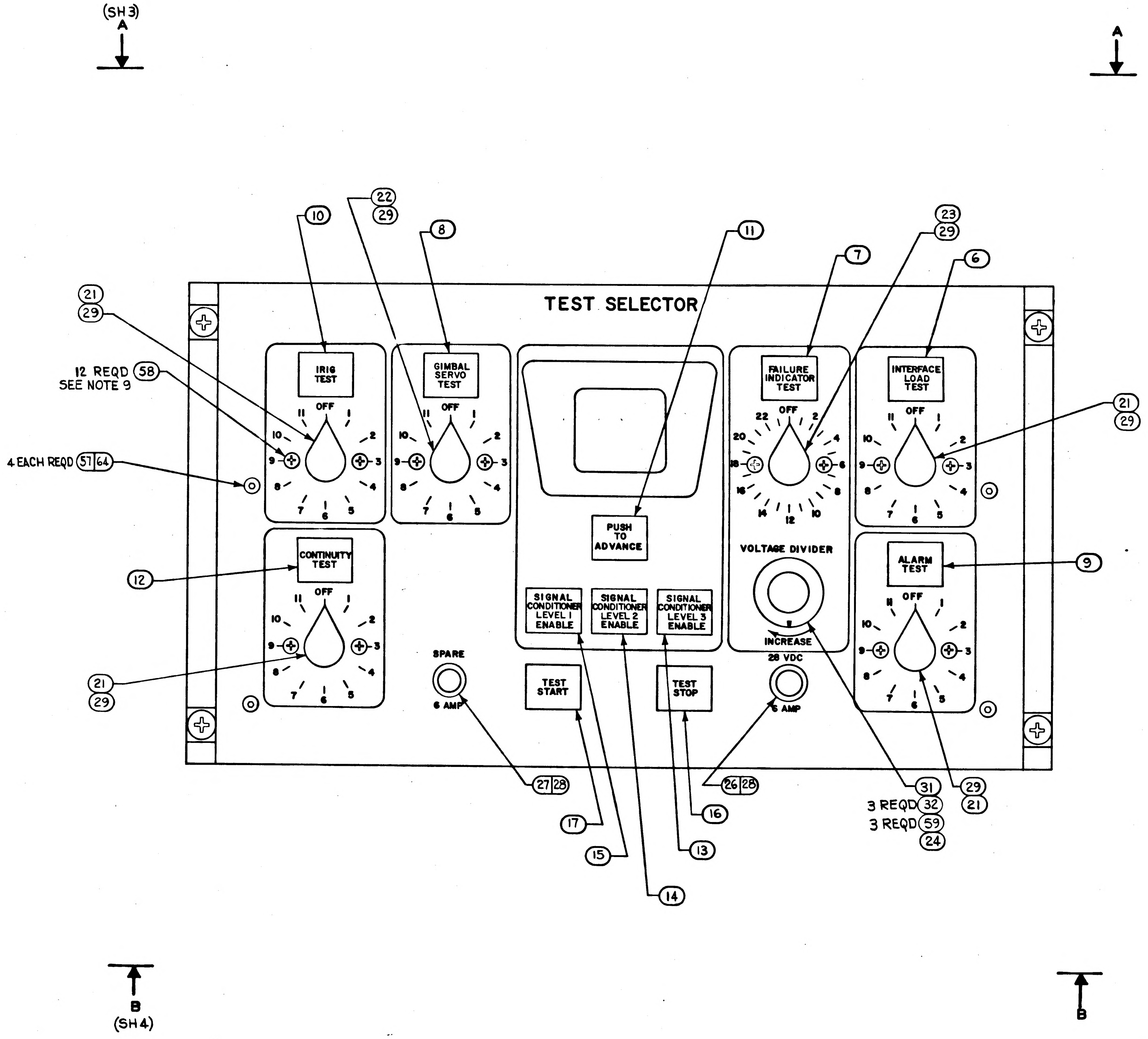
CODE IDENT NO. 99974
SIZE E
2900028
SCALE FULL
SHEET 1 OF 4

2900028 V

10 June 65

REVISIONS 23412

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 202278	—	24 JUN 65	JJJ
F		REVISION STATUS CHANGED	—	8 JUL 65	JJJ
G		REVISION STATUS CHANGED	—	14 JUL 65	RS
H		REVISION STATUS CHANGED	—	22 JUL 65	MCR
J		REVISION STATUS CHANGED	—	29 JUL 65	RWH
K		REVISION STATUS CHANGED	—	17 AUG 65	
L		REVISION STATUS CHANGED		27 SEP 65	
M		REVISION STATUS CHANGED		5 OCT 65	
N		REVISION STATUS CHANGED		19 OCT 65	B.
P		REVISION STATUS CHANGED		19 OCT 65	B.
R		INITIAL RELEASE CLASS A PER TDRR 23412		[illegible] 65	
S		REVISION STATUS CHANGED		[illegible] 65	
T		REVISION STATUS CHANGED		9 JAN 66	
U		REVISION STATUS CHANGED		7 FEB 66	
V		REVISION STATUS CHANGED		7 APR 66	AU

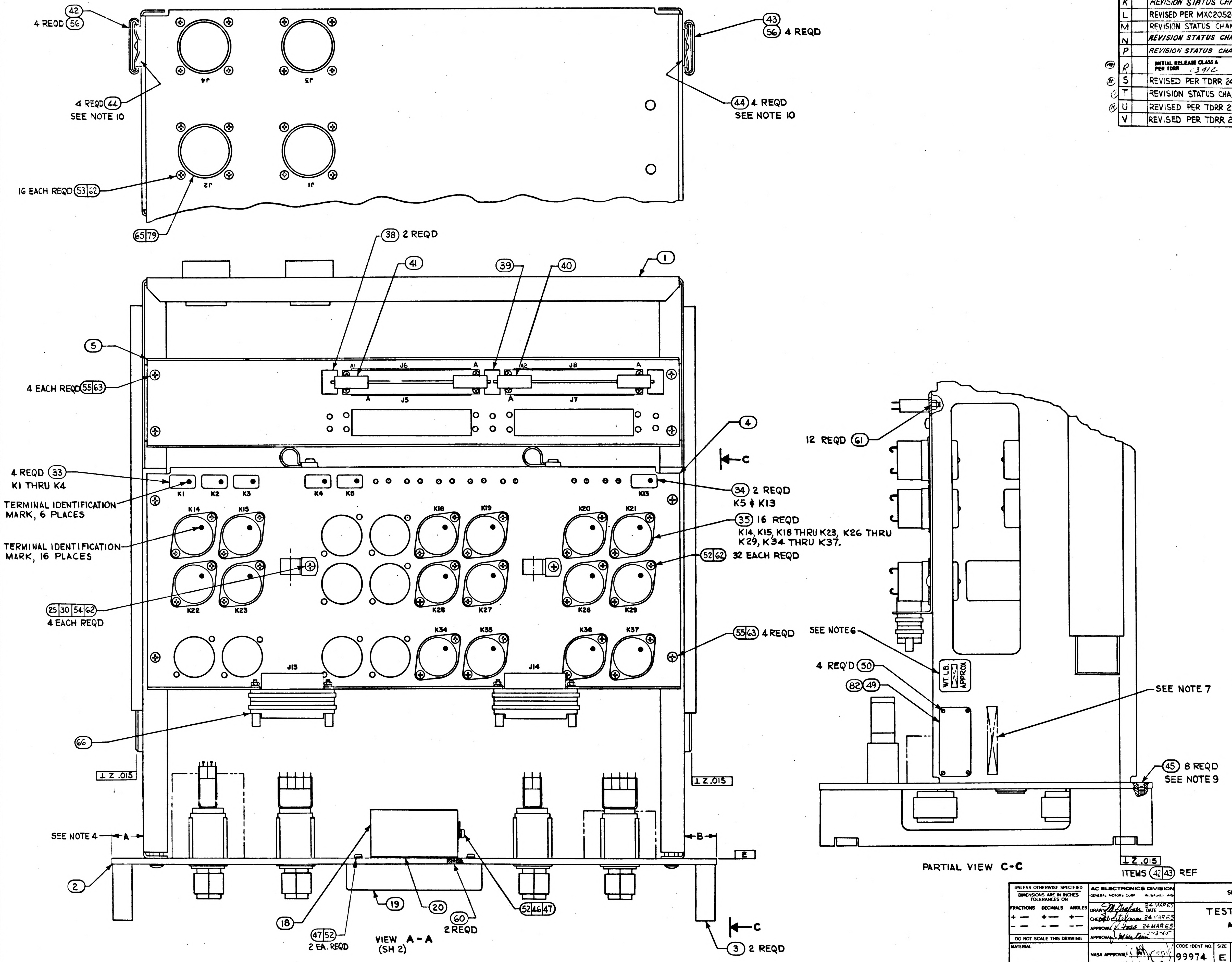


(SH 3)
A
A
TEST SELECTOR
IRIG TEST
GIMBAL SERVO TEST
CONTINUITY TEST
PUSH TO ADVANCE
SIGNAL CONDITIONER LEVEL 1 ENABLE
SIGNAL CONDITIONER LEVEL 2 ENABLE
SIGNAL CONDITIONER LEVEL 3 ENABLE
TEST START
TEST STOP
SPARE
6 AMP
FAILURE INDICATOR TEST
VOLTAGE DIVIDER
INCREASE
28 VDC
6 AMP
INTERFACE LOAD TEST
ALARM TEST
OFF
1 2 3 4 5 6 7 8 9 10 11
2 4 6 8 10 12 14 16 18 20 22
10
22 29
8
11
23 29
7
6
21 29
12 REQD 58 SEE NOTE 9
4 EACH REQD 57 64
21 29
12
9
21 29
27 28
17
15
14
13
16
26 28
31
3 REQD 32
3 REQD 59
24
29 21
B
(SH4)
B

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± —	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON TEXAS
DO NOT SCALE THIS DRAWING	DRAWN M. Grubner DATE 24 MAR 65 CHECKED J. Sterne 24 MAR 65 APPROVAL J. Foss 24 MAR 65 APPROVAL J. McWalsh 10-13-65	TEST SELECTOR ASSEMBLY
MATERIAL	NASA APPROVAL	CODE IDENT NO 99974 SIZE E 2900028
CONTRACT NAS 9-497	MIT APPROVAL	SCALE FULL SHEET 2 OF 4

2900028 V

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 202278	—	24 JUN 65	J J J
F		REVISED PER MXC 202736	—	8 JUL 65	J J J
G		REVISION STATUS CHANGED	—	14 JUL 65	RS
H		REVISION STATUS CHANGED	—	22 JUL 65	MCR
J		REVISION STATUS CHANGED	—	29 JUL 65	RWH
K		REVISION STATUS CHANGED	—	17 AUG 65	
L		REVISED PER MXC205249		27 SEP 65	A.N.
M		REVISION STATUS CHANGED		5 OCT 65	
N		REVISION STATUS CHANGED		19 OCT 65	B.
P		REVISION STATUS CHANGED		19 OCT 65	B. J.E.G.
R		INITIAL RELEASE CLASS A PER TDRR 23412		26 OCT 65	
S		REVISED PER TDRR 24149		29 NOV 65	
T		REVISION STATUS CHANGED		19 JAN 66	
U		REVISED PER TDRR 25735		7 FEB 66	
V		REVISED PER TDRR 27585		7 APR 66	



4 REQD 42 56
43 56 4 REQD
4 REQD 44 SEE NOTE 10
44 4 REQD SEE NOTE 10
J4
J3
J2
J1
16 EACH REQD 53 62
65 79
38 2 REQD
41
39
40
1
5
4 EACH REQD 55 63
A1
J6
A
A2
J8
J5
J7
4
C
4 REQD 33 K1 THRU K4
TERMINAL IDENTIFICATION MARK, 6 PLACES
K1 K2 K3 K4 K5 K13
34 2 REQD K5 & K13
TERMINAL IDENTIFICATION MARK, 16 PLACES
K14 K15 K18 K19 K20 K21
K22 K23 K26 K27 K28 K29
K34 K35 K36 K37
35 16 REQD K14, K15, K18 THRU K23, K26 THRU K29, K34 THRU K37.
52 62 32 EACH REQD
25 30 54 62 4 EACH REQD
55 63 4 REQD
J13
J14
66
⊥ Z .015
SEE NOTE 4
A
B
E
2
18
19
20
60 2 REQD
52 46 47
47 52 2 EA. REQD
VIEW A-A (SH 2)
3 2 REQD
12 REQD 61
SEE NOTE 6
WT. LB. APPROX
4 REQ'D 50
82 49
SEE NOTE 7
45 8 REQD SEE NOTE 9
PARTIAL VIEW C-C
ITEMS 42 43 REF

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN M. Galan DATE 24 MAR 65
CHECKED J. Stolman 24 MAR 65
APPROVAL R. Foss 24 MAR 65
APPROVAL J. M. Watson 10-13-65
NASA APPROVAL
MIT APPROVAL

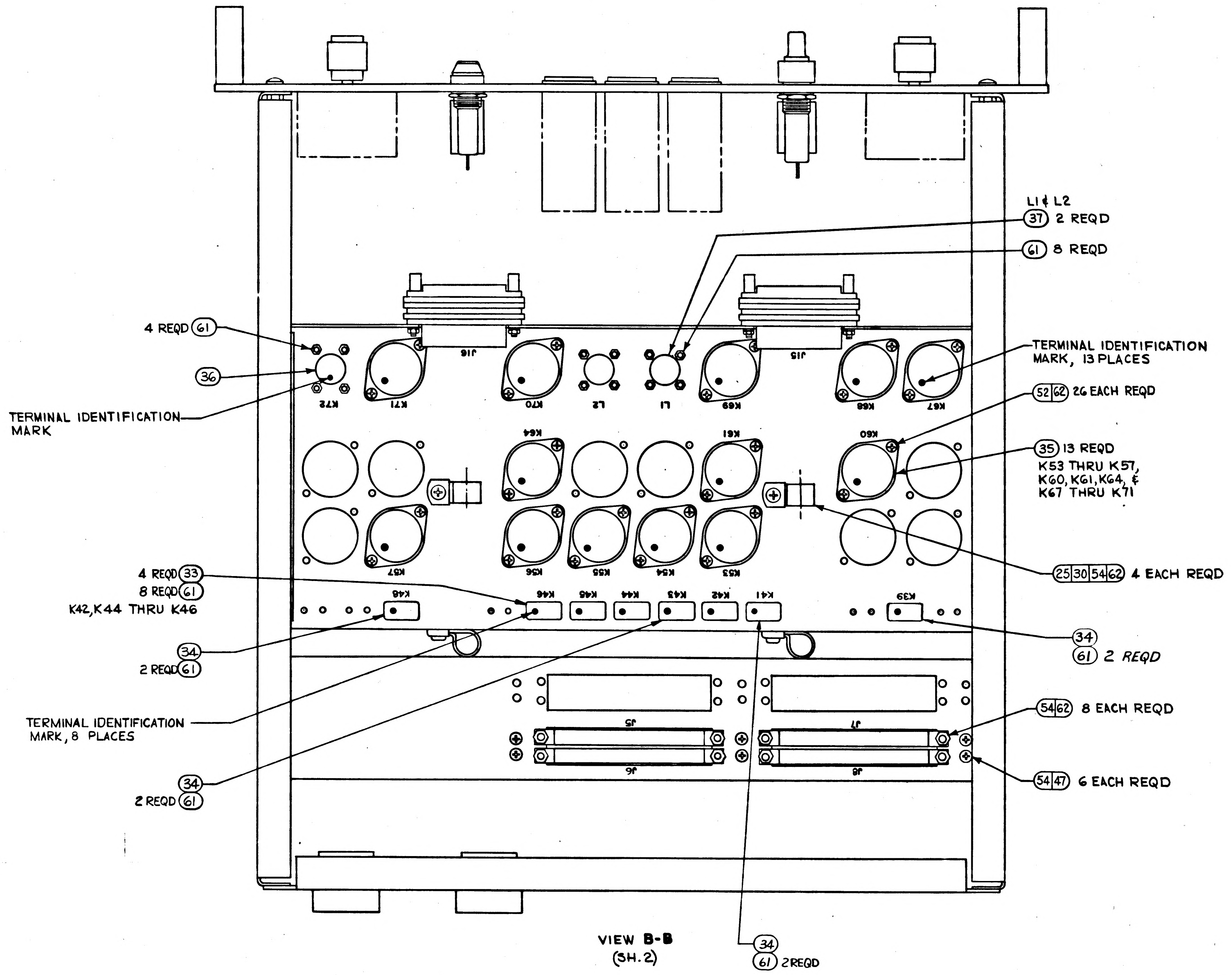
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TEST SELECTOR
ASSEMBLY

CODE IDENT NO. 99974 SIZE E 2900028
SCALE FULL SHEET 3 OF 4

2900028 V

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 202278	—	24 JUN 65	
F		REVISION STATUS CHANGED	—	8 JUL 65	JJJ
G		REVISED PER MXC202974	—	14 JUL 65	RS
H		REVISED PER MXC203051	—	22 JUL 65	MCE
J		REVISION STATUS CHANGED	—	29 JUL 65	
K		REVISED PER MXC203956	—	7 AUG 65	JCD
L		REVISED PER MXC 205249		27 SEP 65	AN
M		REVISED PER MXC 205427		5 OCT 65	
N		REVISION STATUS CHANGED		19 OCT 65	B.
P		REVISION STATUS CHANGED		19 OCT 65	B.
R		INITIAL RELEASE CLASS A PER TDRR 3912			
S		REVISED PER TDRR 24149		29 NOV 65	
T		REVISION STATUS CHANGED		19 JAN 66	
U		REVISION STATUS CHANGED		7 FEB 66	
V		REVISION STATUS CHANGED		7 APR 66	AU


L1 & L2
37 2 REQD
61 8 REQD
4 REQD 61
36
TERMINAL IDENTIFICATION MARK
TERMINAL IDENTIFICATION MARK, 13 PLACES
52 62 26 EACH REQD
35 13 REQD
K53 THRU K57, K60, K61, K64, & K67 THRU K71
25 30 54 62 4 EACH REQD
4 REQD 33
8 REQD 61
K42, K44 THRU K46
34
2 REQD 61
34
61 2 REQD
TERMINAL IDENTIFICATION MARK, 8 PLACES
54 62 8 EACH REQD
54 47 6 EACH REQD
34
2 REQD 61
34
61 2 REQD
J16
J15
K72
K71
K70
L2
L1
K69
K68
K67
K64
K61
K60
K57
K56
K55
K54
K53
K48
K46
K45
K44
K43
K42
K41
K39
J5
J7
J6
J8

VIEW B-B
(SH. 2)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + — + — + — - — - — - —	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN N. Gruber DATE 24 MAR 65 CHECKER Stelins 24 MAR 65 APPROVAL Foss 24 MAR 65 APPROVAL M. Watson 10-13-65	TEST SELECTOR ASSEMBLY
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974 SIZE E 2900028
CONTRACT NAS-497	MIT APPROVAL	SCALE FULL SHEET 4 OF 4

2900028 V

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM (72), OR (70) AND (71).
3. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.
4. DIMENSION "A" MUST BE EQUAL TO DIMENSION "B" WITHIN .040.
5. DRAWER SLIDE MOUNTING SCREWS AND FRONT PANEL MOUNTING SCREWS, ITEMS (56) AND (57) REF., SHALL BE SUBJECTED TO TORQUE OF 33.0 -36.2 IN/LBS AT INSTALLATION.
6. MARK WEIGHT OF ASSEMBLY, (39 LBS), PER ND 1002123.
7. MARK "SCHEMATIC" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND 002019, .12 HIGH, COLOR BLACK, IN LOCATION SHOWN.
8. MARK CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (49) OR (82) AS APPLICABLE IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
9. SECURE SCREWS USING ITEM (73).
10. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.
11. THE FOLLOWING ARE PART OF THIS ASSEMBLY.

WIRE LIST AA	ITEMS 68,78
WIRE LIST BB	ITEMS 69
WIRING HARNESS A	ITEMS 65,79
WIRING HARNESS B	ITEMS 66

12. DRAWINGS FOR REFERENCE.

SCHEMATIC DIAGRAM	ITEMS 75,77
RUNNING LIST	ITEMS 76,80

REVISIONS 23412

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		REPLACES REV D WITH CHANGE PER MXC 202278	—	24 JUN 65	J J J
F		REVISION STATUS CHANGED	—	8 JUL 65	J J J
G		REVISED PER MXC202974	—	14 JUL 65	RS
H		REVISED PER MXC203051	—	22 JUL 65	[illegible]
J		REVISED PER MXC 203179	—	29 JUL 65	RP
K		*REVISED PER MXC 203956*	—	17 AUG 65	JCD
L		REVISED PER MXC 205249		27 SEP 65	[illegible]
M		REVISED PER MXC 205427		5 OCT 65	[illegible]
N		*REVISED PER MXC-205702*		19-OCT-65	B
P		*REVISED PER MXC 205970*		19-OCT-65	B
R		INITIAL RELEASE CLASS A PER TDRR 23412		20 OCT 65	[illegible]
S		REVISION STATUS CHANGED		29 NOV 65	RP
T		REVISED PER TDRR 25301		9 JAN 66	RP
U		REVISED PER TDRR 25735		7 FEB 66	RP
V		REVISED PER TDRR 27585		7 APR 66	RP AU
W		REVISED PER TDRR 28268		4 MAY 66	JIMP RS

	QUANTITY REQUIRED				EFFECTIVITY	LIST OF PARTS AND MATERIALS		
			021	011		ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			1			*82*	*1004260-168*	*NAMEPLATE*
			☒			*81*		*PROCUREMENT SPECIFICATION*
			☒			*80*	*2901051*	*RUNNING LIST*
			1			*79*	*2901050*	*WIRING HARNESS "A"*
			1			*78*	*2901052*	*WIRE LIST A-A*
			☒			*77*	*2901006*	*SCHEMATIC DIAGRAM, ELECT.*
			—	☒		76	2900678	RUNNING LIST - TEST SELECTOR
			—	☒		75	2900295	SCHEMATIC DIAGRAM, ELECT.
			—	☒		74	PS 2900028	PROCUREMENT SPECIFICATION
			AR	AR		73	MIL-S-22473 (GRC)	(ES2544-3) SEALING COMPOUND
			AR	AR		72	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
			AR	AR		71	MIL-F-14256 TYPE AORW	FLUX (ES2798)
			AR	AR		70	SN60WS	SOLDER QQ-S-571 (ES2175-1)
			1	1		69	2900297	WIRE LIST BB
			—	1		68	2900296	WIRE LIST AA
						67		
			1	1		66	2900294	WIRING HARNESS B
			—	1		65	2900293	WIRING HARNESS A
SEE NOTE 3			4	4		64	1016151 -C10	NUT, SELF LOCKING
			8	8		63	| -008	| | |
			90	90		62	| -C06	| | |
			40	40		61	1016151 -004	NUT, SELF LOCKING
			2	2		60	1015912-193	SCREW
SEE NOTE 3			3	3		59	1000093-4	|
			12	12		58	MS35200-40	|
SEE NOTE 3			4	4		57	1006783-45	| BUTTON HD
SEE NOTE 3			8	8		56	1006783-44	| BUTTON HD
			8	8		55	MS35216-40	| PAN HD
			22	22		54	| -27	| |
			16	16		53	| -26	| |
			61	61		52	MS 35216-25	SCREW, PAN HD
				~~58~~		~~51~~	~~MS35216-24~~	~~SCREW, PAN HD~~

	QUANTITY REQUIRED				EFFECTIVITY	LIST OF PARTS AND MATERIALS		
			021	011		ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			4	4		50	MS35216-1	SCREW, PAN HD
			—	1		49	1004260-106	NAMEPLATE
						48		
			9	9		47	MS35333-71	WASHER-LOCK
			1	1		46	AN960-C6	(1897006-026) WASHER-FLAT
			8	8		45	AN507C832 R12	(1897003-568) SCREW
SEE NOTE 3			8	8		44	1016005-1	SHIM, SLIDE LOCATING
SEE NOTE 3			1	1		43	1015785-009	SLIDE ASSEMBLY, RH
SEE NOTE 3			1	1		42	1015785-010	SLIDE ASSEMBLY, LH
			1	1		41	2900239-011	TERMINAL BOARD ASSEMBLY
			1	1		40	2900181-011	TERMINAL BOARD ASSEMBLY
			1	1		39	1900391	BRACKET HOLDER, DOUBLE
			2	2		38	1900390	BRACKET HOLDER, SINGLE
SEE NOTE 3			2	2		37	1015995-11	REACTOR
			1	1		36	1016096-013	RELAY, TIME DELAY
			29	29		35	1015837-C01	| ARMATURE
			6	6		34	1015802-006	ARMATURE
			8	8		33	1015832-318	RELAY, SENSITIVE
SEE NOTE 3			3	3		32	1016004-008	CLAMP
			1	1		31	MS91528-2F1B	(1897080-125) KNOB
SEE NOTE 3			8	8		30	1015986-140	WASHER, SADDLE
			6	6		29	MS91528-2K2B	(1897080-023) KNOB
			2	2		28	MS90078-15-1	(1897077-115) FUSE
			1	1		27	MS26572-1	FUSEHOLDER
SEE NOTE 3			1	1		26	1015873-008	FUSEHOLDER
			8	8		25	1015985-007 *THRU -010*	CABLE CLAMP
			1	1		24	1015959	RESISTOR, VARIABLE
			1	1		23	1015825-020	SWITCH, ROTARY
			1	1		22	1015825-018	SWITCH, ROTARY
SEE NOTE 3			4	4		21	1015825-017	SWITCH, ROTARY
			1	1		20	1900220	SPACER, READOUT DIGITAL
SEE NOTE 3			1	1		19	1015943-001	BEZEL
SEE NOTE 3			1	1		18	1015844-001	READOUT, DIGITAL
SEE NOTE 3			1	1		17	1015869-325	LIGHT INDICATOR
			1	1		16	| -326	| |
			1	1		15	| -737	| |
			1	1		14	| -738	| |
			1	1		13	| -739	| |
			1	1		12	| -517	| |
			1	1		11	| -740	| |
			1	1		10	| -329	| |
			1	1		9	| -703	| |
			1	1		8	| -702	| |
			1	1		7	| -328	| |
SEE NOTE 3			1	1		6	1015869-743	LIGHT INDICATOR
			1	1		5	2900292	PLATE, MOUNTING, CONNECTOR
			1	1		4	2900291	PLATE, MOUNTING, RELAY
			2	2		3	90005-061	HANDLE ASSEMBLY
			1	1		2	2900289	PANEL, FRONT
			1	1		1	2900290	DRAWER, TEST SELECT. (INSEP ASSY)

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN M. Gruber DATE 24 MAR 65
CHECKED S. Stelma 24 MAR 65
APPROVAL V. Foss 24 MAR 65
APPROVAL J. M. Watson 10-13-65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

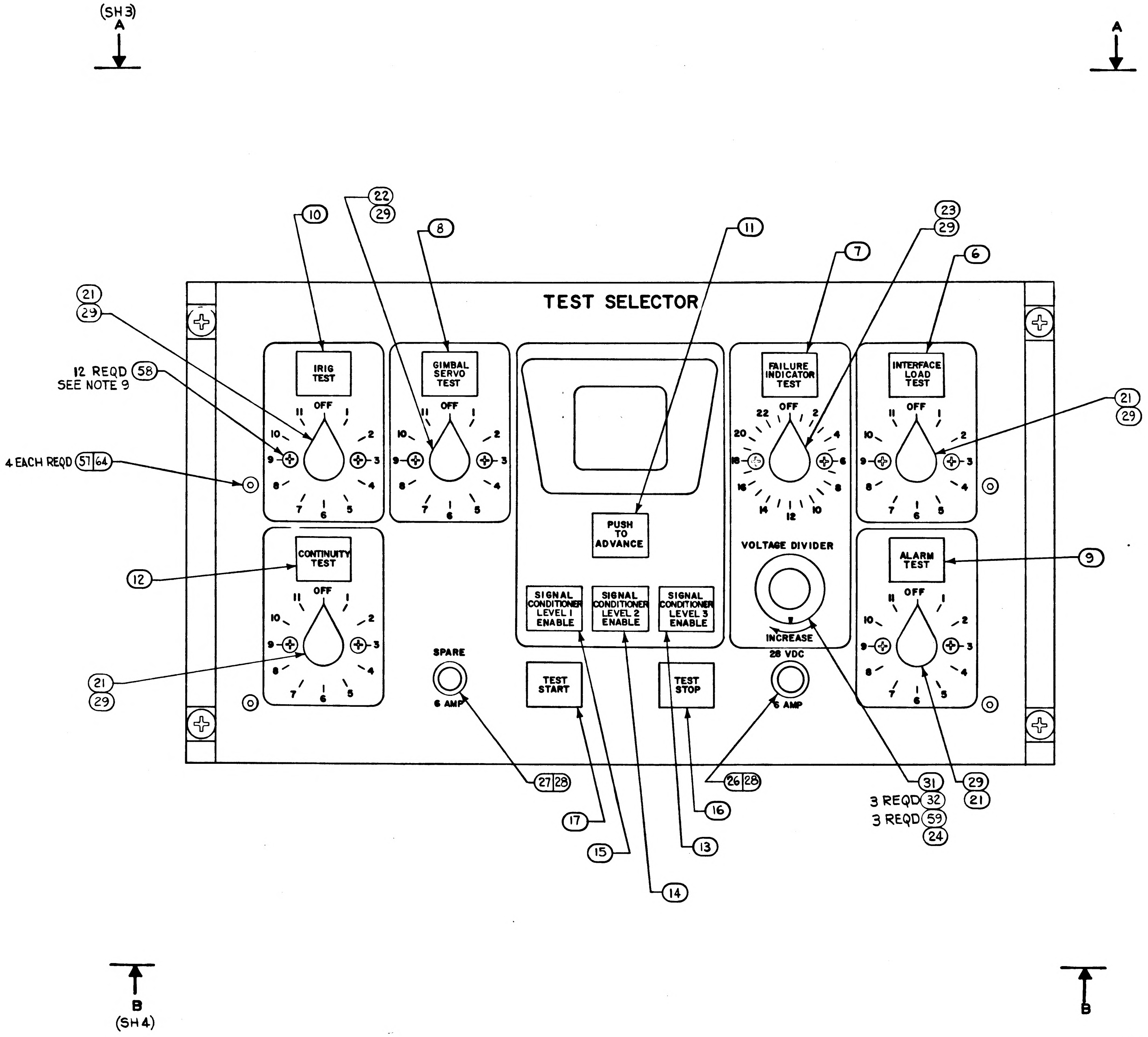
TEST SELECTOR
ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900028
SCALE FULL
SHEET 1 OF 4

W 2900028

10 JUN 65

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 203278	—	24 JUN 65	
F		REVISION STATUS CHANGED	—	8 JUL 65	JJS MEN
G		REVISION STATUS CHANGED	—	14 JUL 65	RS
H		REVISION STATUS CHANGED	—	22 JUL 65	MCR
J		REVISION STATUS CHANGED	—	29 JUL 65	
K		REVISION STATUS CHANGED	—	17 AUG 65	
L		REVISION STATUS CHANGED		27 SEP 65	
M		REVISION STATUS CHANGED		5 OCT 65	
N		REVISION STATUS CHANGED		19 OCT 65	
P		REVISION STATUS CHANGED		19 OCT 65	
R		INITIAL RELEASE CLASS A PER TDRR 23412		65	
S		REVISION STATUS CHANGED		65	
T		REVISION STATUS CHANGED		9 JAN 66	
U		REVISION STATUS CHANGED		7 FEB 66	MEN
V		REVISION STATUS CHANGED		7 APR 66	AJ
W		REVISION STATUS CHANGED		4 MAY 66	JMP


(SH3)
A
A
TEST SELECTOR
IRIG TEST
GIMBAL SERVO TEST
CONTINUITY TEST
PUSH TO ADVANCE
SIGNAL CONDITIONER LEVEL 1 ENABLE
SIGNAL CONDITIONER LEVEL 2 ENABLE
SIGNAL CONDITIONER LEVEL 3 ENABLE
FAILURE INDICATOR TEST
INTERFACE LOAD TEST
ALARM TEST
VOLTAGE DIVIDER
INCREASE
28 VDC
6 AMP
SPARE
6 AMP
TEST START
TEST STOP
OFF
1 2 3 4 5 6 7 8 9 10 11
22 2 4 6 8 10 12 14 16 18 20
(10)
(22) (29)
(8)
(11)
(7)
(23) (29)
(6)
(21) (29)
12 REQD (58) SEE NOTE 9
4 EACH REQD (57) (64)
(21) (29)
(9)
(12)
(21) (29)
(27) (28)
(26) (28)
(17)
(15)
(14)
(13)
(16)
(31)
3 REQD (32)
3 REQD (59)
(24)
(29)
(21)
B
(SH4)
B

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN M. Grubne DATE 24 MAR 65
CHECKED 24 MAR 65
APPROVAL V. Foss 24 MAR 65
APPROVAL J. M. Walsh 6-13-65
NASA APPROVAL
MIT APPROVAL

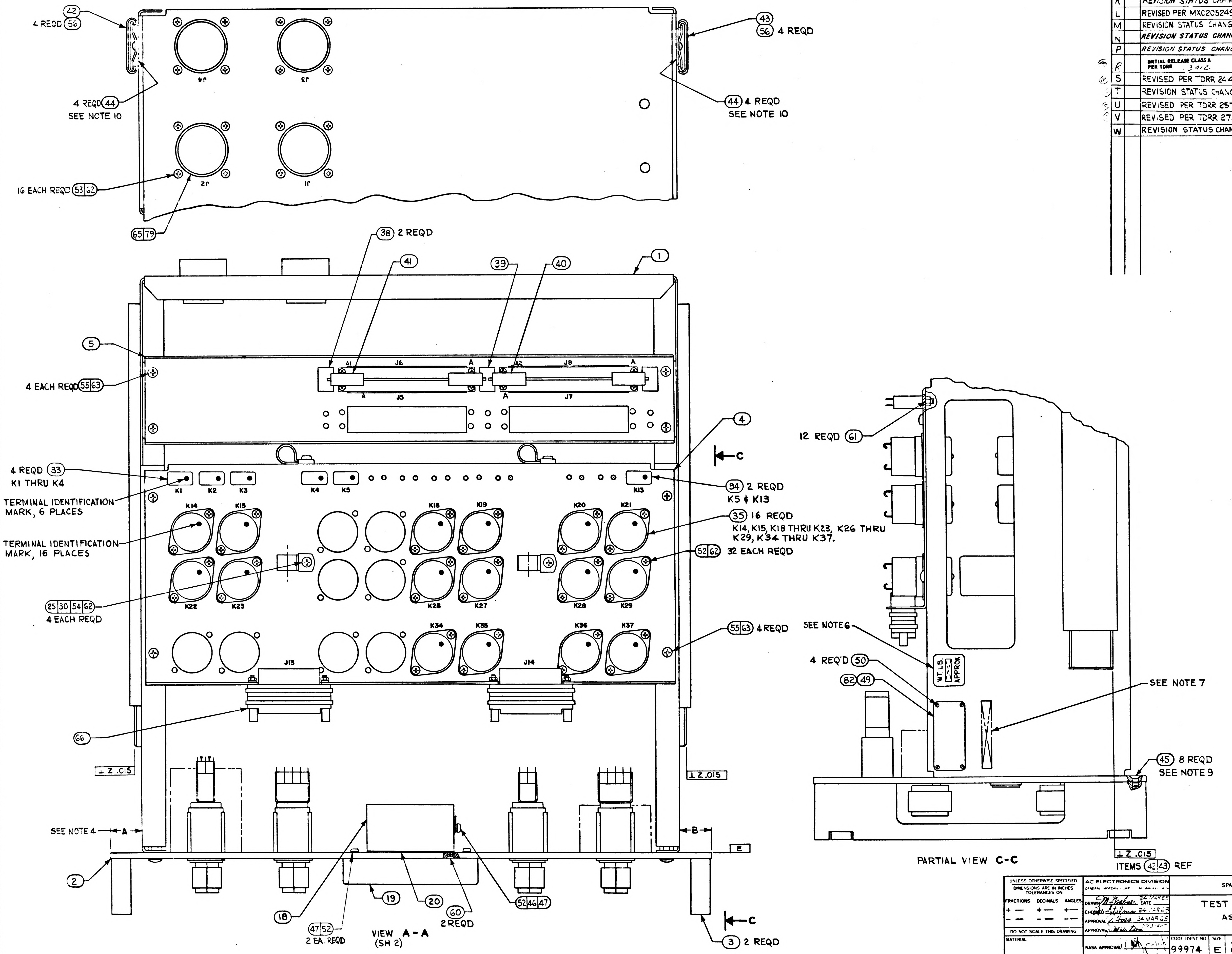
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TEST SELECTOR
ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900028
SCALE FULL
SHEET 2 OF 4

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 202278	—	24 JUN 65	
F		REVISED PER MXC 202736	—	9 JUL 65	
G		REVISION STATUS CHANGED	—	14 JUL 65	RS
H		REVISION STATUS CHANGED	—	65	
J		REVISION STATUS CHANGED	—	29 JUL 65	
K		REVISION STATUS CHANGED	—	65	
L		REVISED PER MXC205249		27 SEP 65	
M		REVISION STATUS CHANGED		5 OCT 65	
N		REVISION STATUS CHANGED		19 OCT 65	B.
P		REVISION STATUS CHANGED		65	E
R		INITIAL RELEASE CLASS A PER TDRR 3412			
S		REVISED PER TDRR 2449		29 NOV 65	
T		REVISION STATUS CHANGED		19 JAN 66	
U		REVISED PER TDRR 25735		7 FEB 66	
V		REVISED PER TDRR 27585		7 APR 66	
W		REVISION STATUS CHANGED		4 MAY 66	JMP



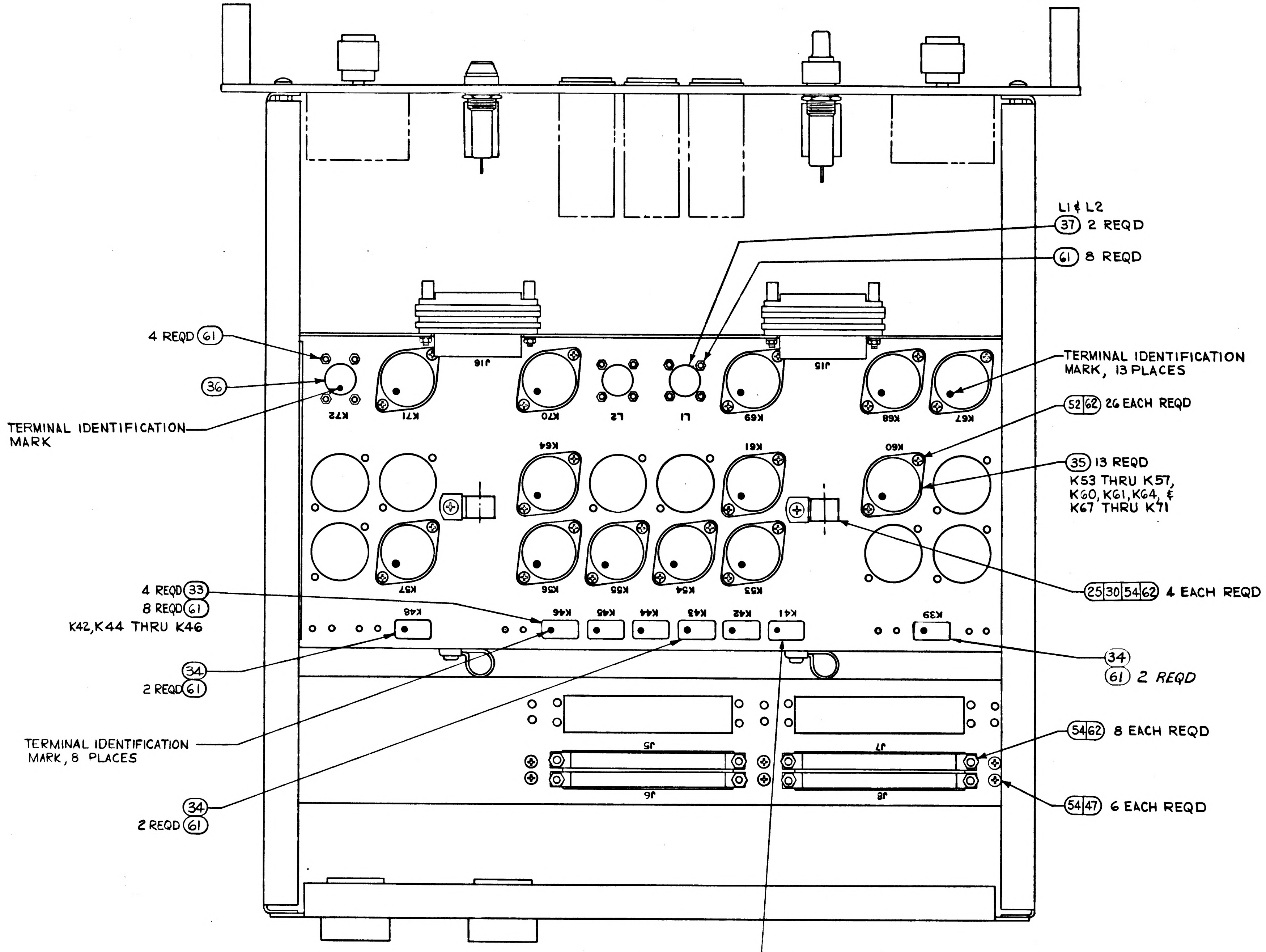
42
4 REQD 56
43
56 4 REQD
J4
J3
J2
J1
4 REQD 44
SEE NOTE 10
44 4 REQD
SEE NOTE 10
16 EACH REQD 53 62
65 79
38 2 REQD
41
39
40
1
5
4 EACH REQD 55 63
A1
J6
A
A2
J8
A
J5
A
J7
4
C
4 REQD 33
K1 THRU K4
K1
K2
K3
K4
K5
K13
34 2 REQD
K5 & K13
TERMINAL IDENTIFICATION MARK, 6 PLACES
TERMINAL IDENTIFICATION MARK, 16 PLACES
K14
K15
K18
K19
K20
K21
35 16 REQD
K14, K15, K18 THRU K23, K26 THRU K29, K34 THRU K37.
52 62 32 EACH REQD
K22
K23
K26
K27
K28
K29
25 30 54 62
4 EACH REQD
K34
K35
K36
K37
55 63 4 REQD
J13
J14
66
⊥ Z .015
⊥ Z .015
SEE NOTE 4
A
B
Z
2
18
19
20
60
2 REQD
52 46 47
47 52
2 EA. REQD
VIEW A-A
(SH 2)
3 2 REQD
C
12 REQD 61
SEE NOTE 6
WT. LB. APPROX
4 REQ'D 50
82 49
SEE NOTE 7
45 8 REQD
SEE NOTE 9
PARTIAL VIEW C-C
⊥ Z .015
ITEMS 42 43 REF

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + — + — + — — — — — — —	AC ELECTRONICS DIVISION GENERAL MOTORS CORP. MILWAUKEE, WIS.	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN M. Gralow DATE 22 MAR 65 CHECKED J. Stelmon 24 MAR 65 APPROVAL J. Foss 24 MAR 65 APPROVAL M. Watson 3-23-65	TEST SELECTOR ASSEMBLY
MATERIAL	NASA APPROVAL	CODE IDENT NO 99974 · SIZE E · 2900028
CONTRACT NAS 9-497	MIT APPROVAL	SCALE FULL · SHEET 3 OF 4

2900028 W

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 202278	—	65	
F		REVISION STATUS CHANGED	—	8 JUL 65	
G		REVISED PER MXC202974	—	14 JUL 65	RS
H		REVISED PER MXC203051	—	65	
J		REVISION STATUS CHANGED	—	29 JUL 65	
K		REVISED PER MXC203956	—	65	
L		REVISED PER MXC 205249		27 SEP 65	
M		REVISED PER MXC 205427		5 OCT 65	
N		REVISION STATUS CHANGED		19 OCT 65	B.
P		REVISION STATUS CHANGED		19 OCT 65	B
R		INITIAL RELEASE CLASS A PER TDRR 23912			
S		REVISED PER TDRR 24149		29 NOV 65	
T		REVISION STATUS CHANGED		9 JAN 66	
U		REVISION STATUS CHANGED		7 FEB 66	
V		REVISION STATUS CHANGED		7 APR 66	
W		REVISION STATUS CHANGED		4 MAY 66	JIMP


L1 & L2
37 2 REQD
61 8 REQD
4 REQD 61
36
TERMINAL IDENTIFICATION MARK
TERMINAL IDENTIFICATION MARK, 13 PLACES
52 62 26 EACH REQD
35 13 REQD K53 THRU K57, K60, K61, K64, & K67 THRU K71
25 30 54 62 4 EACH REQD
4 REQD 33
8 REQD 61
K42, K44 THRU K46
34
2 REQD 61
TERMINAL IDENTIFICATION MARK, 8 PLACES
34
2 REQD 61
34
61 2 REQD
54 62 8 EACH REQD
54 47 6 EACH REQD
34
61 2 REQD
J16
J15
K72
K71
K70
L2
L1
K69
K68
K67
K64
K61
K60
K56
K57
K48
K46
K45
K44
K43
K42
K41
K39
J5
J6
J7
J8

VIEW B-B
(SH.2)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + — + — + — — — — — — —	AC ELECTRONICS DIVISION GENERAL MOTORS CORP. MILWAUKEE, WIS.	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
DO NOT SCALE THIS DRAWING	DRAWN N. Grabner DATE 24 MAR 65 CHECKED Stelma 24 MAR 65 APPROVAL Foss 24 MAR 65 APPROVAL M. Watson 10-13-65	TEST SELECTOR ASSEMBLY	
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974	SIZE E 2900028
CONTRACT NAS-497	MIT APPROVAL	SCALE FULL	SHEET 4 OF 4

W 2900028

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM (72), OR (70) AND (71).
3. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.
4. DIMENSION "A" MUST BE EQUAL TO DIMENSION "B" WITHIN .040.
5. DRAWER SLIDE MOUNTING SCREWS AND FRONT PANEL MOUNTING SCREWS, ITEMS (56) AND (57) REF., SHALL BE SUBJECTED TO TORQUE OF 33.0 –36.2 IN/LBS AT INSTALLATION.
6. MARK WEIGHT OF ASSEMBLY, (39 LBS), PER ND 1002123.
7. MARK "SCHEMATIC" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH, COLOR BLACK, IN LOCATION SHOWN.
8. MARK CONTRACT NUMBER AND SERIAL NUMBER TO ITEM ㊾ OR (82) AS APPLICABLE IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
9. SECURE SCREWS USING ITEM (73).
10. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.
11. THE FOLLOWING ARE PART OF THIS ASSEMBLY.

WIRE LIST AA	ITEMS 68, 78
WIRE LIST BB	ITEMS 69
WIRING HARNESS A	ITEMS 65, 79
WIRING HARNESS B	ITEMS 66

12. DRAWINGS FOR REFERENCE.

SCHEMATIC DIAGRAM	ITEMS 75, 77
RUNNING LIST	ITEMS 76, 80

REVISIONS 23412					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		REPLACES REV D WITH CHANGE PER MXC 202278	—	24 JUN 65	J J J
F		REVISION STATUS CHANGED	—	8 JUL 65	J J J
G		REVISED PER MXC202974	—	14 JUL 65	RS
H		REVISED PER MXC203051	—	22 JUL 65	MCK
J		REVISED PER MXC 203179	—	29 JUL 65	RP
K		REVISED PER MXC 203956	—	17 AUG 65	JCD
L		REVISED PER MXC 205249		27 SEP 65	
M		REVISED PER MXC 205427		5 OCT 65	
N		REVISED PER MXC-205702		19-OCT-65	B.
P		REVISED PER MXC 205970		19-OCT-65	B.
R		INITIAL RELEASE CLASS A PER TDRR 23412		20 OCT 65	
S		REVISION STATUS CHANGED		29 NOV 65	RP
T		REVISED PER TDRR 25301		19 JAN 66	RP
U		REVISED PER TDRR 25735		7 FEB 66	RP
V		REVISED PER TDRR 27585		7 APR 66	RP AU
W		REVISED PER TDRR 28268		6 MAY 66	JIMP RS
Y		REVISED PER TDRR 28893		23 NOV 66	RP JAC

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			021	011			LIST OF PARTS AND MATERIALS	
			1			82	1004260-168	NAMEPLATE
			X			81	PS 2016107	PROCUREMENT SPECIFICATION
			X			80	2901051	RUNNING LIST
			1			79	2901050	WIRING HARNESS "A"
			1			78	2901052	WIRE LIST A-A
			X			77	2901006	SCHEMATIC DIAGRAM, ELECT.
			—	X		76	2900678	RUNNING LIST - TEST SELECTOR
			—	X		75	2900295	SCHEMATIC DIAGRAM, ELECT.
			—	X		74	PS 2900028	PROCUREMENT SPECIFICATION
			AR	AR		73	MIL-S-22473 (GRC)	(ES2544-3) SEALING COMPOUND
			AR	AR		72	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
			AR	AR		71	MIL-F-14256 TYPE AORW	FLUX (ES2798)
			AR	AR		70	SN60WS	SOLDER QQ-S-571 (ES2175-1)
			1	1		69	2900297	WIRE LIST BB
			—	1		68	2900296	WIRE LIST AA
						67		
			1	1		66	2900294	WIRING HARNESS B
			—	1		65	2900293	WIRING HARNESS A
SEE NOTE 3			4	4		64	1016151 -010	NUT, SELF LOCKING
			8	8		63	-008	
			90	90		62	-006	
			40	40		61	1016151 -004	NUT, SELF LOCKING
			2	2		60	1015912-193	SCREW
SEE NOTE 3			3	3		59	1000093-14	
			12	12		58	MS35200-40	
SEE NOTE 3			4	4		57	1006783 -45	BUTTON HD
SEE NOTE 3			8	8		56	1006783 -44	BUTTON HD
			8	8		55	MS35216-40	PAN HD
			22	22		54	-27	
			16	16		53	-26	
			61	61		52	MS 35216-25	SCREW, PAN HD
				~~58~~		~~51~~	~~MS35216-24~~	~~SCREW, PAN HD~~

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			021	011			LIST OF PARTS AND MATERIALS	
			4	4		50	MS35216-1	SCREW, PAN HD
			—	1		49	1004260-106	NAMEPLATE
						48		
			9	9		47	MS35333-71	WASHER-LOCK
			1	1		46	AN960-C6	(1897006-026) WASHER-FLAT
			8	8		45	AN507C832 R12	(1897003-568) SCREW
SEE NOTE 3			8	8		44	1016005-1	SHIM, SLIDE LOCATING
SEE NOTE 3			1	1		43	1015785-009	SLIDE ASSEMBLY, RH
SEE NOTE 3			1	1		42	1015785-010	SLIDE ASSEMBLY, LH
			1	1		41	2900239-011	TERMINAL BOARD ASSEMBLY
			1	1		40	2900181 -011	TERMINAL BOARD ASSEMBLY
			1	1		39	1900391	BRACKET HOLDER, DOUBLE
			2	2		38	1900390	BRACKET HOLDER, SINGLE
SEE NOTE 3			2	2		37	1015995-11	REACTOR
			1	1		36	1016096-013	RELAY, TIME DELAY
			29	29		35	1015837-001	ARMATURE
			6	6		34	1015802-004	ARMATURE
			8	8		33	1015832-318	RELAY, SENSITIVE
SEE NOTE 3			3	3		32	1016004-008	CLAMP
			1	1		31	MS91528-2F1B	(1897080-125) KNOB
SEE NOTE 3			8	8		30	1015986-140	WASHER, SADDLE
			6	6		29	MS91528-2K2B	(1897080-023) KNOB
			2	2		28	MS90078-15-1	(1897077-115) FUSE
			1	1		27	MS26572-1	FUSEHOLDER
SEE NOTE 3			1	1		26	1015873-008	FUSEHOLDER
			8	8		25	1015985-007 THRU -010	CABLE CLAMP
			1	1		24	1015959	RESISTOR, VARIABLE
			1	1		23	1015825-020	SWITCH, ROTARY
			1	1		22	1015825-018	SWITCH, ROTARY
SEE NOTE 3			4	4		21	1015825-017	SWITCH, ROTARY
			1	1		20	1900220	SPACER, READOUT DIGITAL
SEE NOTE 3			1	1		19	1015943-001	BEZEL
SEE NOTE 3			1	1		18	1015844-001	READOUT, DIGITAL
SEE NOTE 3			1	1		17	1015869-325	LIGHT INDICATOR
			1	1		16	-326	
			1	1		15	-737	
			1	1		14	-738	
			1	1		13	-739	
			1	1		12	-517	
			1	1		11	-740	
			1	1		10	-329	
			1	1		9	-703	
			1	1		8	-702	
			1	1		7	-328	
SEE NOTE 3			1	1		6	1015869-743	LIGHT INDICATOR
			1	1		5	2900292	PLATE, MOUNTING, CONNECTOR
			1	1		4	2900291	PLATE, MOUNTING, RELAY
			2	2		3	900015-061	HANDLE ASSEMBLY
			1	1		2	2900289	PANEL, FRONT
			1	1		1	2900290	DRAWER, TEST SELECT. (INSEP ASSY)

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS

DRAWN M. Grabner 24 MAR 65 DATE
CHECKED Stelma 24 MAR 65
APPROVAL V. Foss 24 MAR 65
APPROVAL J. M. Watson 10-13-65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

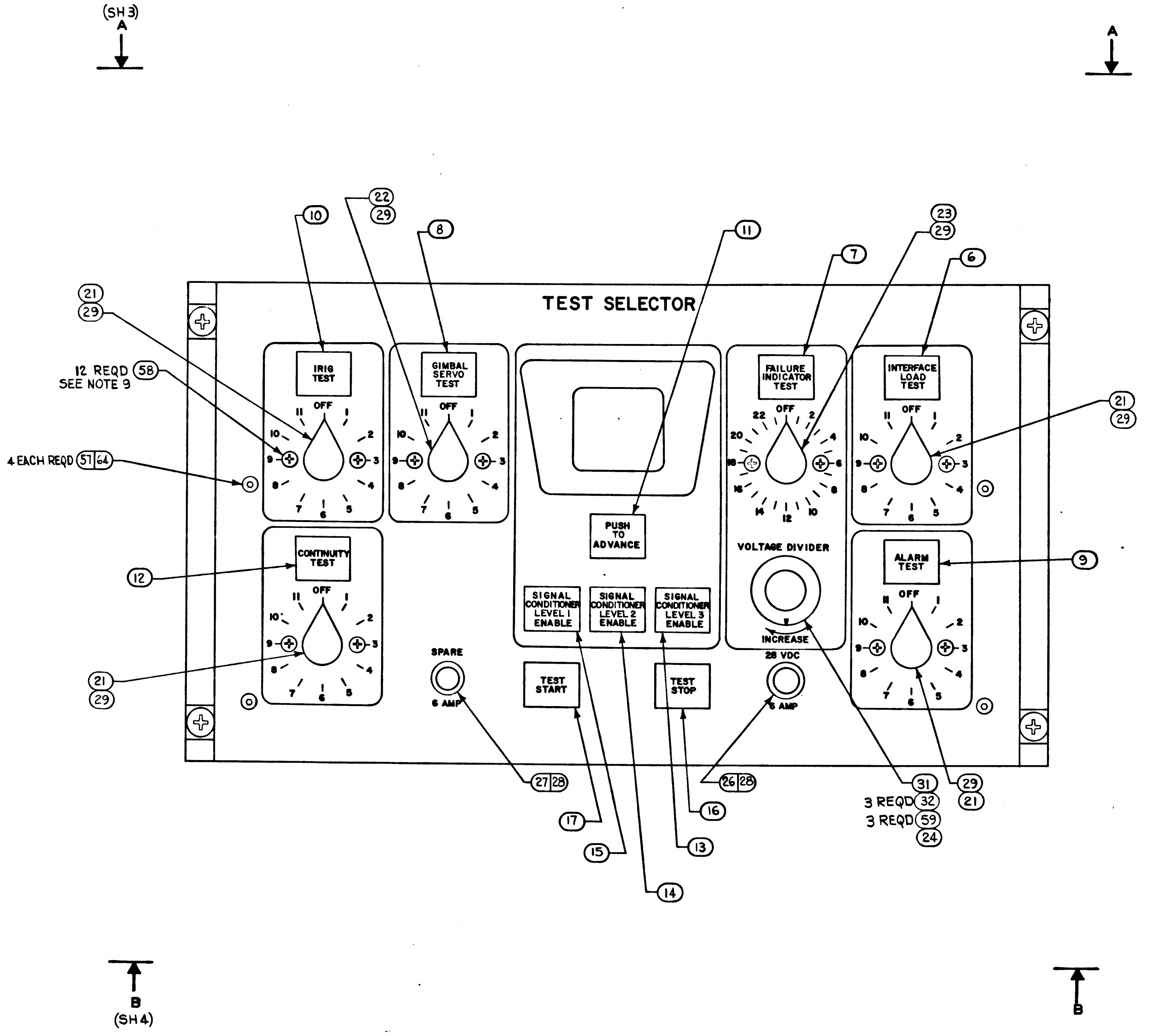
TEST SELECTOR
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900028
SCALE FULL
SHEET 1 OF 4

Y 2900028

10 June 65

REVISIONS 23412					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 203278	—	24 JUN 65	JJJ
F		REVISION STATUS CHANGED	—	8 JUL 65	JJJ
G		REVISION STATUS CHANGED	—	14 JUL 65	RS
H		REVISION STATUS CHANGED	—	22 JUL 65	MCR
J		REVISION STATUS CHANGED	—	29 JUL 65	RWH
K		REVISION STATUS CHANGED	—	17 AUG 65	
L		REVISION STATUS CHANGED		27 SEP 65	
M		REVISION STATUS CHANGED		5 OCT 65	
N		REVISION STATUS CHANGED		19 OCT 65	B.
P		REVISION STATUS CHANGED		19 [illegible] 65	B
R		INITIAL RELEASE CLASS A PER TDRR 23412		[illegible]	
S		REVISION STATUS CHANGED		23 [illegible] 65	
T		REVISION STATUS CHANGED		9 JAN 66	
U		REVISION STATUS CHANGED		7 FEB 66	RF
V		REVISION STATUS CHANGED		7 APR 66	RF AU
W		REVISION STATUS CHANGED		4 MAY 66	JMP
Y		REVISION STATUS CHANGED		23 MAY 66	RF JAC


(SH 3)
A
A
TEST SELECTOR
IRIG TEST
GIMBAL SERVO TEST
CONTINUITY TEST
PUSH TO ADVANCE
SIGNAL CONDITIONER LEVEL 1 ENABLE
SIGNAL CONDITIONER LEVEL 2 ENABLE
SIGNAL CONDITIONER LEVEL 3 ENABLE
TEST START
TEST STOP
FAILURE INDICATOR TEST
INTERFACE LOAD TEST
ALARM TEST
VOLTAGE DIVIDER
INCREASE
28 VDC
6 AMP
SPARE
6 AMP
OFF
1
2
3
4
5
6
7
8
9
10
11
22
20
18
16
14
12
10
8
6
4
2
12 REQD (58)
SEE NOTE 9
4 EACH REQD (57)(64)
(10)
(22)
(29)
(8)
(11)
(7)
(23)
(29)
(6)
(21)
(29)
(12)
(9)
(27)(28)
(26)(28)
(17)
(15)
(14)
(13)
(16)
(31)
3 REQD (32)
3 REQD (59)
(24)
(29)
(21)
B
(SH 4)
B

2900028 Y B

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

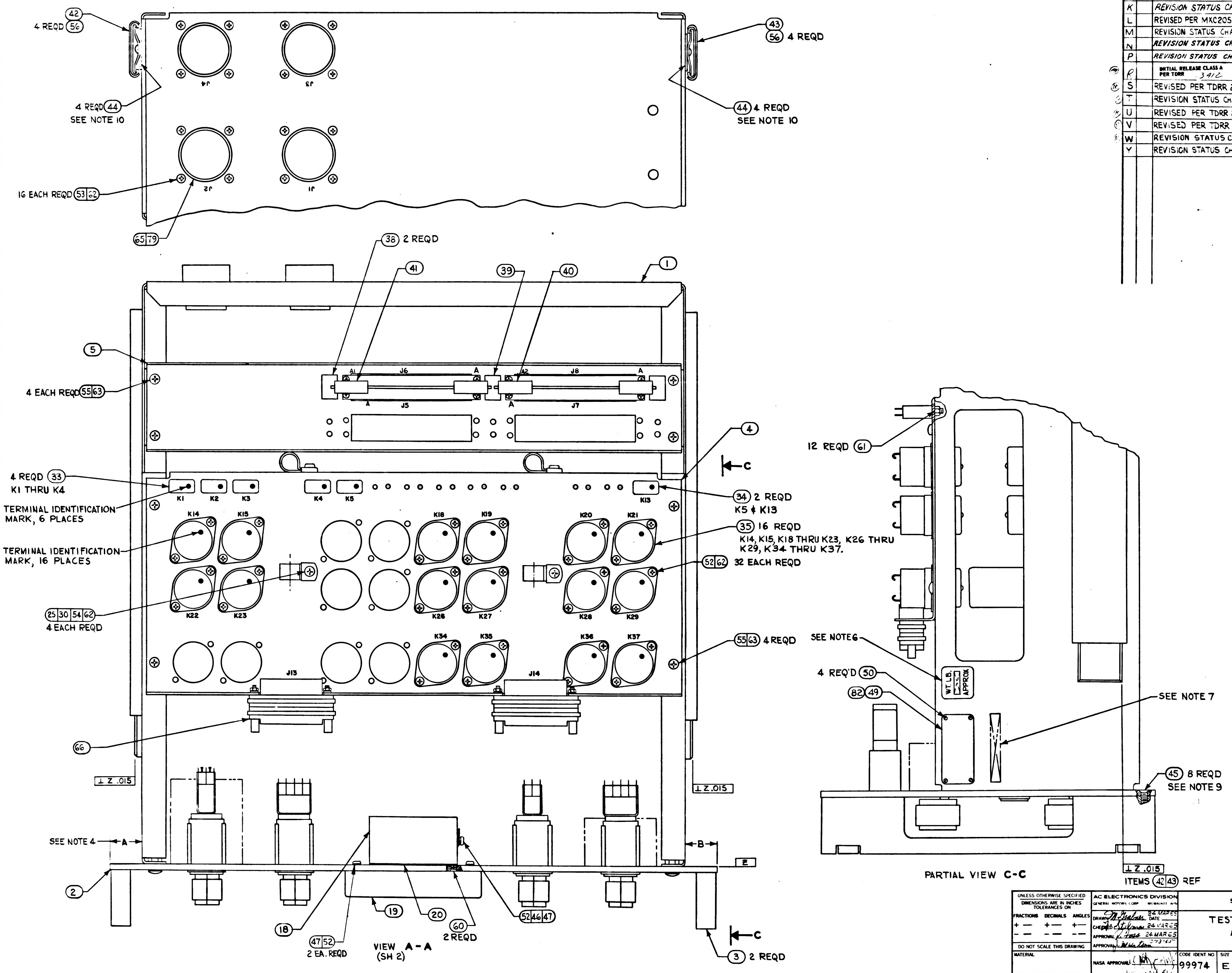
AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN M. Grubner DATE 24 MAR 65
CHECKED J. Stelma 24 MAR 65
APPROVAL J. Foss 24 MAR 65
APPROVAL J. M. Walsh 10-13-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

TEST SELECTOR
ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900028
SCALE FULL
SHEET 2 OF 4

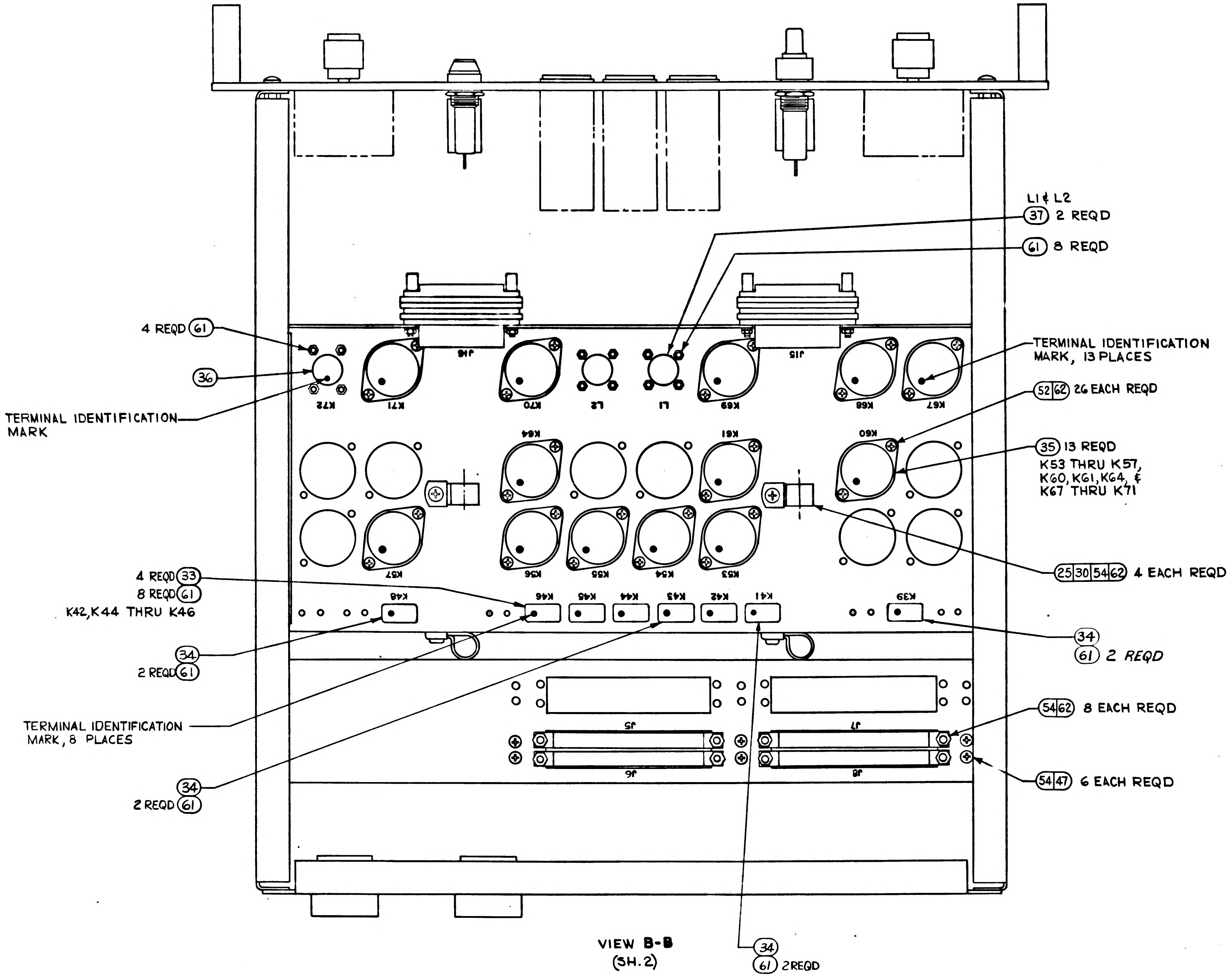
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 202278	—	24 JUN 65	
F		REVISED PER MXC 202736	—	8 JUL 65	
G		REVISION STATUS CHANGED	—	14 JUL 65	RS
H		REVISION STATUS CHANGED	—	22 JUL 65	
J		REVISION STATUS CHANGED	—	29 JUL 65	
K		REVISION STATUS CHANGED	—	AUG 65	
L		REVISED PER MXC205249		27 SEP 65	
M		REVISION STATUS CHANGED		5 OCT 65	
N		REVISION STATUS CHANGED		19 OCT 65	JB
P		REVISION STATUS CHANGED			
R		INITIAL RELEASE CLASS A PER TDRR 3412			
S		REVISED PER TDRR 2449		29 65	
T		REVISION STATUS CHANGED		JAN 66	
U		REVISED PER TDRR 25735		7 FEB 66	
V		REVISED PER TDRR 27585		7 APR 66	
W		REVISION STATUS CHANGED		4 MAY 66	JIMP
Y		REVISION STATUS CHANGED		23 MAY 66	JAC


42 4 REQD 56
43 56 4 REQD
4 REQD 44 SEE NOTE 10
44 4 REQD SEE NOTE 10
J4
J3
J2
J1
16 EACH REQD 53 62
65 79
38 2 REQD
41
39
40
1
5
A1
J6
A
A2
J8
J5
J7
4 EACH REQD 55 63
4
C
4 REQD 33 K1 THRU K4
TERMINAL IDENTIFICATION MARK, 6 PLACES
TERMINAL IDENTIFICATION MARK, 16 PLACES
K1
K2
K3
K4
K5
K13
34 2 REQD K5 & K13
35 16 REQD K14, K15, K18 THRU K23, K26 THRU K29, K34 THRU K37.
52 62 32 EACH REQD
K14
K15
K18
K19
K20
K21
K22
K23
K26
K27
K28
K29
K34
K35
K36
K37
25 30 54 62 4 EACH REQD
55 63 4 REQD
J13
J14
66
⊥ Z .015
SEE NOTE 4
A
B
2
19
20
18
60 2 REQD
52 46 47
47 52 2 EA. REQD
VIEW A-A (SH 2)
3 2 REQD
C
12 REQD 61
SEE NOTE 6
WT. LB. APPROX
4 REQ'D 50
82 49
SEE NOTE 7
45 8 REQD SEE NOTE 9
PARTIAL VIEW C-C
⊥ Z .015
ITEMS 42 43 REF

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± —	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN M Gralmer DATE 24 MAR 65 CHECKED F. Stolmar 24 MAR 65 APPROVAL J. Foss 24 MAR 65 APPROVAL J. Watson 3-23-65	TEST SELECTOR ASSEMBLY
MATERIAL	NASA APPROVAL MIT APPROVAL	CODE IDENT NO 99974 SIZE E 2900028
CONTRACT NAS9-497		SCALE FULL SHEET 3 OF 4

2900028 Y

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
E		THIS SHEET ADDED PER MXC 202278	—	[illegible] JUN 65	[illegible]
F		REVISION STATUS CHANGED	—	8 JUL 65	[illegible]
G		REVISED PER MXC202974	—	14 JUL 65	RS
H		REVISED PER MXC203051	—	22 JUL 65	[illegible]
J		REVISION STATUS CHANGED	—	29 JUL 65	[illegible]
K		REVISED PER MXC203956	—	[illegible] AUG 65	[illegible]
L		REVISED PER MXC 205249		27 SEP 65	[illegible]
M		REVISED PER MXC 205427		5 OCT 65	[illegible]
N		REVISION STATUS CHANGED		19 OCT 65	B.
P		REVISION STATUS CHANGED		19 OCT 65	B. J.E.G.
R		INITIAL RELEASE CLASS A PER TDRR 23912		[illegible]	[illegible]
S		REVISED PER TDRR 24149		29 NOV 65	EF
T		REVISION STATUS CHANGED		19 JAN 66	EF
U		REVISION STATUS CHANGED		7 FEB 66	EP
V		REVISION STATUS CHANGED		7 APR 66	RP AU
W		REVISION STATUS CHANGED		4 MAY 66	JMP
Y		REVISION STATUS CHANGED		23 MAY 66	RP TAC


L1 & L2
37 2 REQD
61 8 REQD
4 REQD 61
36
TERMINAL IDENTIFICATION MARK
TERMINAL IDENTIFICATION MARK, 13 PLACES
52 62 26 EACH REQD
35 13 REQD
K53 THRU K57, K60, K61, K64, & K67 THRU K71
25 30 54 62 4 EACH REQD
4 REQD 33
8 REQD 61
K42, K44 THRU K46
34
2 REQD 61
34
61 2 REQD
TERMINAL IDENTIFICATION MARK, 8 PLACES
54 62 8 EACH REQD
54 47 6 EACH REQD
34
2 REQD 61
34
61 2 REQD
K72
K71
J16
K70
L2
L1
K69
J15
K68
K67
K64
K61
K60
K57
K56
K55
K54
K53
K48
K46
K45
K44
K43
K42
K41
K39
J5
J7
J6
J8

VIEW B-B
(SH. 2)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + — − — DECIMALS + — − — ANGLES + — − —	AC ELECTRONICS DIVISION GENERAL MOTORS CORP. MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN N. Grüne DATE 24 MAR 65 CHECKED Stelnis 24 MAR 65 APPROVAL J. Foss 24 MAR 65 APPROVAL M. Watson 10-13-65	TEST SELECTOR ASSEMBLY
MATERIAL —	NASA APPROVAL 10/13/65	CODE IDENT NO. 99974 | SIZE E | 2900028
CONTRACT NAS-497	MIT APPROVAL	SCALE FULL | SHEET 4 OF 4

2900028 Y

APOLLO G&C Specification
PS2900029 REV ~~A~~ B
Original Issue Date: 10/29/65
Release Authority: TDRR 23556
Class Release
CODE IDENT NO. 99974

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

GYRO CAGING ELECTRONICS

DRAWING NO. 2900029

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
	A		5, 8, 10, 12, 16, 17, &18		
18 OCT 65	B		ALL, Init Rel.		

This specification consists of page 1 to 18 inclusive.

APPROVALS	NASA/MSC	10-27-65 M. Watson MIT/IL 29 Oct 65	Jm W R Hadley ACSP

1. SCOPE

1.1 PURPOSE. This specification establishes the detail requirements for complete identification and acceptance of the Gyro Caging Electronics, Part Number 2900029-011.

2. APPLICABLE DOCUMENTS

2.1 EFFECTIVE ISSUES. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, Military Standards and Specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G&C

ND1002214	General Specification for Preservation, Packaging, Packing and Container Marking of APOLLO Guidance and Navigation Major Assemblies, Assemblies, Subassemblies, Parts and Associated Ground Support Equipment

DRAWINGS

APOLLO G&C

2900272	Schematic Diagram, Gyro Caging Electronics Assembly
2900029	Gyro Caging Electronics Assembly

(Copies of specifications, standards, drawings, bulletins, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 CONFLICTING REQUIREMENTS. In event of a conflict between requirements, the following order of precedence shall apply. The contractor shall also notify MIT/IL APOLLO Management of the conflict.

a. The contract
b. This specification
c. Documents listed in this section

APOLLO G&C Specification
PS2900029 REV C
Original Issue Date: 10/29/65
Release Authority: TDRR 23556
Class **Release**
CODE IDENT NO. 99974

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

GYRO CAGING ELECTRONICS

DRAWING NO. 2900029

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
	A		5, 8, 10, 12, 16, 17, &18		
Ⓜ 18Oct65	B		ALL, Init Rel.		
11/16/65	C	24178	7, 18 [illegible]/AL	WK	TM

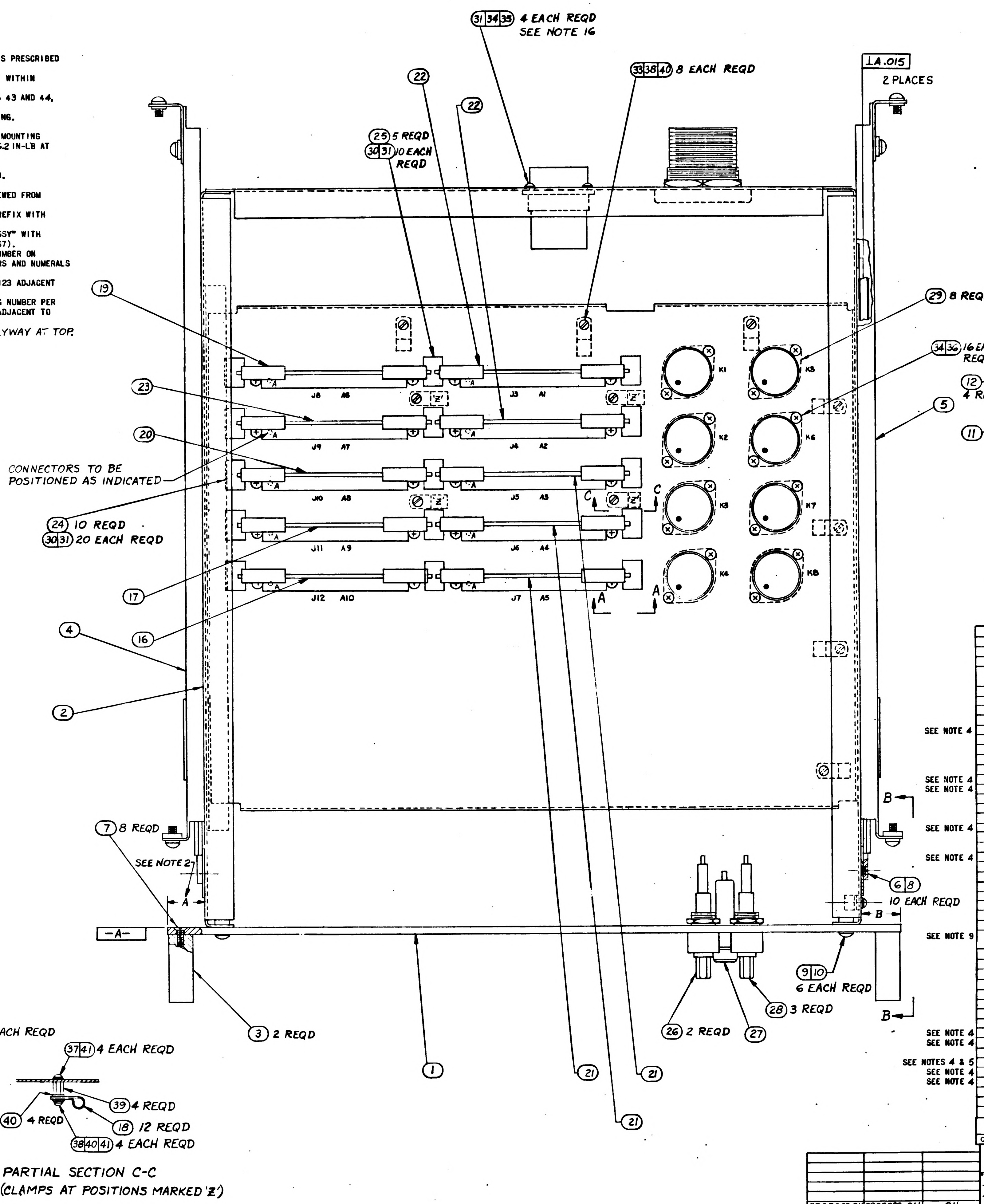
This specification consists of page 1 to 18 inclusive.

APPROVALS	NASA/MSC	10-27-65 M. Watson 29Oct65 MIT/IL	JM W R Hadley ACSP

NOTES:

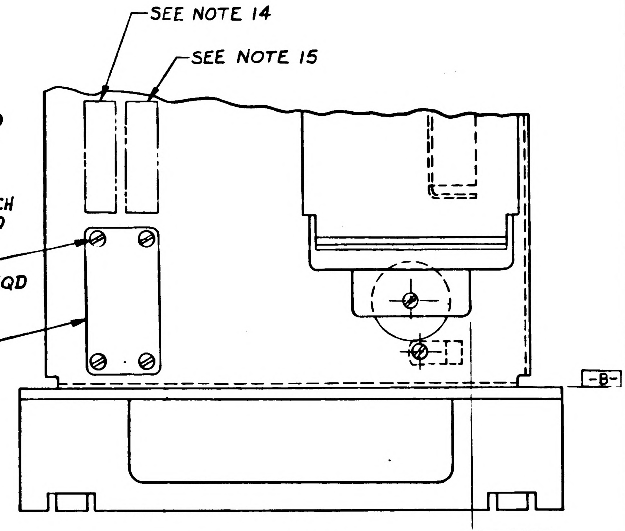
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. DIMENSION "A" SHALL BE EQUAL TO DIMENSION "B" WITHIN .040.
3. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEMS 43 AND 44, OR ITEM 45.
4. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
5. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.
6. DRAWER SLIDE MOUNTING SCREWS AND FRONT PANEL MOUNTING SCREWS SHALL BE SUBJECTED TO A TORQUE OF 33-36.2 IN-LB AT INSTALLATION.
7. SECURE SCREWS USING ITEM 46.
8. QUANTITY SPECIFIED "AR" INDICATES AS REQUIRED.
9. SELECT AS REQUIRED.
10. POSITIONING OF RELAYS INDICATED BY DOT AS VIEWED FROM TOP OF CHASSIS.
11. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. PREFIX WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.
12. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES 267).
13. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER ON ITEM 11 IN ACCORDANCE WITH ND 1002023, LETTERS AND NUMERALS TO BE .06 HIGH.
14. MARK WEIGHT OF ASSEMBLY (35LBS.) PER ND 1002123 ADJACENT TO NAMEPLATE.
15. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND 1002019, .12 HIGH, COLOR BLACK, BELOW OR ADJACENT TO WEIGHT MARKING.
16. INSTALL CONNECTOR WITH MASTER KEYWAY AT TOP.

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.
C	-	REPLACES REV (B) WITH CHANGE PER MXC202279	-	24 [illegible] 65	[illegible]
D		REVISED PER MXC 202975		13 JUL 65	LGC
E		REVISED PER MXC-203433	—	2 AUG 65	CKD
F		REVISED PER MXC-203812	—	16 AUG 65	DKD
G		REVISED PER MXC 205893		5 OCT 65	[illegible]
H		INITIAL RELEASE CLASS A PER TCR 23556		[illegible] 65	[illegible]



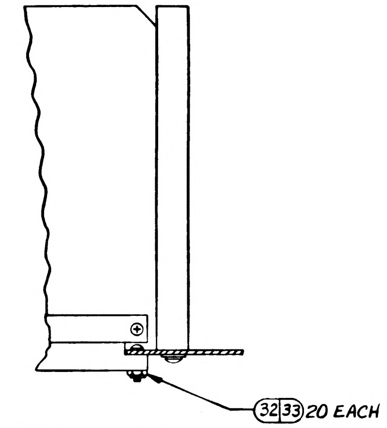
31 34 35 4 EACH REQD SEE NOTE 16
33 38 40 8 EACH REQD
22
22
25 5 REQD
30 31 10 EACH REQD
⊥A.015
2 PLACES
19
23
20
CONNECTORS TO BE POSITIONED AS INDICATED
24 10 REQD
30 31 20 EACH REQD
17
16
4
2
J8 A6
J3 A1
J9 A7
J4 A2
J10 A8
J5 A3
J11 A9
J6 A4
J12 A10
J7 A5
Z'
C
A
K1
K2
K3
K4
K5
K6
K7
K8
29 8 REQD
34 36 16 EACH REQD
5
7 8 REQD
SEE NOTE 2
A
-A-
3 2 REQD
1
21
21
21
26 2 REQD
27
28 3 REQD
9 10 6 EACH REQD
6 8 10 EACH REQD
B
B
B
37 41 4 EACH REQD
39 4 REQD
40 4 REQD
18 12 REQD
38 40 41 4 EACH REQD

PARTIAL SECTION C-C
(CLAMPS AT POSITIONS MARKED 'Z')



SEE NOTE 14
SEE NOTE 15
12 4 REQD
11
-B-
⊥B.015

PARTIAL VIEW B-B



32 33 20 EACH REQD

PARTIAL SECTION A-A

	QUANTITY REQUIRED			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				X		48	PS 2900029	PROCUREMENT SPECIFICATION
				X		47	2900272	SCHEMATIC DIAGRAM
				AR		46	MIL-S-22473 GRADE H	SEALING COMPOUND (ES 2544-5)
				AR		45	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
				AR		44	MIL-F-14256 TYPE A OR W	FLUX (ES 2798)
				AR		43	SN60WS	SOLDER QQ-S-571 (ES 2175-1)
						42	2900284	HARNESS "A"
				8		41	MS 35333-070	WASHER, LOCK, INT. TOOTH
				16		40	AN960C4	WASHER, PLAIN
SEE NOTE 4				4		39	1016000-002	STAND-OFF
				12		38	MS 35216-13	SCREW, PAN HD
				4		37	MS 35216-11	SCREW, PAN HD
				16		36	MS 35216-25	SCREW, PAN HD
				4		35	AN960C6	WASHER, PLAIN
SEE NOTE 4				20		34	1016151-006	NUT, SELF LOCKING
SEE NOTE 4				28		33	1016151-004	NUT, SELF LOCKING
				20		32	MS 35216-016	SCREW, PAN HD
				34		31	MS 35216-026	SCREW, PAN HD
				30		30	MS 35333-071	WASHER, LOCK, INT. TOOTH
SEE NOTE 4				8		29	1015837-002	RELAY-ARMATURE
				3		28	F02A250V3A	(1897099-12) FUSE MIL-F-15160/02
				1		27	MS26572-1	FUSE HOLDER, SPARE
SEE NOTE 4				2		26	1015873-008	FUSE HOLDER
				5		25	1900391	BRACKET HOLDER, DOUBLE
				10		24	1900390	BRACKET HOLDER, SINGLE
				1		23	2900078-011	TORQUE ENABLE ASSY
				2		22	2900077-011	SELECTOR DRIVER ASSY
				3		21	2900076-011	INTERROGATOR ASSY
				1		20	2900080-011	BUFFER ASSY
				1		19	2900075-011	FLIP FLOP ASSY
SEE NOTE 9				12		18	MS 21919DG2 THRU 8	(1897073-104 THRU -106) CLAMP, CUSHIONED, SUPPORT
				1		17	2900687-011	SCALE FACTOR ASS'Y.
				1		16	2900706-011	TIME DELAY ASS'Y
						15		
						14		
						13		
				4		12	MS 35216-1	SCREW-PAN HD
				1		11	1004260-107	NAMEPLATE
				6		10	AN363C1032	(1896990-011) NUT
SEE NOTE 4				6		9	1006783-45	SCREW, BUTTON HD.
SEE NOTE 4				10		8	1015826-304	SCREW, FLAT HD.
				8		7	AN507C832R12	(1897003-568) SCREW FLAT HD.
SEE NOTES 4 & 5				10		6	1016005-001	SHIM-LAMINATED
SEE NOTE 4				1		5	1015791-009	SLIDE ASSY R.H.
SEE NOTE 4				1		4	1015791-010	SLIDE ASSY L.H.
				2		3	1900015-051	HANDLE ASSY
				1		2	2900173	CHASSIS INSEP ASSY
				1		1	2900174	FRONT PANEL

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN WEISSERT DATE 24 MAR 65
CHECKED W. Diehl 24 MAR 65
APPROVAL 24 MAR 65
APPROVAL 6-10-20 65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

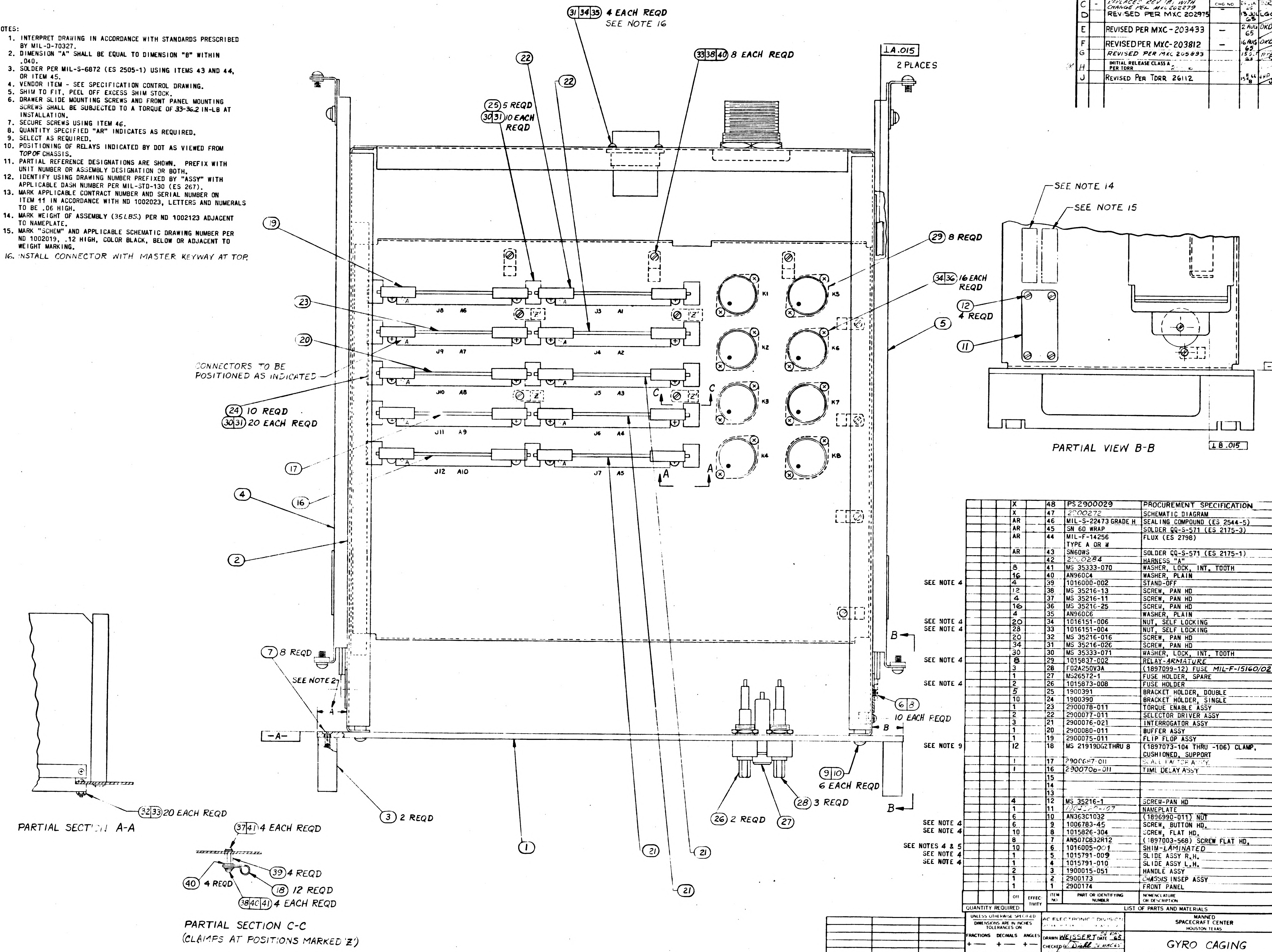
GYRO CAGING ELECTRONICS ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900029
SCALE FULL
SHEET 1 OF 1

H 2900029

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. DIMENSION "A" SHALL BE EQUAL TO DIMENSION "B" WITHIN .040.
3. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEMS 43 AND 44, OR ITEM 45.
4. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
5. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.
6. DRAWER SLIDE MOUNTING SCREWS AND FRONT PANEL MOUNTING SCREWS SHALL BE SUBJECTED TO A TORQUE OF 33-36.2 IN-LB AT INSTALLATION.
7. SECURE SCREWS USING ITEM 46.
8. QUANTITY SPECIFIED "AR" INDICATES AS REQUIRED.
9. SELECT AS REQUIRED.
10. POSITIONING OF RELAYS INDICATED BY DOT AS VIEWED FROM TOP OF CHASSIS.
11. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. PREFIX WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.
12. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES 267).
13. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER ON ITEM 11 IN ACCORDANCE WITH ND 1002023, LETTERS AND NUMERALS TO BE .06 HIGH.
14. MARK WEIGHT OF ASSEMBLY (35 LBS.) PER ND 1002123 ADJACENT TO NAMEPLATE.
15. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND 1002019, .12 HIGH, COLOR BLACK, BELOW OR ADJACENT TO WEIGHT MARKING.
16. INSTALL CONNECTOR WITH MASTER KEYWAY AT TOP.

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
C	-	REPLACES REV (B) WITH CHANGE PER MXC 202279	—	24 JUN 65	RR
D		REVISED PER MXC 202975		13 JUL 65	LGC
E		REVISED PER MXC-203433	—	2 AUG 65	DKD
F		REVISED PER MXC-203812	—	16 AUG 65	DKD
G		REVISED PER MXC 205893		15 OCT 65	RTP
H		INITIAL RELEASE CLASS A PER TDRR			
J		REVISED PER TDRR 26112		15 FEB 66	JHP J.E.G.



31 34 35 4 EACH REQD SEE NOTE 16
33 38 40 8 EACH REQD
⊥A .015 2 PLACES
22
22
25 5 REQD
30 31 10 EACH REQD
19
23
20
CONNECTORS TO BE POSITIONED AS INDICATED
24 10 REQD
30 31 20 EACH REQD
17
16
4
2
J8 A6
J3 A1
J9 A7
J4 A2
J10 A8
J5 A3
J11 A9
J6 A4
J12 A10
J7 A5
K1 K2 K3 K4 K5 K6 K7 K8
Z
C
A
29 8 REQD
34 36 16 EACH REQD
5
SEE NOTE 14
SEE NOTE 15
12 4 REQD
11
-B-
PARTIAL VIEW B-B
⊥B .015
7 8 REQD
SEE NOTE 2
A
-A-
B
6 8 10 EACH REQD
9 10 6 EACH REQD
3 2 REQD
1
26 2 REQD
27
28 3 REQD
21
21
21
32 33 20 EACH REQD
PARTIAL SECTION A-A
37 41 4 EACH REQD
39 4 REQD
40 4 REQD
18 12 REQD
38 40 41 4 EACH REQD
PARTIAL SECTION C-C (CLAMPS AT POSITIONS MARKED 'Z')

						ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011	EFFECTIVITY			
				X		48	PS 2900029	PROCUREMENT SPECIFICATION
				X		47	2900272	SCHEMATIC DIAGRAM
				AR		46	MIL-S-22473 GRADE H	SEALING COMPOUND (ES 2544-5)
				AR		45	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
				AR		44	MIL-F-14256 TYPE A OR W	FLUX (ES 2798)
				AR		43	SN60WS	SOLDER QQ-S-571 (ES 2175-1)
						42	2900284	HARNESS "A"
				8		41	MS 35333-070	WASHER, LOCK, INT. TOOTH
				16		40	AN960C4	WASHER, PLAIN
SEE NOTE 4				4		39	1016000-002	STAND-OFF
				12		38	MS 35216-13	SCREW, PAN HD
				4		37	MS 35216-11	SCREW, PAN HD
				16		36	MS 35216-25	SCREW, PAN HD
				4		35	AN960C6	WASHER, PLAIN
SEE NOTE 4				20		34	1016151-006	NUT, SELF LOCKING
SEE NOTE 4				28		33	1016151-004	NUT, SELF LOCKING
				20		32	MS 35216-016	SCREW, PAN HD
				34		31	MS 35216-026	SCREW, PAN HD
				30		30	MS 35333-071	WASHER, LOCK, INT. TOOTH
SEE NOTE 4				8		29	1015837-002	RELAY-ARMATURE
				3		28	F02A250V3A	(1897099-12) FUSE MIL-F-15160/02
				1		27	MS26572-1	FUSE HOLDER, SPARE
SEE NOTE 4				2		26	1015873-008	FUSE HOLDER
				5		25	1900391	BRACKET HOLDER, DOUBLE
				10		24	1900390	BRACKET HOLDER, SINGLE
				1		23	2900078-011	TORQUE ENABLE ASSY
				2		22	2900077-011	SELECTOR DRIVER ASSY
				3		21	2900076-021	INTERROGATOR ASSY
				1		20	2900080-011	BUFFER ASSY
				1		19	2900075-011	FLIP FLOP ASSY
SEE NOTE 9				12		18	MS 21919DG2 THRU 8	(1897073-104 THRU -106) CLAMP, CUSHIONED, SUPPORT
				1		17	2900687-011	SCALE FACTOR ASSY.
				1		16	2900706-011	TIME DELAY ASS'Y
						15		
						14		
						13		
				4		12	MS 35216-1	SCREW-PAN HD
				1		11	1004220-107	NAMEPLATE
				6		10	AN363C1032	(1896990-011) NUT
SEE NOTE 4				6		9	1006783-45	SCREW, BUTTON HD.
SEE NOTE 4				10		8	1015826-304	SCREW, FLAT HD.
				8		7	AN507C832R12	(1897003-568) SCREW FLAT HD.
SEE NOTES 4 & 5				10		6	1016005-001	SHIM-LAMINATED
SEE NOTE 4				1		5	1015791-009	SLIDE ASSY R.H.
SEE NOTE 4				1		4	1015791-010	SLIDE ASSY L.H.
				2		3	1900015-051	HANDLE ASSY
				1		2	2900173	CHASSIS INSEP ASSY
				1		1	2900174	FRONT PANEL
	QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

NEXT ASSY	USED ON	APPLICABLE DASH NO
2900023-011	2900023-011	-011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
DRAWN WEISSERT DATE 24 MAR 65
CHECKED W. Diehl 24 MAR 65
APPROVAL 24 MAR 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

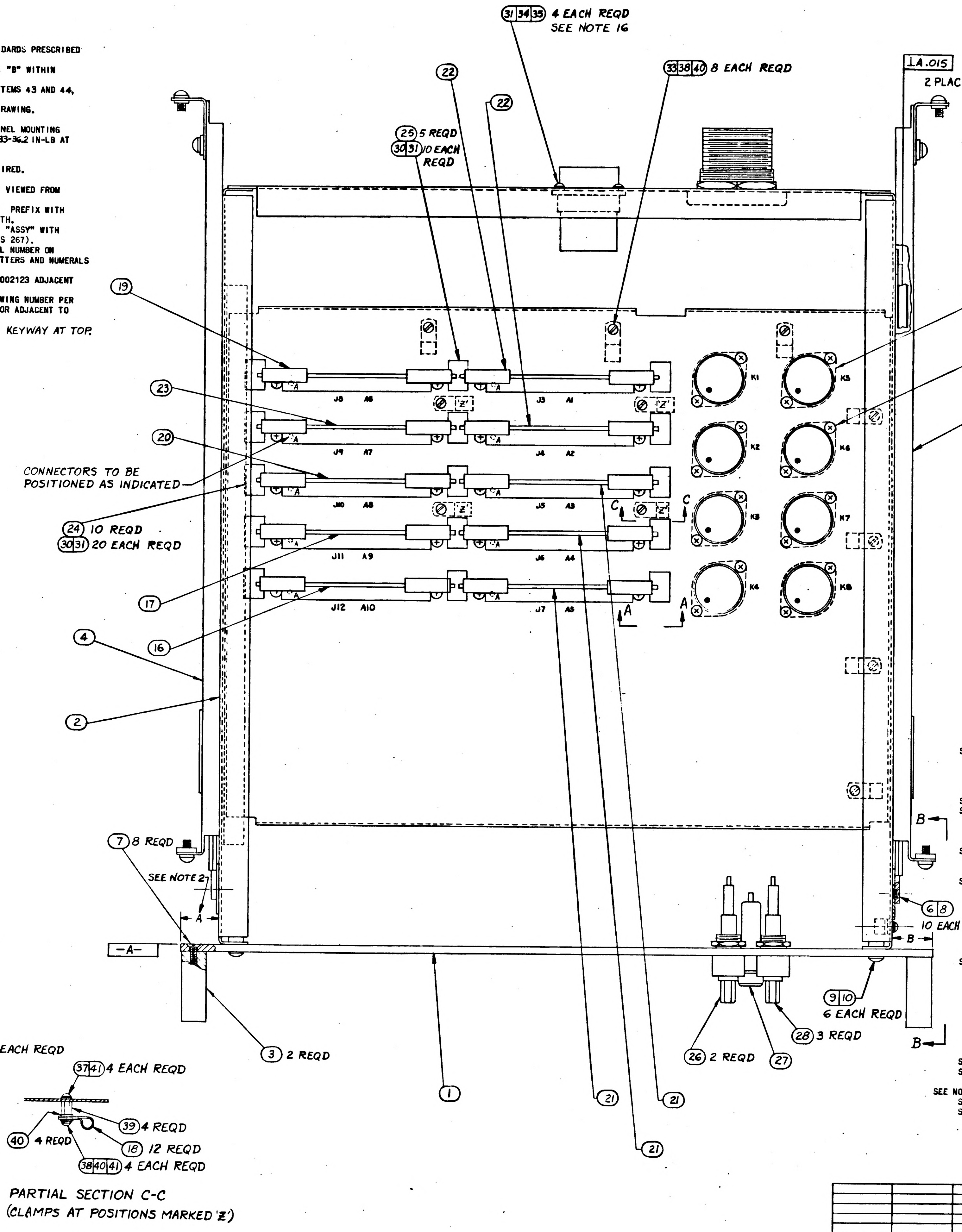
GYRO CAGING
ELECTRONICS ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900029
SCALE FULL
SHEET 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. DIMENSION "A" SHALL BE EQUAL TO DIMENSION "B" WITHIN .040.
3. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEMS 43 AND 44, OR ITEM 45.
4. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
5. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.
6. DRAWER SLIDE MOUNTING SCREWS AND FRONT PANEL MOUNTING SCREWS SHALL BE SUBJECTED TO A TORQUE OF 33-36.2 IN-LB AT INSTALLATION.
7. SECURE SCREWS USING ITEM 46.
8. QUANTITY SPECIFIED "AR" INDICATES AS REQUIRED.
9. SELECT AS REQUIRED.
10. POSITIONING OF RELAYS INDICATED BY DOT AS VIEWED FROM TOP OF CHASSIS.
11. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. PREFIX WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.
12. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES 267).
13. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER ON ITEM 11 IN ACCORDANCE WITH ND 1002023, LETTERS AND NUMERALS TO BE .06 HIGH.
14. MARK WEIGHT OF ASSEMBLY (35LBS.) PER ND 1002123 ADJACENT TO NAMEPLATE.
15. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND 1002019, .12 HIGH, COLOR BLACK, BELOW OR ADJACENT TO WEIGHT MARKING.
16. INSTALL CONNECTOR WITH MASTER KEYWAY AT TOP.

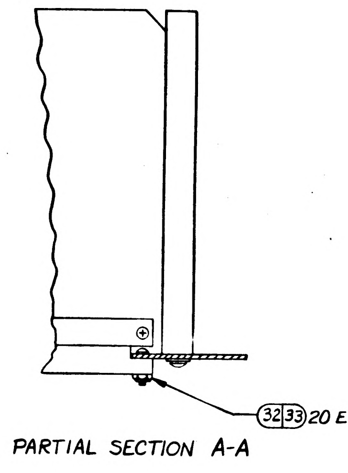
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
C	-	REPLACES REV (B) WITH CHANGE PER MXC202279	—	24 JUN 65	[illegible]
D		REVISED PER MXC 202975		13 JUL 65	LGC
E		REVISED PER MXC-203433	—	2 AUG 65	DKD
F		REVISED PER MXC-203812	—	16 AUG 65	DKD
G		REVISED PER MXC 205893		15 OCT 65	[illegible]
ⓜ H		INITIAL RELEASE CLASS A PER TDRR 23556		[illegible] 65	[illegible]
J		REVISED PER TDRR 26112		15 FEB 66	E.G.
K		REVISED PER TDRR 26116		FEB 66	MEM



31 34 35 4 EACH REQD
SEE NOTE 16
33 38 40 8 EACH REQD
⊥A .015
2 PLACES
22
22
25 5 REQD
30 31 10 EACH REQD
19
23
20
CONNECTORS TO BE POSITIONED AS INDICATED
24 10 REQD
30 31 20 EACH REQD
17
16
4
2
29 8 REQD
34 36 16 EACH REQD
5
J8 A6
J3 A1
J9 A7
J4 A2
J10 A8
J5 A3
J11 A9
J6 A4
J12 A10
J7 A5
K1
K2
K3
K4
K5
K6
K7
K8
Z
C
C
A
A
7 8 REQD
SEE NOTE 2
A
-A-
B
B
B
6 8
10 EACH REQD
9 10
6 EACH REQD
3 2 REQD
1
21
21
21
26 2 REQD
27
28 3 REQD

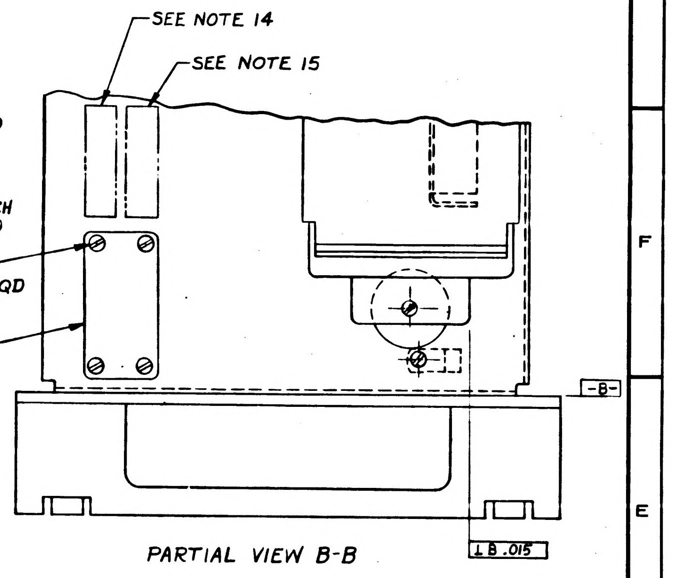
PARTIAL SECTION C-C
(CLAMPS AT POSITIONS MARKED 'Z')

37 41 4 EACH REQD
39 4 REQD
18 12 REQD
40 4 REQD
38 40 41 4 EACH REQD



32 33 20 EACH REQD

PARTIAL SECTION A-A



SEE NOTE 14
SEE NOTE 15
12
4 REQD
11
-B-
⊥B .015

PARTIAL VIEW B-B

	X		49	2900592	RUNNING LIST
	X		48	PS2900029	PROCUREMENT SPECIFICATION
	X		47	2900272	SCHEMATIC DIAGRAM
	AR		46	MIL-S-22473 GRADE H	SEALING COMPOUND (ES 2544-5)
	AR		45	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
	AR		44	MIL-F-14256 TYPE A OR W	FLUX (ES 2798)
	AR		43	SN60WS	SOLDER QQ-S-571 (ES 2175-1)
			42	2900284	HARNESS "A"
	8		41	MS 35333-070	WASHER, LOCK, INT. TOOTH
	16		40	AN960C4	WASHER, PLAIN
SEE NOTE 4	4		39	1016000-002	STAND-OFF
	12		38	MS 35216-13	SCREW, PAN HD
	4		37	MS 35216-11	SCREW, PAN HD
	16		36	MS 35216-25	SCREW, PAN HD
	4		35	AN960C6	WASHER, PLAIN
SEE NOTE 4	20		34	1016151-006	NUT, SELF LOCKING
SEE NOTE 4	28		33	1016151-004	NUT, SELF LOCKING
	20		32	MS 35216-016	SCREW, PAN HD
	34		31	MS 35216-026	SCREW, PAN HD
	30		30	MS 35333-071	WASHER, LOCK, INT. TOOTH
SEE NOTE 4	8		29	1015837-002	RELAY-ARMATURE
	3		28	F02A250V3A	(1897099-12) FUSE MIL-F-15160/02
	1		27	MS26572-1	FUSE HOLDER, SPARE
SEE NOTE 4	2		26	1015873-008	FUSE HOLDER
	5		25	1900391	BRACKET HOLDER, DOUBLE
	10		24	1900390	BRACKET HOLDER, SINGLE
	1		23	2900078-011	TORQUE ENABLE ASSY
	2		22	2900077-011	SELECTOR DRIVER ASSY
	3		21	2900076-021	INTERROGATOR ASSY
	1		20	2900080-011	BUFFER ASSY
	1		19	2900075-011	FLIP FLOP ASSY
SEE NOTE 9	12		18	MS 21919DG2THRU 8	(1897073-104 THRU -106) CLAMP, CUSHIONED, SUPPORT
	1		17	2900687-011	SCALE FACTOR ASS'Y.
	1		16	2900706-011	TIME DELAY ASS'Y
			15		
			14		
			13		
	4		12	MS 35216-1	SCREW-PAN HD
	1		11	1004260-107	NAMEPLATE
	6		10	AN363C1032	(1896990-011) NUT
SEE NOTE 4	6		9	1006783-45	SCREW, BUTTON HD.
SEE NOTE 4	10		8	1015826-304	SCREW, FLAT HD.
	8		7	AN507C832R12	(1897003-568) SCREW FLAT HD.
SEE NOTES 4 & 5	10		6	1016005-001	SHIM-LAMINATED
SEE NOTE 4	1		5	1015791-009	SLIDE ASSY R.H.
SEE NOTE 4	1		4	1015791-010	SLIDE ASSY L.H.
	2		3	1900015-051	HANDLE ASSY
	1	✓	2	2900173	CHASSIS INSEP ASSY
	1		1	2900174	FRONT PANEL
	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			LIST OF PARTS AND MATERIALS		

2900023-011	2900023-011	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN WEISSERT DATE 24 MAR 65
CHECKED W. Diehl 24 MAR 65
APPROVAL 24 MAR 65
APPROVAL 6-10-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

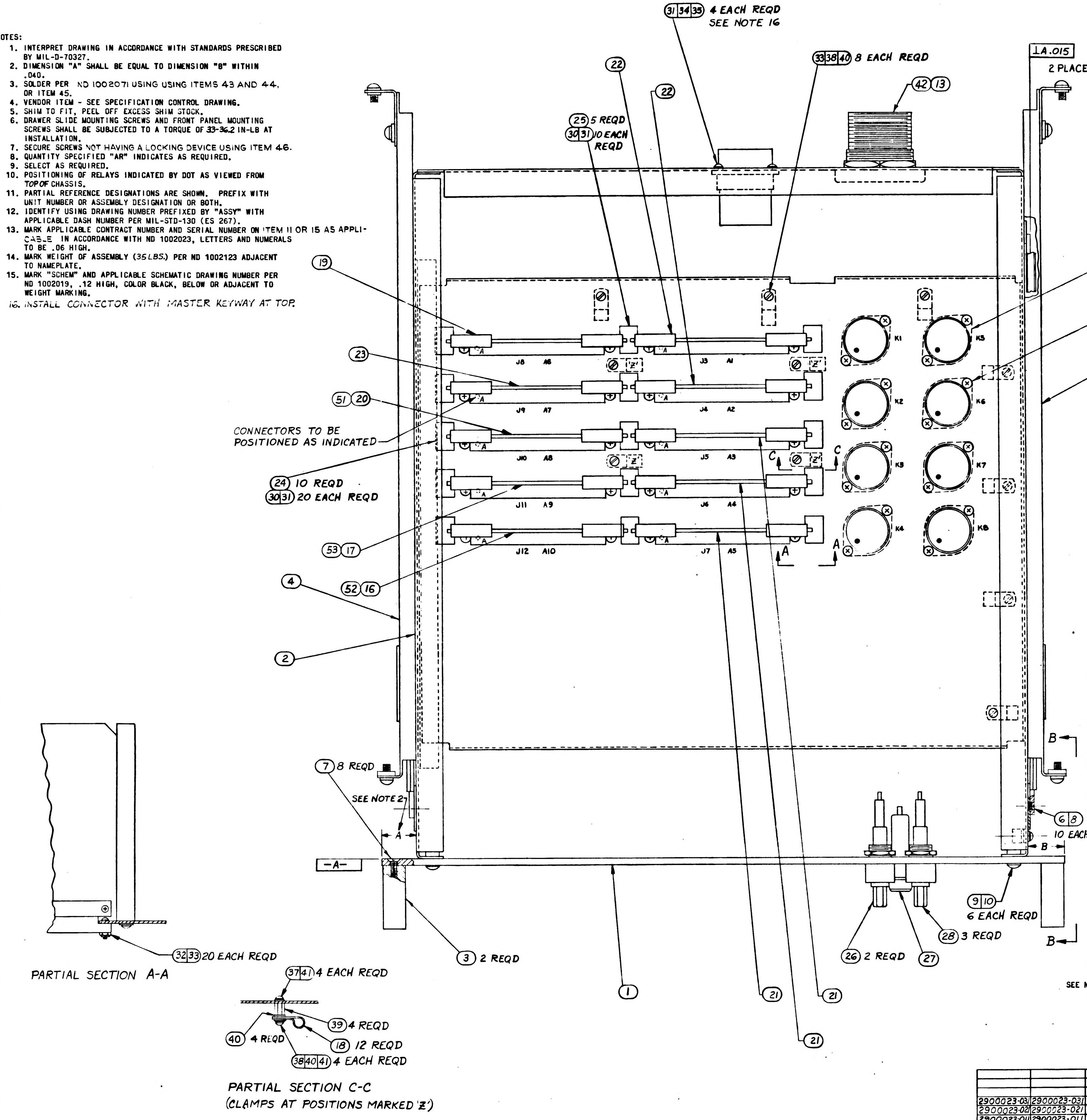
GYRO CAGING ELECTRONICS ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900029
SCALE FULL
SHEET 1 OF 1

2900029 K

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. DIMENSION "A" SHALL BE EQUAL TO DIMENSION "B" WITHIN .040.
3. SOLDER PER ND 1002071 USING USING ITEMS 43 AND 44, OR ITEM 45.
4. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
5. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.
6. DRAWER SLIDE MOUNTING SCREWS AND FRONT PANEL MOUNTING SCREWS SHALL BE SUBJECTED TO A TORQUE OF 33-36.2 IN-LB AT INSTALLATION.
7. SECURE SCREWS NOT HAVING A LOCKING DEVICE USING ITEM 46.
8. QUANTITY SPECIFIED "AR" INDICATES AS REQUIRED.
9. SELECT AS REQUIRED.
10. POSITIONING OF RELAYS INDICATED BY DOT AS VIEWED FROM TOP OF CHASSIS.
11. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. PREFIX WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.
12. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES 267).
13. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER ON ITEM 11 OR 15 AS APPLICABLE IN ACCORDANCE WITH ND 1002023, LETTERS AND NUMERALS TO BE .06 HIGH.
14. MARK WEIGHT OF ASSEMBLY (35 LBS.) PER ND 1002123 ADJACENT TO NAMEPLATE.
15. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND 1002019, .12 HIGH, COLOR BLACK, BELOW OR ADJACENT TO WEIGHT MARKING.
16. INSTALL CONNECTOR WITH MASTER KEYWAY AT TOP.

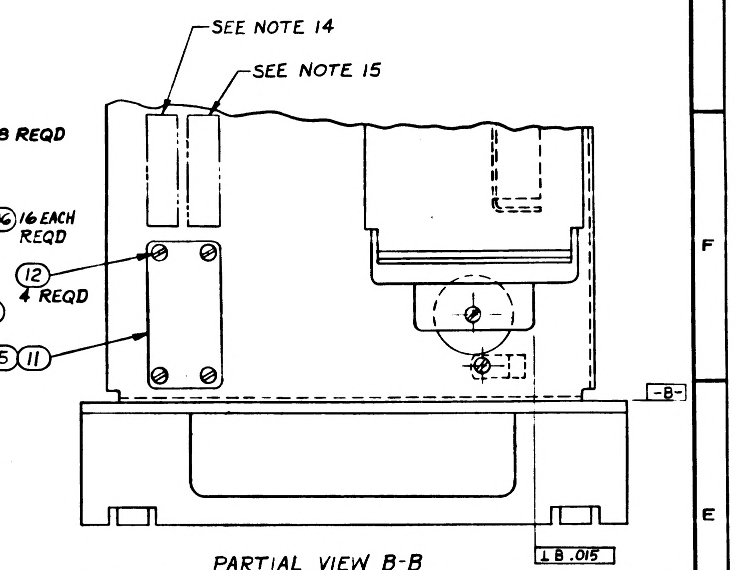
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.
C	-	REPLACES REV (B) WITH CHANGE PER MXC 202279	-	24 JUN 65	MCR
D		REVISED PER MXC 202975		3 JUL 65	LGC
E		REVISED PER MXC-203433	—	2 AUG 65	DKD
F		REVISED PER MXC-203812	—	6 AUG 65	DKD
G		REVISED PER MXC 205893		15 OCT 65	RTP
H		INITIAL RELEASE CLASS A PER TDRR 23556			
J		REVISED PER TDRR 26112			J.E.G.
K		REVISED PER TDRR 26116			
L		REVISED PER TDRR 28765		MAY 66	J.E.G.



31 34 35 4 EACH REQD
SEE NOTE 16
33 38 40 8 EACH REQD
42 13
⊥A .015
2 PLACES
22
22
25 5 REQD
30 31 10 EACH REQD
19
23
51 20
CONNECTORS TO BE POSITIONED AS INDICATED
24 10 REQD
30 31 20 EACH REQD
53 17
52 16
4
2
29 8 REQD
34 36 16 EACH REQD
5
J8 A6
J3 A1
J9 A7
J4 A2
J10 A8
J5 A3
J11 A9
J6 A4
J12 A10
J7 A5
K1
K2
K3
K4
K5
K6
K7
K8
C
A
B
7 8 REQD
SEE NOTE 2
A
-A-
3 2 REQD
1
21
21
21
6 8
10 EACH REQD
9 10
6 EACH REQD
26 2 REQD
27
28 3 REQD
32 33 20 EACH REQD
37 41 4 EACH REQD
39 4 REQD
40 4 REQD
18 12 REQD
38 40 41 4 EACH REQD

PARTIAL SECTION A-A

PARTIAL SECTION C-C
(CLAMPS AT POSITIONS MARKED 'Z')



SEE NOTE 14
SEE NOTE 15
12 4 REQD
15 11
-B-
⊥B .015

PARTIAL VIEW B-B

			QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS	
			021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			1			53	2900687-021	SCALE FACTOR ASSY
			1			52	2901424-011	TIME DELAY ASSY
			1			51	2901405-011	BUFFER ASSY
			X			50	2901423	RUNNING LIST
				X		49	2900592	RUNNING LIST
			X	X		48	PS 2900029	PROCUREMENT SPECIFICATION
				X		47	2900272	SCHEMATIC DIAGRAM
			AR	AR		46	MIL-S-22473 GRADE H	SEALING COMPOUND (ES 2544-5)
			AR	AR		45	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
			AR	AR		44	MIL-F-14256 TYPE A OR W	FLUX (ES 2798)
			AR	AR		43	SN60WS	SOLDER QQ-S-571 (ES 2175-1)
				1		42	2900284	HARNESS "A"
			8	8		41	MS 35333-070	WASHER, LOCK, INT. TOOTH
			16	16		40	AN960C4	WASHER, PLAIN
SEE NOTE 4			4	4		39	1016000-002	STAND-OFF
			12	12		38	MS 35216-13	SCREW, PAN HD
			4	4		37	MS 35216-11	SCREW, PAN HD
			16	16		36	MS 35216-25	SCREW, PAN HD
			4	4		35	AN960C6	WASHER, PLAIN
SEE NOTE 4			20	20		34	1016151-006	NUT, SELF LOCKING
SEE NOTE 4			28	28		33	1016151-004	NUT, SELF LOCKING
			20	20		32	MS 35216-016	SCREW, PAN HD
			34	34		31	MS 35216-026	SCREW, PAN HD
			30	30		30	MS 35333-071	WASHER, LOCK, INT. TOOTH
SEE NOTE 4			8	8		29	1015837-002	RELAY-ARMATURE
			3	3		28	F02A250V3A	(1897099-12) FUSE MIL-F-15160/02
			1	1		27	MS26572-1	FUSE HOLDER, SPARE
SEE NOTE 4			2	2		26	1015873-008	FUSE HOLDER
			5	5		25	1900391	BRACKET HOLDER, DOUBLE
			10	10		24	1900390	BRACKET HOLDER, SINGLE
			1	1		23	2900078-011	TORQUE ENABLE ASSY
			2	2		22	2900077-011	SELECTOR DRIVER ASSY
			3	3		21	2900076-021	INTERROGATOR ASSY
				1		20	2900080-011	BUFFER ASSY
			1	1		19	2900075-011	FLIP FLOP ASSY
SEE NOTE 9			12	12		18	MS 21919DG2THRU 8	(1897073-104 THRU -106) CLAMP, CUSHIONED, SUPPORT
				1		17	2900687-011	SCALE FACTOR ASS'Y.
				1		16	2900706-011	TIME DELAY ASS'Y.
			1			15	1004260-172	NAMEPLATE
			X			14	2901421	SCHEMATIC DIAGRAM
			1			13	2901422	WIRING HARNESS 'A'
			4	4		12	MS 35216-1	SCREW-PAN HD
				1		11	1004260-107	NAMEPLATE
			6	6		10	AN363C1032	(1896990-011) NUT
SEE NOTE 4			6	6		9	1006783-45	SCREW, BUTTON HD.
SEE NOTE 4			10	10		8	1015826-304	SCREW, FLAT HD.
			8	8		7	AN507C832R12	(1897003-568) SCREW FLAT HD.
SEE NOTES 4 & 5			10	10		6	1016005-001	SHIM-LAMINATED
SEE NOTE 4			1	1		5	1015791-009	SLIDE ASSY R.H.
SEE NOTE 4			1	1		4	1015791-010	SLIDE ASSY L.H.
			2	2		3	1900015-051	HANDLE ASSY
			1	1		2	2900173	CHASSIS INSEP ASSY
			1	1		1	2900174	FRONT PANEL

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-031	2900023-031	-021
2900023-021	2900023-021	-011
2900023-011	2900023-011	-011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN WEISSERT DATE 24 MAR 65
CHECKED W. Diehl 24 MAR 65
APPROVAL 24 MAR 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

GYRO CAGING
ELECTRONICS ASSEMBLY

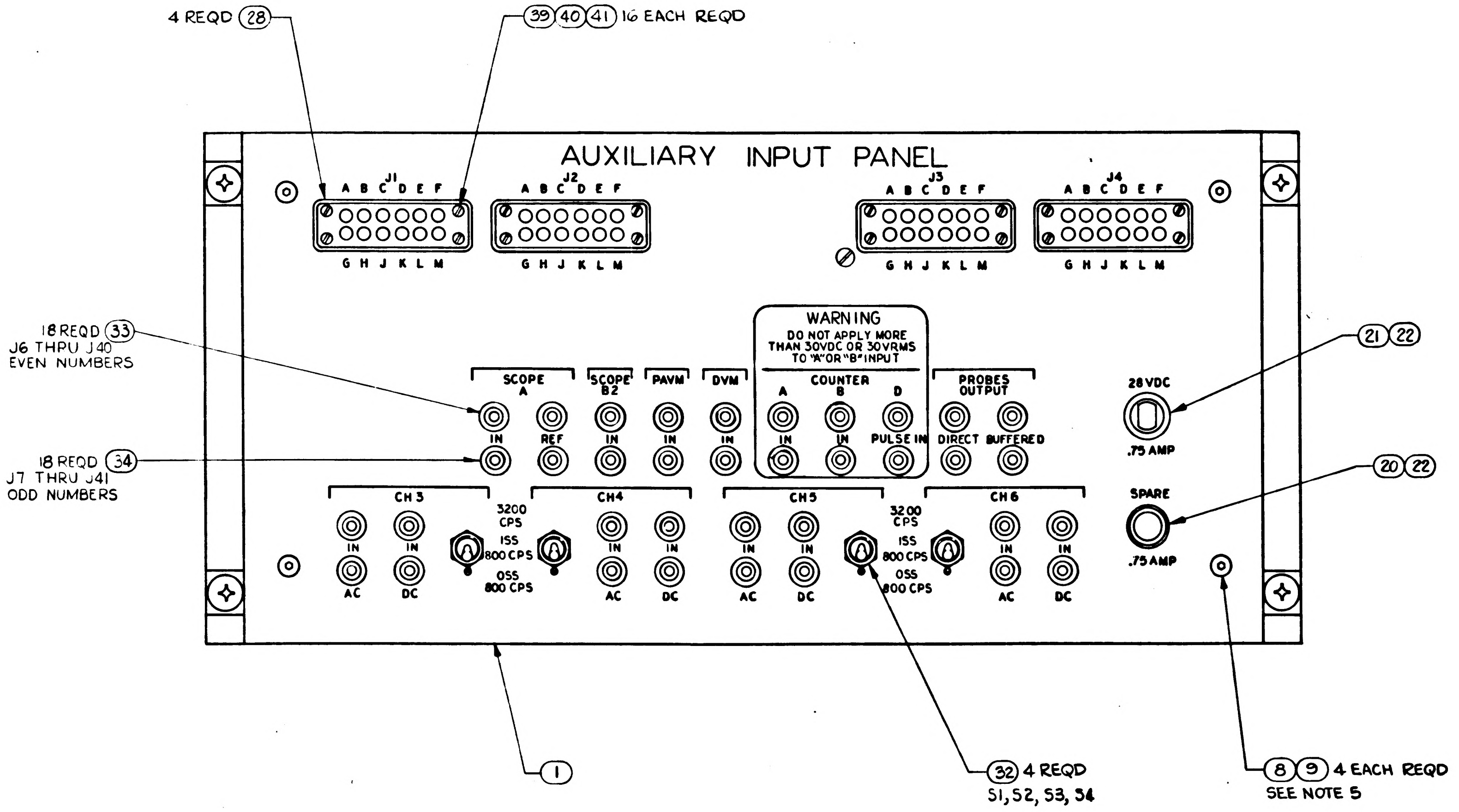
CODE IDENT NO. 99974
SIZE E
2900029
SCALE FULL
SHEET 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEMS ⑪ & ⑫ OR ITEM ⑬
3. VENDOR ITEM. SEE SPEC CONTROL DRAWING.
4. DIMENSION "A" MUST BE EQUAL TO DIMENSION "B" WITHIN .040.
5. DRAWER SLIDE MOUNTING SCREWS ITEM ⑦ & FRONT PANEL MOUNTING SCREWS ITEM ⑧ SHALL BE SUBJECTED TO TORQUE OF 33.0 - 36.2 IN. LBS AT INSTALLATION.
6. MARK WEIGHT OF ASSY, (24 LBS), PER ND1002123.
7. MARK "SCHEMATIC" & APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH, COLOR BLACK, IN LOCATION SHOWN.
8. MARK APPLICABLE CONTRACT NUMBER & SERIAL NUMBER TO ITEM ㉔ IN ACCORDANCE WITH ND1002023. LETTERS & NUMERALS TO BE .06 HIGH.
9. SHIM TO FIT, PEEL OFF EXCESS SHIM STOCK.
10. THE FOLLOWING ARE PART OF THIS ASSEMBLY:
    PATCHCORD ITEMS ㉟, ㊱ & ㊲
11. DRAWINGS FOR REFERENCE:
    SCHEMATIC DIAGRAM ITEM ㉗
12. DISCARD SOLDER LUG WHEN NOT REQUIRED

REVISIONS 23467

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
K		REPLACES REV (J) WITH CHANGE PER MXC 203345 WAS "C" SIZE		29 JUL 65	RC
L		REVISED PER MXC 204346		9 SEP 65	LK
M		REVISED PER MXC 205311		28 SEP 65	G.W.T. AU
N		INITIAL RELEASE CLASS A PER TDRR 23467		18 OCT 65	JR


4 REQD ㉘
㊴ ㊵ ㊶ 16 EACH REQD
AUXILIARY INPUT PANEL
J1
J2
J3
J4
A B C D E F
G H J K L M
WARNING
DO NOT APPLY MORE THAN 30VDC OR 30VRMS TO "A" OR "B" INPUT
SCOPE A
SCOPE B2
PAVM
DVM
COUNTER
A
B
D
PROBES OUTPUT
IN
REF
PULSE IN
DIRECT
BUFFERED
18 REQD ㉝ J6 THRU J40 EVEN NUMBERS
18 REQD ㉞ J7 THRU J41 ODD NUMBERS
CH3
CH4
CH5
CH6
AC
DC
3200 CPS
ISS 800 CPS
OSS 800 CPS
28VDC
.75 AMP
SPARE
.75 AMP
㉑ ㉒
⑳ ㉒
①
㉜ 4 REQD S1, S2, S3, S4
⑧ ⑨ 4 EACH REQD SEE NOTE 5

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	10		51	MS35216-27	SCREW, PAN HD.
	1		50	MS21919DG8	(1897073-108) CLAMP, CUSHIONED CABLE
SEE NOTE 3	11		49	1016151-006	NUT, SELF LOCKING
	1		48	AN960C4	WASHER, FLAT
	1		47	AN507C632-10	(1897003-037) SCREW, FLAT HD
	X		46	PS2900030	PROCUREMENT SPECIFICATION
	4		45	MS35216-14	SCREW, PAN HEAD
SEE NOTE 3	4		44	1016151-004	NUT, SELF LOCKING
	12		43	MS35216-26	SCREW, PAN HEAD
	12		42	MS35333-71	WASHER, LOCK
	18		41	1896988-040	NUT, HEX
	18		40	MS35338-21	WASHER, LOCK
	16		39	MS35275-17	SCREW, FILLISTER HEAD
	8		38	AN507C832-R12	(1897003-568) SCREW, FLAT HD
	2		37	2900056	PATCHCORD
	2		36	2900057	PATCHCORD
	3		35	2900249	PATCHCORD
SEE NOTE 12	36		34	1897302-002	JACK, BANANA
SEE NOTE 12	36		33	1897302-001	JACK, BANANA
	6		32	MS35058-21	SWITCH, TOGGLE
	2		31	MS25068-23	SWITCH, TOGGLE
	1		30	MS35058-23	SWITCH, TOGGLE
	3		29	MS35059-23	SWITCH, TOGGLE
	4		28	1897240-001	CONNECTOR
	X		27	2900439	SCHEMATIC DIAGRAM, ELEC
			26		
	4		25	MS35233-3	SCREW
	1		24	1004260-108	NAMEPLATE
	1		23	2900394-011	DELAY LINE ASSY.
	2		22	F02A250V3/4AS	(1897099-108) FUSE, MIL-F-15160
SEE NOTE 3	1		21	1015873-008	FUSEHOLDER
	1		20	MS26572-1	FUSEHOLDER
	2		19	1900391	BRACKET HOLDER, DOUBLE
	4		18	1900390	BRACKET HOLDER, SINGLE
	1		17	2900382-011	ELECTRONIC COMPONENTS ASSY
	1		16	2900176-011	DC CALIBRATION STD ASSY
	1		15	2900194-011	800~, 3200~ QUAD SUPPLY ASSY
	1		14	2900230-011	AC CALIBRATION STD ASSY
	AR		13	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
	AR		12	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
	AR		11	SN60 WS	SOLDER QQ-S-571 (ES2175-1)
	1		10	2900599	WIRING HARNESS "A"
SEE NOTE 3	4		9	1016151-010	NUT, SELF LOCKING
	4		8	1006783-45	SCREW, BUTTON HEAD
	10		7	1015826-304	SCREW, FLAT HEAD
	10		6	1016005-001	SHIM, LAMINATED
	1		5	1015791-009	SLIDE ASSY, RH
SEE NOTE 3	1		4	1015791-010	SLIDE ASSY, LH
	2		3	1900015-051	HANDLE ASSY
	1		2	2900185	DRAWER, INSEP ASSY
	1		1	2900009	PANEL, FRONT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900022-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Dusel DATE 24 MAR 65
CHECKED Wlovich 29 JUN 65
R. 26 JUN 65
APPROVAL E. NASS 29 JUN 65
APPROVAL 10/20/65
NASA APPROVAL
MIT APPROVAL

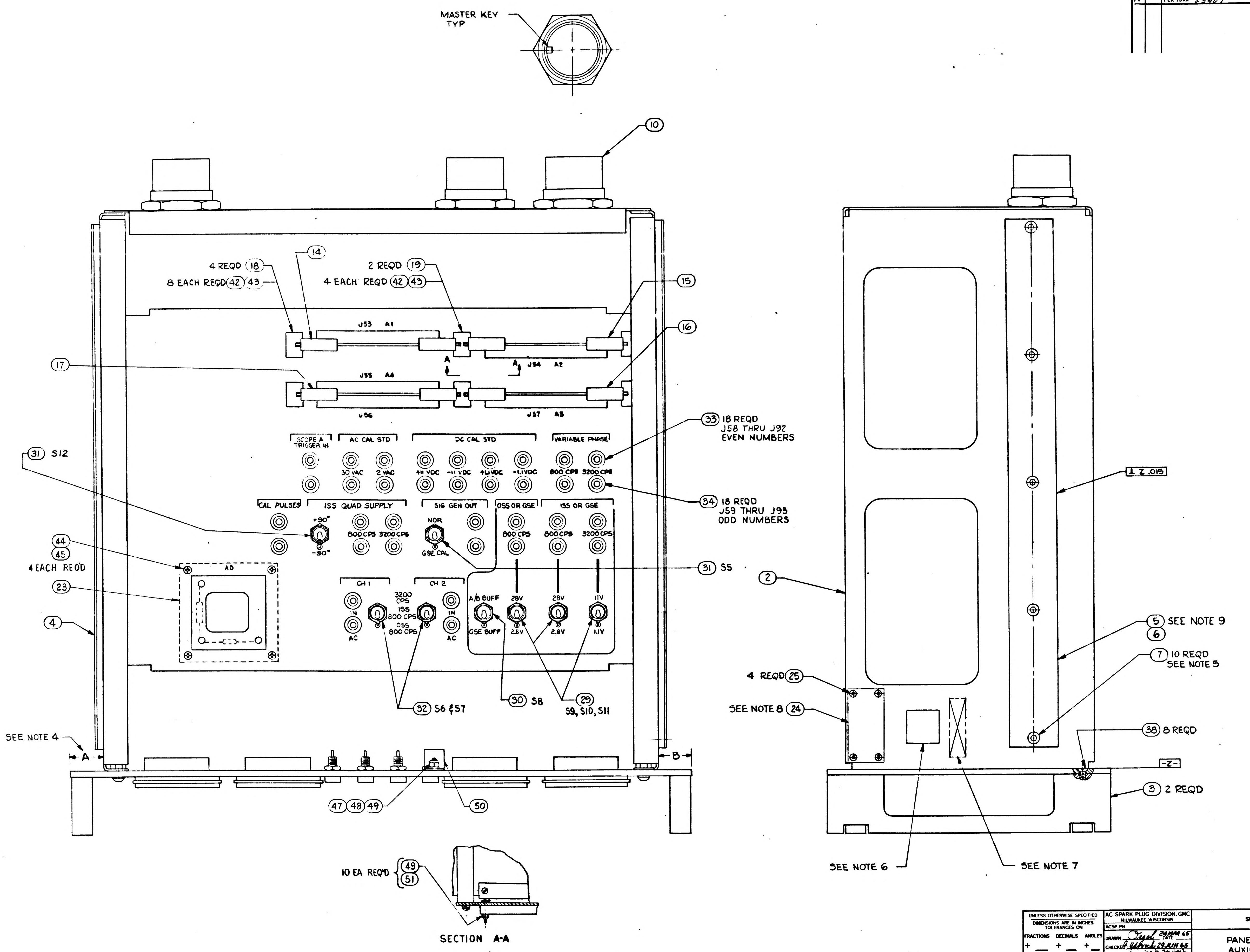
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PANEL ASSEMBLY,
AUXILIARY INPUT

CODE IDENT NO 99974
SIZE E
2900030
SCALE FULL
SHEET 1 OF 2

REVISIONS 23407

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
K		REPLACES REV(J) WITH CHANGE PER MXC 203345 WAS "C" SIZE		29 JUL 65	RP
L		REVISED PER MXC 204346		9 SEP 65	LK
M		REVISED PER MXC 205311		23 SEP 65	RWT
N		INITIAL RELEASE CLASS A PER TDRR 23407		18 OCT 65	



MASTER KEY TYP
⑩
4 REQD ⑱
8 EACH REQD ㊷ ㊸
⑭
2 REQD ⑲
4 EACH REQD ㊷ ㊸
⑮
⑯
⑰
J53 A1
J54 A2
J55 A4
J56
J57 A3
A
SCOPE A TRIGGER IN
AC CAL STD
30 VAC
2 VAC
DC CAL STD
+11 VDC
-11 VDC
+1.1 VDC
-1.1 VDC
VARIABLE PHASE
800 CPS
3200 CPS
㉝ 18 REQD J58 THRU J92 EVEN NUMBERS
㉞ 18 REQD J59 THRU J93 ODD NUMBERS
㉛ S12
CAL PULSES
ISS QUAD SUPPLY
+90°
-90°
800 CPS
3200 CPS
SIG GEN OUT
NOR
GSE CAL
OSS OR GSE
800 CPS
ISS OR GSE
800 CPS
3200 CPS
㉛ S5
㊹
㊺
4 EACH REQD
A5
㉓
④
CH 1
IN
AC
3200 CPS ISS 800 CPS OSS 800 CPS
CH 2
IN
AC
A/B BUFF
GSE BUFF
28V
2.8V
28V
2.8V
11V
1.1V
㉜ S6 & S7
㉚ S8
㉙ S9, S10, S11
SEE NOTE 4
A
B
㊼ ㊽ ㊾
㊿
10 EA REQ'D ㊾ (51)
SECTION A-A
②
⊥ Z .015
⑤ SEE NOTE 9
⑥
⑦ 10 REQD SEE NOTE 5
4 REQD ㉕
SEE NOTE 8 ㉔
㊳ 8 REQD
-Z-
③ 2 REQD
SEE NOTE 6
SEE NOTE 7

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Tigal DATE 24 MAR 65
CHECKED J. Ulbrich 29 JUN 65
APPROVAL E Naas 29 JUN 65
APPROVAL J. M Watson 10-15-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PANEL ASSEMBLY,
AUXILIARY INPUT

CODE IDENT NO 99974
SIZE E
2900030
SCALE FULL
SHEET 2 OF 2

N
2900030

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK WEIGHT OF ASSEMBLY, (67 LBS) PER ND1002123 ADJACENT TO NAMEPLATE LOCATION.
3. CHASSIS SLIDE MOUNTING SCREWS, ITEM (77) AND FRONT PANEL MOUNTING SCREWS, ITEM (48) SHALL BE SUBJECTED TO TORQUE OF 28.5-31.7 IN LB AT INSTALLATION.
4. DIMENSION "A" MUST BE EQUAL TO DIMENSION "B" WITHIN .040.
5. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING
6. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEM (94), OR (92) AND (93).
7.
8. SHIM TO FIT. PEEL OFF EXCESS SHIM STOCK.
9. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002C9, .12 HIGH, COLOR BLACK, BELOW OR ADJACENT TO WEIGHT MARKING.
10. SELECT AS REQUIRED.
11. APPLY WARNING PLATE ITEM (60) TO AREA INDICATED USING SOLVENT ACTIVATOR METHYLETHYL KETONE OR EQUIVALENT. CENTRALIZE AS SHOWN.
12. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (79) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
13. SPOT TIE AS REQUIRED USING ITEM (87).
14. BEND TERMINAL NUMBER 2 ON THE FUSE HOLDER, ITEM (53), 90° AWAY FROM THE BODY OF THE FUSE.
15. SECURE SCREWS USING ITEM (88).
16. THE FOLLOWING ARE PART OF THIS ASSEMBLY:
    - WIRING HARNESS A ITEM (63)
    - WIRING HARNESS B ITEM (64)
17. DRAWINGS FOR REFERENCE
    - SCHEMATIC DIAGRAM ITEM (85)

REVISIONS c3420

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
D		REPLACES REVISION C WITH CHANGE PER MXC 202644		2 JULY 65	D.C.M. / MKM
E		REVISED PER MXC 203059	—	16 JUL 65	WJR
F		REVISED PER MXC 203263		23 JUL 65	
G		REVISED PER MXC 204636		3 SEP 65	
H		INITIAL RELEASE CLASS A PER TDRR c3420		8 OCT 65	

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1		102	1015869-793	LIGHT INDICATOR & SWITCH ASSY
	1		101	-792	
	1		100	-791	
	1		99	-790	
	1		98	-789	
	1		97	-788	
	1		96	1015869-787	LIGHT INDICATOR & SWITCH ASSY
SEE NOTE 10	4		95	MS21919-DG12	CLAMP, CUSHIONED, SUPPORT
				-DG11	
				-DG10	
				-DG9	
				MS21919-DG8	CLAMP, CUSHIONED, SUPPORT
	AR		94	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
	AR		93	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
	AR		92	SN60WS	SOLDER QQ-S-571 (ES2175-1)
	X		91	PS2900031	PROCUREMENT SPECIFICATION
	X		90		RUNNING LIST
	4		89	MS35216-3	SCREW, MACHINE, PAN HD
	AR		88	MIL-S-22473 GRADE H	SEALING COMPOUND (ES2544-5
	AR		87	MIL-T-713	LACING TAPE, TYPE P, CLASS 2, BLACK (ES 2732-1 NO 18)
SEE NOTE 5	6		86	1015864-424	INSULATION, SLEEVING, ELEC
	X		85	2900440	SCHEMATIC DIAGRAM, ELECTRICAL
SEE NOTE 5	44		84	1016151-004	NUT-SELF LOCKING
	44		83	MS-35216-16	SCREW, MACHINE, PAN HD
	11		82	MS-35216-42	SCREW, MACHINE, PAN HD
	3		81	AN363C832	(1896990-281) NUT, SELF LOCKING
	8		80	AN507C832R12	(1897003-568) SCREW, FLAT HD, 100°
	1		79	1004260-109	NAMEPLATE
	12		78	MS-35216-26	SCREW, MACHINE, PAN HD
SEE NOTE 5	10		77	1015826-304	SCREW, FLAT HEAD, HEX SOCKET
	20		76	AN363C632	(1896990-261) NUT, SELF LOCKING
SEE NOTE 5	1		75	1016085	REACTOR
	1		74	1016104	TRANSFORMER
	4		73	1016151-013	(1896990-041) NUT, SELF LOCKING
SEE NOTE 5	1		72	1897183-001	BATTERY, STORAGE – 24 VOLT
	1		71	1900447-021	3200 CPS FREQUENCY COMPARATOR
	78		70	MS35333-71	WASHER, LOCK, FLAT, INTERNAL TOOTH
	1		69	1902113-011	PILOT POWER SUPPLY, ±28 VDC
	1		68	1900487-011	VOLTAGE COMPARATOR, 2 VOLT, 3200 CPS
	1		67	1900707-011	VERIFICATION ASSEMBLY
SEE NOTE 5	1		66	1015791-010	SLIDE ASSY, QUICK RELEASE, L.H.
SEE NOTE 5	1		65	1015791-009	SLIDE ASSY, QUICK RELEASE, R.H.
	1		64	2900139	WIRING HARNESS B
	1		63	2900138	WIRING HARNESS A
	2		62	F02A250V6A	(1897099-015) FUSE MIL-F-15160/02A
	4		61	1902271-011	PULSE DETECTOR 102.4 KC
	1		60	1900617	WARNING PLATE, SELF BONDING
SEE NOTE 5	10		59	1016005-1	SHIM, SLIDE LOCATING
	1		58	CS13AG180K	(1896954-181) CAPACITOR, MIL-C-26655
	1		57	MS35059-23	SWITCH-TOGGLE
	18		56	1900391	BRACKET HOLDER, DOUBLE
	78		55	MS-35216-27	SCREW, MACHINE, PAN HD
	1		54	1900793	BRACKET-CONNECTOR (INSEP ASSY)
SEE NOTE 5	4		53	1015873-001	FUSEHOLDER-INDICATING
	2		52	MS-26572-1	FUSEHOLDER
SEE NOTE 5	2		51	1015873-008	FUSEHOLDER-INDICATING
	6		50	F02A250V3A	(1897099-012) FUSE MIL-F-15160/02A
	6		49	AN363C1032	(1896990-011) NUT, SELF LOCKING
SEE NOTE 5	6		48	1006783-45	SCREW, BUTTON HD, HEX SOCKET
	20		47	1900390	BRACKET HOLDER, SINGLE
	1		46	2900141-011	BRACKET ASSEMBLY, RELAY
	1		45	2900287-011	RELAY BOARD ASSY
	1		44	1901646-011	VOLTAGE COMPARATOR ASSY, 3 PH

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1		43	1901763-011	VOLTAGE COMPARATOR ASSY, D.C.
	1		42	2900276-011	RELAY ASSEMBLY, STATUS
	1		41	2900142-011	RELAY ASSEMBLY, ALARM
	1		40	2900040-011	LAMP-RELAY DRIVER, ASSY
	1		39	2900277-011	RELAY AND COMPONENT ASSY
	1		38	2900115-011	SENSOR ASSY, WHEEL POWER & -28VDC
	1		37	2900137-011	DETECTOR ASSEMBLY, PHASE ANGLE
	1		36	2900143-011	VERIFICATION RELAY ASSY
	1		35	1901570-011	BELL, ELECTRICAL (24 VDC)
SEE NOTE 5	1		34	1015869-364	LIGHT INDICATOR & SWITCH ASSY
	1		33	-365	
	1		32	-194	
	1		31	-745	
	1		30	-193	
	1		29	-362	
	1		28	-387	
	1		27	-344	
	1		26	-186	
	1		25	-343	
	1		24	-177	
	1		23	-178	
	1		22	-176	
	1		21	-776	
	1		20	-200	
	1		19	-199	
	1		18	-777	
	1		17	-781	
	1		16	-782	
	1		15	-363	
	1		14	-198	
	1		13	-197	
	1		12	-196	
	1		11	-195	
	1		10	-184	
	1		9	-126	
	1		8	-185	
	1		7	-182	
	1		6	-121	
	1		5	-109	
SEE NOTE 5	9		4	1015869-159	LIGHT INDICATOR & SWITCH ASSY
	1		3	2900299	DRAWER, MONITOR PANEL (INSEP ASSY)
	2		2	1900015-061	HANDLE ASSEMBLY
	1		1	2900298	PANEL, FRONT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Schwabe DATE 24 MAR. 65
CHECKED J. Stelmo 19 JUN 65
APPROVAL P. Foss 21 JUN 65
APPROVAL Goldman 10/8/65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

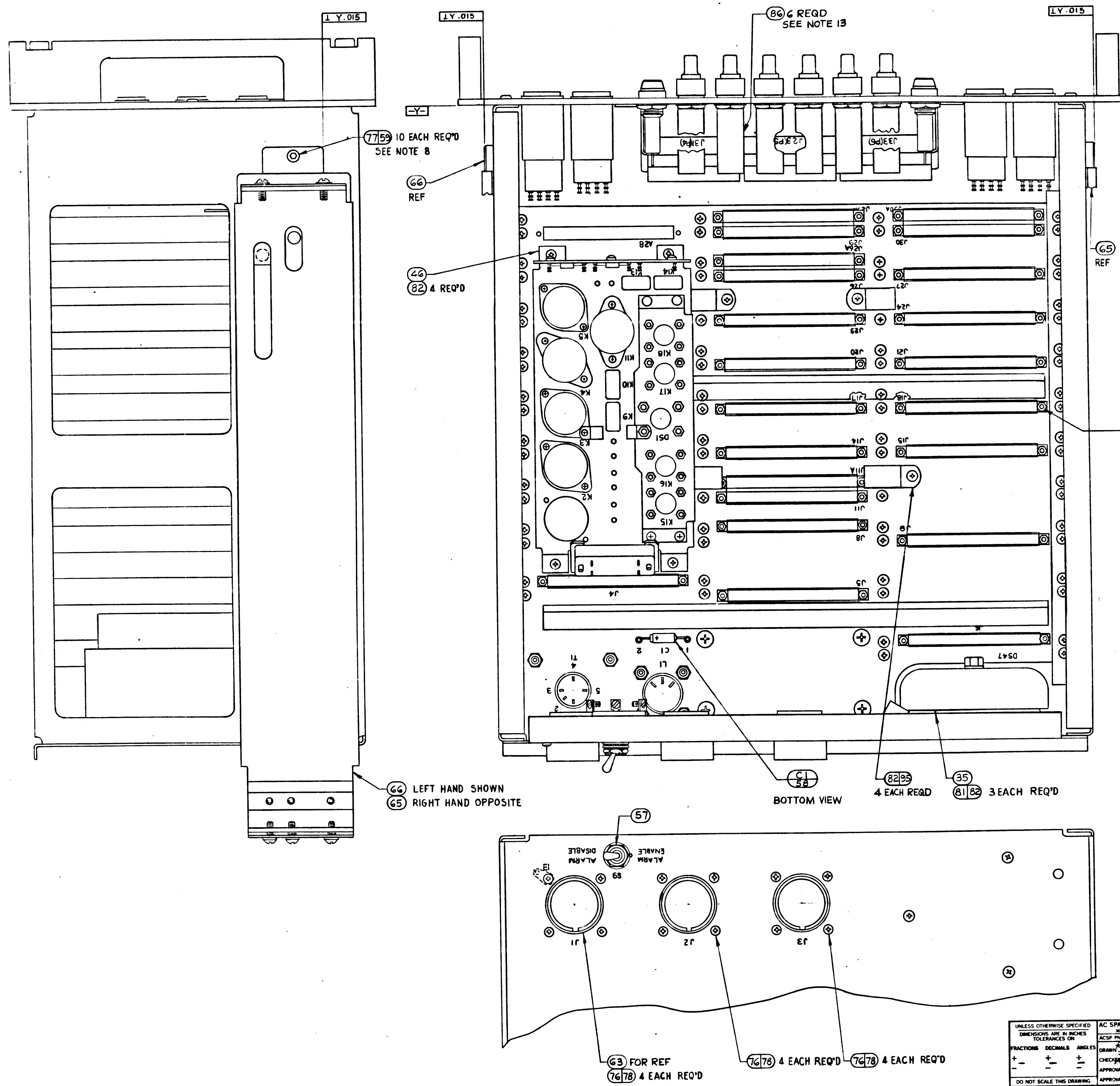
MONITOR PANEL
ASSEMBLY

CODE IDENT NO. 99974 SIZE E 2900031
SCALE NONE SHEET OF 3

21 JUN 65

2900031

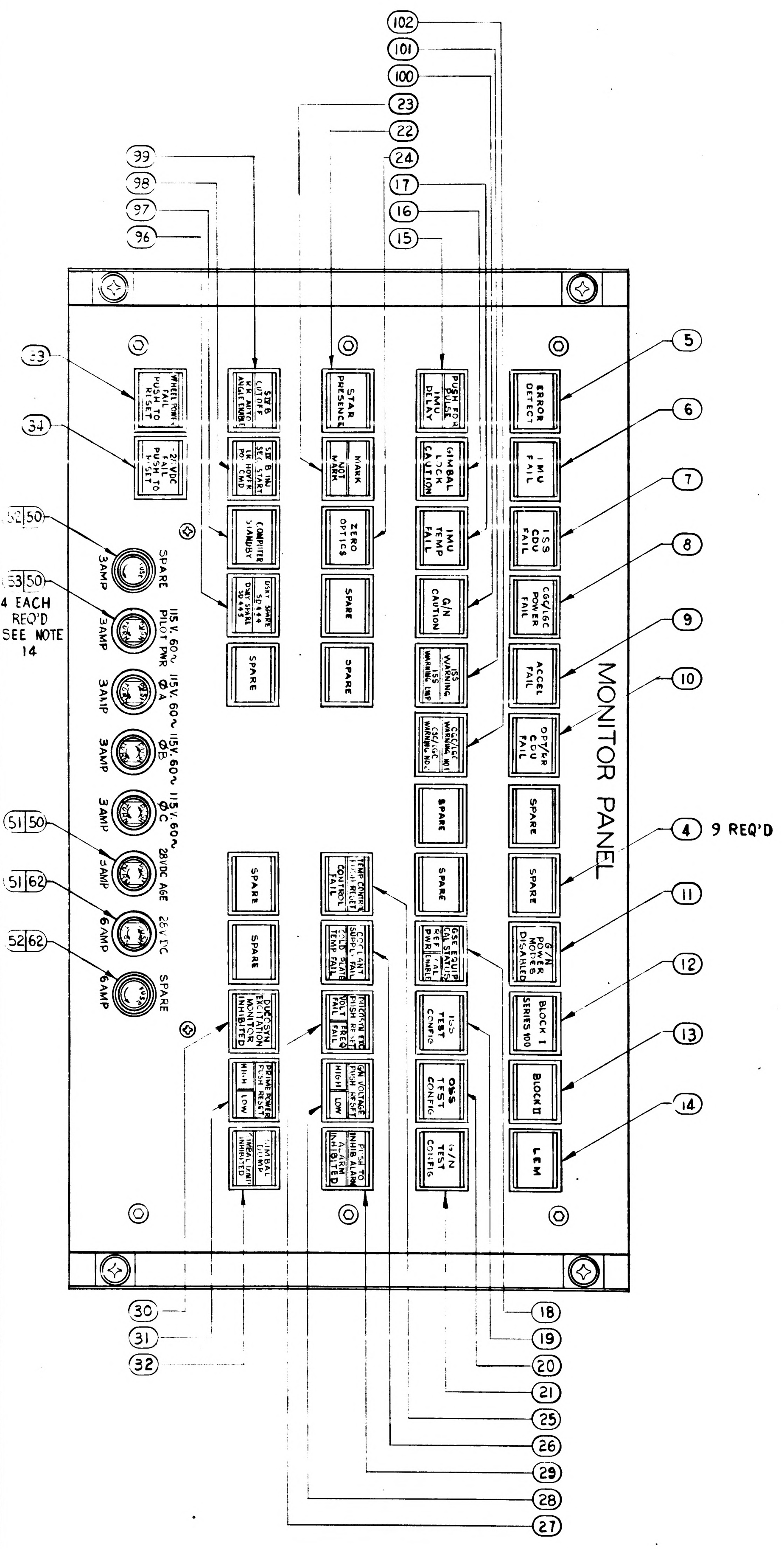
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.
		REVISIONS 23420			
D		REPLACES REVISION C WITH CHANGE PER MXC 202644		2 JULY 65	D.C.M. / MLM
E		REVISION STATUS CHANGED		JUL 65	WJR
F		REVISION STATUS CHANGED		23 JUL 65	
G		REVISION STATUS CHANGED		3 SEP 65	
H		INITIAL RELEASE CLASS A PER TDRR 23420		30 65	



⊥Y.015
⊥Y.015
⊥Y.015
-Y-
(86) 6 REQD
SEE NOTE 13
(77)(59) 10 EACH REQ'D
SEE NOTE 8
(66) REF
(65) REF
(46)
(82) 4 REQ'D
(83)(84) 44 EACH REQD
J31(P4)
J32(P5)
J33(P6)
A2B
K1
K2
K3
K4
K5
K9
K10
K11
K14
K15
K16
K17
K18
DS1
J4
J5
J6
J7
J8
J9
J10
J11
J11A
J12
J14
J15
J18
J19
J20
J21
J23
J24
J25
J26
J27
J28
J29
J30
L1
T1
C1
DS47
(66) LEFT HAND SHOWN
(65) RIGHT HAND OPPOSITE
(C1)(58)
BOTTOM VIEW
(82)(95)
4 EACH REQD
(35)
(81)(82) 3 EACH REQ'D
(57)
ALARM ENABLE
ALARM DISABLE
S3
E1
J1
J2
J3
(63) FOR REF
(76)(78) 4 EACH REQ'D
(76)(78) 4 EACH REQ'D
(76)(78) 4 EACH REQ'D

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN R Turner DATE 24 MAR 65	MONITOR PANEL ASSEMBLY
	CHECKED 19 JUN 65	
	APPROVAL 21 JUN 65	
DO NOT SCALE THIS DRAWING	APPROVAL	
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE E · 2900031
CONTRACT NAS9-497	MIT APPROVAL	SCALE 1:1 · SHEET 2 OF 3

REVISIONS					23420
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
D		REPLACES REVISION C WITH CHANGE PER MXC 202644		2 JULY 65	N.C.M. (MLM)
E		REVISED PER MXC 203059	—	16 JUL 65	WJR
F		REVISION STATUS CHANGED		23 65	
G		REVISION STATUS CHANGED		3 SEP 65	
H		INITIAL RELEASE CLASS A PER TDRR 23420		65	



MONITOR PANEL
102
101
100
23
22
24
17
16
15
99
98
97
96
33
34
52 50
53 50
4 EACH REQ'D SEE NOTE 14
51 50
51 62
52 62
WHEEL POWER FAIL PUSH TO RESET
-28 VDC FAIL PUSH TO RESET
S IV B CUT OFF KR AUTO ANGLE ENABLE
S IV B INJ SEQ START LK HOVER POS CMD
COMPUTER STANDBY
DSKY SPARE SD 444
DSKY SPARE SD 445
STAR PRESENCE
MARK
NOT MARK
ZERO OPTICS
PUSH FOR PULSE
IMU DELAY
GIMBAL LOCK CAUTION
IMU TEMP FAIL
G/N CAUTION
ISS WARNING
ISS WARNING LMP
CGC/LGC WARNING NO.1
CSC/LGC WARNING NO.2
ERROR DETECT
IMU FAIL
ISS CDU FAIL
CGC/LGC POWER FAIL
ACCEL FAIL
OPT/RR CDU FAIL
SPARE
SPARE
115V. 60~ PILOT PWR
115V. 60~ ØA
115V. 60~ ØB
115V. 60~ ØC
28VDC AGE
28V DC
3AMP
6AMP
TEMP CONTROL PUSH RESET CONTROL FAIL
COOLANT SUPPLY FAIL COLD PLATE TEMP FAIL
GSE EQUIP CAL STATUS REF PWR CAL ENABLE
G/N POWER MODES DISABLED
BLOCK I SERIES 100
BLOCK II
LEM
DUCOSYN EXCITATION MONITOR INHIBITED
DUCOSYN EXC PUSH RESET VOLT FAIL FREQ FAIL
ISS TEST CONFIG
OSS TEST CONFIG
G/N TEST CONFIG
PRIME POWER PUSH RESET HIGH LOW
G/N VOLTAGE PUSH RESET HIGH LOW
GIMBAL DUMP GIMBAL DUMP INHIBITED
PUSH TO INHIB ALARM ALARM INHIBITED
5
6
7
8
9
10
4 9 REQ'D
11
12
13
14
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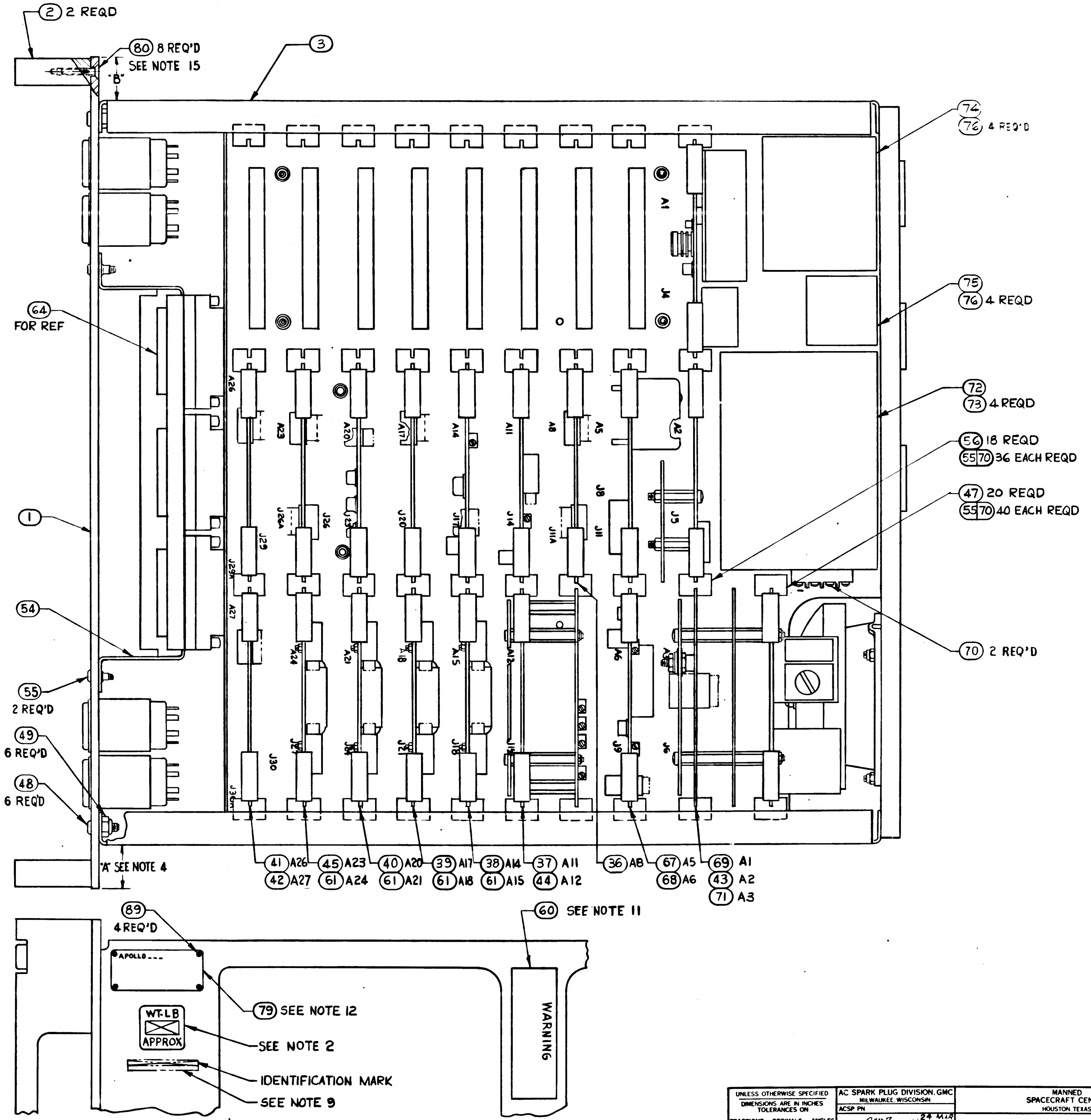

2 2 REQD
80 8 REQ'D SEE NOTE 15
"B"
3
72
76 4 REQ'D
75
76 4 REQD
72
73 4 REQD
56 18 REQD
55 70 36 EACH REQD
47 20 REQD
55 70 40 EACH REQD
70 2 REQ'D
64 FOR REF
1
54
55 2 REQ'D
49 6 REQ'D
48 6 REQ'D
"A" SEE NOTE 4
A1 A2 A3 A5 A6 A8 A11 A12 A14 A15 A17 A18 A20 A21 A23 A24 A26 A27
J1 J4 J5 J6 J8 J9 J11 J11A J14 J17 J20 J23 J26 J26A J29 J29A J30 J3
41 A26
42 A27
45 A23
61 A24
40 A20
61 A21
39 A17
61 A18
38 A14
61 A15
37 A11
44 A12
36 A8
67 A5
68 A6
69 A1
43 A2
71 A3
60 SEE NOTE 11
89 4 REQ'D
APOLLO
WT-LB APPROX
WARNING
79 SEE NOTE 12
SEE NOTE 2
IDENTIFICATION MARK
SEE NOTE 9

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES

CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN R.W. Turner DATE 24 MAR 65
CHECKED J. Stelma 19 JUN 65
APPROVAL 21 JUN 65
APPROVAL
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MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MONITOR PANEL
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900031
SCALE FULL
SHEET 3 OF 3

2900031 E

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK WEIGHT OF ASSEMBLY, (67 LBS) PER ND1002123 ADJACENT TO NAMEPLATE LOCATION.
3. CHASSIS SLIDE MOUNTING SCREWS, ITEM (77) AND FRONT PANEL MOUNTING SCREWS, ITEM (48) SHALL BE SUBJECTED TO TORQUE OF 28.5-31.7 IN LB AT INSTALLATION.
4. DIMENSION "A" MUST BE EQUAL TO DIMENSION "B" WITHIN .040.
5. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING
6. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEM (94), OR (92) AND (93).
7.
8. SHIM TO FIT. PEEL OFF EXCESS SHIM STOCK.
9. MARK SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH, COLOR BLACK, BELOW OR ADJACENT TO WEIGHT MARKING.
10. SELECT AS REQUIRED.
11. APPLY WARNING PLATE ITEM (60) TO AREA INDICATED USING SOLVENT ACTIVATOR METHYLETHYL KETONE OR EQUIVALENT. CENTRALIZE AS SHOWN.
12. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (79) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
13. SPOT TIE AS REQUIRED USING ITEM (87).
14. BEND TERMINAL NUMBER 2 ON THE FUSE HOLDER, ITEM (53), 90° AWAY FROM THE BODY OF THE FUSE.
15. SECURE SCREWS USING ITEM (88).
16. THE FOLLOWING ARE PART OF THIS ASSEMBLY:
    WIRING HARNESS A   ITEM (63)
    WIRING HARNESS B   ITEM (64)
17. DRAWINGS FOR REFERENCE
    SCHEMATIC DIAGRAM   ITEM (85)

REVISIONS c3420					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
D		REPLACES REVISION C WITH CHANGE PER MXC 202644		2 JULY 65	D.C.M. / MLM
E		REVISED PER MXC 203059	—	16 JUL 65	WJR
F		REVISED PER MXC 203263		23 JUL 65	R.P.
G		REVISED PER MXC 204636		3 SEP 65	
H		INITIAL RELEASE CLASS A PER TDRR c3420		8 OCT 65	
J		REVISION STATUS CHANGED		NOV 65	

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1		102	1015869-793	LIGHT INDICATOR & SWITCH ASSY
	1		101	-792	
	1		100	-791	
	1		99	-790	
	1		98	-789	
	1		97	-788	
	1		96	1015869-787	LIGHT INDICATOR & SWITCH ASSY
SEE NOTE 10	4		95	MS21919-DG12 -DG11 -DG10 -DG9 MS21919-DG8	CLAMP, CUSHIONED, SUPPORT CLAMP, CUSHIONED, SUPPORT
	AR		94	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
	AR		93	MIL-F-14256 TYPE A OR W	FLUX (ES2[illegible]
	AR		92	SN60WS	SOLDER QQ-[illegible] 2175-1)
	X		91	PS2900031	PROCUREM[illegible]CIFICATION
	X		90		RUNNING LIS[illegible]
	4		89	MS35216-3	SCREW, MACHINE, PAN HD
	AR		88	MIL-S-22473 GRADE H	SEALING COMPOUND (ES2544-5
	AR		87	MIL-T-713	LACING TAPE, TYPE P, CLAS[illegible] BLACK (ES 2732-1 NO 18)
SEE NOTE 5	6		86	1015864-424	INSULATION, SLEEVING, ELEC
	X		85	2900440	SCHEMATIC DIAGRAM, ELECTRICAL
SEE NOTE 5	44		84	1016151-004	NUT-SELF LOCKING
	44		83	MS-35216-16	SCREW, MACHINE, PAN HD
	11		82	MS-35216-42	SCREW, MACHINE, PAN HD
	3		81	AN363C832	(1896990-281) NUT, SELF LOCKING
	8		80	AN507C832R12	(1897003-568) SCREW, FLAT HD, 100°
	1		79	1004260-109	NAMEPLATE
	12		78	MS-35216-26	SCREW, MACHINE, PAN HD
SEE NOTE 5	10		77	1015826-304	SCREW, FLAT HEAD, HEX SOCKET
	20		76	AN363C632	(1896990-261) NUT, SELF LOCKING
SEE NOTE 5	1		75	1016085	REACTOR
	1		74	1016104	TRANSFORMER
	4		73	1016151-013	(1896990-041) NUT, SELF LOCKING
SEE NOTE 5	1		72	1897183-001	BATTERY, STORAGE - 24 VOLT
	1		71	1900447-021	3200 CPS FREQUENCY COMPARATOR
	78		70	MS35333-71	WASHER, LOCK, FLAT, INTERNAL TOOTH
	1		69	1902113-011	PILOT POWER SUPPLY, ±28 VDC
	1		68	1900487-011	VOLTAGE COMPARATOR, 2 VOLT, 3200 CPS
	1		67	1900707-011	VERIFICATION ASSEMBLY
SEE NOTE 5	1		66	1015791-010	SLIDE ASSY, QUICK RELEASE, L.H.
SEE NOTE 5	1		65	1015791-009	SLIDE ASSY, QUICK RELEASE, R.H.
	1		64	2900139	WIRING HARNESS B
	1		63	2900138	WIRING HARNESS A
	2		62	F02A250V6A	(1897099-015) FUSE MIL-F-15160/02A
	4		61	1902271-011	PULSE DETECTOR 102.4 KC
	1		60	1900617	WARNING PLATE, SELF BONDING
SEE NOTE 5	10		59	1016005-1	SHIM, SLIDE LOCATING
	1		58	CS13AG180K	(1896954-181) CAPACITOR, MIL-C-26655-2
	1		57	MS35059-23	SWITCH-TOGGLE
	18		56	1900391	BRACKET HOLDER, DOUBLE
	78		55	MS-35216-27	SCREW, MACHINE, PAN HD
	1		54	1900793	BRACKET-CONNECTOR (INSEP ASSY)
SEE NOTE 5	4		53	1015873-001	FUSEHOLDER - INDICATING
	2		52	MS-26572-1	FUSEHOLDER
SEE NOTE 5	2		51	1015873-008	FUSEHOLDER-INDICATING
	6		50	F02A250V3A	(1897099-012) FUSE MIL-F-15160/02A
	6		49	AN363C1032	(1896990-011) NUT, SELF LOCKING
SEE NOTE 5	6		48	1006783-45	SCREW, BUTTON HD, HEX SOCKET
	20		47	1900390	BRACKET HOLDER, SINGLE
	1		46	2900141-011	BRACKET ASSEMBLY, RELAY
	1		45	2900287-011	RELAY BOARD ASSY
	1		44	1901646-011	VOLTAGE COMPARATOR ASSY, 3 PH

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1		43	1901763-011	VOLTAGE COMPARATOR ASSY, D.C.
	1		42	2900276-011	RELAY ASSEMBLY, STATUS
	1		41	2900142-011	RELAY ASSEMBLY, ALARM
	1		40	2900040-011	LAMP-RELAY DRIVER, ASSY
	1		39	2900277-011	RELAY AND COMPONENT ASSY
	1		38	2900115-011	SENSOR ASSY, WHEEL POWER & -28VDC
	1		37	2900137-011	DETECTOR ASSEMBLY, PHASE ANGLE
	1		36	2900143-011	VERIFICATION RELAY ASSY
	1		35	1901570-011	BELL, ELECTRICAL (24 VDC)
SEE NOTE 5	1		34	1015869-364	LIGHT INDICATOR & SWITCH ASSY
	1		33	-365	
	1		32	-194	
	1		31	-745	
	1		30	-193	
	1		29	-362	
	1		28	-387	
	1		27	-344	
	1		26	-186	
	1		25	-343	
	1		24	-177	
	1		23	-178	
	1		22	-176	
	1		21	-776	
	1		20	-200	
	1		19	-199	
	1		18	-777	
	1		17	-781	
	1		16	-782	
	1		15	-363	
	1		14	-198	
	1		13	-197	
	1		12	-196	
	1		11	-195	
	1		10	-184	
	1		9	-126	
	1		8	-185	
	1		7	-182	
	1		6	-121	
	1		5	-109	
SEE NOTE 5	9		4	1015869-159	LIGHT INDICATOR & SWITCH ASSY
	1		3	2900299	DRAWER, MONITOR PANEL (INSEP ASSY)
	2		2	1900015-061	HANDLE ASSEMBLY
	1		1	2900298	PANEL, FRONT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

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MILWAUKEE, WISCONSIN
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CODE IDENT NO. 99974
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2900031 J

21 JUN 65

REVISIONS		23420			
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
D		REPLACES REVISION C WITH CHANGE PER MXC 202644		2 JULY 65	D.C.M.
E		REVISION STATUS CHANGED		JUL 65	WJR
F		REVISION STATUS CHANGED		23 Jun 65	
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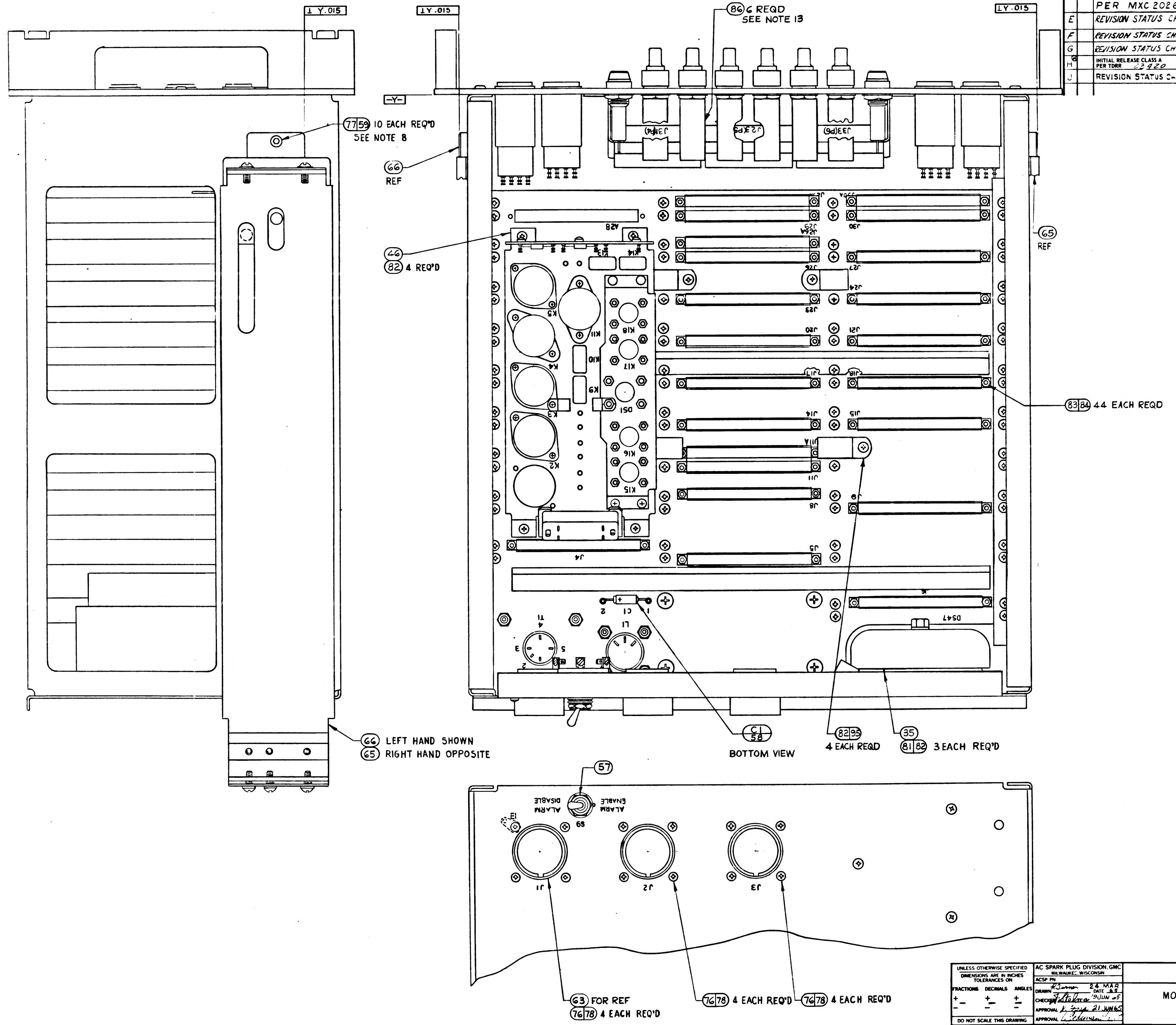

⊥ Y .015
⊥ Y .015
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-Y-
86 6 REQD SEE NOTE 13
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63 FOR REF
76 78 4 EACH REQ'D
76 78 4 EACH REQ'D
76 78 4 EACH REQ'D

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	ACSP PN	
	DRAWN R Turner DATE 24 MAR 65	MONITOR PANEL ASSEMBLY
	CHECKED 19 JUN 65	
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MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 | SIZE E | 2900031
CONTRACT NAS9-497	MIT APPROVAL	SCALE 1:1 | SHEET 2 OF 3

J 2900031 B

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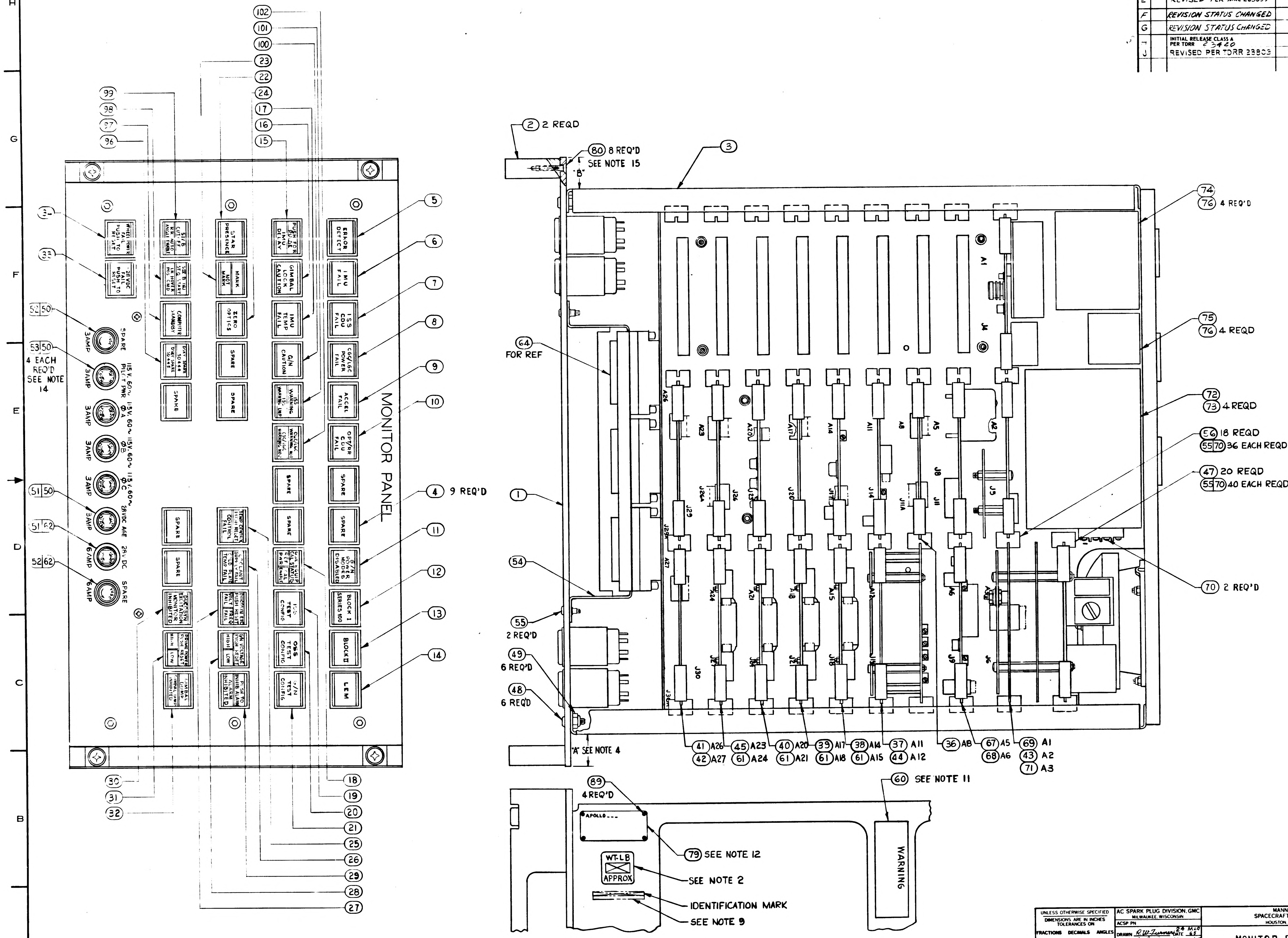
F		REVISION STATUS CHANGED		23 65	
G		REVISION STATUS CHANGED		3 SEP 65	
H		INITIAL RELEASE CLASS A PER TDRR 23420		5 OCT 65	
J		REVISED PER TDRR 23803			

REVISIONS 23420



MONITOR PANEL
WHEEL POWER FAIL PUSH TO RESET
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S IV B CUT OFF / LK AUTO ANGLE ENABLE
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115V. 60~ ØC 3AMP
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28V DC 6AMP
SPARE 6AMP
4 EACH REQ'D SEE NOTE 14
(4) 9 REQ'D
(2) 2 REQD
(80) 8 REQ'D SEE NOTE 15
"B"
(64) FOR REF
(55) 2 REQ'D
(49) 6 REQ'D
(48) 6 REQ'D
"A" SEE NOTE 4
(74) (76) 4 REQ'D
(75) (76) 4 REQD
(72) (73) 4 REQD
(56) 18 REQD
(55)(70) 36 EACH REQD
(47) 20 REQD
(55)(70) 40 EACH REQD
(70) 2 REQ'D
(41) A26 (42) A27
(45) A23 (61) A24
(40) A20 (61) A21
(39) A17 (61) A18
(38) A14 (61) A15
(37) A11 (44) A12
(36) A8
(67) A5 (68) A6
(69) A1 (43) A2 (71) A3
(60) SEE NOTE 11
(89) 4 REQ'D
APOLLO
(79) SEE NOTE 12
WT-LB APPROX
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IDENTIFICATION MARK
SEE NOTE 9
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6. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEM (94), OR (92) AND (93).
7.
8. SHIM TO FIT. PEEL OFF EXCESS SHIM STOCK.
9. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH, COLOR BLACK, BELOW OR ADJACENT TO WEIGHT MARKING.
10. SELECT AS REQUIRED.
11. APPLY WARNING PLATE ITEM (60) TO AREA INDICATED USING SOLVENT ACTIVATOR METHYLETHYL KETONE OR EQUIVALENT. CENTRALIZE AS SHOWN.
12. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM [illegible] OR (109) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
13. SPOT TIE AS REQUIRED USING ITEM (87).
14. BEND TERMINAL NUMBER 2 ON THE FUSE HOLDER, ITEM (53), 90° AWAY FROM THE BODY OF THE FUSE.
15. SECURE SCREWS USING ITEM (88).
16. THE FOLLOWING ARE PART OF THIS ASSEMBLY:
    WIRING HARNESS A ITEM (63) OR (111)
    WIRING HARNESS B ITEM (64) OR (110)
17. DRAWINGS FOR REFERENCE
    SCHEMATIC DIAGRAM ITEM (85) OR (109)

REVISIONS 63420

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
D		REPLACES REVISION C WITH CHANGE PER MXC 202644		2 JULY 65	D.C.M. / MEM
E		REVISED PER MXC 203059	—	16 JUL 65	WJR
F		REVISED PER MXC 203263		23 JUL 65	RWH
G		REVISED PER MXC 204636		3 SEP 65	
H		INITIAL RELEASE CLASS A PER TDRR 63420		8 OCT 65	
J		REVISION STATUS CHANGED		NOV 65	
K		REVISED PER TDRR27587		APR 66	

			QTY 021	QTY 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			X			113	PS2016112	PROCUREMENT SPECIFICATION
			1			112		RUNNING LIST
			1			111	2901119	WIRING HARNESS A
			1			110	2901120	WIRING HARNESS B
			X			109	2901164	SCHEMATIC DIAGRAM, ELECT
			1			108	1004260-166	NAMEPLATE
			1			107	2900115-021	SENSOR ASSY
			1			106	2900276-021	RELAY ASSY, STATUS
			1			105	1901763-021	VOLTAGE COMPARATOR ASSY
			1			104	2900141-021	BRACKET ASSY, RELAY
			1			103	1015869-202	LIGHT INDICATOR & SWITCH ASSY
			1	1		102	1015869-793	LIGHT INDICATOR & SWITCH ASSY
			1	1		101	-792	
			1	1		100	-791	
			1	1		99	-790	
			1	1		98	-789	
			1	1		97	-788	
			1	1		96	1015869-787	LIGHT INDICATOR & SWITCH ASSY
SEE NOTE 10			4	4		95	MS21919-DG12	CLAMP, CUSHIONED, SUPPORT
							-DG11	
							-DG10	
							-DG9	
							MS21919-DG8	CLAMP, CUSHIONED, SUPPORT
			AR	AR		94	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
			AR	AR		93	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
			AR	AR		92	SN60WS	SOLDER QQ-S-571 (ES2175-1)
				X		91	PS2900031	PROCUREMENT SPECIFICATION
				X		90		RUNNING LIST
			4	4		89	MS35216-3	SCREW, MACHINE, PAN HD
			AR	AR		88	MIL-S-22473 GRADE H	SEALING COMPOUND (ES2544-5
			AR	AR		87	MIL-T-713	LACING TAPE, TYPE P, CLASS 2, BLACK (ES 2732-1 NO 18)
SEE NOTE 5			6	6		86	1015864-424	INSULATION, SLEEVING, ELEC
				X		85	2900440	SCHEMATIC DIAGRAM, ELECTRICAL
SEE NOTE 5			44	44		84	1016151-004	NUT-SELF LOCKING
			44	44		83	MS-35216-16	SCREW, MACHINE, PAN HD
			11	11		82	MS-35216-42	SCREW, MACHINE, PAN HD
			3	3		81	AN363C832	(1896990-281) NUT, SELF LOCKING
			8	8		80	AN507C832R12	(1897003-568) SCREW, FLAT HD, 100°
				1		79	1004260-109	NAMEPLATE
			12	12		78	MS-35216-26	SCREW, MACHINE, PAN HD
SEE NOTE 5			10	10		77	1015826-304	SCREW, FLAT HEAD, HEX SOCKET
			20	20		76	AN363C632	(1896990-261) NUT, SELF LOCKING
SEE NOTE 5			1	1		75	1016085	REACTOR
			1	1		74	1016104	TRANSFORMER
			4	4		73	1016151-013	(1896990-041) NUT, SELF LOCKING
SEE NOTE 5			1	1		72	1897183-001	BATTERY, STORAGE – 24 VOLT
			1	1		71	1900447-021	3200 CPS FREQUENCY COMPARATOR
			78	78		70	MS35333-71	WASHER, LOCK, FLAT, INTERNAL TOOTH
			1	1		69	1902113-011	PILOT POWER SUPPLY, ±28 VDC
			1	1		68	1900487-011	VOLTAGE COMPARATOR, 2 VOLT, 3200 CPS
			1	1		67	1900707-011	VERIFICATION ASSEMBLY
SEE NOTE 5			1	1		66	1015791-010	SLIDE ASSY, QUICK RELEASE, L.H.
SEE NOTE 5			1	1		65	1015791-009	SLIDE ASSY, QUICK RELEASE, R.H.
				1		64	2900139	WIRING HARNESS B
				1		63	2900138	WIRING HARNESS A
			2	2		62	F02A250V6A	(1897099-015) FUSE MIL-F-15160/02A
			4	4		61	1902271-011	PULSE DETECTOR 102.4 KC
			1	1		60	1900617	WARNING PLATE, SELF BONDING
SEE NOTE 5			10	10		59	1016005-1	SHIM, SLIDE LOCATING
			1	1		58	CS13AG180K	(1896954-181) CAPACITOR, MIL-C-26655-2
			1	1		57	MS35059-23	SWITCH-TOGGLE
			18	18		56	1900391	BRACKET HOLDER, DOUBLE
			78	78		55	MS-35216-27	SCREW, MACHINE, PAN HD
			1	1		54	1900793	BRACKET-CONNECTOR (INSEP ASSY)
SEE NOTE 5			4	4		53	1015873-001	FUSEHOLDER-INDICATING
			2	2		52	MS-26572-1	FUSEHOLDER
SEE NOTE 5			2	2		51	1015873-008	FUSEHOLDER-INDICATING
			6	6		50	F02A250V3A	(1897099-012) FUSE MIL-F-15160/02A
			6	6		49	AN363C1032	(1896990-011) NUT, SELF LOCKING
SEE NOTE 5			6	6		48	1006783-45	SCREW, BUTTON HD, HEX SOCKET
			20	20		47	1900390	BRACKET HOLDER, SINGLE
				1		46	2900141-011	BRACKET ASSEMBLY, RELAY
			1	1		45	2900287-011	RELAY BOARD ASSY
			1	1		44	1901646-011	VOLTAGE COMPARATOR ASSY, 3 PH

QUANTITY REQUIRED — LIST OF PARTS AND MATERIALS

			QTY 021	QTY 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				1		43	1901763-011	VOLTAGE COMPARATOR ASSY, D.C.
				1		42	2900276-011	RELAY ASSEMBLY, STATUS
			1	1		41	2900142-011	RELAY ASSEMBLY, ALARM
			1	1		40	2900040-011	LAMP-RELAY DRIVER, ASSY
			1	1		39	2900277-011	RELAY AND COMPONENT ASSY
				1		38	2900115-011	SENSOR ASSY, WHEEL POWER & -28VDC
			1	1		37	2900137-011	DETECTOR ASSEMBLY, PHASE ANGLE
			1	1		36	2900143-011	VERIFICATION RELAY ASSY
			1	1		35	1901570-011	BELL, ELECTRICAL (24 VDC)
SEE NOTE 5			1	1		34	1015869-364	LIGHT INDICATOR & SWITCH ASSY
			1	1		33	-365	
			1	1		32	-194	
			1	1		31	-745	
			1	1		30	-193	
			1	1		29	-362	
			1	1		28	-387	
			1	1		27	-344	
			1	1		26	-186	
			1	1		25	-343	
			1	1		24	-177	
			1	1		23	-178	
			1	1		22	-176	
			1	1		21	-776	
			1	1		20	-200	
			1	1		19	-199	
			1	1		18	-777	
			1	1		17	-781	
			1	1		16	-782	
			1	1		15	-363	
			1	1		14	-198	
			1	1		13	-197	
			1	1		12	-196	
			1	1		11	-195	
			1	1		10	-184	
			1	1		9	-126	
			1	1		8	-185	
			1	1		7	-182	
			1	1		6	-121	
			1	1		5	-109	
SEE NOTE 5			8	9		4	1015869-159	LIGHT INDICATOR & SWITCH ASSY
			1	1		3	2900299	DRAWER, MONITOR PANEL (INSEP ASS
			2	2		2	1900015-061	HANDLE ASSEMBLY
			1	1		1	2900298	PANEL, FRONT

QUANTITY REQUIRED — LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-021	2900023-021	-021
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN R. Schwabe DATE 24 MAR. 65
CHECKED J. Stelma 19 JUN 65
APPROVAL R. Voss 21 JUN 65
APPROVAL Coleman 10/8/65
NASA APPROVAL
MIT APPROVAL

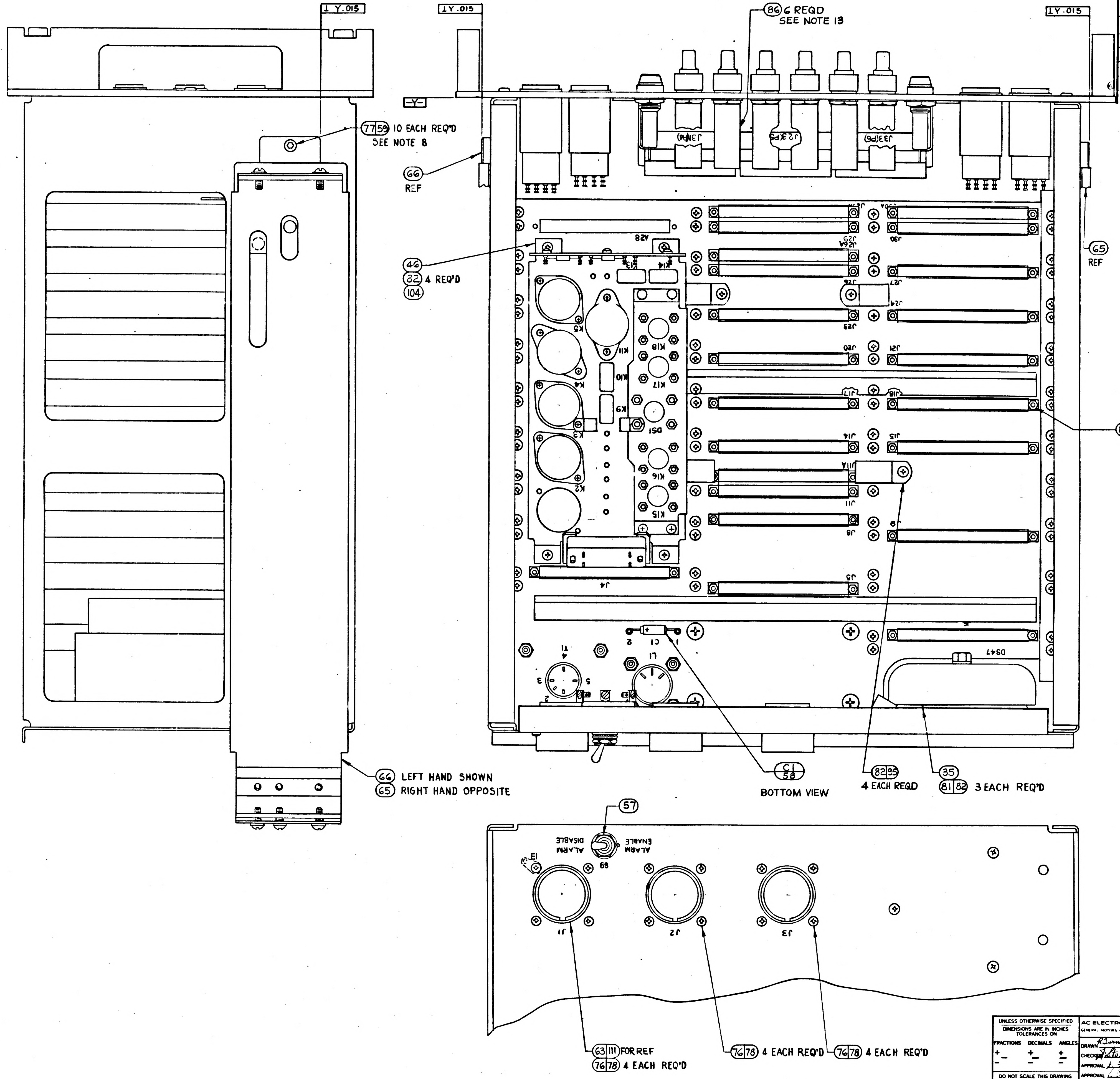
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MONITOR PANEL
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900031
SCALE NONE
SHEET OF 3

K 2900031

REVISIONS 23420					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
D		REPLACES REVISION C WITH CHANGE PER MXC 202644		2 JULY 65	D.C.M. MEM
E		REVISION STATUS CHANGED		16 JUL 65	WJR
F		REVISION STATUS CHANGED		23 JUL 65	
G		REVISION STATUS CHANGED		3 SEP 65	
H		INITIAL RELEASE CLASS A PER TDRR 23420		18 OCT 65	
J		REVISION STATUS CHANGED		NOV 65	
K		REVISED PER TDRR 27587		6-MAR 66	MG

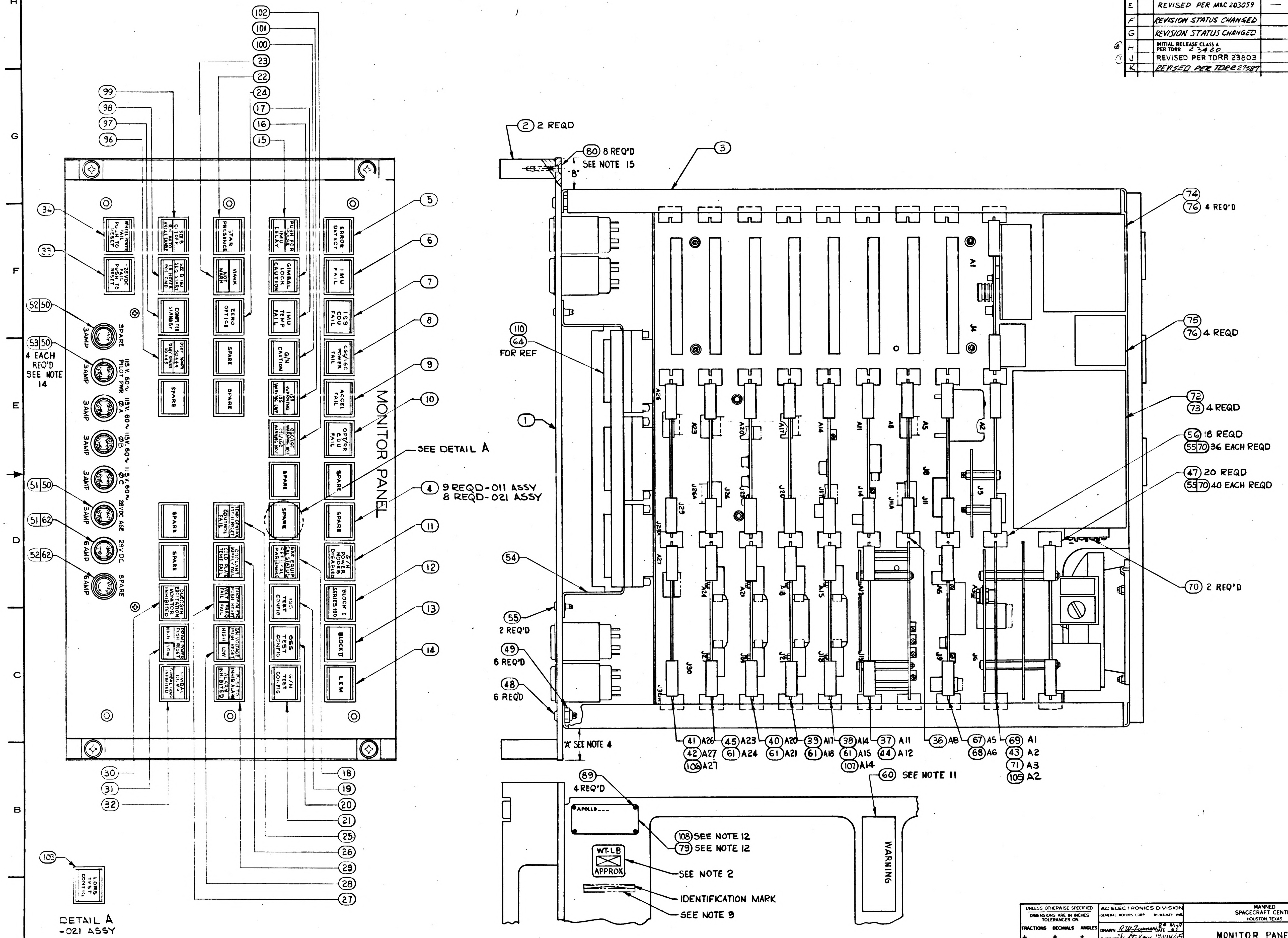

1 Y.015
1 Y.015
1 Y.015
-Y-
(77)(59) 10 EACH REQ'D
SEE NOTE 8
(66)
REF
(86) 6 REQD
SEE NOTE 13
J31(P4)
J23(P5)
J33(P6)
(65)
REF
(46)
(82) 4 REQ'D
(104)
A28
K13
K14
K5
K11
K18
K10
K4
K17
K9
DS1
K3
K16
K2
K15
J4
J28
J29
J26A
J30
J26
J27
J24
J25
J20
J21
J17
J18
J14
J15
J11A
J11
J8
J9
J5
J6
DS47
C1
L1
T1
(83)(84) 44 EACH REQD
(66) LEFT HAND SHOWN
(65) RIGHT HAND OPPOSITE
(C1)(58)
BOTTOM VIEW
(82)(95)
4 EACH REQD
(35)
(81)(82) 3 EACH REQ'D
(57)
ALARM DISABLE
ALARM ENABLE
S9
E1
J1
J2
J3
(63)(111) FOR REF
(76)(78) 4 EACH REQ'D
(76)(78) 4 EACH REQ'D
(76)(78) 4 EACH REQ'D

K
2900031

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC ELECTRONICS DIVISION GENERAL MOTORS CORP. MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN R. Turner DATE 24 MAR 65 CHECKED 19 JUN 65 APPROVAL 21 JUN 65 APPROVAL	MONITOR PANEL ASSEMBLY
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE E · 2900031
CONTRACT NAS9-497	MIT APPROVAL	SCALE 1:1 · SHEET 2 OF 3

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
D		REPLACES REVISION C WITH CHANGE PER MXC 202644		2 JULY 65	D.C.M. MLM
E		REVISED PER MXC 203059	—	16 JUL 65	WJR
F		REVISION STATUS CHANGED		23 JUL 65	RWH
G		REVISION STATUS CHANGED		13 SEP 65	
H		INITIAL RELEASE CLASS A PER TDRR 23420		30CT 65	
J		REVISED PER TDRR 23803		NOV 65	JJJ
K		REVISED PER TDRR 27587		6-APR 66	MG

REVISIONS 23420



MONITOR PANEL
SEE DETAIL A
ERROR DETECT
IMU FAIL
ISS CDU FAIL
CDU/LGC POWER FAIL
ACCEL FAIL
OPTICS CDU FAIL
SPARE
G/N POWER MODE DISABLED
BLOCK I SERIES 100
BLOCK II
LEM
GIMBAL LOCK CAUTION
IMU TEMP FAIL
G/N CAUTION
STAR PRESENCE
MARK NOT MARK
ZERO OPTICS
COMPUTER STANDBY
ISS TEST CONFIG
OSS TEST CONFIG
G/N TEST CONFIG
28VDC FAIL PUSH TO RESET
SPARE 3AMP
115V 60~ PILOT PWR 3AMP
115V 60~ ØA 3AMP
115V 60~ ØB 3AMP
115V 60~ ØC 3AMP
28VDC AGE 3AMP
28V DC 6AMP
SPARE 6AMP
(52)(50)
(53)(50) 4 EACH REQ'D SEE NOTE 14
(51)(50)
(51)(62)
(52)(62)
(34)
(33)
(99)
(98)
(97)
(96)
(102)
(101)
(100)
(23)
(22)
(24)
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(15)
(5)
(6)
(7)
(8)
(9)
(10)
(4) 9 REQD-011 ASSY 8 REQD-021 ASSY
(11)
(12)
(13)
(14)
(30)
(31)
(32)
(18)
(19)
(20)
(21)
(25)
(26)
(29)
(28)
(27)
(103)
DETAIL A -021 ASSY
LORS TEST CONFIG
(2) 2 REQD
(80) 8 REQ'D SEE NOTE 15
"B"
(3)
(74)
(76) 4 REQ'D
(75)
(76) 4 REQD
(72)
(73) 4 REQD
(56) 18 REQD
(55)(70) 36 EACH REQD
(47) 20 REQD
(55)(70) 40 EACH REQD
(70) 2 REQ'D
(110)
(64) FOR REF
(1)
(54)
(55) 2 REQ'D
(49) 6 REQ'D
(48) 6 REQD
"A" SEE NOTE 4
(41) A26
(42) A27
(106) A27
(45) A23
(61) A24
(40) A20
(61) A21
(39) A17
(61) A18
(38) A14
(61) A15
(107) A14
(37) A11
(44) A12
(36) A8
(67) A5
(68) A6
(69) A1
(43) A2
(71) A3
(105) A2
(60) SEE NOTE 11
A1
J4
A26
A23
A20
A17
A14
A11
A8
A5
A2
J29
J26
J23
J20
J17
J14
J11
J8
J5
J30
J36
(89) 4 REQ'D
APOLLO
(108) SEE NOTE 12
(79) SEE NOTE 12
WT-LB APPROX
SEE NOTE 2
IDENTIFICATION MARK
SEE NOTE 9
WARNING

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTES

CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS

DRAWN R.W. Turner DATE 24 MAR 65
CHECKED J. Stelma 19 JUN 65
APPROVAL 21 JUN 65
APPROVAL

NASA APPROVAL

MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MONITOR PANEL ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900031
SCALE FULL
SHEET 3 OF 3

2900031 K

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK WEIGHT OF ASSEMBLY, (67 LBS) PER ND1002123 ADJACENT TO NAMEPLATE LOCATION.
3. CHASSIS SLIDE MOUNTING SCREWS, ITEM (77) AND FRONT PANEL MOUNTING SCREWS, ITEM (48) SHALL BE SUBJECTED TO TORQUE OF 28.5-31.7 IN LB AT INSTALLATION.
4. DIMENSION "A" MUST BE EQUAL TO DIMENSION "B" WITHIN .040.
5. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING
6. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEM (94), OR (92) AND (93).
7.
8. SHIM TO FIT. PEEL OFF EXCESS SHIM STOCK.
9. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH, COLOR BLACK, BELOW OR ADJACENT TO WEIGHT MARKING.
10. SELECT AS REQUIRED.
11. APPLY WARNING PLATE ITEM (60) TO AREA INDICATED USING SOLVENT ACTIVATOR METHYLETHYL KETONE OR EQUIVALENT. CENTRALIZE AS SHOWN.
12. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (79) OR (108) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
13. SPOT TIE AS REQUIRED USING ITEM (87).
14. BEND TERMINAL NUMBER 2 ON THE FUSE HOLDER, ITEM (53), 90° AWAY FROM THE BODY OF THE FUSE.
15. SECURE SCREWS USING ITEM (88).
16. THE FOLLOWING ARE PART OF THIS ASSEMBLY:
    WIRING HARNESS A ITEM (63) OR (111)
    WIRING HARNESS B ITEM (64) OR (110)
17. DRAWINGS FOR REFERENCE
    SCHEMATIC DIAGRAM ITEM (85) OR (109)

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
D		REPLACES REVISION C WITH CHANGE PER MXC 202644		2 JULY 65	D.C.M. MKM
E		REVISED PER MXC 203059	—	16 JUL 65	WJR
F		REVISED PER MXC 203263		23 JUL 65	
G		REVISED PER MXC 204636		3 SEP 65	
H		INITIAL RELEASE CLASS A PER TDRR 23420		8 OCT 65	
J		REVISION STATUS CHANGED		NOV 65	
K		REVISED PER TDRR 27587		6-APR 66	
L		REVISED PER TDRR 28260		3-[illegible] 66	

	QUANTITY REQUIRED 021	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	X			113	PS2016112	PROCUREMENT SPECIFICATION
	1			112		RUNNING LIST
	1			111	2901119	WIRING HARNESS A
	1			110	2901120	WIRING HARNESS B
	X			109	2901164	SCHEMATIC DIAGRAM, ELECT
	1			108	1004260-166	NAMEPLATE
	1			107	2900115-021	SENSOR ASSY
	1			106	2900276-021	RELAY ASSY, STATUS
	1			105	1901763-021	VOLTAGE COMPARATOR ASSY
	1			104	2900141-021	BRACKET ASSY, RELAY
	1			103	1015869-202	LIGHT INDICATOR & SWITCH ASSY
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	1	1		100	-791	
	1	1		99	-790	
	1	1		98	-789	
	1	1		97	-788	
	1	1		96	1015869-787	LIGHT INDICATOR & SWITCH ASSY
SEE NOTE 10	4	4		95	MS21919-DG12	CLAMP, CUSHIONED, SUPPORT
					-DG11	
					-DG10	
					-DG9	
					MS21919-DG8	CLAMP, CUSHIONED, SUPPORT
	AR	AR		94	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
	AR	AR		93	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
	AR	AR		92	SN60WS	SOLDER QQ-S-571 (ES2175-1)
		X		91	PS2900031	PROCUREMENT SPECIFICATION
		X		90	2900773	RUNNING LIST
	4	4		89	MS35216-3	SCREW, MACHINE, PAN HD
	AR	AR		88	MIL-S-22473 GRADE H	SEALING COMPOUND (ES2544-5
	AR	AR		87	MIL-T-713	LACING TAPE, TYPE P, CLASS 2, BLACK (ES 2732-1 NO 18)
SEE NOTE 5	6	6		86	1015864-424	INSULATION, SLEEVING, ELEC
		X		85	2900440	SCHEMATIC DIAGRAM, ELECTRICAL
SEE NOTE 5	44	44		84	1016151-004	NUT-SELF LOCKING
	44	44		83	MS-35216-16	SCREW, MACHINE, PAN HD
	11	11		82	MS-35216-42	SCREW, MACHINE, PAN HD
	3	3		81	AN363C832	(1896990-281) NUT, SELF LOCKING
	8	8		80	AN507C832R12	(1897003-568) SCREW, FLAT HD, 100°
		1		79	1004260-109	NAMEPLATE
	12	12		78	MS-35216-26	SCREW, MACHINE, PAN HD
SEE NOTE 5	10	10		77	1015826-304	SCREW, FLAT HEAD, HEX SOCKET
	20	20		76	AN363C632	(1896990-261) NUT, SELF LOCKING
SEE NOTE 5	1	1		75	1016085	REACTOR
	1	1		74	1016104	TRANSFORMER
	4	4		73	1016151-013	(1896990-041) NUT, SELF LOCKING
SEE NOTE 5	1	1		72	1897183-001	BATTERY, STORAGE - 24 VOLT
	1	1		71	1900447-021	3200 CPS FREQUENCY COMPARATOR
	78	78		70	MS35333-71	WASHER, LOCK, FLAT, INTERNAL TOOTH
	1	1		69	1902113-011	PILOT POWER SUPPLY, ±28 VDC
	1	1		68	1900487-011	VOLTAGE COMPARATOR, 2 VOLT, 3200 CPS
	1	1		67	1900707-011	VERIFICATION ASSEMBLY
SEE NOTE 5	1	1		66	1015791-010	SLIDE ASSY, QUICK RELEASE, L.H.
SEE NOTE 5	1	1		65	1015791-009	SLIDE ASSY, QUICK RELEASE, R.H.
		1		64	2900139	WIRING HARNESS B
		1		63	2900138	WIRING HARNESS A
	2	2		62	F02A250V6A	(1897099-015) FUSE MIL-F-15160/02A
	4	4		61	1902271-011	PULSE DETECTOR 102.4 KC
	1	1		60	1900617	WARNING PLATE, SELF BONDING
SEE NOTE 5	10	10		59	1016005-1	SHIM, SLIDE LOCATING
	1	1		58	CS13AG180K	(1896954-181) CAPACITOR, MIL-C-26655/2
	1	1		57	MS35059-23	SWITCH-TOGGLE
	18	18		56	1900391	BRACKET HOLDER, DOUBLE
	78	78		55	MS-35216-27	SCREW, MACHINE, PAN HD
	1	1		54	1900793	BRACKET-CONNECTOR (INSEP ASSY)
SEE NOTE 5	4	4		53	1015873-001	FUSE HOLDER - INDICATING
	2	2		52	MS-26572-1	FUSE HOLDER
SEE NOTE 5	2	2		51	1015873-008	FUSEHOLDER - INDICATING
	6	6		50	F02A250V3A	(1897099-012) FUSE MIL-F-15160/02A
	6	6		49	AN363C1032	(1896990-011) NUT, SELF LOCKING
SEE NOTE 5	6	6		48	1006783-45	SCREW, BUTTON HD, HEX SOCKET
	20	20		47	1900390	BRACKET HOLDER, SINGLE
		1		46	2900141-011	BRACKET ASSEMBLY, RELAY
	1	1		45	2900287-011	RELAY BOARD ASSY
	1	1		44	1901646-011	VOLTAGE COMPARATOR ASSY, 3 PH

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED 021	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
		1		43	1901763-011	VOLTAGE COMPARATOR ASSY, D.C.
		1		42	2900276-011	RELAY ASSEMBLY, STATUS
	1	1		41	2900142-011	RELAY ASSEMBLY, ALARM
	1	1		40	2900040-011	LAMP-RELAY DRIVER, ASSY
	1	1		39	2900277-011	RELAY AND COMPONENT ASSY
		1		38	2900115-011	SENSOR ASSY, WHEEL POWER & -28VDC
	1	1		37	2900137-011	DETECTOR ASSEMBLY, PHASE ANGLE
	1	1		36	2900143-011	VERIFICATION RELAY ASSY
	1	1		35	1901570-011	BELL, ELECTRICAL (24 VDC)
SEE NOTE 5	1	1		34	1015869-364	LIGHT INDICATOR & SWITCH ASSY
	1	1		33	-365	
	1	1		32	-194	
	1	1		31	-745	
	1	1		30	-193	
	1	1		29	-36[illegible]	
	1	1		28	-387	
	1	1		27	-344	
	1	1		26	-186	
	1	1		25	-343	
	1	1		24	-177	
	1	1		23	-178	
	1	1		22	-176	
	1	1		21	-776	
	1	1		20	-200	
	1	1		19	-199	
	1	1		18	-777	
	1	1		17	-781	
	1	1		16	-782	
	1	1		15	-363	
	1	1		14	-198	
	1	1		13	-197	
	1	1		12	-196	
	1	1		11	-195	
	1	1		10	-184	
	1	1		9	-126	
	1	1		8	-185	
	1	1		7	-182	
	1	1		6	-121	
	1	1		5	-109	
SEE NOTE 5	8	9		4	1015869-159	LIGHT INDICATOR & SWITCH ASSY
	1	1		3	2900299	DRAWER, MONITOR PANEL (INSEP ASSY)
	2	2		2	1900015-061	HANDLE ASSEMBLY
	1	1		1	2900298	PANEL, FRONT

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-021	2900023-021	-021
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN R. Schwabe DATE 24 MAR. 65
CHECKED J. Stelma 19 JUN 65
APPROVAL J. Foss 21 JUN 65
APPROVAL Bateman
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MONITOR PANEL
ASSEMBLY

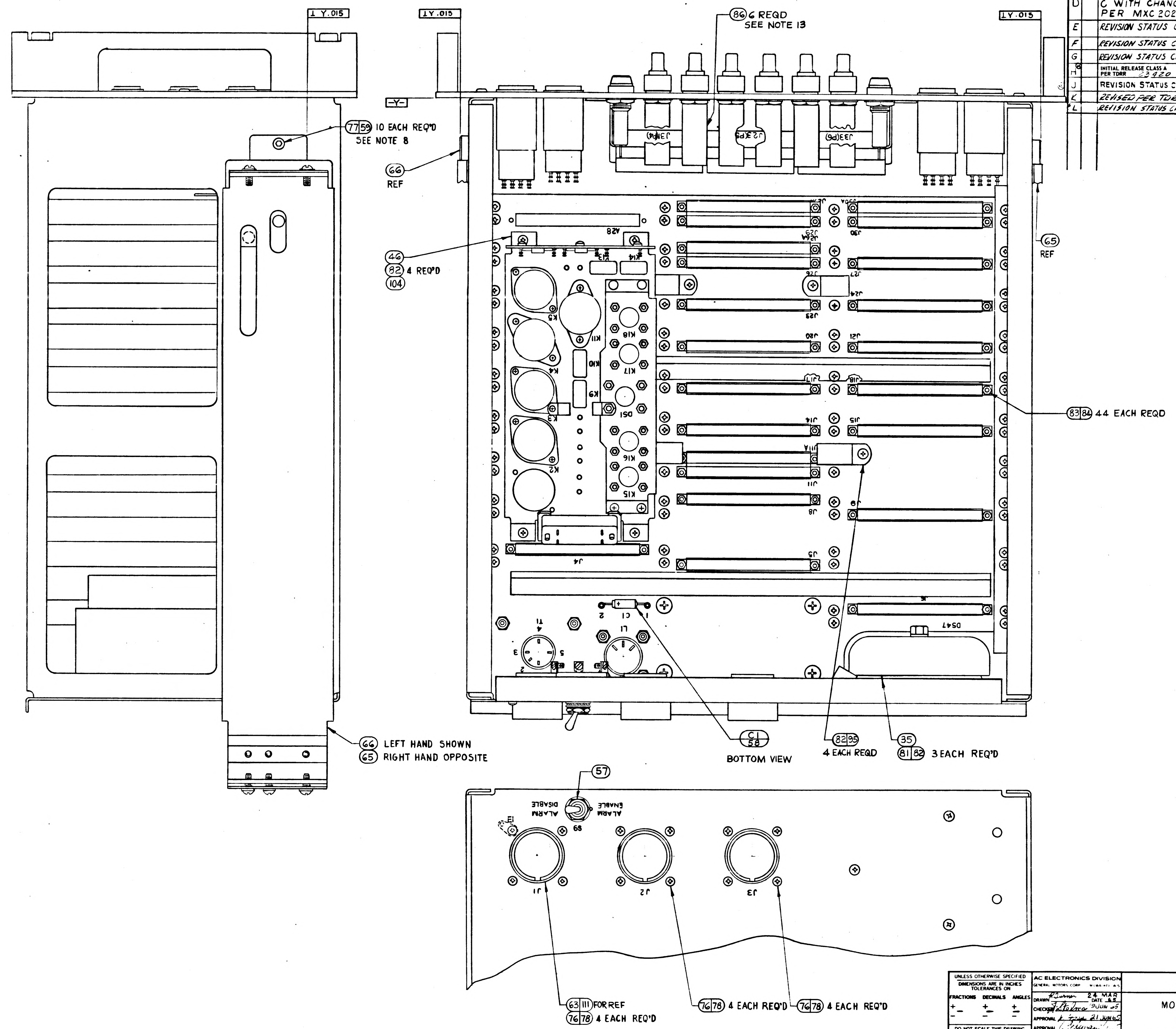
CODE IDENT NO 99974
SIZE E
2900031
SCALE NONE
SHEET OF 3

21 JUN 65

L
2900031

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.
D		REPLACES REVISION C WITH CHANGE PER MXC 202644		2 JULY 65	D.C.M.
E		REVISION STATUS CHANGED		JUL 65	WJR
F		REVISION STATUS CHANGED		23 JUL 65	[illegible]
G		REVISION STATUS CHANGED		3 SEP 65	[illegible]
H		INITIAL RELEASE CLASS A PER TDRR 23420		18 OCT 65	[illegible]
J		REVISION STATUS CHANGED		NOV 65	[illegible]
K		REVISED PER TDRR 27587		6-AUG 66	[illegible]
L		REVISION STATUS CHANGED		3-MAR 66	[illegible]

REVISIONS 23420



1 Y.015
1 Y.015
1 Y.015
-Y-
86 6 REQD
SEE NOTE 13
77 59 10 EACH REQ'D
SEE NOTE 8
66
REF
65
REF
46
82 4 REQ'D
104
83 84 44 EACH REQD
66 LEFT HAND SHOWN
65 RIGHT HAND OPPOSITE
C1
58
BOTTOM VIEW
82 95
4 EACH REQD
35
81 82 3 EACH REQ'D
57
ALARM ENABLE
ALARM DISABLE
J1
J2
J3
63 111 FOR REF
76 78 4 EACH REQ'D
76 78 4 EACH REQ'D
76 78 4 EACH REQ'D

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE, WIS.
DRAWN R Turner DATE 24 MAR 65
CHECKED 19 JUN 65
APPROVAL 21 JUN 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

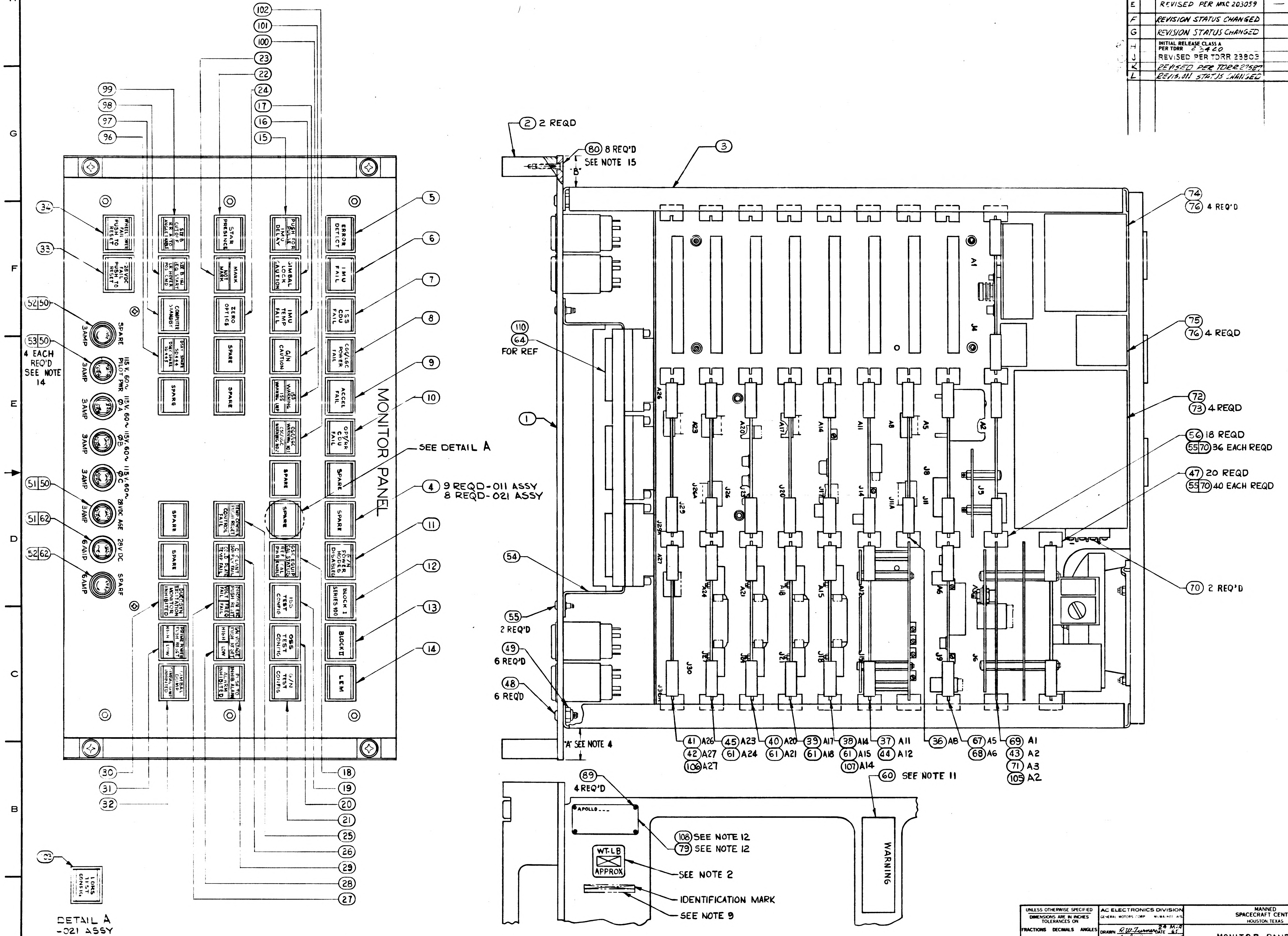
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MONITOR PANEL
ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900031
SCALE 1:1
SHEET 2 OF 3

L
2900031

REVISIONS			23420		
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APP'D
D		REPLACES REVISION C WITH CHANGE PER MXC 202644		2 JULY 65	D.C.M. ML
E		REVISED PER MXC 203059	—	16 JUL 65	WJR
F		REVISION STATUS CHANGED		23 [illegible] 65	RWH
G		REVISION STATUS CHANGED		3 SEP 65	
H		INITIAL RELEASE CLASS A PER TDRR 23420		[illegible] 65	
J		REVISED PER TDRR 23803		NOV 65	
K		REVISED PER TDRR 27587		5-APR	
L		REVISION STATUS CHANGED		[illegible]	


MONITOR PANEL
WHEEL POWER FAIL PUSH TO RESET
-28 VDC FAIL PUSH TO RESET
S IV B CUTOFF / RR AUTO ANGLE ENABLE
S IV B INJ SEQ START / LR HOVER POS CMD
COMPUTER STANDBY
DSKY SPARE SD444 / DSKY SPARE SD445
STAR PRESENCE
MARK / NOT MARK
ZERO OPTICS
SPARE
PUSH FOR PULSE / IMU DELAY
GIMBAL LOCK CAUTION
IMU TEMP FAIL
G/N CAUTION
ISS WARNING / ISS WARNING LMP
CGC/LGC WARNING NO1 / CGC/LGC WARNING NO2
ERROR DETECT
IMU FAIL
ISS CDU FAIL
CGC/LGC POWER FAIL
ACCEL FAIL
OPT/RR CDU FAIL
G/N POWER MODES DISABLED
BLOCK I SERIES 100
BLOCK II
LEM
TEMP CONTROL PUSH RESET / CONTROL FAIL
COOLANT SUPPLY FAIL / COLD PLATE TEMP FAIL
GSE EQUIP CAL STATUS / REF PWR / CAL ENABLE
ISS TEST CONFIG
OSS TEST CONFIG
G/N TEST CONFIG
DUCOSYN EXCITATION MONITOR INHIBITED
DUCOSYN EXC PUSH RESET / VOLT FAIL / FREQ FAIL
PRIME POWER PUSH RESET / HIGH / LOW
G/N VOLTAGE PUSH RESET / HIGH / LOW
GIMBAL DUMP / GIMBAL DUMP INHIBITED
PUSH TO INHIB ALARM / ALARM INHIBITED
SPARE 3AMP
115 V. 60~ PILOT PWR 3AMP
115V. 60~ ØA 3AMP
115V. 60~ ØB 3AMP
115V. 60~ ØC 3AMP
28VDC AGE 3AMP
28V DC 6AMP
SPARE 6AMP
52 50
53 50
4 EACH REQ'D SEE NOTE 14
51 50
51 62
52 62
34
33
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98
97
96
102
101
100
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16
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9
10
SEE DETAIL A
4 9 REQD-011 ASSY 8 REQD-021 ASSY
11
12
13
14
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31
32
18
19
20
21
25
26
29
28
27
39
DETAIL A -021 ASSY
ISS TEST CONFIG
2 2 REQD
80 8 REQ'D SEE NOTE 15
"B"
3
110
64 FOR REF
1
54
55 2 REQ'D
49 6 REQ'D
48 6 REQ'D
"A" SEE NOTE 4
A1
A2
A3
A5
A6
A8
A11
A12
A14
A15
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J4
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J6
J8
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J11
J11A
J14
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J21
J23
J24
J26
J26A
J27
J29
J29A
J30
74
76 4 REQ'D
75
76 4 REQD
72
73 4 REQD
56 18 REQD
55 70 36 EACH REQD
47 20 REQD
55 70 40 EACH REQD
70 2 REQ'D
41 A26
42 A27
106 A27
45 A23
61 A24
40 A20
61 A21
39 A17
61 A18
38 A14
61 A15
107 A14
37 A11
44 A12
36 A8
67 A5
68 A6
69 A1
43 A2
71 A3
105 A2
60 SEE NOTE 11
89 4 REQ'D
APOLLO
108 SEE NOTE 12
79 SEE NOTE 12
WT-LB APPROX
SEE NOTE 2
IDENTIFICATION MARK
SEE NOTE 9
WARNING

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN R.W. Turner DATE 24 MAR 65
CHECKED J. Stelma 19 JUN 65
APPROVAL [illegible] 21 JUN 65
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MONITOR PANEL
ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900031
SCALE FULL
SHEET 3 OF 3

L
2900031
B

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK WEIGHT OF ASSEMBLY, (67 LBS) PER ND1002123 ADJACENT TO NAMEPLATE LOCATION.
3. CHASSIS SLIDE MOUNTING SCREWS, ITEM (77) AND FRONT PANEL MOUNTING SCREWS, ITEM (48) SHALL BE SUBJECTED TO TORQUE OF 28.5-31.7 IN LB AT INSTALLATION.
4. DIMENSION "A" MUST BE EQUAL TO DIMENSION "B" WITHIN .040.
5. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING
6. SOLDER PER ND1002071 USING ITEMS (94), OR (92) AND (93).
7.
8. SHIM TO FIT. PEEL OFF EXCESS SHIM STOCK.
9. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH, COLOR BLACK, BELOW OR ADJACENT TO WEIGHT MARKING.
10. SELECT AS REQUIRED.
11. APPLY WARNING PLATE ITEM (60) TO AREA INDICATED USING SOLVENT ACTIVATOR METHYLETHYL KETONE OR EQUIVALENT. CENTRALIZE AS SHOWN.
12. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (79), (108) OR (115) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
13. SPOT TIE AS REQUIRED USING ITEM (87).
14. BEND TERMINAL NUMBER 2 ON THE FUSE HOLDER, ITEM (53), 90° AWAY FROM THE BODY OF THE FUSE.
15. SECURE SCREWS USING ITEM (88).
16. THE FOLLOWING ARE PART OF THIS ASSEMBLY:
    - WIRING HARNESS A ITEM (63), (111) OR (117)
    - WIRING HARNESS B ITEM (64) OR (110)
17. DRAWINGS FOR REFERENCE
    - SCHEMATIC DIAGRAM ITEM (85), (109) OR (116)

REVISIONS 23420

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
D		REPLACES REVISION C WITH CHANGE PER MXC 202644		2 JULY 65	D.C.M. MEM
E		REVISED PER MXC 203059	—	16 JUL 65	WJR
F		REVISED PER MXC 203263		23 JUL 65	
G		REVISED PER MXC 204636		3 SEP 65	
H		INITIAL RELEASE CLASS A PER TDRR 23420		8 OCT 65	
J		REVISION STATUS CHANGED		NOV 65	
K		REVISED PER TDRR 27587		APR 66	
L		REVISED PER TDRR 28269		66	
M		REVISED PER TDRR 28774		MAY 66	E.G.

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED 031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	X				119	PS2016114	PROCUREMENT SPECIFICATION
	X				118	2901466	RUNNING LIST
	1				117	2901378	WIRE HARNESS A
	X				116	2901390	SCHEMATIC DIAGRAM, ELECTRICAL
	1				115	1004260-194	NAMEPLATE
	1				114	1901763-031	VOLTAGE COMPARATOR ASSY DC
		X			113	PS2016112	PROCUREMENT SPECIFICATION
		1			112		RUNNING LIST
		1			111	2901119	WIRING HARNESS A
	1	1			110	2901120	WIRING HARNESS B
		X			109	2901164	SCHEMATIC DIAGRAM, ELECT
		1			108	1004260-166	NAMEPLATE
	1	1			107	2900115-021	SENSOR ASSY
	1	1			106	2900276-021	RELAY ASSY, STATUS
		1			105	1901763-021	VOLTAGE COMPARATOR ASSY
	1	1			104	2900141-021	BRACKET ASSY, RELAY
	1	1			103	1015869-202	LIGHT INDICATOR & SWITCH ASSY
	1	1	1		102	1015869-793	LIGHT INDICATOR & SWITCH ASSY
	1	1	1		101	-792	
	1	1	1		100	-791	
	1	1	1		99	-790	
	1	1	1		98	-789	
	1	1	1		97	-788	
	1	1	1		96	1015869-787	LIGHT INDICATOR & SWITCH ASSY
SEE NOTE 10	4	4	4		95	MS21919-DG12 -DG11 -DG10 -DG9 MS21919-DG8	CLAMP, CUSHIONED, SUPPORT CLAMP, CUSHIONED, SUPPORT
	AR	AR	AR		94	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
	AR	AR	AR		93	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
	AR	AR	AR		92	SN60WS	SOLDER QQ-S-571 (ES2175-1)
			X		91	PS2900031	PROCUREMENT SPECIFICATION
			X		90	2900773	RUNNING LIST
	4	4	4		89	MS35216-3	SCREW, MACHINE, PAN HD
	AR	AR	AR		88	MIL-S-22473 GRADE H	SEALING COMPOUND (ES2544-5
	AR	AR	AR		87	MIL-T-713	LACING TAPE, TYPE P, CLASS 2, BLACK (ES2732-1 NO 18)
SEE NOTE 5	6	6	6		86	1015864-424	INSULATION, SLEEVING, ELEC
			X		85	2900440	SCHEMATIC DIAGRAM, ELECTRICAL
SEE NOTE 5	44	44	44		84	1016151-004	NUT-SELF LOCKING
	44	44	44		83	MS-35216-16	SCREW, MACHINE, PAN HD
	11	11	11		82	MS-35216-42	SCREW, MACHINE, PAN HD
	3	3	3		81	AN363C832	(1896990-281) NUT, SELF LOCKING
	8	8	8		80	AN507C832R12	(1897003-568) SCREW, FLAT HD, 100°
			1		79	1004260-109	NAMEPLATE
	12	12	12		78	MS-35216-26	SCREW, MACHINE, PAN HD
SEE NOTE 5	10	10	10		77	1015826-304	SCREW, FLAT HEAD, HEX SOCKET
	20	20	20		76	AN363C632	(1896990-261) NUT, SELF LOCKING
SEE NOTE 5	1	1	1		75	1016085	REACTOR
	1	1	1		74	1016104	TRANSFORMER
	4	4	4		73	1016151-013	(1896990-041) NUT, SELF LOCKING
SEE NOTE 5	1	1	1		72	1897183-001	BATTERY, STORAGE – 24 VOLT
	1	1	1		71	1900447-021	3200 CPS FREQUENCY COMPARATOR
	78	78	78		70	MS35333-71	WASHER, LOCK, FLAT, INTERNAL TOOTH
	1	1	1		69	1902113-011	PILOT POWER SUPPLY, ±28 VDC
	1	1	1		68	1900487-011	VOLTAGE COMPARATOR, 2 VOLT, 3200 CPS
	1	1	1		67	1900707-011	VERIFICATION ASSEMBLY
SEE NOTE 5	1	1	1		66	1015791-010	SLIDE ASSY, QUICK RELEASE, L.H.
SEE NOTE 5	1	1	1		65	1015791-009	SLIDE ASSY, QUICK RELEASE, R.H.
			1		64	2900139	WIRING HARNESS B
			1		63	2900138	WIRING HARNESS A
	2	2	2		62	F02A250V6A	(1897099-015) FUSE MIL-F-15160/02A
	4	4	4		61	1902271-011	PULSE DETECTOR 102.4 KC
	1	1	1		60	1900617	WARNING PLATE, SELF BONDING
SEE NOTE 5	10	10	10		59	1016005-1	SHIM, SLIDE LOCATING
	1	1	1		58	CS13AG180K	(1896954-181) CAPACITOR, MIL-C-26655-2
	1	1	1		57	MS35059-23	SWITCH-TOGGLE
	18	18	18		56	1900391	BRACKET HOLDER, DOUBLE
	78	78	78		55	MS-35216-27	SCREW, MACHINE, PAN HD
	1	1	1		54	1900793	BRACKET-CONNECTOR (INSEP ASSY)
SEE NOTE 5	4	4	4		53	1015873-001	FUSEHOLDER - INDICATING
	2	2	2		52	MS-26572-1	FUSEHOLDER
SEE NOTE 5	2	2	2		51	1015873-008	FUSEHOLDER - INDICATING
	6	6	6		50	F02A250V3A	(1897099-012) FUSE MIL-F-15160/02A
	6	6	6		49	AN363C1032	(1896990-011) NUT, SELF LOCKING
SEE NOTE 5	6	6	6		48	1006783-45	SCREW, BUTTON HD, HEX SOCKET
	20	20	20		47	1900390	BRACKET HOLDER, SINGLE
			1		46	2900141-011	BRACKET ASSEMBLY, RELAY
	1	1	1		45	2900287-011	RELAY BOARD ASSY
	1	1	1		44	1901646-011	VOLTAGE COMPARATOR ASSY, 3 PH
			1		43	1901763-011	VOLTAGE COMPARATOR ASSY, D.C.
			1		42	2900276-011	RELAY ASSEMBLY, STATUS
	1	1	1		41	2900142-011	RELAY ASSEMBLY, ALARM
	1	1	1		40	2900040-011	LAMP-RELAY DRIVER, ASSY
	1	1	1		39	2900277-011	RELAY AND COMPONENT ASSY
			1		38	2900115-011	SENSOR ASSY, WHEEL POWER & -28VDC
	1	1	1		37	2900137-011	DETECTOR ASSEMBLY, PHASE ANGLE
	1	1	1		36	2900143-011	VERIFICATION RELAY ASSY
	1	1	1		35	1901570-011	BELL, ELECTRICAL (24 VDC)
SEE NOTE 5	1	1	1		34	1015869-364	LIGHT INDICATOR & SWITCH ASSY
	1	1	1		33	-365	
	1	1	1		32	-194	
	1	1	1		31	-745	
	1	1	1		30	-193	
	1	1	1		29	-362	
	1	1	1		28	-387	
	1	1	1		27	-344	
	1	1	1		26	-186	
	1	1	1		25	-343	
	1	1	1		24	-177	
	1	1	1		23	-178	
	1	1	1		22	-176	
	1	1	1		21	-776	
	1	1	1		20	-200	
	1	1	1		19	-199	
	1	1	1		18	-777	
	1	1	1		17	-781	
	1	1	1		16	-782	
	1	1	1		15	-363	
	1	1	1		14	-198	
	1	1	1		13	-197	
	1	1	1		12	-196	
	1	1	1		11	-195	
	1	1	1		10	-184	
	1	1	1		9	-126	
	1	1	1		8	-185	
	1	1	1		7	-182	
	1	1	1		6	-121	
	1	1	1		5	-109	
SEE NOTE 5	8	8	9		4	1015869-159	LIGHT INDICATOR & SWITCH ASSY
	1	1	1		3	2900299	DRAWER, MONITOR PANEL (INSEP ASSY)
	2	2	2		2	1900015-061	HANDLE ASSEMBLY
	1	1	1		1	2900298	PANEL, FRONT

APPLICATION

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900031-031	2900031-031	-031
2900023-021	2900023-021	-021
2900023-011	2900023-011	-011

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN R. Schwabe DATE 24 MAR. 65
CHECKED J. Stelma 19 JUN 65
APPROVAL J. Yoss 21 JUN 65
APPROVAL Coleman
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

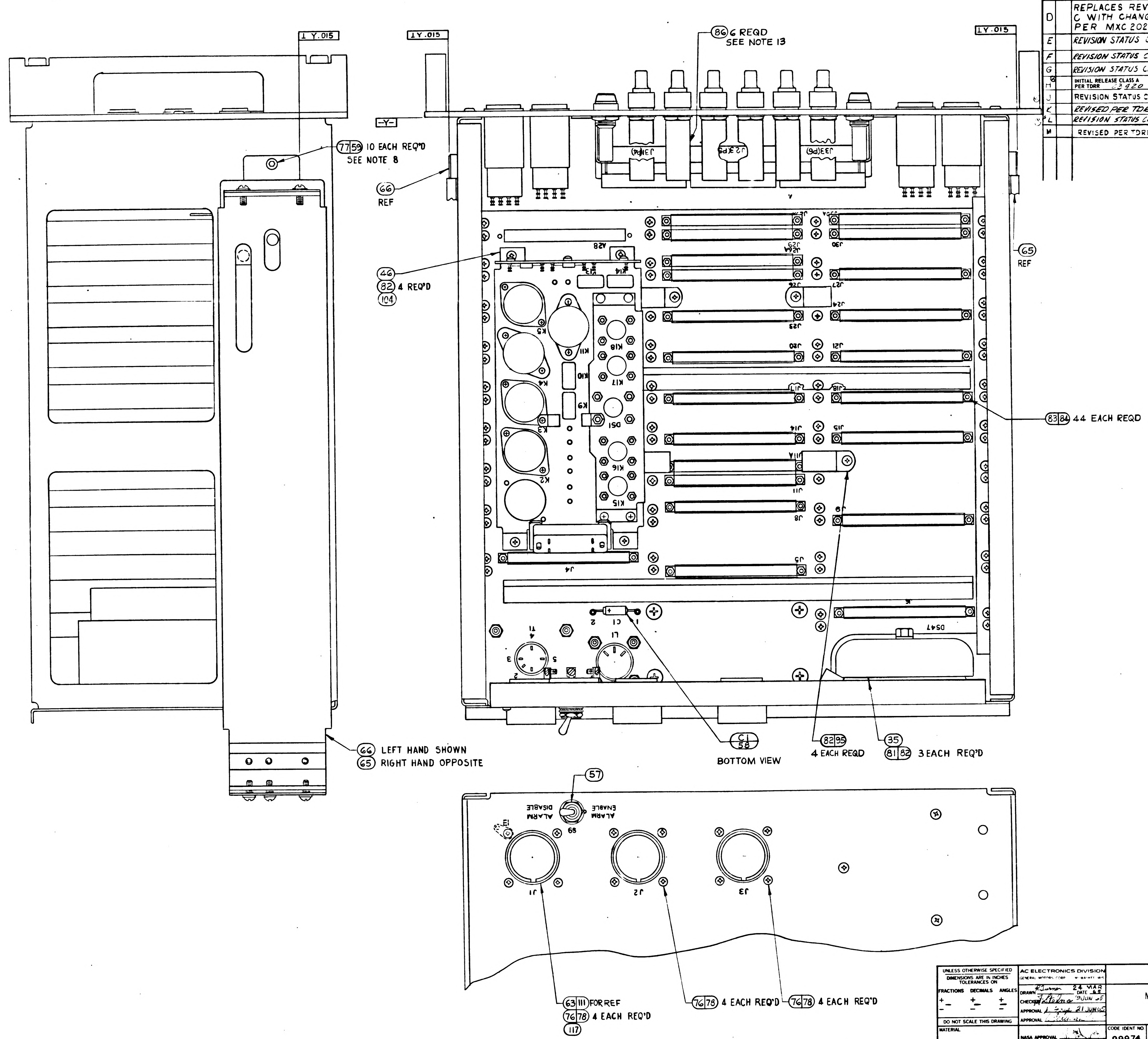
MONITOR PANEL
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900031
SCALE NONE
SHEET OF 3

21 JUN 65

2900031

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
D		REPLACES REVISION C WITH CHANGE PER MXC 202644		2 JULY 65	D.C.M.
E		REVISION STATUS CHANGED		6 JUL 65	WJR
F		REVISION STATUS CHANGED		23 JUL 65	
G		REVISION STATUS CHANGED		3 SEP 65	
H		INITIAL RELEASE CLASS A PER TDRR 23420		18 OCT 65	
J		REVISION STATUS CHANGED		NOV 65	
K		REVISED PER TDRR 27587		6-[illegible] 66	M.G.
L		REVISION STATUS CHANGED		3-MAR 66	
M		REVISED PER TDRR 28774		MAY 66	J.E.S.



1 Y.015
1 Y.015
1 Y.015
-Y-
86 6 REQD SEE NOTE 13
77 59 10 EACH REQ'D SEE NOTE 8
66 REF
65 REF
46
82 4 REQ'D
104
83 84 44 EACH REQD
66 LEFT HAND SHOWN
65 RIGHT HAND OPPOSITE
C1 58
BOTTOM VIEW
82 95 4 EACH REQD
35
81 82 3 EACH REQ'D
57
ALARM DISABLE
ALARM ENABLE
68
E1
J1
J2
J3
63 111 FOR REF
76 78 4 EACH REQ'D
117
76 78 4 EACH REQ'D
76 78 4 EACH REQ'D

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS
DRAWN R. Turner DATE 24 MAR 65
CHECKER J. Stelma 19 JUN 65
APPROVAL 21 JUN 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

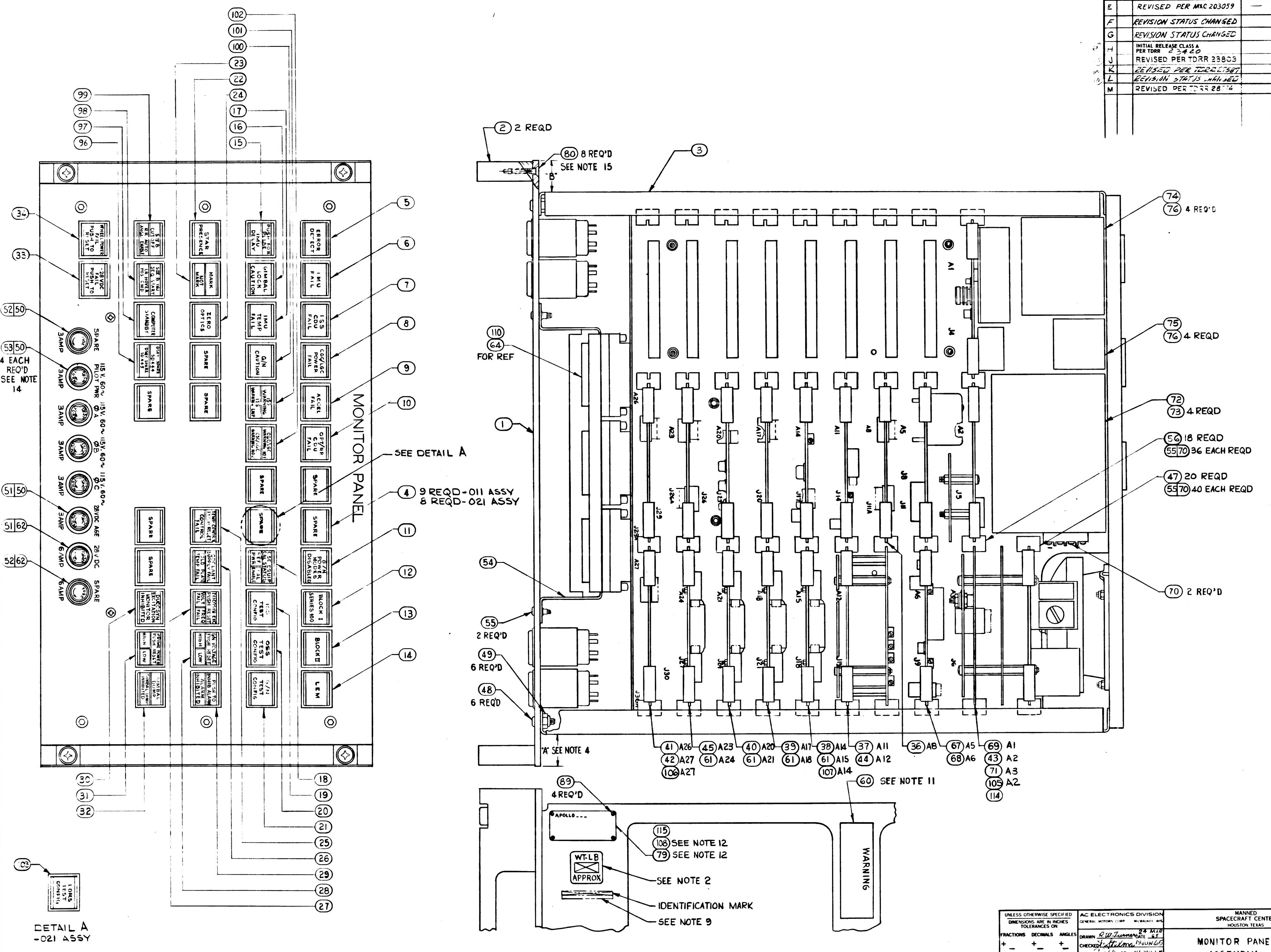
MONITOR PANEL
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900031
SCALE 1:1
SHEET 2 OF 3

2900031 M

REVISIONS 23420

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
D		REPLACES REVISION C WITH CHANGE PER MXC 202644		2 JULY 65	D.C.M.
E		REVISED PER MXC 203059	—	16 JUL 65	WJR
F		REVISION STATUS CHANGED		23 65	
G		REVISION STATUS CHANGED		3 SEP 65	
H		INITIAL RELEASE CLASS A PER TDRR 23420		65	
J		REVISED PER TDRR 23803		65	
K		REVISED PER TDRR 27587		6-APR	MG
L		REVISION STATUS CHANGED		7- 66	
M		REVISED PER TDRR 28 74		17	J.E.G.



MONITOR PANEL
WHEEL POWER FAIL PUSH TO RESET
-28 VDC FAIL PUSH TO RESET
SIVB CUT OFF
RR AUTO ANGL ENABLE
SIVB INJ SEQ START
LR HOVER POS CMD
COMPUTER STANDBY
DSKY SPARE SD 444
DSKY SPARE SD 445
STAR PRESENCE
MARK
NOT MARK
ZERO OPTICS
PUSH FOR PULSE
IMU DELAY
GIMBAL LOCK CAUTION
IMU TEMP FAIL
G/N CAUTION
ISS WARNING
ISS WARNING LMP
CGC/LGC WARNING NO1
CSC/LGC WARNING NO2
ERROR DETECT
IMU FAIL
ISS CDU FAIL
CGC/LGC POWER FAIL
ACCEL FAIL
OPT/RP CDU FAIL
SPARE
G/N POWER MODES DISABLED
BLOCK I SERIES 100
BLOCK II
LEM
TEMP CONTROL PUSH RESET
CONTROL FAIL
COOLANT SUPPLY FAIL
COLD PLATE TEMP FAIL
DUCOSYN EXC PUSH RESET
VOLT FAIL
FREQ FAIL
G/N VOLTAGE PUSH RESET
HIGH
LOW
PUSH TO INHIB ALARM
ALARM INHIBITED
CSC EQUIP CAL STATUS
REF PWR
CAL ENABLE
ISS TEST CONFIG
OSS TEST CONFIG
G/N TEST CONFIG
DUCOSYN EXCITATION MONITOR INHIBITED
PRIME POWER PUSH RESET
GIMBAL DUMP
GIMBAL DUMP INHIBITED
SPARE 3AMP
115 V. 60~ PILOT PWR 3AMP
115V. 60~ ØA 3AMP
115V. 60~ ØB 3AMP
115V. 60~ ØC 3AMP
28VDC A6E 3AMP
28V DC 6AMP
SPARE 6AMP
4 EACH REQ'D SEE NOTE 14
SEE DETAIL A
4 9 REQD-011 ASSY 8 REQD-021 ASSY
2 2 REQD
80 8 REQ'D SEE NOTE 15
3
74 76 4 REQ'D
75 76 4 REQD
72 73 4 REQD
56 18 REQD
55 70 36 EACH REQD
47 20 REQD
55 70 40 EACH REQD
70 2 REQ'D
110 64 FOR REF
1
54
55 2 REQ'D
49 6 REQ'D
48 6 REQ'D
"A" SEE NOTE 4
41 A26
42 A27
106 A27
45 A23
61 A24
40 A20
61 A21
39 A17
61 A18
38 A14
61 A15
107 A14
37 A11
44 A12
36 A8
67 A5
68 A6
69 A1
43 A2
71 A3
105 A2
114
60 SEE NOTE 11
89 4 REQ'D
APOLLO
115
108 SEE NOTE 12
79 SEE NOTE 12
WT-LB APPROX
SEE NOTE 2
IDENTIFICATION MARK
SEE NOTE 9
WARNING
DETAIL A -021 ASSY
03
LOAD TEST CONFIG
A1 A2 A3 A5 A6 A8 A11 A12 A14 A15 A17 A18 A20 A21 A23 A24 A26 A27
J1 J4 J5 J6 J8 J9 J11A J14 J18 J20 J24 J26 J26A J28 J29 J30
5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 50 51 52 53 62 96 97 98 99 100 101 102

UNLESS OTHERWISE SPECIFIED
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FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTES
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN R.W. Turner DATE 24 MAR 65
CHECKED J. Stelma 19 JUN 65
APPROVAL Viggas 21 JUN 65
APPROVAL Gelman
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MONITOR PANEL
ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900031
SCALE FULL
SHEET 3 OF 3

M
2900031
B

SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
REVISIONS 23919					
G		REPLACES REVISION F WITH CHANGE PER MXC203112	—		
H		REVISED PER MXC 203444		2 AUG 65	
J		REVISED PER MXC 203526		6 AUG	RTP
K		REVISION STATUS CHANGED		28 SEP 65	
L		INITIAL RELEASE CLASS A PER TDRR 23919		19 OCT 65	

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM, SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.
3. MARK CHARACTERS PER ND 1002019, .12 HIGH, COLOR BLACK. CENTRALIZE AS SHOWN.
4. SELECT ITEM (50) DASH NUMBERS 2 THRU 15 AS REQUIRED AT ASSEMBLY.
5. C REPRESENTS A CLOSED OPENING IN THE AIR PLENUM OF ITEM (1). OPENINGS SHALL BE CLOSED WITH PLATES SUPPLIED WITH ITEM (1) BY VENDOR PLUS THE QUANTITY SHOWN AS ITEM (10) TO COMPLETE THE REQUIREMENTS.
6. APPLY TIGHTENING TORQUE TO ALL SCREWS AS FOLLOWS, EXCEPT FOR PANEL ATTACHING SCREWS WHICH SHALL BE TORQUED TO 21.4 - 23.8 IN. LBS:

6-32	8.6 - 9.6 IN. LBS
8-32	17.8 - 19.8 IN. LBS
10-32	28.5 - 31.7 IN. LBS
$\frac{3}{8}$ - 24	233 - 259 IN. LBS

7. CONNECTOR INSTALLATION:
   A. INSTALL J1 THRU J4 AND J28 THRU J30 INCLUSIVE OF ITEM (2) INTO ITEM (49) AS SHOWN.
   B. INSTALL J16 THRU J27 INCLUSIVE OF ITEM (2) INTO ITEM (22) AS SHOWN.
   C. INSTALL J5 THRU J15 INCLUSIVE OF ITEM (2) INTO ITEM (52) AS SHOWN.
   D. INSTALL GROUND LUGS TO E1 AND E80 AS SHOWN.
8. DISPOSE OF EXCESS DRAWER MOUNTING AND RETRACTOR HARDWARE.
9. AFTER ASSEMBLY OF ITEM (2) TO ITEM (1), ATTACH RETRACTOR MOUNTED CABLES OF ITEM (2) TO ITEM (12) IN THEIR RESPECTIVE AREAS.
10. MARK CHARACTERS PER ND 1002019, .38 HIGH, COLOR BLACK. CENTRALIZE AS SHOWN.
11. ADJUST ITEM (26) SO AS TO SUPPORT UNDER SIDE OF ITEM (62)
12. IDENTIFY USING DRAWING NUMBER PER MIL-STD-130 (ES-267) AND SERIALIZE PER ND 1002023
13. SELECT EITHER PART NO. 1901346 OR 1897313 FOR ITEM (10)

SECTIONS APPEAR ON SHEETS AS FOLLOWS:

A-A	SHT 3
B-B	SHT 4
C-C	SHT 5
D-D	SHT 2
E-E	SHT 6
F-F	SHT 6
G-G	SHT 6
H-H	SHT 6
J-J	SHT 7
K-K	SHT 7
L-L	SHT 7
M-M	SHT 7
N-N	SHT 5
P-P	SHT 5
R-R	SHT 3
S-S	SHT 3
T-T	SHT 4
U-U	SHT 4
V-V	SHT 4
W-W	SHT 6
X-X	SHT 4
Y-Y	SHT 6
AA-AA	SHT 2

DETAILS:

A	SHT 4
B	SHT 3
C	SHT 5
D	SHT 7
E	SHT 5

PARTIAL VIEWS:

Q-Q	SHT 2
Z-Z	SHT 2

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			66		
	1		65	1900368-009	GASKET-CONNECTOR
	1		64	1900364-011	BLANK PANEL ASSY (3.50)
	1		63	1900568	STORAGE DRAWER ASSY
	2		62	1900345-021	WRITING SURFACE ASSY
	1		61	1900550	GROUND PLATE
	1		60	1900368-006	GASKET-CONNECTOR
	1		59	-001	
	4		58	-003	
	9		57	-004	
	6		56	1900368-005	GASKET-CONNECTOR
	88		55	AN363C632(1896990-261)	NUT, SELF LOCKING
	88		54	AN960C6L(1897006-036)	WASHER, FLAT #6
SEE NOTE 2	88		53	1006783-23	SCREW-BUTTON-HEX SOC
	1		52	1900365	PANEL (INSEP ASSY)
	5		51	1900369	GASKET-CONNECTOR
SEE NOTE 4	20		50	MS21919WDG-2 THRU 15 (1897073-202 THRU 215)	CLAMP, LOOP TYPE
	1		49	2900392	PANEL (INSEP ASSY)
	14		48	AN960C616(1897006-062)	WASHER, FLAT
	1		47	1900309-011	PANEL ASSY, CROSSBAR SWITCH COMP
SEE NOTE 2	2		46	1015800-001	CABLE RETRACTOR
	1		45	1901656	INSULATOR PAD
	1		44	1900364-051	BLANK PANEL ASSY (10.50)
	1		43	1900364-021	BLANK PANEL ASSY (5.25)
	3		42	MS 171492	PIN
	6		41	MS 16995-79	SCREW, SOC HD CAP
	4		40	MS 16995-86	SCREW, SOC HD CAP
	8		39	AN 363C1032(1896990-011)	NUT, SELF LOCKING
	5		38	AN 335-6	NUT-HEX
			37		
SEE NOTE 2	4		36	1006783-46	SCREW, BUTTON HD-HEX SOC
SEE NOTE 2	55		35	1006783-45	
SEE NOTE 2	82		34	1006783-44	
SEE NOTE 2	1		33	1006783-43	SCREW, BUTTON HD-HEX SOC
			32		
	13		31	MS 35338-84	WASHER-LOCK 3/8
	114		30	AN960C10L (1897006-019)	WASHER, FLAT #10
	135		29	MS 35338-81	WASHER-LOCK #10
	1		28	1901657	INSULATOR BUSHING
	4		27	1900344	NUT BAR
	4		26	1900343	BRACKET
SEE NOTE 2	4		25	1015790-001	NUT BAR
	2		24	1900277	BRACKET
	1		23	1901687	PLATE, INSTRUCTION
	1		22	1901958	PANEL (INSEP ASSY)
	1		21	1900255-011	LATCH ASSY
	2		20	1900080	STUD-GROUND
			19		
	2		18	1900973	DEFLECTOR, AIR
			17		
	42		16	AN363C832(1896990-281)	NUT, SELF LOCKING
SEE NOTE 2	21		15	1006783-29	SCREW, BUTTON HD-HEX SOC
SEE NOTE 2	4		14	1015819-001	AIR FILTER ASSY, SPECIAL
	12		13	MS35234-60	SCREW, PAN HD
SEE NOTE 2	30		12	1015991-001	SCREW, HANGER
SEE NOTES 5 & 13	16		10	1897313 1901346	COVER, VENTILATORY PLATE, CLOSURE
	4		9	1900308	GUIDE
	2		8	1900303	SUPPORT BRACKET R.H.
	2		7	1900304	SUPPORT BRACKET L.H.
	1		6	1902100	GUARD, SWITCH (INSEP ASSY)
	4		5	1900198	SPACER
	1		4	1900306	BAR-STOP
	1		3	1900305	SUPPORT SHEET
	1		2	2900058-011	HARNESS FRAME ASSY
SEE NOTE 2	1		1	2900043	CABINET ASSY, BASIC

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± .02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 24-MAR 65
CHECKED 24-MAR-65
APPROVAL G. STODDARD 24-MAR 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

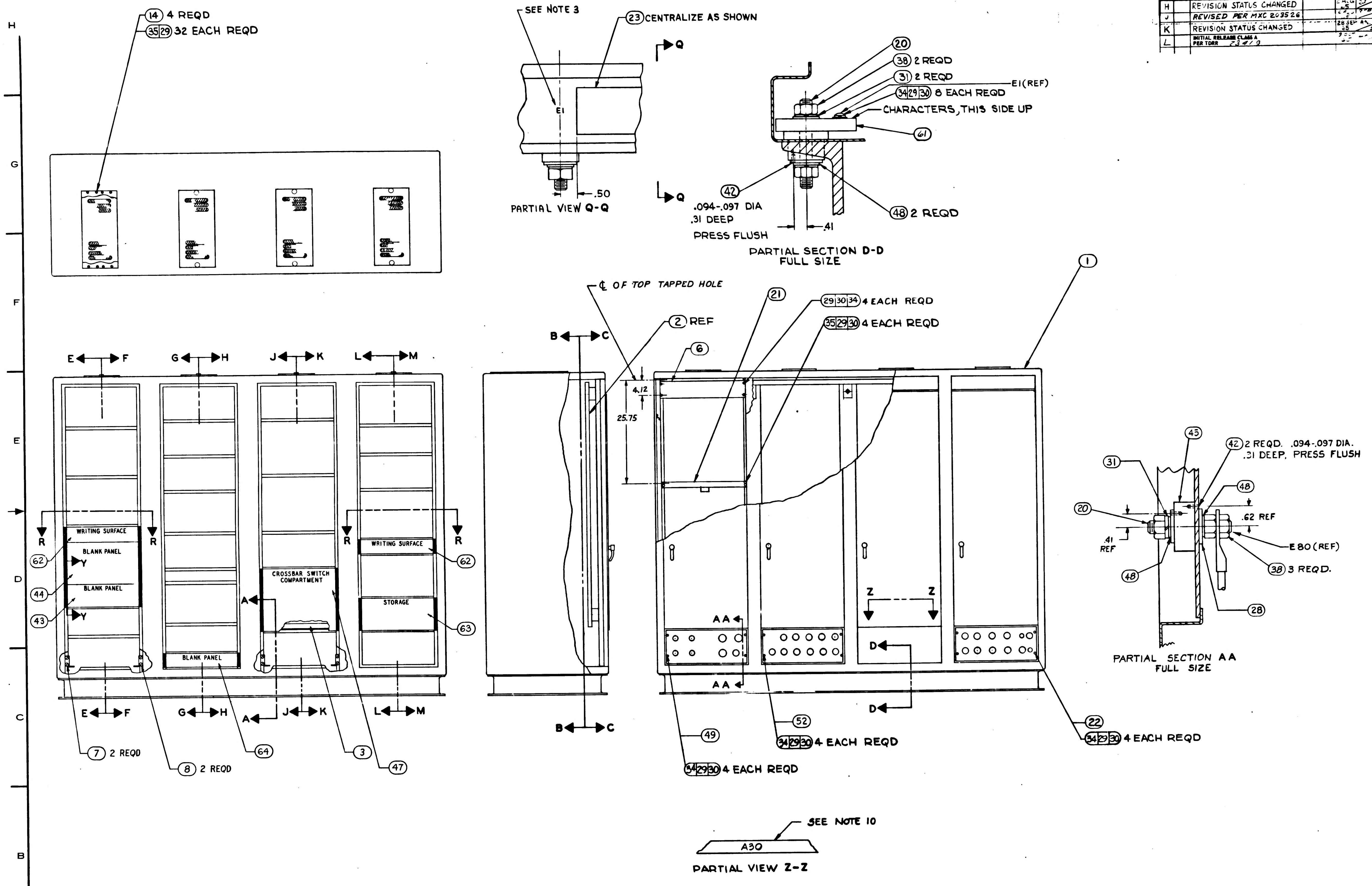
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABINET ASSEMBLY
ELECTRICAL EQUIPMENT
OPTICS INERTIAL ANALYZER
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900032
SCALE NOTED
SHEET 1 OF 7

Charleston 8 JUL 65

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
G		THIS SHEET ADDED PER MXC 203112		[illegible] 65	Rwm
H		REVISION STATUS CHANGED		2 AUG 65	[illegible]
J		REVISED PER MXC 203526		[illegible] 65	[illegible]
K		REVISION STATUS CHANGED		28 SEP 65	[illegible]
L		INITIAL RELEASE CLASS A PER TDRR 23419		9 [illegible] 65	[illegible]



(14) 4 REQD
(35)(29) 32 EACH REQD
SEE NOTE 3
(23) CENTRALIZE AS SHOWN
Q
E1
.50
PARTIAL VIEW Q-Q
(20)
(38) 2 REQD
(31) 2 REQD
E1(REF)
(34)(29)(30) 8 EACH REQD
CHARACTERS, THIS SIDE UP
(61)
(42)
.094-.097 DIA
.31 DEEP
PRESS FLUSH
(48) 2 REQD
.41
PARTIAL SECTION D-D
FULL SIZE
(1)
¢ OF TOP TAPPED HOLE
(21)
(29)(30)(34) 4 EACH REQD
(35)(29)(30) 4 EACH REQD
(2) REF
(6)
E F G H J K L M
B C
4.12
25.75
R
WRITING SURFACE
BLANK PANEL
Y
BLANK PANEL
CROSSBAR SWITCH COMPARTMENT
A
STORAGE
(62)
(44)
(43)
(63)
AA
Z
D
(45)
(42) 2 REQD. .094-.097 DIA.
.31 DEEP, PRESS FLUSH
(31)
(48)
(20)
.62 REF
.41 REF
E80 (REF)
(38) 3 REQD.
(28)
PARTIAL SECTION AA
FULL SIZE
(7) 2 REQD
(8) 2 REQD
(64)
(3)
(47)
(49)
(34)(29)(30) 4 EACH REQD
(52)
(34)(29)(30) 4 EACH REQD
(22)
(34)(29)(30) 4 EACH REQD
SEE NOTE 10
A30
PARTIAL VIEW Z-Z

NEXT ASSY	USED ON
APPLICATION	

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS + − ANGLES + −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bandier DATE 24-[illegible]65
CHECKED [illegible] 6JUL65
APPROVAL [illegible] 7JUL65
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

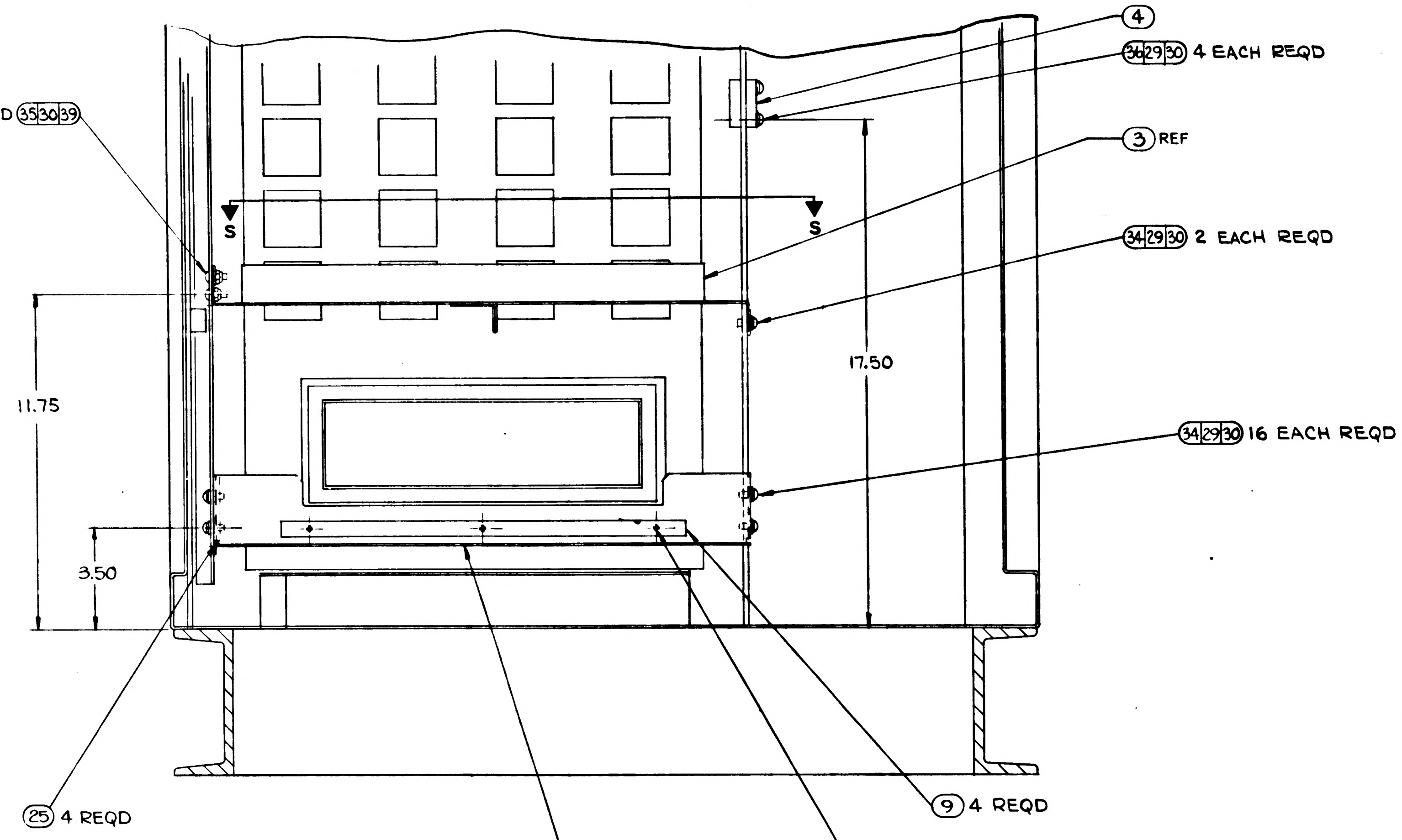
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABINET ASSEMBLY -
ELECTRICAL EQUIPMENT
OPTICS INERTIAL ANALYZER
ASSEMBLY

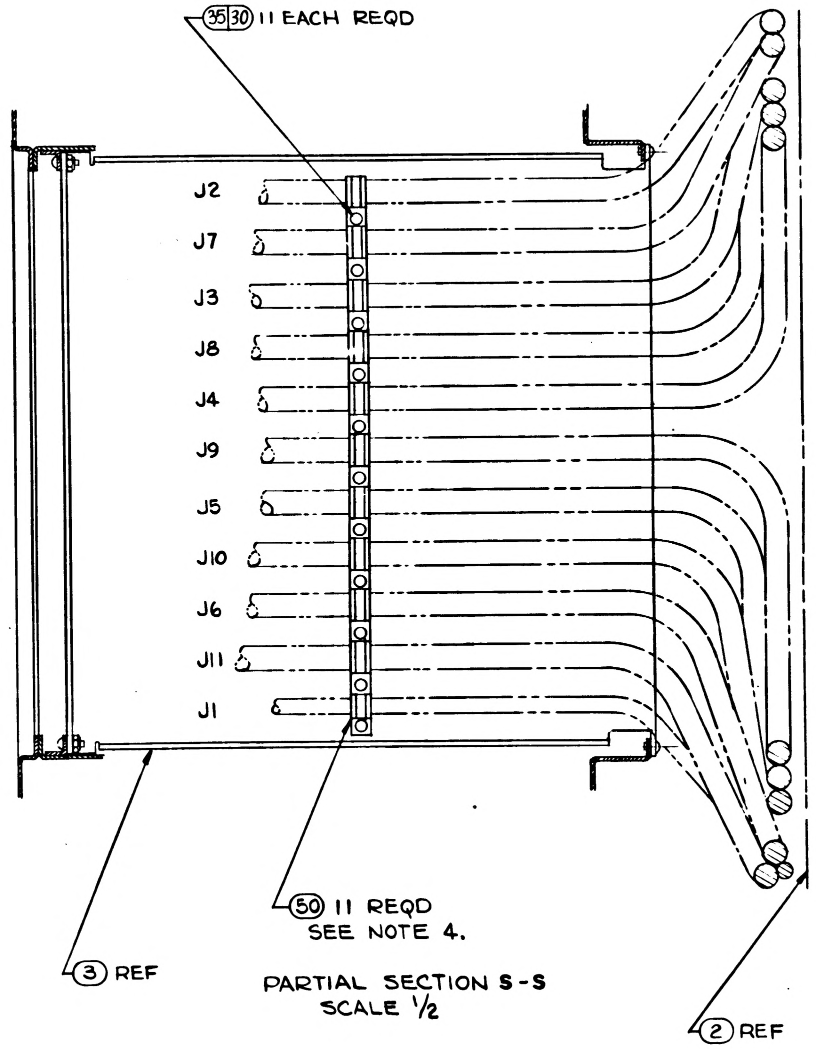
CODE IDENT NO. 99974
SIZE E
2900032
SCALE
SHEET 2 OF 7

2900032 L

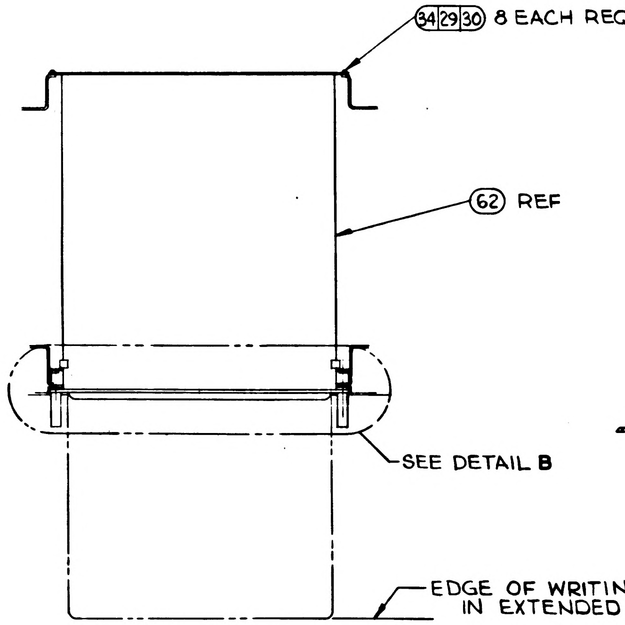
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
G		THIS SHEET ADDED PER MXC 203112	—	65	
H		REVISION STATUS CHANGED		2 AUG 65	
J		REVISION STATUS CHANGED			
K		REVISION STATUS CHANGED		28 SEP 65	
L		INITIAL RELEASE CLASS A PER TDRR 23419		65	


④
36 29 30 4 EACH REQD
4 EACH REQD 35 30 39
③ REF
S
S
34 29 30 2 EACH REQD
17.50
11.75
34 29 30 16 EACH REQD
3.50
㉕ 4 REQD
⑨ 4 REQD
⑦ REF
13 29 30 12 EACH REQD
INSTALL FROM FAR SIDE
4 PLACES

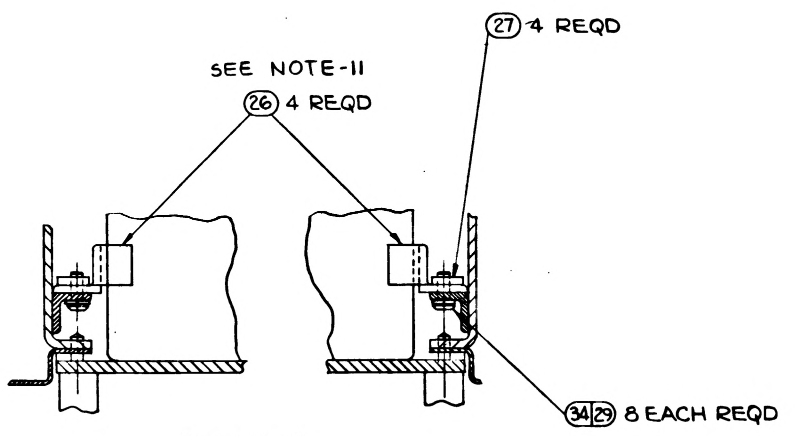
PARTIAL SECTION A-A
SCALE 1/2
SHT 2 ZONE C7


35 30 11 EACH REQD
J2
J7
J3
J8
J4
J9
J5
J10
J6
J11
J1
③ REF
㊿ 11 REQD
SEE NOTE 4.
② REF

PARTIAL SECTION S-S
SCALE 1/2


34 29 30 8 EACH REQD
(62) REF
SEE DETAIL B
EDGE OF WRITING SURFACE
IN EXTENDED POSITION.

PARTIAL SECTION R-R
SCALE 1/4
SHT 2 ZONE D6 & 8


SEE NOTE-11
㉖ 4 REQD
㉗ 4 REQD
34 29 8 EACH REQD

DETAIL B
SCALE-FULL

2900058-011	2900023-011
NEXT ASSY	USED ON
APPLICATION	

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MATERIAL
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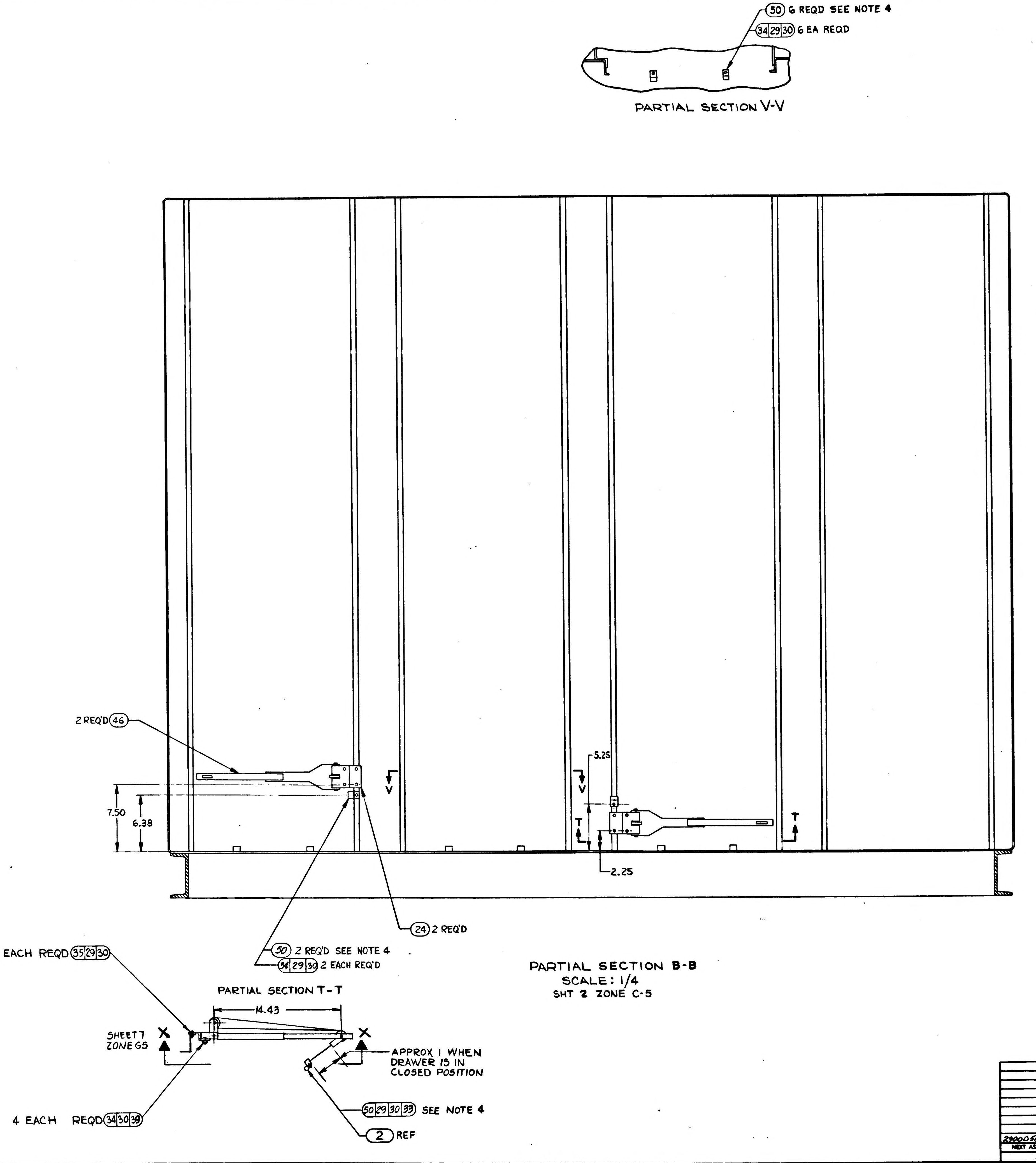
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 24 MAR 65
CHECKED 6 JUL 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABINET ASSEMBLY - ELECTRICAL EQUIPMENT OPTICS-INERTIAL ANALYZER ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900032
SCALE NOTED
SHEET 3 OF 7

SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MXC 203112			
H		REVISED PER MXC 203444		2 AUG 65	
J		REVISION STATUS CHANGED		6 AUG	
K		REVISED PER MXC 205205		28 SEP 65	
L		INITIAL RELEASE CLASS A PER TDRR 23919		9 OC	



(50) 6 REQD SEE NOTE 4
(34)(29)(30) 6 EA REQD
PARTIAL SECTION V-V
2 REQ'D (46)
V
5.25
V
T
T
7.50
6.38
2.25
(24) 2 REQ'D
(50) 2 REQ'D SEE NOTE 4
(34)(29)(30) 2 EACH REQ'D
4 EACH REQD (35)(29)(30)
PARTIAL SECTION T-T
14.43
SHEET 7 ZONE G5
X
X
APPROX 1 WHEN DRAWER IS IN CLOSED POSITION
(50)(29)(30)(33) SEE NOTE 4
(2) REF
4 EACH REQD (34)(30)(39)

PARTIAL SECTION B-B
SCALE: 1/4
SHT 2 ZONE C-5

2900058-011	2900023-011
NEXT ASSY	USED ON
APPLICATION	

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MATERIAL
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AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 24-MAR-65
CHECKED 6 JUL 5
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

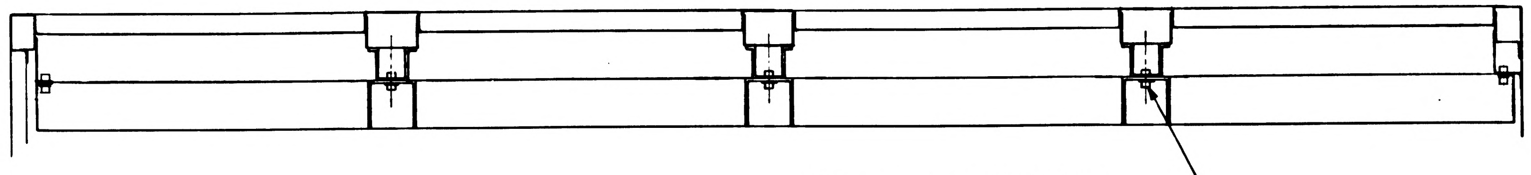
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABINET ASSEMBLY
ELECTRICAL EQUIPMENT
OPTICS-INERTIAL
ANALYZER ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900032
SCALE NOTED
SHEET 4 OF 7

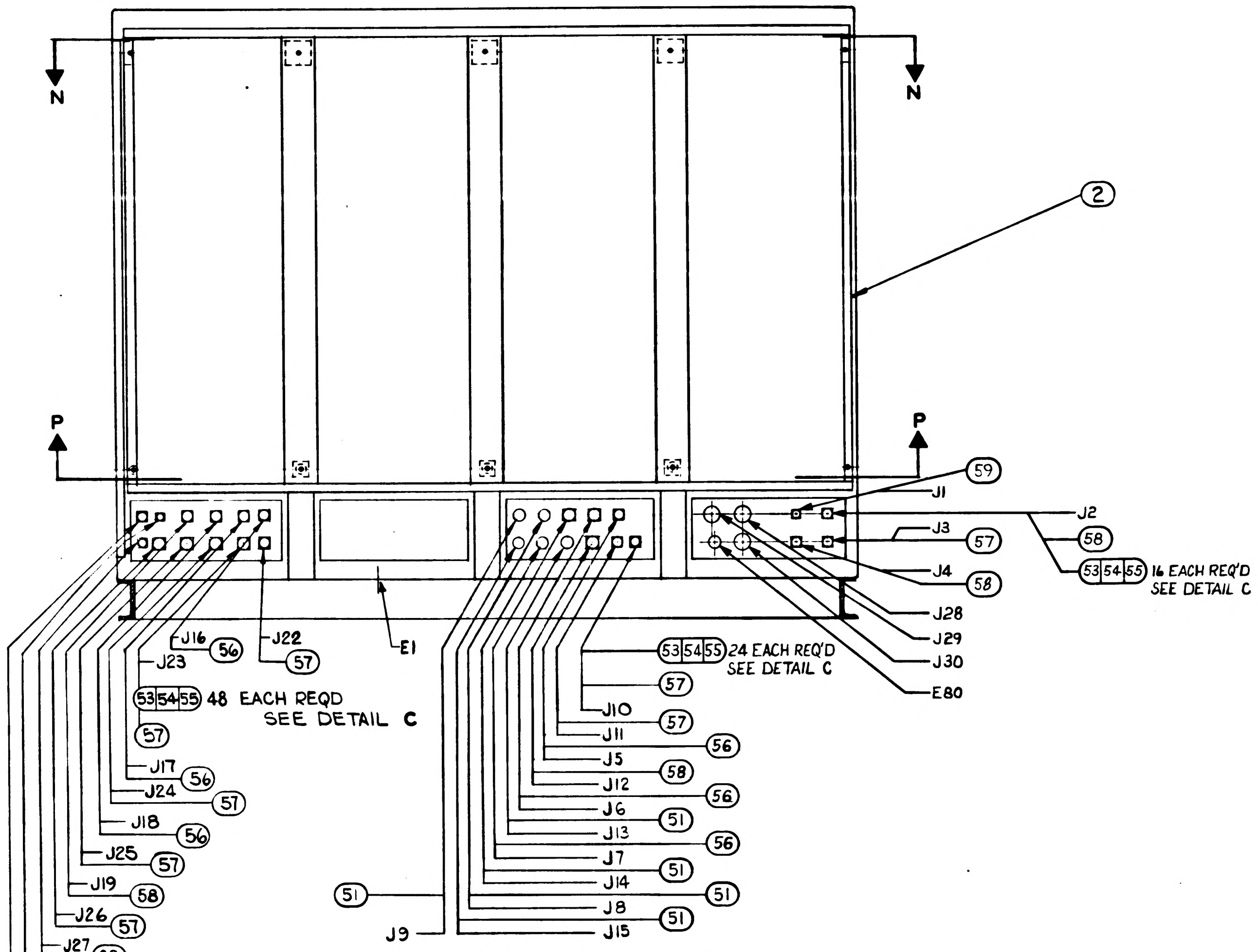
2900032
SHT 5 OF 7

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MX- 20312		19-JUL 65	
H		REVISION STATUS CHANGED		2 AUG 65	
J		REVISION STATUS CHANGED		AUG 65	
K		REVISION STATUS CHANGED		28 SEP 65	
L		INITIAL RELEASE CLASS A PER TDRR 23419		9 65	



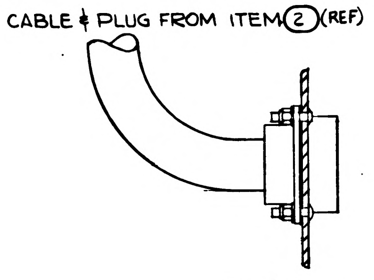
41 31 48 5 EACH REQD

PARTIAL SECTION N-N
SCALE 1/4



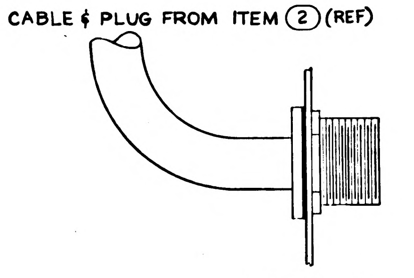
N
N
2
P
P
59
J1
J2
58
J3
57
J4
58
53 54 55 16 EACH REQ'D
SEE DETAIL C
J28
J29
J30
E80
E1
J16
56
J22
57
J23
53 54 55 48 EACH REQD
SEE DETAIL C
57
J17
56
J24
57
J18
56
J25
57
J19
58
J26
57
J27
60
J20
65
J21
57
53 54 55 24 EACH REQ'D
SEE DETAIL C
57
J10
57
J11
56
J5
58
J12
56
J6
51
J13
56
J7
51
J14
51
J8
51
J15
51
J9

PARTIAL SECTION C-C



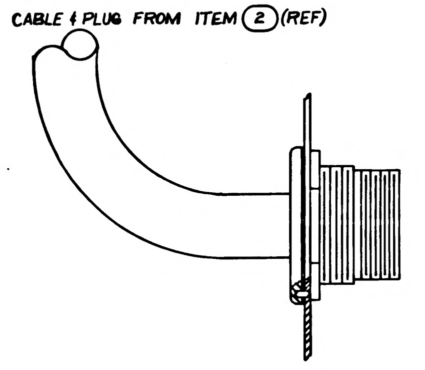
CABLE & PLUG FROM ITEM 2 (REF)

DETAIL C
INSTALLATION OF J1 THRU J7, J10 THRU J12 & J16 THRU J27.



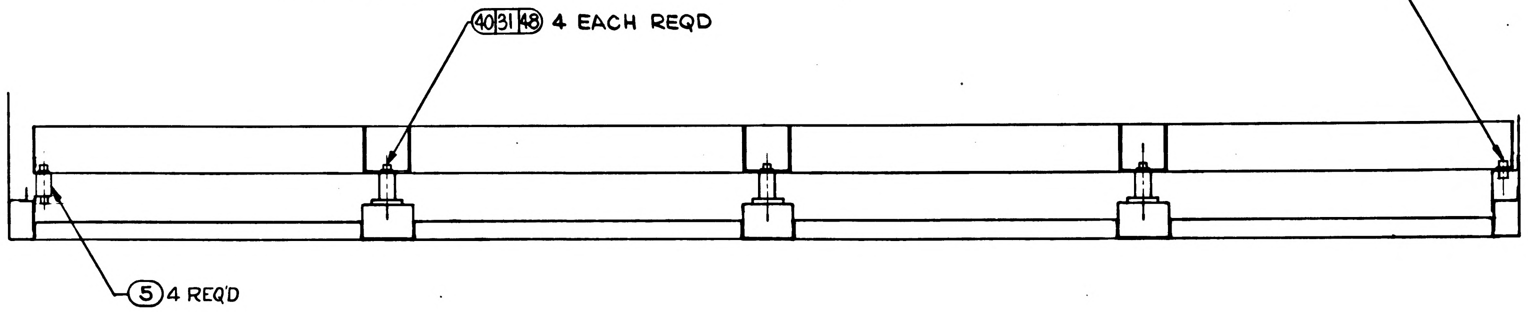
CABLE & PLUG FROM ITEM 2 (REF)

DETAIL E
INSTALLATION OF J8, J9, J13, J14, & J15.



CABLE & PLUG FROM ITEM 2 (REF)

DETAIL F
INSTALLATION OF J28, J29 & J30



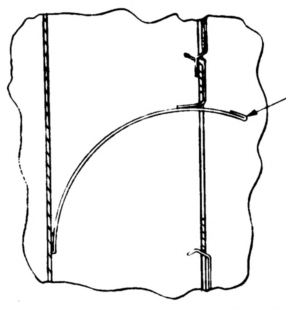
40 31 48 4 EACH REQD
41 31 48
5 4 REQ'D

PARTIAL SECTION P-P
SCALE 1/4

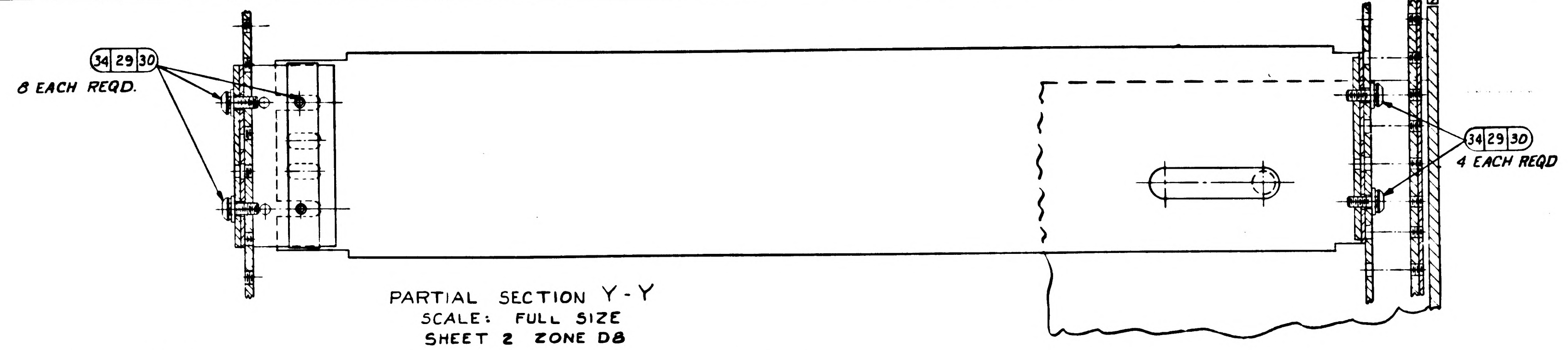
2900058-011	2900023-011	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ± DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
NEXT ASSY	USED ON	MATERIAL	DRAWN Bender DATE 24 MAR 65 CHECKED 6 JUL 65 APPROVAL APPROVAL	CABINET ASSEMBLY ELECTRICAL EQUIPMENT OPTICS-INERTIAL ANALYZER ASSEMBLY	
APPLICATION		CONTRACT NAS9-497	NASA APPROVAL MIT APPROVAL	CODE IDENT NO. 99974	SIZE E
				2900032	
				SCALE NOTED	SHEET 5 OF 7

2900032 L

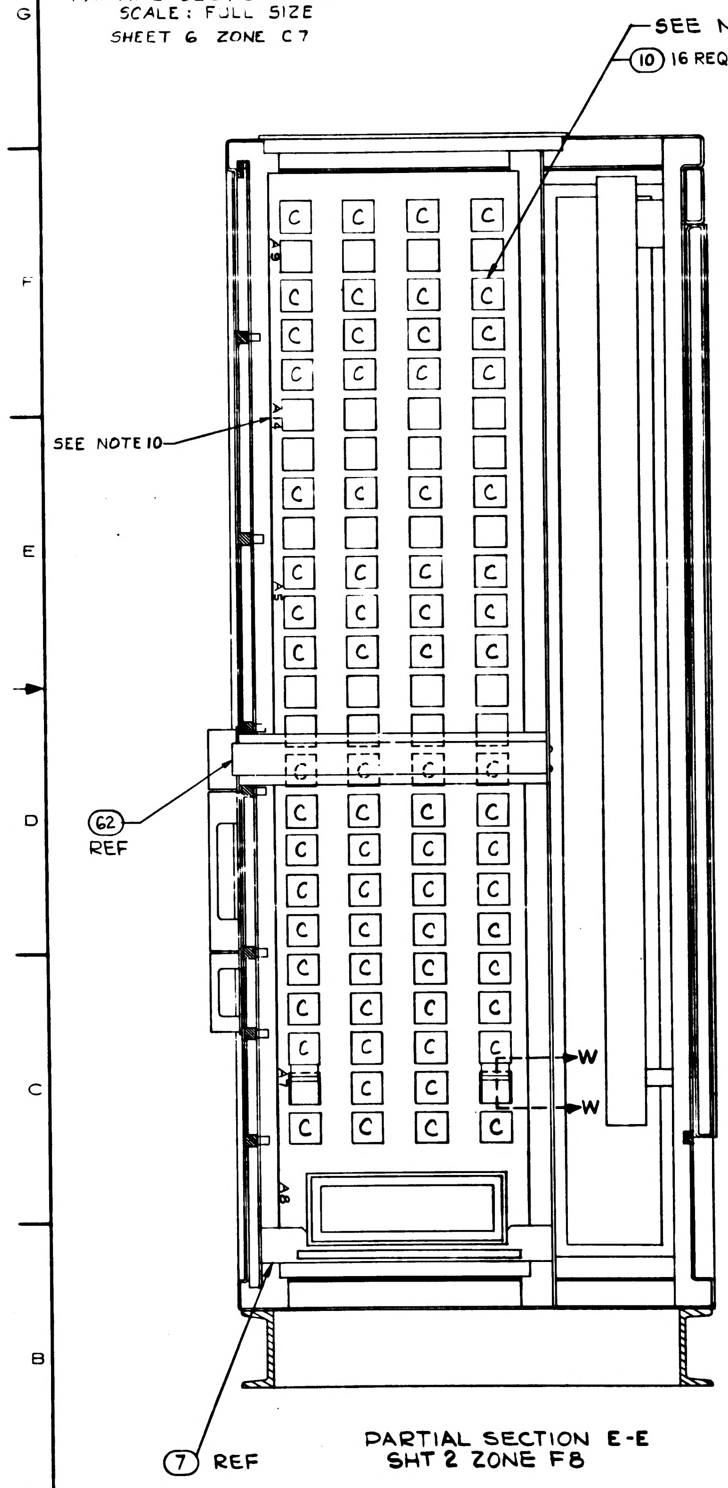
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
REVISIONS					
G		THIS SHEET ADDED PER MX 203112		[illegible] 65	M.J. RWH
H		REVISION STATUS CHANGED		2 AUG 65	RP
J		REVISION STATUS CHANGED		6 AUG 65	[illegible]
K		REVISION STATUS CHANGED		28 SEP 65	[illegible]
L		INITIAL RELEASE CLASS A PER TDRR 23919		8 OCT 65	[illegible]



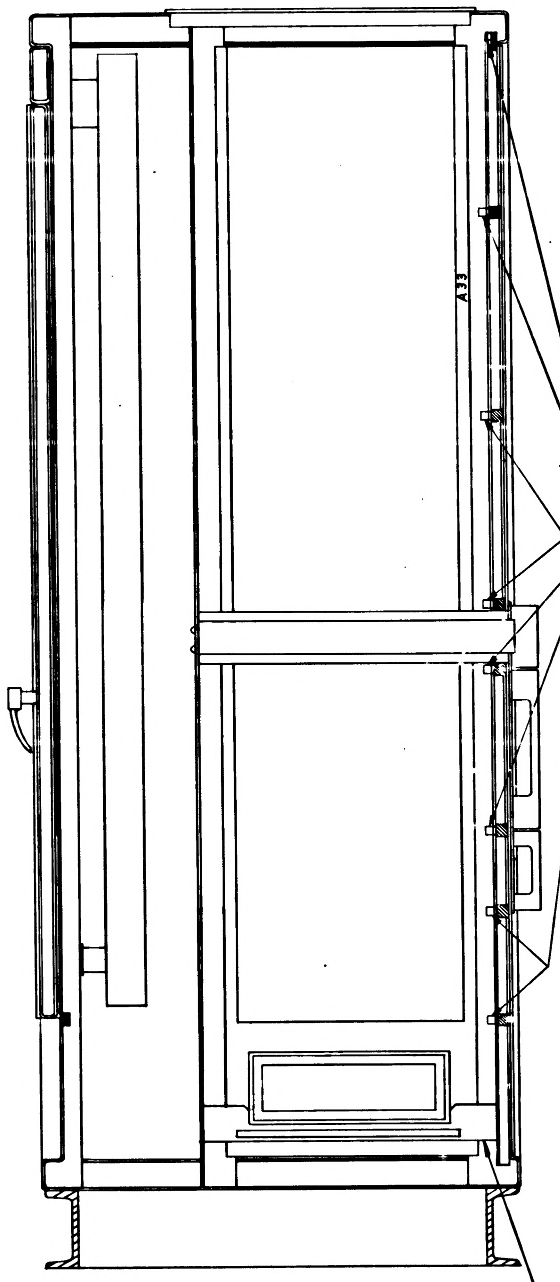
PARTIAL SECTION W-W
SCALE: FULL SIZE
SHEET 6 ZONE C7


(34)(29)(30)
8 EACH REQD.
(34)(29)(30)
4 EACH REQD

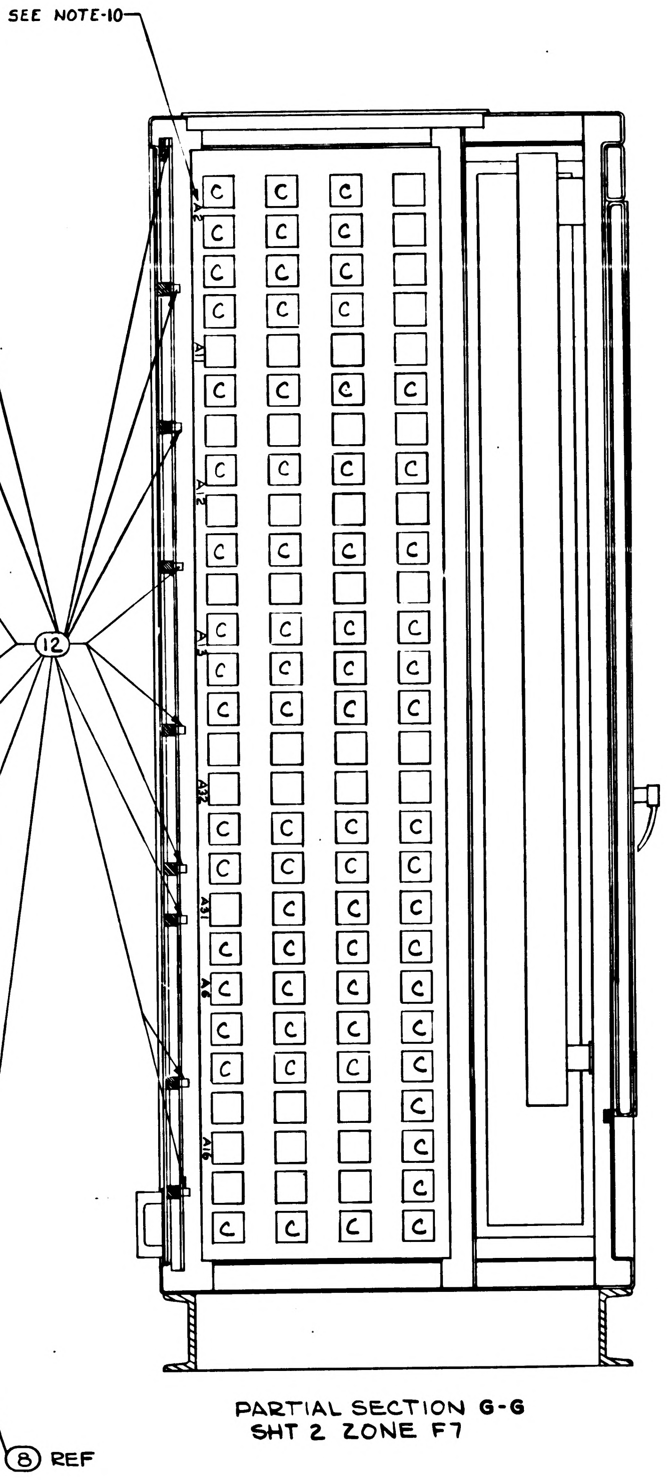
PARTIAL SECTION Y-Y
SCALE: FULL SIZE
SHEET 2 ZONE D8


SEE NOTE 5.
(10) 16 REQD
SEE NOTE 10
(62) REF
(7) REF
W
W

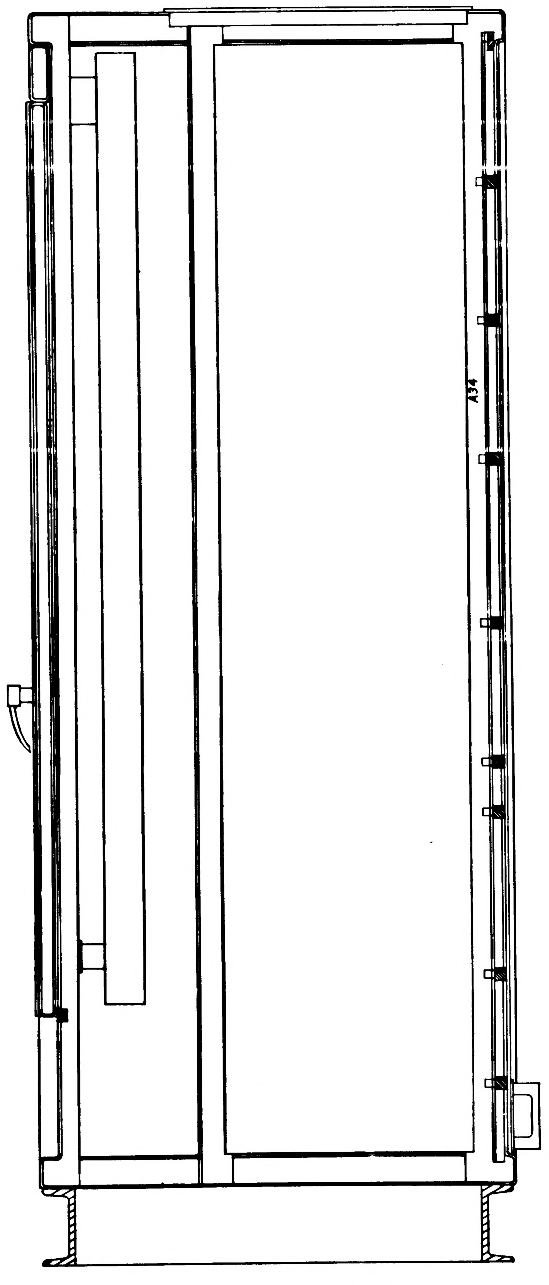
PARTIAL SECTION E-E
SHT 2 ZONE F8



PARTIAL SECTION F-F
SHT 2 ZONE F7


SEE NOTE-10
(12)
(8) REF

PARTIAL SECTION G-G
SHT 2 ZONE F7



PARTIAL SECTION H-H
SHT 2 ZONE F6

2900058-011	2900023-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS + − ANGLES + −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

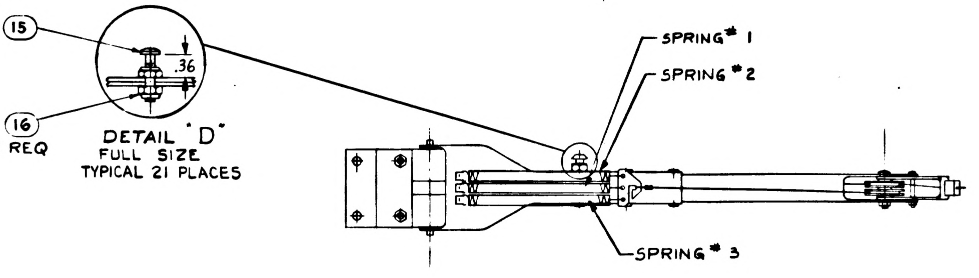
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 24-MAR-65
CHECKED [illegible] 6 JUL 65
APPROVAL G. Stoddard [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
BLOCK II/LEM

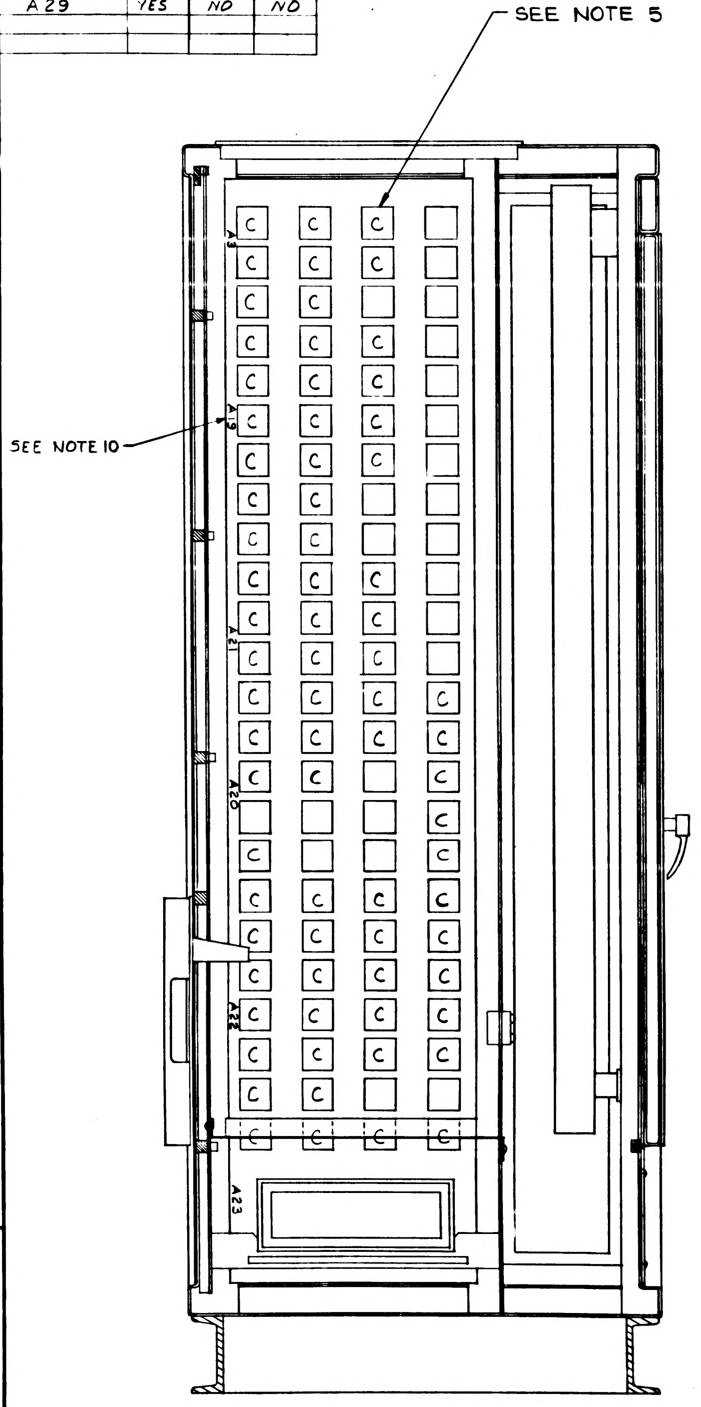
CABINET ASSEMBLY
ELECTRICAL EQUIPMENT
OPTICS INERTIAL
ANALYZER ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900032
SCALE
SHEET 6 OF 7

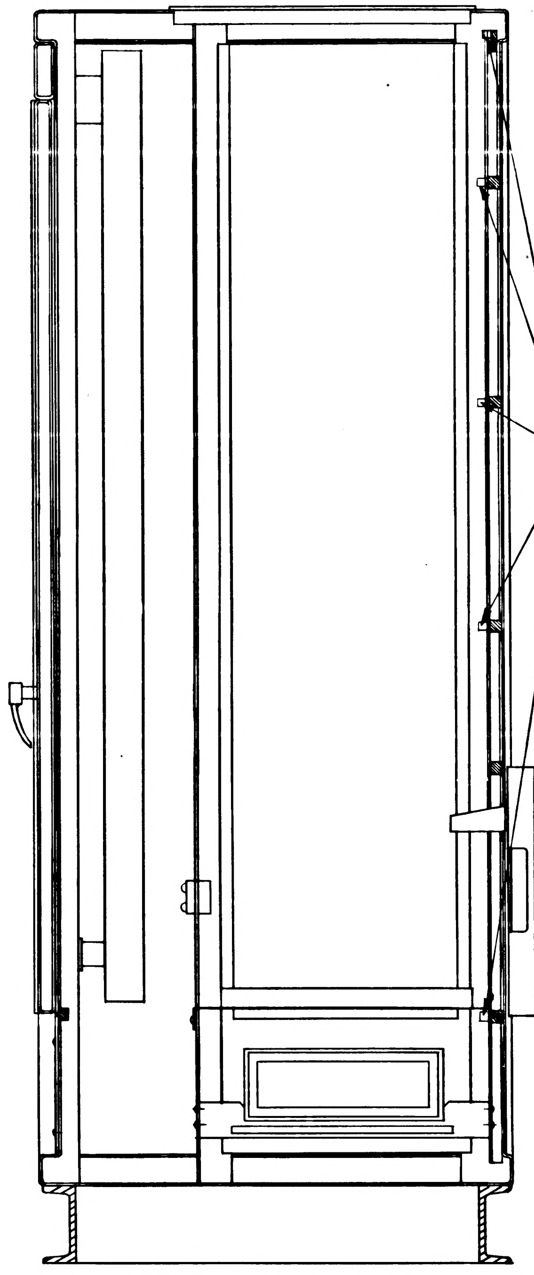
ALL CABLE RETRACTORS HAVE 3 SPRINGS UNLESS SHOWN BELOW			
DRAWER NUMBER	SPRINGS REQUIRED		
	#1	#2	#3
A2	NO	YES	YES
A31	NO	YES	YES
A16	YES	NO	NO
A3	NO	YES	YES
A19	NO	YES	YES
A20	NO	YES	YES
A18	NO	YES	YES
A10	NO	YES	YES
A4	NO	YES	YES
A26	NO	YES	YES
A6	YES	NO	NO
A29	YES	NO	NO


15
16
.36
DETAIL "D"
2 REQ
FULL SIZE
TYPICAL 21 PLACES
SPRING # 1
SPRING # 2
SPRING # 3

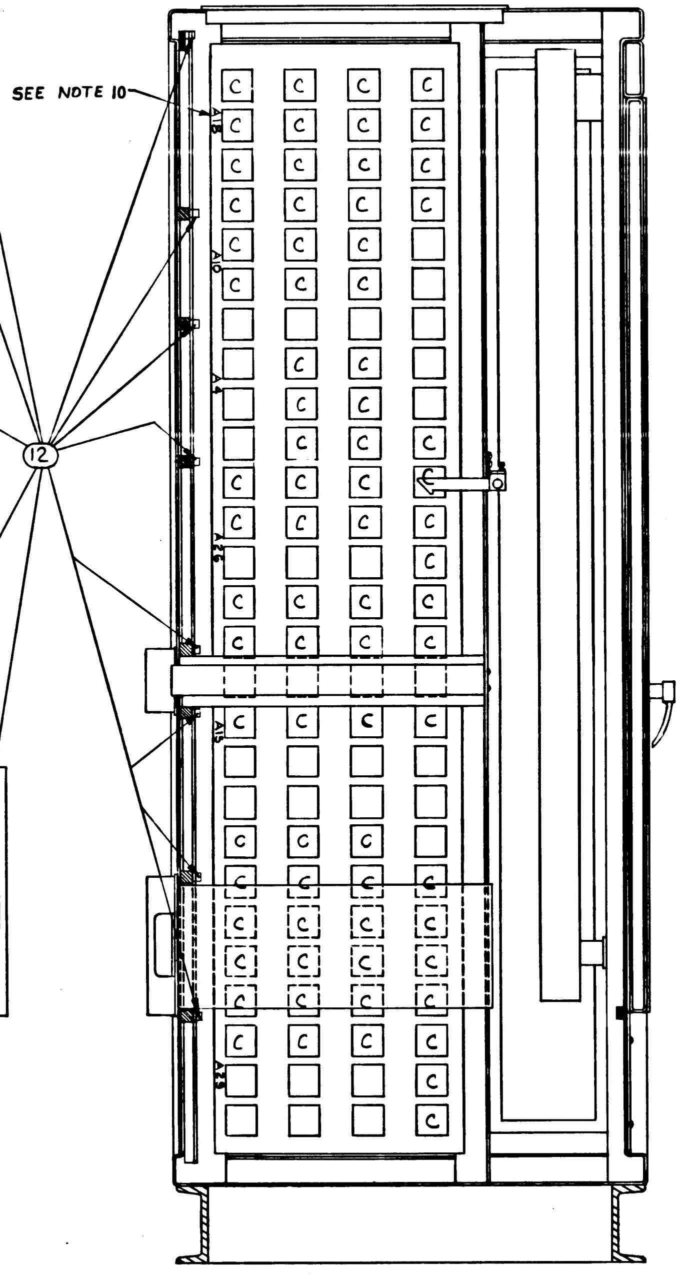
VIEW X-X
HALF SIZE
SHEET 4 ZONE A7


SEE NOTE 5
SEE NOTE 10
A3
A19
A21
A20
A26
A23

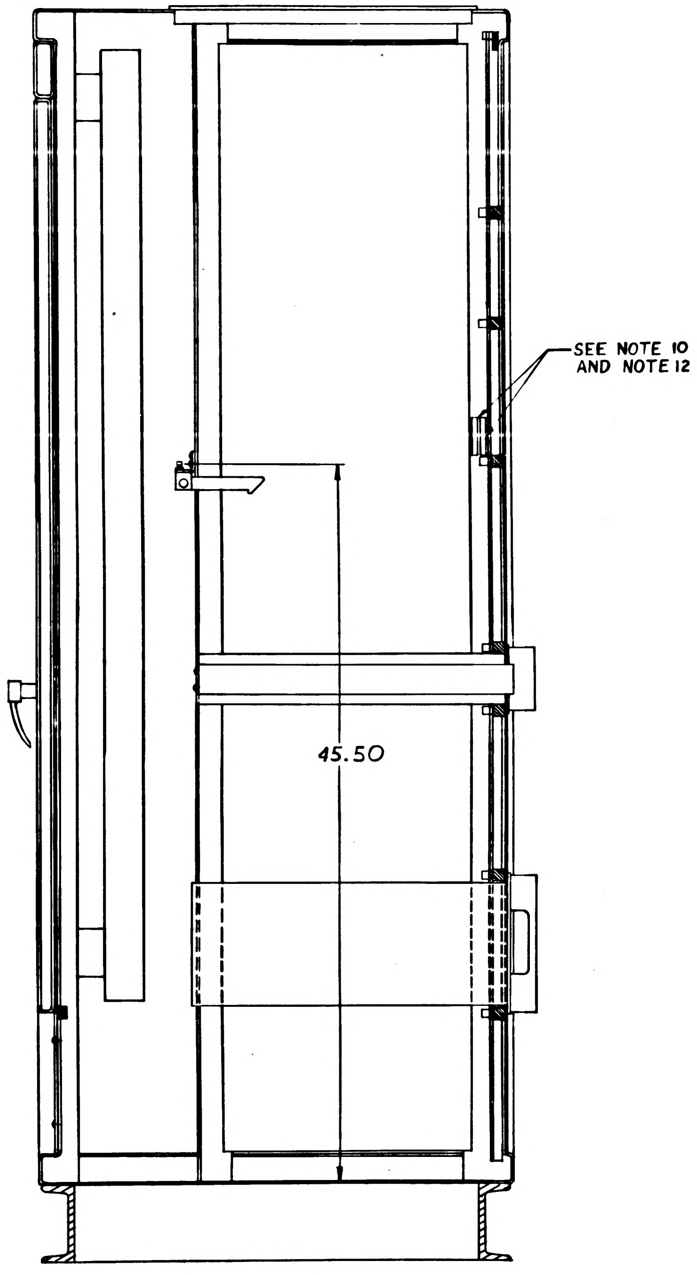
PARTIAL SECTION J-J
SHT 2 ZONE F7



PARTIAL SECTION K-K
SHT 2 ZONE F7


SEE NOTE 10
12
A18
A10
A4
A26
A15
A29

PARTIAL SECTION L-L
SHT 2 ZONE F6


SEE NOTE 10
AND NOTE 12
45.50

PARTIAL SECTION M-M
SHT 2 ZONE F6

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MXC 203.12		19-JUL 65	[illegible]
H		REVISION STATUS CHANGED		2 AUG 65	[illegible]
J		REVISION STATUS CHANGED		[illegible]	[illegible]
K		REVISION STATUS CHANGED		28 SEP 65	[illegible]
L		INITIAL RELEASE CLASS A PER TDRR 23119		[illegible] 65	[illegible]

2900058-011	2900023-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-947

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 24 MAR-65
CHECKED [illegible] 6 JUL 65
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABINET ASSEMBLY
ELECTRICAL EQUIPMENT
OPTICS-INERTIAL
ANALYZER ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900032
SCALE
SHEET 7 OF 7

L 2900032 B

SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		REPLACES REVISION F WITH CHANGE PER MXC 203112	—	19-JUL 65	TWH
H		REVISED PER MXC 203444		2 AUG 65	RLP
J		REVISED PER MXC 203526		6 AUG 65	RTP
K		REVISION STATUS CHANGED		28 SEP 65	
L		INITIAL RELEASE CLASS A PER TDRR 23419		19 OCT 65	
M		REVISED PER TDRR 27583			

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM, SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.
3. MARK CHARACTERS PER ND 1002019, .12 HIGH, COLOR BLACK. CENTRALIZE AS SHOWN.
4. SELECT ITEM (50) DASH NUMBERS 2 THRU 15 AS REQUIRED AT ASSEMBLY.
5. [C] REPRESENTS A CLOSED OPENING IN THE AIR PLENUM OF ITEM ①. OPENINGS SHALL BE CLOSED WITH PLATES SUPPLIED WITH ITEM ① BY VENDOR PLUS THE QUANTITY SHOWN AS ITEM ⑩ TO COMPLETE THE REQUIREMENTS.
6. APPLY TIGHTENING TORQUE TO ALL SCREWS AS FOLLOWS, EXCEPT FOR PANEL ATTACHING SCREWS WHICH SHALL BE TORQUED TO 21.4 - 23.8 IN. LBS:
   - 6-32 8.6 - 9.6 IN. LBS
   - 8-32 17.8 - 19.8 IN. LBS
   - 10-32 28.5 - 31.7 IN. LBS
   - 3/8 - 24 233 - 259 IN. LBS
7. CONNECTOR INSTALLATION:
   - A. INSTALL J1 THRU J4 AND J28 THRU J30 INCLUSIVE OF ITEM ② INTO ITEM (49) AS SHOWN.
   - B. INSTALL J16 THRU J27 INCLUSIVE OF ITEM ② INTO ITEM (22) AS SHOWN.
   - C. INSTALL J5 THRU J15 INCLUSIVE OF ITEM ② INTO ITEM (52) AS SHOWN.
   - D. INSTALL GROUND LUGS TO E1 AND E80 AS SHOWN.
8. DISPOSE OF EXCESS DRAWER MOUNTING AND RETRACTOR HARDWARE.
9. AFTER ASSEMBLY OF ITEM ② TO ITEM ①, ATTACH RETRACTOR MOUNTED CABLES OF ITEM ② TO ITEM ⑫ IN THEIR RESPECTIVE AREAS.
10. MARK CHARACTERS PER ND 1002019, .38 HIGH, COLOR BLACK. CENTRALIZE AS SHOWN.
11. ADJUST ITEM (26) SO AS TO SUPPORT UNDER SIDE OF ITEM (62)
12. IDENTIFY USING DRAWING NUMBER PER MIL-STD-130 (ES-267) AND SERIALIZE PER ND 1002023
13. SELECT EITHER PART NO. 1901346 OR 1897313 FOR ITEM ⑩

SECTIONS APPEAR ON SHEETS AS FOLLOWS:

A-A SHT 3
B-B SHT 4
C-C SHT 5
D-D SHT 2
E-E SHT 6
F-F SHT 6
G-G SHT 6
H-H SHT 6
J-J SHT 7
K-K SHT 7
L-L SHT 7
M-M SHT 7
N-N SHT 5
P-P SHT 5
R-R SHT 3
S-S SHT 3
T-T SHT 4
U-U SHT 4
V-V SHT 4
W-W SHT 6
X-X SHT 4
Y-Y SHT 6
AA-AA SHT 2

DETAILS:
A SHT 4
B SHT 3
C SHT 5
D SHT 7
E SHT 5

PARTIAL VIEWS:
Q-Q SHT 2
Z-Z SHT 2

	QUANTITY REQUIRED 021	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1	-		67	2900058-021	HARNESS FRAME ASSY.
	X	-		66	2901206	RUNNING LIST
	1	1		65	1900368-009	GASKET-CONNECTOR
	1	1		64	1900364-011	BLANK PANEL ASSY (3.50)
	1	1		63	1900568	STORAGE DRAWER ASSY
	2	2		62	1900345-021	WRITING SURFACE ASSY
	1	1		61	1900550	GROUND PLATE
	1	1		60	1900368-006	GASKET-CONNECTOR
	1	1		59	-001	
	4	4		58	-003	
	9	9		57	-004	
	6	6		56	1900368-005	GASKET-CONNECTOR
	88	88		55	AN363C632 (1896990-261)	NUT, SELF LOCKING
	88	88		54	AN960C6L (1897006-036)	WASHER, FLAT #6
SEE NOTE 2	88	88		53	1006783-23	SCREW-BUTTON-HEX SOC
	1	1		52	1900365	PANEL (INSEP ASSY)
	5	5		51	1900369	GASKET-CONNECTOR
SEE NOTE 4	20	20		50	MS21919WDG-2 THRU 15 (1897073-202 THRU 215)	CLAMP, LOOP TYPE
	1	1		49	2900392	PANEL (INSEP ASSY)
	14	14		48	AN960C616 (1897006-062)	WASHER, FLAT
	1	1		47	1900309-011	PANEL ASSY, CROSSBAR SWITCH COMP
SEE NOTE 2	2	2		46	1015800-001	CABLE RETRACTOR
	1	1		45	1901656	INSULATOR PAD
	1	1		44	1900364-051	BLANK PANEL ASSY (10.50)
	1	1		43	1900364-021	BLANK PANEL ASSY (5.25)
	3	3		42	MS 171492	PIN

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED 021	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	6	6		41	MS 16995-79	SCREW, SOC HD CAP
	4	4		40	MS 16995-86	SCREW, SOC HD CAP
	8	8		39	AN363C1032 (1896990-011)	NUT, SELF LOCKING
	5	5		38	AN 335-6	NUT-HEX
				37		
SEE NOTE 2	4	4		36	1006783-46	SCREW, BUTTON HD - HEX SOC
SEE NOTE 2	55	55		35	1006783-45	
SEE NOTE 2	82	82		34	1006783-44	
SEE NOTE 2	1	1		33	1006783-43	SCREW, BUTTON HD - HEX SOC
				32		
	13	13		31	MS 35338-84	WASHER-LOCK 3/8
	114	114		30	AN960C10L (1897006-019)	WASHER, FLAT #10
	135	135		29	MS 35338-81	WASHER-LOCK #10
	1	1		28	1901657	INSULATOR BUSHING
	4	4		27	1900344	NUT BAR
	4	4		26	1900343	BRACKET
SEE NOTE 2	4	4		25	1015790-001	NUT BAR
	2	2		24	1900277	BRACKET
	1	1		23	1901687	PLATE, INSTRUCTION
	1	1		22	1901958	PANEL (INSEP ASSY)
	1	1		21	1900255-011	LATCH ASSY
	2	2		20	1900080	STUD-GROUND
				19		
	2	2		18	1900973	DEFLECTOR, AIR
				17		
	42	42		16	AN363C832 (1896990-281)	NUT, SELF LOCKING
SEE NOTE 2	21	21		15	1006783-29	SCREW, BUTTON HD - HEX SOC
SEE NOTE 2	4	4		14	1015819-001	AIR FILTER ASSY, SPECIAL
	12	12		13	MS35234-60	SCREW, PAN HD
SEE NOTE 2	30	30		12	1015991-001	SCREW, HANGER
SEE NOTES 5 & 13	16	16		10	1897313 1901346	COVER, VENTILATORY PLATE, CLOSURE
	4	4		9	1900308	GUIDE
	2	2		8	1900303	SUPPORT BRACKET R.H.
	2	2		7	1900304	SUPPORT BRACKET L.H.
	1	1		6	1902100	GUARD, SWITCH (INSEP ASSY)
	4	4		5	1900198	SPACER
	1	1		4	1900306	BAR-STOP
	1	1		3	1900305	SUPPORT SHEET
	-	1		2	2900058-011	HARNESS FRAME ASSY
SEE NOTE 2	1	1		1	2900043	CABINET ASSY, BASIC

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-021	2900022-021	-021
2900023-011	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± .02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender 24-MAR 65 DATE
CHECKED 24-MAR 65
APPROVAL G. Stoddard 24-MAR 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

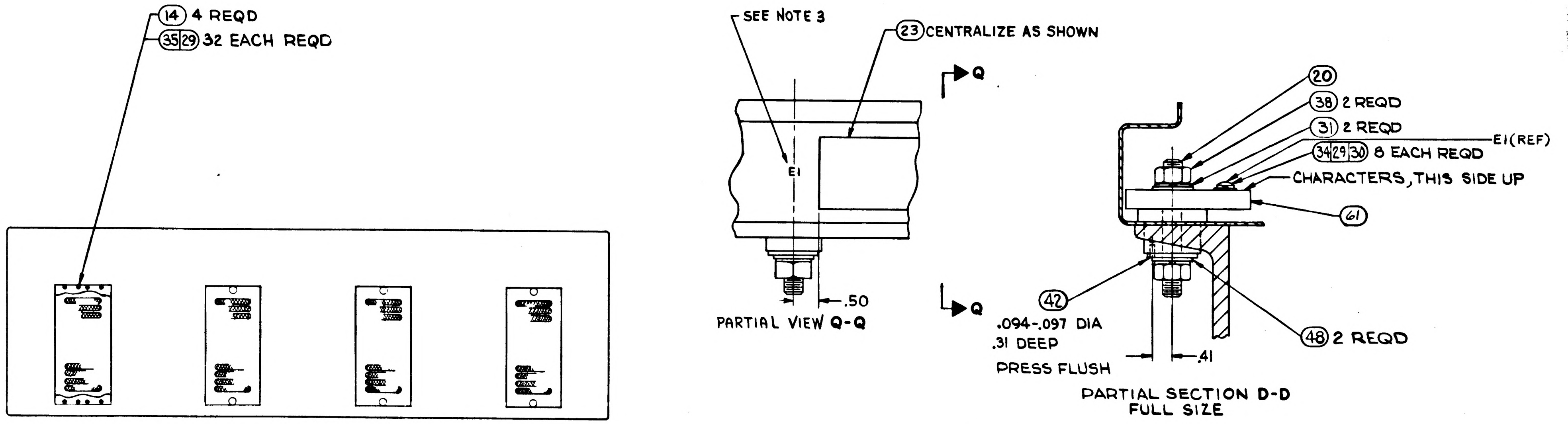
CABINET ASSEMBLY
ELECTRICAL EQUIPMENT
OPTICS INERTIAL ANALYZER
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900032
SCALE NOTED
SHEET 1 OF 7

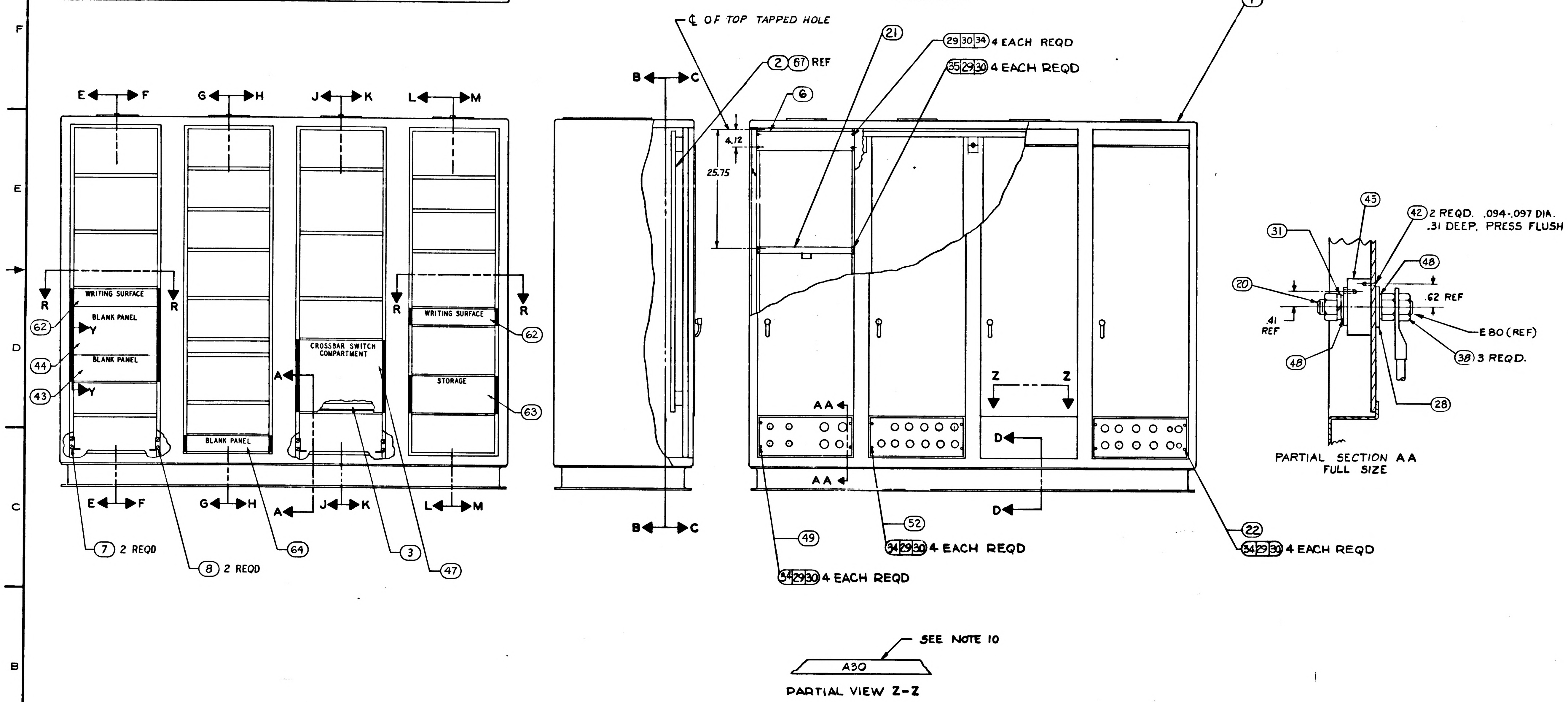
8 JUL 65

2900032 M

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MXC 203112		19-JUL 65	
H		REVISION STATUS CHANGED		2 AUG 65	
J		REVISED PER MXC 203526			
K		REVISION STATUS CHANGED		28 SEP 65	
L		INITIAL RELEASE CLASS A PER TDRR 23413		9 OCT 65	
M		REVISED PER TDRR 27583		4 APR 66	



(14) 4 REQD
(35)(29) 32 EACH REQD
SEE NOTE 3
E1
.50
PARTIAL VIEW Q-Q
(23) CENTRALIZE AS SHOWN
Q
Q
(20)
(38) 2 REQD
(31) 2 REQD
(34)(29)(30) 8 EACH REQD
E1(REF)
CHARACTERS, THIS SIDE UP
(61)
(42)
.094-.097 DIA
.31 DEEP
PRESS FLUSH
.41
(48) 2 REQD
PARTIAL SECTION D-D
FULL SIZE

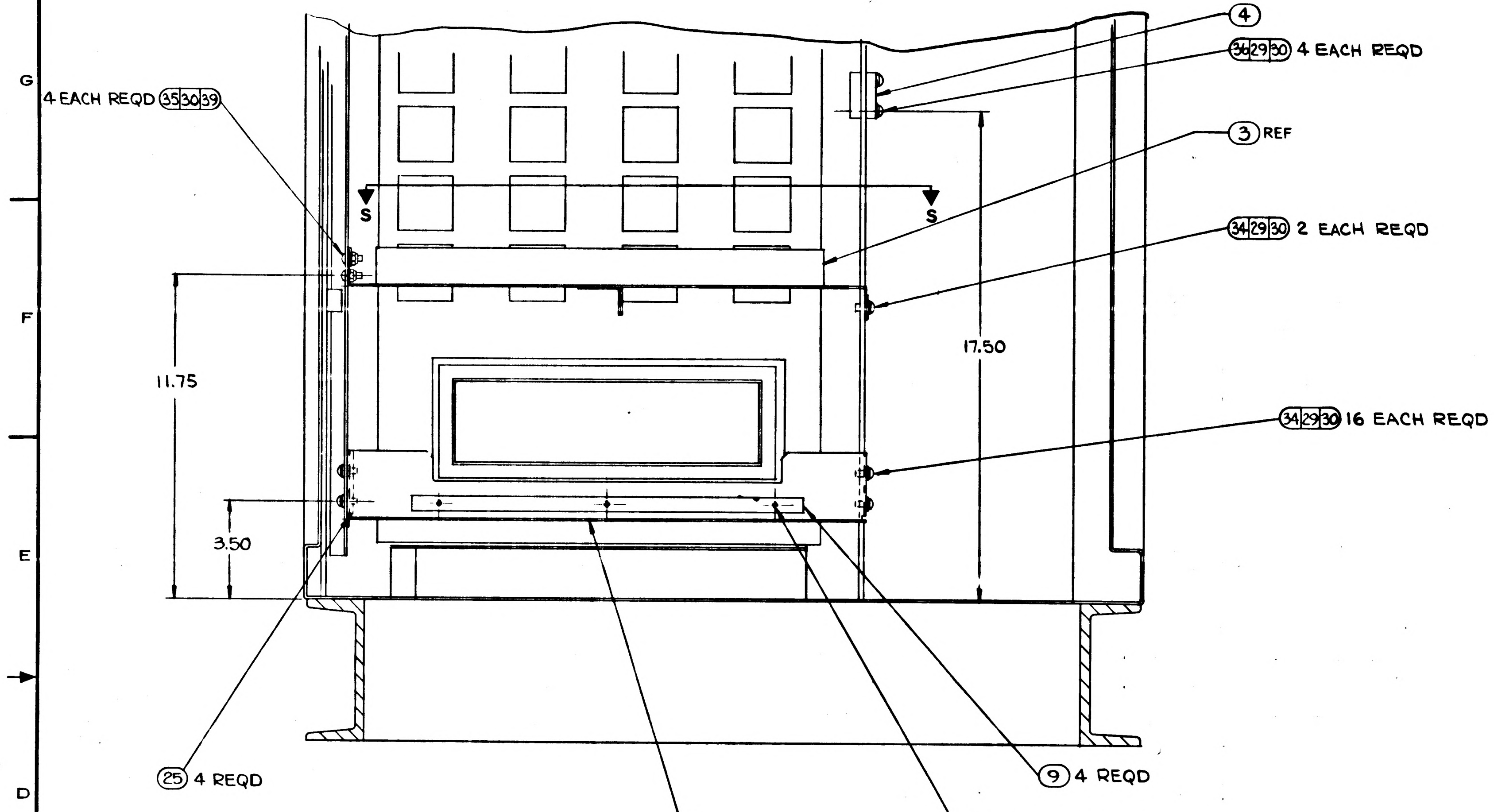


℄ OF TOP TAPPED HOLE
(21)
(29)(30)(34) 4 EACH REQD
(35)(29)(30) 4 EACH REQD
(1)
(2)(67) REF
(6)
B
C
4.12
25.75
E F
G H
J K
L M
R R
WRITING SURFACE
BLANK PANEL
Y
BLANK PANEL
Y
(62)
(44)
(43)
CROSSBAR SWITCH COMPARTMENT
A
WRITING SURFACE
STORAGE
R R
(62)
(63)
BLANK PANEL
AA
AA
Z Z
D
D
E F
G H
A
J K
L M
B C
(7) 2 REQD
(8) 2 REQD
(64)
(3)
(47)
(52)
(34)(29)(30) 4 EACH REQD
(49)
(34)(29)(30) 4 EACH REQD
(22)
(34)(29)(30) 4 EACH REQD
(43)
(42) 2 REQD. .094-.097 DIA.
.31 DEEP, PRESS FLUSH
(31)
(48)
(20)
.62 REF
.41
REF
E80 (REF)
(48)
(38) 3 REQD.
(28)
PARTIAL SECTION AA
FULL SIZE
SEE NOTE 10
A30
PARTIAL VIEW Z-Z

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
APPLICATION		DO NOT SCALE THIS DRAWING	DRAWN Bender DATE 24-JUN-65 CHECKED 6 JUL 65 APPROVAL 7 JUL 65 APPROVAL	CABINET ASSEMBLY - ELECTRICAL EQUIPMENT OPTICS INERTIAL ANALYZER ASSEMBLY
		MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 SIZE E 2900032
		CONTRACT NAS9-497	MIT APPROVAL	SCALE SHEET 2 OF 7

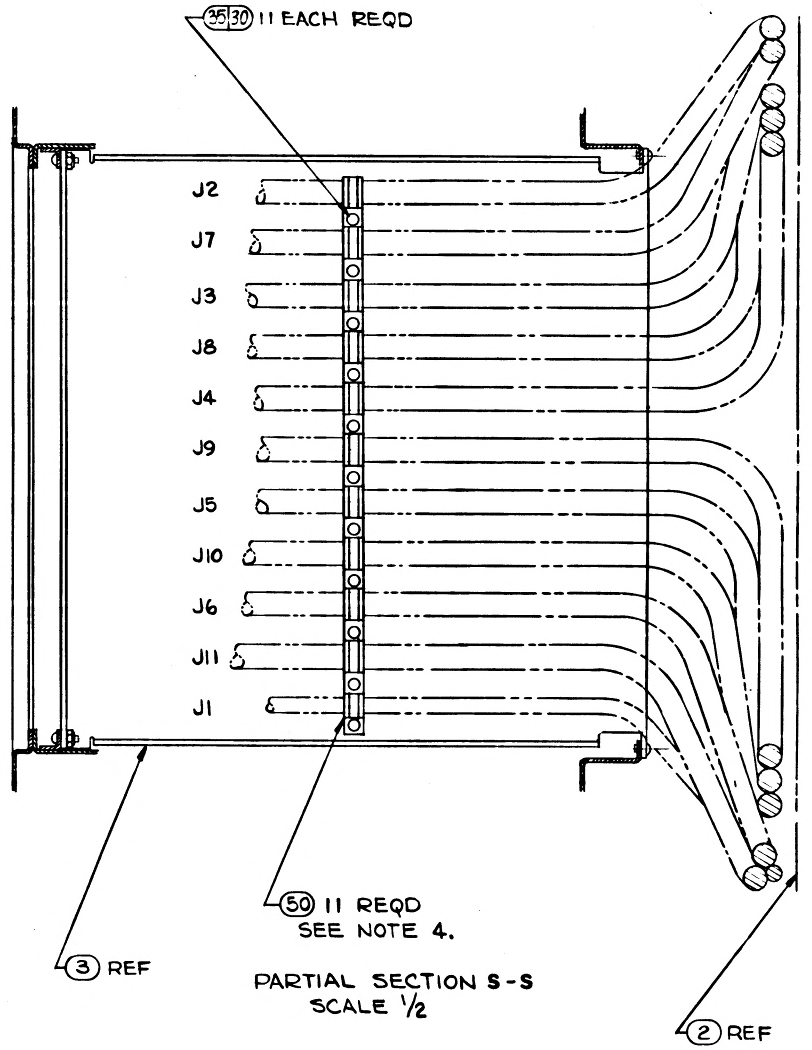
2900032 M

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
G		THIS SHEET ADDED PER MXC 203112	—	17-JL 65	M G / Ru
H		REVISION STATUS CHANGED		2 AUG 65	RJ
J		REVISION STATUS CHANGED			PTO
K		REVISION STATUS CHANGED		28 SEP 65	A.N.
Ⓜ L		INITIAL RELEASE CLASS A PER TDRR 23919		9 OCT 65	LF / CW
M		REVISION STATUS CHANGED		6 APR 66	RH



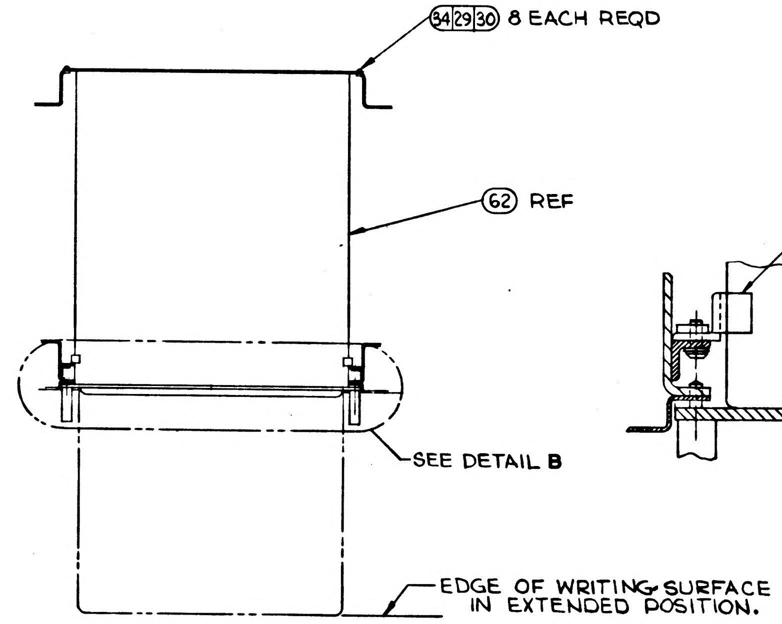
④
㊱㉙㉚ 4 EACH REQD
③ REF
㉞㉙㉚ 2 EACH REQD
㉞㉙㉚ 16 EACH REQD
4 EACH REQD ㉟㉚㊴
S
S
11.75
3.50
17.50
㉕ 4 REQD
⑨ 4 REQD
⑦ REF
⑬㉙㉚ 12 EACH REQD
INSTALL FROM FAR SIDE
4 PLACES

PARTIAL SECTION A-A
SCALE 1/2
SHT 2 ZONE C7



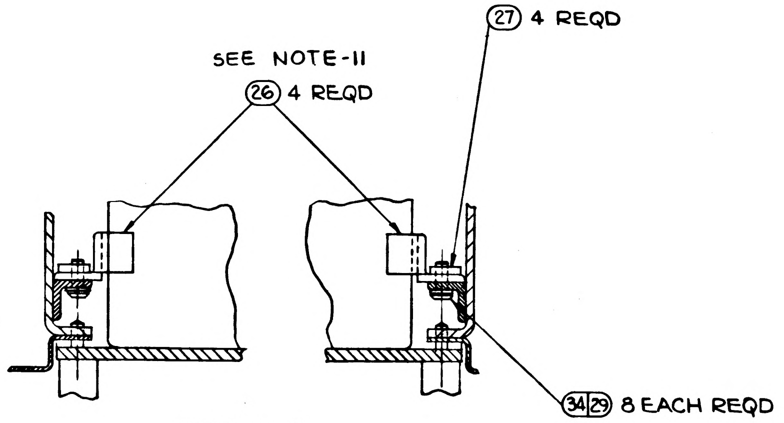
㉟㉚ 11 EACH REQD
J2
J7
J3
J8
J4
J9
J5
J10
J6
J11
J1
㊿ 11 REQD
SEE NOTE 4.
③ REF
② REF

PARTIAL SECTION S-S
SCALE 1/2



㉞㉙㉚ 8 EACH REQD
(62) REF
SEE DETAIL B
EDGE OF WRITING SURFACE
IN EXTENDED POSITION.

PARTIAL SECTION R-R
SCALE 1/4
SHT 2 ZONE D6 & 8



SEE NOTE-11
㉖ 4 REQD
㉗ 4 REQD
㉞㉙ 8 EACH REQD

DETAIL B
SCALE-FULL

2900058-011	2900027-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 24 MAR 65
CHECKED 6 JUL 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

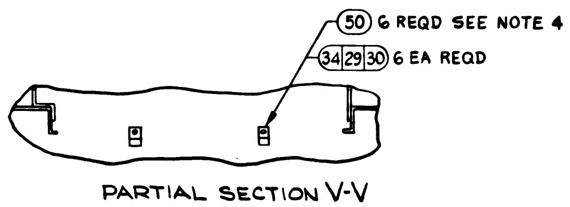
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

CABINET ASSEMBLY -
ELECTRICAL EQUIPMENT
OPTICS-INERTIAL
ANALYZER ASSEMBLY

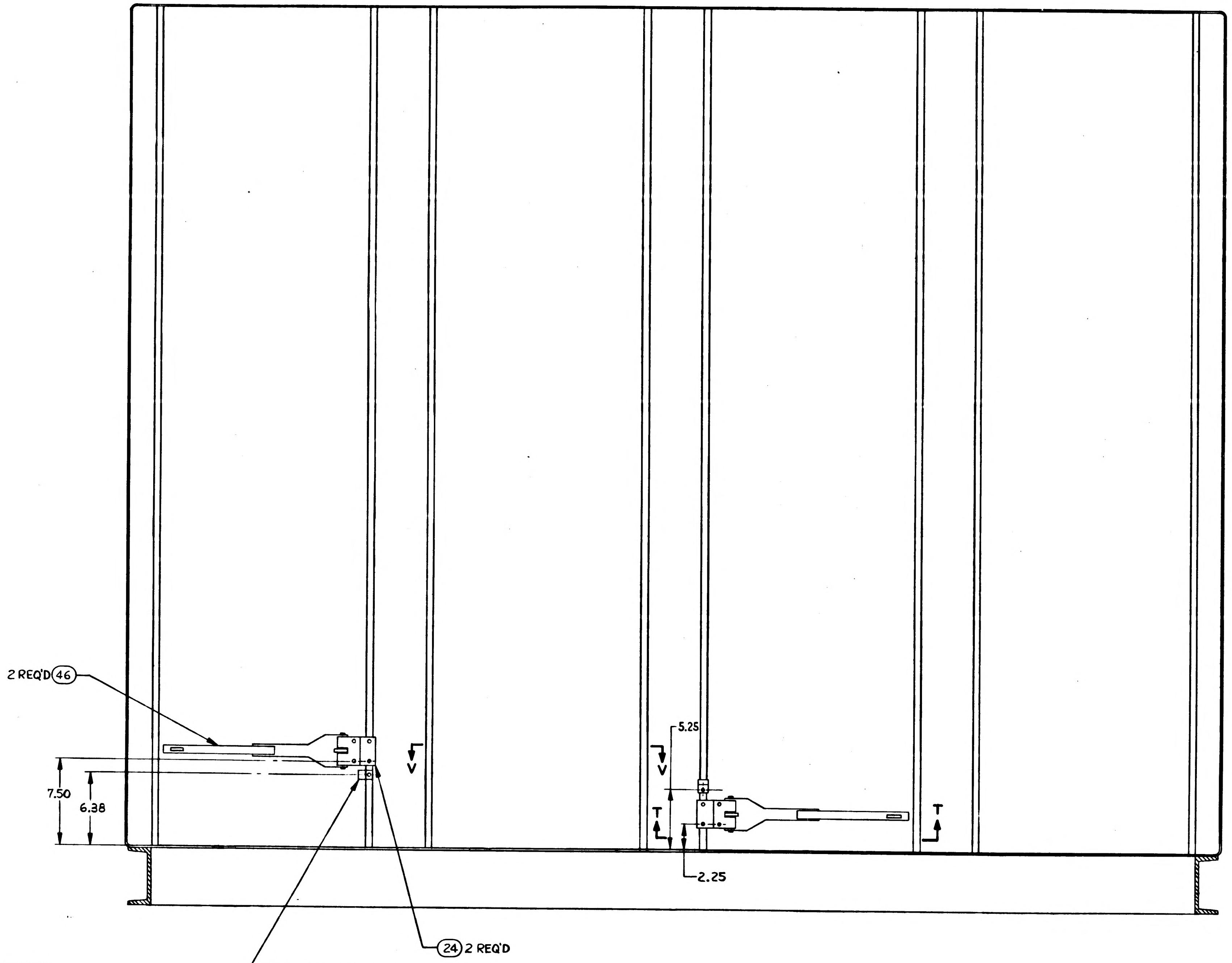
CODE IDENT NO. 99974
SIZE E
2900032
SCALE NOTED
SHEET 3 OF 7

2900032 M

SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MXC 203112		[illegible] 65	MG
H		REVISED PER MXC 203444		2 AUG 65	
J		REVISION STATUS CHANGED		6 AUG 65	RTB
K		REVISED PER MXC 205205		28 SEP 65	AN
L		INITIAL RELEASE CLASS A PER TDRR 23919		9 OCT 65	
M		REVISED PER TDRR 27583		3 APR 66	

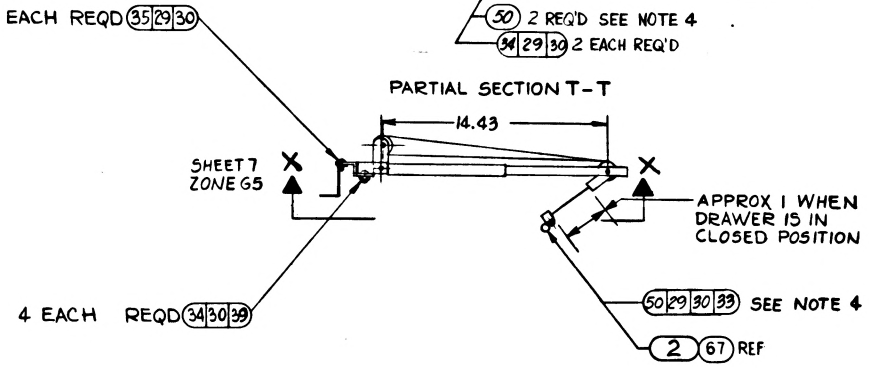

(50) 6 REQD SEE NOTE 4
(34)(29)(30) 6 EA REQD

PARTIAL SECTION V-V


2 REQ'D (46)
V
V
7.50
6.38
5.25
T
T
2.25
(24) 2 REQ'D

(50) 2 REQ'D SEE NOTE 4
(34)(29)(30) 2 EACH REQ'D

PARTIAL SECTION B-B
SCALE: 1/4
SHT 2 ZONE C-5


4 EACH REQD (35)(29)(30)
14.43
SHEET 7
ZONE G5
X
X
APPROX 1 WHEN DRAWER IS IN CLOSED POSITION
4 EACH REQD (34)(30)(39)
(50)(29)(30)(33) SEE NOTE 4
(2) (67) REF

PARTIAL SECTION T-T

2900058-011	2900023-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 24-MAR-65
CHECKED [illegible] 6 JUL 65
APPROVAL G. Stampa [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

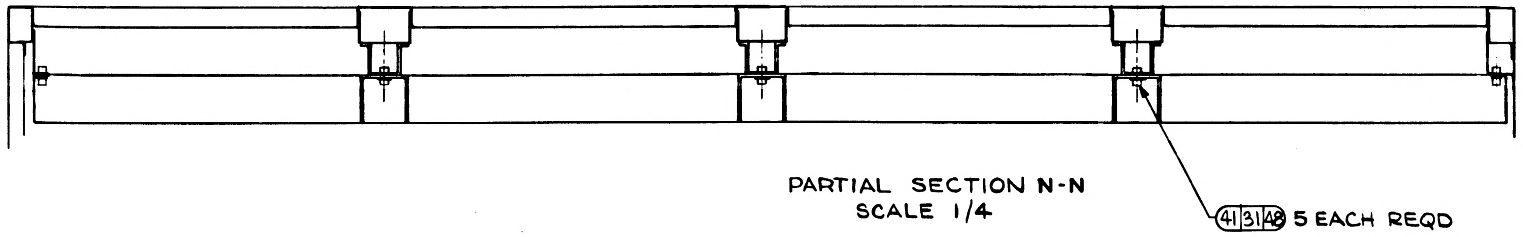
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABINET ASSEMBLY
ELECTRICAL EQUIPMENT
OPTICS-INERTIAL
ANALYZER ASSEMBLY

CODE IDENT NO. 99974 SIZE E 2900032
SCALE NOTED SHEET 4 OF 7

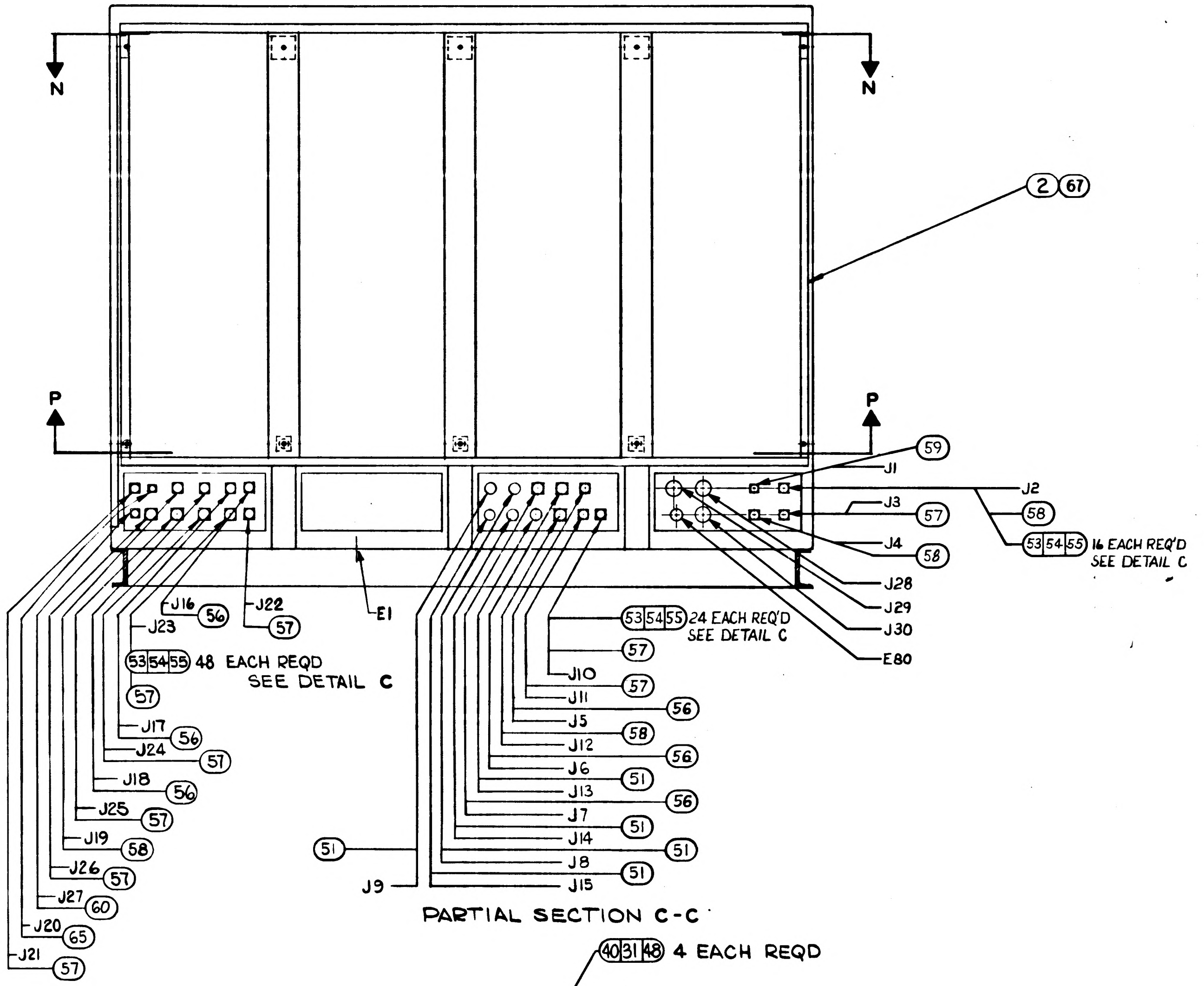
2900032 M

SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APP'D
G		THIS SHEET ADDED PER MXL 20312		19-JUL-65	RWH
H		REVISION STATUS CHANGED		2 AUG 65	
J		REVISION STATUS CHANGED		AUG 65	
K		REVISION STATUS CHANGED		28 SEP 65	A.N.
L		INITIAL RELEASE CLASS A PER TDRR 23419		9 OCT 65	
M		REVISED PER TDRR 27583		APR 66	



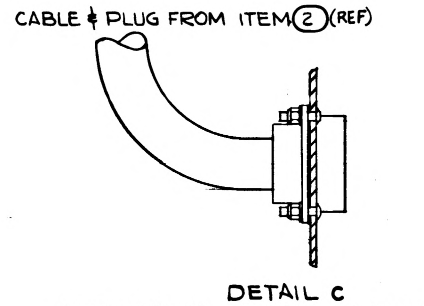
(41)(31)(48) 5 EACH REQD

PARTIAL SECTION N-N
SCALE 1/4



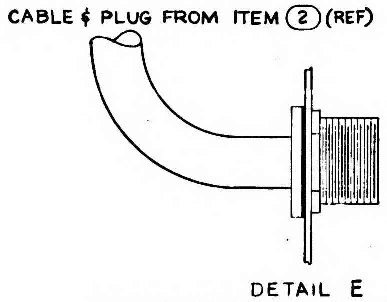
N
N
P
P
(2)(67)
(59)
J1
J2
J3
(57)
(58)
J4
(58)
(53)(54)(55) 16 EACH REQ'D
SEE DETAIL C
J28
J29
J30
E80
E1
J16
(56)
J22
(57)
J23
(53)(54)(55) 48 EACH REQD
SEE DETAIL C
(57)
J17
(56)
J24
(57)
J18
(56)
J25
(57)
J19
(58)
J26
(57)
J27
(60)
J20
(65)
J21
(57)
(53)(54)(55) 24 EACH REQ'D
SEE DETAIL C
(57)
J10
(57)
J11
(56)
J5
(58)
J12
(56)
J6
(51)
J13
(56)
J7
(51)
J14
(51)
J8
(51)
(51)
J9
J15

PARTIAL SECTION C-C



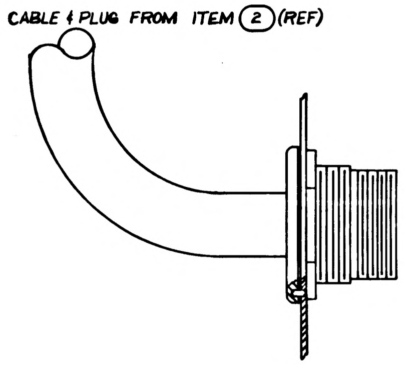
CABLE & PLUG FROM ITEM (2) (REF)

DETAIL C
INSTALLATION OF J1 THRU J7, J10 THRU J12 & J16 THRU J27.



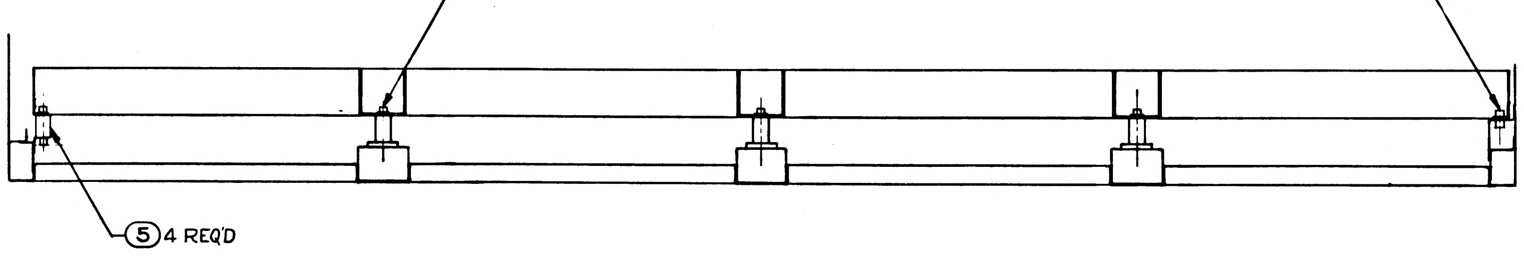
CABLE & PLUG FROM ITEM (2) (REF)

DETAIL E
INSTALLATION OF J8, J9, J13, J14, & J15.



CABLE & PLUG FROM ITEM (2) (REF)

DETAIL F
INSTALLATION OF J28, J29 & J30



(40)(31)(48) 4 EACH REQD
(41)(31)(48)
(5) 4 REQ'D

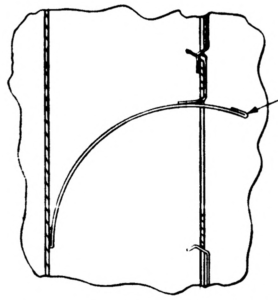
PARTIAL SECTION P-P
SCALE 1/4

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Bender DATE 24 MAR 65 CHECKED 6-JUL-65 APPROVAL APPROVAL	CABINET ASSEMBLY ELECTRICAL EQUIPMENT OPTICS-INERTIAL ANALYZER ASSEMBLY
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 SIZE E 2900032
CONTRACT NAS9-497	MIT APPROVAL	SCALE NOTED SHEET 5 OF 7

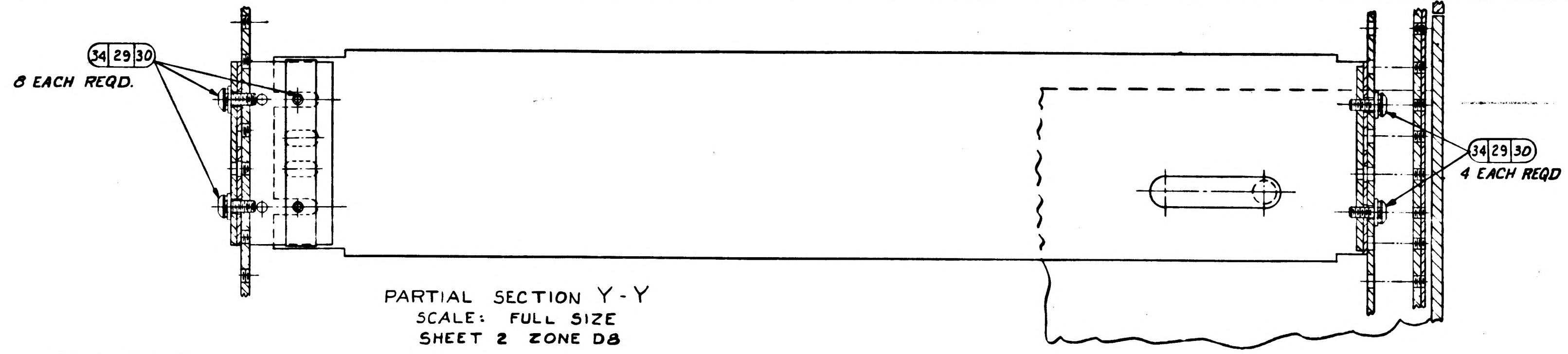
NEXT ASSY	USED ON
2900058-011	2900023-011
APPLICATION	

2900032 M

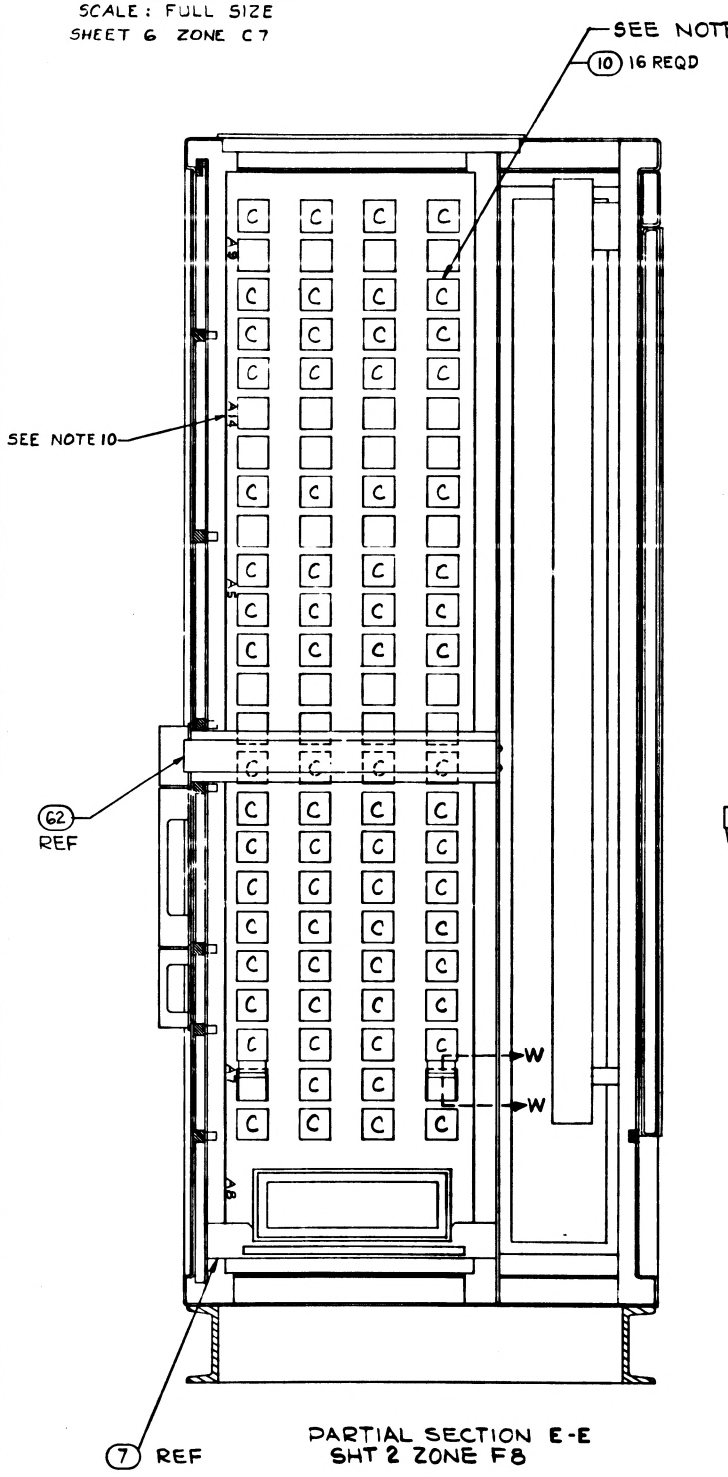
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MXC 203112		14-JL 65	M.G. RWH
H		REVISION STATUS CHANGED		2 AUG 65	
J		REVISION STATUS CHANGED		6 AUG 65	RTD
K		REVISION STATUS CHANGED		28 SEP 65	A.N.
L		INITIAL RELEASE CLASS A PER TDRR 23919		18 OCT 65	
M		REVISION STATUS CHANGED		2 APR 66	R.H.



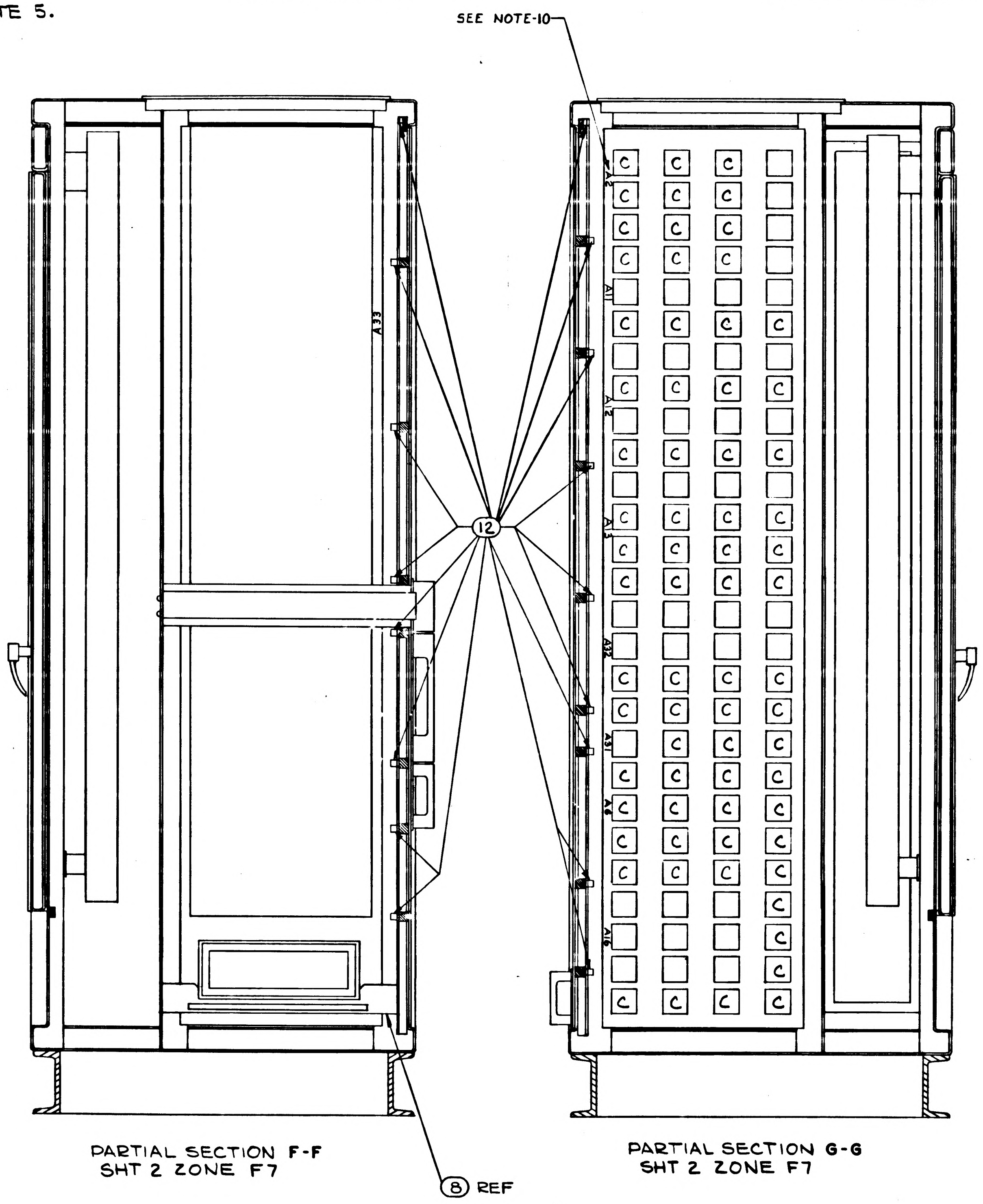
PARTIAL SECTION W-W
SCALE: FULL SIZE
SHEET 6 ZONE C7


(34)(29)(30)
8 EACH REQD.
(34)(29)(30)
4 EACH REQD

PARTIAL SECTION Y-Y
SCALE: FULL SIZE
SHEET 2 ZONE D8

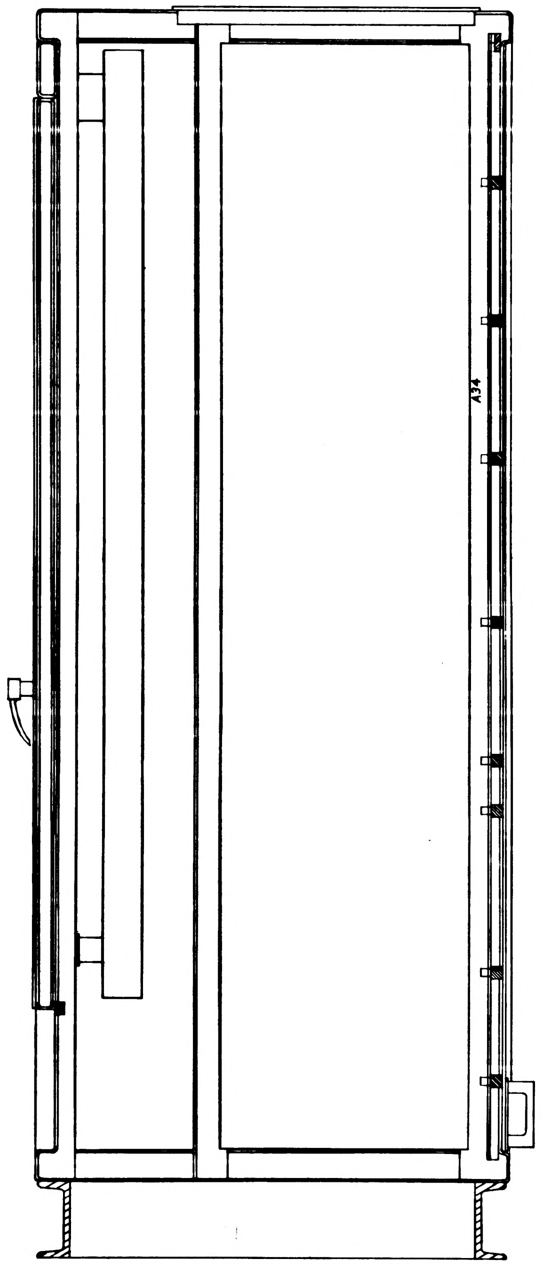

SEE NOTE 5.
(10) 16 REQD
SEE NOTE 10
(62) REF
W
W
(7) REF

PARTIAL SECTION E-E
SHT 2 ZONE F8


SEE NOTE-10
A33
(12)
(8) REF

PARTIAL SECTION F-F
SHT 2 ZONE F7

PARTIAL SECTION G-G
SHT 2 ZONE F7



PARTIAL SECTION H-H
SHT 2 ZONE F6

NEXT ASSY	USED ON
2900058-011	290023-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS + − ANGLES + −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 24-MAR-65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

CABINET ASSEMBLY
ELECTRICAL EQUIPMENT
OPTICS INERTIAL
ANALYZER ASSEMBLY

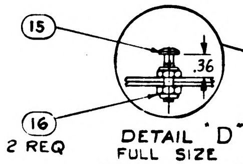
CODE IDENT NO 99974
SIZE E
2900032
SCALE
SHEET 6 OF 7

2900032 M

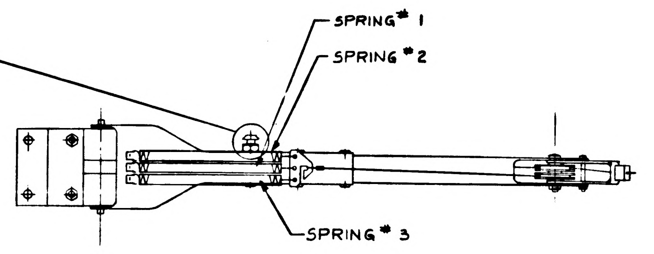
ALL CABLE RETRACTORS
HAVE 3 SPRINGS
UNLESS SHOWN BELOW

DRAWER NUMBER	SPRINGS REQUIRED		
	#1	#2	#3
A2	NO	YES	YES
A31	NO	YES	YES
A16	YES	NO	NO
A3	NO	YES	YES
A19	NO	YES	YES
A20	NO	YES	YES
A18	NO	YES	YES
A10	NO	YES	YES
A4	NO	YES	YES
A26	NO	YES	YES
A6	YES	NO	NO
A29	YES	NO	NO

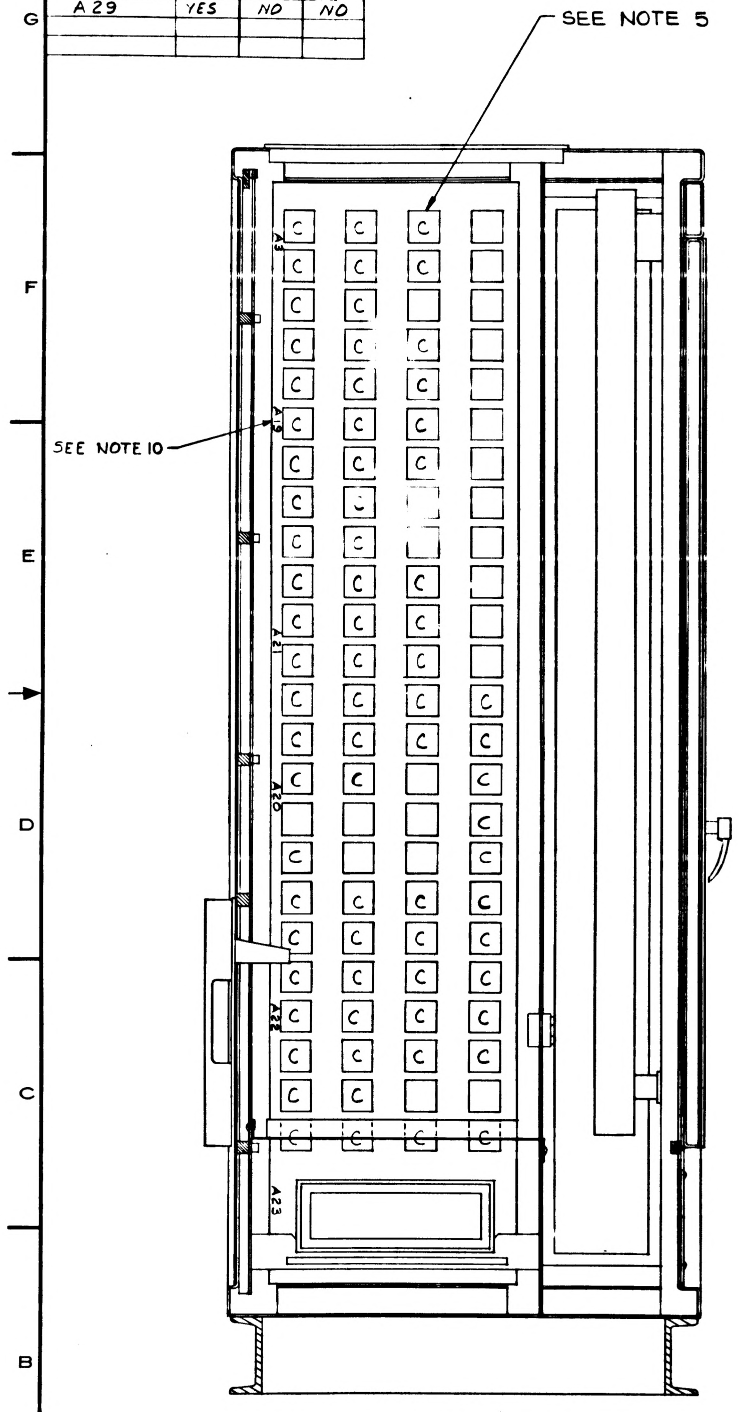
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MXC 203112		19-JUL 65	RWH
H		REVISION STATUS CHANGED		2 AUG 65	
J		REVISION STATUS CHANGED		6 AUG 65	
K		REVISION STATUS CHANGED		28 SEP 65	
L		INITIAL RELEASE CLASS A PER TDRR 23419		19 65	
M		REVISION STATUS CHANGED		66	



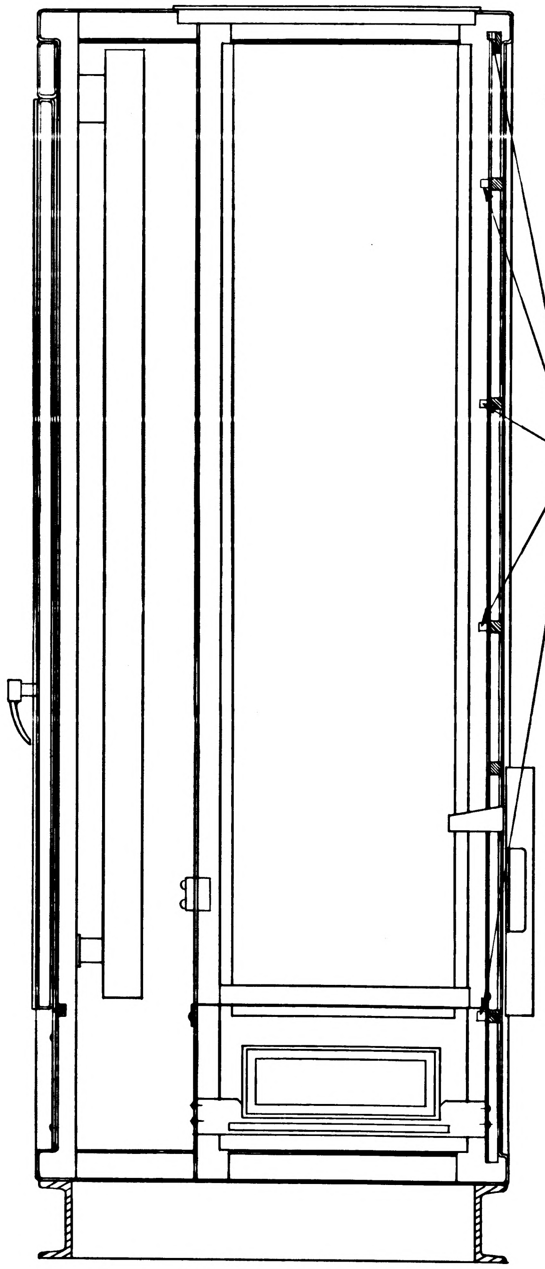
DETAIL "D"
2 REQ
FULL SIZE
TYPICAL 21 PLACES



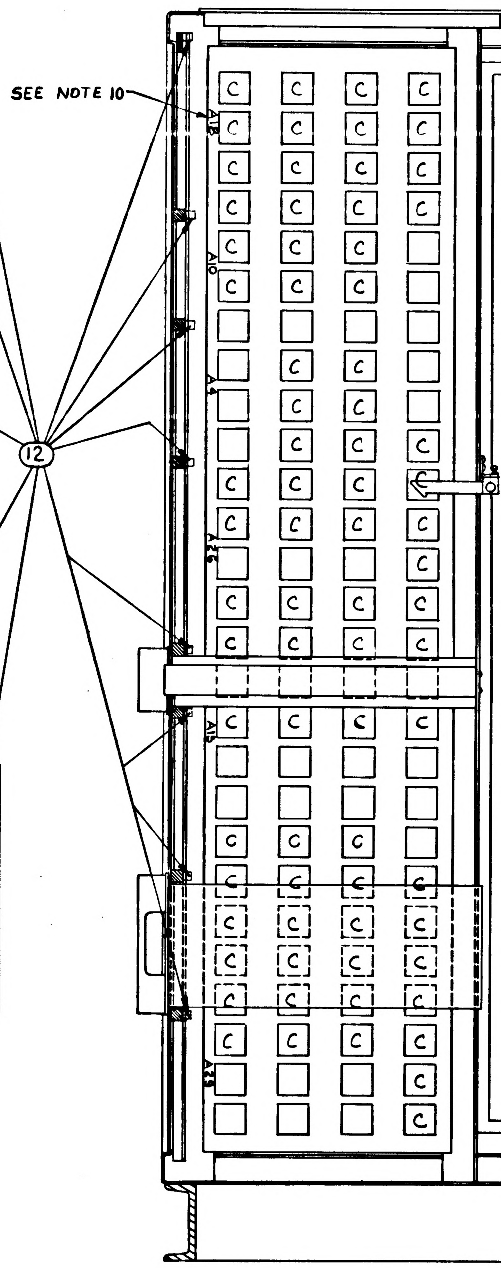
VIEW X-X
HALF SIZE
SHEET 4 ZONE A7



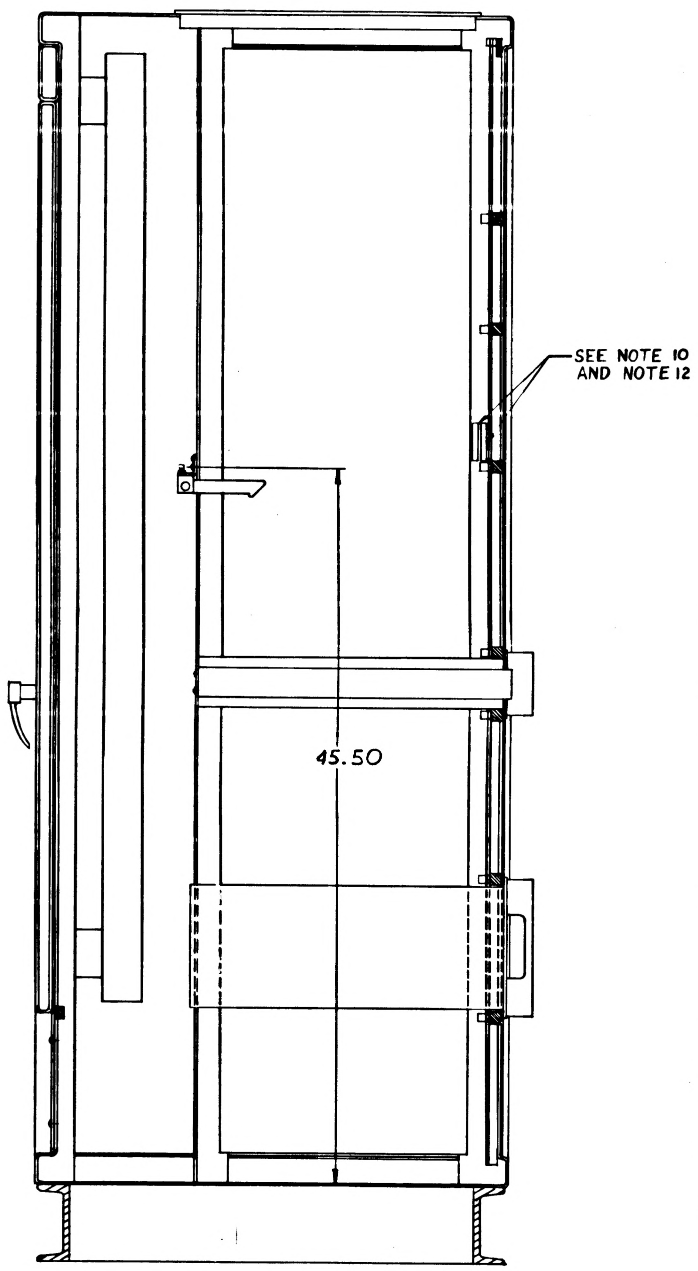
PARTIAL SECTION J-J
SHT 2 ZONE F7



PARTIAL SECTION K-K
SHT 2 ZONE F7



PARTIAL SECTION L-L
SHT 2 ZONE F6



PARTIAL SECTION M-M
SHT 2 ZONE F6

290058-011	290023-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-947

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 24 MAR-66
CHECKED 6 JUL 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABINET ASSEMBLY
ELECTRICAL EQUIPMENT
OPTICS-INERTIAL
ANALYZER ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900032
SCALE
SHEET 7 OF 7

2900032 M B

S80035
SHEET 1 OF 1

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM, SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.
3. MARK CHARACTERS PER ND 1002019, .12 HIGH, COLOR BLACK. CENTRALIZE AS SHOWN.
4. SELECT ITEM (50) DASH NUMBERS 2 THRU 15 AS REQUIRED AT ASSEMBLY.
5. [C] REPRESENTS A CLOSED OPENING IN THE AIR PLENUM OF ITEM ①. OPENINGS SHALL BE CLOSED WITH PLATES SUPPLIED WITH ITEM ① BY VENDOR PLUS THE QUANTITY SHOWN AS ITEM ⑩ TO COMPLETE THE REQUIREMENTS.
6. APPLY TIGHTENING TORQUE TO ALL SCREWS AS FOLLOWS, EXCEPT FOR PANEL ATTACHING SCREWS WHICH SHALL BE TORQUED TO 21.4 - 23.8 IN. LBS :
   - 6-32 8.6 - 9.6 IN. LBS
   - 8-32 17.8 - 19.8 IN. LBS
   - 10-32 28.5 - 31.7 IN. LBS
   - $\frac{3}{8}$-24 233 - 259 IN. LBS
7. CONNECTOR INSTALLATION :
   - A. INSTALL J1 THRU J4 AND J28 THRU J30 INCLUSIVE OF ITEM ② INTO ITEM (49) AS SHOWN.
   - B. INSTALL J16 THRU J27 INCLUSIVE OF ITEM ② INTO ITEM ㉒ AS SHOWN.
   - C. INSTALL J5 THRU J15 INCLUSIVE OF ITEM ② INTO ITEM (52) AS SHOWN.
   - D. INSTALL GROUND LUGS TO E1 AND E80 AS SHOWN.
8. DISPOSE OF EXCESS DRAWER MOUNTING AND RETRACTOR HARDWARE.
9. AFTER ASSEMBLY OF ITEM ② TO ITEM ①, ATTACH RETRACTOR MOUNTED CABLES OF ITEM ② TO ITEM ⑫ IN THEIR RESPECTIVE AREAS.
10. MARK CHARACTERS PER ND 1002019, .38 HIGH, COLOR BLACK. CENTRALIZE AS SHOWN.
11. ADJUST ITEM ㉖ SO AS TO SUPPORT UNDER SIDE OF ITEM (62)
12. IDENTIFY USING DRAWING NUMBER PER MIL-STD-130 (ES-267) AND SERIALIZE PER ND 1002023
13. SELECT EITHER PART NO. 1901346 OR 1897313 FOR ITEM ⑩

SECTIONS APPEAR ON SHEETS AS FOLLOWS :

A-A	SHT 3
B-B	SHT 4
C-C	SHT 5
D-D	SHT 2
E-E	SHT 6
F-F	SHT 6
G-G	SHT 6
H-H	SHT 6
J-J	SHT 7
K-K	SHT 7
L-L	SHT 7
M-M	SHT 7
N-N	SHT 5
P-P	SHT 5
R-R	SHT 3
S-S	SHT 3
T-T	SHT 4
U-U	SHT 4
V-V	SHT 4
W-W	SHT 6
X-X	SHT 4
Y-Y	SHT 6
AA-AA	SHT 2

DETAILS :

A	SHT 4
B	SHT 3
C	SHT 5
D	SHT 7
E	SHT 5

PARTIAL VIEWS :

Q-Q	SHT 2
Z-Z	SHT 2

REVISIONS

SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		REPLACED REVISION F WITH CHANGE PER MXC 203112	—	7-JUL 65	RWH
H		REVISED PER MXC 203444		2 AUG 65	[illegible]
J		REVISED PER MXC 203526		6 AUG [illegible]	RTP
K		REVISION STATUS CHANGED		28 SEP 65	AN
L		INITIAL RELEASE CLASS A PER TDRR 23219		19 OCT 65	[illegible]
M		REVISED PER TDRR 27583		4 APR 66	[illegible]
N		REVISED PER TDRR 28052		19 APR 66	[illegible]

	QTY 021	QTY 011	EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
		X		68	2901169	RUNNING LIST
	1	-		67	2900058-021	HARNESS FRAME ASSY.
	X	-		66	2901206	RUNNING LIST
	1	1		65	1900368-009	GASKET-CONNECTOR
	1	1		64	1900364-011	BLANK PANEL ASSY (3.50)
	1	1		63	1900568	STORAGE DRAWER ASSY
	2	2		62	1900345-021	WRITING SURFACE ASSY
	1	1		61	1900550	GROUND PLATE
	1	1		60	1900368-006	GASKET-CONNECTOR
	1	1		59	-001	
	4	4		58	-003	
	9	9		57	-004	
	6	6		56	1900368-005	GASKET-CONNECTOR
	88	88		55	AN363C632(1896990-261)	NUT, SELF LOCKING
	88	88		54	AN960C6L(1897006-036)	WASHER, FLAT #6
SEE NOTE 2	88	88		53	1006783-23	SCREW-BUTTON-HEX SOC
	1	1		52	1900365	PANEL (INSEP ASSY)
	5	5		51	1900369	GASKET-CONNECTOR
SEE NOTE 4	20	20		50	MS21919WDG-2 THRU 15 (1897073-202 THRU 215)	CLAMP, LOOP TYPE
	1	1		49	2900392	PANEL (INSEP ASSY)
	14	14		48	AN960C616(1897006-062)	WASHER, FLAT
	1	1		47	1900309-011	PANEL ASSY, CROSSBAR SWITCH COMP
SEE NOTE 2	2	2		46	1015800-001	CABLE RETRACTOR
	1	1		45	1901656	INSULATOR PAD
	1	1		44	1900364-051	BLANK PANEL ASSY (10.50)
	1	1		43	1900364-021	BLANK PANEL ASSY (5.25)
	3	3		42	MS 171492	PIN
	6	6		41	MS 16995-79	SCREW, SOC HD CAP
	4	4		40	MS 16995-86	SCREW, SOC HD CAP
	8	8		39	AN 363C1032(1896990-011)	NUT, SELF LOCKING
	5	5		38	AN 335-6	NUT-HEX
				37		
SEE NOTE 2	4	4		36	1006783-46	SCREW, BUTTON HD - HEX SOC
SEE NOTE 2	55	55		35	1006783-45	
SEE NOTE 2	82	82		34	1006783-44	
SEE NOTE 2	1	1		33	1006783-43	SCREW, BUTTON HD - HEX SOC
				32		
	13	13		31	MS 35338-84	WASHER-LOCK 3/8
	114	114		30	AN960C10L (1897006-019)	WASHER, FLAT #10
	135	135		29	MS 35338-81	WASHER-LOCK #10
	1	1		28	1901657	INSULATOR BUSHING
	4	4		27	1900344	NUT BAR
	4	4		26	1900343	BRACKET
SEE NOTE 2	4	4		25	1015790-001	NUT BAR
	2	2		24	1900277	BRACKET
	1	1		23	1901687	PLATE, INSTRUCTION
	1	1		22	1901958	PANEL (INSEP ASSY)
	1	1		21	1900255-011	LATCH ASSY
	2	2		20	1900080	STUD-GROUND
				19		
	2	2		18	1900973	DEFLECTOR, AIR
				17		
	42	42		16	AN363C832 (1896990-281)	NUT, SELF LOCKING
SEE NOTE 2	21	21		15	1006783-29	SCREW, BUTTON HD - HEX SOC
SEE NOTE 2	4	4		14	1015819-001	AIR FILTER ASSY, SPECIAL
	12	12		13	MS35234-60	SCREW, PAN HD
SEE NOTE 2	30	30		12	1015991-001	SCREW, HANGER
SEE NOTES 5 & 13	16	16		10	1897313 1901346	COVER, VENTILATORY PLATE, CLOSURE
	4	4		9	1900308	GUIDE
	2	2		8	1900303	SUPPORT BRACKET R.H.
	2	2		7	1900304	SUPPORT BRACKET L.H.
	1	1		6	1902100	GUARD, SWITCH (INSEP ASSY)
	4	4		5	1900198	SPACER
	1	1		4	1900306	BAR-STOP
	1	1		3	1900305	SUPPORT SHEET
	-	1		2	2900058-011	HARNESS FRAME ASSY
SEE NOTE 2	1	1		1	2900043	CABINET ASSY, BASIC

QUANTITY REQUIRED — LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-021	2900022-021	-021
2900023-011	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON FRACTIONS ± — DECIMALS ± .02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 24-MAR 65
CHECKED [illegible] 24-MAR 65
APPROVAL G. Stoddard 24-MAR 65
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

CABINET ASSEMBLY
ELECTRICAL EQUIPMENT
OPTICS INERTIAL ANALYZER
ASSEMBLY

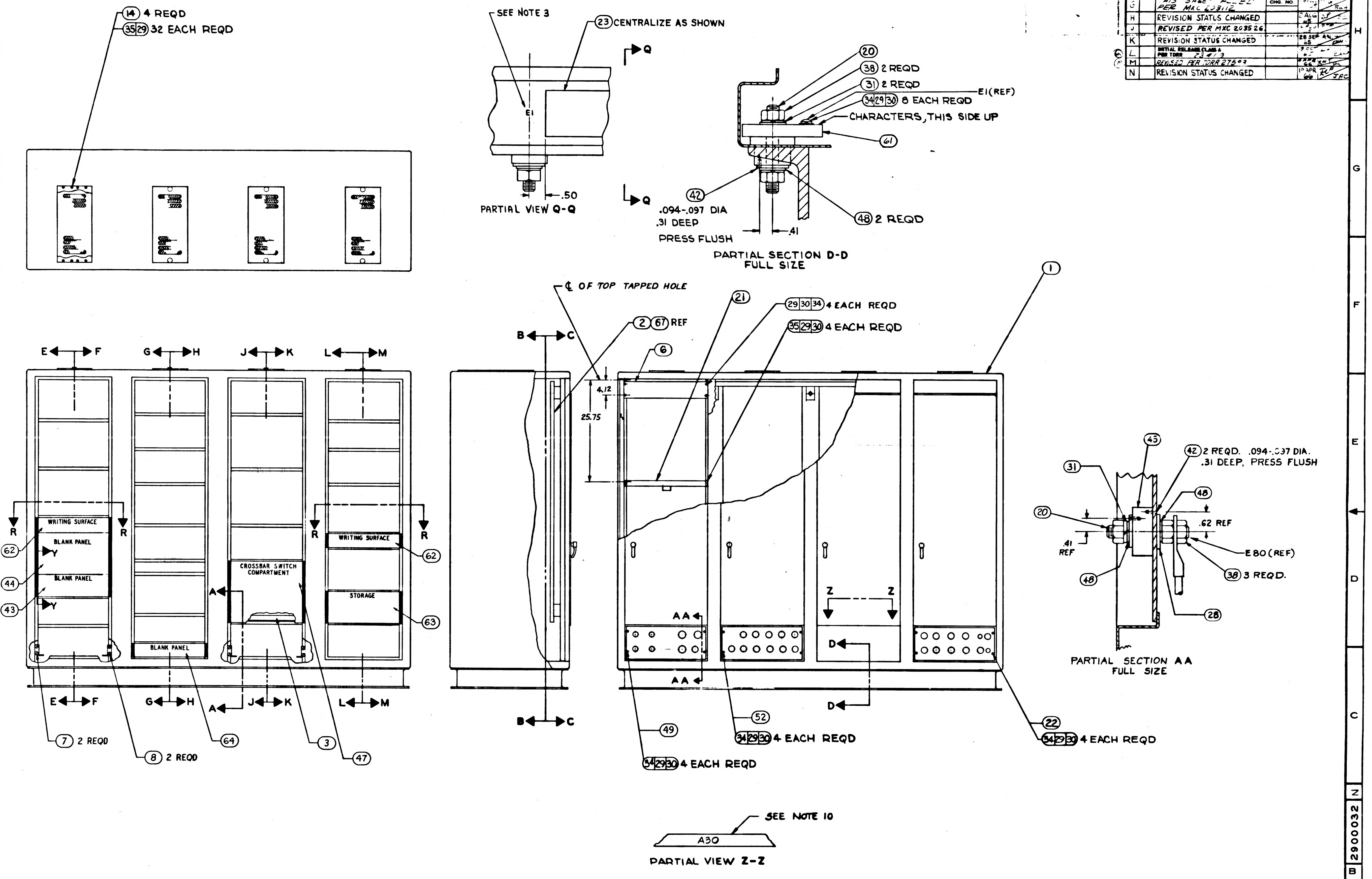
CODE IDENT NO. 99974 SIZE E 2900032
SCALE NOTED SHEET 1 OF 7

2900032 N

[illegible] 8 JUL 65

S80035

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MXC 203112		9 ... 65	Ru
H		REVISION STATUS CHANGED		2 AUG 65	
J		REVISED PER MXC 203526			
K		REVISION STATUS CHANGED		28 SEP 65	A.N.
L		INITIAL RELEASE CLASS A PER TDRR 23419		9 OCT 65	
M		REVISED PER TDRR 27503		APR 66	
N		REVISION STATUS CHANGED		1? APR 66	JAC



14 4 REQD
35 29 32 EACH REQD
SEE NOTE 3
23 CENTRALIZE AS SHOWN
Q
E1
.50
PARTIAL VIEW Q-Q
20
38 2 REQD
31 2 REQD
34 29 30 8 EACH REQD
E1 (REF)
CHARACTERS, THIS SIDE UP
61
42
.094-.097 DIA
.31 DEEP
PRESS FLUSH
48 2 REQD
.41
PARTIAL SECTION D-D
FULL SIZE
℄ OF TOP TAPPED HOLE
21
29 30 34 4 EACH REQD
35 29 30 4 EACH REQD
1
2 67 REF
6
4.12
25.75
B C
E F
G H
J K
L M
R
WRITING SURFACE
BLANK PANEL
BLANK PANEL
Y
62
44
43
CROSSBAR SWITCH COMPARTMENT
A
WRITING SURFACE
STORAGE
62
63
BLANK PANEL
AA
Z
D
7 2 REQD
8 2 REQD
64
3
47
49
34 29 30 4 EACH REQD
52
34 29 30 4 EACH REQD
22
34 29 30 4 EACH REQD
43
42 2 REQD. .094-.097 DIA.
.31 DEEP, PRESS FLUSH
31
48
20
.41 REF
.62 REF
E80 (REF)
38 3 REQD.
48
28
PARTIAL SECTION AA
FULL SIZE
SEE NOTE 10
A30
PARTIAL VIEW Z-Z

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bander DATE 24-...65
CHECKED ... 6JUL65
APPROVAL ... GODDARD 7JUL65
APPROVAL
NASA APPROVAL
MIT APPROVAL

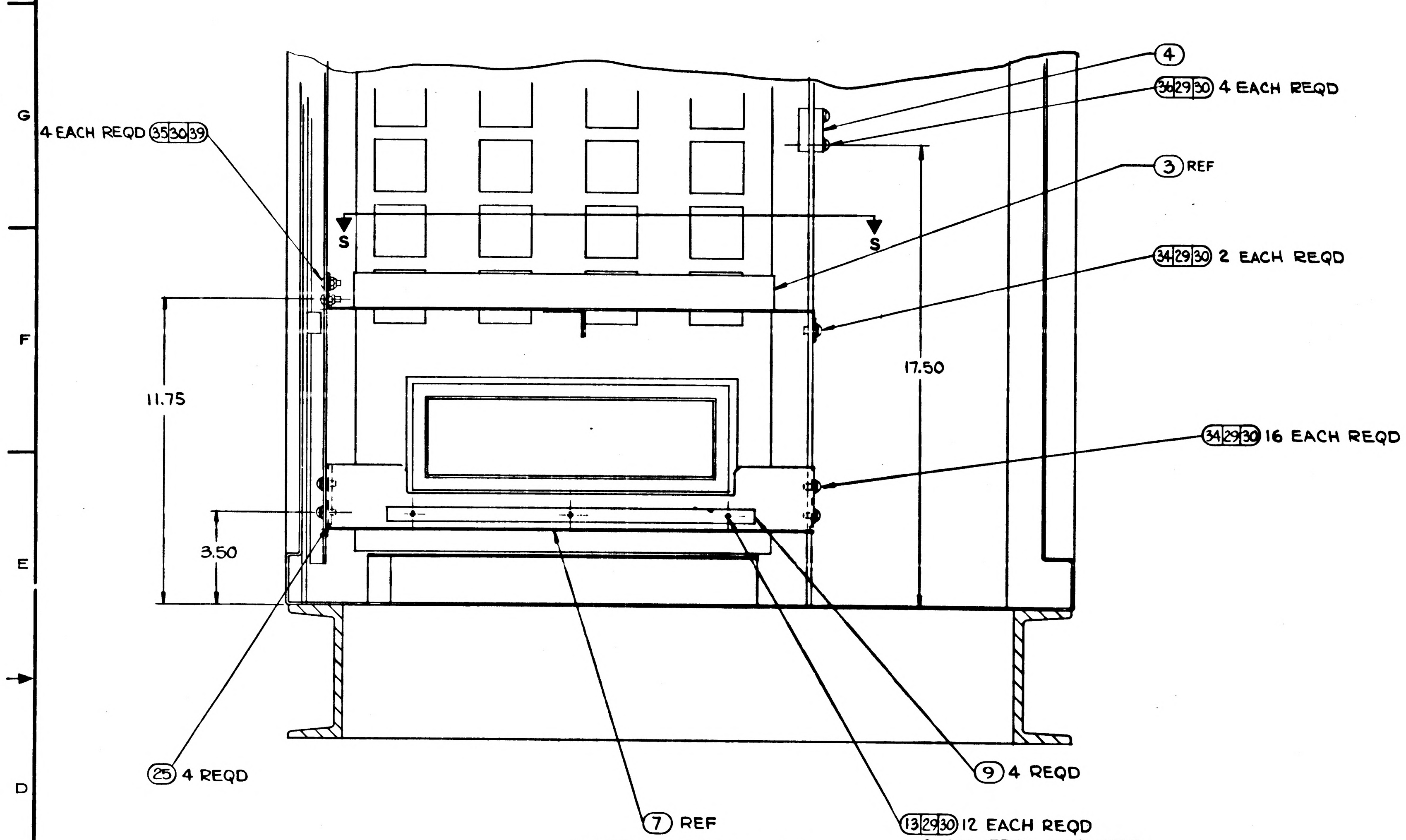
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABINET ASSEMBLY-
ELECTRICAL EQUIPMENT
OPTICS INERTIAL ANALYZER
ASSEMBLY

CODE IDENT NO 99974 SIZE E 2900032
SCALE
SHEET 2 OF 7

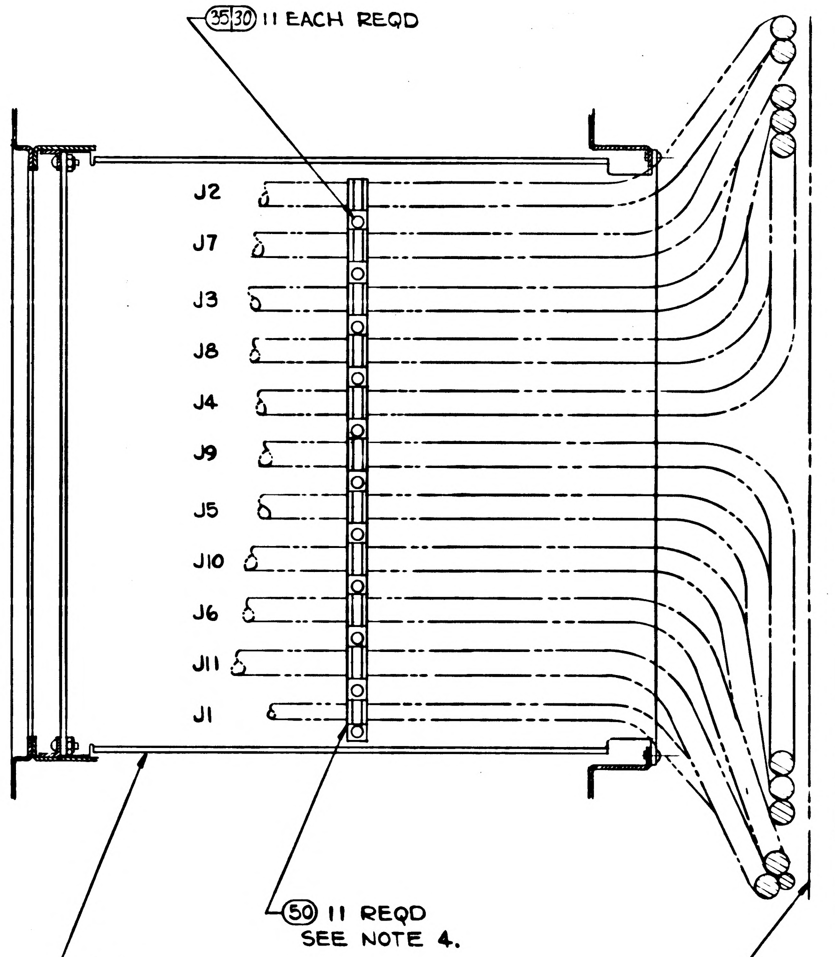
2900032 N

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
REVISIONS					
G		THIS SHEET ADDED PER MXC 203112	—	65	
H		REVISION STATUS CHANGED		2 AUG 65	
J		REVISION STATUS CHANGED			
K		REVISION STATUS CHANGED		28 SEP 65	A.N.
L		INITIAL RELEASE CLASS A PER TDRR 23419		13 OCT 65	LF
M		REVISION STATUS CHANGED		2 APR 66	R.M.T.
N		REVISION STATUS CHANGED		10 APR	RLD JAC



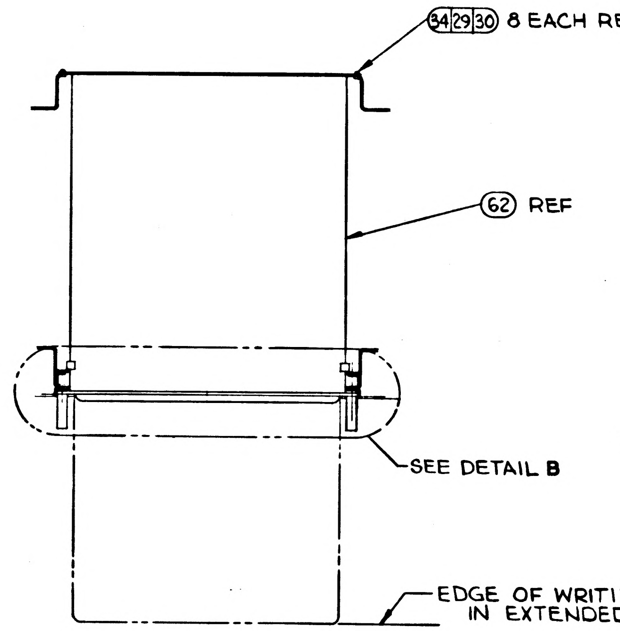
(4)
(34)(29)(30) 4 EACH REQD
4 EACH REQD (35)(30)(39)
(3) REF
S
S
(34)(29)(30) 2 EACH REQD
11.75
17.50
(34)(29)(30) 16 EACH REQD
3.50
(25) 4 REQD
(9) 4 REQD
(7) REF
(13)(29)(30) 12 EACH REQD
INSTALL FROM FAR SIDE
4 PLACES

PARTIAL SECTION A-A
SCALE 1/2
SHT 2 ZONE C7



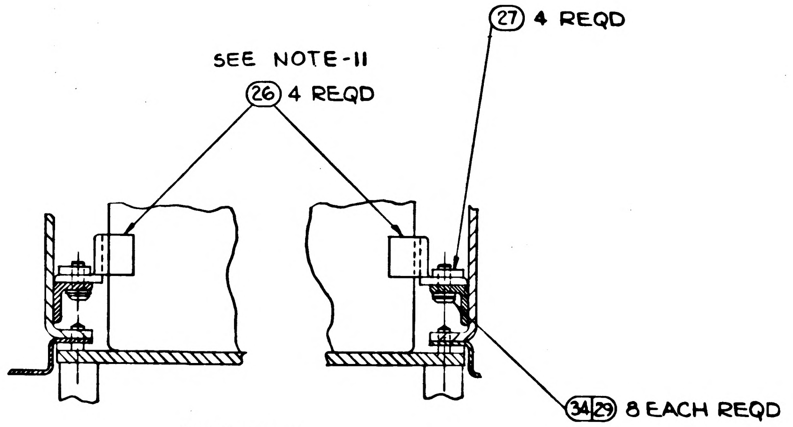
(35)(30) 11 EACH REQD
J2
J7
J3
J8
J4
J9
J5
J10
J6
J11
J1
(50) 11 REQD
SEE NOTE 4.
(3) REF
(2) REF

PARTIAL SECTION S-S
SCALE 1/2



(34)(29)(30) 8 EACH REQD
(62) REF
SEE DETAIL B
EDGE OF WRITING SURFACE
IN EXTENDED POSITION.

PARTIAL SECTION R-R
SCALE 1/4
SHT 2 ZONE D6 & 8



SEE NOTE-11
(26) 4 REQD
(27) 4 REQD
(34)(29) 8 EACH REQD

DETAIL B
SCALE-FULL

2900058-011	2900023-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 21 MAR-65
CHECKED 6 JUL 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

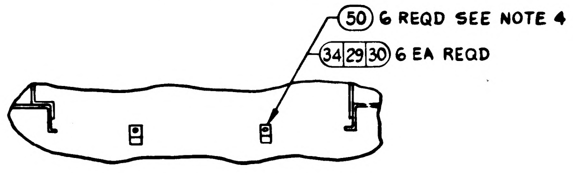
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABINET ASSEMBLY -
ELECTRICAL EQUIPMENT
OPTICS-INERTIAL
ANALYZER ASSEMBLY

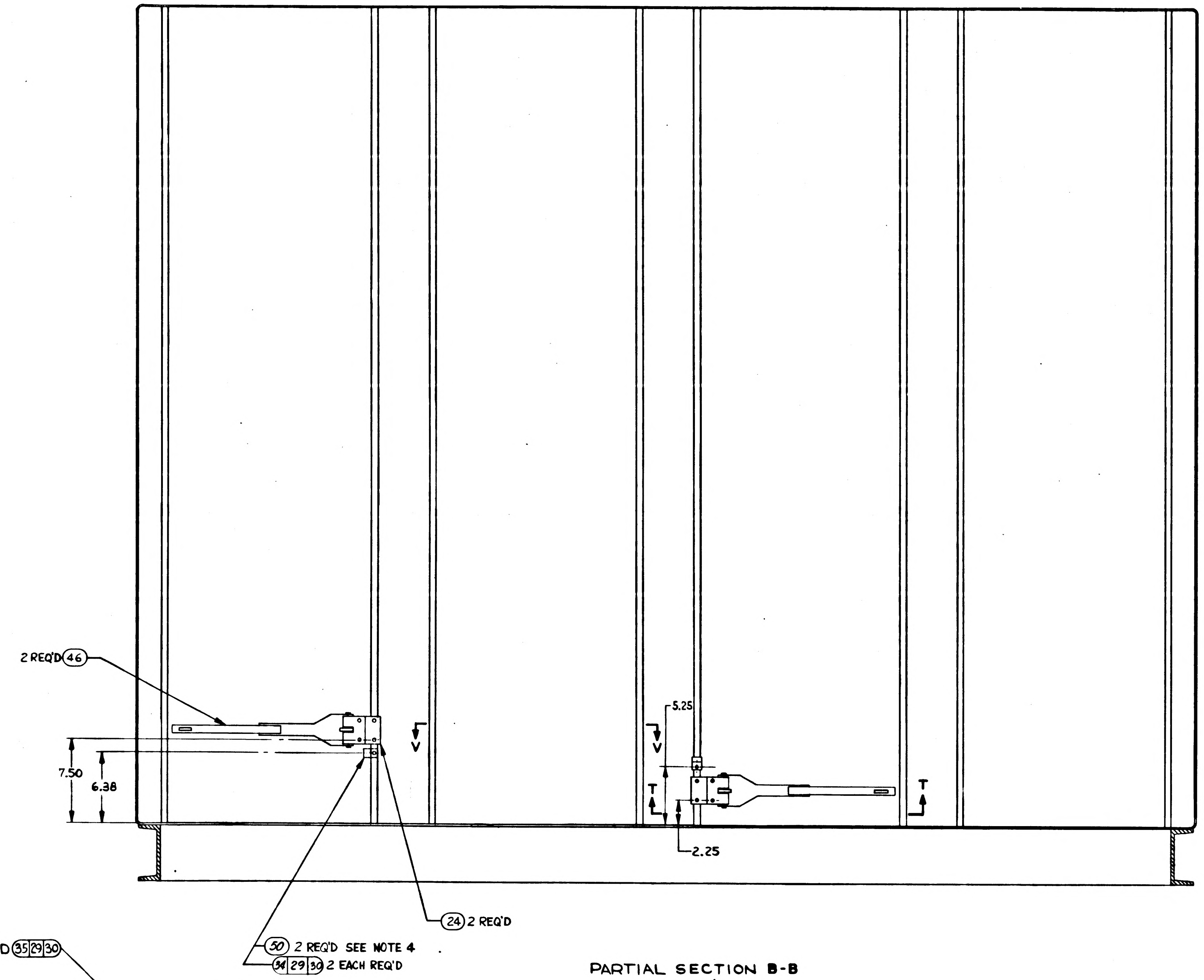
CODE IDENT NO 99974 SIZE E 2900032
SCALE NOTED SHEET 3 OF 7

2900032

SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MXC 203112		65	NG RWH
H		REVISED PER MXC 203444		2 AUG 65	
J		REVISION STATUS CHANGED		6 AUG	
K		REVISED PER MXC 205205		28 SEP 65	
L		INITIAL RELEASE CLASS A PER TDRR 23419			
M		REV. SED PER TDRR 27583		66	
N		REVISION STATUS CHANGED		10 APR 66	JAC

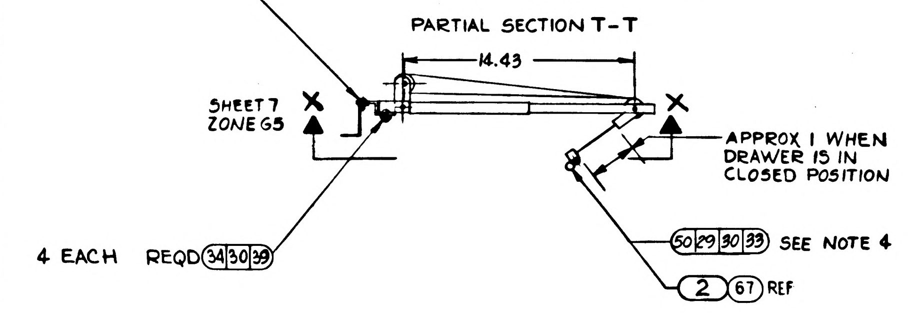

(50) 6 REQD SEE NOTE 4
34 29 30 6 EA REQD

PARTIAL SECTION V-V


2 REQ'D (46)
V
V
5.25
7.50
6.38
T
T
2.25
(24) 2 REQ'D
(50) 2 REQ'D SEE NOTE 4
34 29 30 2 EACH REQ'D

PARTIAL SECTION B-B
SCALE: 1/4
SHT 2 ZONE C-5

PARTIAL SECTION T-T


4 EACH REQD 35 29 30
14.43
SHEET 7 ZONE G5
X
X
APPROX 1 WHEN DRAWER IS IN CLOSED POSITION
50 29 30 33 SEE NOTE 4
(2) (67) REF
4 EACH REQD 34 30 39

2900058-011	2900023-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 24-MAR-65
CHECKED 6 JUL
APPROVAL G Swanson
APPROVAL
NASA APPROVAL
MIT APPROVAL

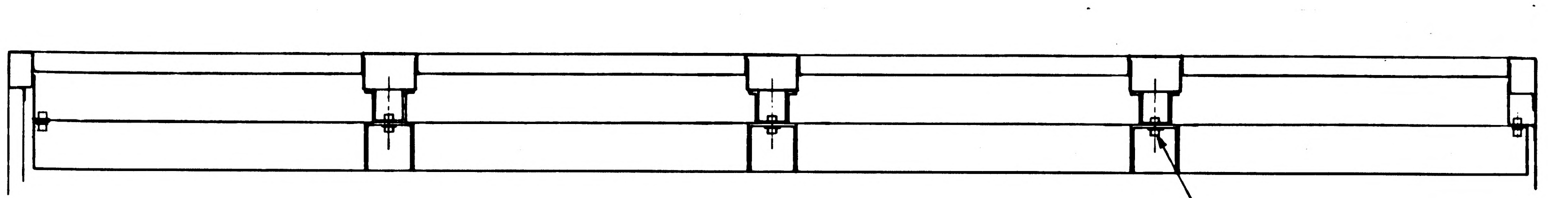
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABINET ASSEMBLY
ELECTRICAL EQUIPMENT
OPTICS-INERTIAL
ANALYZER ASSEMBLY

CODE IDENT NO. 99974 SIZE E 2900032
SCALE NOTED SHEET 4 OF 7

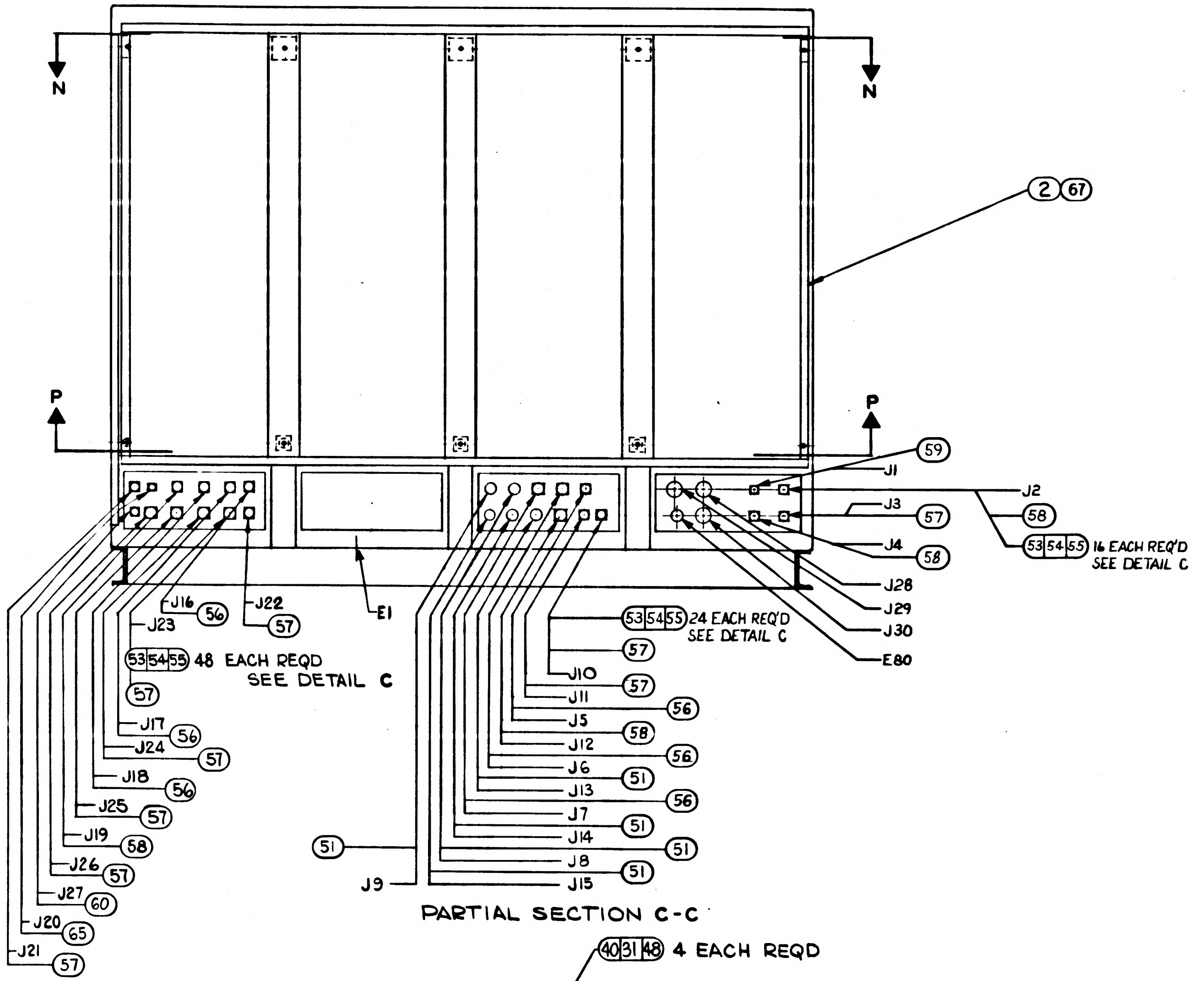
REVISIONS

SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MX-20312		19-JUL-65	RWH
H		REVISION STATUS CHANGED		2 AUG 65	
J		REVISION STATUS CHANGED		AUG 65	
K		REVISION STATUS CHANGED		28 SEP 65	A.N.
L		INITIAL RELEASE CLASS A PER TDRR 23419		OCT 65	
M		REVISED PER TDRR 27583		APR 66	R.N.T.
N		REVISION STATUS CHANGED		10 APR 66	JEC



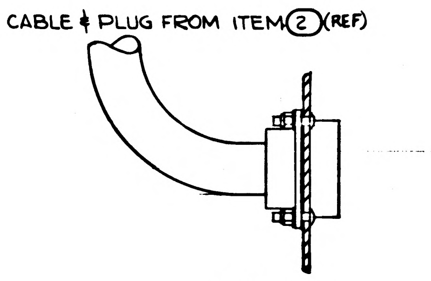
(41)(31)(48) 5 EACH REQD

PARTIAL SECTION N-N
SCALE 1/4



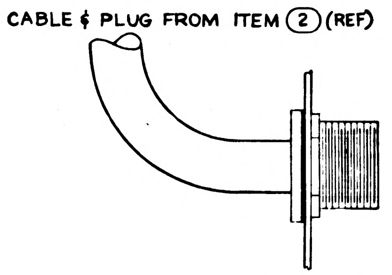
N
N
(2)(67)
P
P
(59)
J1
J2
J3
(58)
(57)
J4
(58)
(53)(54)(55) 16 EACH REQ'D
SEE DETAIL C
J28
J29
J30
E80
E1
J16
(56)
J22
(57)
J23
(53)(54)(55) 48 EACH REQD
SEE DETAIL C
(57)
J17
(56)
J24
(57)
J18
(56)
J25
(57)
J19
(58)
J26
(57)
J27
(60)
J20
(65)
J21
(57)
(53)(54)(55) 24 EACH REQ'D
SEE DETAIL C
(57)
J10
(57)
J11
(56)
J5
(58)
J12
(56)
J6
(51)
J13
(56)
J7
(51)
J14
(51)
J8
(51)
J15
(51)
J9

PARTIAL SECTION C-C



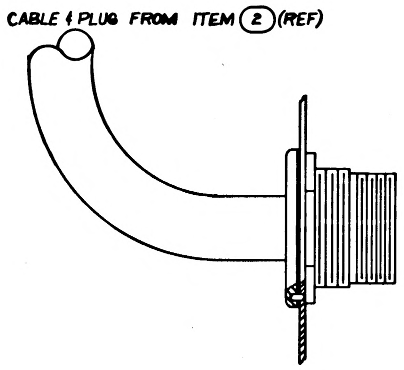
CABLE & PLUG FROM ITEM (2) (REF)

DETAIL C
INSTALLATION OF J1 THRU J7, J10 THRU J12
& J16 THRU J27.



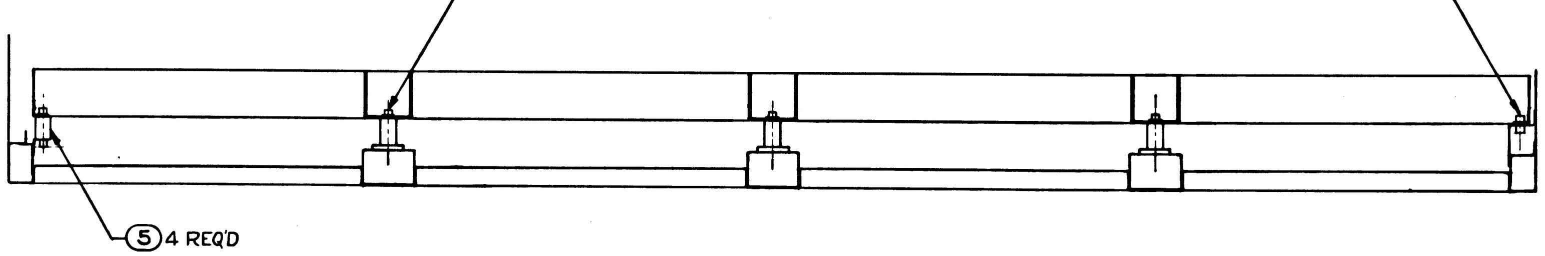
CABLE & PLUG FROM ITEM (2) (REF)

DETAIL E
INSTALLATION OF J8, J9, J13, J14, & J15.



CABLE & PLUG FROM ITEM (2) (REF)

DETAIL F
INSTALLATION OF J28, J29 & J30



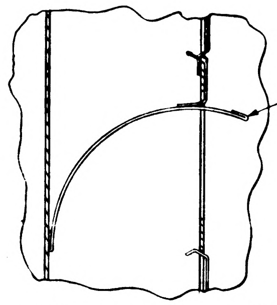
(40)(31)(48) 4 EACH REQD
(41)(31)(48)
(5) 4 REQ'D

PARTIAL SECTION P-P
SCALE 1/4

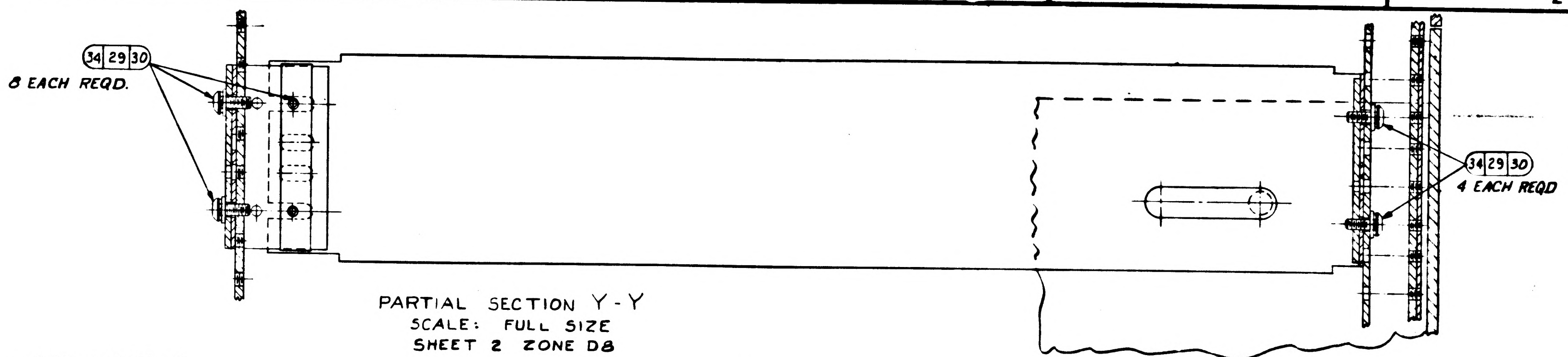
2900058-011	2900029-011	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ± DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS		
NEXT ASSY	USED ON	MATERIAL	DRAWN Bender DATE 26 MAR 65 CHECKED 6 JUL 65 APPROVAL APPROVAL NASA APPROVAL MIT APPROVAL	CABINET ASSEMBLY ELECTRICAL EQUIPMENT OPTICS-INERTIAL ANALYZER ASSEMBLY		
APPLICATION		CONTRACT NAS9-497		CODE IDENT NO. 99974	SIZE E	2900032
				SCALE NOTED		SHEET 5 OF 7

2900032

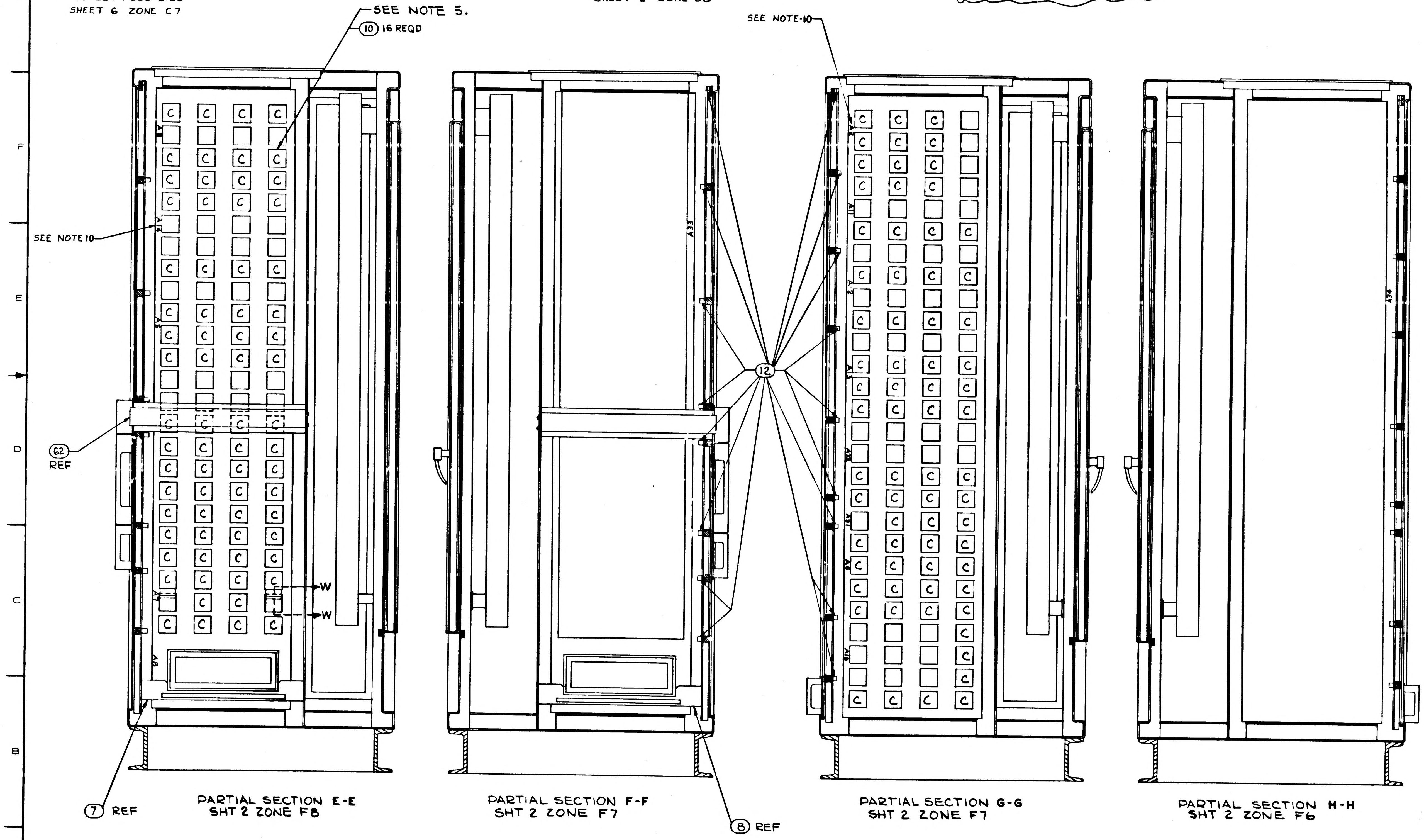
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
A		THIS SHEET ADDED PER MX- 203112			RWM
H		REVISION STATUS CHANGED		2 AUG 65	
J		REVISION STATUS CHANGED		6 AUG 65	PTD
K		REVISION STATUS CHANGED		28 SEP 65	A.N.
L		INITIAL RELEASE CLASS A PER TDRR 23919			
M		REVISION STATUS CHANGED		6 APR 66	
N		REVISION STATUS CHANGED		10 APR 66	



PARTIAL SECTION W-W
SCALE: FULL SIZE
SHEET 6 ZONE C7



PARTIAL SECTION Y-Y
SCALE: FULL SIZE
SHEET 2 ZONE D8



PARTIAL SECTION E-E
SHT 2 ZONE F8

PARTIAL SECTION F-F
SHT 2 ZONE F7

PARTIAL SECTION G-G
SHT 2 ZONE F7

PARTIAL SECTION H-H
SHT 2 ZONE F6

2900058-011	2900023-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender 24-MAR-65 DATE
CHECKED Moore 6 JUL 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

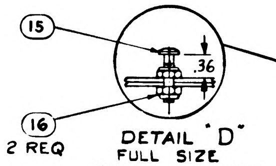
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

CABINET ASSEMBLY
ELECTRICAL EQUIPMENT
OPTICS INERTIAL
ANALYZER ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900032
SCALE
SHEET 6 OF 7

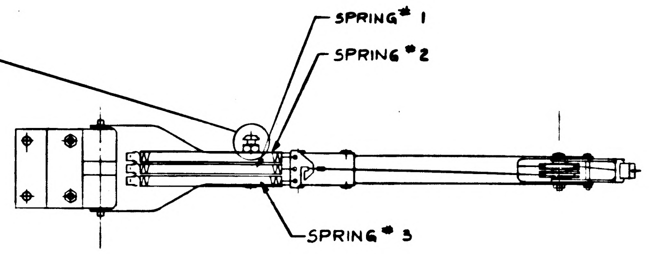
ALL CABLE RETRACTORS
HAVE 3 SPRINGS
UNLESS SHOWN BELOW

DRAWER NUMBER	SPRINGS REQUIRED		
	#1	#2	#3
A2	NO	YES	YES
A31	NO	YES	YES
A16	YES	NO	NO
A3	NO	YES	YES
A19	NO	YES	YES
A20	NO	YES	YES
A18	NO	YES	YES
A10	NO	YES	YES
A4	NO	YES	YES
A26	NO	YES	YES
A6	YES	NO	NO
A29	YES	NO	NO



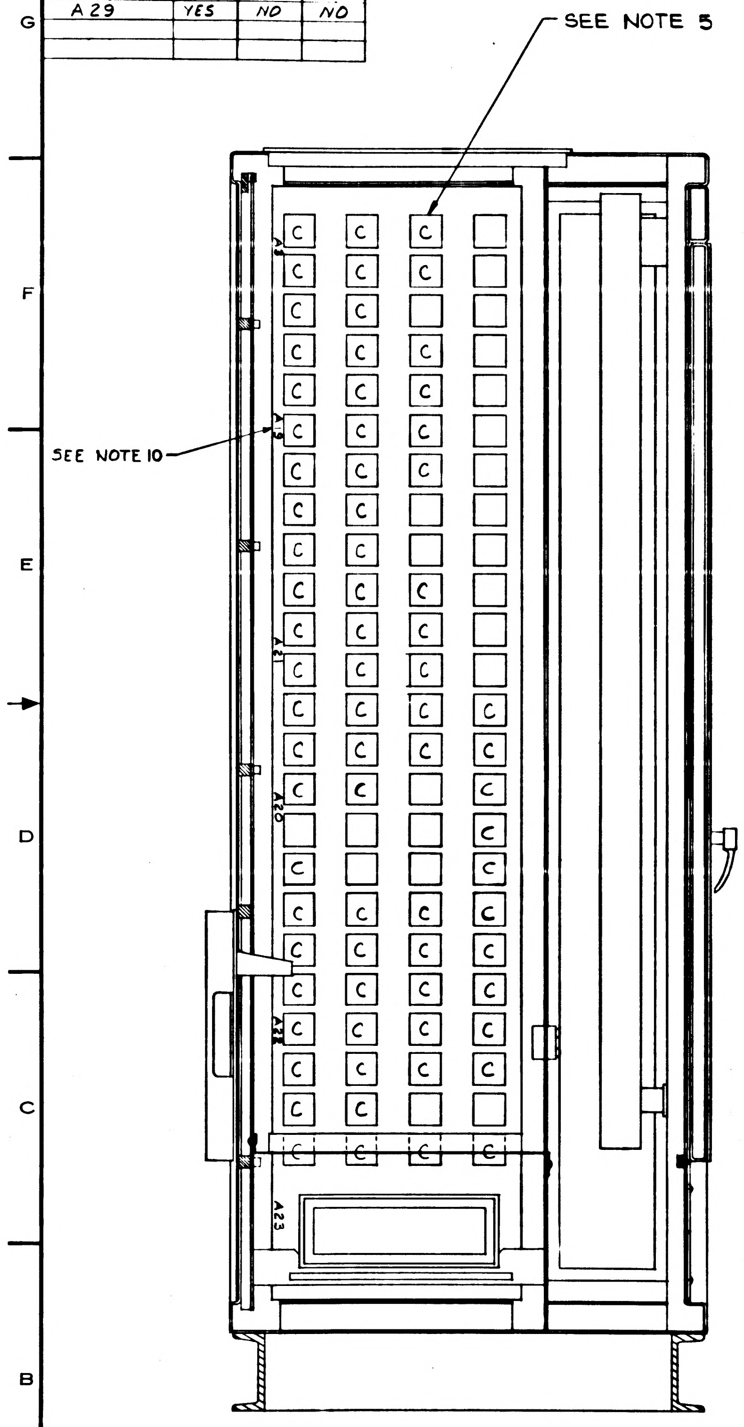
2 REQ

DETAIL "D"
FULL SIZE
TYPICAL 21 PLACES

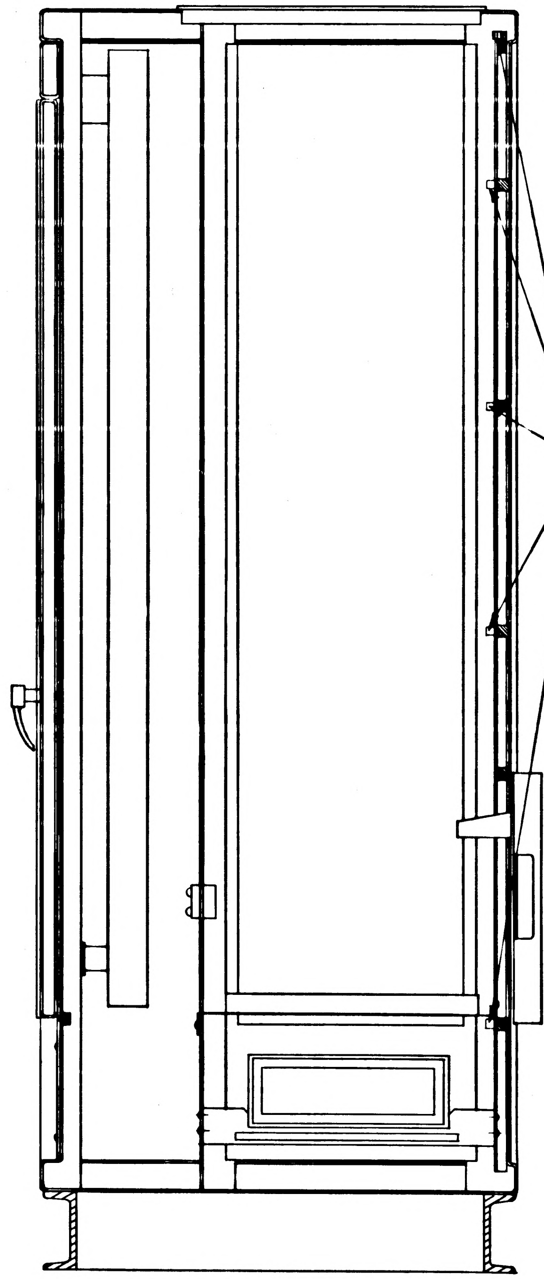


VIEW X-X
HALF SIZE
SHEET 4 ZONE A7

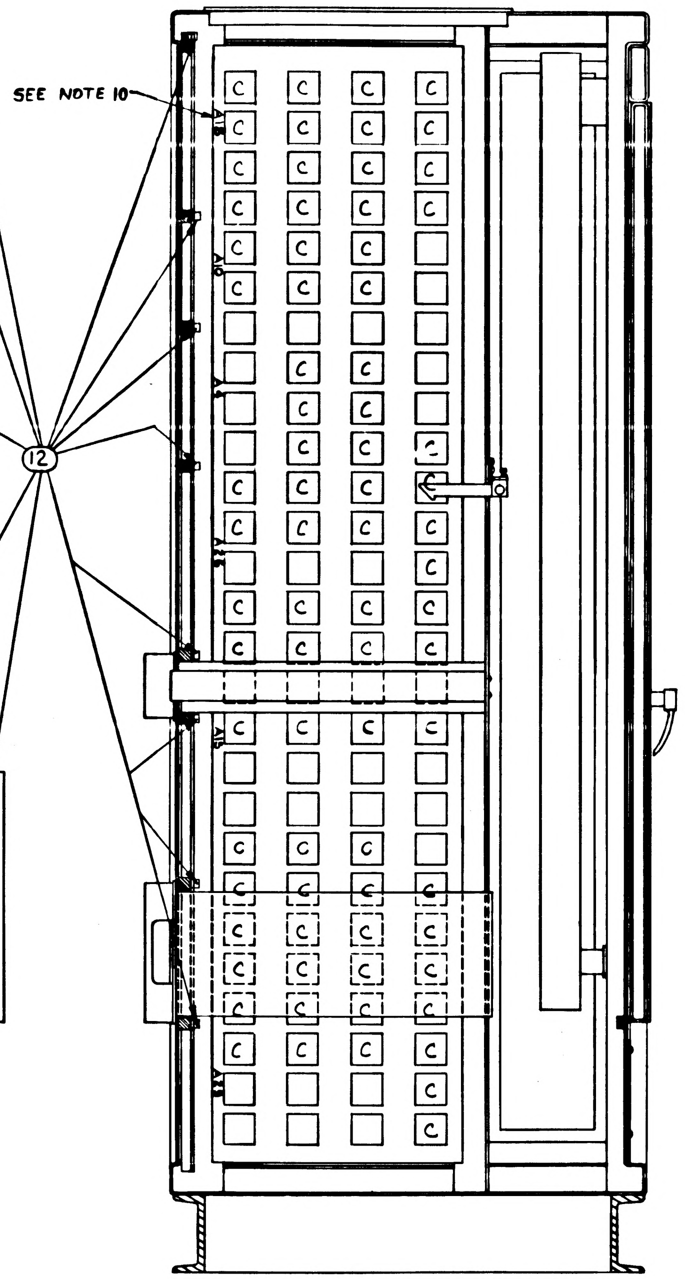
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MXC 203.2		19 JUL 65	
H		REVISION STATUS CHANGED		2 AUG 65	
J		REVISION STATUS CHANGED		6 AUG 65	RTP
K		REVISION STATUS CHANGED		28 SEP 65	
L		INITIAL RELEASE CLASS A PER TDRR 2319		19 OCT 65	
M		REVISION STATUS CHANGED		4 APR 66	
N		REVISION STATUS CHANGED		19 APR 66	



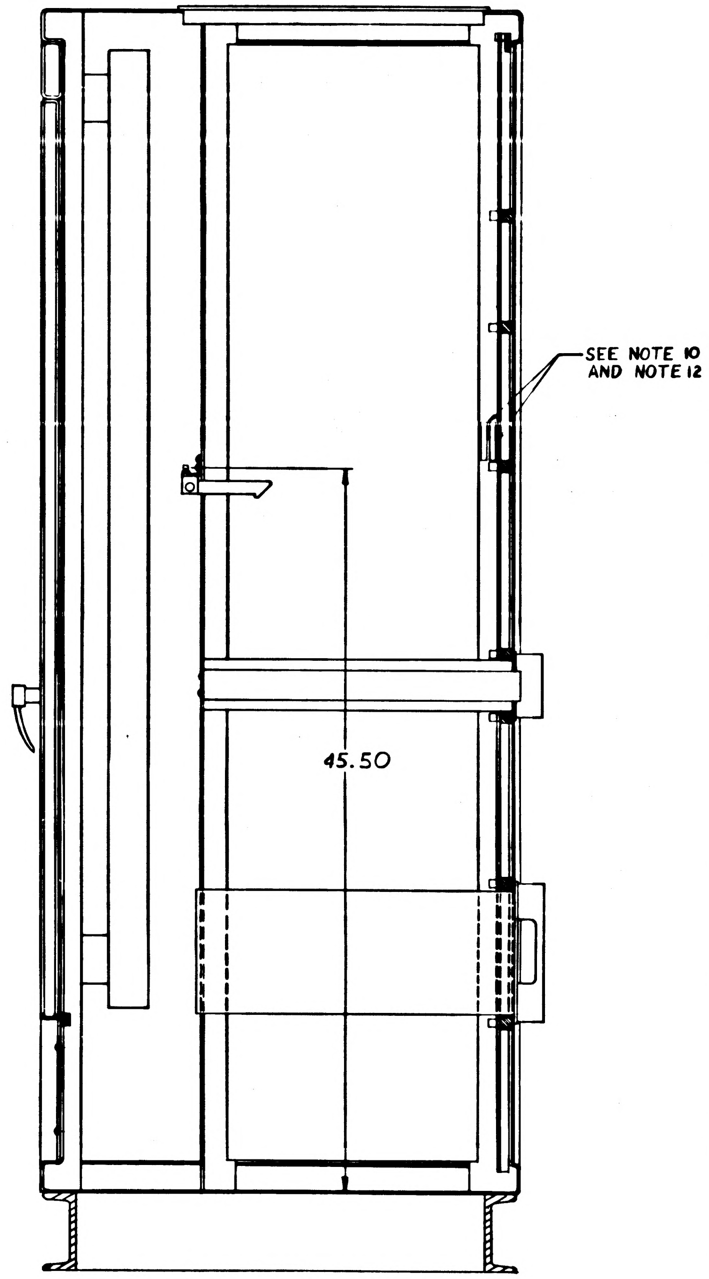
PARTIAL SECTION J-J
SHT 2 ZONE F7



PARTIAL SECTION K-K
SHT 2 ZONE F7



PARTIAL SECTION L-L
SHT 2 ZONE F6



PARTIAL SECTION M-M
SHT 2 ZONE F6

290058-011	290023-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-947

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 23 JUN 65
CHECKED 6 JUL 65
APPROVAL E. Stoppard 7 JUL 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABINET ASSEMBLY
ELECTRICAL EQUIPMENT
OPTICS-INERTIAL
ANALYZER ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900032
SCALE
SHEET 7 OF 7

2900032
SHEET 1 OF 7

SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		REPLACES REVISION F WITH CHANGE PER MXC203112	—	19-JUL 65	
H		REVISED PER MXC 203444		2 AUG 65	
J		REVISED PER MXC 203526		6 AUG	
K		REVISION STATUS CHANGED		28 SEP 65	
L		INITIAL RELEASE CLASS A PER TDRR 23419		19 OCT 65	
M		REVISED PER TDRR 27583			
N		REVISED PER TDRR 28052			
P		REVISED PER TDRR 28⁻⁻2			

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. VENDOR ITEM, SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

3. MARK CHARACTERS PER ND 1002019, .12 HIGH, COLOR BLACK. CENTRALIZE AS SHOWN.

4. SELECT ITEM (50) DASH NUMBERS 2 THRU 15 AS REQUIRED AT ASSEMBLY.

5. [C] REPRESENTS A CLOSED OPENING IN THE AIR PLENUM OF ITEM (1). OPENINGS SHALL BE CLOSED WITH PLATES SUPPLIED WITH ITEM (1) BY VENDOR PLUS THE QUANTITY SHOWN AS ITEM (10) TO COMPLETE THE REQUIREMENTS.

6. APPLY TIGHTENING TORQUE TO ALL SCREWS AS FOLLOWS, EXCEPT FOR PANEL ATTACHING SCREWS WHICH SHALL BE TORQUED TO 21.4 - 23.8 IN. LBS:
   6-32 8.6 - 9.6 IN. LBS
   8-32 17.8 - 19.8 IN. LBS
   10-32 28.5 - 31.7 IN. LBS
   $\frac{3}{8}$-24 233 - 259 IN. LBS

7. CONNECTOR INSTALLATION:
   A. INSTALL J1 THRU J4 AND J28 THRU J30 INCLUSIVE OF ITEM (2) INTO ITEM (49) AS SHOWN.
   B. INSTALL J16 THRU J27 INCLUSIVE OF ITEM (2) INTO ITEM (22) AS SHOWN.
   C. INSTALL J5 THRU J15 INCLUSIVE OF ITEM (2) INTO ITEM (52) AS SHOWN.
   D. INSTALL GROUND LUGS TO E1 AND E80 AS SHOWN.

8. DISPOSE OF EXCESS DRAWER MOUNTING AND RETRACTOR HARDWARE.

9. AFTER ASSEMBLY OF ITEM (2) TO ITEM (1), ATTACH RETRACTOR MOUNTED CABLES OF ITEM (2) TO ITEM (12) IN THEIR RESPECTIVE AREAS.

10. MARK CHARACTERS PER ND 1002019, .38 HIGH, COLOR BLACK. CENTRALIZE AS SHOWN.

11. ADJUST ITEM (26) SO AS TO SUPPORT UNDER SIDE OF ITEM (62)

12. IDENTIFY USING DRAWING NUMBER PER MIL-STD-130 (ES-267) AND SERIALIZE PER ND 1002023

13. SELECT EITHER PART NO. 1901346 OR 1897313 FOR ITEM (10)

SECTIONS APPEAR ON SHEETS AS FOLLOWS:
A-A SHT 3
B-B SHT 4
C-C SHT 5
D-D SHT 2
E-E SHT 6
F-F SHT 6
G-G SHT 6
H-H SHT 6
J-J SHT 7
K-K SHT 7
L-L SHT 7
M-M SHT 7
N-N SHT 5
P-P SHT 5
R-R SHT 3
S-S SHT 3
T-T SHT 4
U-U SHT 4
V-V SHT 4
W-W SHT 6
X-X SHT 4
Y-Y SHT 6
AA-AA SHT 2

DETAILS:
A SHT 4
B SHT 3
C SHT 5
D SHT 7
E SHT 5

PARTIAL VIEWS:
Q-Q SHT 2
Z-Z SHT 2

	QUANTITY REQUIRED 031	QUANTITY REQUIRED 021	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1	—	—		69	2900058-031	HARNESS FRAME ASSEMBLY
			☒		68	2901169	RUNNING LIST
	—	1	-		67	2900058-021	HARNESS FRAME ASSY.
	☒	☒	-		66	2901206	RUNNING LIST
	1	1	1		65	1900368-009	GASKET-CONNECTOR
	1	1	1		64	1900364-011	BLANK PANEL ASSY (3.50)
	1	1	1		63	1900568	STORAGE DRAWER ASSY
	2	2	2		62	1900345-021	WRITING SURFACE ASSY
	1	1	1		61	1900550	GROUND PLATE
	1	1	1		60	1900368-006	GASKET-CONNECTOR
	1	1	1		59	-001	
	4	4	4		58	-003	
	9	9	9		57	-004	
	6	6	6		56	1900368-005	GASKET-CONNECTOR
	88	88	88		55	AN363C632(1896990-261)	NUT, SELF LOCKING
	88	88	88		54	AN960C6L(1897006-036)	WASHER, FLAT #6
SEE NOTE 2	88	88	88		53	1006783-23	SCREW-BUTTON-HEX SOC
	1	1	1		52	1900365	PANEL (INSEP ASSY)
	5	5	5		51	1900369	GASKET-CONNECTOR
SEE NOTE 4	20	20	20		50	MS21919WDG-2 THRU 15 (1897073-202 THRU 215)	CLAMP, LOOP TYPE
	1	1	1		49	2900392	PANEL (INSEP ASSY)
	14	14	14		48	AN960C616(1897006-062)	WASHER, FLAT
	1	1	1		47	1900309-011	PANEL ASSY, CROSSBAR SWITCH COMP
SEE NOTE 2	2	2	2		46	1015800-001	CABLE RETRACTOR
	1	1	1		45	1901656	INSULATOR PAD
	1	1	1		44	1900364-051	BLANK PANEL ASSY (10.50)
	1	1	1		43	1900364-021	BLANK PANEL ASSY (5.25)
	3	3	3		42	MS 171492	PIN

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED 031	QUANTITY REQUIRED 021	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	6	6	6		41	MS 16995-79	SCREW, SOC HD CAP
	4	4	4		40	MS 16995-86	SCREW, SOC HD CAP
	8	8	8		39	AN363C1032(1896990-011)	NUT, SELF LOCKING
	5	5	5		38	AN 335-6	NUT-HEX
					37		
SEE NOTE 2	4	4	4		36	1006783-46	SCREW, BUTTON HD - HEX SOC
SEE NOTE 2	55	55	55		35	1006783-45	
SEE NOTE 2	82	82	82		34	1006783-44	
SEE NOTE 2	1	1	1		33	1006783-43	SCREW, BUTTON HD - HEX SOC
					32		
	13	13	13		31	MS 35338-84	WASHER-LOCK 3/8
	114	114	114		30	AN960C10L (1897006-019)	WASHER, FLAT #10
	135	135	135		29	MS 35338-81	WASHER-LOCK #10
	1	1	1		28	1901657	INSULATOR BUSHING
	4	4	4		27	1900344	NUT BAR
	4	4	4		26	1900343	BRACKET
SEE NOTE 2	4	4	4		25	1015790-001	NUT BAR
	2	2	2		24	1900277	BRACKET
	1	1	1		23	1901687	PLATE, INSTRUCTION
	1	1	1		22	1901958	PANEL (INSEP ASSY)
	1	1	1		21	1900255-011	LATCH ASSY
	2	2	2		20	1900080	STUD-GROUND
					19		
	2	2	2		18	1900973	DEFLECTOR, AIR
					17		
	42	42	42		16	AN363C832(1896990-281)	NUT, SELF LOCKING
SEE NOTE 2	21	21	21		15	1006783-29	SCREW, BUTTON HD - HEX SOC
SEE NOTE 2	4	4	4		14	1015819-001	AIR FILTER ASSY, SPECIAL
	12	12	12		13	MS35234-60	SCREW, PAN HD
SEE NOTE 2	30	30	30		12	1015991-001	SCREW, HANGER
SEE NOTES 5 & 13	16	16	16		10	1897313 1901346	COVER, VENTILATORY PLATE, CLOSURE
	4	4	4		9	1900308	GUIDE
	2	2	2		8	1900303	SUPPORT BRACKET R.H.
	2	2	2		7	1900304	SUPPORT BRACKET L.H.
	1	1	1		6	1902100	GUARD, SWITCH (INSEP ASSY)
	4	4	4		5	1900198	SPACER
	1	1	1		4	1900306	BAR-STOP
	1	1	1		3	1900305	SUPPORT SHEET
	—	—	1		2	2900058-011	HARNESS FRAME ASSY
SEE NOTE 2	1	1	1		1	2900043	CABINET ASSY, BASIC

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-031	2900022-031	-031
2900023-021	2900022-021	-021
2900023-011	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± .02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 22-MAR 65
CHECKED 24-MAR 65
APPROVAL 24-MAY 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

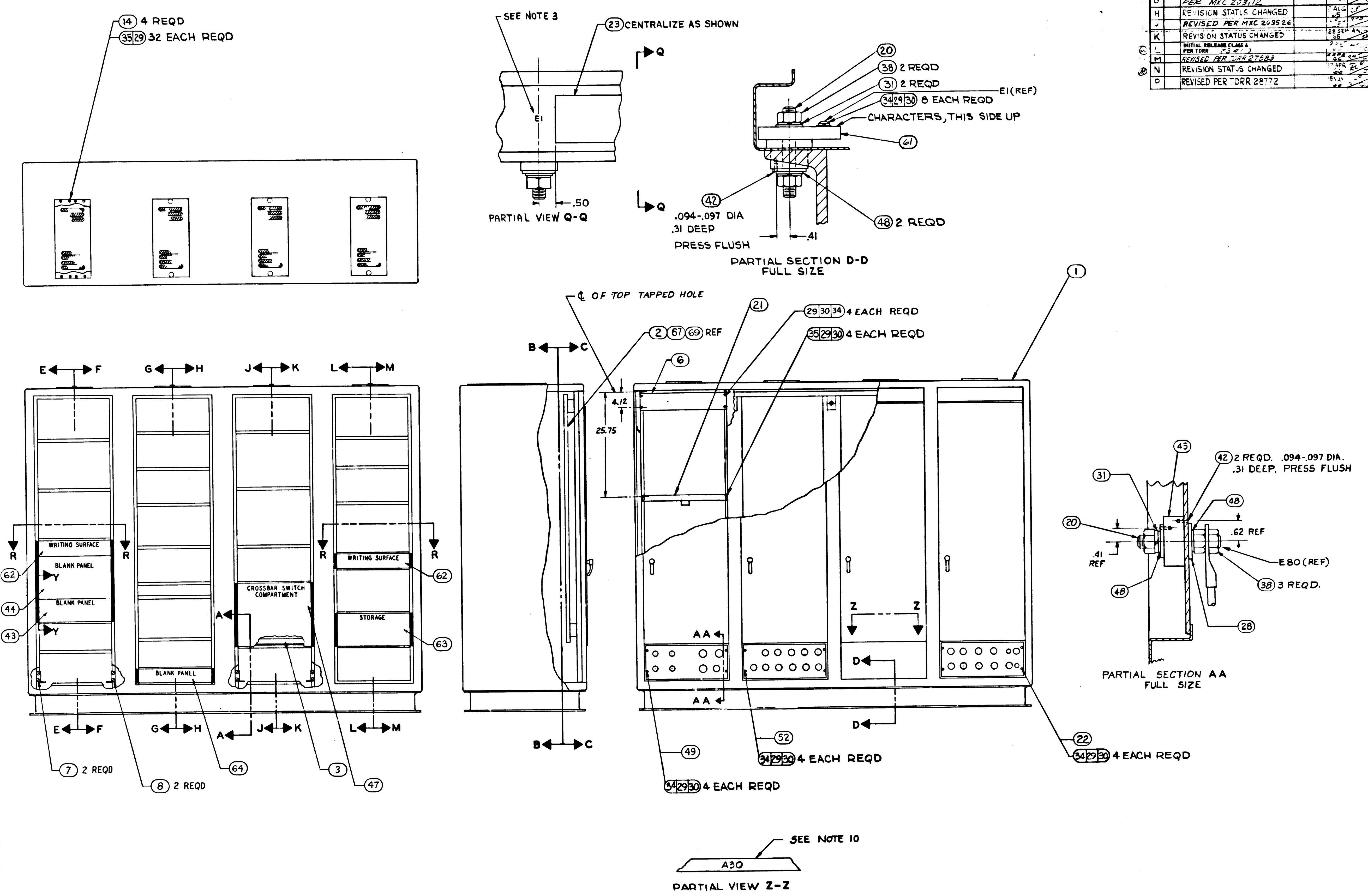
CABINET ASSEMBLY ELECTRICAL EQUIPMENT OPTICS INERTIAL ANALYZER ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900032
SCALE NOTED
SHEET 1 OF 7

2900032 P

23 JUL 65

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MXC 203112		[illegible]	[illegible]
H		REVISION STATUS CHANGED		2 AUG 65	[illegible]
J		REVISED PER MXC 203526		[illegible]	[illegible]
K		REVISION STATUS CHANGED		28 SEP 65	[illegible]
L		INITIAL RELEASE CLASS A PER TDRR 23412		9 OCT 65	[illegible]
M		REVISED PER TDRR 27583		8 APR 66	[illegible]
N		REVISION STATUS CHANGED		19 APR 66	[illegible]
P		REVISED PER TDRR 28772		[illegible]	[illegible]


14 4 REQD
35 29 32 EACH REQD
SEE NOTE 3
E1
23 CENTRALIZE AS SHOWN
Q
Q
.50
PARTIAL VIEW Q-Q
20
38 2 REQD
31 2 REQD
34 29 30 8 EACH REQD
E1(REF)
CHARACTERS, THIS SIDE UP
61
42
.094-.097 DIA
.31 DEEP
PRESS FLUSH
48 2 REQD
.41
PARTIAL SECTION D-D
FULL SIZE
℄ OF TOP TAPPED HOLE
21
29 30 34 4 EACH REQD
35 29 30 4 EACH REQD
1
2 67 69 REF
6
4.12
25.75
E F
G H
J K
L M
B C
R R
R R
WRITING SURFACE
BLANK PANEL
BLANK PANEL
Y
Y
62
44
43
WRITING SURFACE
62
STORAGE
63
CROSSBAR SWITCH COMPARTMENT
A
A
BLANK PANEL
AA
AA
Z Z
D
D
E F
G H
J K
L M
B C
7 2 REQD
8 2 REQD
64
3
47
49
34 29 30 4 EACH REQD
52
34 29 30 4 EACH REQD
22
34 29 30 4 EACH REQD
43
42 2 REQD. .094-.097 DIA.
.31 DEEP, PRESS FLUSH
31
48
20
.62 REF
.41 REF
E80 (REF)
38 3 REQD.
48
28
PARTIAL SECTION AA
FULL SIZE
SEE NOTE 10
A30
PARTIAL VIEW Z-Z

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ \+ \+
− − −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 24-[illegible]-65
CHECKED [illegible] 6 JUL 65
APPROVAL [illegible]
APPROVAL
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

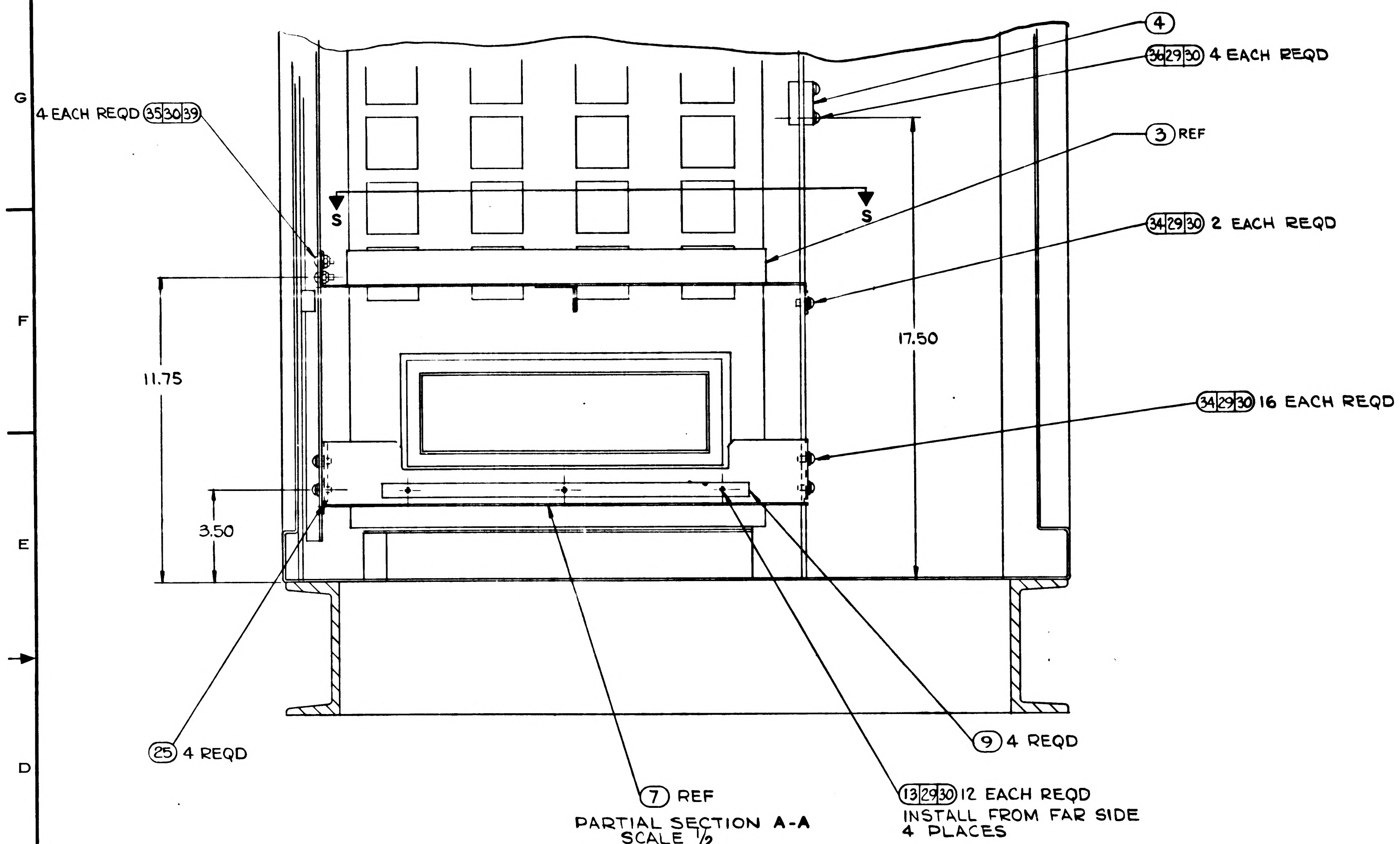
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

CABINET ASSEMBLY -
ELECTRICAL EQUIPMENT
OPTICS INERTIAL ANALYZER
ASSEMBLY

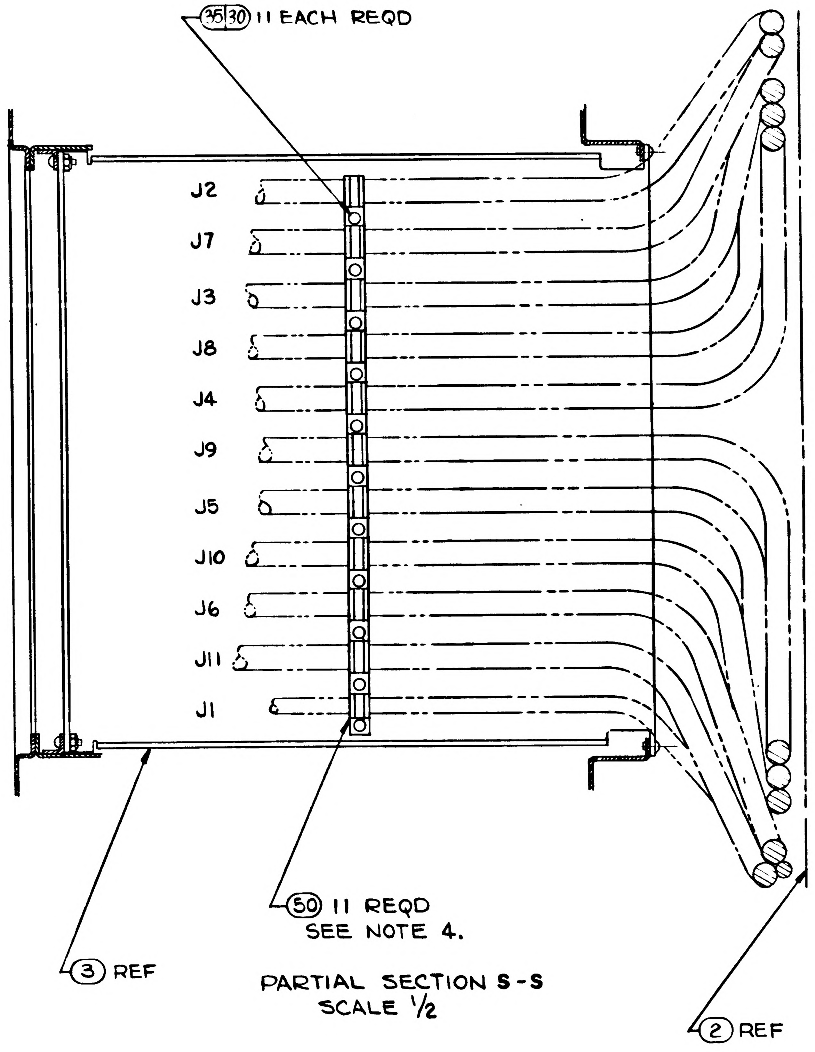
CODE IDENT NO 99974
SIZE E
2900032
SCALE
SHEET 2 OF 7

2900032 P

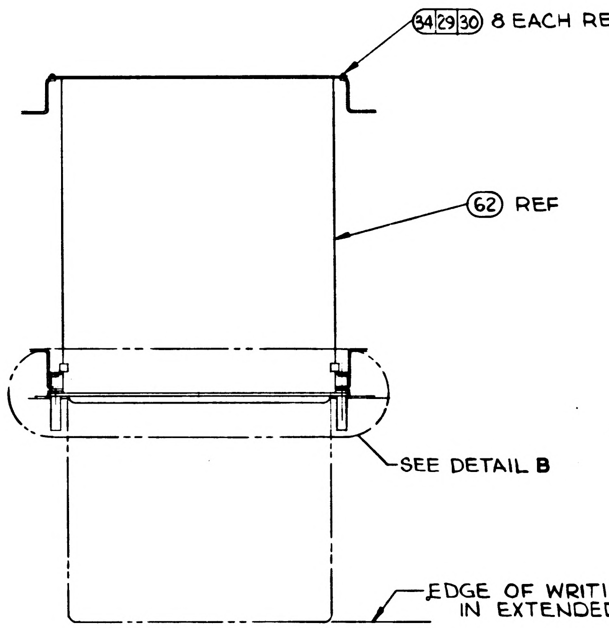
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
REVISIONS					
G		THIS SHEET ADDED PER MXC 203112	—	17 JUL 65	[illegible]
H		REVISION STATUS CHANGED		2 AUG 65	[illegible]
J		REVISION STATUS CHANGED			[illegible]
K		REVISION STATUS CHANGED		28 SEP 65	A.N
L		INITIAL RELEASE CLASS A PER TDRR 23919		9 OCT 65	LF
M		REVISION STATUS CHANGED		4 APR 66	[illegible]
N		REVISION STATUS CHANGED		9 APR 66	[illegible]
P		REVISION STATUS CHANGED		8 MAY 66	[illegible]


4
36 29 30 4 EACH REQD
4 EACH REQD 35 30 39
3 REF
S
S
34 29 30 2 EACH REQD
17.50
11.75
34 29 30 16 EACH REQD
3.50
25 4 REQD
9 4 REQD
7 REF
13 29 30 12 EACH REQD
INSTALL FROM FAR SIDE
4 PLACES

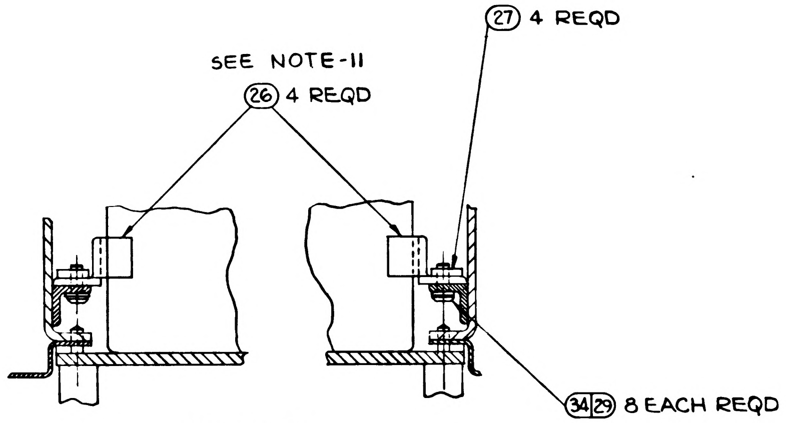
PARTIAL SECTION A-A
SCALE 1/2
SHT 2 ZONE C7


35 30 11 EACH REQD
J2
J7
J3
J8
J4
J9
J5
J10
J6
J11
J1
50 11 REQD
SEE NOTE 4.
3 REF
2 REF

PARTIAL SECTION S-S
SCALE 1/2


34 29 30 8 EACH REQD
62 REF
SEE DETAIL B
EDGE OF WRITING SURFACE
IN EXTENDED POSITION.

PARTIAL SECTION R-R
SCALE 1/4
SHT 2 ZONE D6 & 8


SEE NOTE-11
26 4 REQD
27 4 REQD
34 29 8 EACH REQD

DETAIL B
SCALE-FULL

2900058-011	2900023-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 24 MAR 65
CHECKED [illegible] 6 JUL 65
APPROVAL [illegible]
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

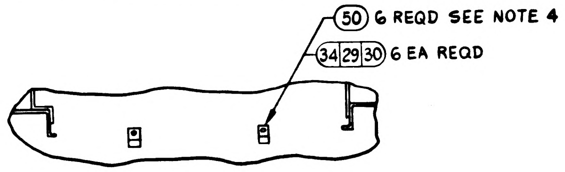
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABINET ASSEMBLY -
ELECTRICAL EQUIPMENT
OPTICS-INERTIAL
ANALYZER ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900032
SCALE NOTED
SHEET 3 OF 7

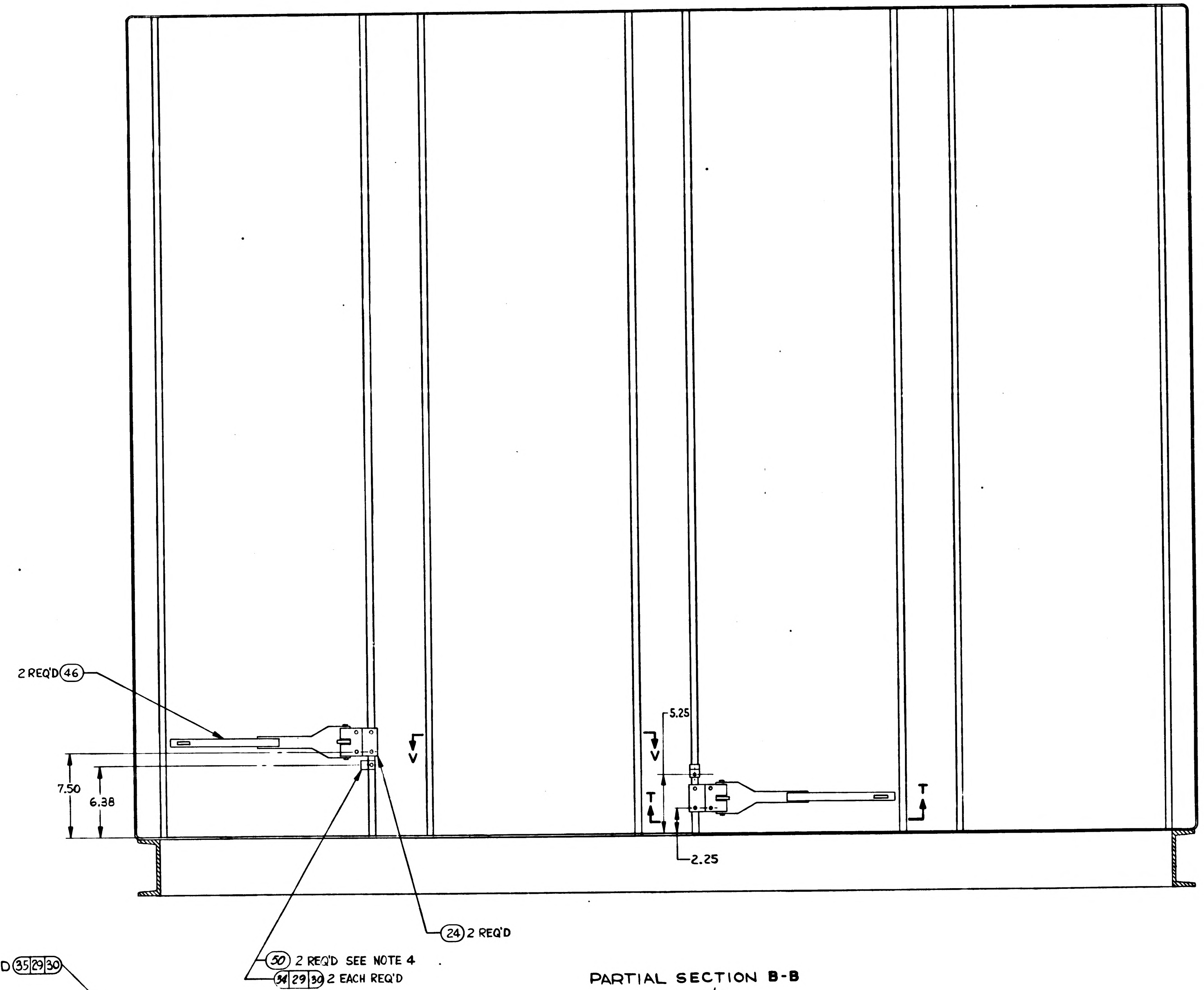
S00035

SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MXC 203112		JUL 65	MG
H		REVISED PER MXC 203444		2 AUG 65	RP
J		REVISION STATUS CHANGED		6 AUG 65	RTP
K		REVISED PER MXC 205205		28 SEP 65	[illegible]
L		INITIAL RELEASE CLASS A PER TDRR 23919		9 OCT 65	[illegible]
M		REVISED PER TDRR 27583		2 APR 66	[illegible]
N		REVISION STATUS CHANGED		9 APR 66	[illegible]
P		REVISED PER TDRR 28772		9 MAY 66	JHF



(50) 6 REQD SEE NOTE 4
(34)(29)(30) 6 EA REQD

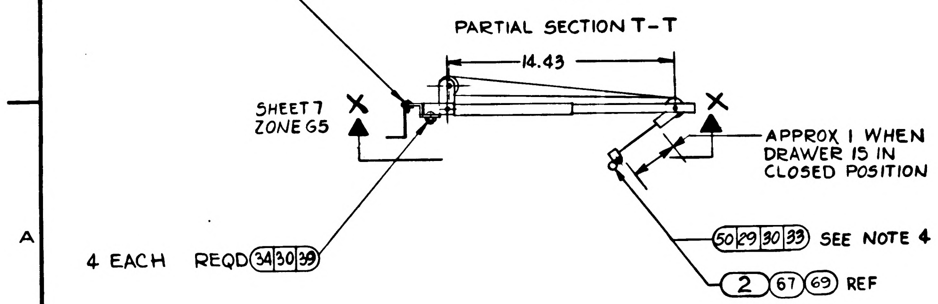
PARTIAL SECTION V-V



2 REQ'D (46)
V
V
7.50
6.38
5.25
T
T
2.25
(24) 2 REQ'D
(50) 2 REQ'D SEE NOTE 4
(34)(29)(30) 2 EACH REQ'D

PARTIAL SECTION B-B
SCALE: 1/4
SHT 2 ZONE C-5

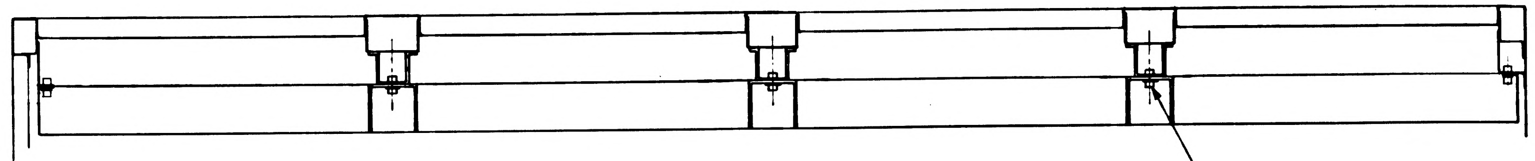
PARTIAL SECTION T-T



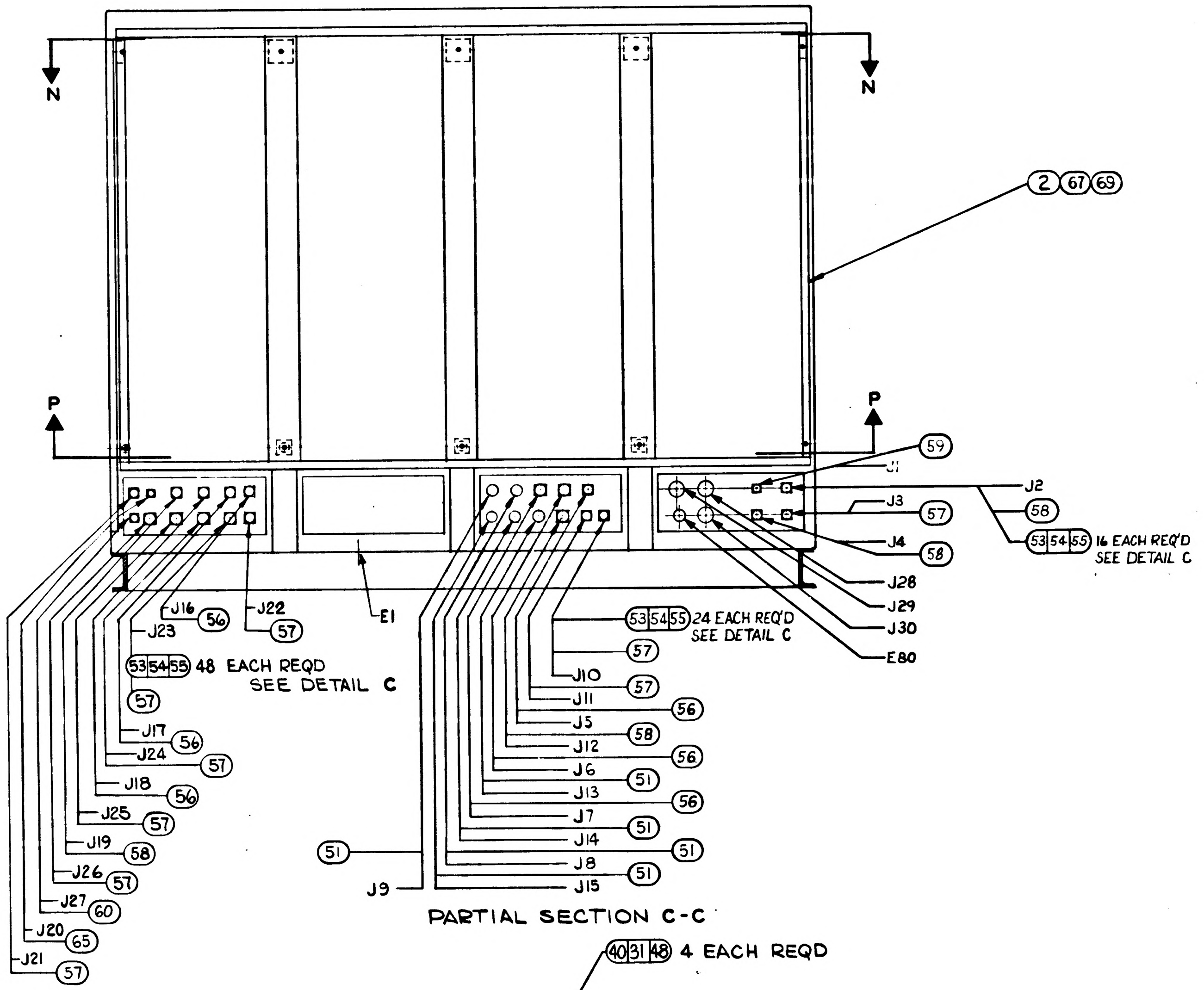
4 EACH REQD (35)(29)(30)
14.43
SHEET 7 ZONE G5
X
X
APPROX 1 WHEN DRAWER IS IN CLOSED POSITION
(50)(29)(30)(33) SEE NOTE 4
(2)(67)(69) REF
4 EACH REQD (34)(30)(39)

2900058-011 NEXT ASSY	2900023-011 USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + − DECIMALS + − ANGLES + − DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
APPLICATION		MATERIAL	DRAWN Bender DATE 24-MAR-65 CHECKED 6 JUL 65 APPROVAL APPROVAL	CABINET ASSEMBLY ELECTRICAL EQUIPMENT OPTICS-INERTIAL ANALYZER ASSEMBLY
		CONTRACT NAS9-497	NASA APPROVAL MIT APPROVAL	CODE IDENT NO 99974 SIZE E 2900032 SCALE NOTED SHEET 4 OF 7

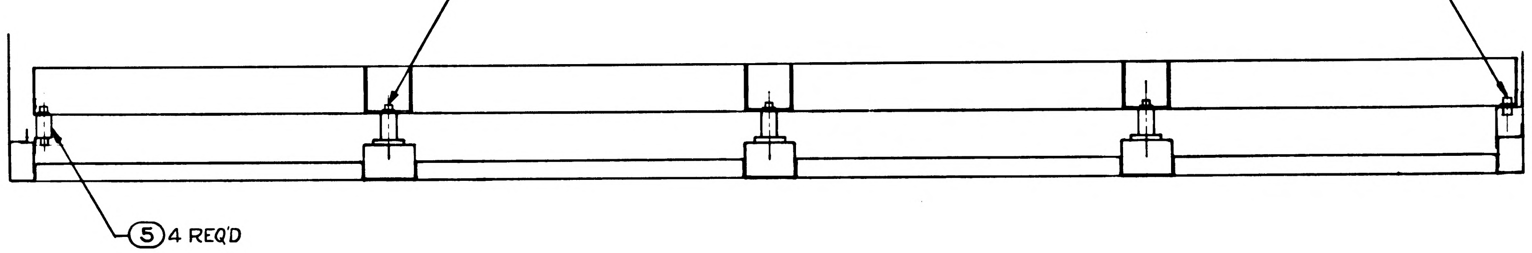
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MX- 20312		19-JUL-65	RWH
H		REVISION STATUS CHANGED		2 AUG 65	
J		REVISION STATUS CHANGED		AUG 65	
K		REVISION STATUS CHANGED		28 SEP 65	A.N.
L		INITIAL RELEASE CLASS A PER TDRR 23419		9 OCT 65	
M		REVISED PER TDRR 27583		4 APR 66	
N		REVISION STATUS CHANGED		19 APR 66	
P		REVISED PER TDRR 28772		8 MAY 66	


41 31 48 5 EACH REQD

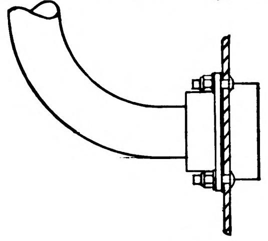
PARTIAL SECTION N-N
SCALE 1/4


N
N
2 67 69
P
P
59
J1
J2
J3
58
57
53 54 55 16 EACH REQ'D SEE DETAIL C
J4
58
J28
J29
J30
E80
E1
J16 56
J22
J23 57
53 54 55 48 EACH REQD SEE DETAIL C
57
J17 56
J24 57
J18 56
J25 57
J19 58
J26 57
J27 60
J20 65
J21 57
53 54 55 24 EACH REQ'D SEE DETAIL C
57
J10 57
J11 56
J5 58
J12 56
J6 51
J13 56
J7 51
J14 51
J8 51
J15
51
J9

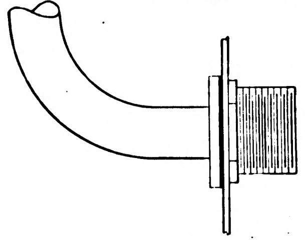
PARTIAL SECTION C-C


41 31 48
40 31 48 4 EACH REQD
5 4 REQ'D

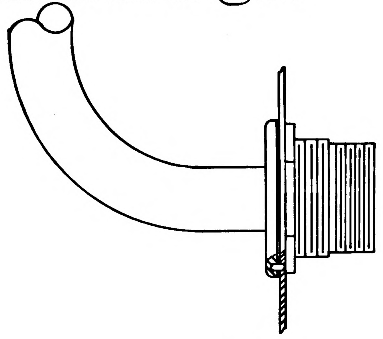
PARTIAL SECTION P-P
SCALE 1/4


CABLE & PLUG FROM ITEM 2 (REF)

DETAIL C
INSTALLATION OF J1 THRU J7, J10 THRU J12 & J16 THRU J27.


CABLE & PLUG FROM ITEM 2 (REF)

DETAIL E
INSTALLATION OF J8, J9, J13, J14, & J15.


CABLE & PLUG FROM ITEM 2 (REF)

DETAIL F
INSTALLATION OF J28, J29 & J30

2900058-011	2900023-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ + +
− − −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

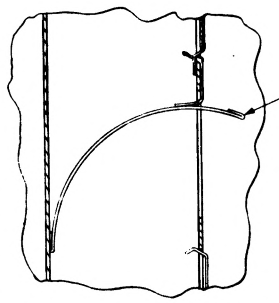
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 22 MAR 65
CHECKED 6 JUL 65
APPROVAL G. STODDARD
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

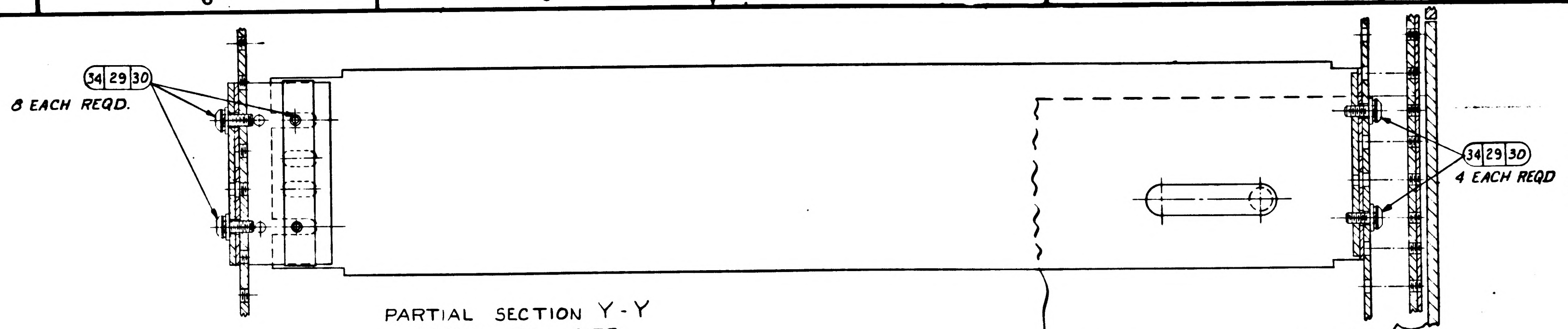
CABINET ASSEMBLY ELECTRICAL EQUIPMENT OPTICS-INERTIAL ANALYZER ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900032
SCALE NOTE D
SHEET 5 OF 7

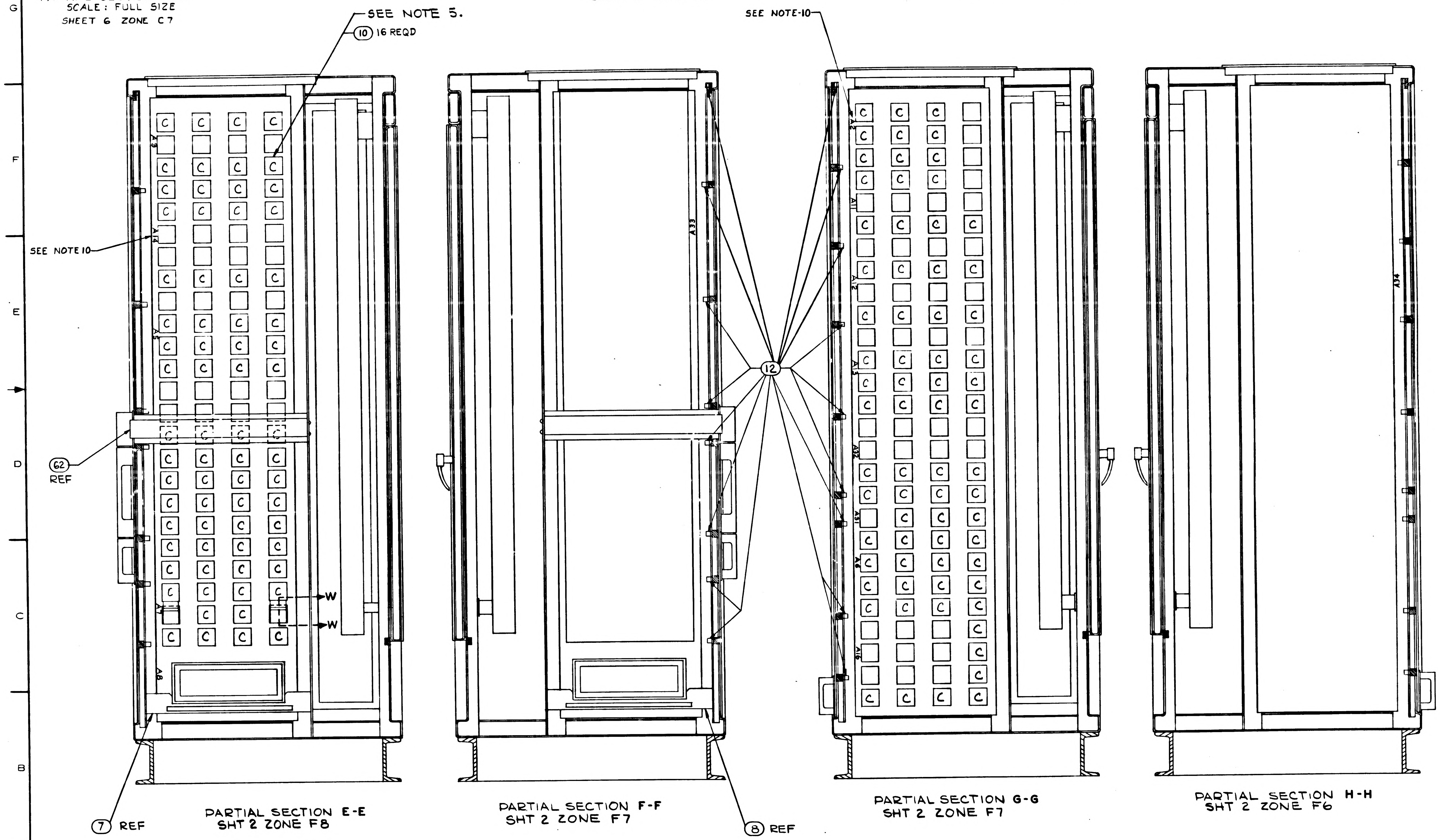
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
REVISIONS					
J		THIS SHEET ADDED PER MX- 203112		14-JL 65	M.G. RWH
H		REVISION STATUS CHANGED		2 AUG 65	
J		REVISION STATUS CHANGED		6 AUG 65	
K		REVISION STATUS CHANGED		28 SEP 65	A.N.
L		INITIAL RELEASE CLASS A PER TDRR 23919		8 OCT 65	
M		REVISION STATUS CHANGED		4 APR 66	
N		REVISION STATUS CHANGED		19 APR 66	
P		REVISION STATUS CHANGED		8 MAY 66	



PARTIAL SECTION W-W
SCALE: FULL SIZE
SHEET 6 ZONE C7



PARTIAL SECTION Y-Y
SCALE: FULL SIZE
SHEET 2 ZONE D8



PARTIAL SECTION E-E
SHT 2 ZONE F8

PARTIAL SECTION F-F
SHT 2 ZONE F7

PARTIAL SECTION G-G
SHT 2 ZONE F7

PARTIAL SECTION H-H
SHT 2 ZONE F6

2900058-011	290023-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 24-MAR-59
CHECKED 6 JUL
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

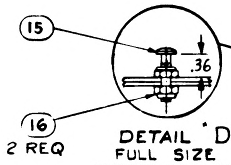
CABINET ASSEMBLY
ELECTRICAL EQUIPMENT
OPTICS INERTIAL
ANALYZER ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900032
SCALE
SHEET 6 OF 7

2900032 P

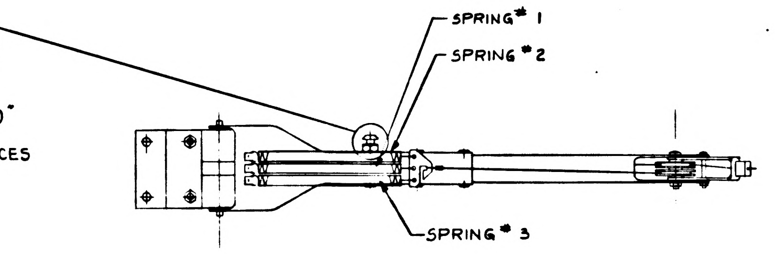
ALL CABLE RETRACTORS
HAVE 3 SPRINGS
UNLESS SHOWN BELOW

DRAWER NUMBER	SPRINGS REQUIRED		
	#1	#2	#3
A2	NO	YES	YES
A31	NO	YES	YES
A16	YES	NO	NO
A3	NO	YES	YES
A19	NO	YES	YES
A20	NO	YES	YES
A18	NO	YES	YES
A10	NO	YES	YES
A4	NO	YES	YES
A26	NO	YES	YES
A6	YES	NO	NO
A29	YES	NO	NO



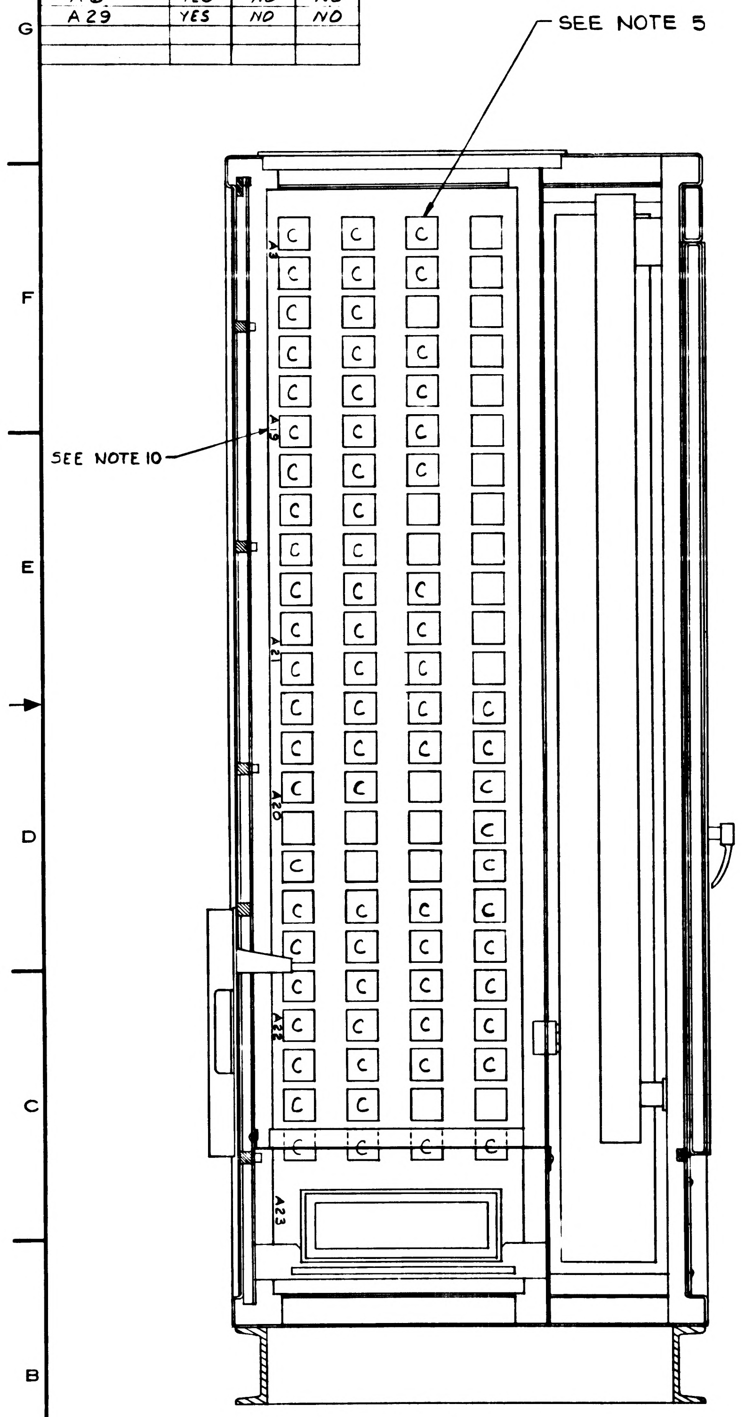
16 2 REQ

DETAIL "D"
FULL SIZE
TYPICAL 21 PLACES

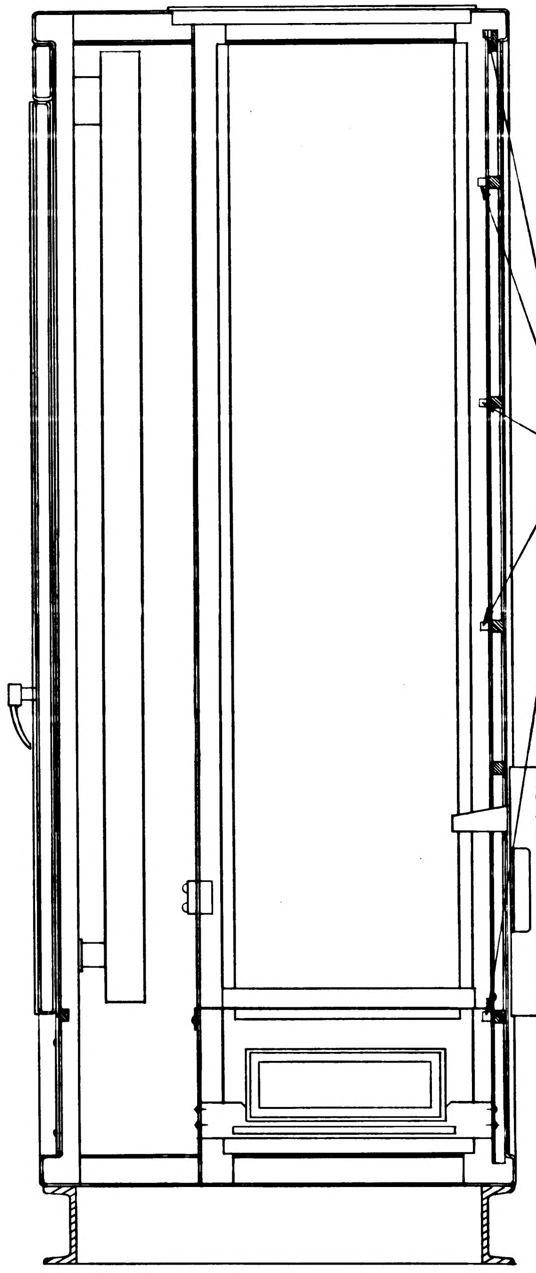


VIEW X-X
HALF SIZE
SHEET 4 ZONE A7

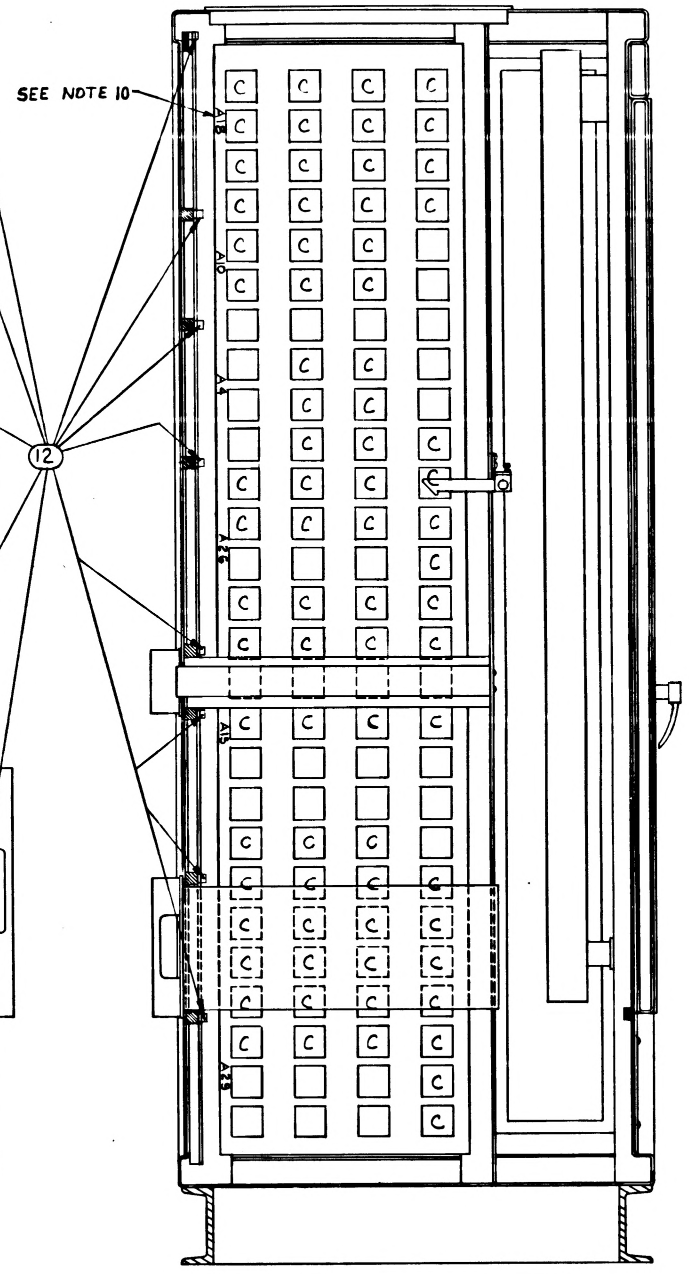
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MXC 203112		19-JUL 65	
H		REVISION STATUS CHANGED		2 AUG 65	
J		REVISION STATUS CHANGED		6 AUG 65	
K		REVISION STATUS CHANGED		28 SEP 65	
L		INITIAL RELEASE CLASS A PER TDRR 23419		19 OCT 65	
M		REVISION STATUS CHANGED		4 APR 66	
N		REVISION STATUS CHANGED		19 APR 66	
P		REVISION STATUS CHANGED		8 MAY 66	



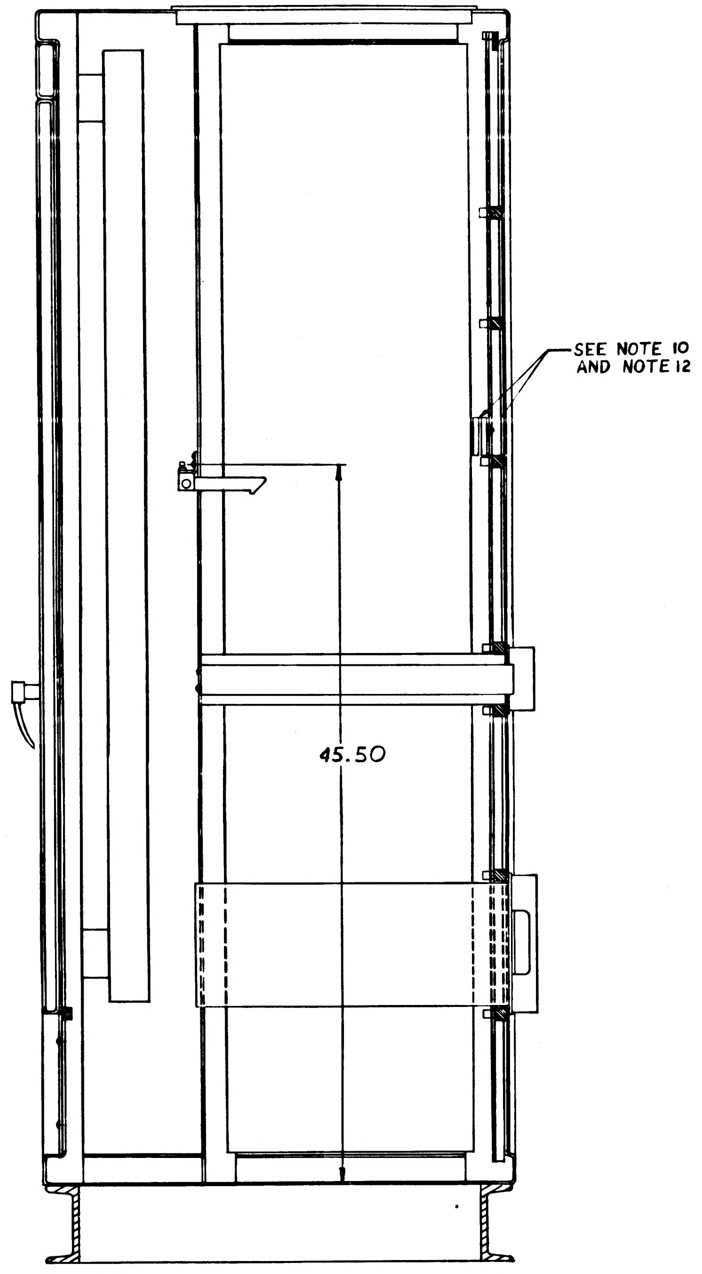
PARTIAL SECTION J-J
SHT 2 ZONE F7



PARTIAL SECTION K-K
SHT 2 ZONE F7



PARTIAL SECTION L-L
SHT 2 ZONE F6



PARTIAL SECTION M-M
SHT 2 ZONE F6

P
2900032
B

290005 8-011	2900023-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ \+ \+
- \- \-
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-947

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 24-MAR-65
CHECKED 6 JUL 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABINET ASSEMBLY
ELECTRICAL EQUIPMENT
OPTICS-INERTIAL
ANALYZER ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900032
SCALE
SHEET 7 OF 7

SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
REVISIONS 23919					
G		REPLACES REVISION F WITH CHANGE PER MXC203112	—	19-JUL 65	M.G. RWH
H		REVISED PER MXC 203444		2 AUG 65	RLP
J		REVISED PER MXC 203526		6 AUG 65	RTP
K		REVISION STATUS CHANGED		28 SEP 65	A.N.
L		INITIAL RELEASE CLASS A PER TDRR 23919		19 OCT 65	FE
M		REVISED PER TDRR 27583		8 APR 66	RWH
N		REVISED PER TDRR 28052		19 APR 66	RLP JRC
P		REVISED PER TDRR 28772		18 MAY 66	JHP
R		REVISED PER TDRR 31240		30 SEP 66	D.D.

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. VENDOR ITEM, SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.

3. MARK CHARACTERS PER ND1002019, .12 HIGH, COLOR BLACK. CENTRALIZE AS SHOWN.

4. SELECT ITEM (50) DASH NUMBERS 2 THRU 15 AS REQUIRED AT ASSEMBLY.

5. [C] REPRESENTS A CLOSED OPENING IN THE AIR PLENUM OF ITEM ①. OPENINGS SHALL BE CLOSED WITH PLATES SUPPLIED WITH ITEM ① BY VENDOR PLUS THE QUANTITY SHOWN AS ITEM ⑩ TO COMPLETE THE REQUIREMENTS.

6. APPLY TIGHTENING TORQUE TO ALL SCREWS AS FOLLOWS, EXCEPT FOR PANEL ATTACHING SCREWS WHICH SHALL BE TORQUED TO 21.4 - 23.8 IN. LBS:
   - 6-32 8.6 - 9.6 IN. LBS
   - 8-32 17.8 - 19.8 IN. LBS
   - 10-32 28.5 - 31.7 IN. LBS
   - 3/8 - 24 233 - 259 IN. LBS

7. CONNECTOR INSTALLATION:
   - A. INSTALL J1 THRU J4 AND J28 THRU J30 INCLUSIVE OF ITEM ② INTO ITEM (49) AS SHOWN.
   - B. INSTALL J16 THRU J27 INCLUSIVE OF ITEM ② INTO ITEM ㉒ AS SHOWN.
   - C. INSTALL J5 THRU J15 INCLUSIVE OF ITEM ② INTO ITEM (52) AS SHOWN.
   - D. INSTALL GROUND LUGS TO E1 AND E80 AS SHOWN.

8. DISPOSE OF EXCESS DRAWER MOUNTING AND RETRACTOR HARDWARE.

9. AFTER ASSEMBLY OF ITEM ② TO ITEM ①, ATTACH RETRACTOR MOUNTED CABLES OF ITEM ② TO ITEM ⑫ IN THEIR RESPECTIVE AREAS.

10. MARK CHARACTERS PER ND 1002019, .38 HIGH, COLOR BLACK. CENTRALIZE AS SHOWN.

11. ADJUST ITEM ㉖ SO AS TO SUPPORT UNDER SIDE OF ITEM (62)

12. IDENTIFY USING DRAWING NUMBER PER MIL-STD-130 (ES-267) AND SERIALIZE PER ND 1002023

13. SELECT EITHER PART NO. 1901346 OR 1897313 FOR ITEM ⑩

SECTIONS APPEAR ON SHEETS AS FOLLOWS:

A-A SHT 3
B-B SHT 4
C-C SHT 5
D-D SHT 2
E-E SHT 6
F-F SHT 6
G-G SHT 6
H-H SHT 6
J-J SHT 7
K-K SHT 7
L-L SHT 7
M-M SHT 7
N-N SHT 5
P-P SHT 5
R-R SHT 3
S-S SHT 3
T-T SHT 4
U-U SHT 4
V-V SHT 4
W-W SHT 6
X-X SHT 4
Y-Y SHT 6
AA-AA SHT 2

DETAILS:
A SHT 4
B SHT 3
C SHT 5
D SHT 7
E SHT 5

PARTIAL VIEWS:
Q-Q SHT 2
Z-Z SHT 2

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED 031	QUANTITY REQUIRED 021	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	☒	—	—		70	2901529	RUNNING LIST
	1	—	—		69	2900058-031	HARNESS FRAME ASSEMBLY
	—	—	☒		68	2901169	RUNNING LIST
	—	1	-		67	2900058-021	HARNESS FRAME ASSY.
	☒	☒	-		66	2901206	RUNNING LIST
	1	1	1		65	1900368-009	GASKET-CONNECTOR
	1	1	1		64	1900364-011	BLANK PANEL ASSY (3.50)
	1	1	1		63	1900568	STORAGE DRAWER ASSY
	2	2	2		62	1900345-021	WRITING SURFACE ASSY
	1	1	1		61	1900550	GROUND PLATE
	1	1	1		60	1900368-006	GASKET-CONNECTOR
	1	1	1		59	-001	
	4	4	4		58	-003	
	9	9	9		57	-004	
	6	6	6		56	1900368-005	GASKET-CONNECTOR
	88	88	88		55	AN363C632(1896990-261)	NUT, SELF LOCKING
	88	88	88		54	AN960C6L(1897006-036)	WASHER, FLAT #6
SEE NOTE 2	88	88	88		53	1006783-23	SCREW-BUTTON-HEX SOC
	1	1	1		52	1900365	PANEL (INSEP ASSY)
	5	5	5		51	1900369	GASKET-CONNECTOR
SEE NOTE 4	20	20	20		50	MS21919WDG-2 THRU 15 (1897073-202 THRU 215)	CLAMP, LOOP TYPE
	1	1	1		49	2900392	PANEL (INSEP ASSY)
	14	14	14		48	AN960C616(1897006-062)	WASHER, FLAT
	1	1	1		47	1900309-011	PANEL ASSY, CROSSBAR SWITCH COMP
SEE NOTE 2	2	2	2		46	1015800-001	CABLE RETRACTOR
	1	1	1		45	1901656	INSULATOR PAD
	1	1	1		44	1900364-051	BLANK PANEL ASSY (10.50)
	1	1	1		43	1900364-021	BLANK PANEL ASSY (5.25)
	3	3	3		42	MS 171492	PIN
	6	6	6		41	MS 16995-79	SCREW, SOC HD CAP
	4	4	4		40	MS 16995-86	SCREW, SOC HD CAP
	8	8	8		39	AN363C1032(1896990-011)	NUT, SELF LOCKING
	5	5	5		38	AN 335-6	NUT-HEX
					37		
SEE NOTE 2	4	4	4		36	1006783-46	SCREW, BUTTON HD-HEX SOC
SEE NOTE 2	55	55	55		35	1006783-45	
SEE NOTE 2	82	82	82		34	1006783-44	
SEE NOTE 2	1	1	1		33	1006783-43	SCREW, BUTTON HD-HEX SOC
					32		
	13	13	13		31	MS 35338-84	WASHER-LOCK 3/8
	114	114	114		30	AN960C10L(1897006-019)	WASHER, FLAT #10
	135	135	135		29	MS 35338-81	WASHER-LOCK #10
	1	1	1		28	1901657	INSULATOR BUSHING
	4	4	4		27	1900344	NUT BAR
	4	4	4		26	1900343	BRACKET
SEE NOTE 2	4	4	4		25	1015790-001	NUT BAR
	2	2	2		24	1900277	BRACKET
	1	1	1		23	1901687	PLATE, INSTRUCTION
	1	1	1		22	1901958	PANEL (INSEP ASSY)
	1	1	1		21	1900255-011	LATCH ASSY
	2	2	2		20	1900080	STUD-GROUND
					19		
	2	2	2		18	1900973	DEFLECTOR, AIR
					17		
	42	42	42		16	AN363C832(1896990-281)	NUT, SELF LOCKING
SEE NOTE 2	21	21	21		15	1006783-29	SCREW, BUTTON HD - HEX SOC
SEE NOTE 2	4	4	4		14	1015819-001	AIR FILTER ASSY, SPECIAL
	12	12	12		13	MS35234-60	SCREW, PAN HD
SEE NOTE 2	30	30	30		12	1015991-001	SCREW, HANGER
SEE NOTES 5 & 13	16	16	16		10	1897313 1901346	COVER, VENTILATORY PLATE, CLOSURE
	4	4	4		9	1900308	GUIDE
	2	2	2		8	1900303	SUPPORT BRACKET R.H.
	2	2	2		7	1900304	SUPPORT BRACKET L.H.
	1	1	1		6	1902100	GUARD, SWITCH (INSEP ASSY)
	4	4	4		5	1900198	SPACER
	1	1	1		4	1900306	BAR-STOP
	1	1	1		3	1900305	SUPPORT SHEET
	—	—	1		2	2900058-011	HARNESS FRAME ASSY
SEE NOTE 2	1	1	1		1	2900043	CABINET ASSY, BASIC

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-031	2900022-031	-031
2900023-021	2900022-021	-021
2900023-011	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 24-MAR 65
CHECKED 24-MAR-65
APPROVAL G. Stoddard 24-MAR-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

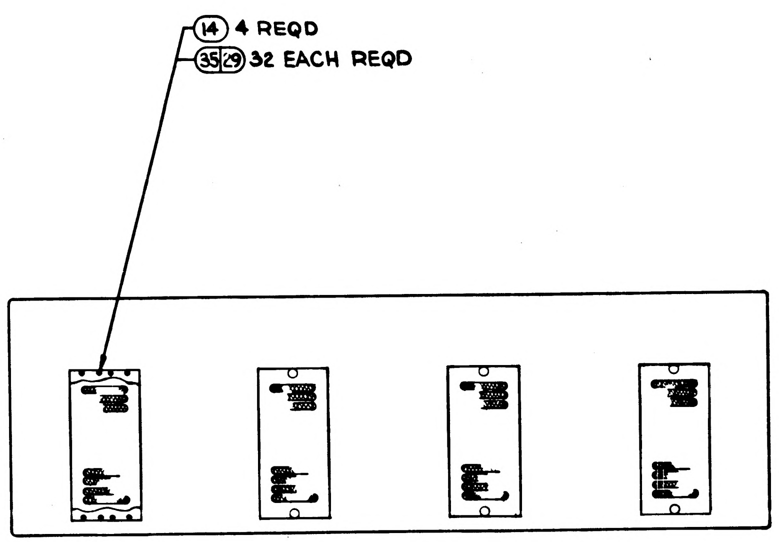
CABINET ASSEMBLY
ELECTRICAL EQUIPMENT
OPTICS INERTIAL ANALYZER
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900032
SCALE NOTED
SHEET 1 OF 7

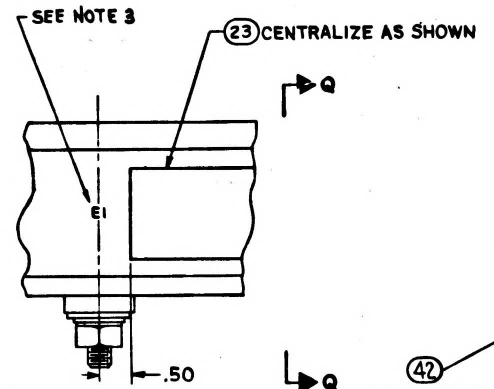
Charleston
8 JUL 65

2900032 K

REVISIONS 23419					
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MXC 203112		19-JUL 65	M.G. RWH
H		REVISION STATUS CHANGED		2 AUG 65	
J		REVISED PER MXC 203526		6 AUG 65	
K		REVISION STATUS CHANGED		28 SEP 65	A.N.
L		INITIAL ~~RELEASE CLASS~~ L PER TDRR 23419		19 OCT 65	LF
M		REVISED PER TDRR 27583		APR 66	R.A.T.
N		REVISION STATUS CHANGED		10 APR 66	JSC
P		REVISED PER TDRR 28772		18 MAY 66	J.H.P.
R		REVISION STATUS CHANGED		30 SEP 66	

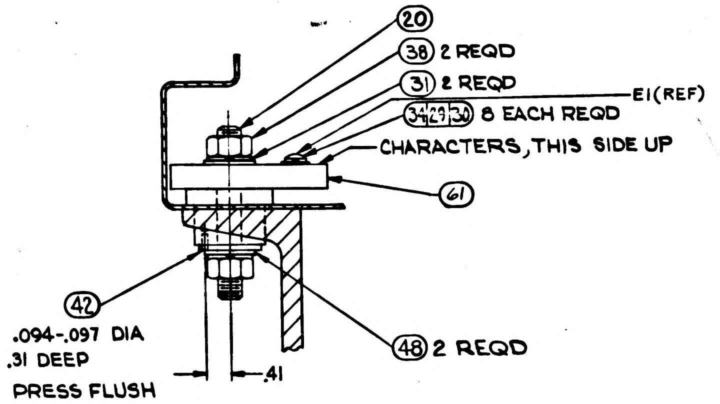


(14) 4 REQD
(35)(29) 32 EACH REQD



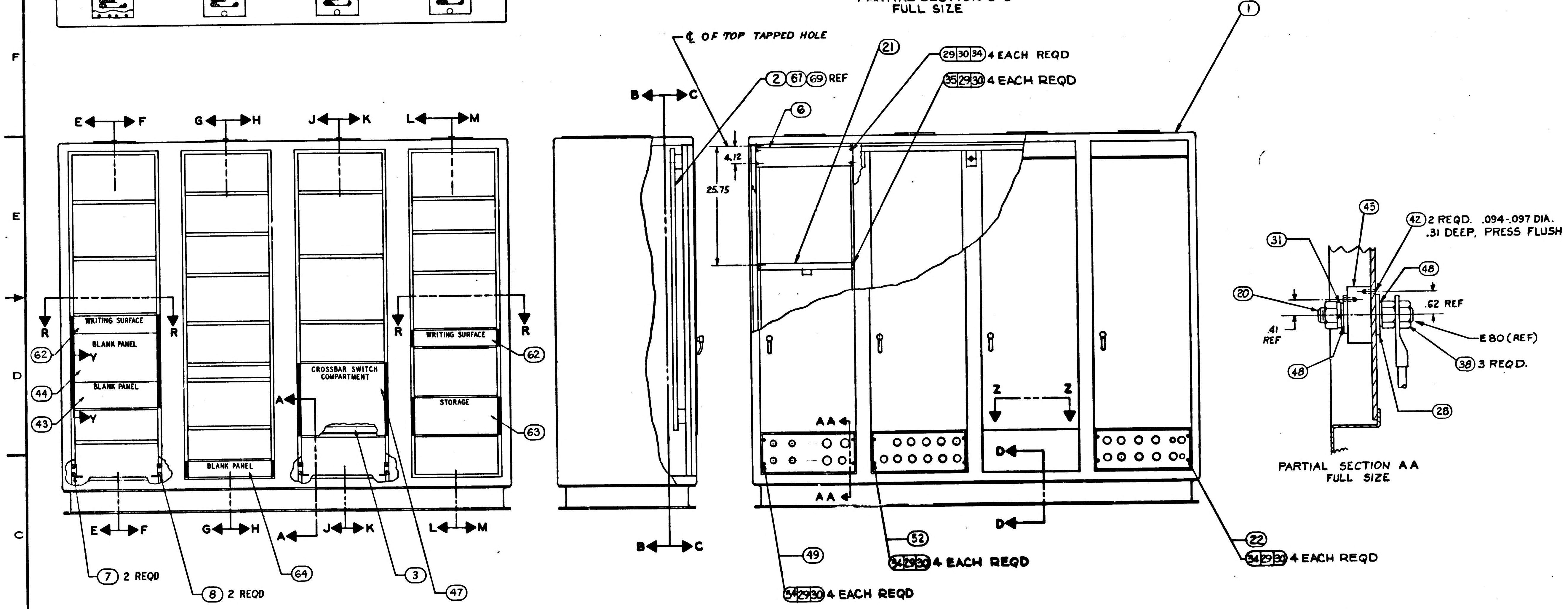
SEE NOTE 3
(23) CENTRALIZE AS SHOWN
Q
Q
E1
.50

PARTIAL VIEW Q-Q



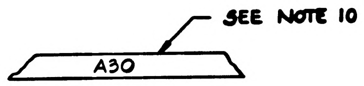
(20)
(38) 2 REQD
(31) 2 REQD
(34)(29)(30) 8 EACH REQD
E1 (REF)
CHARACTERS, THIS SIDE UP
(61)
(42)
.094-.097 DIA
.31 DEEP
PRESS FLUSH
(48) 2 REQD
.41

PARTIAL SECTION D-D
FULL SIZE



℄ OF TOP TAPPED HOLE
(21)
(29)(30)(34) 4 EACH REQD
(35)(29)(30) 4 EACH REQD
(1)
(2)(67)(69) REF
(6)
4.12
25.75
E F
G H
J K
L M
B C
R R
R R
WRITING SURFACE
BLANK PANEL
BLANK PANEL
Y
Y
(62)
(44)
(43)
CROSSBAR SWITCH COMPARTMENT
A
WRITING SURFACE
(62)
STORAGE
(63)
BLANK PANEL
E F
G H
A J K
L M
B C
(7) 2 REQD
(8) 2 REQD
(64)
(3)
(47)
AA
AA
Z Z
D
D
(49)
(34)(29)(30) 4 EACH REQD
(52)
(34)(29)(30) 4 EACH REQD
(22)
(34)(29)(30) 4 EACH REQD
(45)
(42) 2 REQD. .094-.097 DIA. .31 DEEP, PRESS FLUSH
(31)
(48)
(20)
.62 REF
.41 REF
E80 (REF)
(38) 3 REQD.
(48)
(28)

PARTIAL SECTION AA
FULL SIZE



SEE NOTE 10
A30

PARTIAL VIEW Z-Z

2900032 R

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ + +
- - -
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

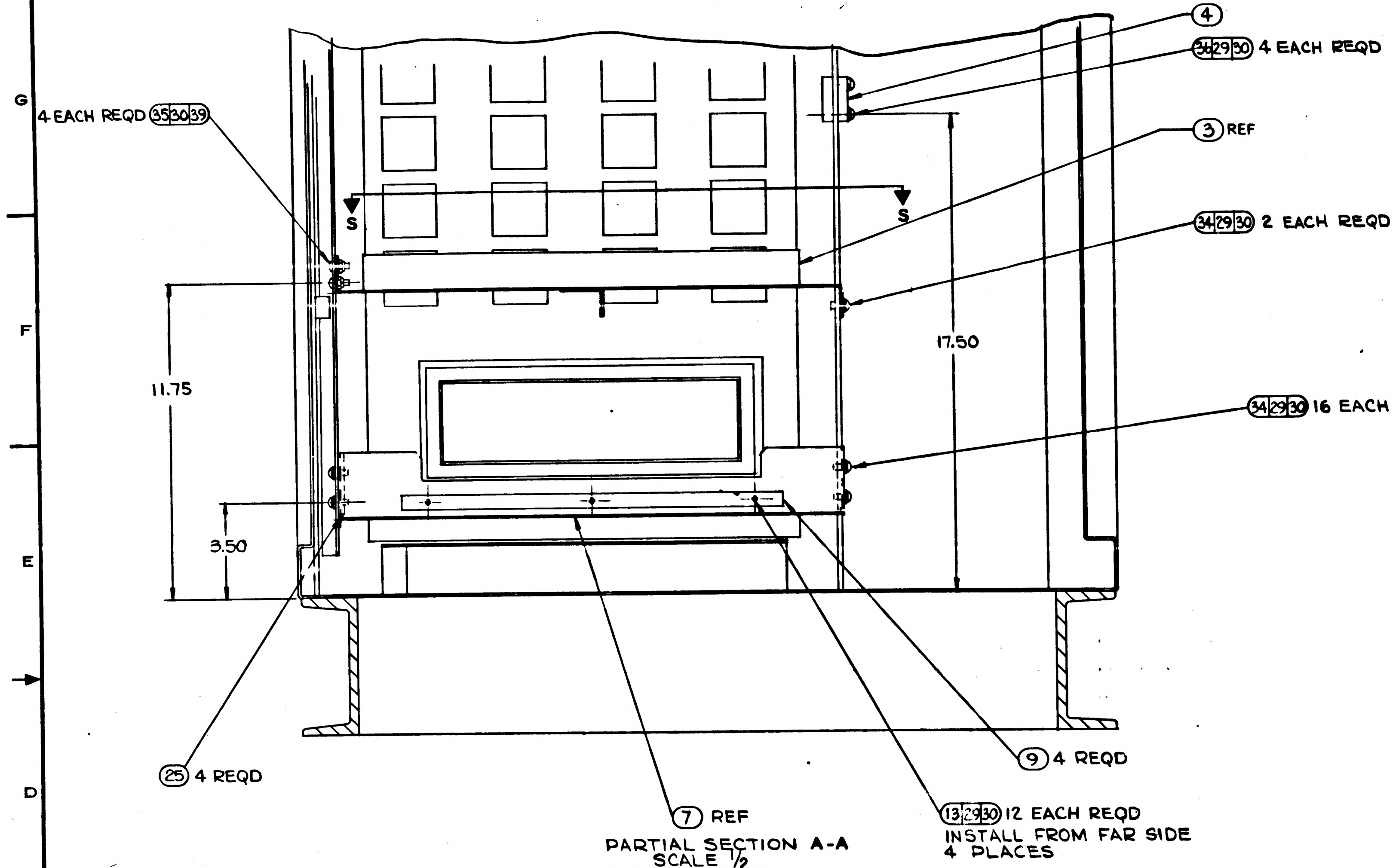
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 24-65
CHECKED 6JUL65
APPROVAL G. STODDARD 7JUL65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

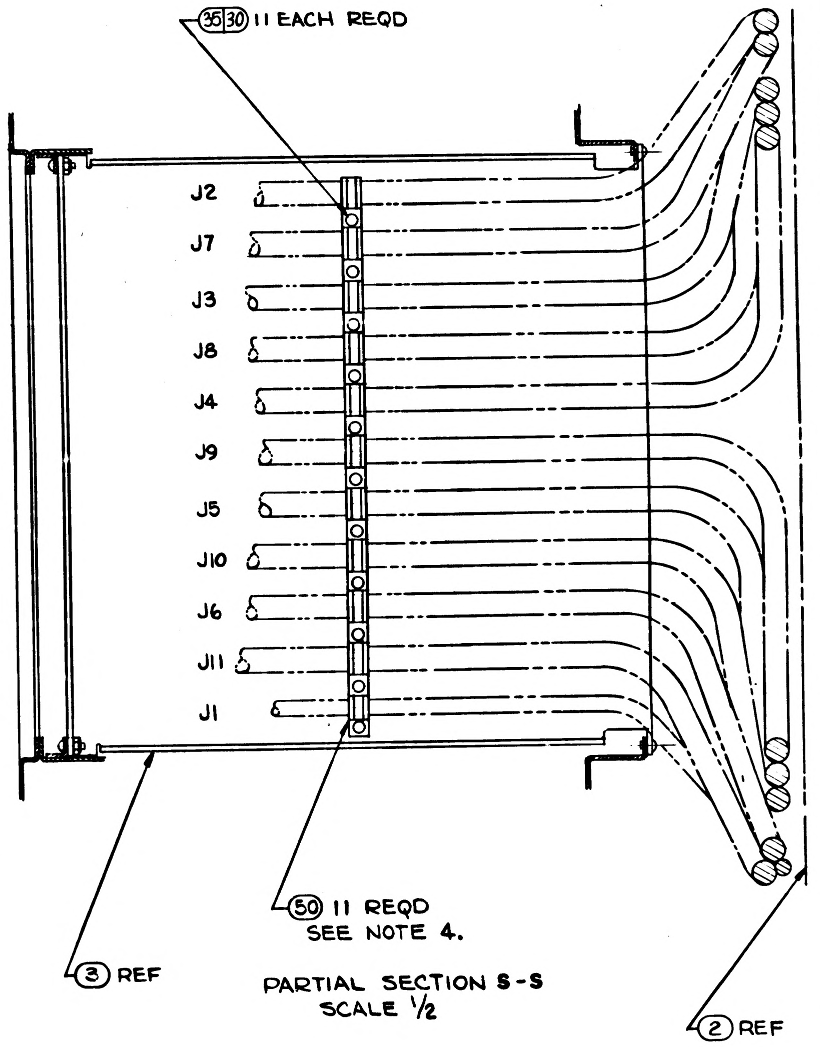
CABINET ASSEMBLY-
ELECTRICAL EQUIPMENT
OPTICS INERTIAL ANALYZER
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900032
SCALE
SHEET 2 OF 7

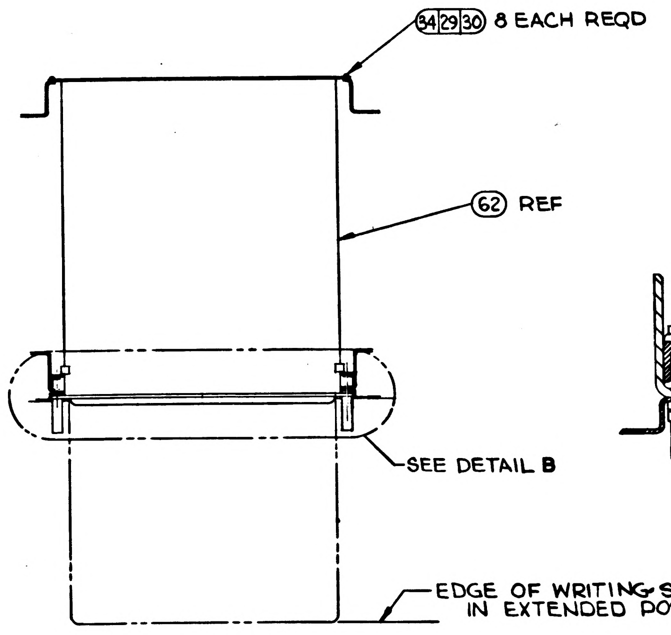
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
		REVISIONS 23911			
G		THIS SHEET ADDED PER MXC 203112	—	17 JUL 65	M.G. RWH
H		REVISION STATUS CHANGED		2 AUG 65	RLP
J		REVISION STATUS CHANGED			RTD
K		REVISION STATUS CHANGED		28 SEP 65	A.N.
L		INITIAL RELEASE CLASS A PER TDRR 23919		19 OCT 65	LF
M		REVISION STATUS CHANGED		APR 66	R.W.T.
N		REVISION STATUS CHANGED		19 APR 66	RLP JAC
P		REVISION STATUS CHANGED		18 MAY 66	J.H.P.
R		REVISION STATUS CHANGED		30 SEP 66	D.D. RWW


4
34 29 30 4 EACH REQD
4 EACH REQD 35 30 39
3 REF
S
S
34 29 30 2 EACH REQD
17.50
11.75
34 29 30 16 EACH REQD
3.50
25 4 REQD
9 4 REQD
7 REF
13 29 30 12 EACH REQD
INSTALL FROM FAR SIDE
4 PLACES

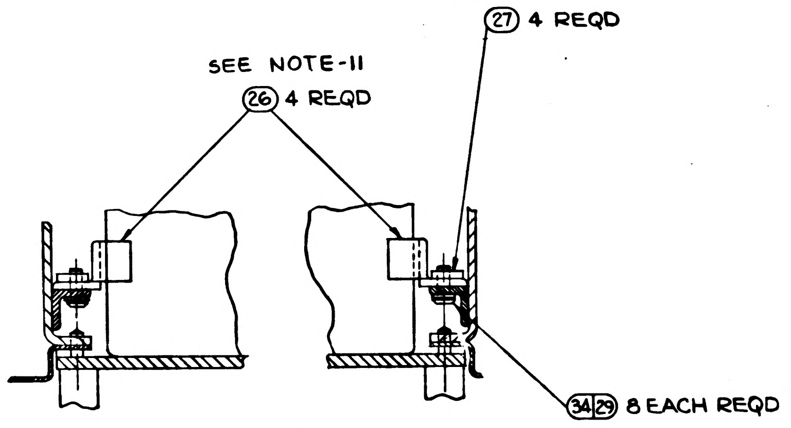
PARTIAL SECTION A-A
SCALE 1/2
SHT 2 ZONE C7


35 30 11 EACH REQD
J2
J7
J3
J8
J4
J9
J5
J10
J6
J11
J1
50 11 REQD
SEE NOTE 4.
3 REF
2 REF

PARTIAL SECTION S-S
SCALE 1/2


34 29 30 8 EACH REQD
62 REF
SEE DETAIL B
EDGE OF WRITING SURFACE
IN EXTENDED POSITION.

PARTIAL SECTION R-R
SCALE 1/4
SHT 2 ZONE D6 & 8


SEE NOTE-11
26 4 REQD
27 4 REQD
34 29 8 EACH REQD

DETAIL B
SCALE-FULL

2900058-011	2900023-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS + − ANGLES + −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bonder DATE 24 MAR 65
CHECKED 6 JUL 65
APPROVAL 7 JUL 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

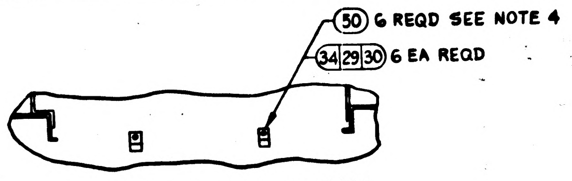
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABINET ASSEMBLY - ELECTRICAL EQUIPMENT OPTICS-INERTIAL ANALYZER ASSEMBLY

CODE IDENT NO. 99974 SIZE E 2900032
SCALE NOTED SHEET 3 OF 7

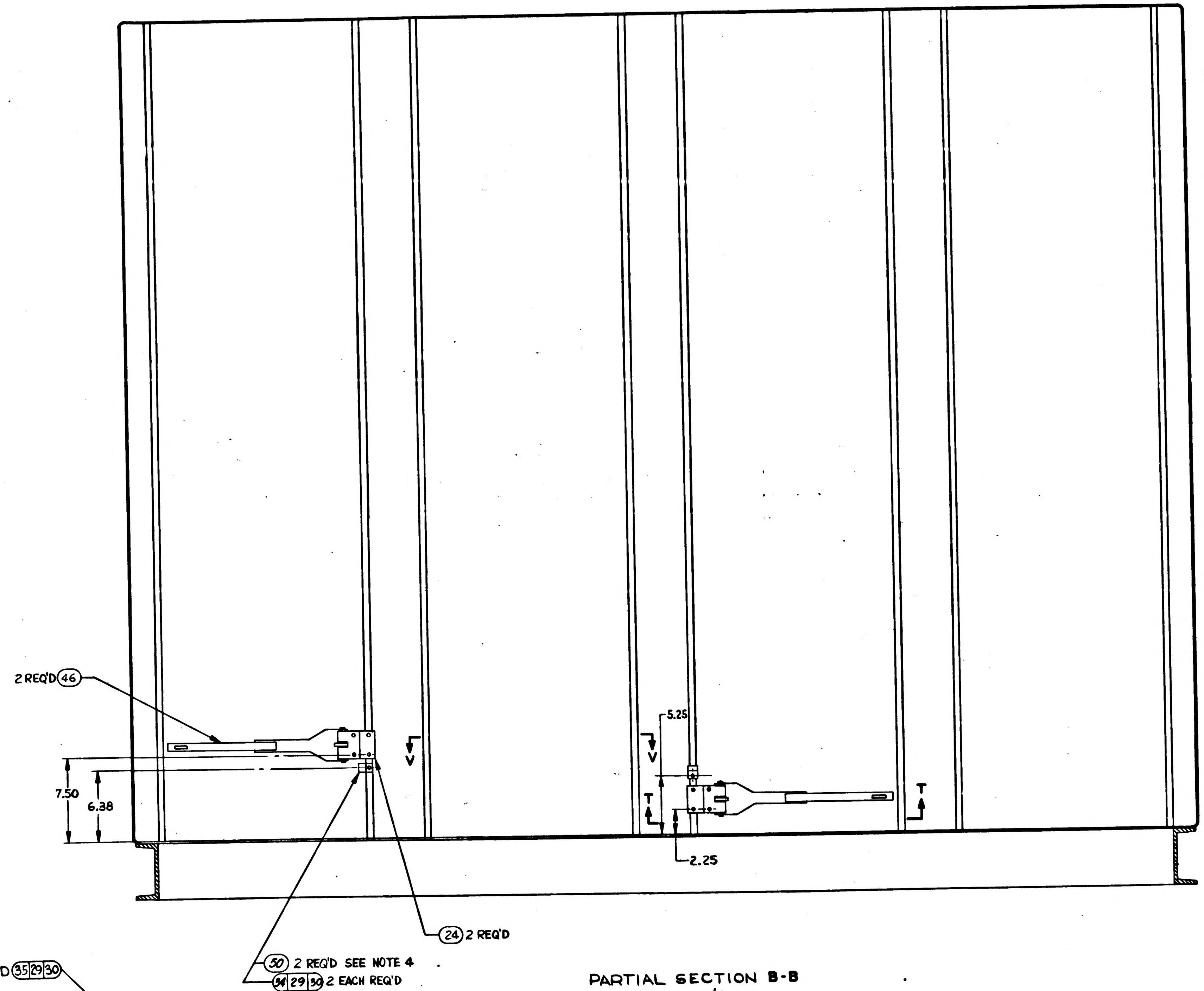
2900032 R

SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
		REVISIONS 23919			
G		THIS SHEET ADDED PER MXC 203112		19-JUL 65	N.G. RWH
H		REVISED PER MXC 203444		2 AUG 65	RLP
J		REVISION STATUS CHANGED		6 AUG 65	RTP
K		REVISED PER MXC 205205		28 SEP 65	A.N.
L		INITIAL RELEASE CLASS A PER TI.RR 23919		19 OCT 65	LF
M		REVISED PER TDRR 27583		8 APR 66	R.W.J.
N		REVISION. STATUS CHANGED		19 APR 66	RLP JAC
P		REVISED PER TDRR 28772		16 MAY 66	JHP
R		REVISION STATUS CHANGED		30 SEP 66	DD



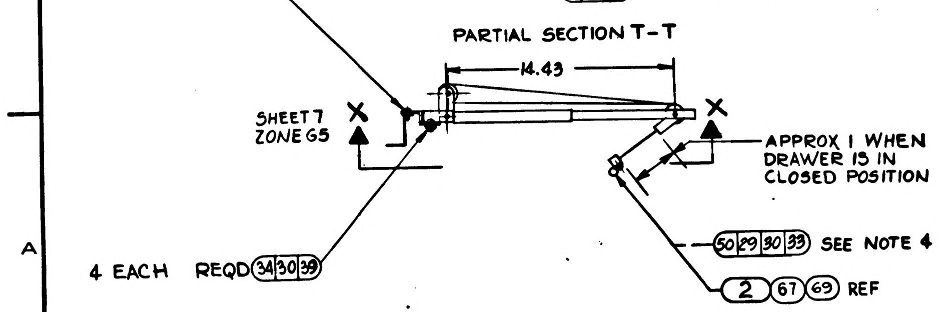
50 6 REQD SEE NOTE 4
34 29 30 6 EA REQD

PARTIAL SECTION V-V



2 REQ'D 46
V
7.50
6.38
5.25
V
T
T
2.25
24 2 REQ'D
50 2 REQ'D SEE NOTE 4
34 29 30 2 EACH REQ'D

PARTIAL SECTION B-B
SCALE: 1/4
SHT 2 ZONE C-5



4 EACH REQD 35 29 30
14.43
X
SHEET 7 ZONE G5
X
APPROX 1 WHEN DRAWER IS IN CLOSED POSITION
4 EACH REQD 34 30 39
50 29 30 33 SEE NOTE 4
2 67 69 REF

PARTIAL SECTION T-T

2900058-011	2900023-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE
CHECKED 6 JUL 65
APPROVAL G. Squazzo 1 Jul 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABINET ASSEMBLY
ELECTRICAL EQUIPMENT
OPTICS-INERTIAL
ANALYZER ASSEMBLY

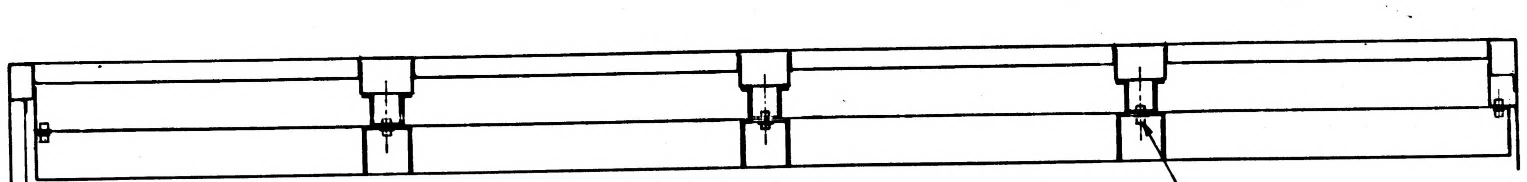
CODE IDENT NO.	SIZE	
99974	E	2900032
SCALE NOTED		SHEET 4 OF 7

R
2900032

S80003S

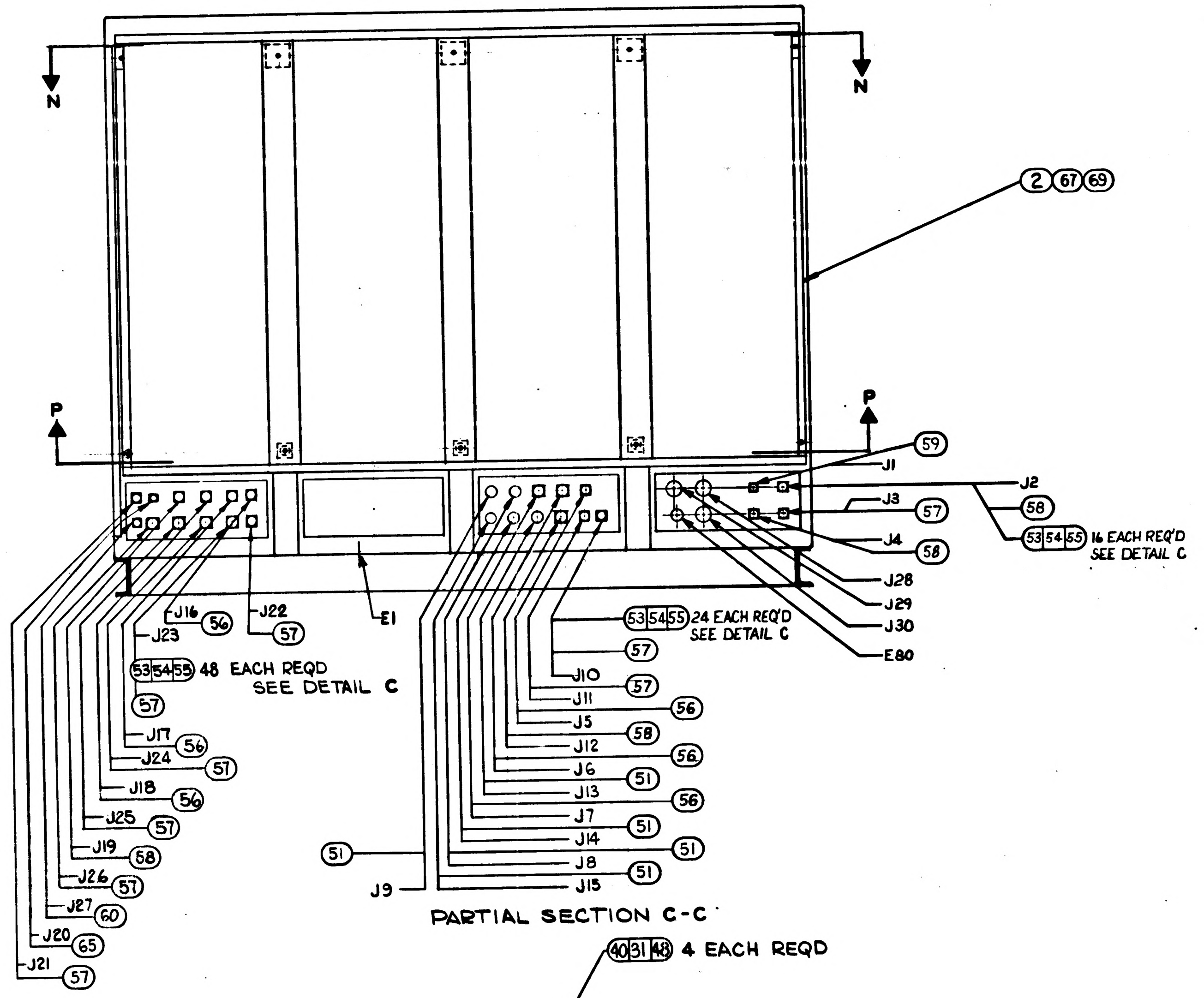
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MXC 20312		19 JUL 63	M.G. RWH
H		REVISION STATUS CHANGED		2 AUG 65	RLP
J		REVISION STATUS CHANGED		6 AUG 65	RTP
K		REVISION STATUS CHANGED		28 SEP 65	A.N.
L		INITIAL RELEASE CLASS A PER TDRR 23413		19 OCT 65	7E
M		REVISED PER TDRR 27583		4 APR 66	R.W.T.
N		REVISION STATUS CHANGED		19 APR 66	RL JFC
P		REVISED PER TDRR 28772		18 MAY 66	
R		REVISION STATUS CHANGED		30 SEP 66	

REVISIONS 2341



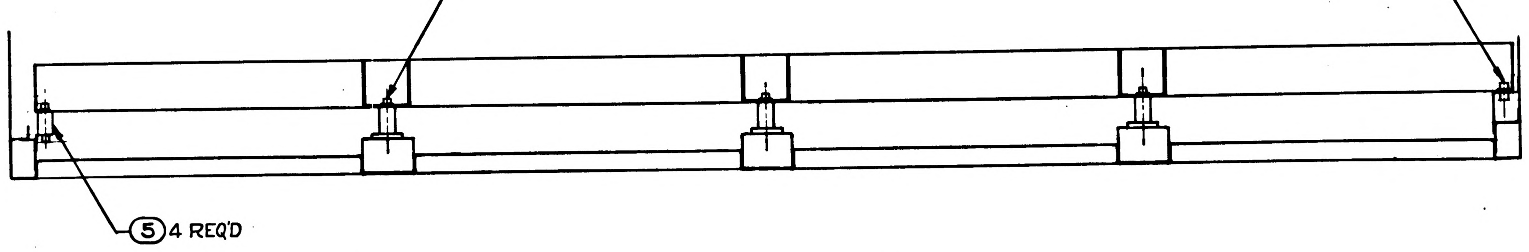
(41)(31)(48) 5 EACH REQD

PARTIAL SECTION N-N
SCALE 1/4



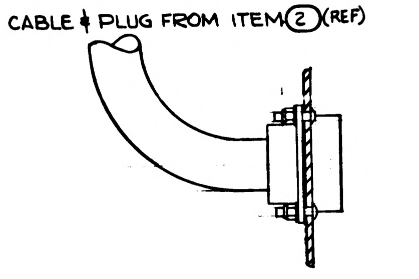
N
N
P
P
(2)(67)(69)
(59)
J1
J2
J3
(57)
(58)
J4
(58)
(53)(54)(55) 16 EACH REQ'D SEE DETAIL C
J28
J29
J30
E80
E1
J16 (56)
J22 (57)
J23
(53)(54)(55) 48 EACH REQD SEE DETAIL C
(57)
J17 (56)
J24 (57)
J18 (56)
J25 (57)
J19 (58)
J26 (57)
J27 (60)
J20 (65)
J21 (57)
(53)(54)(55) 24 EACH REQ'D SEE DETAIL C
(57)
J10 (57)
J11 (56)
J5 (58)
J12 (56)
J6 (51)
J13 (56)
J7 (51)
J14 (51)
J8 (51)
J15
(51)
J9

PARTIAL SECTION C-C



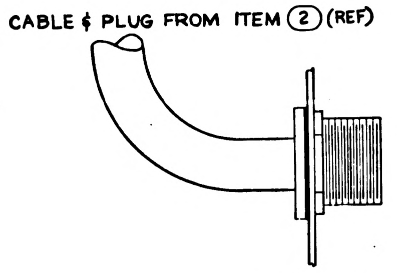
(40)(31)(48) 4 EACH REQD
(41)(31)(48)
(5) 4 REQ'D

PARTIAL SECTION P-P
SCALE 1/4



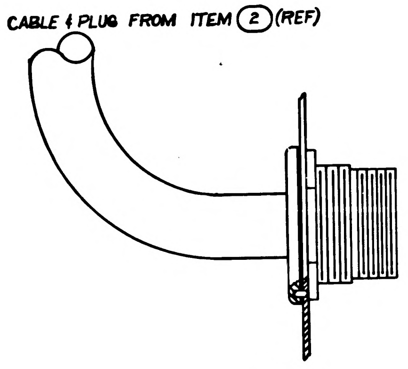
CABLE & PLUG FROM ITEM (2) (REF)

DETAIL C
INSTALLATION OF J1 THRU J7, J10 THRU J12 & J16 THRU J27.



CABLE & PLUG FROM ITEM (2) (REF)

DETAIL E
INSTALLATION OF J8, J9, J13, J14, & J15.



CABLE & PLUG FROM ITEM (2) (REF)

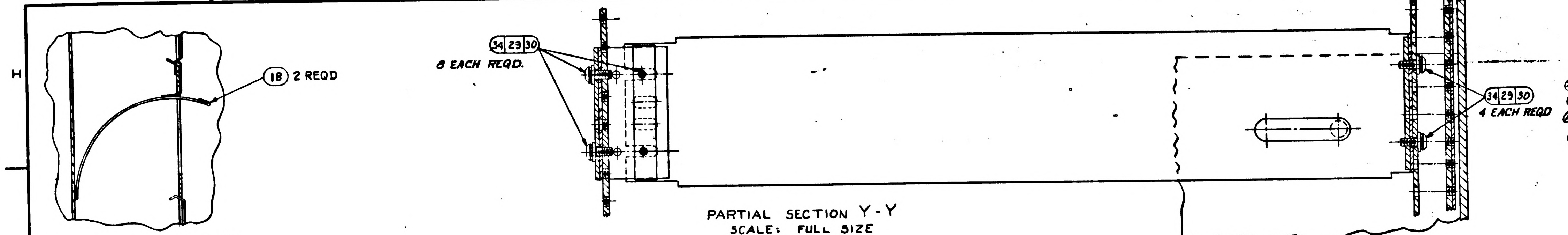
DETAIL F
INSTALLATION OF J28, J29 & J30

2900058-01 NEXT ASSY	2900029-01 USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
APPLICATION		DO NOT SCALE THIS DRAWING	ACSP PN	CABINET ASSEMBLY ELECTRICAL EQUIPMENT OPTICS-INERTIAL ANALYZER ASSEMBLY
		MATERIAL	DRAWN Bender DATE 26 MAR 63	CODE IDENT NO. 99974
		CONTRACT NAS9-497	CHECKED 6 JUL 65	SIZE E
			APPROVAL G. Stoddard Nov 65	2900032
			NASA APPROVAL	SCALE NOTED
			MIT APPROVAL 21 Jul 66	SHEET 5 OF 7

2900032 R

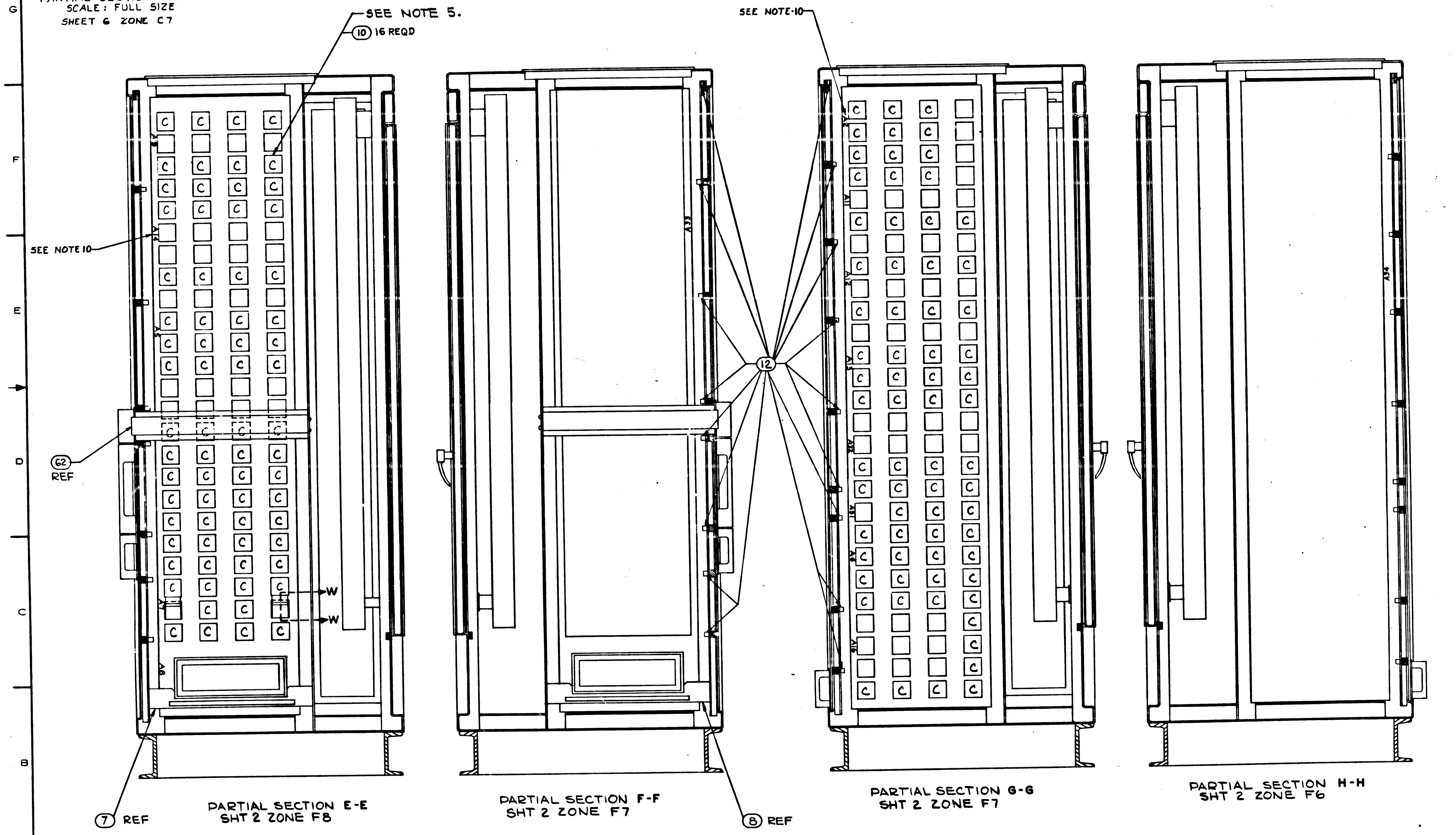
S80003S

REVISIONS 23 919					
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MXC 203112		14 JUL 65	M.G. RWH
H		REVISION STATUS CHANGED		2 AUG 65	RLP
J		REVISION STATUS CHANGED		6 AUG 65	RTD
K		REVISION STATUS CHANGED		28 SEP 65	A.N.
L		INITIAL RELEASE CLASS A PER TDRR 23 919		18 OCT 65	
M		REVISION STATUS CHANGED		4 APR 66	R.W.T.
N		REVISION STATUS CHANGED		19 APR 66	RLP JAC
P		REVISION STATUS CHANGED		18 MAY 66	J.H.P.
R		REVISION STATUS CHANGED		30 SEP 66	DD



PARTIAL SECTION W-W
SCALE: FULL SIZE
SHEET 6 ZONE C7

PARTIAL SECTION Y-Y
SCALE: FULL SIZE
SHEET 2 ZONE D8



PARTIAL SECTION E-E
SHT 2 ZONE F8

PARTIAL SECTION F-F
SHT 2 ZONE F7

PARTIAL SECTION G-G
SHT 2 ZONE F7

PARTIAL SECTION H-H
SHT 2 ZONE F6

2900058-011	2900023-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ \+ \+
- \- \-
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 30-MAR-65
CHECKED 6 JUL 65
APPROVAL E. Stoddard 7 JUL 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

CABINET ASSEMBLY
ELECTRICAL EQUIPMENT
OPTICS INERTIAL
ANALYZER ASSEMBLY

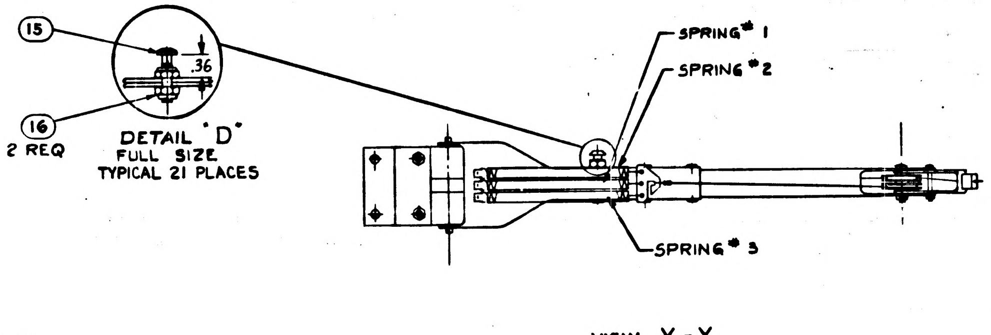
CODE IDENT NO 99974
SIZE E
2900032
SCALE
SHEET 6 OF 7

2900032 R

ALL CABLE RETRACTORS
HAVE 3 SPRINGS
UNLESS SHOWN BELOW

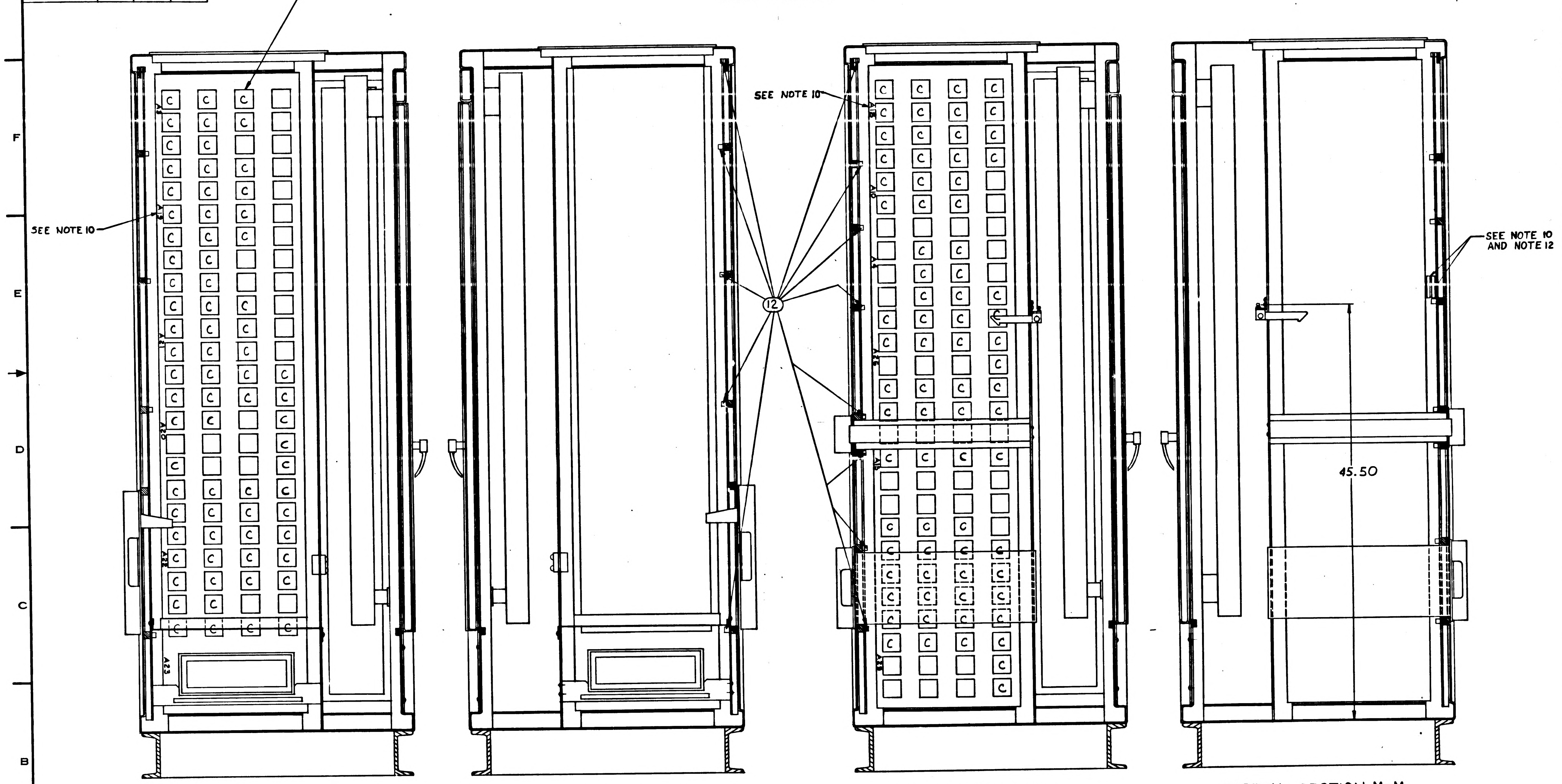
DRAWER NUMBER	SPRINGS REQUIRED		
	#1	#2	#3
A2	NO	YES	YES
A31	NO	YES	YES
A16	YES	NO	NO
A3	NO	YES	YES
A19	NO	YES	YES
A20	NO	YES	YES
A18	NO	YES	YES
A10	NO	YES	YES
A4	NO	YES	YES
A26	NO	YES	YES
A6	YES	NO	NO
A29	YES	NO	NO

REVISIONS 23419					
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
G		THIS SHEET ADDED PER MXC 203112		19-JUL 65	H.G. RWH
H		REVISION STATUS CHANGED		2 AUG 65	RP
J		REVISION STATUS CHANGED		6 AUG 65	RTP
K		REVISION STATUS CHANGED		28 SEP 65	A.N.
L		INITIAL RELEASE CLASS A PER TDRR 23419		19 OCT 65	
M		REVISION STATUS CHANGED		8 APR 66	
N		REVISION STATUS CHANGED		19 APR 66	JAC
P		REVISION STATUS CHANGED		18 MAY 66	
R		REVISION STATUS CHANGED		30 SEP 66	DD



DETAIL "D"
2 REQ
FULL SIZE
TYPICAL 21 PLACES

VIEW X-X
HALF SIZE
SHEET 4 ZONE A7



PARTIAL SECTION J-J
SHT 2 ZONE F7

PARTIAL SECTION K-K
SHT 2 ZONE F7

PARTIAL SECTION L-L
SHT 2 ZONE F6

PARTIAL SECTION M-M
SHT 2 ZONE F6

2900058-011	2900023-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-947

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE
CHECKED 6 JUL 65
APPROVAL E. Stoppard
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

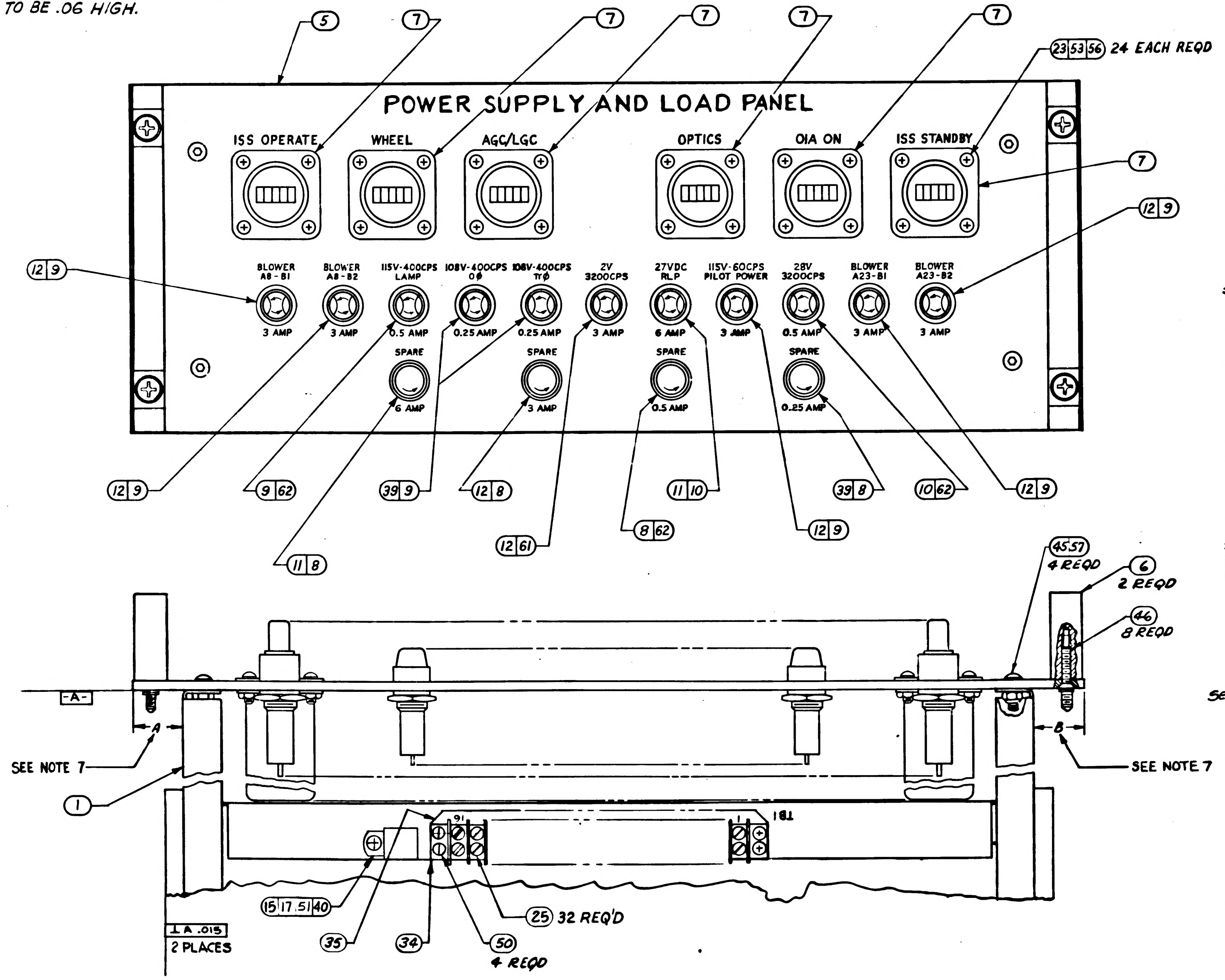
CABINET ASSEMBLY
ELECTRICAL EQUIPMENT
OPTICS-INERTIAL
ANALYZER ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900032
SCALE
SHEET 7 OF 7

2900032 R

SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
E	-	REPLACES REV (D) WITH CHANGE PER MXC 202261	-	22 JUL 65	MCR
F		REVISED PER MXC 202922			
G		REVISED PER MXC 204818		13 SEP 65	
H		INITIAL RELEASE CLASS A PER TDRR 23403		8 OCT 65	

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEMS (58) AND (59), OR (60)
3. VENDOR ITEM-SEE SPECIFICATION CONTROL DRAWING
4. DRAWER SLIDE MTG. SCREWS & FRONT PANEL MTG. SCREWS SHALL BE SUBJECT TO A TORQUE OF 33-36.2 IN. LB. AT INSTALLATION.
5. MARK WEIGHT OF ASSY (40 LBS) PER ND1002123 IN LOCATION SHOWN.
6. SELECT AS REQUIRED.
7. DIMENSION "A" SHALL BE EQUAL TO DIMENSION "B" WITHIN .040 IN.
8. SHIM TO FIT. PEEL OFF EXCESS SHIM STOCK.
9. MARK "SCHEM." & APPLICABLE SCHEMATIC DRAWING NO. PER ND 1002019, .12 HIGH, COLOR BLACK, IN LOCATION SHOWN.
10. APPLY WARNING PLATE TO AREA INDICATED USING SOLVENT ACTIVATOR METHYLETHYL KETONE OR EQUIVALENT.
11. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER ON ITEM (65) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .06 HIGH.


5
7
7
7
7
7
7
23 53 56 24 EACH REQD
POWER SUPPLY AND LOAD PANEL
ISS OPERATE
WHEEL
AGC/LGC
OPTICS
OIA ON
ISS STANDBY
12 9
BLOWER A8-B1
BLOWER A8-B2
115V-400CPS LAMP
108V-400CPS 0φ
108V-400CPS πφ
2V 3200CPS
27VDC RLP
115V-60CPS PILOT POWER
28V 3200CPS
BLOWER A23-B1
BLOWER A23-B2
3 AMP
3 AMP
0.5 AMP
0.25 AMP
0.25 AMP
3 AMP
6 AMP
3 AMP
0.5 AMP
3 AMP
3 AMP
SPARE
6 AMP
SPARE
3 AMP
SPARE
0.5 AMP
SPARE
0.25 AMP
12 9
9 62
39 9
12 8
11 10
39 8
10 62
12 9
8 62
12 9
12 61
11 8
45 57 4 REQD
6 2 REQD
46 8 REQD
-A-
A
B
SEE NOTE 7
SEE NOTE 7
1
181
91
15 17 51 40
35
34
50 4 REQD
25 32 REQ'D
⊥ A .015 2 PLACES

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1		66	RE65G2490	(1896981-327) RESISTOR (MIL-R-18546/1)
	1		65	1004260-110	NAMEPLATE, APOLLO, G & N
	1		64	2900373	WIRING HARNESS "A"
SEE NOTE 3	7		63	1015802-004	RELAY-ARMATURE
	3		62	F02A250V½A	(1897099-007) FUSE (MIL-F-15160/02)
SEE NOTE 3	1		61	1015873-006	FUSE HOLDER-INDICATING
	AR		60	SN60WRAP	SOLDER QQ-S-571 (ES 2175-3)
	AR		59	MIL-F-14256 TYPE A OR W	FLUX (ES 2798)
	AR		58	SN60WS	SOLDER QQ-S-571 (ES2175-1)
	4		57	AN363C1032	(1896990-011) NUT-SELF-LOCKING
	44		56	1016151-006	NUT-SELF-LOCKING
SEE NOTE 3	24		55	1016151-004	NUT, SELF LOCKING
	3		54	AN960C8	(1897006-028) WASHER, -FLAT
	40		53	AN960C6	(1897006-026) WASHER, -FLAT
	12		52	MS35216-43	SCREW, PAN HD
	4		51	MS35216-42	SCREW, PAN HD
	4		50	MS35216-29	SCREW, PAN HD
	20		49	MS35216-27	SCREW, PAN HD
SEE NOTE 3	2		48	1015837-001	RELAY-ARMATURE
	12		47	MS35216-5	SCREW, PAN HD
	8		46	AN507C832R12	(1897003-568) SCREW-FLAT HD. 100°
SEE NOTE 3	4		45	1006783-45	SCREW, BUTTON HD
SEE NOTE 3	8		44	1006783-44	SCREW BUTTON HD
SEE NOTE 3	2		43	1015914-001	RELAY-ARMATURE 4PDT
SEE NOTE 3	4		42	1015860-001	SPACER
	1		41	MS35431-3	TERMINAL LUG
	5		40	AN363C832	(1896990-281) NUT, SELF-LOCKING
	3		39	F02A250V¼A	(1897099-005) FUSE (MIL-F-15160/02
SEE NOTE 3	8		38	1016005-1	SHIM, LAMINATED
SEE NOTE 3	1		37	1015785-009	SLIDE ASSY, QUICK RELEASE R.H.
SEE NOTE 3	1		36	1015785-010	SLIDE ASSY, QUICK RELEASE L.H.
SEE NOTE 3	1		35	1016170-016	MARKER STRIP
	1		34	MIL-T-55164/1-37TB16	TERMINAL BOARD
SEE NOTE 3	1		33	1016088	TRANSFORMER
	1		32	1896966-006	SEMICONDUCTOR DIODE (1N649)
SEE NOTE 6	1		31	MS21919DG5 THRU 7	(1897073-105 THRU 107) CLAMP, CUSH.
SEE NOTE 3	2		30	1015995-1	REACTOR
SEE NOTE 3	1		29	1015995-2	REACTOR
	1		28	RE65G1910	(1896981-316) RESISTOR (MIL-R-18546/1)
	4		27	MS35216-1	SCREW, PAN HEAD
	☒		26	2900400	WIRING DIAGRAM
	32		25	MS35333-71	WASHER LOCK, INTERNAL TOOTH
	☒		24	PS2900033	PROCUREMENT SPECIFICATION
	28		23	MS35216-28	SCREW, PAN HEAD
SEE NOTE 6	1		22	MS21919DG-13 THRU-15	(1897073-113 THRU-115) CLAMP, CUSH.
SEE NOTE 6	1		21	MS21919DG-9 THRU-11	(1897073-109 THRU-111) CLAMP, CUSH.
SEE NOTE 6	1		20	MS21919DG-4 THRU-6	(1897073-104 THRU-106) CLAMP, CUSH.
	1		19	RE65G2R21	(1896981-130) RESISTOR (MIL-R-18546/1)
	1		18	RE65G2R10	(1896981-128) RESISTOR (MIL-R-18546/1)
SEE NOTE 3	1		17	1015986-167	SADDLE WASHER
	2		16	RE65G34R0	(1896981-244) RESISTOR (MIL-R-18546/1)
SEE NOTE 3	1		15	1015985-010	CLAMP-LOOP
	1		14	1900617	WARNING PLATE, SELF BONDING
	☒		13	2900271	SCHEMATIC DIAGRAM
	7		12	F02A250V3A	(1897099-012) FUSE (MIL-F-15160/02)
	2		11	F02A250V6A	(1897099-015) FUSE (MIL-F-15160/02)
SEE NOTE 3	2		10	1015873-008	FUSEHOLDER-INDICATING
SEE NOTE 3	8		9	1015873-001	FUSEHOLDER-INDICATING
	4		8	MS26572-1	FUSEHOLDER
SEE NOTE 3	6		7	1006927	INDICATOR, TOTAL TIME
	2		6	1900015-041	HANDLE ASSY
	1		5	2900146	PANEL, FRONT
	1		4	2900275	TERMINAL BOARD (INSEP. ASSY)
	1		3	2900162-011	POWER SUPPLY ASSY
	1		2	1902389-011	POWER SUPPLY ASSY
	1		1	2900261	DRAWER (INSEPARABLE ASSY)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
Contract NAS 9-497

AC SPARK PLUG DIVISION GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Bender DATE 24 MAR 65
CHECKED FESLER 24 MAR 65
APPROVAL R. P. Bildsoyld 24 MAR 65
APPROVAL J. N. Gaston
NASA APPROVAL
MIT APPROVAL

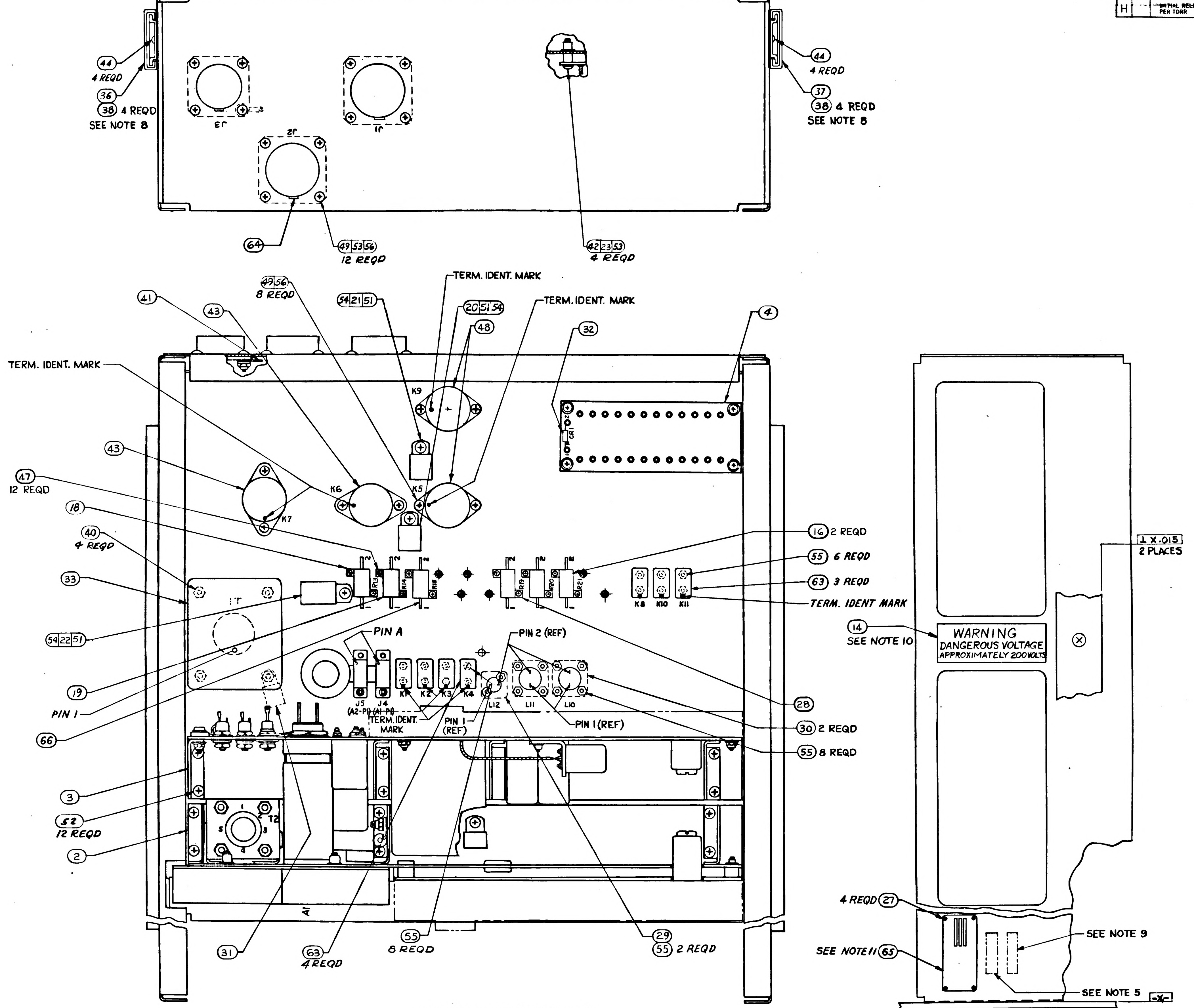
MANNED SPACECRAFT CENTER
HOUSTON TEXAS

POWER SUPPLY AND LOAD PANEL ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900033
SCALE FULL
SHEET 1 OF 2

3 JUN 65

SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
REVISIONS					
E	-	THIS SHEET ADDED		65	
F		REVISION STATUS CHANGED			
G	-	REVISION STATUS CHANGED		3 SEP 65	
H		~~INITIAL RELEASE CLASS ★~~ PER TDRR 23403		18 OCT 65	



44
4 REQD
36
38 4 REQD
SEE NOTE 8
J3
J1
J2
37
38 4 REQD
SEE NOTE 8
64
49 53 56
12 REQD
42 23 53
4 REQD
41
49 56
8 REQD
43
54 21 51
TERM. IDENT. MARK
20 51 54
48
TERM. IDENT. MARK
32
4
TERM. IDENT. MARK
K9
CR1
43
K6
K5
K7
47
12 REQD
18
40
4 REQD
33
R3
R14
R15
R19
R20
R21
16 2 REQD
55 6 REQD
63 3 REQD
TERM. IDENT MARK
K8
K10
K11
T1
54 22 51
PIN A
PIN 2 (REF)
J5 (A2-P1)
J4 (A1-P1)
K1
K2
K3
K4
L12
L11
L10
TERM. IDENT. MARK
PIN 1 (REF)
PIN 1 (REF)
19
PIN 1
66
28
30 2 REQD
55 8 REQD
3
52
12 REQD
2
T2
A1
31
63
4 REQD
55
8 REQD
29
55 2 REQD
⊥ X .015
2 PLACES
14
SEE NOTE 10
WARNING
DANGEROUS VOLTAGE
APPROXIMATELY 200 VOLTS
4 REQD 27
SEE NOTE 11 65
SEE NOTE 9
SEE NOTE 5
-X-

VIEW WITH FRONT PANEL REMOVED

2900023-011	2900023-011	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
Contract NAS 9-497

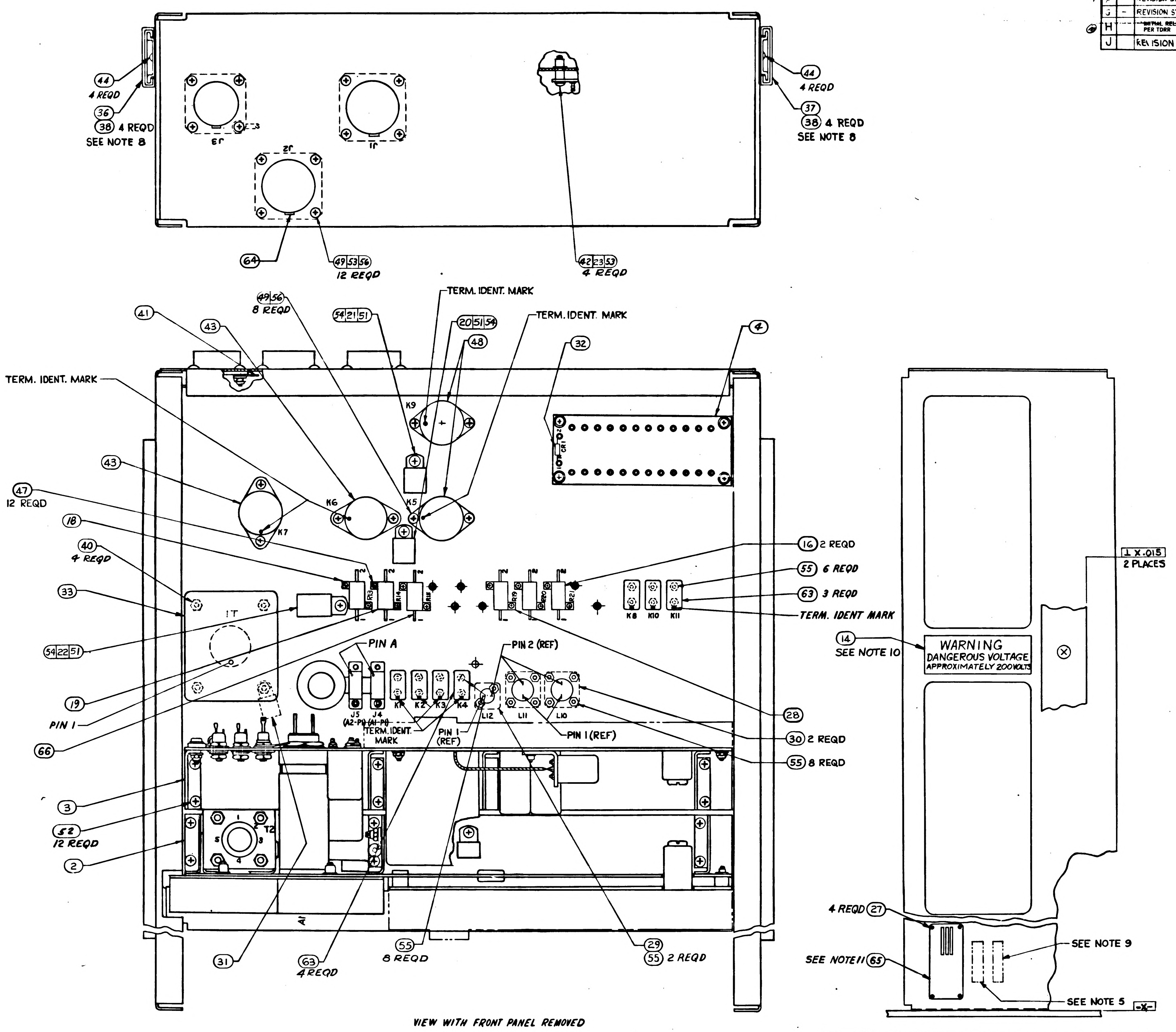
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 24 MAR 65
CHECKED FESLER 24 MAR 65
APPROVAL 24 MAR 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

POWER SUPPLY AND LOAD
PANEL
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900033
SCALE FULL
SHEET 2 OF 2

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
E	-	THIS SHEET ADDED		24 JUN 65	MCK
F		REVISION STATUS CHANGED			
G	-	REVISION STATUS CHANGED		3 SEP 65	HP
H		~~INITIAL RELEASE CLASS A~~ PER TDRR 23403		18 OCT 65	DKD FE
J		REVISION STATUS CHANGED		3	V.E.G.



(44) 4 REQD
(36)
(38) 4 REQD
SEE NOTE 8
(44) 4 REQD
(37)
(38) 4 REQD
SEE NOTE 8
J3
J1
J2
(64)
(49)(53)(56) 12 REQD
(42)(23)(53) 4 REQD
(49)(56) 8 REQD
(41)
(43)
(54)(21)(51)
TERM. IDENT. MARK
(20)(51)(54)
(48)
TERM. IDENT. MARK
(32)
(4)
TERM. IDENT. MARK
(43)
(47) 12 REQD
(18)
(40) 4 REQD
(33)
(54)(22)(51)
(19)
PIN I
(66)
K9
K6
K5
K7
CR1
T1
R13
R14
R18
R19
R20
R21
K8
K10
K11
(16) 2 REQD
(55) 6 REQD
(63) 3 REQD
TERM. IDENT MARK
PIN A
PIN 2 (REF)
J5 (A2-P1)
J4 (A1-P1)
K1
K2
K3
K4
L12
L11
L10
TERM. IDENT. MARK
PIN 1 (REF)
PIN 1 (REF)
(28)
(30) 2 REQD
(55) 8 REQD
(3)
(52) 12 REQD
(2)
T2
A1
(31)
(63) 4 REQD
(55) 8 REQD
(29)
(55) 2 REQD
VIEW WITH FRONT PANEL REMOVED
⊥ X .015
2 PLACES
(14)
SEE NOTE 10
WARNING
DANGEROUS VOLTAGE
APPROXIMATELY 200 VOLTS
4 REQD (27)
SEE NOTE 9
SEE NOTE 11 (65)
SEE NOTE 5
-X-

2900023-011	2900023-011	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

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+ \+ \+
- \- \-
DO NOT SCALE THIS DRAWING
MATERIAL
Contract NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN Bender DATE 24 MAR 65
CHECKED FESLER 24 MAR 65
APPROVAL 24 MAR 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

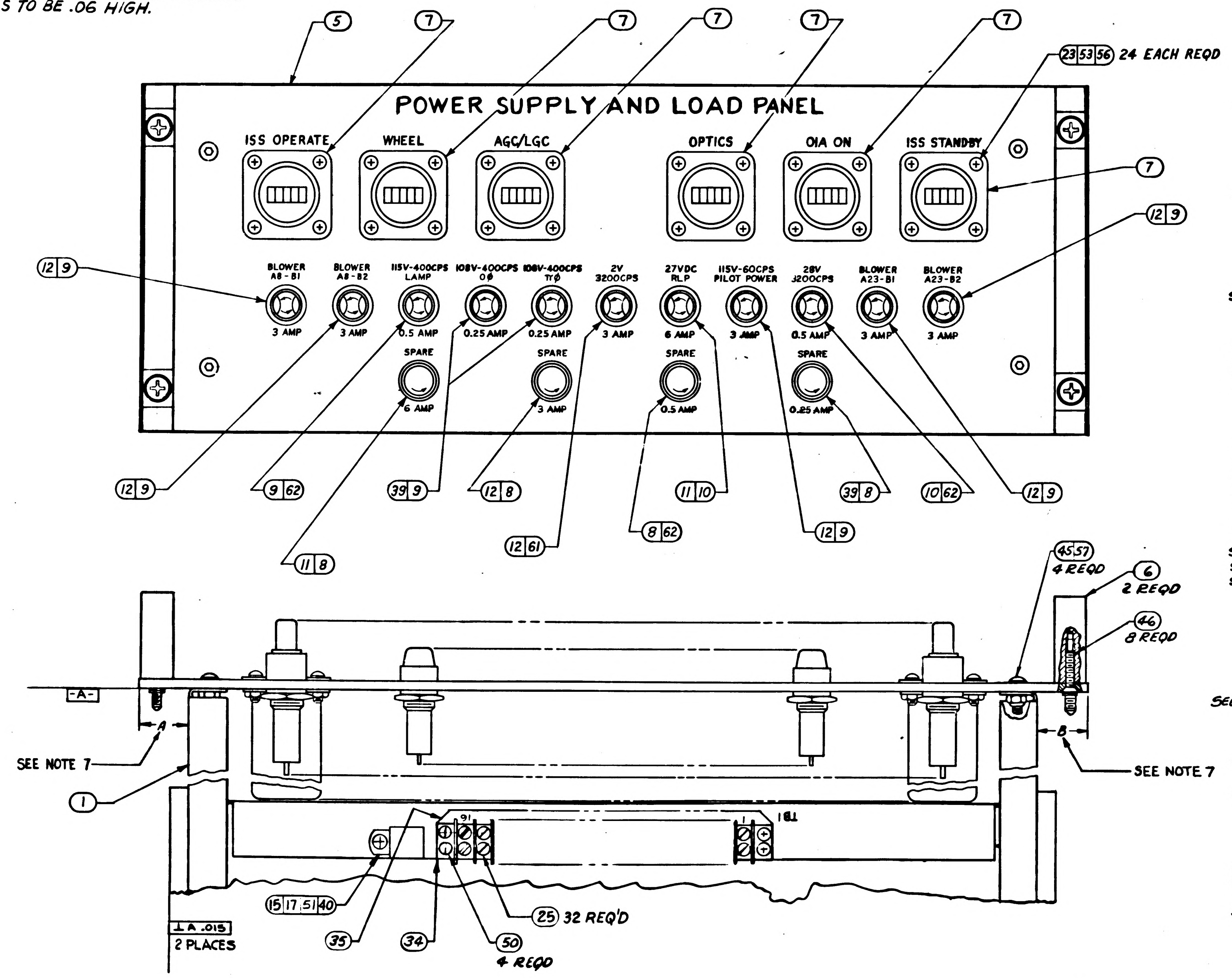
POWER SUPPLY AND LOAD
PANEL
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900033
SCALE FULL
SHEET 2 OF 2

2900033

SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
E	-	REPLACES REV (D) WITH CHANGE PER MXC 202261	–	26 JUN 65	MCR
F		REVISED PER MXC 202922		[illegible]	[illegible]
G		REVISED PER MXC 204818		13 SEP 65	[illegible]
H		INITIAL RELEASE CLASS A PER TDRR 23403		18 OCT 65	[illegible]
J		REVISED PER TDRR 25426		31 JAN 66	[illegible]

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEMS (58) AND (59), OR (60)
3. VENDOR ITEM-SEE SPECIFICATION CONTROL DRAWING
4. DRAWER SLIDE MTG. SCREWS & FRONT PANEL MTG. SCREWS SHALL BE SUBJECT TO A TORQUE OF 33-36.2 IN. LB. AT INSTALLATION.
5. MARK WEIGHT OF ASSY (40 LBS) PER ND1002123 IN LOCATION SHOWN.
6. SELECT AS REQUIRED.
7. DIMENSION "A" SHALL BE EQUAL TO DIMENSION "B" WITHIN .040 IN.
8. SHIM TO FIT. PEEL OFF EXCESS SHIM STOCK.
9. MARK "SCHEM." & APPLICABLE SCHEMATIC DRAWING NO. PER ND 1002019, .12 HIGH, COLOR BLACK, IN LOCATION SHOWN.
10. APPLY WARNING PLATE TO AREA INDICATED USING SOLVENT ACTIVATOR METHYLETHYL KETONE OR EQUIVALENT.
11. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER ON ITEM (65) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .06 HIGH.



							ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
					1		66	RE65G2490	(1896981-327) RESISTOR (MIL-R-18546/1)
					1		65	1004260-110	NAMEPLATE, APOLLO, G & N
					1		64	2900373	WIRING HARNESS "A"
SEE NOTE 3					7		63	1015802-004	RELAY-ARMATURE
					3		62	F02A250V½A	(1897099-007) FUSE (MIL-F-15160/02)
SEE NOTE 3					1		61	1015873-006	FUSE HOLDER-INDICATING
					AR		60	SNGOWRAP	SOLDER QQ-S-571 (ES 2175-3)
					AR		59	MIL-F-14256 TYPE A OR W	FLUX (ES 2798)
					AR		58	SNGOWS	SOLDER QQ-S-571 (ES2175-1)
					4		57	AN363C1032	(1896990-011) NUT-SELF-LOCKING
					44		56	1016151-006	NUT-SELF-LOCKING
SEE NOTE 3					24		55	1016151-004	NUT, SELF LOCKING
					3		54	AN960C8	(1897006-028) WASHER, -FLAT
					40		53	AN960C6	(1897006-026) WASHER, -FLAT
					12		52	MS35216-43	SCREW, PAN HD
					4		51	MS35216-42	SCREW, PAN HD
					4		50	MS35216-29	SCREW, PAN HD
					20		49	MS35216-27	SCREW, PAN HD
SEE NOTE 3					2		48	1015837-001	RELAY-ARMATURE
					12		47	MS35216-5	SCREW, PAN HD
					8		46	AN507C832R12	(1897003-568) SCREW-FLAT HD. 100°
SEE NOTE 3					4		45	1006783-45	SCREW, BUTTON HD
SEE NOTE 3					8		44	1006783-44	SCREW BUTTON HD
SEE NOTE 3					2		43	1015914-001	RELAY-ARMATURE 4PDT
SEE NOTE 3					4		42	1015860-001	SPACER
					1		41	MS35431-3	TERMINAL LUG
					5		40	AN363C832	(1896990-281) NUT, SELF-LOCKING
					3		39	F02A250V¼A	(1897099-005) FUSE (MIL-F-15160/02)
SEE NOTE 3					8		38	1016005-1	SHIM, LAMINATED
SEE NOTE 3					1		37	1015785-009	SLIDE ASSY, QUICK RELEASE R.H.
SEE NOTE 3					1		36	1015785-010	SLIDE ASSY, QUICK RELEASE L.H.
SEE NOTE 3					1		35	1016170-016	MARKER STRIP
					1		34	MIL-T-55164/1-37TB16	(1897142-016) TERMINAL BOARD
SEE NOTE 3					1		33	1016088	TRANSFORMER
					1		32	1896966-006	SEMICONDUCTOR, DIODE (1N649)
SEE NOTE 6					1		31	MS21919DG5 THRU 7	(1897073-105 THRU 107) CLAMP, CUSH.
SEE NOTE 3					2		30	1015995-1	REACTOR
SEE NOTE 3					1		29	1015995-2	REACTOR
					1		28	RE65G1910	(1896981-316) RESISTOR (MIL-R-18546/1)
					4		27	MS35216-1	SCREW, PAN HEAD
					X		26	2900400	WIRING DIAGRAM
					32		25	MS35333-71	WASHER LOCK, INTERNAL TOOTH
					X		24	PS2900033	PROCUREMENT SPECIFICATION
					28		23	MS35216-28	SCREW, PAN HEAD
SEE NOTE 6					1		22	MS21919DG-13 THRU-15	(1897073-113 THRU-115) CLAMP, CUSH.
					1		21	MS21919DG-9 THRU-11	(1897073-109 THRU-111) CLAMP, CUSH.
					1		20	MS21919DG-4 THRU-6	(1897073-104 THRU-106) CLAMP, CUSH.
					1		19	RE65G2R21	(1896981-130) RESISTOR (MIL-R-18546/1)
					1		18	RE65G2R10	(1896981-128) RESISTOR (MIL-R-18546/1)
SEE NOTE 3					1		17	1015986-167	SADDLE WASHER
					2		16	RE65G34R0	(1896981-244) RESISTOR (MIL-R-18546/1)
SEE NOTE 3					1		15	1015985-010	CLAMP-LOOP
					1		14	1900617	WARNING PLATE, SELF BONDING
					X		13	2900271	SCHEMATIC DIAGRAM
					7		12	F02A250V3A	(1897099-012) FUSE (MIL-F-15160/02)
					2		11	F02A250V6A	(1897099-015) FUSE (MIL-F-15160/02)
SEE NOTE 3					2		10	1015873-008	FUSEHOLDER-INDICATING
SEE NOTE 3					8		9	1015873-001	FUSEHOLDER-INDICATING
					4		8	MS26572-1	FUSEHOLDER
SEE NOTE 3					6		7	1006927	INDICATOR TOTAL TIME
					2		6	1900015-041	HANDLE ASSY
					1		5	2900146	PANEL, FRONT
					1		4	2900275	TERMINAL BOARD (INSEP. ASSY)
					1		3	2900162-011	POWER SUPPLY ASSY
					1		2	1902389-011	POWER SUPPLY ASSY
					1		1	2900261	DRAWER (INSEPARABLE ASSY)
	QUANTITY REQUIRED				011	EFFECTIVITY			

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
Contract NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN Bender DATE 24 MAR 65
CHECKED FESSLER 24 MAR 65
APPROVAL R. Weingold 24 MAR 65
APPROVAL J. M. Gaston 10-12-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

POWER SUPPLY AND LOAD
PANEL
ASSEMBLY

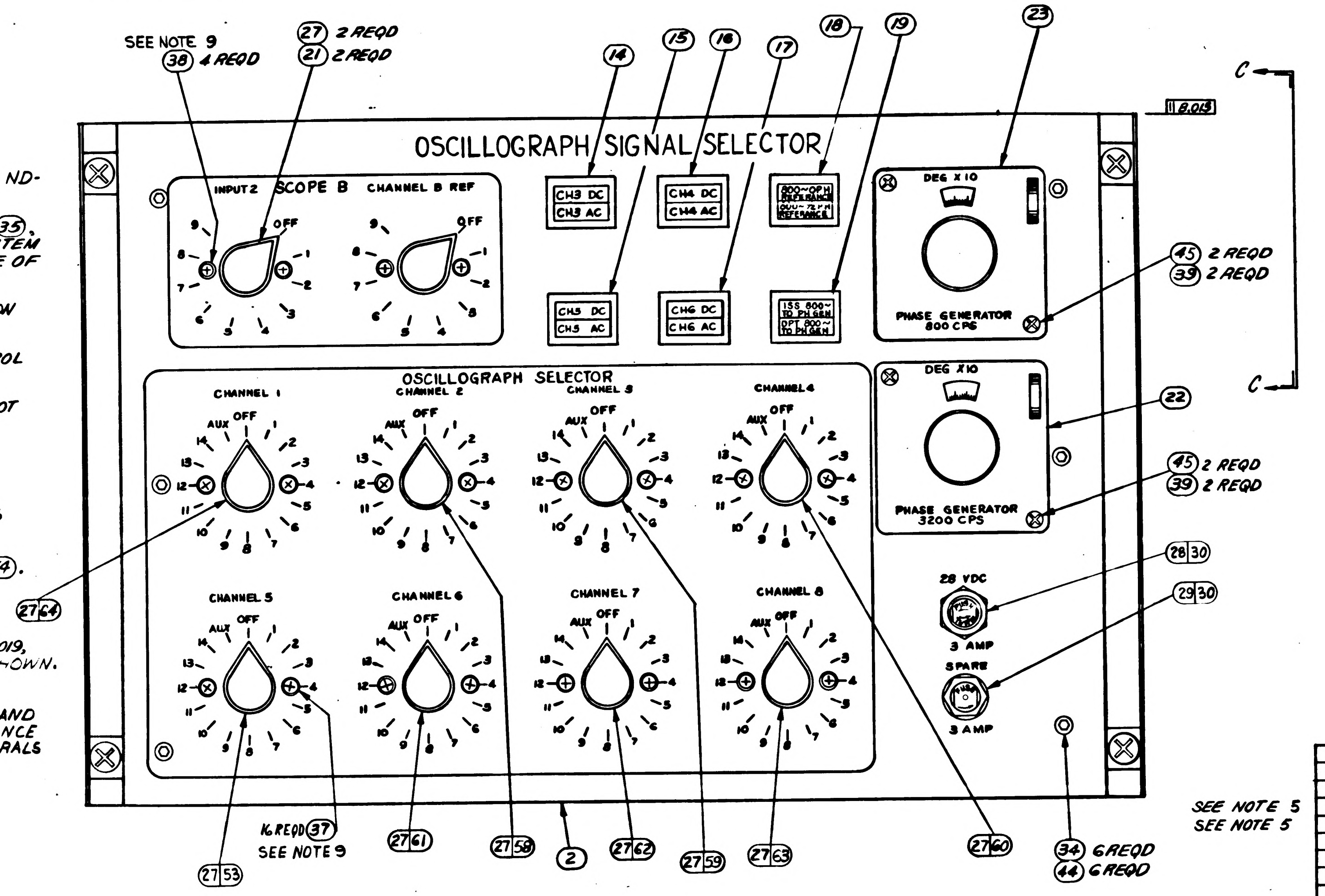
CODE IDENT NO 99974
SIZE E
2900033
SCALE FULL
SHEET 1 OF 2

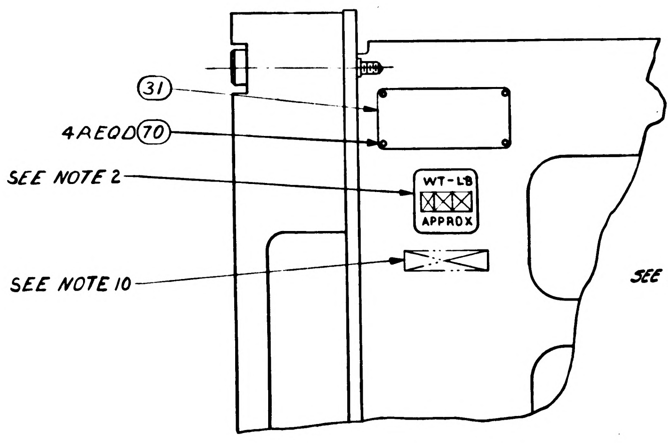
5 JUN 65

2900033

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH MIL-D-70327.
2. MARK WEIGHT OF ASSEMBLY (50 LBS) PER ND-1002123, IN LOCATION SHOWN.
3. CHASSIS SLIDE MOUNTING SCREWS, ITEM ㉟, AND FRONT PANEL MOUNTING SCREWS, ITEM ㉞, SHALL BE SUBJECTED TO TORQUE OF 33.0-36.2 IN. LB AT INSTALLATION.
4. DIMENSION "A" SHALL BE EQUAL TO DIMENSION "B" WITHIN .040 IN.
5. VENDOR ITEM-SEE SPECIFICATION CONTROL DRAWING.
6. ASSEMBLE RELAYS, ITEM ㊼, WITH RED DOT IN POSITION SHOWN.
7. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEM (55) AND ㊿, OR (77).
8. SHIM TO FIT USING ITEM (57) PEEL OFF EXCESS SHIM STOCK.
9. SECURE ITEMS ㊲ AND ㊳ USING ITEM (54).
10. MARK "SCHEM " AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND-1002019, .12 HIGH, COLOR BLACK, IN LOCATION SHOWN.
11. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER ON ITEM ㉛ IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
12. SECURE SCREWS USING ITEM (73).
13. SELECT AS REQUIRED.





PARTIAL VIEW "CC"

SYM	ZONE	DESCRIPTION	DATE	APPD
C		REPLACES REVISION (B) WITH CHANGE PER MXC 202550	26 JUN 65	
D		REVISED PER MXC 202738	[illegible] JUL 65	
E		REVISED PER MXC 202801	10 JUL 65	
F		REVISED PER MXC 203015	15 JUL 65	
G		REVISED PER MXC 203171	26 [illegible] 65	
H		REVISED PER MXC 203772	[illegible] 65	
J		INITIAL RELEASE CLASS A PER TDRR 23408	10 [illegible] 65	

REVISIONS 23408

				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				X		85	2900536	SCHEMATIC DIAGRAM ELEC.
				X		84	PS 2900034	PROCUREMENT SPECIFICATION
				1		83	2900463	WIRE HARNESS A
				1		82	1015837-001	RELAY, ARMATURE
				1		81	1897246	TRANSFORMER
				1		80	1897226	TRANSFORMER
				2		79	1016151-006	NUT-SELF LOCKING
SEE NOTE 5				4		78	1015860-008	SPACER
				AR		77	SN60WRAP	SOLDER QQ-S-571 (ES 2175-3)
				2		76	MS21919DG 21 THRU 23	(1897073-121 THRU 123) CLAMP
				2		75	MS21919DG 19 THRU 21	(1897073-119 THRU 121) CLAMP
				2		74	MS21919DG 17 THRU 19	(1897073-117 THRU 119) CLAMP
				AR		73	MIL-S-22473 GRADE H	(ES 2544-5) SEALING COMPOUND
				4		72	MS35333-71	WASHER, LOCK, INT. TOOTH
				6		71	AN960-C6	(1897006-026) WASHER, FLAT
				4		70	MS35233-2	SCREW, MACHINE, PAN HD
				1		69	1900864	BRKT, REL & CONN (INSEP ASSY)
				2		68	1900863	BRACKET, SUPPORT
				2		67	AN363C832	(1896990-281) NUT-HEX
						66		
				1		65	MS 21919 DG3 THRU 4	(1897073-103 THRU 104) CLAMP
				1		64	1902320-011	SWITCH AND CONNECTOR ASSY
				1		63	1900490-081	
				1		62	1900490-071	
				1		61	1902320-021	
				1		60	1902320-041	
				1		59	1902320-031	
				1		58	1900490-021	SWITCH AND CONNECTOR ASSY
SEE NOTE 5				10		57	1016005-001	SHIM, LAMINATED
SEE NOTE 5				2		56	1015842	TRANSFORMER
				AR		55	MIL-F-14256 TYPE A or W	FLUX (ES 2175-1)
				AR		54	MIL-S-22473 GRADE C	SEALING & RETAINING COMP (ES 2544-3)
				1		53	1902320-051	SWITCH & CONNECTOR ASSY
				1		52	1900394	WIRING HARNESS B
						51		

QUANTITY REQUIRED — LIST OF PARTS AND MATERIALS

				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				AR		50	SN60WS	SOLDER QQ-S-571 (ES2175-3)
				8		49	AN500AD4-7	(1897012-425) SCREW, MACHINE, FIL HD
				2		48	MS35216-27	SCREW, MACHINE, PAN HD
SEE NOTE 5				24		47	1015802-004	RELAY, ARMATURE
SEE NOTE 5				60		46	1016151-004	NUT-SELF-LOCKING
				38		45	AN363C632	(1896990-261) NUT-SELF-LOCKING
				6		44	AN363C1032	(1896990-011) NUT-SELF-LOCKING
				16		43	MS35216-45	SCREW, MACHINE, PAN HD
				4		42	MS35216-42	SCREW, MACHINE, PAN HD
				6		41	MS35216-41	SCREW, MACHINE, PAN HD
				34		40	MS35216-26	SCREW, MACHINE, PAN HD
				4		39	MS35216-32	SCREW, MACHINE, PAN HD
				8		38	AN507C632 R6	(1897003-534) SCREW, MACHINE, FLAT HD, 100°
				16		37	AN507C832 R6	(1897003-564) SCREW, MACHINE, FLAT HD, 100°
SEE NOTE 5				8		36	AN507C832R12	(1897003-568) SCREW, FLAT HD. 100°
SEE NOTE 5				10		35	1015826-304	SCREW, FLAT HD (HEX SOC)
SEE NOTE 5				6		34	1006783-45	SCREW, BUTTON HD, HEX SOC
SEE NOTE 5				12		33	1015860-007	SPACER
				1		32	MS 21919 DG 5 THRU 6	(1897073-105 THRU 106) CLAMP
				1		31	1004260-111	NAMEPLATE
				2		30	MS90078-12-1	(1897077-112) FUSE
				1		29	MS26572-1	FUSEHOLDER-CARTRIDGE
SEE NOTE 5				1		28	1015873-008	FUSEHOLDER (LIGHT IND TYPE)
				10		27	MS91528-2K2B	(1897080-023) KNOB, CONTROL
				2		26	1900015-071	HANDLE ASSY
SEE NOTE 5				1		25	1015791-010	SLIDE ASSY QUICK RELEASE
SEE NOTE 5				1		24	1015791-009	SLIDE ASSY QUICK RELEASE
SEE NOTE 5				1		23	1015820	PHASE GENERATOR 800 CPS
SEE NOTE 5				1		22	1015821	PHASE GENERATOR 3200 CPS
SEE NOTE 5				2		21	1015825-4	SWITCH ROTARY
SEE NOTE 5				4		20	1015981-003	STAND-OFF, HEX
SEE NOTE 5				1		19	1015869-803	LIGHT INDICATOR ASSY
SEE NOTE 5				1		18	1015869-804	LIGHT INDICATOR ASSY
SEE NOTE 5				1		17	1015869-516	LIGHT INDICATOR ASSY
SEE NOTE 5				1		16	1015869-514	LIGHT INDICATOR ASSY
SEE NOTE 5				1		15	1015869-515	LIGHT-INDICATOR ASSY
SEE NOTE 5				1		14	1015869-513	LIGHT-INDICATOR ASSY
				1		13	1900194	PLATE
				2		12	2900247	BRACKET, AMPL (INSEP ASSY)
				1		11	1900190	BRACKET, AMPL (INSEP ASSY)
				1		10	1900189	BRACKET, AMPL (INSEP ASSY)
				24		9	AN526C832 R7	(1897083-757) SCREW, MACHINE, TRUSS HD
				2		8	1900181-011	BUFFER AMPL 800 CPS 0° ASSY
				2		7	1900138-011	BUFFER AMPLIFIER ASSY
				1		6	2900169-011	BUFFER AMPLIFIER ASSY
				1		5	2900170-011	BUFFER AMPL ASSY 3200 CPS
						4		
						3		
				1		2	1900188	PANEL, FRONT
				1		1	2900248	DRAWER, SEL, SIG, OSCILLOGRAPH

QUANTITY REQUIRED — LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011

APPLICATION

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MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 24 MAR 65
CHECKED 24 MAR 65
APPROVAL D CARPENTIER 24 MAR 65
APPROVAL 10-12-65
NASA APPROVAL
MIT APPROVAL

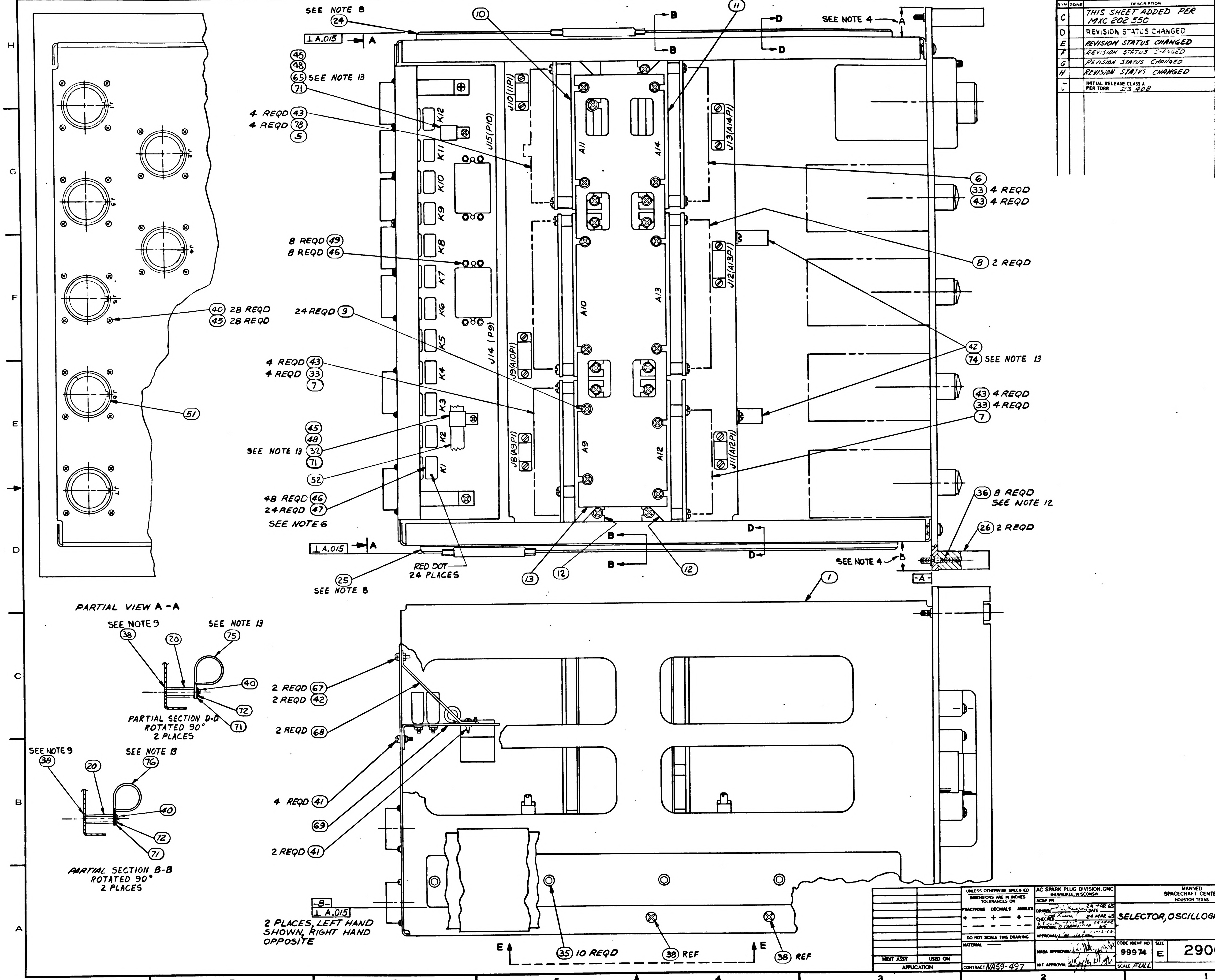
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SELECTOR, OSCILLOGRAPH SIGNAL

CODE IDENT NO. 99974 | SIZE E | 2900034
SCALE FULL | SHEET 1 OF 3

19 MAY 65

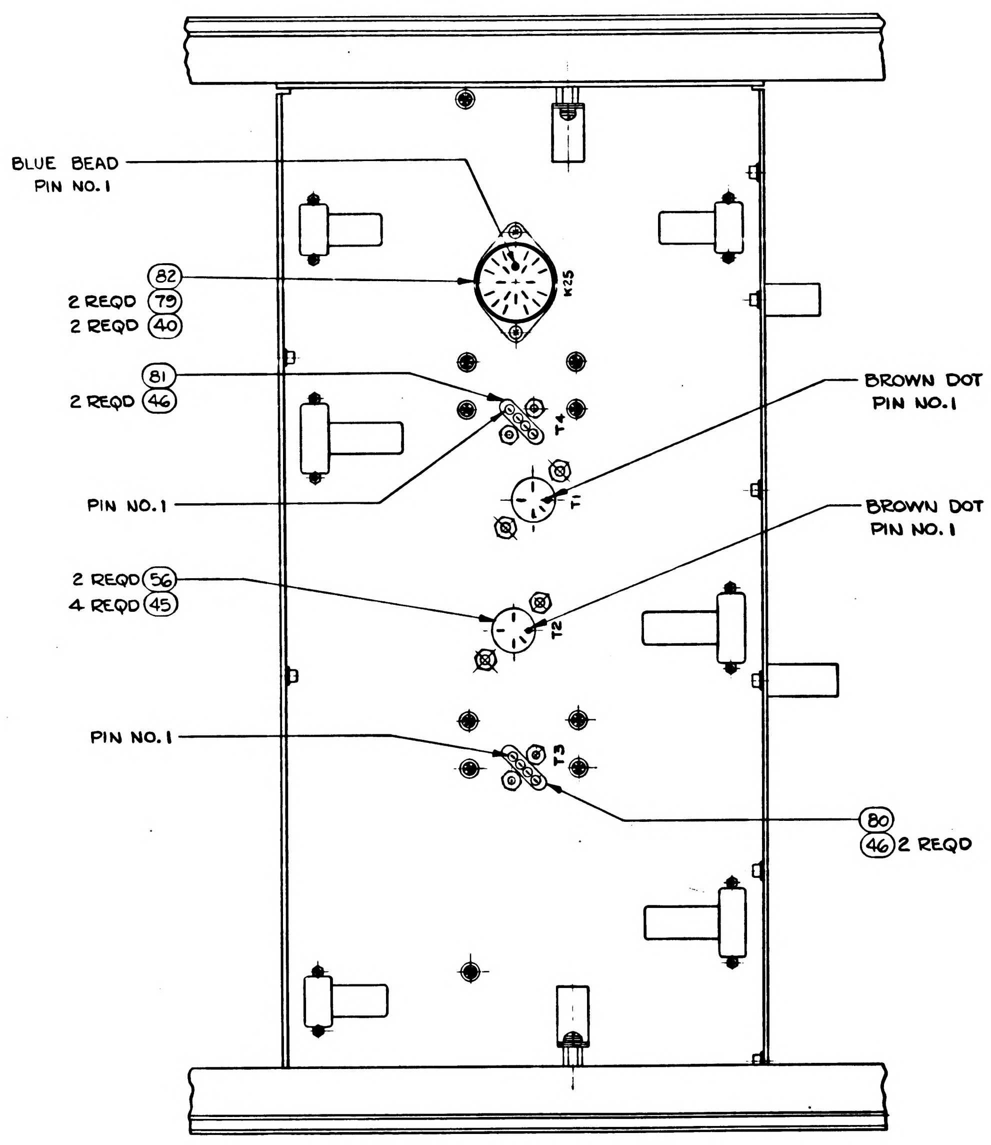
SYM	ZONE	DESCRIPTION	DATE	APPD
C		THIS SHEET ADDED PER MXC 202 550	65	
D		REVISION STATUS CHANGED	65	
E		REVISION STATUS CHANGED	10 JUL 65	RW
F		REVISION STATUS CHANGED	13 JUL 65	RW
G		REVISION STATUS CHANGED	28 JUL 65	RW-
H		REVISION STATUS CHANGED	11 AUG 65	JWP RW-
J		INITIAL RELEASE CLASS A PER TDRR 23 408	10-18-65	


SEE NOTE 8
24
⊥ A.015
A
45
48
65 SEE NOTE 13
71
4 REQD 43
4 REQD 78
5
10
11
B
B
D
D
SEE NOTE 4
A
K12
K11
K10
K9
K8
K7
K6
K5
K4
K3
K2
K1
J15 (P10)
J14 (P9)
J10 (I1P1)
J9 (A10P1)
J8 (A9P1)
J13 (A14P1)
J12 (A13P1)
J11 (A12P1)
A11
A14
A10
A13
A9
A12
6
33 4 REQD
43 4 REQD
8 REQD 49
8 REQD 46
8 2 REQD
24 REQD 9
40 28 REQD
45 28 REQD
42
74 SEE NOTE 13
4 REQD 43
4 REQD 33
7
43 4 REQD
33 4 REQD
7
51
45
48
SEE NOTE 13 32
71
52
48 REQD 46
24 REQD 47
SEE NOTE 6
36 8 REQD
SEE NOTE 12
26 2 REQD
⊥ A.015
A
RED DOT
24 PLACES
25
SEE NOTE 8
13
12
12
B
B
D
D
SEE NOTE 4
B
-A-
1
PARTIAL VIEW A-A
SEE NOTE 9
38
20
SEE NOTE 13
75
40
72
71
PARTIAL SECTION D-D
ROTATED 90°
2 PLACES
SEE NOTE 9
38
20
SEE NOTE 13
76
40
72
71
PARTIAL SECTION B-B
ROTATED 90°
2 PLACES
2 REQD 67
2 REQD 42
2 REQD 68
4 REQD 41
69
2 REQD 41
-B-
⊥ A.015
2 PLACES, LEFT HAND
SHOWN, RIGHT HAND
OPPOSITE
E
35 10 REQD
38 REF
E
38 REF
2900034

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± — ± — ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
APPLICATION		DO NOT SCALE THIS DRAWING	DRAWN DATE 24 MAR 65 CHECKED 24 MAR 65 APPROVAL 24 MAR 65 APPROVAL 10-18-65	SELECTOR, OSCILLOGRAPH SIGNAL	
		MATERIAL —	NASA APPROVAL MIT APPROVAL	CODE IDENT NO. 99974	SIZE E · 2900034
		CONTRACT NAS9-497		SCALE FULL	SHEET 2 OF 3

REVISIONS 23408

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
C		THIS SHEET ADDED PER MXC 202550		26 JUN 65	RLP
D		REVISION STATUS CHANGED		JUL 65	J
E		REVISION STATUS CHANGED		10 JUL 65	2
F		REVISION STATUS CHANGED		65	
G		REVISION STATUS CHANGED		22 JUL 65	RWH
H		REVISION STATUS CHANGED		AUG 65	RWH
J		INITIAL RELEASE CLASS A PER TDRR 23408		10 65	MRC


BLUE BEAD
PIN NO. 1
82
2 REQD 79
2 REQD 40
K25
81
2 REQD 46
T4
PIN NO. 1
BROWN DOT
PIN NO. 1
T1
BROWN DOT
PIN NO. 1
2 REQD 56
4 REQD 45
T2
PIN NO. 1
T3
80
46 2 REQD

PARTIAL VIEW E-E

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN 24 MAR 65 DATE
CHECKED J. GRIEB 24 MAR 65
APPROVAL D. CARPENTIER 24 MAR 65
APPROVAL J. M. Watson
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SELECTOR, OSCILLOGRAPH SIGNAL

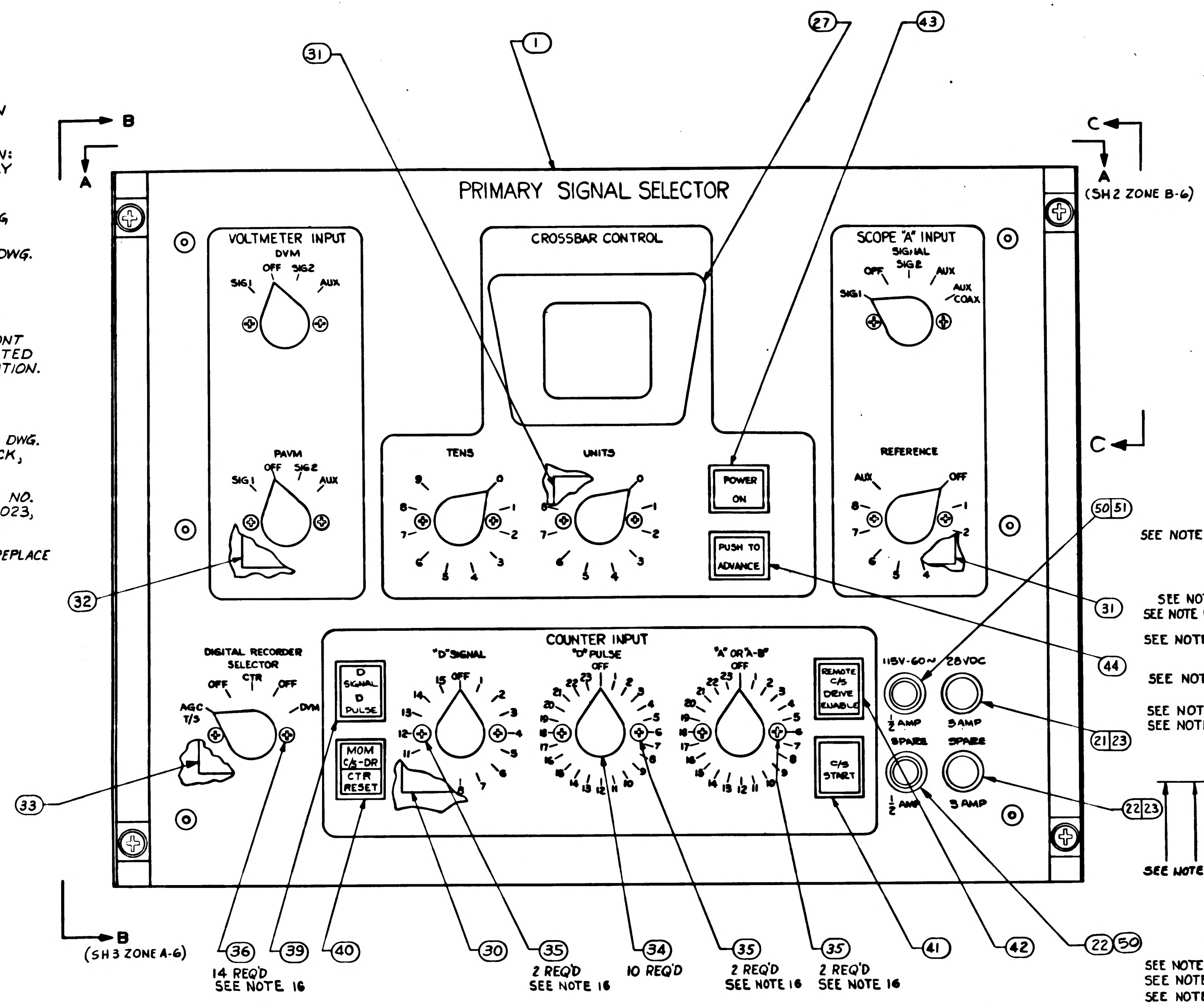
CODE IDENT NO. 99974
SIZE E
2900034
SCALE FULL
SHEET 3 OF 3

2900034 J

NOTES:

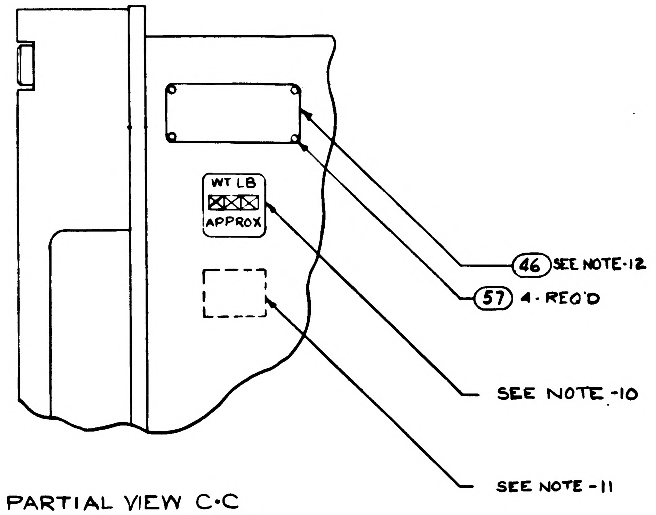
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. POSITIONING OF RELAYS INDICATED BY DOT AS VIEWED FROM BELOW CHASSIS
3. DIMENSION "A" SHALL BE EQUAL TO DIMENSION "B" WITHIN .040 INCHES.
4. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN: PREFIX WITH UNIT NUMBER OR SUB-ASSEMBLY DESIGNATION (S) OR BOTH FOR COMPLETE DESIGNATION.
5. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEMS (60) ~~AND~~ (61), OR (77).
6. VENDOR ITEM - SEE SPECIFICATION CONTROL DWG.
7. SELECT AS REQUIRED.
8. SHIM TO FIT. PEEL OFF EXCESS SHIM STOCK.
9. DRAWER SLIDE MOUNTING SCREWS AND FRONT PANEL MOUNTING SCREWS SHALL BE SUBJECTED TO A TORQUE OF 33.0-36.2 IN. LB. AT INSTALLATION.
10. MARK WEIGHT OF ASSEMBLY (48-LBS) PER ND1002123 IN LOCATION SHOWN.
11. MARK "SCHEM" AND APPLICABLE SCHEMATIC DWG. NO. PER ND1002019, .12 HIGH, COLOR BLACK, IN LOCATION SHOWN.
12. MARK APPLICABLE CONTR NO. AND SERIAL NO. ON ITEM (46) REF IN ACCORDANCE WITH ND1002023, LETTERS AND NUMERALS TO BE .06 HIGH.
13. REMOVE EXISTING FLAT HEAD SCREW AND REPLACE WITH ITEMS (8), (11) & (12) REF.
14. SECURE SCREWS USING ITEM (45).
15. QTY. SPECIFIED "AR" INDICATES -AS REQ'D.
16. SECURE SCREWS USING ITEM (75).

REVISIONS 23404					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
B		REPLACES REV A WITH CHANGE PER MXC 20255		65	REN
C		REVISED PER MXC 202821.	—	8 JULY 65	WJR MEM
D		REVISED PER MXC 203253		23 65	
E		INITIAL RELEASE CLASS A PER TDRR 23404		65	



				QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				1		79	2900119-011	SIGNAL SHAPING & INHIBIT ASS'Y
				☒		78	2900390	RUNNING LIST
				AR		77	SN60WRAP	SOLDER QQ-S-571 (ES 2175-3)
SEE NOTE 6				1		76	1016800-013	STAND OFF
				AR		75	MIL-S-22473 (GRC)	SEALING COMPOUND (ES-2544-3)
				2		74	1902013	GUIDE CARD
				2		73	1902012	BRACKET HOLDER, TRIPLE
				8		72	MS35216-14	SCREW, PAN HEAD
				6		71	MS 35216-17	SCREW, PAN HEAD
SEE NOTE 6				1		70	1016350	COMPLEMENTING FLIP-FLOP ASSY
				1		69	1901939-011	ELECTRONIC COMP. ASSY
SEE NOTE 6				2		68	1016151-006	NUT, SELF LOCKING
SEE NOTE 6				2		67	1016351	LOGIC DRIVER ASSY
				1		66	1900391	BRACKET HOLDER, DOUBLE
SEE NOTE 7				2		65	MS21919 DG19 THRU 21	CLAMP, CUSHIONED SUPPORT (1897073-119 THRU 121)
SEE NOTE 7				2		64	MS21919 DG8 THRU 11	CLAMP, CUSHIONED SUPPORT (1897073-108 THRU 111)
SEE NOTE 7				1		63	MS 21919 DG7 THRU 9	CLAMP, CUSHIONED SUPPORT (1897073-107 THRU 109)
				1		62	1900778	WIRE LIST BB
				AR		61	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
				AR		60	SN60WS	SOLDER QQ-S-571 (ES 2175-1)
SEE NOTE 6				24		59	1016151-004	NUT, SELF LOCKING
				8		58	AN500AD4-7	(1897012-425) SCREW, MACH, FIL HD
				4		57	MS35216-1	SCREW, PAN HD.
				33		56	MS 35216-26	SCREW, PAN HEAD
SEE NOTE 6				1		55	1015825-014	ROTARY SWITCH
SEE NOTE 6				10		54	1016005-1	SHIM, SLIDE LOCATING
SEE NOTE 7				2		53	MS 21919 DG4 THRU 6	CLAMP, CUSHIONED, SUPPORT (1897073-104 THRU 106)
				1		52	1900221-031	SWITCH & CONNECTOR ASSY.
SEE NOTE 6				1		51	1015873-1	FUSE HOLDER
				2		50	MS90078-7-1	(1897077-107) FUSE
SEE NOTE 6				1		49	1015791-010	CHASSIS SLIDE ASSY.
SEE NOTE 6				1		48	1015791-009	CHASSIS SLIDE ASSY.
				☒		47	2900388	SCHEMATIC DIAGRAM
				1		46	1004260-112	NAMEPLATE, APOLLO GEN
				AR		45	MIL-S-22473 GR H	SEALING COMPOUND (ES-2544-5)
				1		44	1015869-336	SWITCH, PUSH BUTTON
				1		43	1015869-512	↑
				1		42	1015869-806	↑
				1		41	1015869-345	↑
				1		40	1015869-726	↑
SEE NOTE 6				1		39	1015869-805	SWITCH, PUSH BUTTON
				1		38	2900389	HARNESS "A" ASSY.
				☒		37	PS2900035	PROCUREMENT SPECIFICATION
				14		36	MS35200-25	SCREW, MACH., FLAT CSK
				6		35	MS35200-40	SCREW, MACH., FLAT CSK
				10		34	MS91528-2K2B	(1897080-023) KNOB
SEE NOTE 6				2		33	1015825-8	ROTARY SWITCH
SEE NOTE 6				1		32	1015825-6	ROTARY SWITCH
SEE NOTE 6				3		31	1015825-4	ROTARY SWITCH
				1		30	1900221-021	SWITCH & CONNECTOR ASSY.
				1		29	1900221-051	SWITCH & CONNECTOR ASSY.
				3		28	1901812-011	PULSE GENERATOR ASSY
SEE NOTE 6				1		27	1015943-1	BEZEL - 2 DIGIT
SEE NOTE 6				2		26	1015912-193	SCREW, NYLON-FLAT HEAD
				1		25	1900220	SPACER, DIGITAL READOUT
SEE NOTE 6				1		24	1015844-001	DIGITAL READOUT
				2		23	MS 90078-12-1	(1897077-112) FUSE
				2		22	MS 26572-1	FUSE HOLDER - SPARE
SEE NOTE 6.				1		21	1015873-008	FUSE HOLDER
				2		20	1901727	BRACKET, ANGLE
				35		19	AN363C632	(1896990-261) NUT, LOCK
				1		18	1902006	HARNESS "B" ASSY.
				8		17	1900390	BRACKET HOLDER, SINGLE
SEE NOTE 6				4		16	1015837-001	RELAY, ARMATURE
SEE NOTE 6				10		15	1015826-304	SCREW, FLAT HEAD, HEX. SOCKET
SEE NOTE 6				1		14	1015981-005	STANDOFF, HEX.
				2		13	MS35216-24	SCREW, PAN HD
				37		12	MS 35333-71	WASHER, LOCK, INTERNAL TOOTH
				12		11	AN960C-6	(1897006-026) WASHER, FLAT
				10		10	MS35216-16	SCREW, PAN HD
				1		9	1902003-011	COMPONENT BOARD ASSY
				37		8	MS 35216-25	SCREW, PAN HEAD
				1		7	1900217-021	TRANSFORMER & RELAY PANEL ASSY
				6		6	AN363C1032	(1896990-011) NUT, SELF-LOCKING
SEE NOTE 6				6		5	100E783-45	SCREW - BUTTON HEAD
				8		4	AN507C832R12	(1897003-568) SCREW-FL. HD. 100°
				2		3	1900015-081	HANDLE ASSY.
				1		2	2900260	DRAWER INSEP. ASSY.
				1		1	1900209	FRONT PANEL

LIST OF PARTS AND MATERIALS



PARTIAL VIEW C-C

2900023-011	2900023-011	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

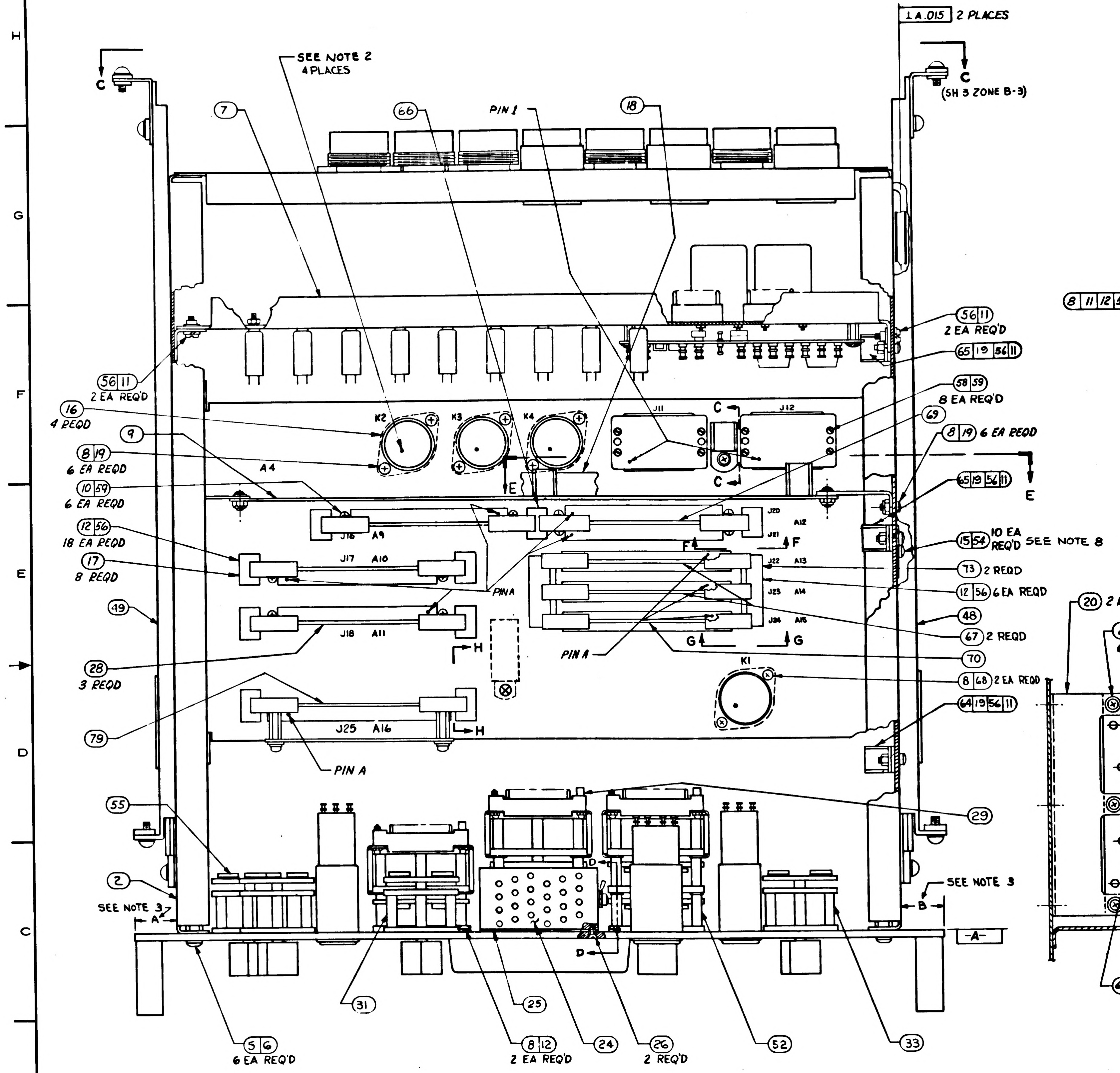
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 21 MAR 65
CHECKED Wilson 24 MAR 65
APPROVAL R. Pierini 24 MAR 65
APPROVAL 10-12-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PRIMARY SIGNAL SELECTOR
ASSEMBLY

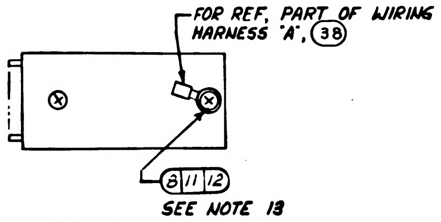
CODE IDENT NO. 99974
SIZE E
2900035
SCALE FULL
SHEET 1 OF 3

REVISIONS		-3 404			
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
B		REPLACES REV A WITH CHANGE PER MXC 20255	—	65	[illegible]
C		REV STATUS CHANGED	—	8 JULY 65	WJR
D		REVISION STATUS CHANGED		23 JUL 65	[illegible]
E		INITIAL RELEASE CLASS A PER TDRR 23404		[illegible] 65	[illegible]



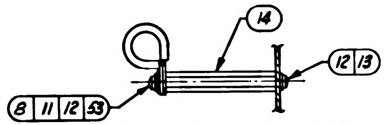
⊥ A .015 2 PLACES
C
C (SH 3 ZONE B-3)
SEE NOTE 2 4 PLACES
7
66
PIN 1
18
56 11 2 EA REQ'D
65 19 56 11
56 11 2 EA REQ'D
58 59 8 EA REQ'D
16 4 REQD
K2
K3
K4
J11
J12
C
C
69
8 19 6 EA REQD
9
8 19 6 EA REQD
A4
E
E
10 59 6 EA REQD
J16 A9
J20 A12
65 19 56 11
J21
F
F
15 54 10 EA REQ'D SEE NOTE 8
12 56 18 EA REQD
J17 A10
J22 A13
73 2 REQD
17 8 REQD
J23 A14
12 56 6 EA REQD
PIN A
J18 A11
J24 A15
49
48
H
G
G
67 2 REQD
PIN A
70
28 3 REQD
K1
8 68 2 EA REQD
64 19 56 11
J25 A16
H
79
PIN A
55
29
2
SEE NOTE 3
A
SEE NOTE 3
B
D
-A-
31
25
5 6 6 EA REQ'D
8 12 2 EA REQ'D
24
26 2 REQ'D
52
33

VIEW A-A
(SH1 ZONE G-3)



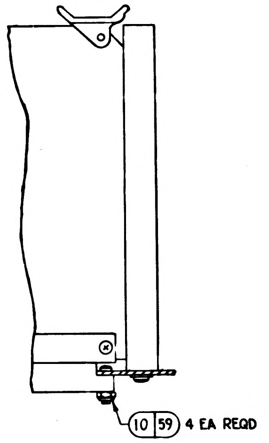
FOR REF, PART OF WIRING HARNESS "A", 38
8 11 12
SEE NOTE 13

PARTIAL VIEW D-D



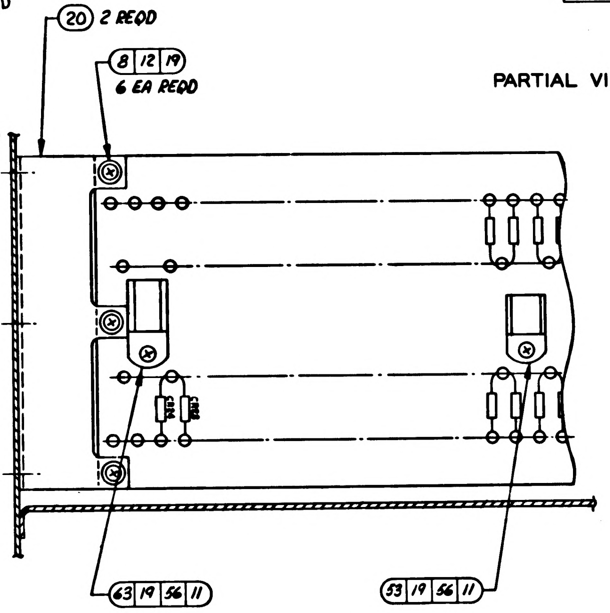
14
12 13
8 11 12 53

PARTIAL VIEW "C-C"



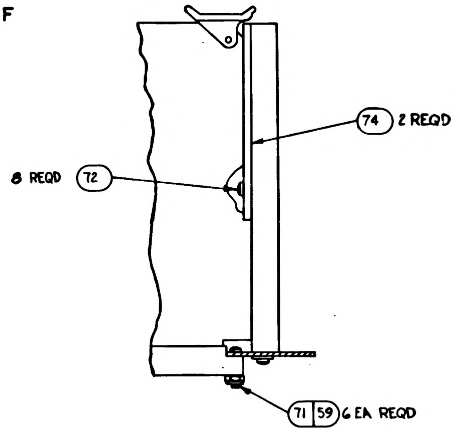
10 59 4 EA REQD

PARTIAL VIEW FF



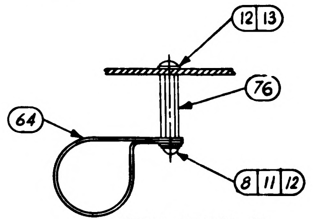
20 2 REQD
8 12 19 6 EA REQD
63 19 56 11
53 19 56 11

PARTIAL VIEW EE
(ROTATED 180°)



74 2 REQD
8 REQD 72
71 59 6 EA REQD

PARTIAL VIEW GG



12 13
76
64
8 11 12

PARTIAL VIEW H-H
ROTATED 90° CCW

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+	+	+
−	−	−

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 21 MAR 65
CHECKED Wilson 26 MAR 65
QC APPROVAL C. Pierini 26 MAR 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

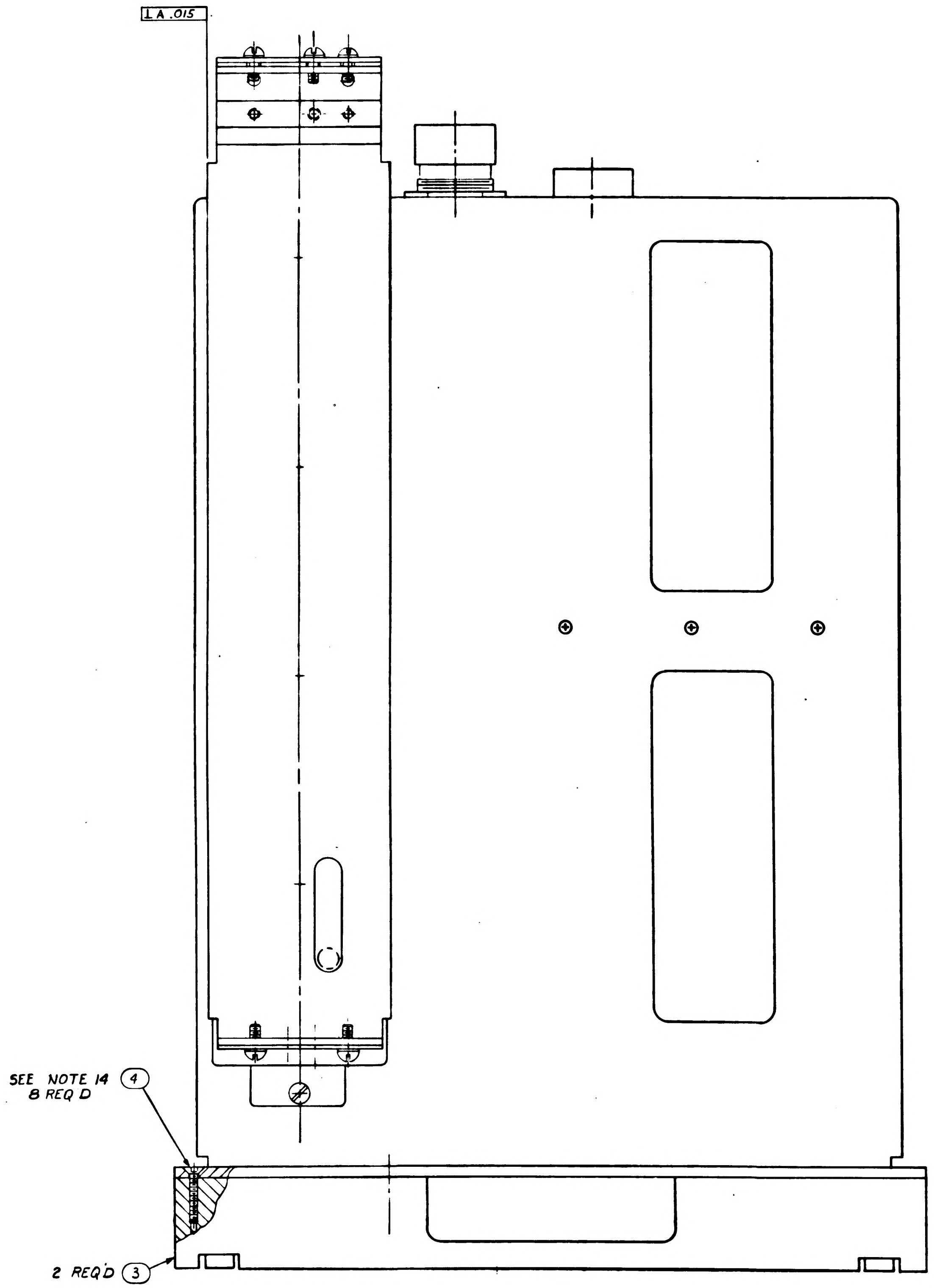
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PRIMARY SIGNAL SELECTOR
ASSEMBLY

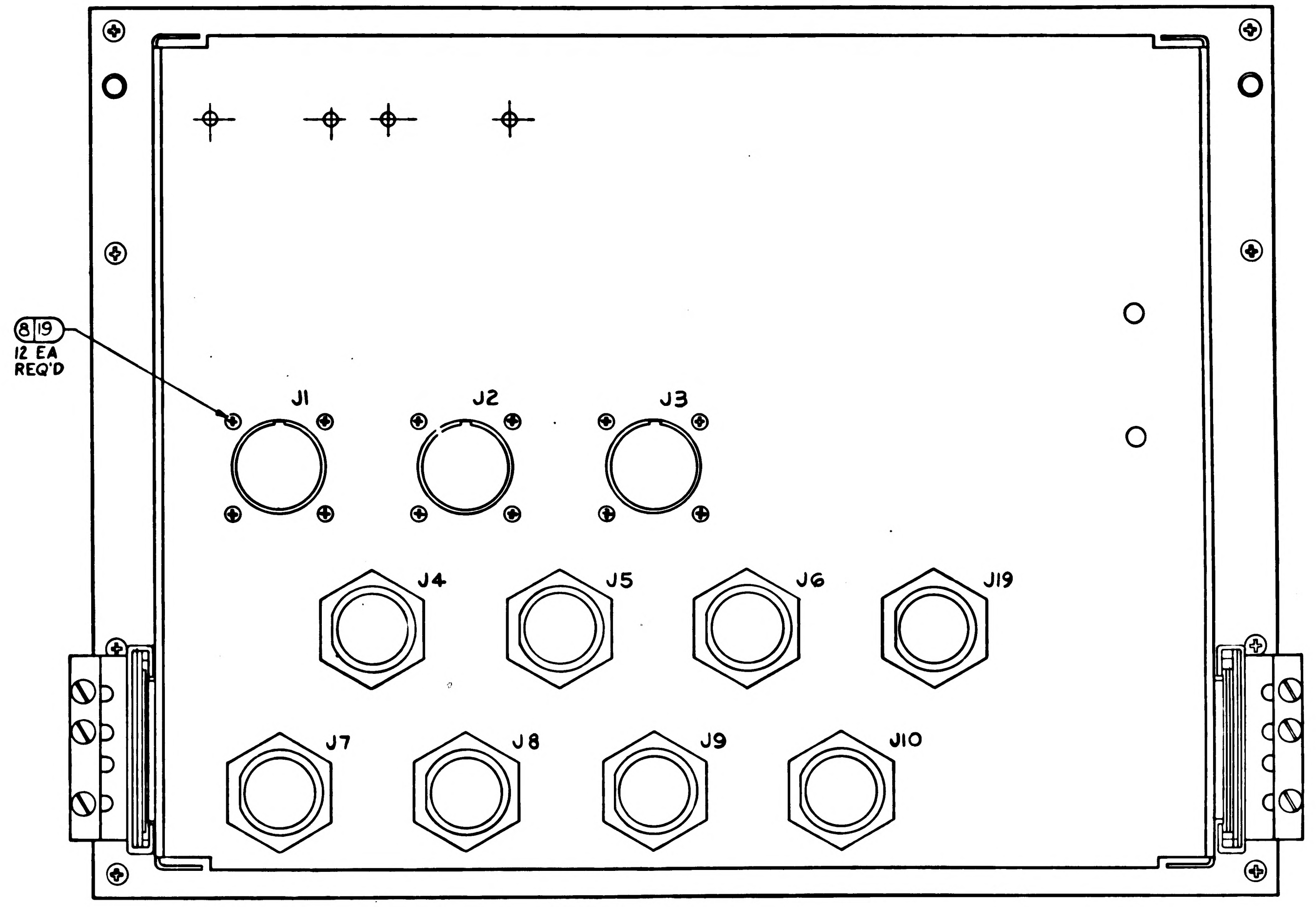
CODE IDENT NO. 99974
SIZE E
2900035
SCALE FULL
SHEET 2 OF 9

2900035 / B

REVISIONS		23114			
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.
B		THIS SHEET ADDED PER MXC 20255		2 [illegible] 65	EEW
C		REV STATUS CHANGED	—	8 JULY 65	WJR
D		REVISION STATUS CHANGED		23 [illegible] 65	
E		INITIAL RELEASE CLASS A PER TDRR 23 404		30 [illegible] 65	



VIEW B - B
ROTATED 90°
(SH 1 ZONE D-6)

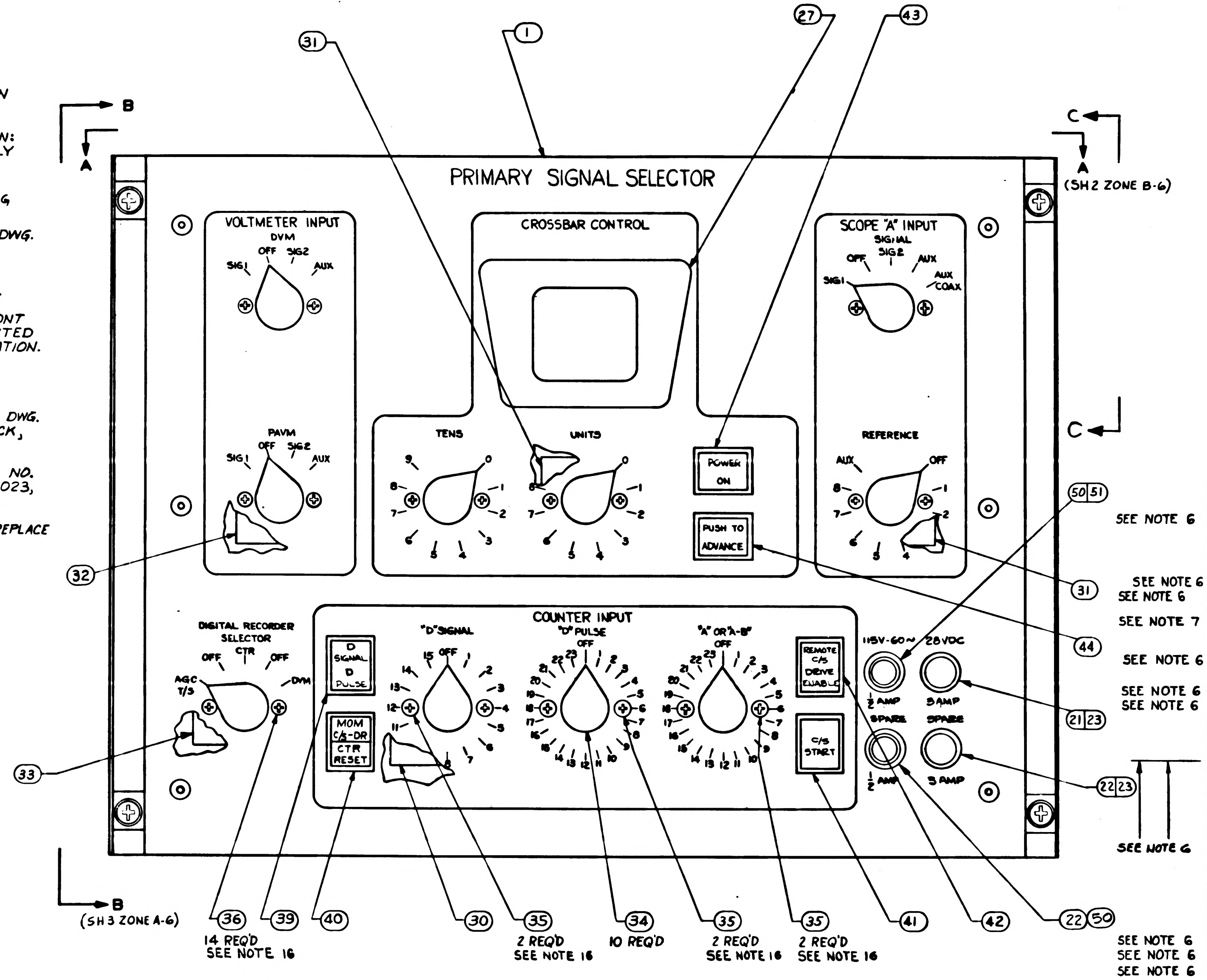


VIEW C - C
(SH 2 ZONE H-4)

2900035

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
	ACSP PN		
	DRAWN Bender DATE 21 MAR 65 CHECKED Wilson 26 MAR 65 APPROVAL R Pecrini 26 MAR 65 APPROVAL	PRIMARY SIGNAL SELECTOR ASSEMBLY	
DO NOT SCALE THIS DRAWING			
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974	SIZE E | 2900035
CONTRACT NAS 9 - 497	MIT APPROVAL	SCALE FULL	SHEET 3 OF 3

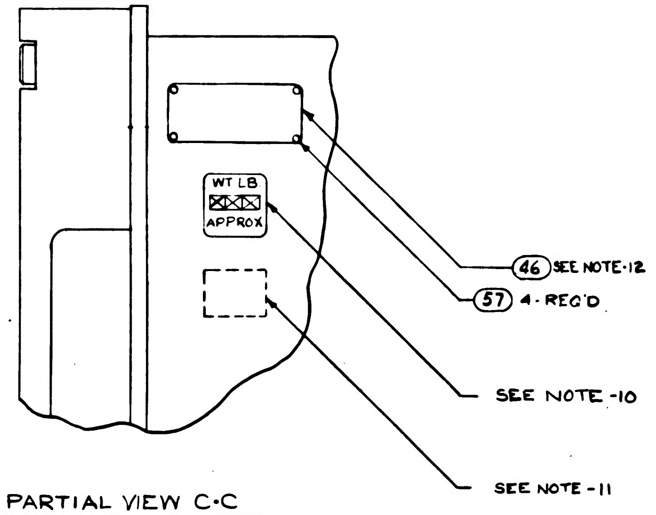
NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. POSITIONING OF RELAYS INDICATED BY DOT AS VIEWED FROM BELOW CHASSIS
3. DIMENSION "A" SHALL BE EQUAL TO DIMENSION "B" WITHIN .040 INCHES.
4. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN: PREFIX WITH UNIT NUMBER OR SUB-ASSEMBLY DESIGNATION (S) OR BOTH FOR COMPLETE DESIGNATION.
5. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEMS (60) ~~AND~~ (61), OR (77).
6. VENDOR ITEM - SEE SPECIFICATION CONTROL DWG.
7. SELECT AS REQUIRED.
8. SHIM TO FIT. PEEL OFF EXCESS SHIM STOCK.
9. DRAWER SLIDE MOUNTING SCREWS AND FRONT PANEL MOUNTING SCREWS SHALL BE SUBJECTED TO A TORQUE OF 33.0-36.2 IN. LB. AT INSTALLATION.
10. MARK WEIGHT OF ASSEMBLY (48-LBS) PER ND 1002123 IN LOCATION SHOWN.
11. MARK "SCHEM" AND APPLICABLE SCHEMATIC DWG. NO. PER ND 1002019, .12 HIGH, COLOR BLACK, IN LOCATION SHOWN.
12. MARK APPLICABLE CONTR NO. AND SERIAL NO. ON ITEM (46) REF IN ACCORDANCE WITH ND 1002023, LETTERS AND NUMERALS TO BE .06 HIGH.
13. REMOVE EXISTING FLAT HEAD SCREW AND REPLACE WITH ITEMS (8), (11) & (12) REF.
14. SECURE SCREWS USING ITEM (45).
15. QTY. SPECIFIED "AR" INDICATES -AS REQ'D.
16. SECURE SCREWS USING ITEM (75).


PRIMARY SIGNAL SELECTOR
VOLTMETER INPUT
DVM
OFF SIG2
SIG1 AUX
PAVM
OFF SIG2
SIG1 AUX
CROSSBAR CONTROL
TENS
UNITS
9 0 8 1 7 2 6 5 4 3
POWER ON
PUSH TO ADVANCE
SCOPE "A" INPUT
SIGNAL
OFF SIG2 AUX
SIG1 AUX COAX
REFERENCE
AUX OFF 8 1 7 2 6 5 4
DIGITAL RECORDER SELECTOR
OFF CTR OFF
AGC T/S DVM
COUNTER INPUT
"D" SIGNAL
"D" PULSE
"A" OR "A-B"
OFF
D SIGNAL D PULSE
MOM C/S-DR CTR RESET
REMOTE C/S DRIVE ENABLE
C/S START
115V-60~
28VDC
½ AMP
3 AMP
SPARE
SPARE
½ AMP
3 AMP
B
A
C
A
(SH2 ZONE B-6)
C
B
(SH3 ZONE A-6)
1
27
43
31
32
31
44
50 51
21 23
22 23
33
36
14 REQ'D
SEE NOTE 16
39
40
30
35
2 REQ'D
SEE NOTE 16
34
10 REQ'D
35
2 REQ'D
SEE NOTE 16
35
2 REQ'D
SEE NOTE 16
41
42
22 50

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
B		REPLACES REV A WITH CHANGE PER MXC 202551	—	26 JUN 65	REW
C		REVISED PER MXC 202821.	—	8 JULY 65	WJR MEM
D		REVISED PER MXC 203253		23 JUL 65	
E		INITIAL RELEASE CLASS A PER TDRR 23404		18 OCT 65	
F		REVISED PER TDRR 25303		19 JAN 66	JEC

				AR		61	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
				AR		60	SN60WS	SOLDER QQ-S-571 (ES 2175-1)
SEE NOTE 6				26		59	1016151-004	NUT, SELF LOCKING
				8		58	AN500AD4-7	(1897012-425) SCREW, MACH, FIL HD
				4		57	MS35216-1	SCREW, PAN HD.
				33		56	MS 35216-26	SCREW, PAN HEAD
SEE NOTE 6				1		55	1015825-014	ROTARY SWITCH
SEE NOTE 6				10		54	1016005-1	SHIM, SLIDE LOCATING
SEE NOTE 7				2		53	MS 21919 DG4 THRU 6	CLAMP, CUSHIONED, SUPPORT (1897073-104 THRU 106)
				1		52	1900221-031	SWITCH & CONNECTOR ASSY.
SEE NOTE 6				1		51	1015873-1	FUSE HOLDER
				2		50	MS90078-7-1	(1897077-107) FUSE
SEE NOTE 6				1		49	1015791-010	CHASSIS SLIDE ASSY.
SEE NOTE 6				1		48	1015791-009	CHASSIS SLIDE ASSY.
				☒		47	2900388	SCHEMATIC DIAGRAM
				1		46	1004260-112	NAMEPLATE, APOLLO GEN
				AR		45	MIL-S-22473 GR H	SEALING COMPOUND (ES-2544-5)
				1		44	1015869-336	SWITCH, PUSH BUTTON
				1		43	1015869-512	↑
				1		42	1015869-806	↑
				1		41	1015869-345	↑
				1		40	1015869-726	↑
SEE NOTE 6				1		39	1015869-805	SWITCH, PUSH BUTTON
				1		38	2900389	HARNESS "A" ASSY.
				☒		37	PS2900035	PROCUREMENT SPECIFICATION
				14		36	MS 35200-25	SCREW, MACH., FLAT CSK
				6		35	MS 35200-40	SCREW, MACH., FLAT CSK
				10		34	MS91528-2K2B	(1897080-023) KNOB
SEE NOTE 6				2		33	1015825-8	ROTARY SWITCH
SEE NOTE 6				1		32	1015825-6	ROTARY SWITCH
SEE NOTE 6				3		31	1015825-4	ROTARY SWITCH
				1		30	1900221-021	SWITCH & CONNECTOR ASSY.
				1		29	1900221-051	SWITCH & CONNECTOR ASSY.
				3		28	1901812-011	PULSE GENERATOR ASSY
SEE NOTE 6				1		27	1015943-1	BEZEL - 2 DIGIT
SEE NOTE 6				2		26	1015912-193	SCREW, NYLON-FLAT HEAD
				1		25	1900220	SPACER, DIGITAL READOUT
SEE NOTE 6				1		24	1015844-001	DIGITAL READOUT
				2		23	MS 90078-12-1	(1897077-112) FUSE
				2		22	MS 26572-1	FUSE HOLDER - SPARE
SEE NOTE 6.				1		21	1015873-008	FUSE HOLDER
				2		20	1901727	BRACKET, ANGLE
				35		19	AN363C632	(1896990-261) NUT, LOCK
				1		18	1902006	HARNESS "B" ASSY.
				8		17	1900390	BRACKET HOLDER, SINGLE
SEE NOTE 6				4		16	1015837-001	RELAY, ARMATURE
SEE NOTE 6				10		15	1015826-304	SCREW, FLAT HEAD, HEX. SOCKET
SEE NOTE 6				1		14	1015981-005	STANDOFF, HEX.
				2		13	MS35216-24	SCREW, PAN HD
				37		12	MS 35333-71	WASHER, LOCK, INTERNAL TOOTH
				12		11	AN960C-6	(1897006-026) WASHER, FLAT
				12		10	MS35216-16	SCREW, PAN HD
				1		9	1902003-011	COMPONENT BOARD ASSY
				37		8	MS 35216-25	SCREW, PAN HEAD
				1		7	1900217-021	TRANSFORMER & RELAY PANEL ASSY
				6		6	AN363C1032	(1896990-011) NUT, SELF-LOCKING
SEE NOTE 6				6		5	1006783-45	SCREW-BUTTON HEAD
				8		4	AN507C832R12	(1897003-568) SCREW-FL. HD. 100°
				2		3	1900015-081	HANDLE ASSY.
				1		2	2900260	DRAWER INSEP. ASSY.
				1		1	1900209	FRONT PANEL
				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

				1		79	2900119-011	SIGNAL SHAPING & INHIBIT ASS'Y
				☒		78	2900390	RUNNING LIST
				AR		77	SN60WRAP	SOLDER QQ-S-571 (ES 2175-3)
SEE NOTE 6				1		76	1016000-013	STAND OFF
				AR		75	MIL-S-22473 (GRC)	SEALING COMPOUND (ES-2544-3)
				2		74	1902013	GUIDE CARD
				2		73	1902012	BRACKET HOLDER, TRIPLE
				8		72	MS35216-14	SCREW, PAN HEAD
				6		71	MS 35216-17	SCREW, PAN HEAD
SEE NOTE 6				1		70	1016350	COMPLEMENTING FLIP-FLOP ASSY
				1		69	1901939-011	ELECTRONIC COMP. ASSY
SEE NOTE 6				2		68	1016151-006	NUT, SELF LOCKING
SEE NOTE 6				2		67	1016351	LOGIC DRIVER ASSY
				1		66	1900391	BRACKET HOLDER, DOUBLE
SEE NOTE 7				2		65	MS21919 DG19 THRU 21	CLAMP, CUSHIONED SUPPORT (1897073-119 THRU 121)
SEE NOTE 7				2		64	MS21919 DG8 THRU 11	CLAMP, CUSHIONED SUPPORT (1897073-108 THRU 111)
SEE NOTE 7				1		63	MS 21919 DG7 THRU 9	CLAMP, CUSHIONED SUPPORT (1897073-107 THRU 109)
				1		62	1900778	WIRE LIST BB
				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		


WT LB
☒☒
APPROX
46 SEE NOTE-12
57 4-REQ'D
SEE NOTE-10
SEE NOTE-11

PARTIAL VIEW C-C

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ .± ___ ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ———
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE, WIS.
DRAWN Bender DATE 21 MAR 65
CHECKED Wilson 24 MAR 65
APPROVAL C. Pirino 24 MAR 65
APPROVAL [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

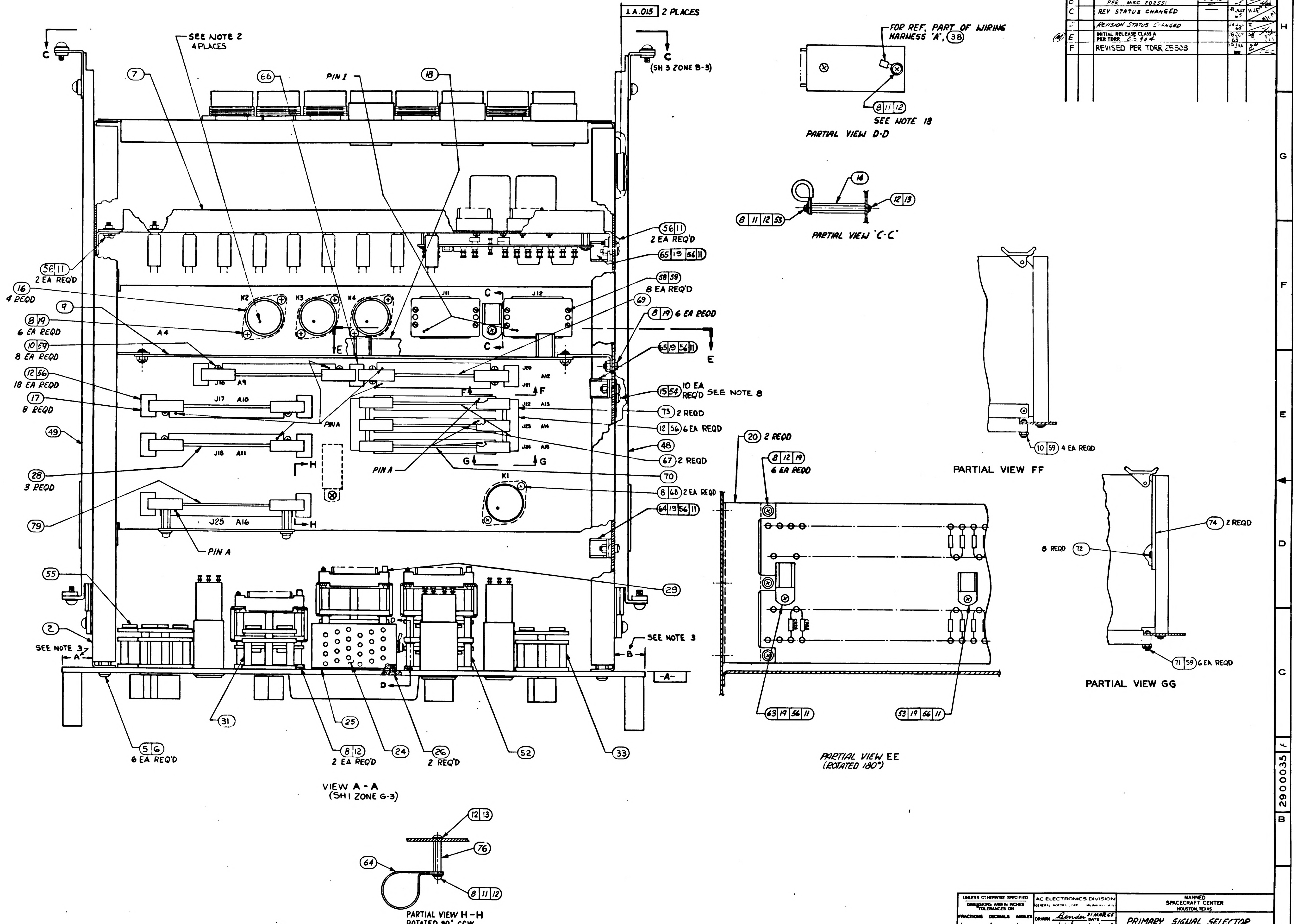
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PRIMARY SIGNAL SELECTOR
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900035
SCALE FULL
SHEET 1 OF 3

2900035 F

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
B		REPLACES REV A WITH CHANGE PER MKC 202551		65	
C		REV STATUS CHANGED	—	8 JULY 65	11 JR
		REVISION STATUS CHANGED		23 JUL 65	
E		INITIAL RELEASE CLASS A PER TDRR 23404		65	
F		REVISED PER TDRR 25303		19 JAN 66	

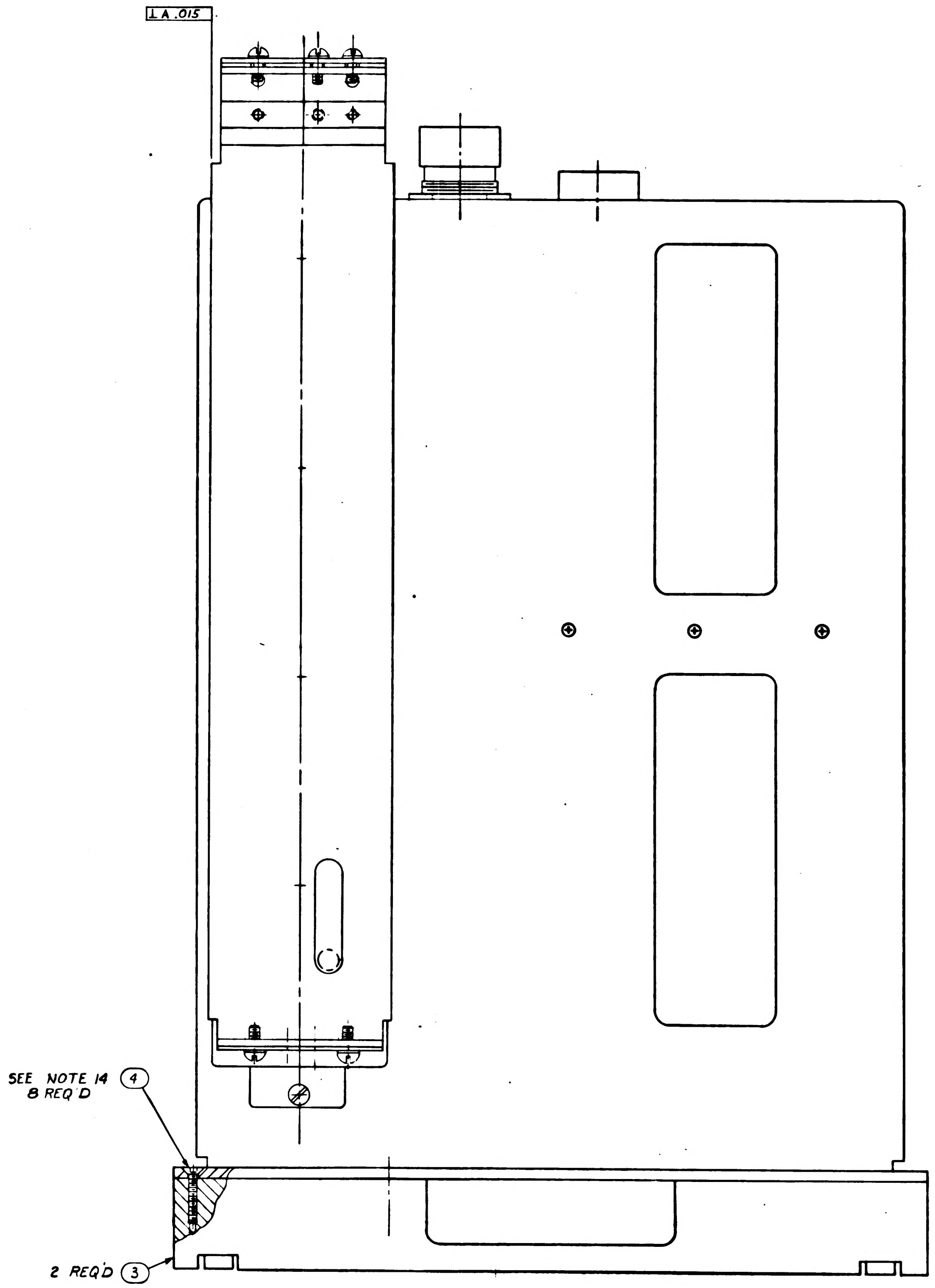

C
SEE NOTE 2
4 PLACES
7
66
PIN 1
18
⊥ A .015 2 PLACES
C
(SH 3 ZONE B-3)
56 11
2 EA REQ'D
65 19 56 11
58 59
8 EA REQ'D
69
8 19 6 EA REQD
65 19 56 11
E
15 54 10 EA REQ'D SEE NOTE 8
73 2 REQD
12 56 6 EA REQD
48
67 2 REQD
70
8 68 2 EA REQD
64 19 56 11
29
SEE NOTE 3
B
-A-
33
52
26
2 REQ'D
24
8 12
2 EA REQ'D
25
D
31
5 6
6 EA REQ'D
2
SEE NOTE 3
A
55
79
28
3 REQD
49
17
8 REQD
12 56
18 EA REQD
10 59
8 EA REQD
8 19
6 EA REQD
16
4 REQD
56 11
2 EA REQ'D
9
A4
K2
K3
K4
J11
J12
J16 A9
J20 A12
J17 A10
J21
F
J22 A13
J23 A14
J24 A15
J18 A11
PIN A
H
G
K1
J25 A16
PIN A
FOR REF. PART OF WIRING HARNESS "A", 38
8 11 12
SEE NOTE 18
PARTIAL VIEW D-D
14
8 11 12 53
12 13
PARTIAL VIEW "C-C"
10 59 4 EA REQD
PARTIAL VIEW FF
20 2 REQD
8 12 19
6 EA REQD
63 19 56 11
53 19 56 11
PARTIAL VIEW EE
(ROTATED 180°)
74 2 REQD
8 REQD 72
71 59 6 EA REQD
PARTIAL VIEW GG
12 13
76
64
8 11 12
PARTIAL VIEW H-H
ROTATED 90° CCW

VIEW A-A
(SH 1 ZONE G-3)

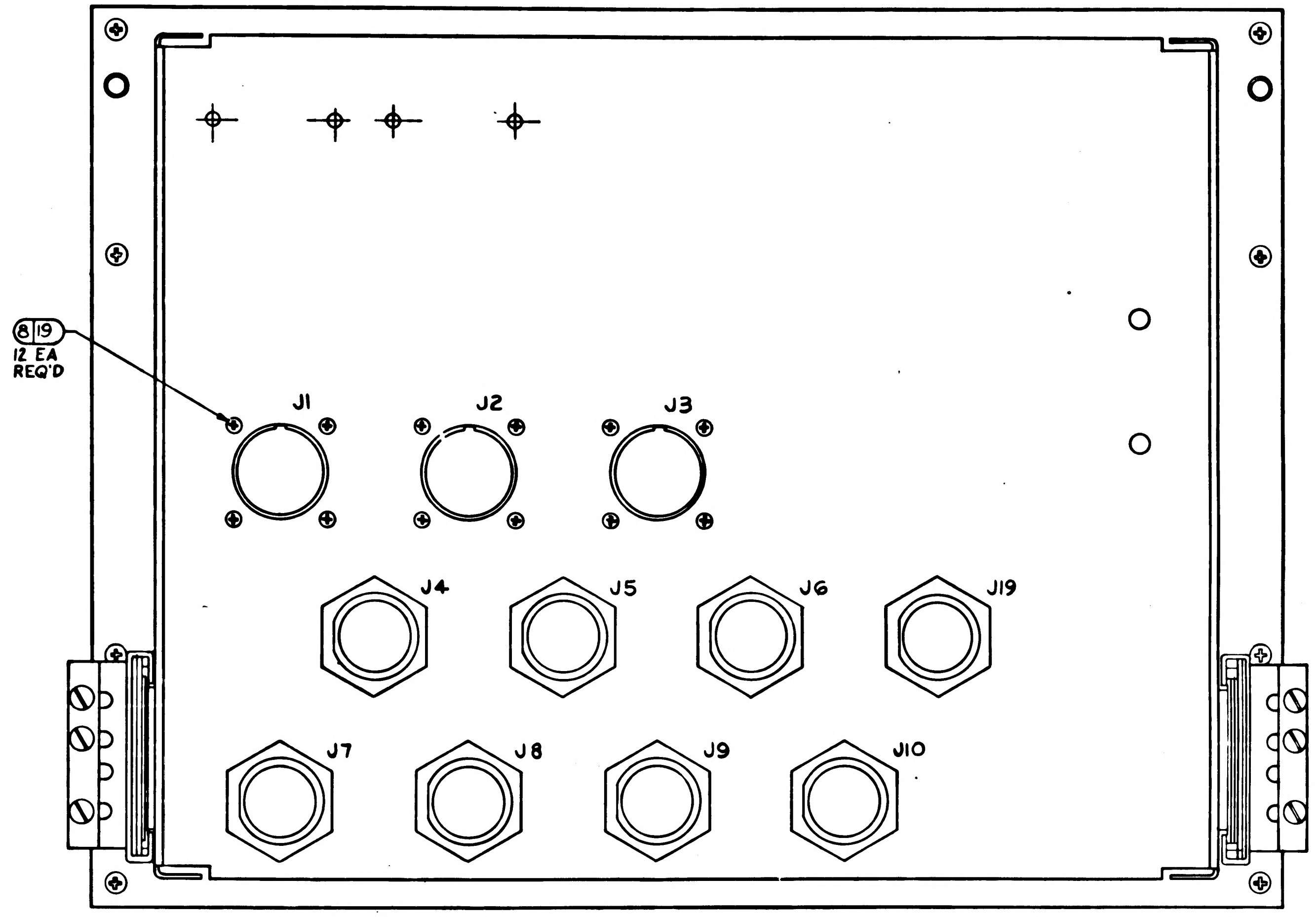
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + − DECIMALS + − ANGLES + −	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS		
DO NOT SCALE THIS DRAWING	DRAWN Bender DATE 21 MAR 65 CHECKED Wilson 26 MAR 65 APPROVAL 26 MAR 65 APPROVAL	PRIMARY SIGNAL SELECTOR ASSEMBLY		
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974	SIZE E	2900035
CONTRACT NAS 9-497	MIT APPROVAL	SCALE FULL		SHEET 2 OF 9

2900035 F

REVISIONS 23404					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.
B		THIS SHEET ADDED PER MXC 202551		26 JUN 65	REW
C		REV STATUS CHANGED	—	8 JULY 65	WJR
D		REVISION STATUS CHANGED		23 JUL 65	
E		INITIAL RELEASE CLASS A PER TDRR 23404		8 OCT 65	
F		REVISION STATUS CHANGED		19 JAN 66	CPC



VIEW B - B
ROTATED 90°
(SH 1 ZONE D-6)



VIEW C - C
(SH 2 ZONE H-4)

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN Bender DATE 21 MAR 65
CHECKED Wilson 26 MAR
APPROVAL R Pecrini 26 MAR 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PRIMARY SIGNAL SELECTOR
ASSEMBLY

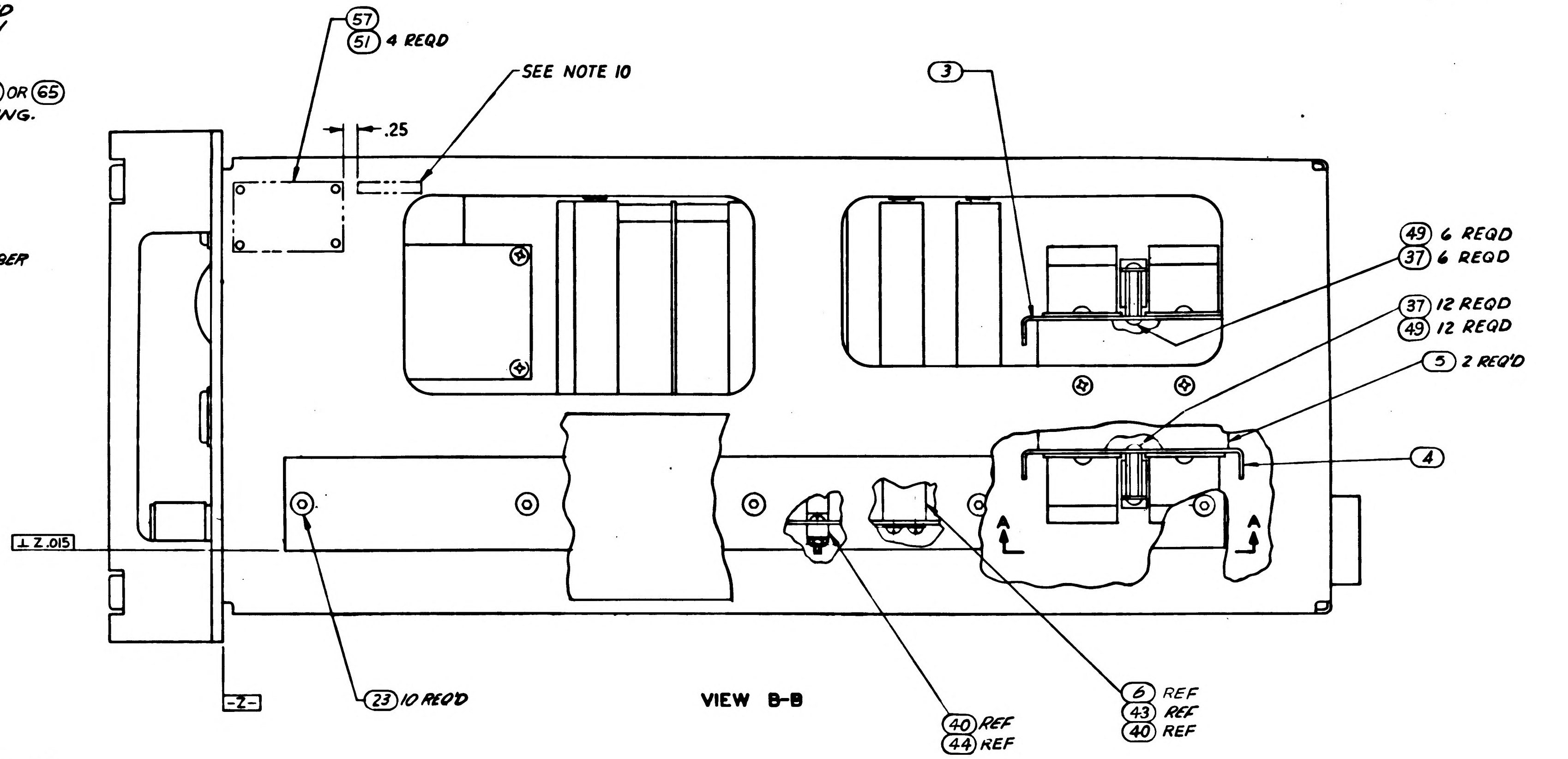
CODE IDENT NO. 99974
SIZE E
2900035
SCALE FULL
SHEET 3 OF 3

2900035 F

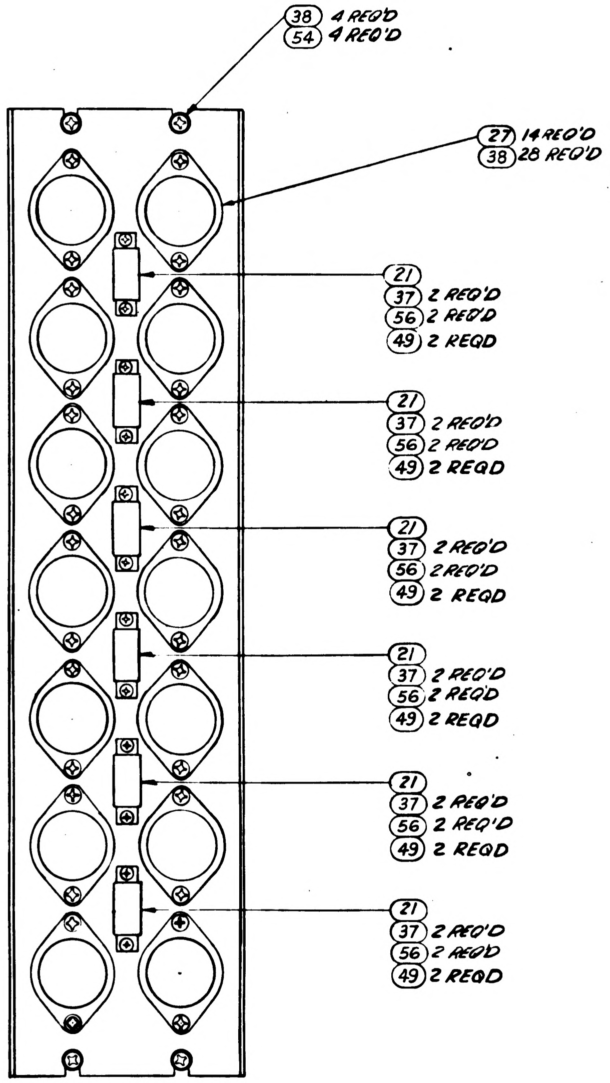
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. DIMENSIONS "A" AND "B" TO BE EQUAL WITHIN .040.
3. DRAWER SLIDE MOUNTING SCREWS AND FRONT PANEL MOUNTING SCREWS SHALL BE SUBJECTED TO TORQUE OF 37-40 LB/IN AT INSTALLATION
4. MARK WEIGHT OF ASSEMBLY (43 LBS) PER ND 1002123 ADJACENT TO NAMEPLATE LOCATION
5. SOLDER PER MIL-S-6872 (ES-2505-1) USING ITEMS (63) AND (64) OR (65)
6. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
7. SHIM TO FIT. PEEL OFF EXCESS SHIM STOCK.
8. MARK APPLICABLE CONTRACT NO. AND SERIAL NO TO ITEM (57) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .06 HIGH
9. SECURE SCREWS USING ITEM (34).
10. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .12 HIGH, COLOR BLACK.
11. SELECT ITEMS (58) AND (59) AS REQUIRED.

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPD.
F		REPLACES REV. (E) WITH CHANGE PER MXC 203254	24 JUL 65	RC
G		REVISED PER MXC 204637	15 SEP 65	
H		INITIAL RELEASE CLASS A PER TDRR 23417	8 OCT 65	



VIEW B-B



PARTIAL VIEW A-A

	QUANTITY REQUIRED							
				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				☒		68	2900743	RUNNING LIST
				☒		67	PS 2900036	PROCUREMENT SPECIFICATION
				☒		66	2900397	SCHEMATIC DIAGRAM-ELECTRICAL
				AR		65	SN60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
				AR		64	MIL-F-14256 TYPE A OR W	FLUX (ES 2798)
				AR		63	SN60WS	SOLDER QQ-S-571 (ES 2175-1)
				1		62	2900396	WIRING HARNESS A
SEE NOTE 6				1		61	1016096-012	RELAY, TIME DELAY
SEE NOTES 6 & 7				AR		60	1016005-001	SHIM-LAMINATED
SEE NOTE 11				1		59	MS21919-DG6 THRU DG8	(1897073-106 THRU 108) CLAMP CUSHIONED LOOP
SEE NOTE 11				1		58	MS21919-DG7 THRU DG9	(1897073-107 THRU 109) CLAMP CUSHIONED LOOP
				1		57	1004260-113	NAMEPLATE
SEE NOTE 6				18		56	1016000-014	SPACER
				3		55	MS91528-2K2B	(1897080-023) KNOB, POINTER
				8		54	AN960C6L	(1897006-036) WASHER-FLAT
				2		53	MS90078-15-1	(1897077-115) FUSE (6 AMP)
				1		52	MS26572-1	FUSE HOLDER-SPARE
				4		51	MS35216-1	SCREW, PAN HD CROSS RECESS
				2		50	AN960C8	(1897006-008) WASHER, FLAT
				36		49	MS35335-29	WASHER, EXT. TOOTH
				38		48	MS35335-30	WASHER, EXT. TOOTH
SEE NOTE 6				4		47	1016151-004	NUT-SELF LOCKING
				6		46	AN363C1032	(1896990-011) NUT-SELF LOCKING
				2		45	AN363C832	(1896990-281) NUT-SELF LOCKING
				38		44	AN363C632	(1896990-261) NUT-SELF LOCKING
				38		43	MS35216-27	SCREW, PAN HD CROSS RECESS
				2		42	MS35216-41	SCREW, PAN HD CROSS RECESS
						41		
				26		40	MS35216-28	SCREW, PAN HD CROSS RECESS
				12		39	MS35216-25	SCREW, PAN HD CROSS RECESS
				64		38	MS35216-24	SCREW, PAN HD CROSS RECESS
				42		37	MS35216-13	SCREW, PAN HD CROSS RECESS
				12		36	MS35200-42	SCREW, FL HD CROSS RECESS
				6		35	MS35200-25	SCREW, FL HD CROSS RECESS
SEE NOTE 9				AR		34	MIL-S-22473 GR H	SEALING COMPOUND (ES 2544-5)
SEE NOTE 6				1		33	1015873-008	FUSEHOLDER
				3		32	1015869-717	LIGHT-INDICATOR SWITCH ASSY
				3		31	1015869-716	
				1		30	1015869-715	
				1		29	1015869-714	
				1		28	1015869-713	LIGHT-INDICATOR SWITCH ASSY
				26		27	1015837-001	RELAY-ARMATURE
				3		26	1015833-009	RELAY THERMAL-TIME DELAY
				3		25	1015832-118	RELAY ELECTROMAGNETIC
				8		24	AN507C832R12	(1897003-568) SCREW-FLAT HD
SEE NOTE 6				10		23	1015826-304	SCREW-FLAT HD
				3		22	1015825-7	SWITCH-ROTARY
				6		21	1015802-001	RELAY-ARMATURE
				1		20	1015791-010	SLIDE ASSY L.H.
				1		19	1015791-009	SLIDE ASSY R.H.
				6		18	1006783-45	SCREW, BUTTON HD
				1		17	2900150-011	PRECISION ALIGN SERVO AMPL-OUTER
				1		16	2900149-011	PRECISION ALIGN SERVO AMPL-MIDDLE
				1		15	2900148-011	PRECISION ALIGN SERVO AMPL-INNER
				2		14	1900323-011	COMPONENT BOARD ASSY
				3		13	2900151-011	PHASE SENSITIVE ERROR DET ASSY
				1		12	2900088-031	DUMP PROTECTION ASSY (OUTER)
				1		11	2900088-021	DUMP PROTECTION ASSY (MIDDLE)
				1		10	2900088-011	DUMP PROTECTION ASSY (INNER)
				3		9	1900300-011	GIMBAL POSITION DISPLAY ASSY
				2		8	1900015-051	HANDLE ASSY
				9		7	1900391	BRKT CIRCUIT BOARD DOUBLE
				10		6	1900390	BRKT CIRCUIT BOARD SINGLE
				2		5	1900389	BRKT SUPPORT RELAY (INSEP) ASSY
				1		4	1900388	BRKT RELAY-LOWER (INSEP) ASSY
				1		3	1900387	BRKT RELAY-UPPER (INSEP) ASSY
				1		2	2900131	FRONT PANEL
				1		1	2900193	CHASSIS (INSEP) ASSY

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900023-011	2900023-011	-011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ±.020 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Janowiak DATE 24 MAR '65
CHECKED Ed Foster 4 JUN 65
E. NASS 7 JUN 65
APPROVAL 10-19-65
APPROVAL J. M. Watson
NASA APPROVAL
MIT APPROVAL
7 JUN 65

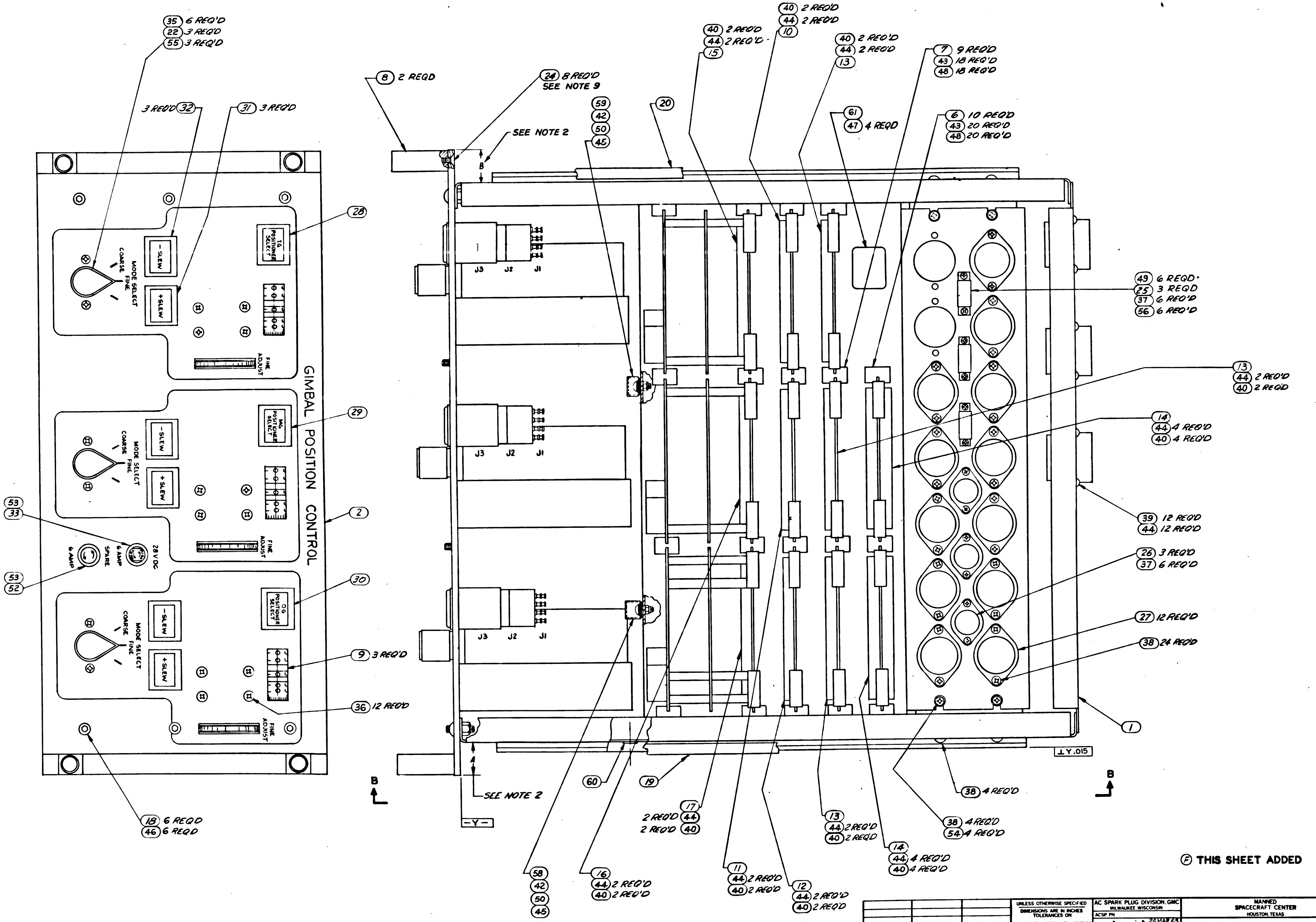
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CONTROL, GIMBAL POSITION
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900036
SCALE FULL
SHEET 1 OF 2

H 2900036

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
F		THIS SHEET ADDED PER MXC 203254		24 JUL 65	
G		REVISION STATUS CHANGED		SEP 65	
H		INITIAL RELEASE CLASS A PER TDRR 23417		OCT 65	



GIMBAL POSITION CONTROL
35 6 REQ'D
22 3 REQ'D
55 3 REQ'D
3 REQ'D 32
31 3 REQ'D
28
29
30
2
53
33
53
52
9 3 REQ'D
36 12 REQ'D
18 6 REQ'D
46 6 REQ'D
IG POSITIONER SELECT
MG POSITIONER SELECT
OG POSITIONER SELECT
-SLEW
+SLEW
MODE SELECT
COARSE
FINE
FINE ADJUST
28 V DC
6 AMP
SPARE
6 AMP
8 2 REQD
24 8 REQ'D
SEE NOTE 9
SEE NOTE 2
B
59
42
50
45
20
40 2 REQ'D
44 2 REQ'D
15
40 2 REQ'D
44 2 REQ'D
10
40 2 REQ'D
44 2 REQ'D
13
61
47 4 REQD
7 9 REQ'D
43 18 REQ'D
48 18 REQ'D
6 10 REQ'D
43 20 REQ'D
48 20 REQ'D
J3
J2
J1
49 6 REQD
25 3 REQD
37 6 REQ'D
56 6 REQ'D
13
44 2 REQ'D
40 2 REQD
14
44 4 REQ'D
40 4 REQ'D
39 12 REQ'D
44 12 REQ'D
26 3 REQ'D
37 6 REQ'D
27 12 REQ'D
38 24 REQ'D
1
⊥Y .015
B
B
A
SEE NOTE 2
-Y-
60
19
38 4 REQ'D
17
2 REQ'D 44
2 REQ'D 40
13
44 2 REQ'D
40 2 REQD
14
44 4 REQ'D
40 4 REQ'D
38 4 REQ'D
54 4 REQ'D
58
42
50
45
16
44 2 REQ'D
40 2 REQ'D
11
44 2 REQ'D
40 2 REQ'D
12
44 2 REQ'D
40 2 REQ'D

Ⓕ THIS SHEET ADDED

NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ ± ___ ± ___
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Janowiak DATE 24 MAR 65
CHECKED Ed Foster 4 JUN 65
APPROVAL
APPROVAL M Watson 10-4-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CONTROL, GIMBAL POSITION
ASSEMBLY

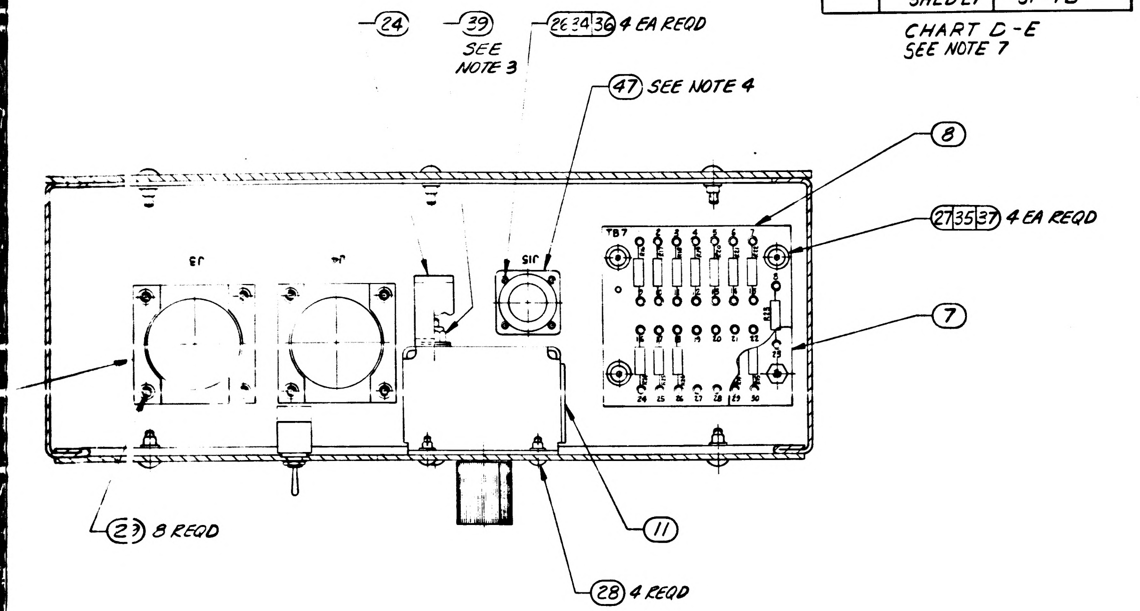
CODE IDENT NO. 99974
SIZE E
2900036
SCALE FULL
SHEET 2 OF 2

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
G		REPLACES REV (F) WITH CHANGE PER MXC 203275 WAS "D" SIZE		30 JUL 65	BP
H		REVISED PER MXC 204276		3 SEP 65	PHG
J		REVISED PER MXC 204738		13 SEP 65	
K		REVISED PER MXC 205616		[illegible] 65	
L		INITIAL RELEASE CLASS A PER DRR 23421		8 OCT	

REVISIONS

ITEM NO.	CONDUCTOR	TERMINATION POINT
46	D1 SHLD D1	P1-34 P1-33
47	E1 SHLD E1	S1-7A S1-7B

CHART D-E
SEE NOTE 7


24
39 SEE NOTE 3
26 34 36 4 EA REQD
47 SEE NOTE 4
8
27 35 37 4 EA REQD
7
TB7
J5
J15
11
27 8 REQD
28 4 REQD

SECTION A-A

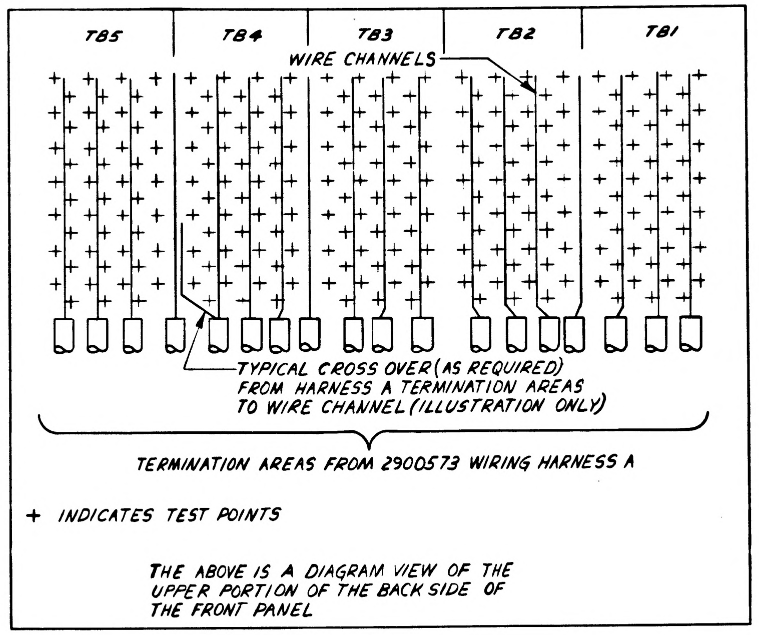
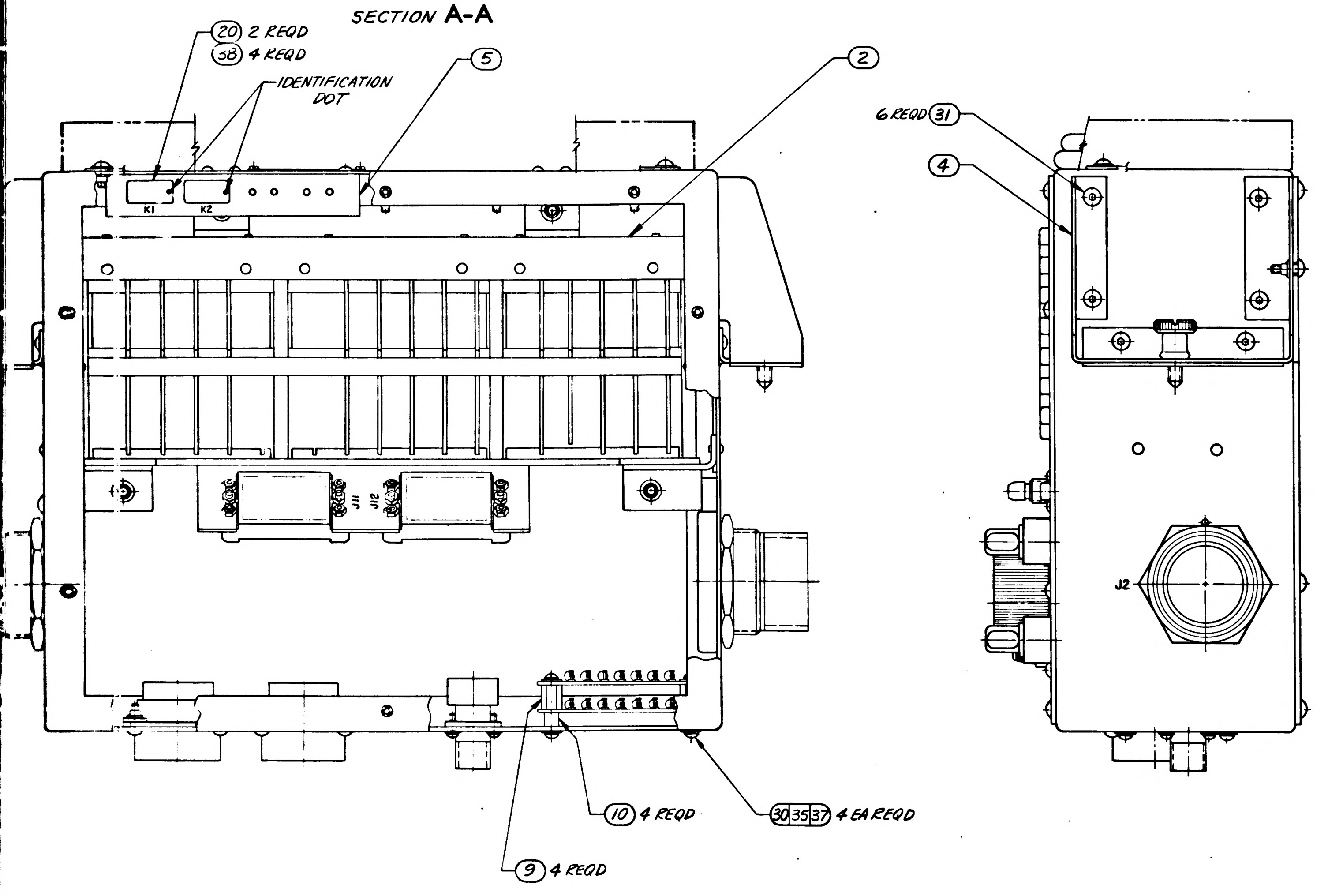

TB5
TB4
TB3
TB2
TB1
WIRE CHANNELS
TYPICAL CROSS OVER (AS REQUIRED) FROM HARNESS A TERMINATION AREAS TO WIRE CHANNEL (ILLUSTRATION ONLY)
TERMINATION AREAS FROM 2900573 WIRING HARNESS A
+ INDICATES TEST POINTS
THE ABOVE IS A DIAGRAM VIEW OF THE UPPER PORTION OF THE BACK SIDE OF THE FRONT PANEL

CHART A
SEE NOTES 6 & 7


20 2 REQD
38 4 REQD
IDENTIFICATION DOT
5
2
K1
K2
J11
J12
10 4 REQD
9 4 REQD
30 35 37 4 EA REQD
6 REQD 31
4
J2

FRONT VIEW - COVER REMOVED

				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				1		51	1016265-106	SWITCH, TOGGLE, MINIATURE
				X		50	PS 2900037	PROCUREMENT SPECIFICATION
				AR		49	MIL-T-713	LACING TAPE, TYPE P, CLASS 2, BLACK WAXED (ES2732, NO. 18)
				AR		48	MIL-S-22473 GRADE C	SEALING COMPOUND (ES2544-3)
SEE NOTE 7				1		47	2900419	CABLE ASSEMBLY - E
SEE NOTE 7				1		46	2900574	CABLE ASSEMBLY - D
SEE NOTE 7				1		45	2900573	WIRING HARNESS "A"
				X		44	2900572	SCHEMATIC DIAGRAM, ELECTRICAL
				1		43	2900571	LEAD SET, TEST - C
				1		42	2900570	LEAD SET, TEST - B
				1		41	2900569	LEAD SET, TEST - A
				1		40	1004260-114	NAMEPLATE
SEE NOTE 2				3		39	1016151-008	NUT - SELF LOCKING
SEE NOTE 2				8		38	1016151-004	NUT - SELF LOCKING
				3		37	MS35338-79	WASHER, LOCK, SPLIT
				4		36	MS35338-78	WASHER, LOCK, SPLIT
				10		35	AN960C6	WASHER, FLAT
				4		34	AN960C4	WASHER, FLAT
SEE NOTE 2				2		33	1010630-24	SCREW, FLAT HD
				22		32	1006783-27	SCREW, BUTTON HD, HEX SOC
				12		31	-26	
				4		30	-24	
				8		29	-23	
				8		28	-22	
				4		27	-21	
SEE NOTE 2				8		26	1006783-19	SCREW, BUTTON HD, HEX SOC
				4		25	MS35233-2	SCREW, PAN HD
				1		24	MS21919G16	CLAMP, CUSHIONED, SUPPORT
						23		
				2		22	MS21919G4	CLAMP, CUSHIONED, SUPPORT
SEE NOTE 2				2		21	1016105-003	STAP ASSEMBLY - HARNESS
SEE NOTE 2				2		20	1015802-004	RELAY - ARMATURE
				5		19	MS90078-7-1	FUSE, STYLE F02
				1		18	MS26572-1	FUSEHOLDER - CARTRIDGE
SEE NOTE 2				4		17	1015873-008	FUSEHOLDER
				1		16	MS91528-2K25	(1897080-023) KNOB, CONTROL
SEE NOTE 2				1		15	1015825-15	SWITCH, ROTARY
SEE NOTE 2				4		14	1016265-104	SWITCH, TOGGLE, MINIATURE
				1		13	2900568	PANEL, FRONT (INSEP ASSY)
				1		12	2900567	COVER, REAR
				1		11	2900566	COVER, PROT, SW (INSEP ASSY)
SEE NOTE 2				4		10	1015860-001	SPACER (FIBRE, CYLINDRICAL)
				4		9	2900565	NUT, PLAIN, HEXAGON
				1		8	2900563	RESISTOR ASSEMBLY
				1		7	2900561	RESISTOR ASSEMBLY
				4		6	2900560	PLATE, RETAINING (INSEP ASSY)
				1		5	2900559	BRACKET, RELAY (INSEP ASSY)
				1		4	2900558	BRACKET, MTG, R (INSEP ASSY)
				1		3	2900557	BRACKET, MTG, L (INSEP ASSY)
				1		2	2900551	HOLDER ASSY, COMPONENT CARD
				1		1	2900550	CHASSIS (INSEP ASSY)

QUANTITY REQUIRED
LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900037-011	2900022-051	-011
	-041	-011
	-031	-011
	-021	-011
2900037-011	2900022-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN McKeel DATE 24 MAR 65
CHECKED C. Pioda 20 JUL 65
APPROVAL 20 JUL 65
APPROVAL Bedman
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

P.S.A TEST POINT ADAPTER

CODE IDENT NO. 99974
SIZE J2
2900037
SCALE 1:1
SHEET 1 OF 1

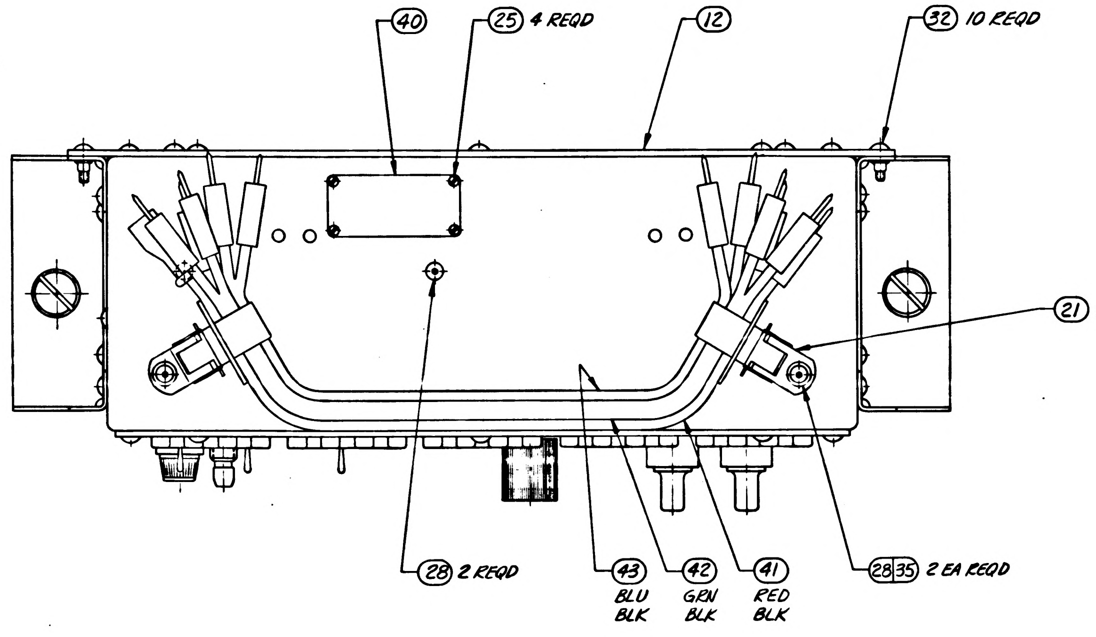
2900037 L

2900037 L SH 1

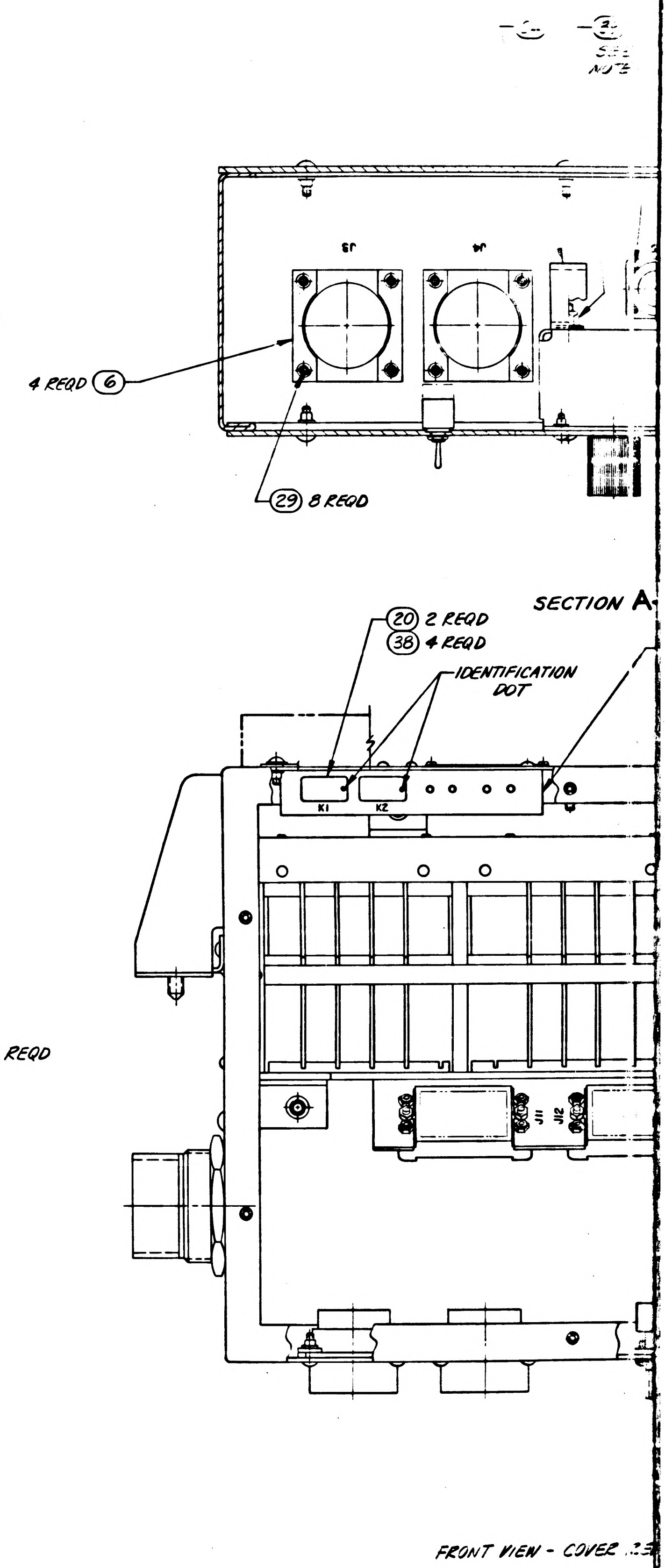
2/2900037

NOTES:

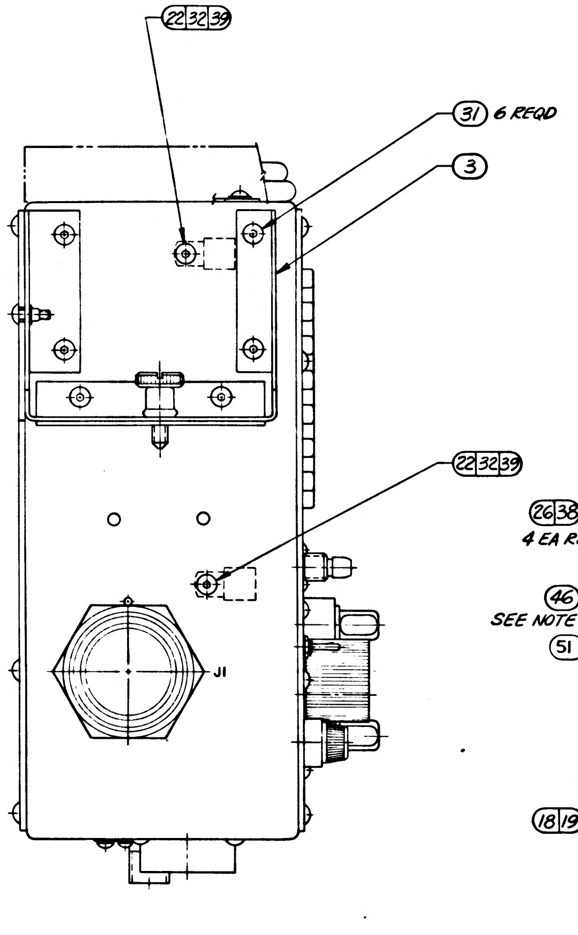
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.
3. TORQUE NOT TO EXCEED 18 INCH POUNDS.
4. SPOT TIE TERMINATING END AS REQUIRED USING ITEM (43).
5. DRAWINGS FOR REFERENCE:
   A. SCHEMATIC DIAGRAM ITEM (44)
6. UNPREPARED WIRES TERMINATING AT TB1 THRU TB7 SHALL BE CUT TO LENGTH AS REQUIRED, STRIPPED .25, AND TINNED AT THIS ASSEMBLY.
7. CABLE ASSEMBLIES "D" AND "E" ARE TO BE TERMINATED AND ROUTED AS INDICATED ON CHART D-E. WIRING HARNESS "A" IS TO BE TERMINATED, IN THE TEST POINT AREA, AS INDICATED BY CHART A AND HARNESS DRAWING 2900573.



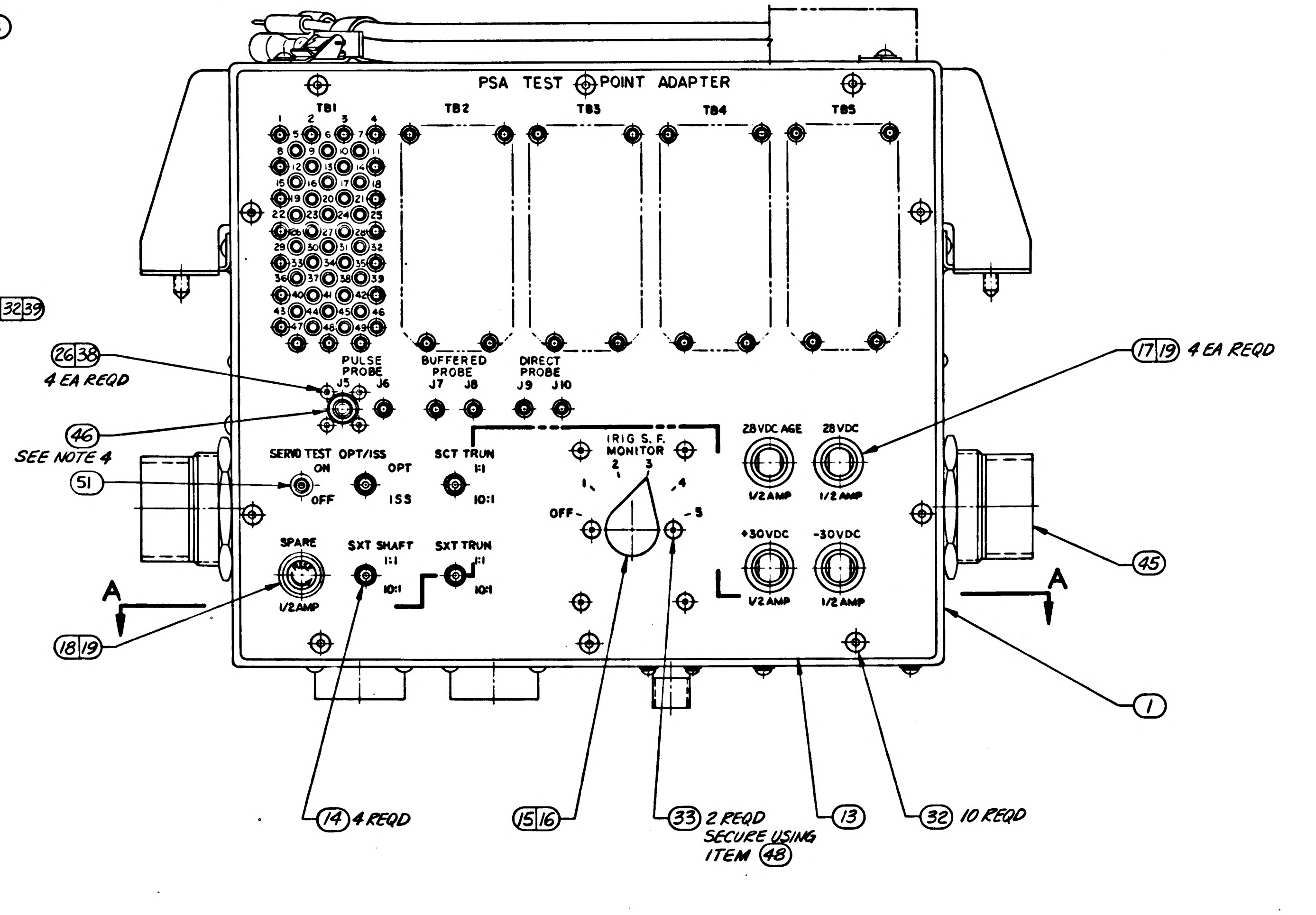
(40)
(25) 4 REQD
(12)
(32) 10 REQD
(21) 2 REQD
(28) 2 REQD
(43) BLU BLK
(42) GRN BLK
(41) RED BLK
(28)(35) 2 EA REQD



4 REQD (6)
(29) 8 REQD
J5
J4
SECTION A
(20) 2 REQD
(38) 4 REQD
IDENTIFICATION DOT
K1
K2
J11
J12
FRONT VIEW - COVER



(22)(32)(39)
(31) 6 REQD
(3)
(22)(32)(39)
J1



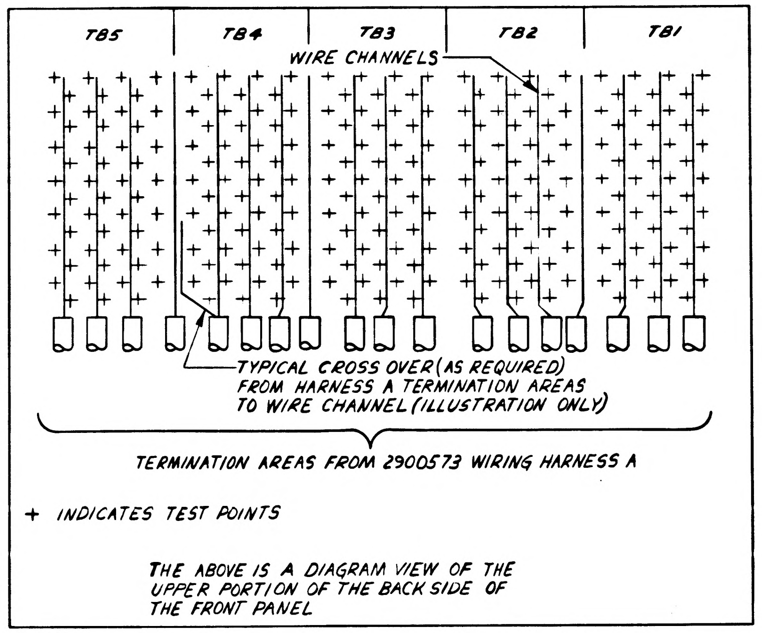
PSA TEST POINT ADAPTER
TB1
TB2
TB3
TB4
TB5
PULSE PROBE
J5
J6
BUFFERED PROBE
J7
J8
DIRECT PROBE
J9
J10
SERVO TEST
ON
OFF
OPT/ISS
OPT
ISS
SCT TRUN
1:1
10:1
IRIG S. F. MONITOR
1
2
3
4
5
OFF
28VDC AGE
28VDC
1/2 AMP
+30VDC
-30VDC
1/2 AMP
SPARE
1/2 AMP
SXT SHAFT
1:1
10:1
SXT TRUN
1:1
10:1
(26)(38) 4 EA REQD
(46) SEE NOTE 4
(51)
(18)(19)
A
A
(17)(19) 4 EA REQD
(45)
(1)
(14) 4 REQD
(15)(16)
(33) 2 REQD SECURE USING ITEM (48)
(13)
(32) 10 REQD

2900037 REV L SH 1

1729000037

ITEM NO.	CONDUCTOR	TERMINATION POINT
46	DI SHLD DI	PI-34 PI-33
47	EI SHLD EI	SI-7A SI-7B

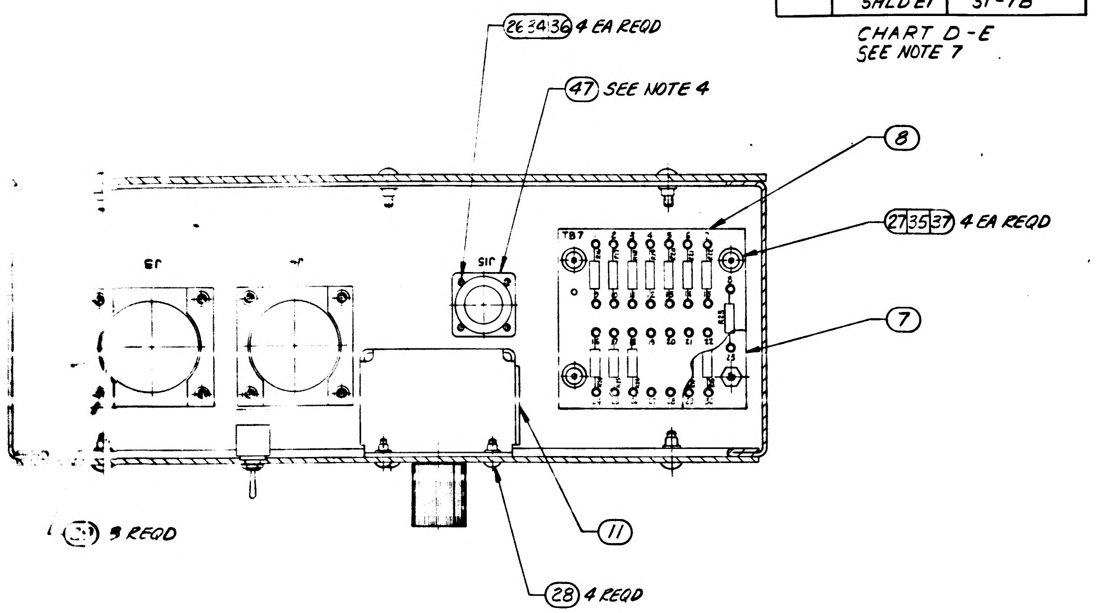
CHART D-E
SEE NOTE 7


TB5
TB4
TB3
TB2
TB1
WIRE CHANNELS
TYPICAL CROSS OVER (AS REQUIRED) FROM HARNESS A TERMINATION AREAS TO WIRE CHANNEL (ILLUSTRATION ONLY)
TERMINATION AREAS FROM 2900573 WIRING HARNESS A

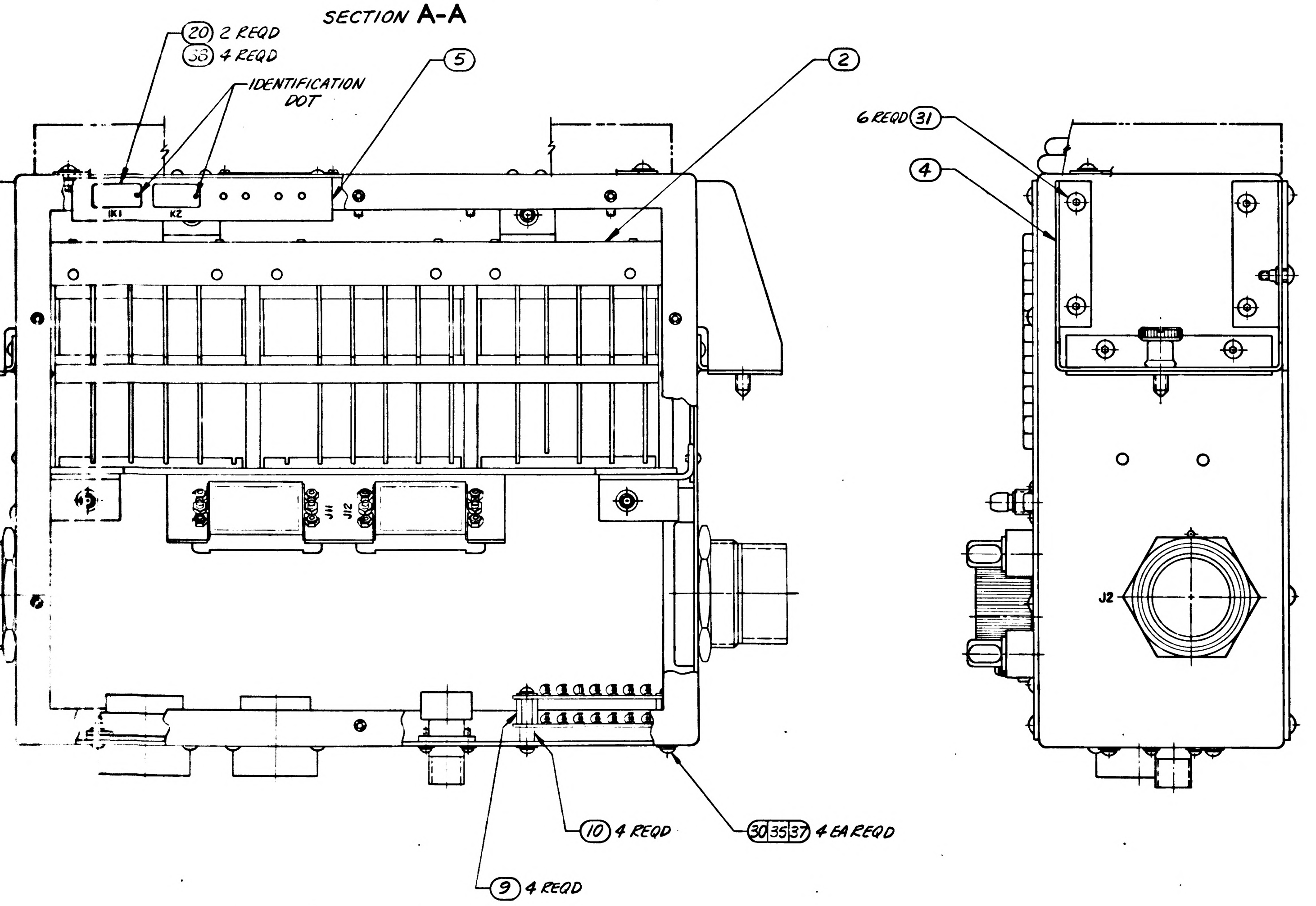
+ INDICATES TEST POINTS

THE ABOVE IS A DIAGRAM VIEW OF THE UPPER PORTION OF THE BACK SIDE OF THE FRONT PANEL

CHART A
SEE NOTES 6 & 7


26 34 36 4 EA REQD
47 SEE NOTE 4
8
27 35 37 4 EA REQD
7
11
28 4 REQD
9 REQD
J13
J15
TB7

SECTION A-A


20 2 REQD
38 4 REQD
IDENTIFICATION DOT
5
2
K1
K2
J11
J12
10 4 REQD
9 4 REQD
30 35 37 4 EA REQD
6 REQD 31
4
J2

FRONT VIEW - COVER REMOVED

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
G		REPLACES REV (F) WITH CHANGE PER MXC 203275 WAS "D" SIZE		30 JUL 65	
H		REVISED PER MXC 204276		3 SEP 65	PHG
J		REVISED PER MXC 204738		13 SEP 65	
K		REVISED PER MXC 205616		[illegible] 65	
L		INITIAL RELEASE CLASS A PER DRR 23421		8 OCT	
M		REVISED PER TCRR 23727		NOV 65	

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1		51	1016265-106	SWITCH, TOGGLE, MINIATURE
	X		50	PS 2900037	PROCUREMENT SPECIFICATION
	AR		49	MIL-T-713	LACING TAPE, TYPE P, CLASS 2, BLACK WAXED (ES2732, NO. 18)
	AR		48	MIL-S-22473 GRADE C	SEALING COMPOUND (ES2544-3)
SEE NOTE 7	1		47	2900419	CABLE ASSEMBLY - E
SEE NOTE 7	1		46	2900574	CABLE ASSEMBLY - D
SEE NOTE 7	1		45	2900573	WIRING HARNESS "A"
	X		44	2900572	SCHEMATIC DIAGRAM, ELECTRICAL
	1		43	2900571	LEAD SET, TEST - C
	1		42	2900570	LEAD SET, TEST - B
	1		41	2900569	LEAD SET, TEST - A
	1		40	1004260-114	NAMEPLATE
SEE NOTE 2	~~3~~		~~39~~	~~1016151-008~~	~~NUT - SELF LOCKING~~
SEE NOTE 2	8		38	1016151-004	NUT - SELF LOCKING
	8		37	MS35338-79	WASHER, LOCK, SPLIT
	4		36	MS35338-78	WASHER, LOCK, SPLIT
	10		35	AN960C6	WASHER, FLAT
	4		34	AN960C4	WASHER, FLAT
SEE NOTE 2	2		33	1010630-24	SCREW, FLAT HD
SEE NOTES 2&3	20		32	1006783-27	SCREW, BUTTON HD, HEX SOC
SEE NOTE 2	12		31	-26	
	4		30	-24	
	8		29	-23	
	8		28	-22	
	4		27	-21	
SEE NOTE 2	8		26	1006783-19	SCREW, BUTTON HD, HEX SOC
	4		25	MS35233-2	SCREW, PAN HD
	~~1~~		~~24~~	~~MS21919G16~~	~~CLAMP, CUSHIONED, SUPPORT~~
			23		
	~~2~~		~~22~~	~~MS21919G4~~	~~CLAMP, CUSHIONED SUPPORT~~
SEE NOTE 2	2		21	1016105-003	STAP ASSEMBLY - HARNESS
SEE NOTE 2	2		20	1015802-004	RELAY - ARMATURE
	5		19	MS90078-7-1	FUSE, STYLE F02
	1		18	MS26572-1	FUSEHOLDER - CARTRIDGE
SEE NOTE 2	4		17	1015873-008	FUSEHOLDER
	1		16	MS91528-2K25	(1897080-023) KNOB, CONTROL
SEE NOTE 2	1		15	1015825-15	SWITCH, ROTARY
SEE NOTE 2	4		14	1016265-104	SWITCH, TOGGLE, MINIATURE
	1		13	2900568	PANEL, FRONT (INSEP ASSY)
	1		12	2900567	COVER, REAR
	1		11	2900566	COVER, PROT, SW (INSEP ASSY)
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	4		9	2900565	NUT, PLAIN, HEXAGON
	1		8	2900563	RESISTOR ASSEMBLY
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	4		6	2900560	PLATE, RETAINING (INSEP ASSY)
	1		5	2900559	BRACKET, RELAY (INSEP ASSY)
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	1		3	2900557	BRACKET, MTG, L (INSEP ASSY)
	1		2	2900551	HOLDER ASSY, COMPONENT CARD
	1		1	2900550	CHASSIS (INSEP ASSY)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900037-011	2900022-051	-011
	-041	-011
	-031	-011
	-021	-011
2900037-011	2900022-011	-011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN McRae DATE 24 MAR 65
CHECKED Piopla 20 Jul 65
APPROVAL 20 Jul 65
APPROVAL Fedman
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

P.S.A TEST POINT ADAPTER

CODE IDENT NO. 99974
SIZE J2
2900037
SCALE 1:1
SHEET 1 OF 1

2900037 REV M SH 1

27 2900037

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.
3. TORQUE NOT TO EXCEED 18 INCH POUNDS.
4. SPOT TIE TERMINATING END AS REQUIRED USING ITEM (49).
5. DRAWINGS FOR REFERENCE:
   A. SCHEMATIC DIAGRAM ITEM (44)
6. UNPREPARED WIRES TERMINATING AT TB1 THRU TB7 SHALL BE CUT TO LENGTH AS REQUIRED, STRIPPED .25, AND TINNED AT THIS ASSEMBLY.
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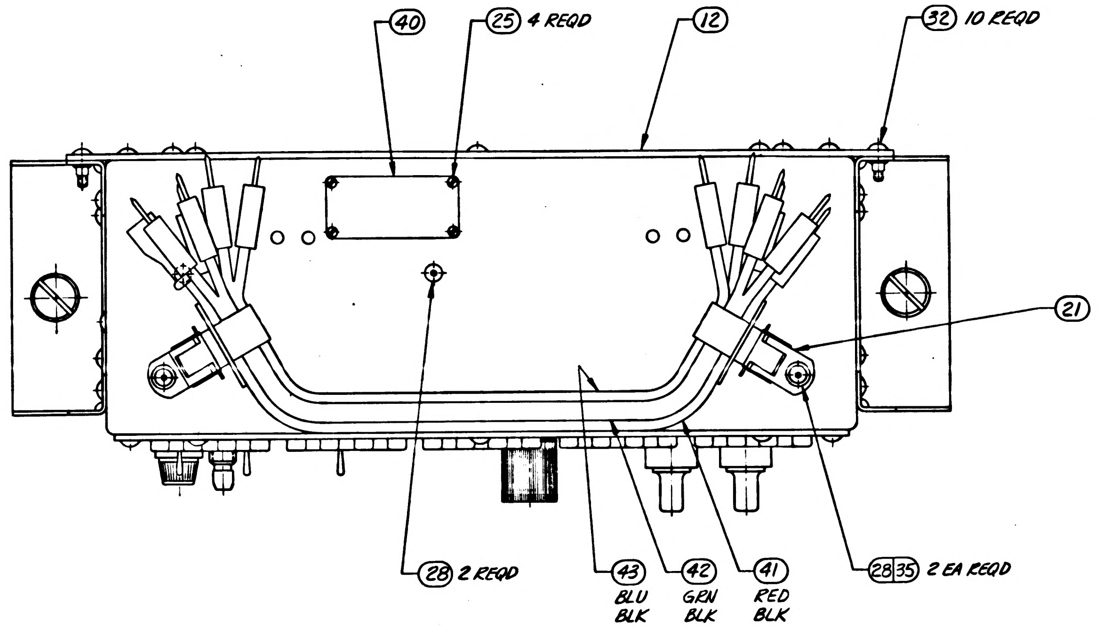
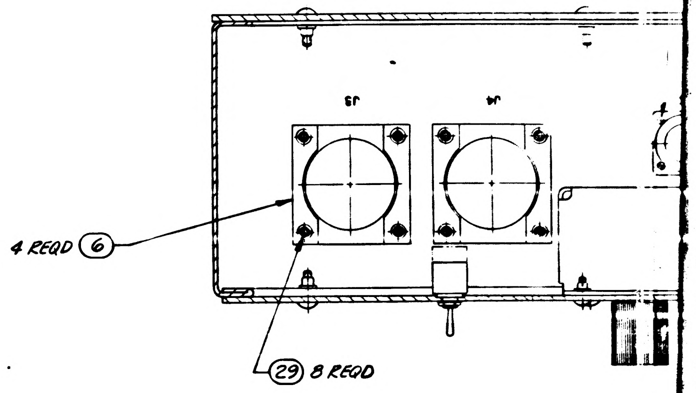
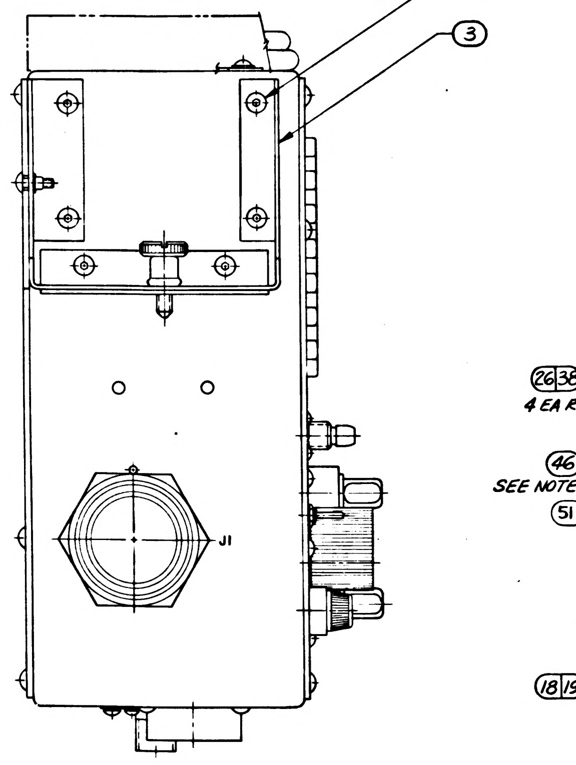
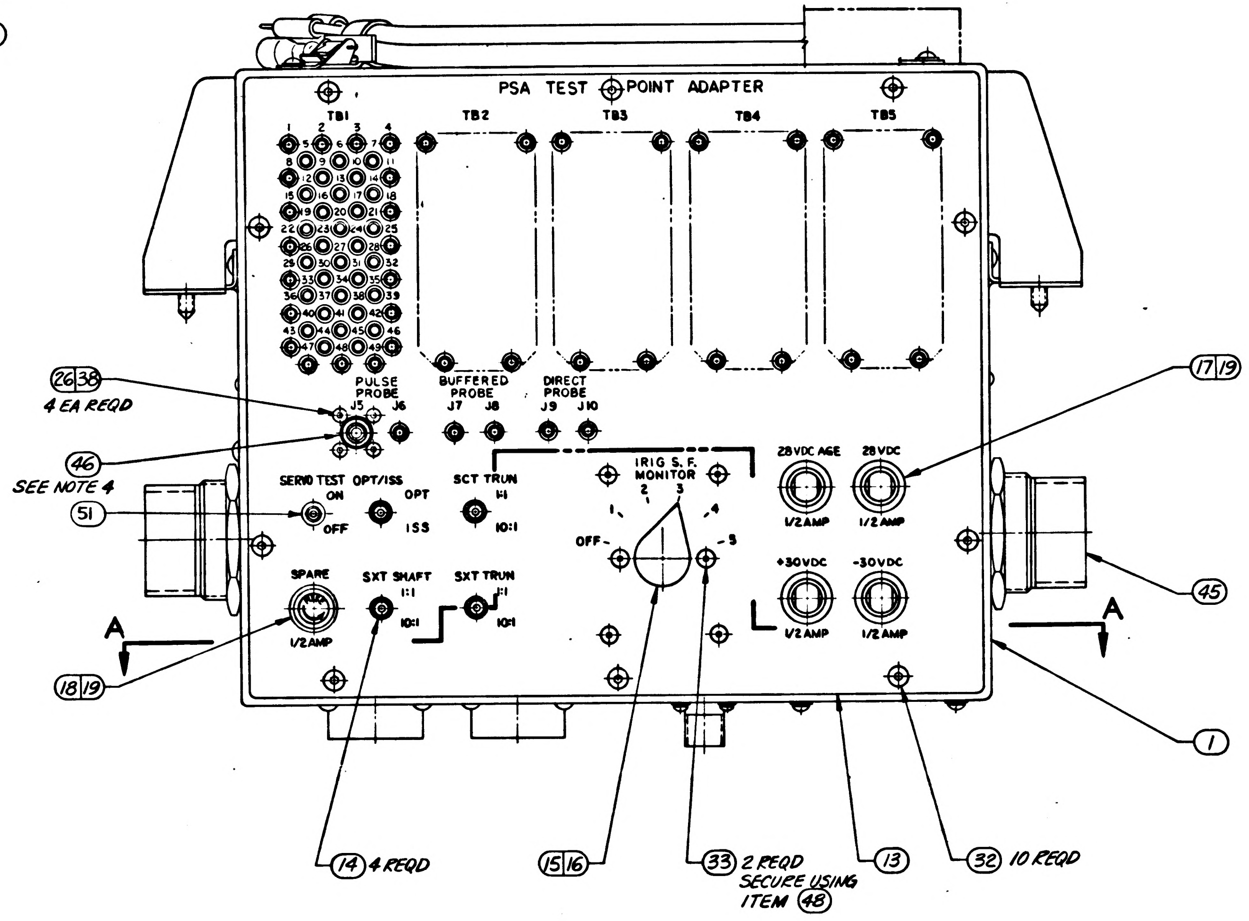
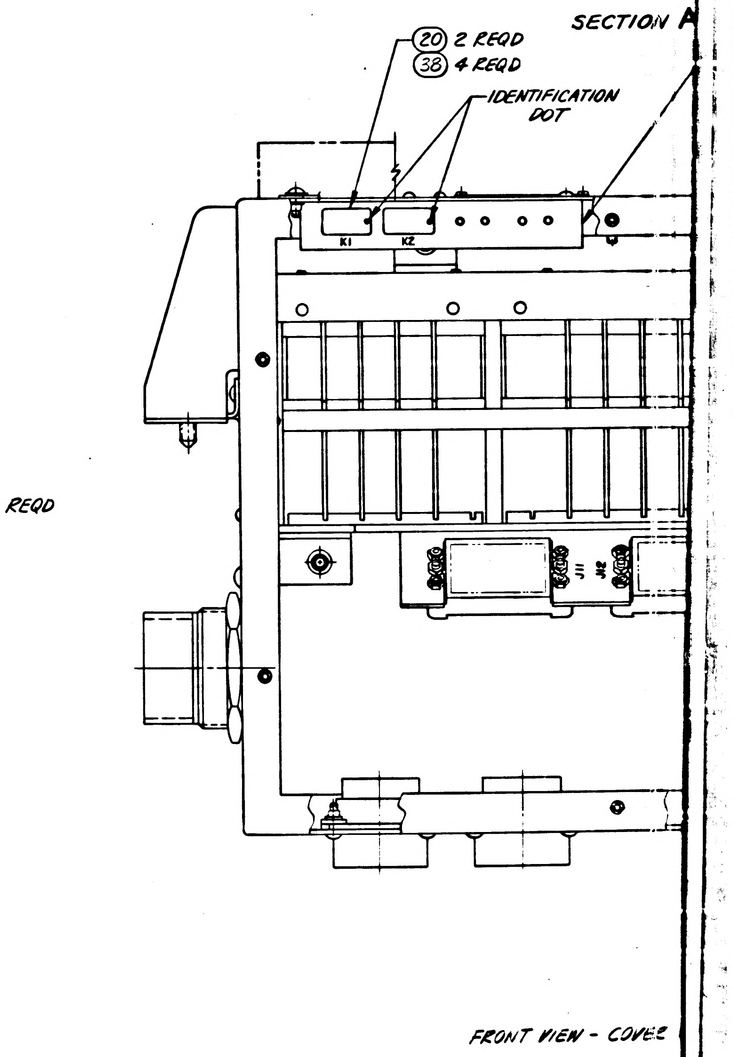

(40)
(25) 4 REQD
(12)
(32) 10 REQD
(21) 2 REQD
(28) 2 REQD
(43) BLU BLK
(42) GRN BLK
(41) RED BLK
(28)(35) 2 EA REQD


J5
J6
4 REQD (6)
(29) 8 REQD


(31) 6 REQD
(3)
J1


PSA TEST POINT ADAPTER
TB1
TB2
TB3
TB4
TB5
PULSE PROBE
J5
J6
BUFFERED PROBE
J7
J8
DIRECT PROBE
J9
J10
SERVO TEST
ON
OFF
OPT/ISS
OPT
ISS
SCT TRUN
1:1
10:1
IRIG S.F. MONITOR
OFF
1
2
3
4
5
28VDC AGE
28VDC
1/2 AMP
+30VDC
-30VDC
SPARE
SXT SHAFT
SXT TRUN
(26)(38) 4 EA REQD
(46) SEE NOTE 4
(51)
(17)(19) 4 EA REQD
(45)
A
A
(18)(19)
(1)
(14) 4 REQD
(15)(16)
(33) 2 REQD SECURE USING ITEM (48)
(13)
(32) 10 REQD


SECTION A
(20) 2 REQD
(38) 4 REQD
IDENTIFICATION DOT
K1
K2
J11
J12

FRONT VIEW - COVE

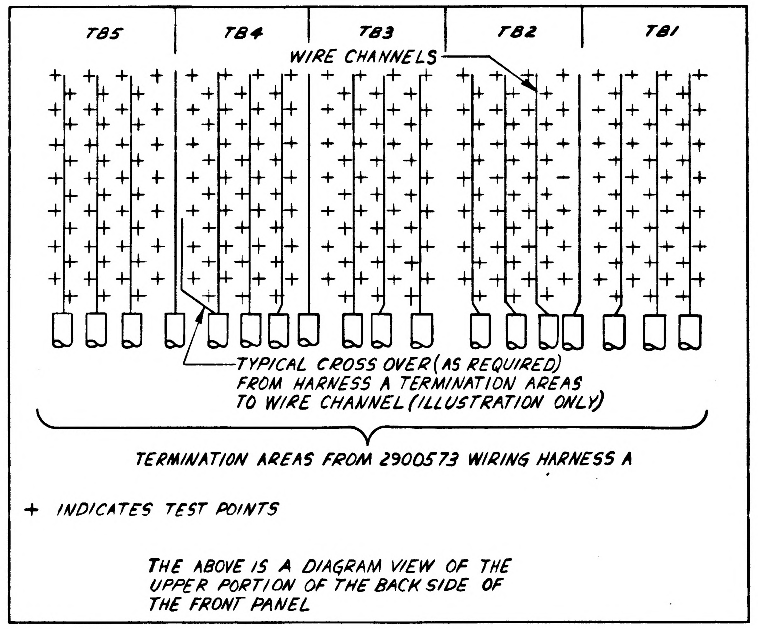
2900037 REV 1A SH 1

1/2900037

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
		REVISIONS 2-421			
G		REPLACES REV(F) WITH CHANGE PER MXC 203275 WAS "D" SIZE		30 JUL 65	RP / PJ
H		REVISED PER MXC 204276		3 SEP 65	PHG
J		REVISED PER MXC 204738		13 SEP 65	RP
K		REVISED PER MXC 205616		6 OCT 65	
L		INITIAL RELEASE CLASS A PER TDRR 23421		18 OCT 65	
M		REVISED PER TDRR 23727		10 NOV 65	
N		REVISED PER TDRR 27574		5 APR 66	JH

ITEM NO.	CONDUCTOR	TERMINATION POINT
46	D1 SHLD D1	P1-34 P1-33
47	E1 SHLD E1	S1-7A S1-7B

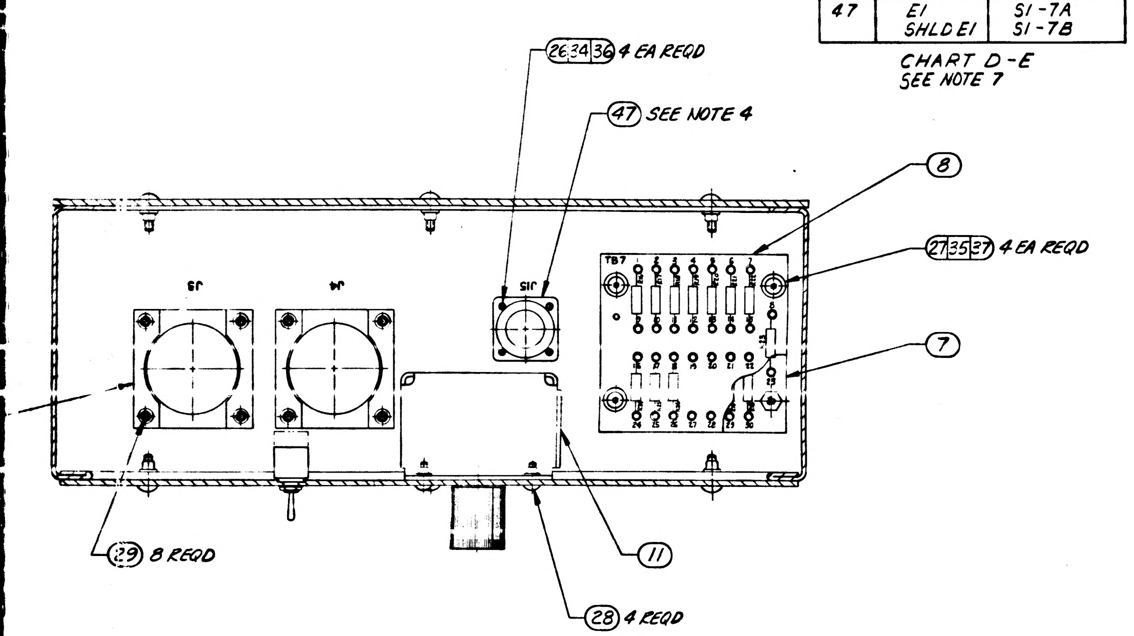
CHART D-E
SEE NOTE 7



TB5
TB4
TB3
TB2
TB1
WIRE CHANNELS
TYPICAL CROSS OVER (AS REQUIRED) FROM HARNESS A TERMINATION AREAS TO WIRE CHANNEL (ILLUSTRATION ONLY)
TERMINATION AREAS FROM 2900573 WIRING HARNESS A
+ INDICATES TEST POINTS

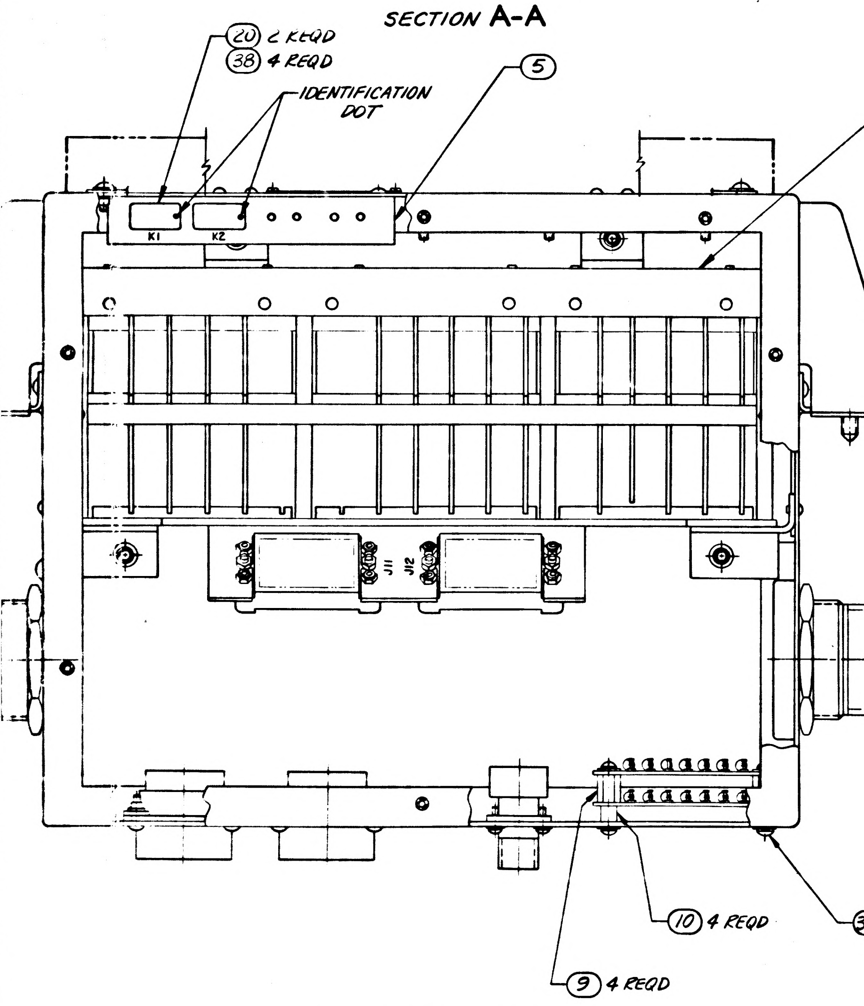
THE ABOVE IS A DIAGRAM VIEW OF THE UPPER PORTION OF THE BACK SIDE OF THE FRONT PANEL

CHART A
SEE NOTES 6 & 7



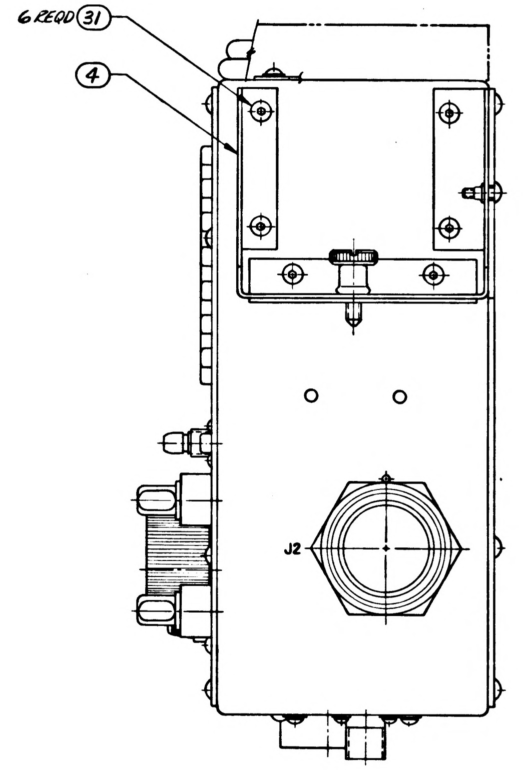
26 34 36 4 EA REQD
47 SEE NOTE 4
8
27 35 37 4 EA REQD
7
J3
J4
J15
TB7
11
28 4 REQD
29 8 REQD

SECTION A-A



20 2 REQD
38 4 REQD
IDENTIFICATION DOT
5
2
K1
K2
J11
J12
10 4 REQD
30 35 37 4 EA REQD
9 4 REQD

FRONT VIEW - COVER REMOVED



6 REQD 31
4
J2

				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			1			56	1004260-169	NAMEPLATE
			X			55	PS2016106	PROCUREMENT SPECIFICATION
			X			54	2901055	SCHEMATIC DIAGRAM, ELEC
			1			53	2901054	PANEL, FRONT (INSEP ASSY)
SEE NOTE 7			1			52	2901053	WIRING HARNESS "A"
			1	1		51	1016265-106	SWITCH, TOGGLE, MINIATURE
				X		50	PS 2900037	PROCUREMENT SPECIFICATION
			AR	AR		49	MIL-T-713	LACING TAPE, TYPE P, CLASS 2, BLACK WAXED (ES2732, NO. 18)
			AR	AR		48	MIL-S-22473 GRADE C	SEALING COMPOUND (ES2544-3)
SEE NOTE 7			1	1		47	2900419	CABLE ASSEMBLY - E
SEE NOTE 7			1	1		46	2900574	CABLE ASSEMBLY - D
SEE NOTE 7				1		45	2900573	WIRING HARNESS "A"
				X		44	2900572	SCHEMATIC DIAGRAM, ELECTRICAL
			1	1		43	2900571	LEAD SET, TEST - C
			1	1		42	2900570	LEAD SET, TEST - B
			1	1		41	2900569	LEAD SET, TEST - A
				1		40	1004260-114	NAMEPLATE
SEE NOTE 2				~~3~~		~~39~~	~~1016151-008~~	~~NUT - SELF LOCKING~~
SEE NOTE 2			8	8		38	1016151-004	NUT - SELF LOCKING
			8	8		37	MS35338-79	WASHER, LOCK, SPLIT
			4	4		36	MS35338-78	WASHER, LOCK, SPLIT
			10	10		35	AN960C6	WASHER, FLAT
			4	4		34	AN960C4	WASHER, FLAT
SEE NOTE 2			2	2		33	1010630-24	SCREW, FLAT HD
SEE NOTES 2&3			20	20		32	1006783-27	SCREW, BUTTON HD, HEX SOC
SEE NOTE 2			12	12		31	-26	
			4	4		30	-24	
			8	8		29	-23	
			8	8		28	-22	
			4	4		27	-21	
SEE NOTE 2			8	8		26	1006783-19	SCREW, BUTTON HD, HEX SOC
			4	4		25	MS35233-2	SCREW, PAN HD
				~~1~~		~~24~~	~~MS21919G16~~	~~CLAMP, CUSHIONED, SUPPORT~~
						23		
				~~2~~		~~22~~	~~MS21919G4~~	~~CLAMP, CUSHIONED, SUPPORT~~
SEE NOTE 2			2	2		21	1016105-003	STAP ASSEMBLY - HARNESS
SEE NOTE 2			2	2		20	1015802-004	RELAY - ARMATURE
			5	5		19	MS90078-7-1	FUSE, STYLE F02
			1	1		18	MS26572-1	FUSEHOLDER - CARTRIDGE
SEE NOTE 2			4	4		17	1015873-008	FUSEHOLDER
			1	1		16	MS91528-2K25	(1897080-023) KNOB, CONTROL
SEE NOTE 2			1	1		15	1015825-15	SWITCH, ROTARY
SEE NOTE 2			4	4		14	1016265-104	SWITCH, TOGGLE, MINIATURE
				1		13	2900568	PANEL, FRONT (INSEP ASSY)
			1	1		12	2900567	COVER, REAR
			1	1		11	2900566	COVER, PROT, SW (INSEP ASSY)
SEE NOTE 2			4	4		10	1015860-001	SPACER (FIBRE, CYLIDRICAL)
			4	4		9	2900565	NUT, PLAIN, HEXAGON
			1	1		8	2900563	RESISTOR ASSEMBLY
			1	1		7	2900561	RESISTOR ASSEMBLY
			4	4		6	2900560	PLATE, RETAINING (INSEP ASSY)
			1	1		5	2900559	BRACKET, RELAY (INSEP ASSY)
			1	1		4	2900558	BRACKET, MTG, R (INSEP ASSY)
			1	1		3	2900557	BRACKET, MTG, L (INSEP ASSY)
			1	1		2	2900551	HOLDER ASSY, COMPONENT CARD
			1	1		1	2900550	CHASSIS (INSEP ASSY)
	QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900037-021	1900030	
2900037-011	1900030	

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN McRiehl DATE 24 MAR 65
CHECKED Pioyda 20 JUL 65
APPROVAL 20 JUL 65
APPROVAL Lederman
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

P.S.A TEST POINT ADAPTER

CODE IDENT NO. 99974
SIZE J_2
2900037
SCALE 1:1
SHEET 1 OF 1

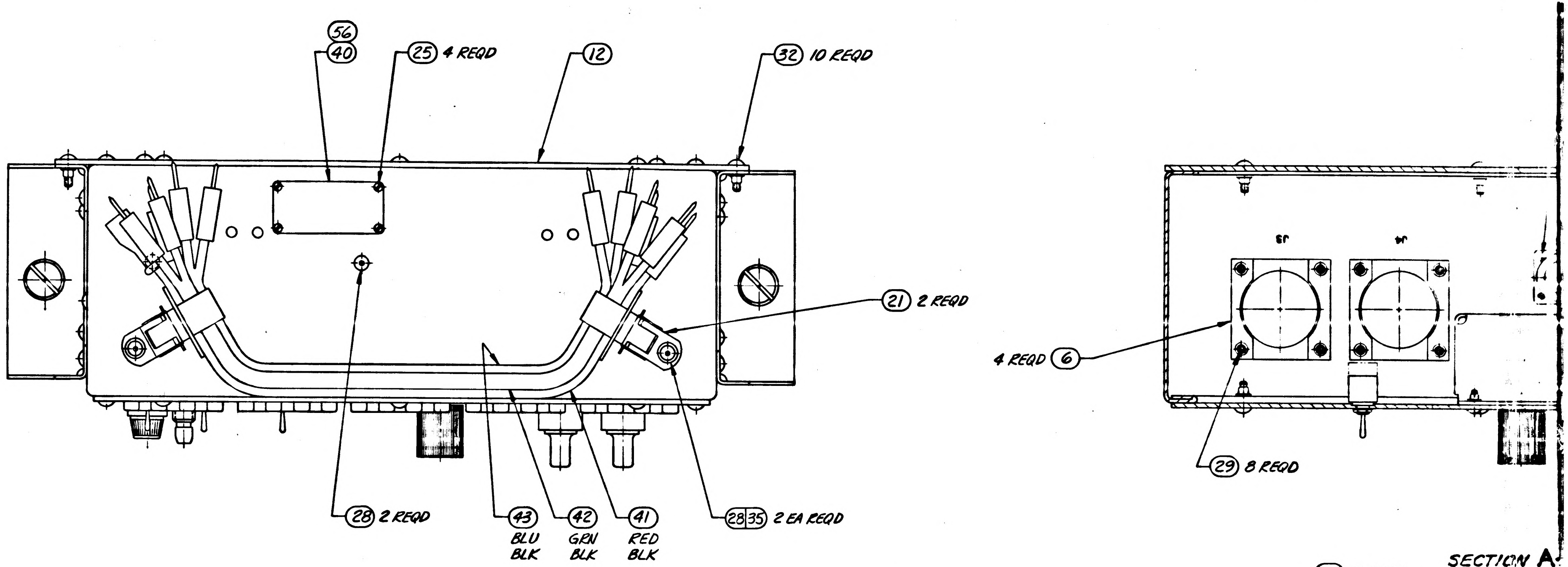
2900037 N

2900037 RE N SH 1

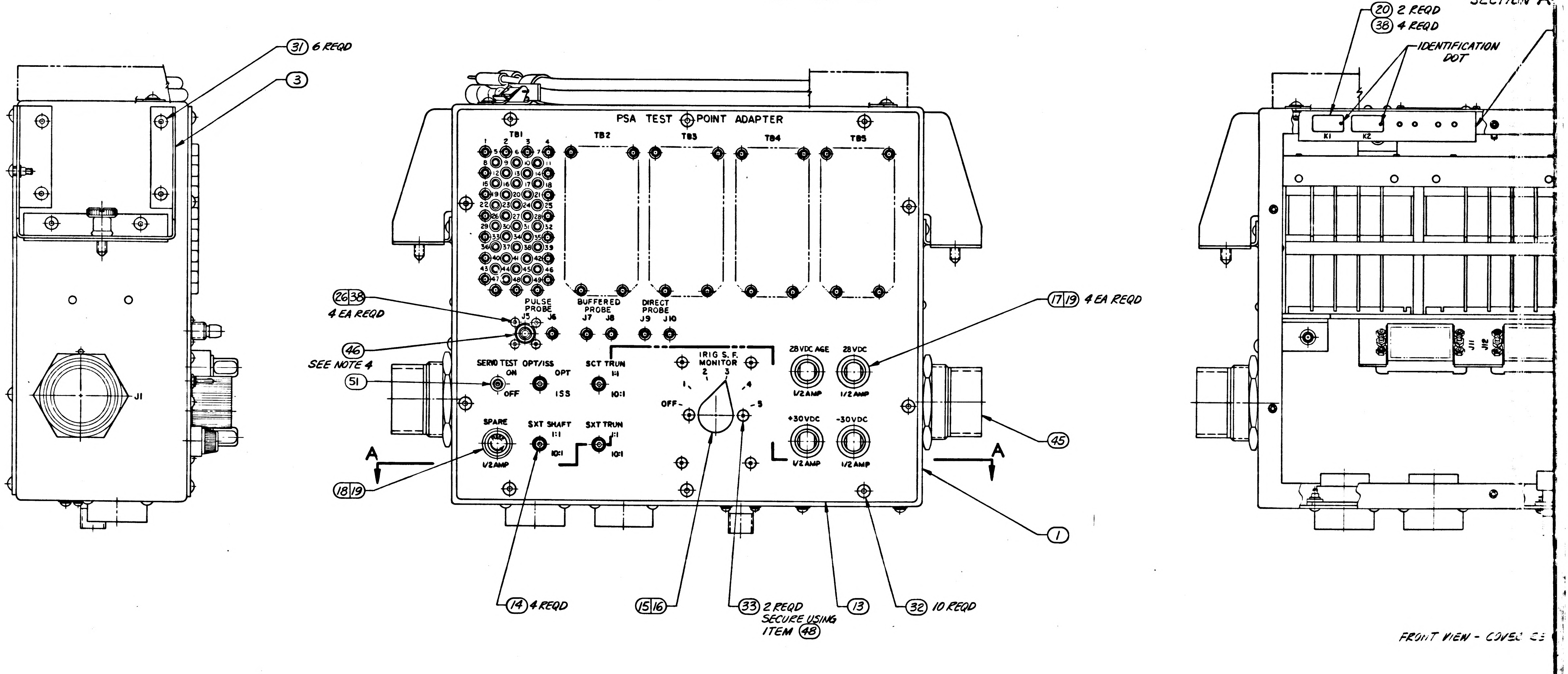
21/2900037

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.
3. TORQUE NOT TO EXCEED 18 INCH POUNDS.
4. SPOT TIE TERMINATING END AS REQUIRED USING ITEM (49).
5. DRAWINGS FOR REFERENCE:
   A. SCHEMATIC DIAGRAM ITEMS (44) AND (54)
6. UNPREPARED WIRES TERMINATING AT TB1 THRU TB7 SHALL BE CUT TO LENGTH AS REQUIRED, STRIPPED .25, AND TINNED AT THIS ASSEMBLY.
7. CABLE ASSEMBLIES "D" AND "E" ARE TO BE TERMINATED AND ROUTED AS INDICATED ON CHART D-E. WIRING HARNESS "A" IS TO BE TERMINATED, IN THE TEST POINT AREA, AS INDICATED BY CHART A AND HARNESS DRAWING 2900573 FOR THE -011 CONFIGURATION AND 2901053 FOR THE -021 CONFIGURATION.



(56)
(40)
(25) 4 REQD
(12)
(32) 10 REQD
(21) 2 REQD
(28) 2 REQD
(43) BLU BLK
(42) GRN BLK
(41) RED BLK
(28)(35) 2 EA REQD
J5
J6
4 REQD (6)
(29) 8 REQD



SECTION A
(31) 6 REQD
(3)
J1
(20) 2 REQD
(38) 4 REQD
IDENTIFICATION DOT
K1
K2
J11
J12
PSA TEST POINT ADAPTER
TB1
TB2
TB3
TB4
TB5
1
2
3
4
5
6
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16
17
18
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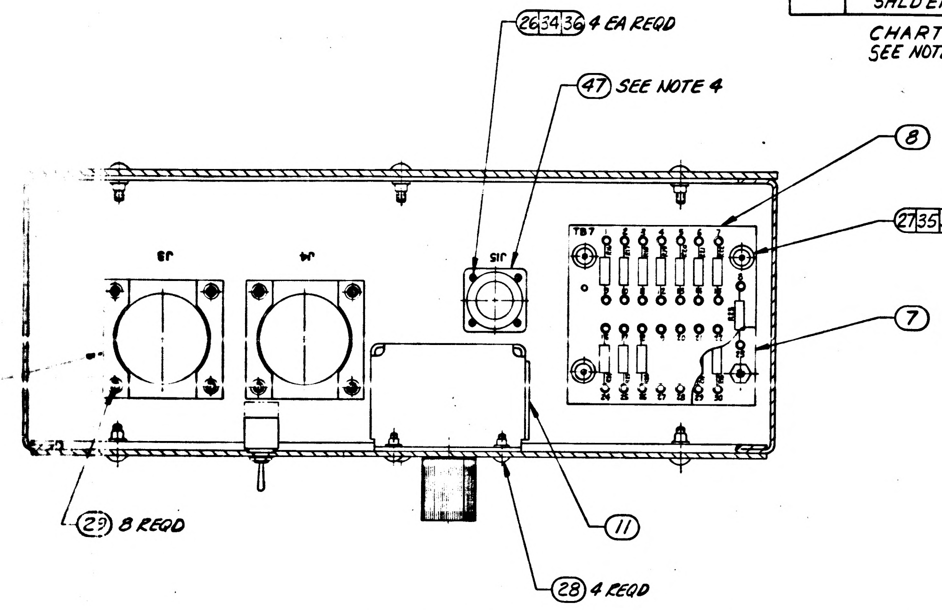
41
42
43
44
45
46
47
48
49
PULSE PROBE
J5
J6
BUFFERED PROBE
J7
J8
DIRECT PROBE
J9
J10
SERVO TEST
ON
OFF
OPT/ISS
OPT
ISS
SCT TRUN
1:1
10:1
IRIG S. F. MONITOR
OFF
1
2
3
4
5
28 VDC AGE
1/2 AMP
28 VDC
1/2 AMP
+30 VDC
1/2 AMP
-30 VDC
1/2 AMP
SPARE
1/2 AMP
SXT SHAFT
1:1
10:1
SXT TRUN
1:1
10:1
(26)(38) 4 EA REQD
(46) SEE NOTE 4
(51)
(18)(19)
(17)(19) 4 EA REQD
(45)
(1)
A
A
(14) 4 REQD
(15)(16)
(33) 2 REQD SECURE USING ITEM (48)
(13)
(32) 10 REQD
FRONT VIEW - COVE

2900037 REV LTR N SH 1

REVISIONS					2 ? 421
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
G		REPLACES REV(F) WITH CHANGE PER MXC 203275 WAS "D" SIZE		30 JUL 65	RP / PJ
H		REVISED PER MYC 204276		3 SEP 65	PHG
J		REVISED PER MXC 204738		13 SEP 65	RP
K		REVISED PER MXC 205616		8 OCT 65	
L		INITIAL RELEASE CLASS A PER TDRR 23421		18 OCT 65	WRB
M		REVISED PER TDRR 23727		10 NOV 65	
N		REVISED PER TDRR 27574		5 APR 66	
P		REVISED PER TDRR 27867		12 APR 66	

ITEM NO.	CONDUCTOR	TERMINATION POINT
46	D1 SHLD D1	P1-34 P1-33
47	E1 SHLD E1	S1-7A S1-7B

CHART D-E
SEE NOTE 7


26 34 36 4 EA REQD
47 SEE NOTE 4
8
27 35 37 4 EA REQD
7
J3
J4
J15
TB7
29 8 REQD
11
28 4 REQD

SECTION A-A

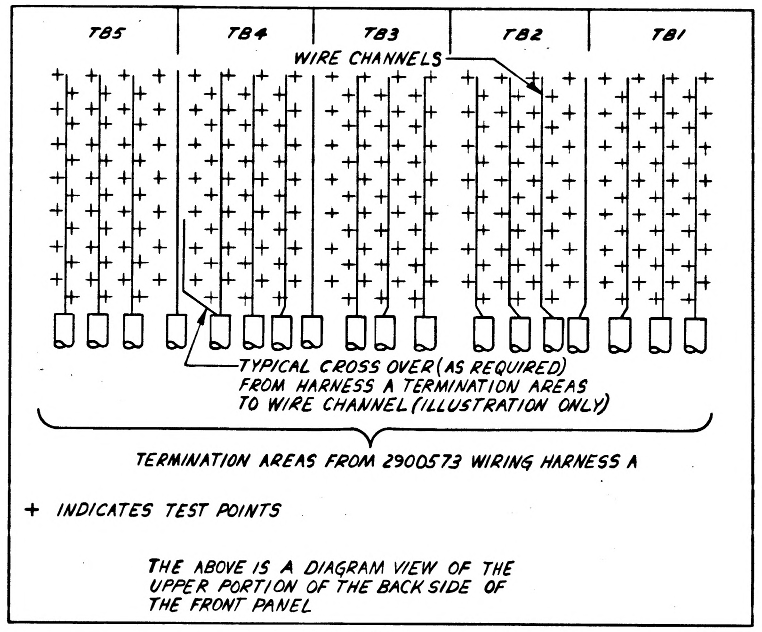
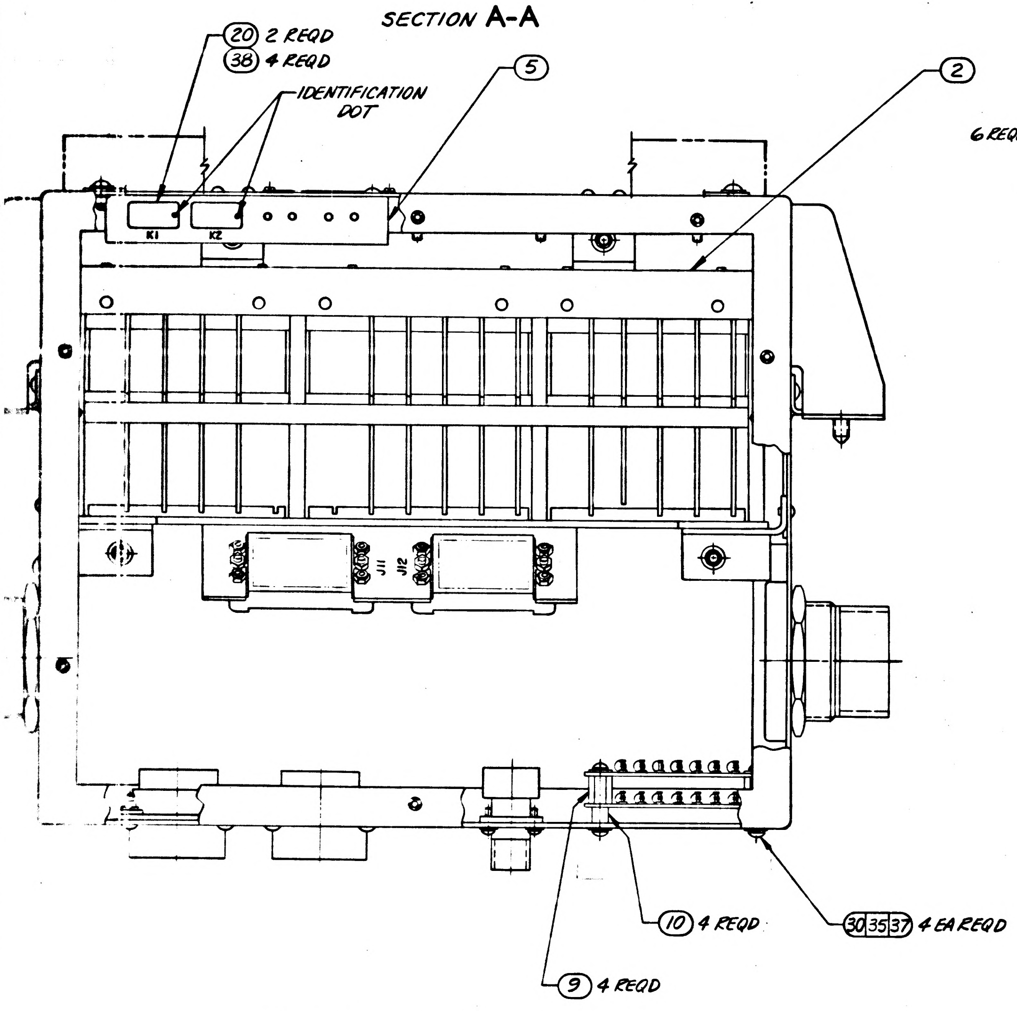
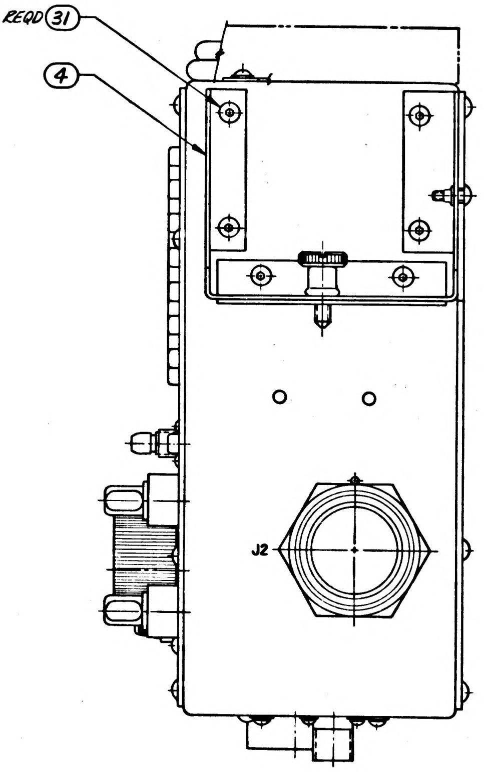

TB5
TB4
TB3
TB2
TB1
WIRE CHANNELS
TYPICAL CROSS OVER (AS REQUIRED) FROM HARNESS A TERMINATION AREAS TO WIRE CHANNEL (ILLUSTRATION ONLY)
TERMINATION AREAS FROM 2900573 WIRING HARNESS A
+ INDICATES TEST POINTS
THE ABOVE IS A DIAGRAM VIEW OF THE UPPER PORTION OF THE BACK SIDE OF THE FRONT PANEL

CHART A
SEE NOTES 6 & 7


20 2 REQD
38 4 REQD
IDENTIFICATION DOT
5
2
K1
K2
J11
J12
10 4 REQD
30 35 37 4 EA REQD
9 4 REQD

FRONT VIEW - COVER REMOVED


6 REQD 31
4
J2

					011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
					2		57	AN960C8	WASHER, FLAT
				1			56	1004260-169	NAMEPLATE
				X			55	PS2016106	PROCUREMENT SPECIFICATION
				X			54	2901055	SCHEMATIC DIAGRAM, ELEC
				1			53	2901054	PANEL, FRONT (INSEP ASSY)
SEE NOTE 7				1			52	2901053	WIRING HARNESS "A"
				1	1		51	1016265-106	SWITCH, TOGGLE, MINIATURE
					X		50	PS 2900037	PROCUREMENT SPECIFICATION
				AR	AR		49	MIL-T-713	LACING TAPE, TYPE P, CLASS 2, BLACK WAXED (ES2732, NO. 18)
				AR	AR		48	MIL-S-22473 GRADE C	SEALING COMPOUND (ES2544-3)
SEE NOTE 7				1	1		47	2900419	CABLE ASSEMBLY - E
SEE NOTE 7				1	1		46	2900574	CABLE ASSEMBLY - D
SEE NOTE 7					1		45	2900573	WIRING HARNESS "A"
					X		44	2900572	SCHEMATIC DIAGRAM, ELECTRICAL
				1	1		43	2900571	LEAD SET, TEST -C
				1	1		42	2900570	LEAD SET, TEST -B
				1	1		41	2900569	LEAD SET, TEST -A
					1		40	1004260-114	NAMEPLATE
SEE NOTE 2					~~3~~		~~39~~	~~1016151-003~~	~~NUT - SELF LOCKING~~
SEE NOTE 2				8	8		38	1016151-004	NUT - SELF LOCKING
				8	8		37	MS35338-79	WASHER, LOCK, SPLIT
				4	4		36	MS35338-78	WASHER, LOCK, SPLIT
				10	10		35	AN960C6	WASHER, FLAT
				4	4		34	AN960C4	WASHER, FLAT
SEE NOTE 2				2	2		33	1010630-24	SCREW, FLAT HD
SEE NOTES 2&3				20	20		32	1006783-27	SCREW, BUTTON HD, HEX SOC
SEE NOTE 2				12	12		31	-26	
				4	4		30	-24	
				8	8		29	-23	
				8	8		28	-22	
				4	4		27	-21	
SEE NOTE 2				8	8		26	1006783-19	SCREW, BUTTON HD, HEX SOC
				4	4		25	MS35233-2	SCREW, PAN HD
					~~1~~		~~24~~	~~MS21919G16~~	~~CLAMP, CUSHIONED, SUPPORT~~
							23		
					~~2~~		~~22~~	~~MS21919G4~~	~~CLAMP, CUSHIONED, SUPPORT~~
SEE NOTE 2				2	2		21	1016105-003	STAP ASSEMBLY - HARNESS
SEE NOTE 2				2	2		20	1015802-004	RELAY - ARMATURE
				5	5		19	MS90078-7-1	FUSE, STYLE F02
				1	1		18	MS26572-1	FUSEHOLDER - CARTRIDGE
SEE NOTE 2				4	4		17	1015873-008	FUSEHOLDER
				1	1		16	MS91528-2K25	(1897080-023) KNOB, CONTROL
SEE NOTE 2				1	1		15	1015825-15	SWITCH, ROTARY
SEE NOTE 2				4	4		14	1016265-104	SWITCH, TOGGLE MINIATURE
					1		13	2900568	PANEL, FRONT (INSEP ASSY)
				1	1		12	2900567	COVER, REAR
				1	1		11	2900566	COVER, PROT, SW (INSEP ASSY)
SEE NOTE 2				4	4		10	1015860-001	SPACER (FIBRE CYLINDRICAL)
				4	4		9	2900565	NUT, PLAIN, HEXAGON
				1	1		8	2900563	RESISTOR ASSEMBLY
				1	1		7	2900561	RESISTOR ASSEMBLY
				4	4		6	2900560	PLATE, RETAINING (INSEP ASSY)
				1	1		5	2900559	BRACKET, RELAY (INSEP ASSY)
				1	1		4	2900558	BRACKET, MTG R (INSEP ASSY)
				1	1		3	2900557	BRACKET, MTG L (INSEP ASSY)
				1	1		2	2900551	HOLDER ASSY, COMPONENT CARD
				1	1		1	2900550	CHASSIS (INSEP ASSY)
	QUANTITY REQUIRED						LIST OF PARTS AND MATERIALS		

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900037-021	1900030	
2900037-011	1900030	
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ ± ___ ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ___
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN MC Real DATE 24 MAR 65
CHECKED C. Propha 20 JUL 65
APPROVAL
APPROVAL Bedman
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

P.S.A TEST POINT ADAPTER

CODE IDENT NO. 99974
SIZE J_2
2900037
SCALE 1:1
SHEET 1 OF 1

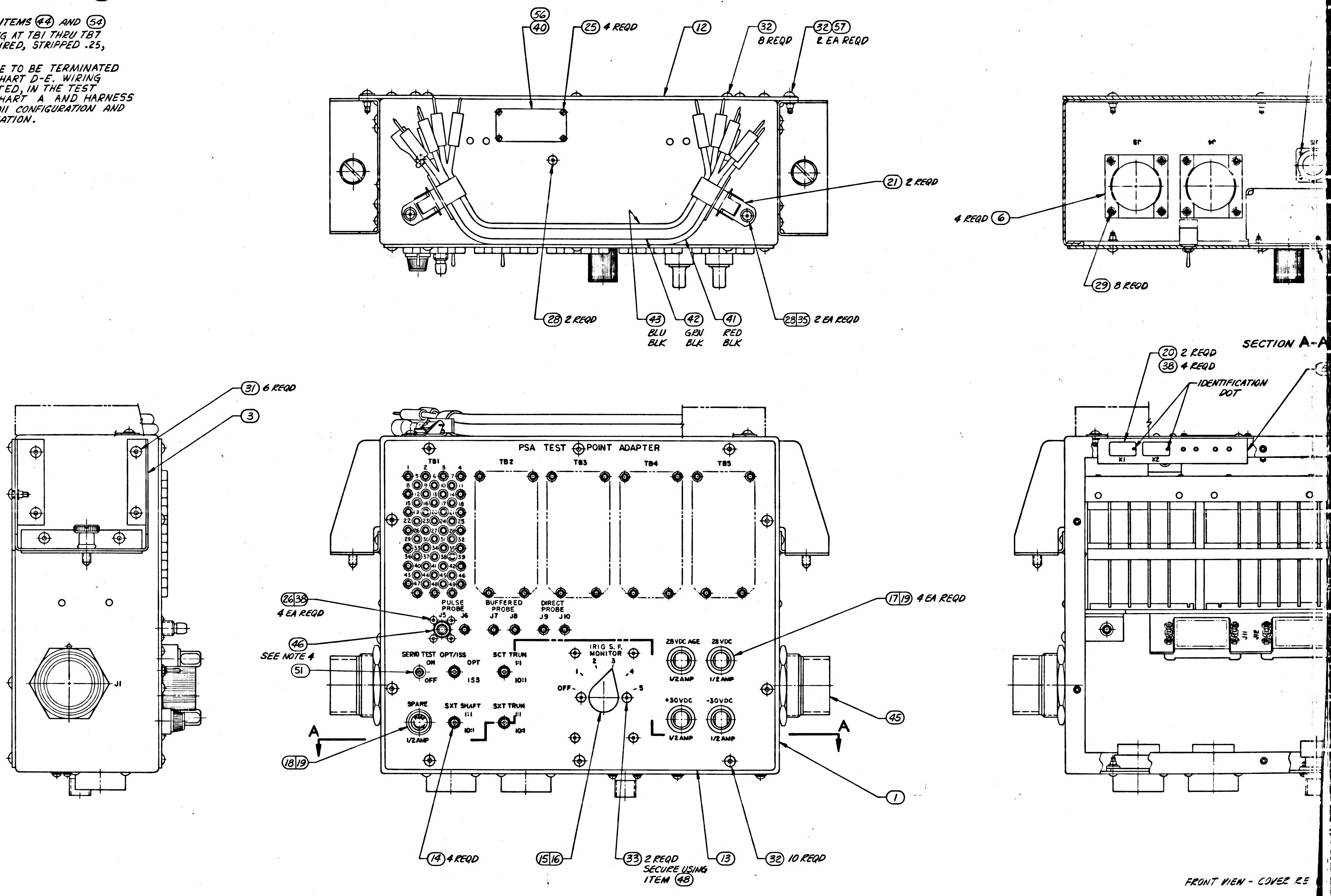
2900037 RE P SH 1

2900037

2/2900037

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING.
3. TORQUE NOT TO EXCEED 18 INCH POUNDS.
4. SPOT TIE TERMINATING END AS REQUIRED USING ITEM (49).
5. DRAWINGS FOR REFERENCE:
   A. SCHEMATIC DIAGRAM ITEMS (44) AND (54)
6. UNPREPARED WIRES TERMINATING AT TB1 THRU TB7 SHALL BE CUT TO LENGTH AS REQUIRED, STRIPPED .25, AND TINNED AT THIS ASSEMBLY.
7. CABLE ASSEMBLIES "D" AND "E" ARE TO BE TERMINATED AND ROUTED AS INDICATED ON CHART D-E. WIRING HARNESS "A" IS TO BE TERMINATED, IN THE TEST POINT AREA, AS INDICATED BY CHART A AND HARNESS DRAWING 2900573 FOR THE -011 CONFIGURATION AND 2901053 FOR THE -021 CONFIGURATION.


(56) (40)
(25) 4 REQD
(12)
(32) 8 REQD
(32)(57) 2 EA REQD
(21) 2 REQD
(28) 2 REQD
(43) BLU BLK
(42) GRN BLK
(41) RED BLK
(28)(35) 2 EA REQD
4 REQD (6)
(29) 8 REQD
SECTION A-A
(20) 2 REQD
(38) 4 REQD
IDENTIFICATION DOT
K1
K2
(31) 6 REQD
(3)
J1
PSA TEST POINT ADAPTER
TB1
TB2
TB3
TB4
TB5
PULSE PROBE
J5
J6
BUFFERED PROBE
J7
J8
DIRECT PROBE
J9
J10
SERVO TEST
ON
OFF
OPT/ISS
OPT
ISS
SCT TRUN
1:1
10:1
IRIG S.F. MONITOR
OFF
1
2
3
4
5
28VDC AGE
28VDC
1/2 AMP
+30VDC
-30VDC
SPARE
SXT SHAFT
SXT TRUN
(26)(38) 4 EA REQD
(46)
SEE NOTE 4
(51)
(17)(19) 4 EA REQD
(45)
(18)(19)
(1)
A
A
(14) 4 REQD
(15)(16)
(33) 2 REQD SECURE USING ITEM (48)
(13)
(32) 10 REQD
FRONT VIEW - COVER RE

2900037 REV P SH 1

MIL 1077J

1-/2900037

APPLICATION	
NEXT ASSY	USED ON
2900040-011	2900031-011

REVISIONS 23420			
SYM	DESCRIPTION	DATE	APPROVAL
A	REVISED PER MXC 201247	29 MAY 65	W.D.
B	SH5 WIRE AA13 WAS FROM P1-R TO K1-7 REVISE PER MXC 201686	1 JUNE 65	EH MEM
C	REVISED PER MXC202337	18-JUN-65	
D	REVISED PER MXC 202600	28 JUN 65	RSP W.T.
E	INITIAL RELEASE CLASS A PER TDRR 23420	18 OCT 65	WRB FE

REV									
SHEET									
REV STATUS	REV	E	E	E	E	E	E	E
OF SHEETS	SHEET	1	2	3	4	5	6	7

AC SPARK PLUG DIVISION , GMC
MILWAUKEE, WISCONSIN

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

ACSP PN

DRAWN DATE 29-MAR-65

CHECKED Udovich 5 APR 65

APPROVAL 6 APR 65

APPROVAL Gediman 1/8/65

NASA APPROVAL

MIT APPROVAL 21 Oct 65

CONTRACT NAS 9-497

WIRE LIST A-A

CODE IDENT NO.	SIZE		REV
99974	A	2900038	E

SCALE —

SHEET 1 OF 7

WIRE LIST AA 2900038 E ~~D~~ ~~C~~

NOTE NUMBER	GENERAL NOTES DESCRIPTION
1	NOTE 1 IS NOT APPLICABLE.
2	INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
3	Y OR N IN TINNED COLUMN INDICATES YES OR NO.
4	SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEMS 3 AND 4, OR 5.

TOLERANCE CHART, UNLESS OTHERWISE SPECIFIED ---

APPLICABLE LENGTH FOR WIRE OR CABLE, STRIP WIRE, STRIP JACKET, CUT WIRE OR CUT SHIELD.	TOLERANCE WIRE OR CABLE	STRIP WIRE	STRIP JACKET	CUT WIRE	CUT SHIELD
UNDER 1 INCH	+ .06-.00	+.03-.00	+.06-.06	+.06-.06	+.06-.06
1 INCH TO 6 INCHES	+ .50-.00	+.06-.00	+.25-.25	+.25-.25	+.25-.25
6 INCHES TO 6 FEET	+1.00-.00		+.50-.50	+.50-.50	+.50-.50
OVER 6 FEET	+2.00-.00				

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A 2900038
SCALE-NONE REV LTR ~~D~~ ~~C~~ E SHEET 2 OF 7

MIL 2084 4-63

WIRE LIST AA 2900038 E ~~D~~ ~~C~~

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2900038- 1	WIRE BUS QQ-W-343 TYPE S (ES110-1 COATED) 24AWG 14.25 INCHES TOTAL LENGTH
	2	1	2900038- 2	WIRE ND1002181 TYPE 1, CLASS 1, 24AWG COLOR WHITE, 69 INCHES TOTAL LENGTH
	3	AR	SN60WS	SOLDER QQ-S-571 (ES2175-1)
	4	AR	MIL-F-14256	TYPE A OR W FLUX (ES2798)
	5	AR	SN60WRAP	SOLDER QQ-S-571 (ES2175-3)

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A 2900038
SCALE-NONE REV LTR ~~C~~ ~~D~~ E SHEET 3 OF 7

MIL 2084 4-63

WIRE LIST AA 2900038 E ~~C~~ ~~D~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 1	2	2.75	P1-A TERM.18					.25 .25	YES YES			
AA 2	1	1.25	P1-B TERM.35						NO NO			
AA 3	2	2.75	P1-C TERM.19					.25 .25	YES YES			
AA 4	1	1.25	P1-D TERM.36						NO NO			
AA 5	2	2.75	P1-E TERM.20					.25 .25	YES YES			
AA 6	1	1.25	P1-F TERM.37						NO NO			
AA 7	2	2.75	P1-H TERM.21					.25 .25	YES YES			
AA 8	1	1.25	P1-J TERM.38						NO NO			
AA 9	2	2.75	P1-K TERM.22					.25 .25	YES YES			
AA 10	1	1.25	P1-L TERM.39						NO NO			
AA 11	2	3.25	TP2 TERM.32					.25 .25	YES YES			
AA 12	1	1.25	P1-N TERM.40						NO NO			

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A 2900038
SCALE-NONE REV LTR ~~D~~ ~~C~~ E SHEET 4 OF 7

MIL 2084 4-63

WIRE LIST AA 2900038 E ~~D~~ ~~C~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 13	2	5.00	P1-M K1-6					.25 .25	YES YES			
AA 14			DELETED									
AA 15	1	1.25	P1-S TERM.42						NO NO			
AA 16	1	1.25	P1-U TERM.43						NO NO			
AA 17	2	1.50	TERM.16 TERM.34					.25 .25	YES YES			
AA 18	2	5.25	P1-X TERM.14					.25 .25	YES YES			
AA 19	1	1.50	P1-Y TERM.44						NO NO			
AA 20	1	.50	TERM.42 TERM.41						NO NO			
AA 21	2	4.50	TERM.41 TP1					.25 .25	YES YES			
AA 22	2	1.50	TERM.14 K1-1					.25 .25	YES YES			
AA 23	1	.50	TERM.13 TERM.12						NO NO			
AA 24	1	.50	TERM.12 TERM.11						NO NO			

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A 2900038
SCALE-NONE REV LTR ~~C~~ ~~D~~ E SHEET 5 OF 7

MIL 2084 4-63

WIRE LIST AA 2900038 E ~~D~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 25	1	.50	TERM.11 TERM.10						NO NO			
AA 26	1	.50	TERM.10 TERM.9						NO NO			
AA 27	2	3.00	TERM.1 TERM.26					.25 .25	YES YES			
AA 28	2	3.00	TERM.2 TERM.27					.25 .25	YES YES			
AA 29	2	3.00	TERM.3 TERM.28					.25 .25	YES YES			
AA 30	2	3.00	TERM.4 TERM.29					.25 .25	YES YES			
AA 31	2	3.00	TERM.5 TERM.30					.25 .25	YES YES			
AA 32	2	3.00	TERM.6 TERM.31					.25 .25	YES YES			
AA 33	1	.50	TERM.9 TERM.8						NO NO			
AA 34	2	1.75	TERM.25 TERM.33					.25 .25	YES YES			
AA 35			DELETED									
AA 36	2	1.50	K1-5 TERM.7					.25 .25	YES YES			

MANNED SPACECRAFT CENTER HOUSTON, TEXAS	SIZE A	2900038	
SCALE - NONE	REV LTR ~~D~~ E	SHEET 6 OF 7	

MIL [illegible]84 4-63

WIRE LIST AA 2900038 E ~~D~~

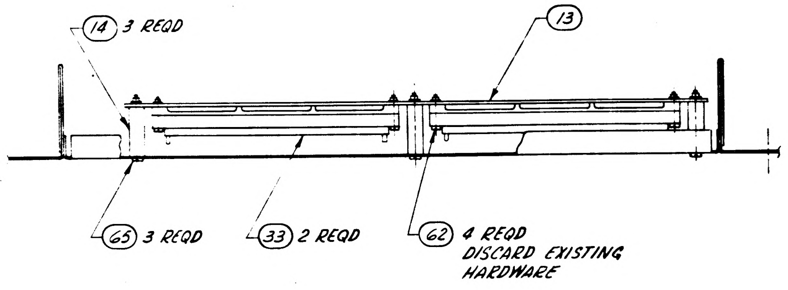
LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCBSSORY ITEMS	REMARKS
AA 37	2	3.00	TERM.7 TERM.23					.25 .25	YES YES			
AA 38			DELETED									
AA 39			DELETED									
AA 40			DELETED									
AA 41			DELETED									
AA 42			DELETED									
AA 43			DELETED									
AA 44			DELETED									
AA 45	2	5.00	P1-P K1-4					.25 .25	YES YES			
AA 46	2	5.00	P1-Z TERM.13					.25 .25	YES YES			

MANNED SPACECRAFT CENTER HOUSTON, TEXAS	SIZE A	2900038	
SCALE - NONE	REV LTR ~~D~~ E	SHEET 7 OF 7	

MIL 2084 4-63

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
L		REPLACES REVISION (K) WITH CHANGE PER MXC 205032		17 SEP 65	OKD
M		REVISED PER MXC 205627		11 OCT 65	
N		INITIAL RELEASA CLASS A PER TOKR 23419		19 OCT 65	OKD

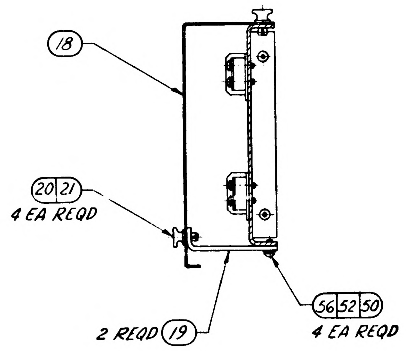
REVISIONS 23419



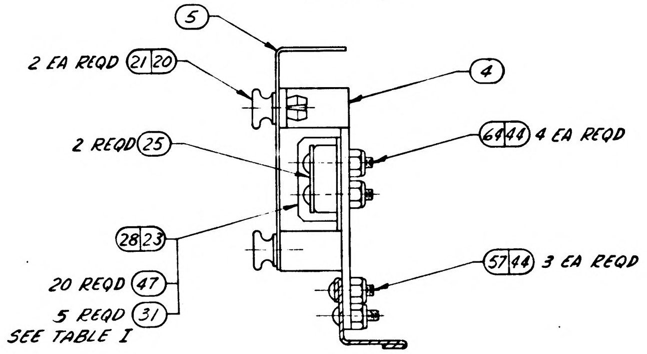
SECTION A-A
SCALE - 1/2

TABLE I

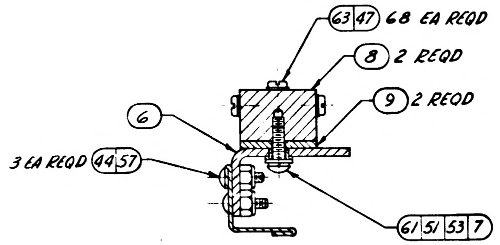
TERMINAL BOARD NO.	JUMPER STRAPS LOCATED ON TERMINALS
TB1	1 TO 2; 2 TO 3
TB2	1 TO 2; 2 TO 3
TB3	1 TO 2; 2 TO 3
TB4	NONE
TB5	3 TO 4; 6 TO 7; 7 TO 8
TB6	1 TO 2; 2 TO 3; 3 TO 4; 4 TO 5; 5 TO 6; 7 TO 8; 8 TO 9
TB7	3 TO 4; 4 TO 5; 5 TO 6; 6 TO 7; 7 TO 8; 8 TO 9; 9 TO 10
TB8	1 TO 2; 2 TO 3; 3 TO 4; 4 TO 5; 5 TO 6; 6 TO 7; 7 TO 8; 8 TO 9; 9 TO 10
TB9	2 TO 3; 5 TO 6; 6 TO 7; 8 TO 9; 9 TO 10



SECTION B-B
SCALE - 1/2



SECTION C-C
SCALE - FULL



SECTION D-D
SCALE - FULL

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1		72	2900833	CABLE ASSEMBLY, ELECTRICAL
SEE NOTE 2	1		71	1016376-24	CONNECTOR, ELEC
	72		70	1897266-001	CONTACT, RECEP, ELEC
	12		69	1897267-001	CONNECTOR, PLUG, ELEC
	110		68	MS21919-WDG4 (1897073-204) THRU MS21919-WDG20 (1897073-220)	CLAMP, CUSHIONED
SEE NOTE 2	2		67	1016170-003	MARKER STRIP
SEE NOTE 2	2		66	1016325-003	TERMINAL BOARD
	3		65	MS35233-52	SCREW, PAN HD
	4		64	-48	
	68		63	-43	
	4		62	MS35233-34	, PAN HD
SEE NOTE 2	46		61	1006783-45	, BUTTON HD
	24		60	-44	
	50		59	-43	
	12		58	-29	
	17		57	-28	
	90		56	-26	
	124		55	-23	
SEE NOTE 2	8		54	1006783-20	SCREW, BUTTON HD
	28		53	AN960C10L (1897006-019)	WASHER, FLAT
	97		52	AN960C8L (1897006-038)	WASHER, FLAT
	64		51	MS35338-81	WASHER, LOCK, SPLIT
	106		50	-80	
	124		49	-79	
	8		48	MS35338-78	SPLIT
	154		47	MS35333-72	INT TOOTH
	52		46	MS35333-71	WASHER, LOCK, INT TOOTH
	56		45	1016151-010	NUT, SELF LOCKING
	17		44	1016151-008	NUT, SELF LOCKING

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1		43	2900763	WIRING HARNESS H
	1		42	2900547	G
	1		41	2900546	F
	1		40	2900545	E
	1		39	2900544	D
	1		38	2900543	C
	1		37	2900542	B
	1		36	2900541	WIRING HARNESS A
	2		35	1900448-021	CABLE CLAMP BRACKET ASSY
	1		34	2900433	BRACKET, CABLE CLAMP
	2		33	1897230-001	CONNECTOR, RECEP, ELEC
SEE NOTE 2	28		32	1016376-13	CONNECTOR, ELEC
	30		31	1015894-004	JUMPER STRAP
	7		30	1015894-002	JUMPER STRAP
	2		29	1016170-010	MARKER STRIP
	4		28	1001666-10	PLATE, DESIGNATION
SEE NOTE 2	1		27	1001666-3	PLATE, DESIGNATION
	8		26	1897322-001	PLATE, TERMINAL BOARD
	10		25	1897322-002	PLATE, TERMINAL BOARD
SEE NOTE 2	2		24	1016325 010	TERMINAL BOARD
	4		23	1001665-010	TERMINAL BOARD
	1		22	1001665-003	TERMINAL BOARD
	6		21	1016020-2	PLUNGER
SEE NOTE 2	6		20	1016020-1	GROMMET
	2		19	2900606	BRACKET, UPPER
	1		18	2900740	COVER, PROTECTIVE
	1		17	2900548	BRACKET, TERMINAL BLOCK
	2		16	2900605	BRACKET, ANGLE
	3		15	2900498	BRACKET, ELEC CONN
	3		14	2900399	SPACER, CONN SUPPORT
	1		13	2900398	SUPPORT, ELEC CONN
SEE NOTE 2	12		12	1016005-001	SHIM, LAMINATED
	1		11	2900376	CONNECTOR PLATE
	7		10	2900732	BRACKET, HARNESS CLAMP
	2		9	1900358	INSULATOR, TOP
	2		8	1900357	BUS BAR
	4		7	2900495	INSULATOR, BUSHING
	1		6	2900738	BRACKET, BUS BAR
	1		5	2900739	COVER, PROTECTIVE
	1		4	2900737	BRACKET, TERMINAL BLOCK
	15		3	2900375	BRACKET, RETRACTOR
SEE NOTE 2	20		2	1015800-001	CABLE RETRACTOR
	1		1	2900377	HARNESS FRAME (INSEP ASSY)

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900032-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN C. M. Kulp 30 MAR 65
CHECKED J. GRIEB 31 MAR 65
APPROVAL 15 Sept 65
APPROVAL 9/9/65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS
BLOCK II/LEM

HARNESS & FRAME ASSEMBLY

CODE IDENT NO. 99974
SIZE J
2900058
SCALE 1/4
SHEET 1 OF 2

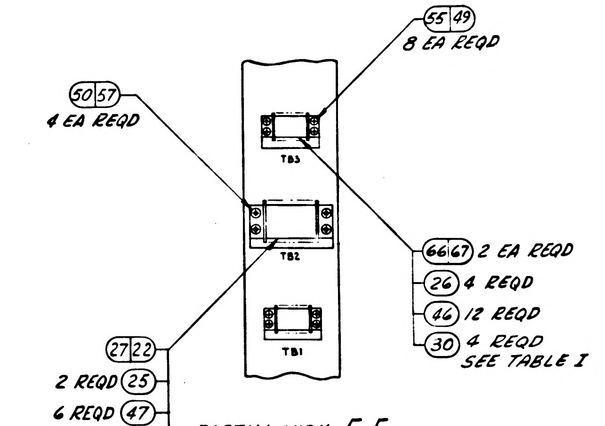
2900058 N

2900058 SH 1

2/2900058

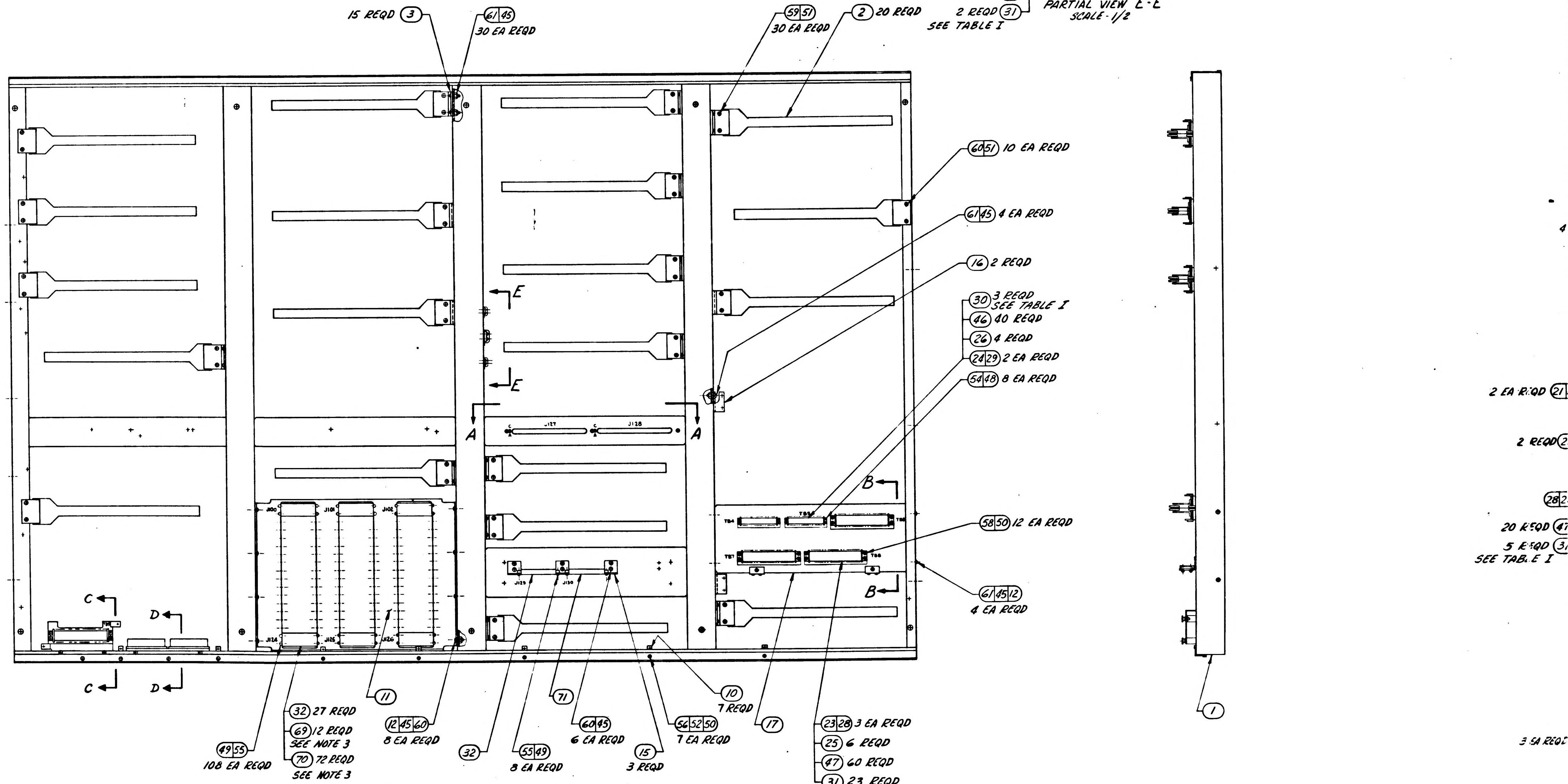
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
3. INSTALL ITEM (69) AT LOCATIONS P101D, P109A, P112A, P112D, P113D, P118D, P120A, P121F, P122F, P123E, P124E AND P125E WITH CRIMPED CONTACTS, ITEM (70), IN HOLES 1, 2, 3, 30, 31 AND 32.
4. ELECTRICAL REQUIREMENTS:
   A. CONTINUITY TEST MEASURE 0^{+1}_{-0} OHMS BETWEEN TERMINAL POINTS OF EACH NETWORK



(55|49) 8 EA REQD
(50|57) 4 EA REQD
TB3
TB2
TB1
(66|67) 2 EA REQD
(26) 4 REQD
(46) 12 REQD
(30) 4 REQD SEE TABLE I
(27|22)
2 REQD (25)
6 REQD (47)
2 REQD (31)
SEE TABLE I

PARTIAL VIEW E-E
SCALE - 1/2



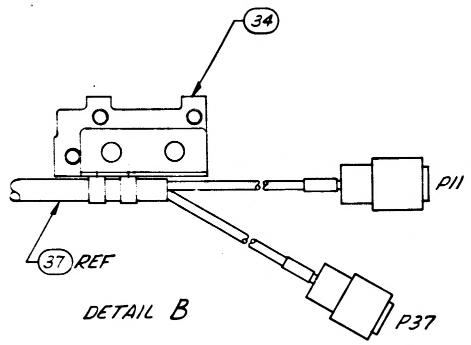
15 REQD (3)
(61|45) 30 EA REQD
(59|51) 30 EA REQD
(2) 20 REQD
(60|51) 10 EA REQD
(61|45) 4 EA REQD
(16) 2 REQD
(30) 3 REQD SEE TABLE I
(46) 40 REQD
(26) 4 REQD
(24|29) 2 EA REQD
(54|48) 8 EA REQD
(58|50) 12 EA REQD
(61|45|12) 4 EA REQD
E
E
A
A
B
B
C
C
D
D
J127
J128
J129
J130
J100
J101
J102
J124
J125
J126
TB4
TB5
TB6
TB7
TB8
(49|55) 108 EA REQD
(32) 27 REQD
(69) 12 REQD SEE NOTE 3
(70) 72 REQD SEE NOTE 3
(11)
(12|45|60) 8 EA REQD
(32)
(55|49) 8 EA REQD
(71)
(60|45) 6 EA REQD
(15) 3 REQD
(56|52|50) 7 EA REQD
(10) 7 REQD
(17)
(23|28) 3 EA REQD
(25) 6 REQD
(47) 60 REQD
(31) 23 REQD SEE TABLE I
(1)
(4) 3 REQD
(65) 3 REQD
2 EA REQD (21|2
2 REQD (25
(28|23
20 REQD (47
5 REQD (31
SEE TABLE I

ITEMS (5) & (18) NOT SHOWN THIS VIEW

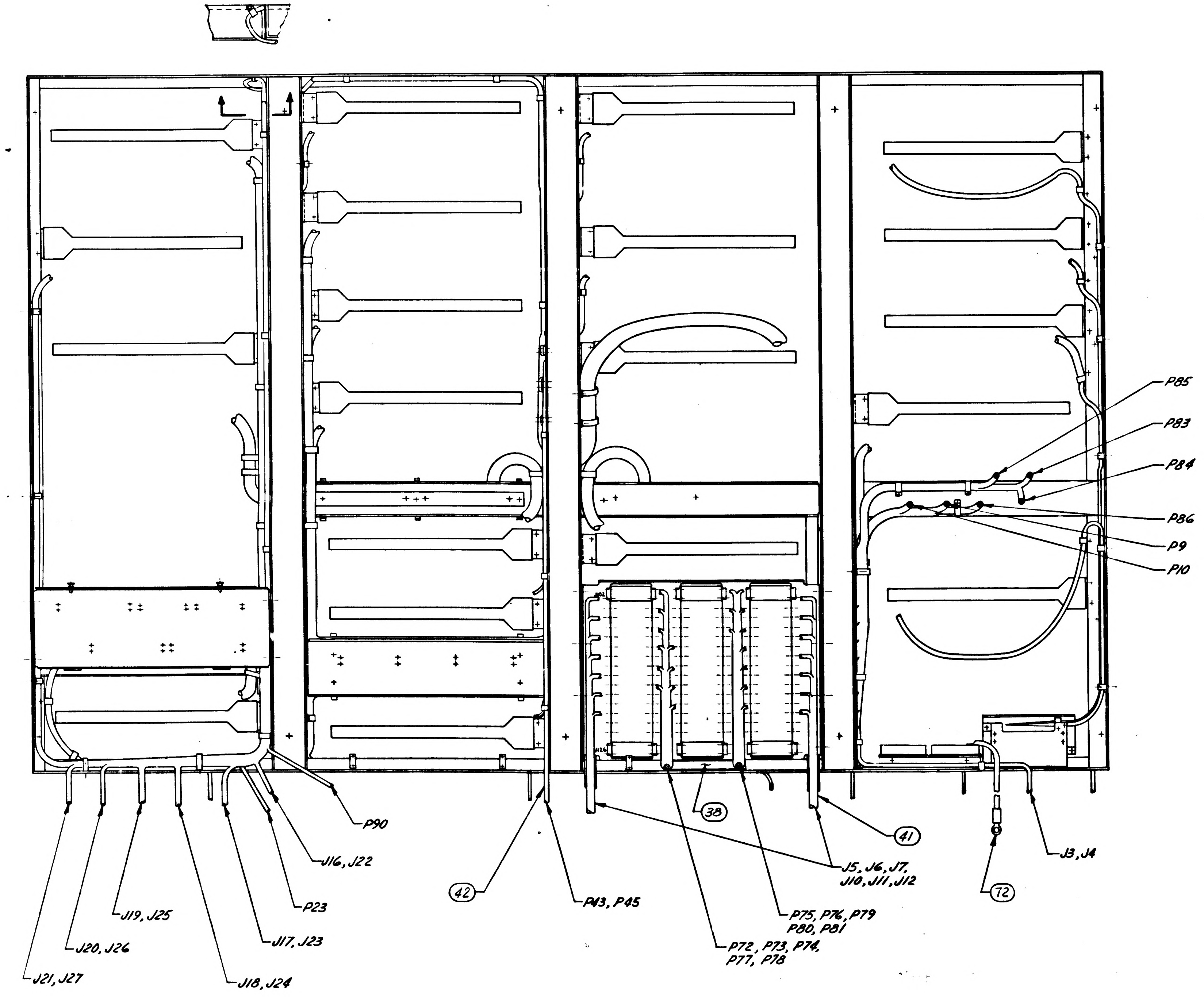
2900058 REV LTR V SH 1

172900058

REVISIONS 23419					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
L		REPLACES REVISION (K) WITH CHANGE PER MXC 205032.		17 SEP 65	OKD
M		REVISED PER MXC 205627		11 OCT 65	
N		INITIAL RELEASE CLASS A PER TDCR 23419		11 OCT 65	OKD


34
P11
37 REF
P37

DETAIL B


P85
P83
P84
P86
P9
P10
P90
J16, J22
P23
J19, J25
J17, J23
J20, J26
J21, J27
J18, J24
42
P43, P45
38
41
J5, J6, J7, J10, J11, J12
P75, P76, P79 P80, P81
P72, P73, P74, P77, P78
72
J3, J4

2900032-011	2900023-011	-011	
NEXT ASSY	USED ON	APPLICABLE DASH NO.	
APPLICATION			

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+— +— +—
—— —— ——

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN C. M. Kuss DATE 30 MAR 65
CHECKED J. GRIEB 31 MAR 65
APPROVAL 15 Sept 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

HARNESS & FRAME ASSEMBLY

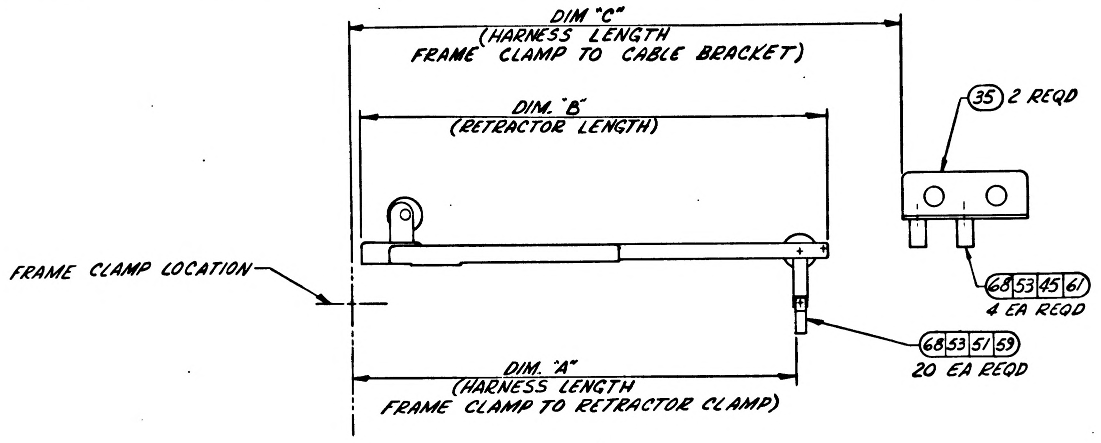
CODE IDENT NO.	SIZE	
99974	J	2900058
SCALE 1/4		SHEET 2 OF 2

2900058 SH 2

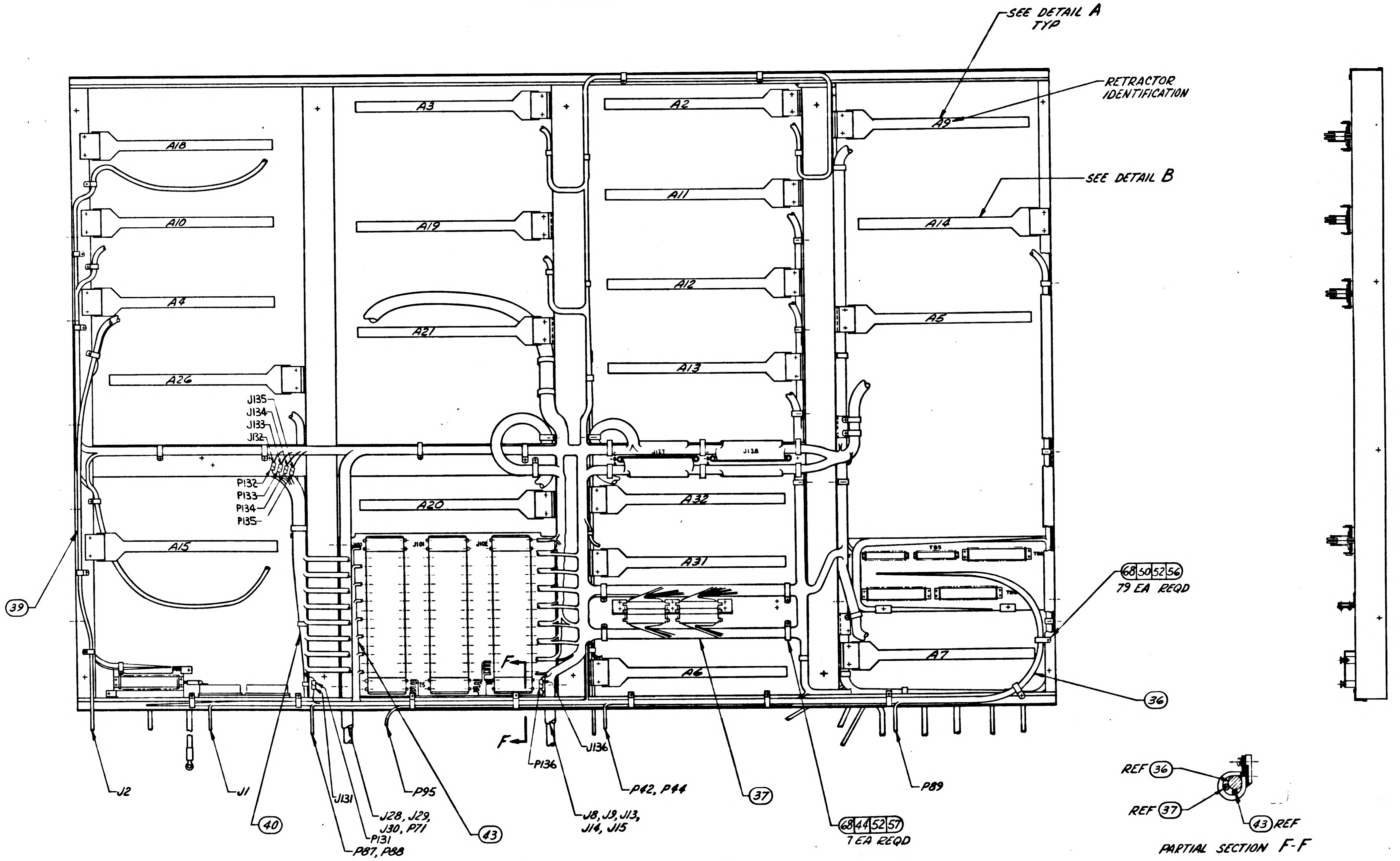
2/2900058

TABLE II

RETRACTOR IDENT	DIM. "A"	DIM. "B"	CONNECTOR IDENT	DIM "C"
A2			P1, P2	—
A3			P3, P4	—
A4			P5, P6, P7, P8	
A5			P14, P15, P16, P17	—
A6			P18, P19	
A7			P20, P21, P22	—
A9			P24, P25, P26	—
A10			P28, P29, P30	—
A11			P31, P32, P33	—
A12			P27, P34, P98, P99	—
A13			P35, P36, P92, P96	—
A14			P11, P37	—
A15			P38, P39, P40, P41	—
A18			P46, P47, P50, P97	—
A19			P13, P51 THRU P59	—
A20			P60, P61, P62	—
A21			P12, P63 THRU P70, P93, P94	—
A26			P82	—
A31			P91	—
A32			P48, P49	—


DIM "C"
(HARNESS LENGTH
FRAME CLAMP TO CABLE BRACKET)
DIM. "B"
(RETRACTOR LENGTH)
35 2 REQD
FRAME CLAMP LOCATION
68 53 45 61
4 EA REQD
68 53 51 59
20 EA REQD
DIM. "A"
(HARNESS LENGTH
FRAME CLAMP TO RETRACTOR CLAMP)

DETAIL A
SEE TABLE II

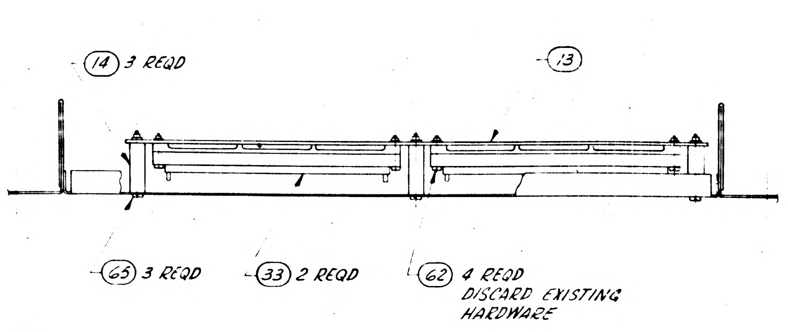

SEE DETAIL A
TYP
RETRACTOR
IDENTIFICATION
SEE DETAIL B
A18
A10
A4
A26
A15
A3
A19
A21
A20
A2
A11
A12
A13
A32
A31
A6
A9
A14
A5
A7
J135
J134
J133
J132
P132
P133
P134
P135
J137
J138
J101
J102
F
68 50 52 56
79 EA REQD
39
J2
J1
40
J131
P131
P87, P88
J28, J29,
J30, P71
P95
43
P136
J136
J8, J9, J13,
J14, J15
P42, P44
37
68 44 52 57
7 EA REQD
P89
36
REF 36
REF 37
43 REF

PARTIAL SECTION F-F

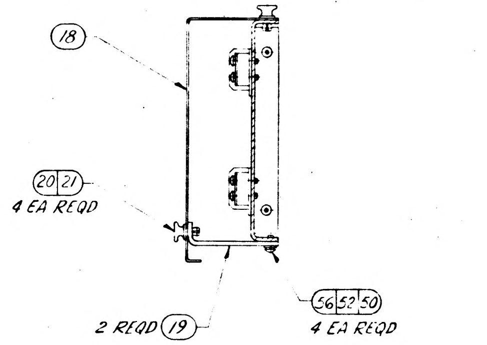
2900058 REV LTR N SH 2

1/2900058

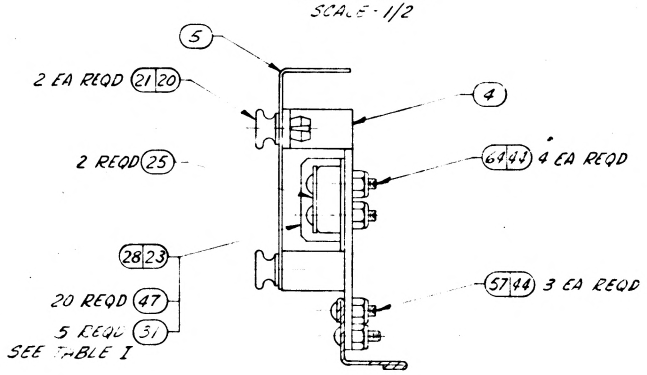
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
L		REPLACES REVISION (K) WITH CHANGE PER MXC 205032		17 SEP 65	DKD
M		REVISED PER MXC 205627		11 OCT 65	RP
N		[illegible] 2349		[illegible]	[illegible]
P		REVISED PER TDRR 27528		4 APR 66	RP CP



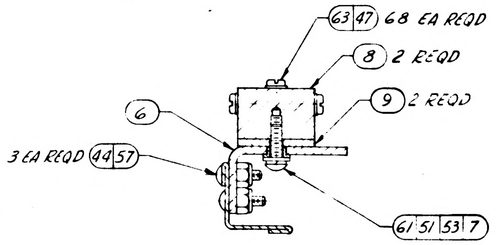
SECTION A-A
SCALE - 1/2



SECTION B-B
SCALE - 1/2



SECTION C-C
SCALE - FULL



SECTION D-D
SCALE - FULL

TABLE I

TERMINAL BOARD NO.	JUMPER STRAPS LOCATED ON TERMINALS
TB1	1 TO 2; 2 TO 3
TB2	1 TO 2; 2 TO 3
TB3	1 TO 2; 2 TO 3
TB4	NONE
TB5	3 TO 4; 6 TO 7; 7 TO 8
TB6	1 TO 2; 2 TO 3; 3 TO 4; 4 TO 5; 5 TO 6; 7 TO 8; 8 TO 9
TB7	3 TO 4; 4 TO 5; 5 TO 6; 6 TO 7; 7 TO 8; 8 TO 9; 9 TO 10
TB8	1 TO 2; 2 TO 3; 3 TO 4; 4 TO 5; 5 TO 6; 6 TO 7; 7 TO 8; 8 TO 9; 9 TO 10
TB9	2 TO 3; 5 TO 6; 6 TO 7; 8 TO 9; 9 TO 10

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
				1		72	2900833	CABLE ASSEMBLY, ELECTRICAL
SEE NOTE 2				1		71	1016376-24	CONNECTOR, ELEC
				72		70	1897266-001	CONTACT, RECEP, ELEC
				15		69	1897267-001	CONNECTOR, PLUG, ELEC
				112		68	MS21919-WDG4 (1897073-204) THRU MS21919-WDG20 (1897073-220)	CLAMP, CUSHIONED
SEE NOTE 2				2		67	1016170-003	MARKER STRIP
SEE NOTE 2				2		66	1016325-003	TERMINAL BOARD
				3		65	MS35233-52	SCREW, PAN HD
				4		64	-48	
				68		63	-43	
				4		62	MS35233-34	, PAN HD
SEE NOTE 2				46		61	1006783-45	, BUTTON HD
				24		60	-44	
				53		59	-43	
				12		58	-29	
				17		57	-28	
				39		56	-26	
				116		55	-23	
SEE NOTE 2				16		54	1006783-20	SCREW, BUTTON HD
				31		53	AN960C10L (189[illegible]-019)	WASHER, FLAT
				36		52	AN960C8L (189[illegible]-035)	WASHER, FLAT
				67		51	MS35338-81	WASHER, LOCK, SPLIT
				105		50	-80	
				116		49	-79	
				16		48	MS35338-78	SPLIT
				154		47	MS35333-72	INT TOOTH
				52		46	MS35333-71	WASHER, LOCK, INT TOOTH
				56		45	1016151-010	NUT, SELF LOCKING
				17		44	1016151-008	NUT, SELF LOCKING

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
				1		43	2900763	WIRING HARNESS H
				1		42	2900547	G
				1		41	2900546	F
				1		40	2900545	[illegible]
				1		39	[illegible]	[illegible]
				1		38	2900543	[illegible]
				1		37	29005[illegible]	[illegible]
				1		36	[illegible]	WIRING HARNESS A
				2		35	1900448-021	CABLE CLAMP BRACKET ASSY
				1		34	[illegible]	BRACKET, [illegible]
				2		33	[illegible] 001	CONNECTOR, RECEP, ELEC
SEE NOTE 2				28		32	1016[illegible]-13	CONNECTOR, ELEC
				30		31	1015894-004	JUMPER STRAP
				7		30	1015894-002	JUMPER STRAP
				2		29	1016[illegible]	MARKER STRIP
				4		28	1001666-10	PLATE, DESIGNATION
SEE NOTE 2				1		27	1001666-3	PLATE, DESIGNATION
				8		26	18973[illegible]	PLATE, TERMINAL BOARD
				10		25	[illegible]-002	PLATE, TERMINAL BOARD
SEE NOTE 2				2		24	[illegible]-010	TERMINAL BOARD
				4		23	[illegible]-010	TERMINAL BOARD
				1		22	[illegible]	TERMINAL BOARD
				6		21	1016[illegible]	[illegible]
SEE NOTE 2				6		20	1016[illegible]	GROMMET
				2		19	[illegible]	BRACKET, [illegible]
				1		18	29[illegible]740	COVER, PROTECTIVE
				1		17	2[illegible]543	BRACKET, TERMINAL BLOCK
				2		16	2900605	BRACKET, ANGLE
				3		15	29[illegible]415	BRACKET, ELEC CONN
				3		14	29003[illegible]	SPACER, CONN SUPPORT
				1		13	2900393	SUPPORT, ELEC CONN
SEE NOTE 2				12		12	1016[illegible]-001	SHIM, LAMINATED
				1		11	29003[illegible]	CONNECTOR PLATE
				7		10	29[illegible]	BRACKET, HARNESS CLAMP
				2		9	19[illegible]	INSULATOR, TOP
				2		8	1[illegible]357	BUS BAR
				4		7	29[illegible]	INSULATOR, BUSHING
				1		6	2900753	BRACKET, BUS BAR
				1		5	[illegible]	COVER, PROTECTIVE
				1		4	2900737	BRACKET, TERMINAL BLOCK
				15		3	2900375	BRACKET, RETRACTOR
SEE NOTE 2				20		2	1015800-001	CABLE RETRACTOR
				1		1	2900377	HARNESS FRAME (INSEP ASSY)

NEXT ASSY	USED ON	APPLICABLE DASH NO
2900032-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — — — DECIMALS + — — — ANGLES + — — —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN C. M. Kurp 30 MAR 65
CHECKED J. GRIEB 31 MAR 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS
BLOCK II/LEM

HARNESS & FRAME
ASSEMBLY

CODE IDENT NO 99974
SIZE J
2900058
SCALE 1/4
SHEET 1 OF 2

2900058 P

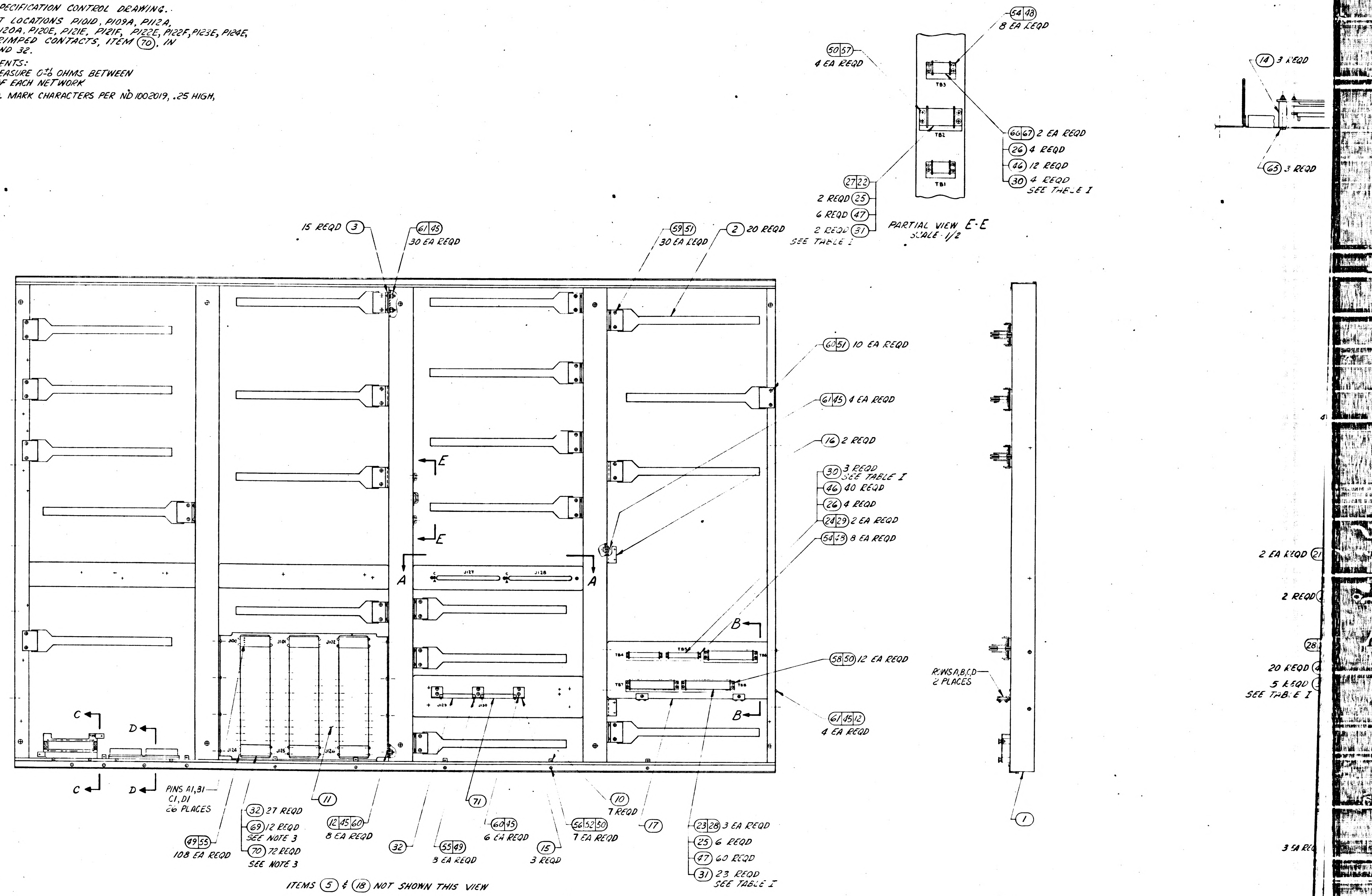
2900058 REV LET P SH 1

2900058

27-2900058

NOTES:

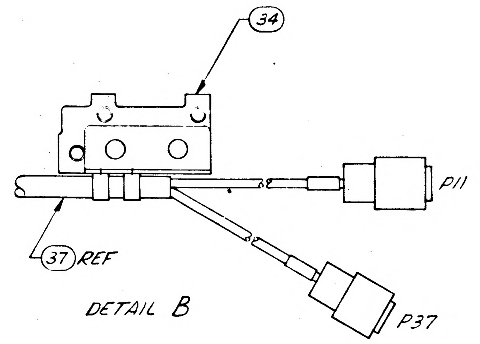
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
3. INSTALL ITEM (69) AT LOCATIONS P101D, P109A, P112A, P112D, P113D, P118D, P120A, P120E, P121E, P121F, P122E, P122F, P123E, P124E, AND P125E WITH CRIMPED CONTACTS, ITEM (70), IN HOLES 1, 2, 3, 30, 31 AND 32.
4. ELECTRICAL REQUIREMENTS:
   A. CONTINUITY TEST MEASURE 0^{+1}_{-0} OHMS BETWEEN TERMINAL POINTS OF EACH NETWORK
5. IDENTIFY USING PART NO. MARK CHARACTERS PER ND 1002019, .25 HIGH, COLOR BLACK.


15 REQD (3)
(61|45) 30 EA REQD
(59|51) 30 EA REQD
(2) 20 REQD
(50|57) 4 EA REQD
(54|48) 8 EA REQD
TB3
TB2
TB1
(66|67) 2 EA REQD
(26) 4 REQD
(46) 12 REQD
(30) 4 REQD SEE TABLE I
(27|22)
2 REQD (25)
6 REQD (47)
2 REQD (31) SEE TABLE I
PARTIAL VIEW E-E SCALE - 1/2
(14) 3 REQD
(65) 3 REQD
(60|51) 10 EA REQD
(61|45) 4 EA REQD
(16) 2 REQD
(30) 3 REQD SEE TABLE I
(46) 40 REQD
(26) 4 REQD
(24|29) 2 EA REQD
(54|48) 8 EA REQD
E
E
A
A
J127
J128
B
B
TB4
TB5
TB6
TB7
TB8
(58|50) 12 EA REQD
(61|45|12) 4 EA REQD
J129
J130
J100
J101
J102
J124
J125
J126
C
C
D
D
ROWS A,B,C,D 2 PLACES
(1)
2 EA REQD (21
2 REQD
(28
20 REQD (4
5 REQD (
SEE TABLE I
3 EA RE
PINS A1, B1 C1, D1 26 PLACES
(49|55) 108 EA REQD
(32) 27 REQD
(69) 12 REQD SEE NOTE 3
(70) 72 REQD SEE NOTE 3
(11)
(12|45|60) 8 EA REQD
(32)
(55|49) 8 EA REQD
(71)
(60|45) 6 EA REQD
(15) 3 REQD
(56|52|50) 7 EA REQD
(10) 7 REQD
(17)
(23|28) 3 EA REQD
(25) 6 REQD
(47) 60 REQD
(31) 23 REQD SEE TABLE I
ITEMS (5) & (18) NOT SHOWN THIS VIEW

2900058 REV LTR P SH 1

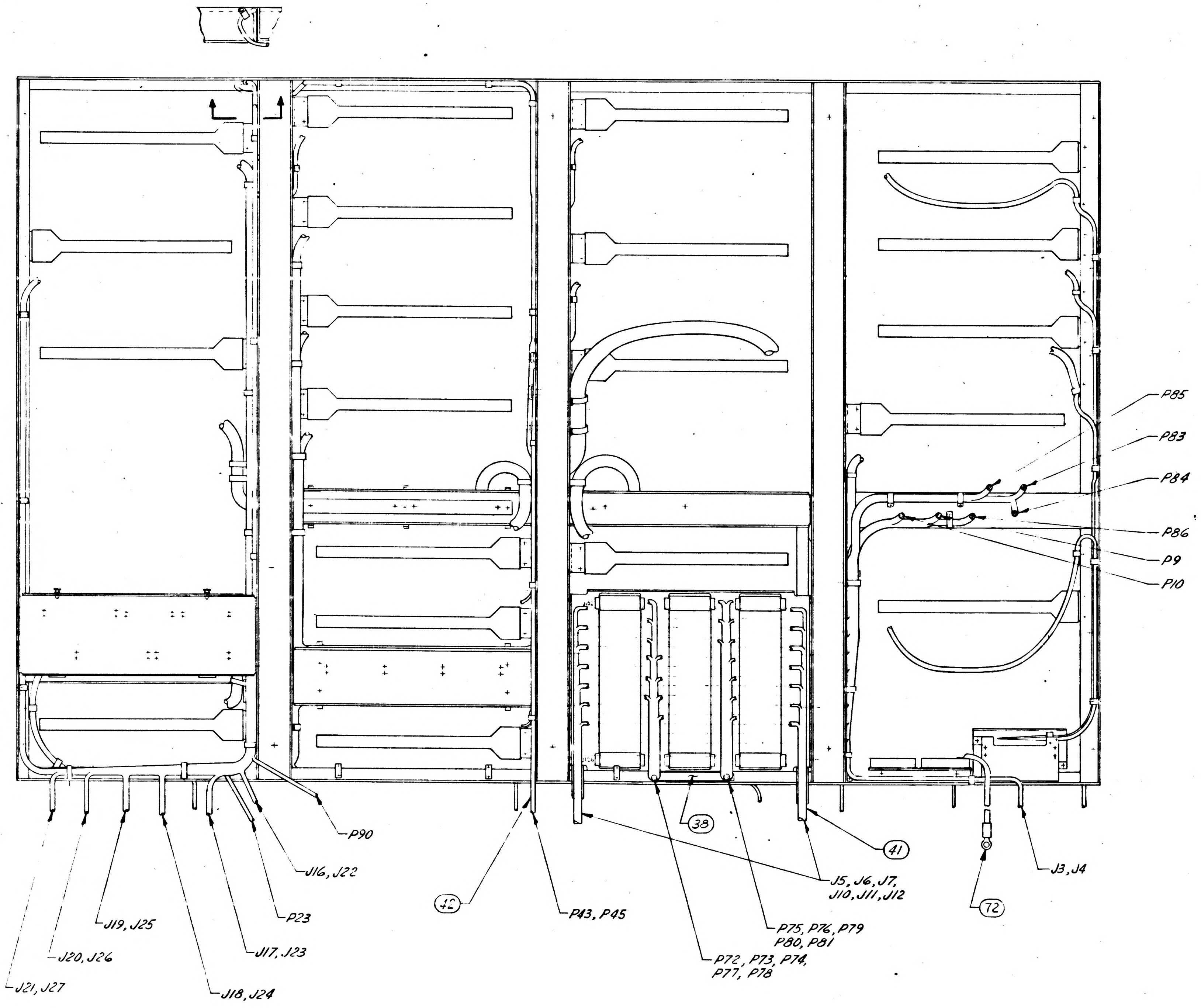
1/2900058

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
L		REPLACES REVISION (K) WITH CHANGE PER MXC 205032.		17 SEP 65	OKD
M		REVISED PER MXC 205627		11 OCT 65	RLP
N		INITIAL RELEASE CLASS A PER TDRR 23419		19 OCT 65	OKD
P		REVISED PER TDRR 27528		4 APR 66	RLP CP



34
P11
37 REF
P37

DETAIL B



P85
P83
P84
P86
P9
P10
P90
J16, J22
P23
J19, J25
J20, J26
J21, J27
J17, J23
J18, J24
42
P43, P45
38
41
J5, J6, J7, J10, J11, J12
P75, P76, P79 P80, P81
P72, P73, P74, P77, P78
72
J3, J4

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900135-011	2900025-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN

DRAWN J. GRIEB DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

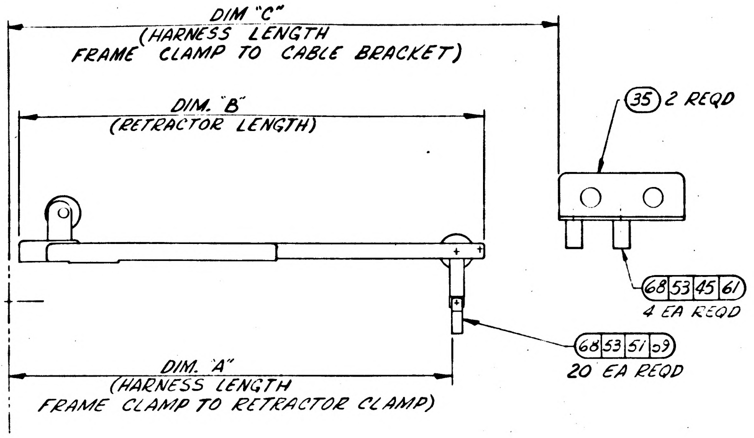
HARNESS & FRAME
ASSEMBLY

CODE IDENT NO 99974 SIZE J 2900058

SCALE 1/2 SHEET 2

2900058 SH 2

2/2900058

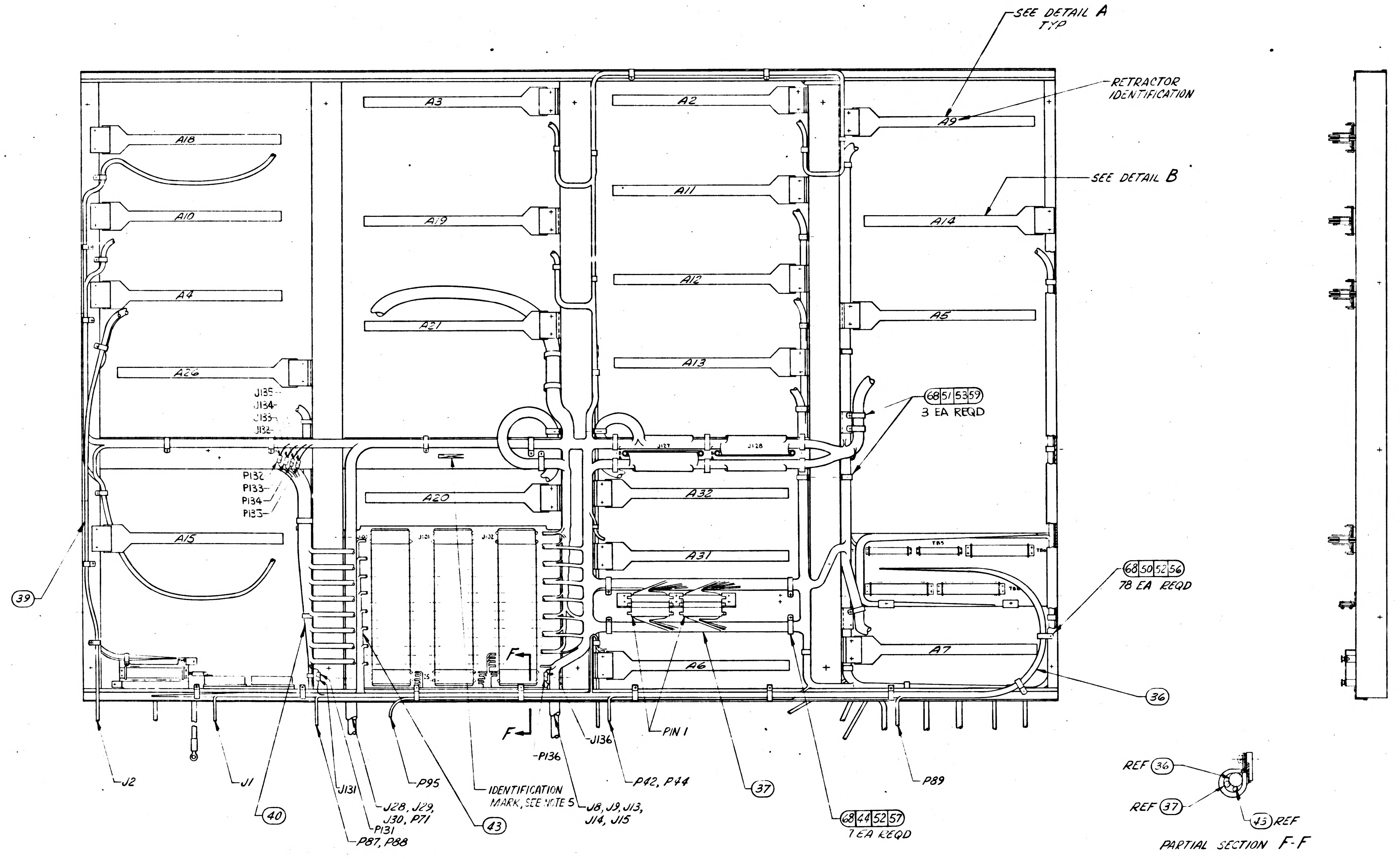


DIM "C"
(HARNESS LENGTH
FRAME CLAMP TO CABLE BRACKET)
DIM. "B"
(RETRACTOR LENGTH)
FRAME CLAMP LOCATION
35 2 REQD
68 53 45 61
4 EA REQD
68 53 51 63
20 EA REQD
DIM. "A"
(HARNESS LENGTH
FRAME CLAMP TO RETRACTOR CLAMP)

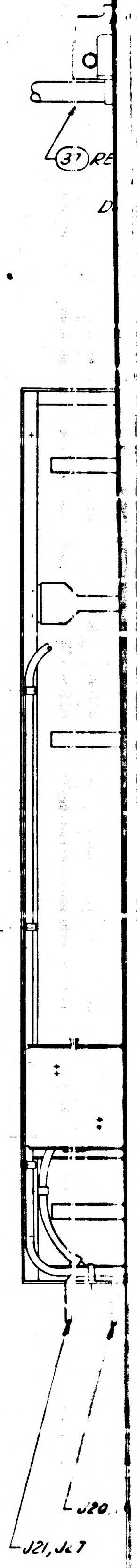
DETAIL A
SEE TABLE II

TABLE II

RETRACTOR IDENT	DIM. "A"	DIM. "B"	CONNECTOR IDENT	DIM "C"
A2			P1, P2	
A3			P3, P4	—
A4			P5, P6, P7, P8	36/40
A5			P14, P15, P16, P17	—
A6			P18, P19	33/37
A7			P20, P21, P22	—
A9			P24, P25, P26	—
A10			P28, P29, P30	—
A11			P31, P32, P33	—
A12			P27, P34, P98, P99	—
A13			P35, P36, P92, P96	—
A14			P11, P37	—
A15			P38, P39, P40, P41	—
A18			P46, P47, P50, P97	—
A19			P13, P51 THRU P59	—
A20			P60, P61, P62	—
A21			P12, P63 THRU P70, P93, P94	—
A26			P82	—
A31			P91	—
A32			P48, P49	—



SEE DETAIL A
TYP
RETRACTOR
IDENTIFICATION
SEE DETAIL B
A18
A10
A4
A26
A15
A3
A19
A21
A20
A2
A11
A12
A13
A32
A31
A6
A9
A14
A5
A7
J135
J134
J133
J132
P132
P133
P134
P135
J127
J128
68 51 53 59
3 EA REQD
68 50 52 56
78 EA REQD
39
36
F
F
J2
J1
40
J131
J28, J29,
J30, P71
P131
P87, P88
P95
43
IDENTIFICATION
MARK, SEE NOTE 5
-P136
J136
J8, J9, J13,
J14, J15
PIN 1
P42, P44
37
68 44 52 57
7 EA REQD
P89
REF 36
REF 37
J3 REF
PARTIAL SECTION F-F

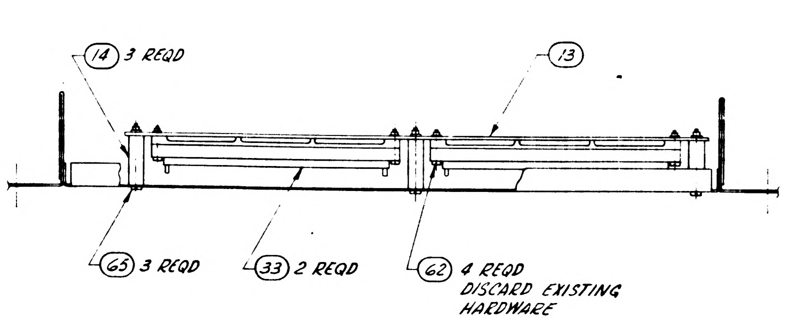


37 RE
J20
J21, J27

2900058 REV SH 2

1/2900058

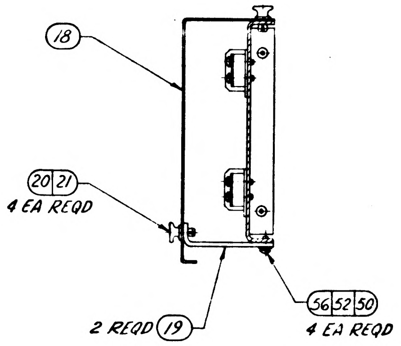
REVISIONS 23919					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
L		REPLACES REVISION(K) WITH CHANGE PER MXC 205032		17 SEP 65	OKD
M		REVISED PER MXC 205627		11 OCT 65	RP
N		INITIAL RELEASE CLASS A PER TDRR 23919		11 OCT 65	
P		REVISED PER TDRR 27528		4 APR 66	RP CP
R		REVISED PER TDRR 27584		7 APR 66	RP RWH



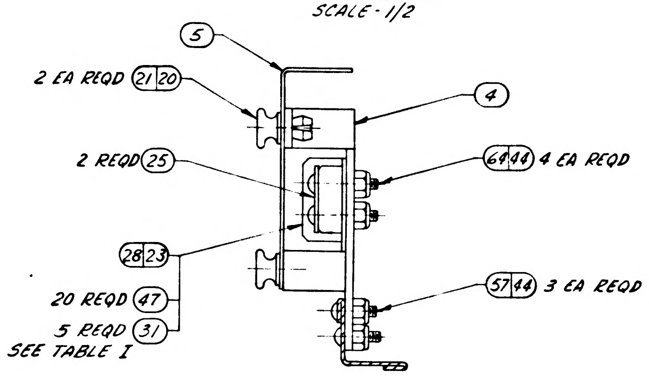
SECTION A-A
SCALE - 1/2

TABLE I

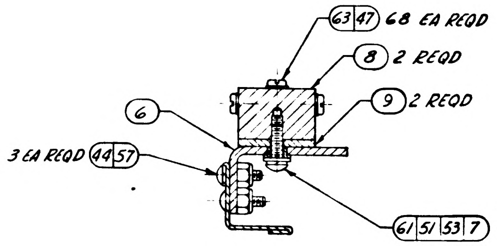
TERMINAL BOARD NO.	JUMPER STRAPS LOCATED ON TERMINALS
TB1	1 TO 2; 2 TO 3
TB2	1 TO 2; 2 TO 3
TB3	1 TO 2; 2 TO 3
TB4	NONE
TB5	3 TO 4; 6 TO 7; 7 TO 8
TB6	1 TO 2; 2 TO 3; 3 TO 4; 4 TO 5; 5 TO 6; 7 TO 8; 8 TO 9
TB7	3 TO 4; 4 TO 5; 5 TO 6; 6 TO 7; 7 TO 8; 8 TO 9; 9 TO 10
TB8	1 TO 2; 2 TO 3; 3 TO 4; 4 TO 5; 5 TO 6; 6 TO 7; 7 TO 8; 8 TO 9; 9 TO 10
TB9	2 TO 3; 5 TO 6; 6 TO 7; 8 TO 9; 9 TO 10



SECTION B-B
SCALE - 1/2



SECTION C-C
SCALE - FULL



SECTION D-D
SCALE - FULL

			021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			1	–		75	2901138	WIRING HARNESS "B"
			1	–		74	2901137	WIRING HARNESS "H"
			1	–		73	2901136	WIRING HARNESS "E"
			1	1		72	2900833	CABLE ASSEMBLY, ELECTRICAL
SEE NOTE 2			1	1		71	1016376-24	CONNECTOR, ELEC
			72	72		70	1897266-001	CONTACT, RECEP, ELEC
			15	15		69	1897267-001	CONNECTOR, PLUG, ELEC
			112	112		68	MS21919-WDG4 (1897073-204) THRU MS21919-WDG20 (1897073-220)	CLAMP, CUSHIONED
SEE NOTE 2			2	2		67	1016170-003	MARKER STRIP
SEE NOTE 2			2	2		66	1016325-003	TERMINAL BOARD
			3	3		65	MS35233-52	SCREW, PAN HD
			4	4		64	-48	
			68	68		63	-43	
			4	4		62	MS35233-34	, PAN HD
SEE NOTE 2			46	46		61	1006783-45	, BUTTON HD
			24	24		60	-44	
			53	53		59	-43	
			12	12		58	-29	
			17	17		57	-28	
			89	89		56	-26	
			116	116		55	-23	
SEE NOTE 2			16	16		54	1006783-20	SCREW, BUTTON HD
			31	31		53	AN960C10L (1897006-019)	WASHER, FLAT
			96	96		52	AN960C8L (1897006-038)	WASHER, FLAT
			67	67		51	MS35338-81	WASHER, LOCK, SPLIT
			105	105		50	-80	
			116	116		49	-79	
			16	16		48	MS35338-78	SPLIT
			154	154		47	MS35333-72	INT TOOTH
			52	52		46	MS35333-71	WASHER, LOCK, INT TOOTH
			56	56		45	1016151-010	NUT, SELF LOCKING
			17	17		44	1016151-008	NUT, SELF LOCKING
			–	1		43	2900763	WIRING HARNESS H
			1	1		42	2900547	G
			1	1		41	2900546	F
			–	1		40	2900545	E
			1	1		39	2900544	D
			1	1		38	2900543	C
			–	1		37	2900542	B
			1	1		36	2900541	WIRING HARNESS A
			2	2		35	1900448-021	CABLE CLAMP BRACKET ASSY
			1	1		34	2900433	BRACKET, CABLE CLAMP
			2	2		33	1897230-001	CONNECTOR, RECEP, ELEC
SEE NOTE 2			28	28		32	1016376-13	CONNECTOR, ELEC
			30	30		31	1015894-004	JUMPER STRAP
			7	7		30	1015894-002	JUMPER STRAP
			2	2		29	1016170-010	MARKER STRIP
			4	4		28	1001666-10	PLATE, DESIGNATION
SEE NOTE 2			1	1		27	1001666-3	PLATE, DESIGNATION
			8	8		26	1897322-001	PLATE, TERMINAL BOARD
			10	10		25	1897322-002	PLATE, TERMINAL BOARD
SEE NOTE 2			2	2		24	1016325-010	TERMINAL BOARD
			4	4		23	1001665-010	TERMINAL BOARD
			1	1		22	1001665-003	TERMINAL BOARD
			6	6		21	1016020-2	PLUNGER
SEE NOTE 2			6	6		20	1016020-1	GROMMET
			2	2		19	2900606	BRACKET, UPPER
			1	1		18	2900740	COVER, PROTECTIVE
			1	1		17	2900548	BRACKET, TERMINAL BLOCK
			2	2		16	2900605	BRACKET, ANGLE
			3	3		15	2900498	BRACKET, ELEC CONN
			3	3		14	2900399	SPACER, CONN SUPPORT
			1	1		13	2900398	SUPPORT, ELEC CONN
SEE NOTE 2			12	12		12	1016005-001	SHIM, LAMINATED
			1	1		11	2900376	CONNECTOR PLATE
			7	7		10	2900732	BRACKET, HARNESS CLAMP
			2	2		9	1900358	INSULATOR, TOP
			2	2		8	1900357	BUS BAR
			4	4		7	2900495	INSULATOR, BUSHING
			1	1		6	2900738	BRACKET, BUS BAR
			1	1		5	2900739	COVER, PROTECTIVE
			1	1		4	2900737	BRACKET, TERMINAL BLOCK
			15	15		3	2900375	BRACKET, RETRACTOR
SEE NOTE 2			20	20		2	1015800-001	CABLE RETRACTOR
			1	1		1	2900377	HARNESS FRAME (INSEP ASSY)

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900032-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN C. M. Kulp 30 MAR 65
CHECKED J. GRIEB DATE 31 MAR 65
APPROVAL 15 Sept 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS
BLOCK II/LEM

HARNESS & FRAME ASSEMBLY

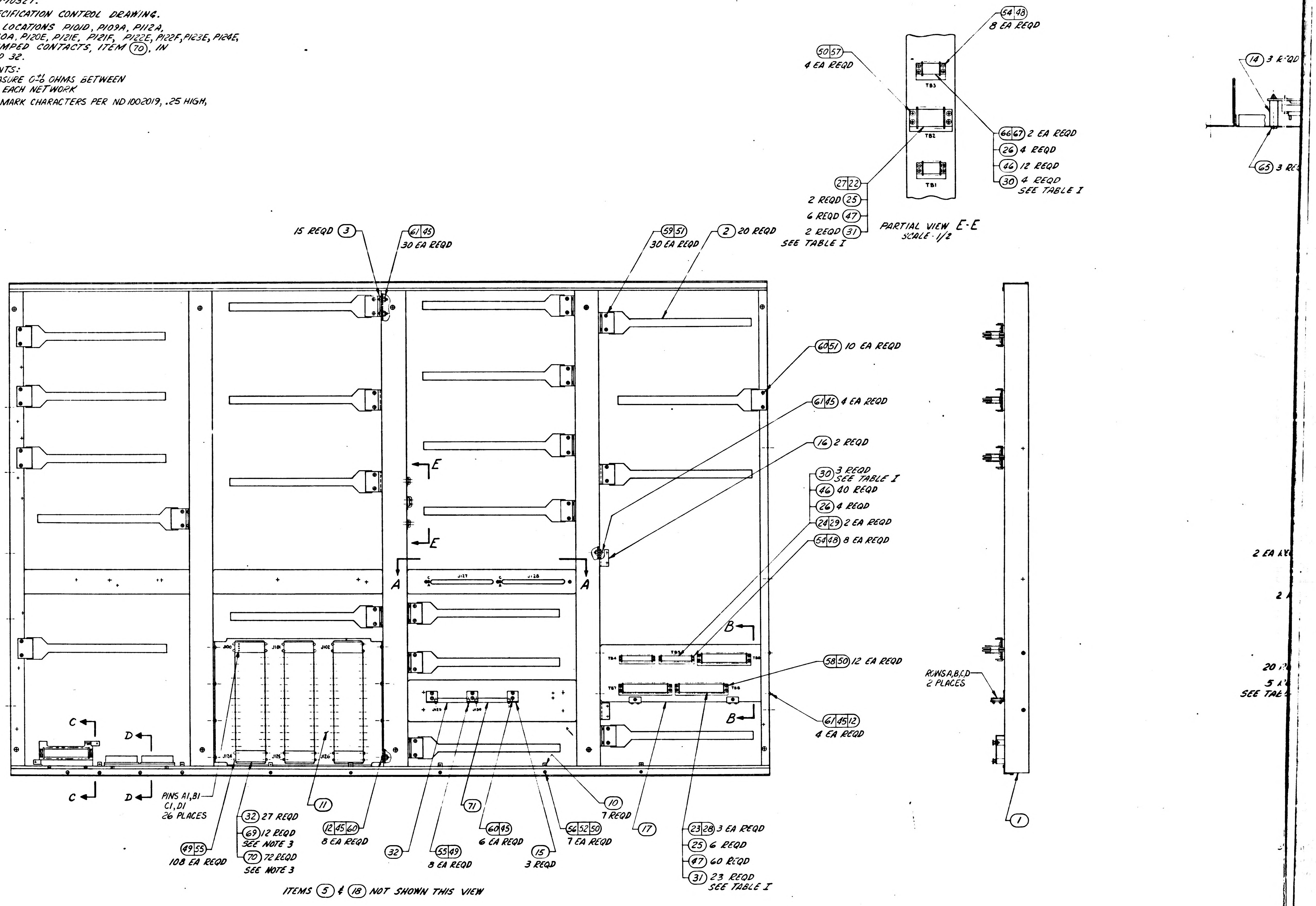
CODE IDENT NO. 99974
SIZE J
2900058
SCALE 1/4
SHEET 1 OF 2

2900058 REV LET R SH 1

2/2900058

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
3. INSTALL ITEM (69) AT LOCATIONS P101D, P109A, P112A, P112D, P113D, P118D, P120A, P120E, P121E, P121F, P122E, P122F, P123E, P124E, AND P125E WITH CRIMPED CONTACTS, ITEM (70), IN HOLES 1, 2, 3, 30, 31 AND 32.
4. ELECTRICAL REQUIREMENTS:
   - A. CONTINUITY TEST MEASURE 0^{+1}_{-0} OHMS BETWEEN TERMINAL POINTS OF EACH NETWORK
5. IDENTIFY USING PART NO. MARK CHARACTERS PER ND1002019, .25 HIGH, COLOR BLACK.



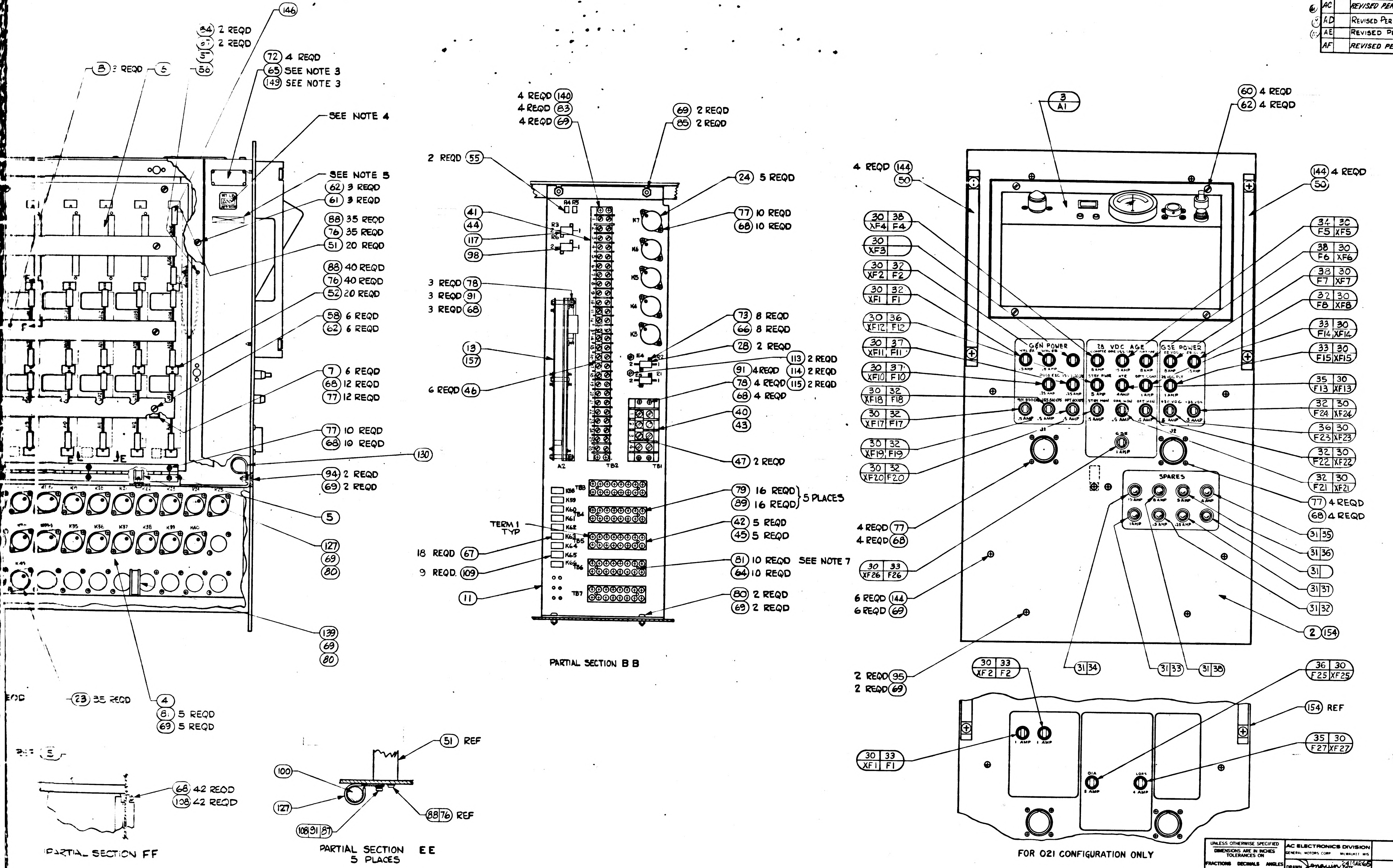
(54|48) 8 EA REQD
(50|57) 4 EA REQD
TB3
TB2
TB1
(66|67) 2 EA REQD
(26) 4 REQD
(46) 12 REQD
(30) 4 REQD SEE TABLE I
(27|22)
2 REQD (25)
6 REQD (47)
2 REQD (31) SEE TABLE I
PARTIAL VIEW E-E
SCALE - 1/2
(14) 3 REQD
(65) 3 RE
15 REQD (3)
(61|45) 30 EA REQD
(59|51) 30 EA REQD
(2) 20 REQD
(60|51) 10 EA REQD
(61|45) 4 EA REQD
(16) 2 REQD
(30) 3 REQD SEE TABLE I
(46) 40 REQD
(26) 4 REQD
(24|29) 2 EA REQD
(54|48) 8 EA REQD
E
E
A
A
J127
J128
B
B
C
C
D
D
J100
J101
J102
J124
J125
J126
TB4
TB5
TB6
TB7
TB8
(58|50) 12 EA REQD
(61|45|12) 4 EA REQD
ROWS A,B,C,D 2 PLACES
(1)
2 EA RE
2
20 R
5 R
SEE TAB
PINS A1, B1 C1, D1 26 PLACES
(49|55) 108 EA REQD
(32) 27 REQD
(69) 12 REQD SEE NOTE 3
(70) 72 REQD SEE NOTE 3
(11)
(12|45|60) 8 EA REQD
(32)
(55|49) 8 EA REQD
(71)
(60|45) 6 EA REQD
(15) 3 REQD
(56|52|50) 7 EA REQD
(10) 7 REQD
(17)
(23|28) 3 EA REQD
(25) 6 REQD
(47) 60 REQD
(31) 23 REQD SEE TABLE I

ITEMS (5) & (18) NOT SHOWN THIS VIEW

2900058 REV LTR A SH 1

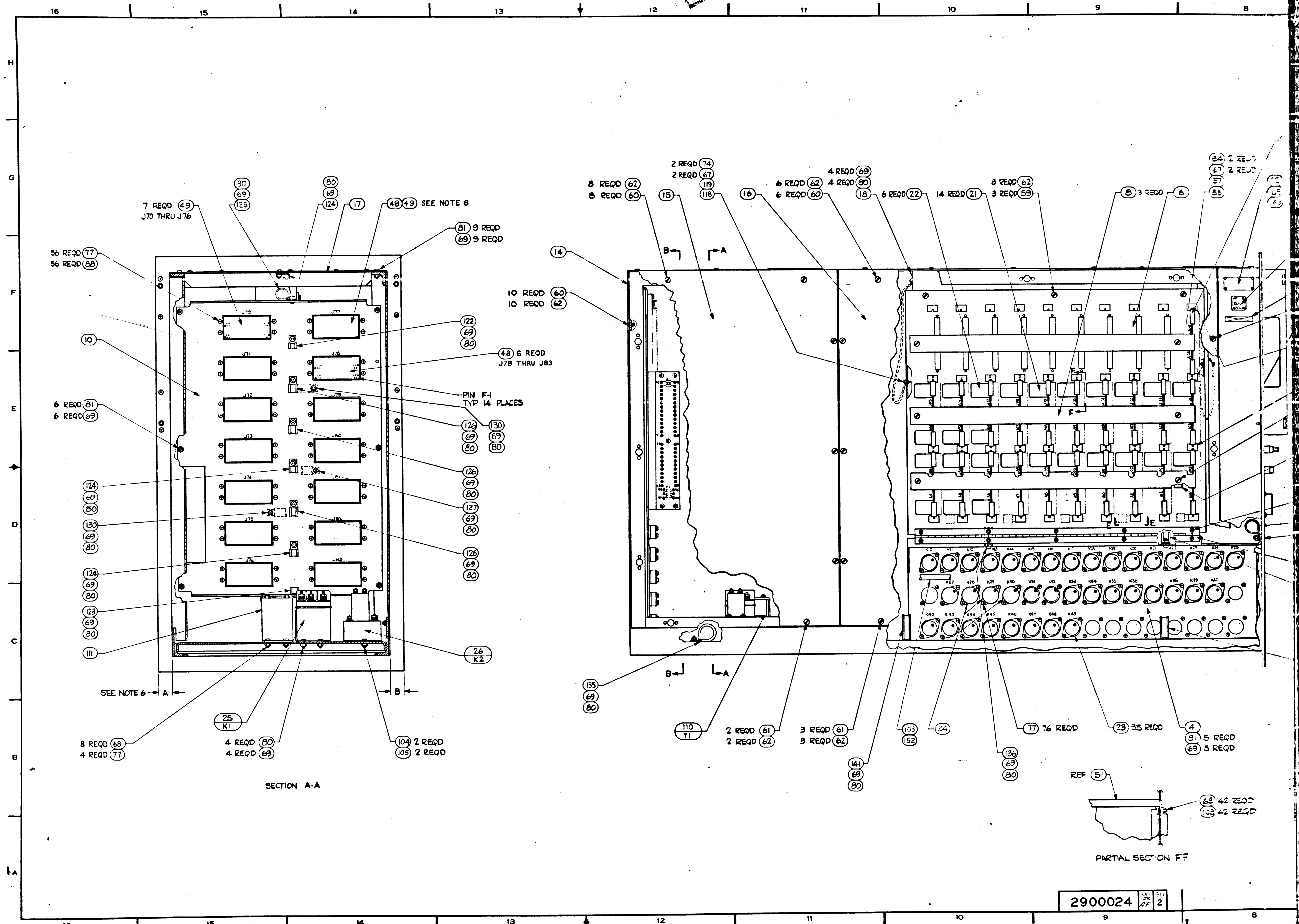
1/2900058

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
S		REPLACES REV R WITH CHANGE PER MXC 203747		5 AUG 65	
T		REVISED PER MXC 203866		17 AUG 65	DKD
U		REVISED PER MXC 204027		30 AUG 65	
V		REVISED PER MXC 204597		10 SEP 65	
W		REVISED PER MXC 204707		14 SEP 65	
Y		REVISED PER MXC 204899		23 SEP 65	
Z		REVISION STATUS CHANGED		1 OCT 65	
AA		REVISED PER MXC 200174		19 OCT 65	
AB		INITIAL RELEASE CLASS A PER TDRR 23557		21 OCT 65	DKD CW
AC		REVISED PER TDRR 24141		30 NOV 65	IWP
AD		REVISED PER TDRR 24592		14 DEC 65	
AE		REVISED PER TDRR 26363		22 FEB 66	
AF		REVISED PER TDRR 27579		11-APR-66	B. RWH


146
34 2 REQD
57 2 REQD
51
56
8 2 REQD
5
72 4 REQD
65 SEE NOTE 3
149 SEE NOTE 3
SEE NOTE 4
SEE NOTE 5
62 3 REQD
61 3 REQD
88 35 REQD
76 35 REQD
51 20 REQD
88 40 REQD
76 40 REQD
52 20 REQD
58 6 REQD
62 6 REQD
7 6 REQD
68 12 REQD
77 12 REQD
77 10 REQD
68 10 REQD
130
94 2 REQD
69 2 REQD
5
127
69
80
139
69
80
23 35 REQD
4
81 5 REQD
69 5 REQD
REF 5
68 42 REQD
108 42 REQD
PARTIAL SECTION FF
4 REQD 140
4 REQD 83
4 REQD 69
69 2 REQD
85 2 REQD
2 REQD 55
24 5 REQD
77 10 REQD
68 10 REQD
41
44
117
98
3 REQD 78
3 REQD 91
3 REQD 68
13
157
6 REQD 46
73 8 REQD
66 8 REQD
28 2 REQD
113 2 REQD
114 2 REQD
115 2 REQD
91 4 REQD
78 4 REQD
68 4 REQD
40
43
47 2 REQD
79 16 REQD
89 16 REQD
5 PLACES
42 5 REQD
45 5 REQD
81 10 REQD
64 10 REQD
SEE NOTE 7
80 2 REQD
69 2 REQD
TERM 1 TYP
18 REQD 67
9 REQD 109
11
K7
K6
K5
K4
K3
R4 R5
R3
R6
E4
R2
R1
A2
TB2
TB1
TB3
TB4
TB5
TB6
TB7
K58
K59
K60
K61
K62
K63
K64
K65
K66
K35
K36
K37
K38
K39
K40
K41
PARTIAL SECTION B B
51 REF
100
127
88 76 REF
108 91 87
PARTIAL SECTION EE
5 PLACES
3 A1
60 4 REQD
62 4 REQD
4 REQD 144
50
144 4 REQD
50
30 38 XF4 F4
30 XF3
30 32 XF2 F2
30 32 XF1 F1
30 36 XF12 F12
30 37 XF11 F11
30 37 XF10 F10
30 32 XF18 F18
30 32 XF17 F17
30 32 XF19 F19
30 32 XF20 F20
34 30 F5 XF5
38 30 F6 XF6
38 30 F7 XF7
32 30 F8 XF8
33 30 F14 XF14
33 30 F15 XF15
35 30 F13 XF13
32 30 F24 XF24
36 30 F23 XF23
32 30 F22 XF22
32 30 F21 XF21
77 4 REQD
68 4 REQD
GEN POWER
28 VDC AGE
GSE POWER
SPARES
J1
J2
4 REQD 77
4 REQD 68
30 33 XF26 F26
6 REQD 144
6 REQD 69
31 35
31 36
31
31 37
31 32
2 154
31 34
31 33
31 38
2 REQD 95
2 REQD 69
30 33 XF2 F2
36 30 F25 XF25
154 REF
35 30 F27 XF27
30 33 XF1 F1
1 AMP
4 AMP
FOR O21 CONFIGURATION ONLY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± —	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Jonquin DATE 24 MAR 65 CHECKED J. G. WEB 2 AUG 65 APPROVAL APPROVAL	DISTRIBUTION BOX ASSEMBLY
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 2900024
CONTRACT NAS 9-497	MIT APPROVAL	SCALE 1:2 · SHEET 2 OF 2

2900024 AF


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
7 REQD 49
J70 THRU J76
80
69
125
80
69
124
17
48 49 SEE NOTE 8
81 9 REQD
69 9 REQD
56 REQD 77
56 REQD 88
10
J70
J71
J72
J73
J74
J75
J76
J77
J78
J79
J80
J81
J82
J83
122
69
80
48 6 REQD
J78 THRU J83
PIN F-1
TYP 14 PLACES
6 REQD 81
6 REQD 69
126
69
80
130
69
80
124
69
80
126
69
80
127
69
80
130
69
80
126
69
80
124
69
80
123
69
80
111
26
K2
SEE NOTE 6
A
B
25
K1
8 REQD 68
4 REQD 77
4 REQD 80
4 REQD 69
104 2 REQD
105 2 REQD
SECTION A-A
14
10 REQD 60
10 REQD 62
8 REQD 62
8 REQD 60
15
2 REQD 74
2 REQD 67
119
118
16
6 REQD 62
6 REQD 60
4 REQD 69
4 REQD 80
18
6 REQD 22
14 REQD 21
3 REQD 62
3 REQD 59
8 3 REQD
6
84 2 REQD
67 2 REQD
57
36
B
A
F
E
K10
K11
K24
K25
K27
K28
K29
K30
K31
K32
K33
K34
K35
K36
K38
K39
K40
K42
K43
K44
K45
K46
K47
K48
K49
135
69
80
110
T1
2 REQD 61
2 REQD 62
3 REQD 61
3 REQD 62
141
69
80
103
152
24
136
69
80
77 76 REQD
23 35 REQD
4
81 5 REQD
69 5 REQD
REF 51
68 42 REQD
42 REQD
PARTIAL SECTION F-F

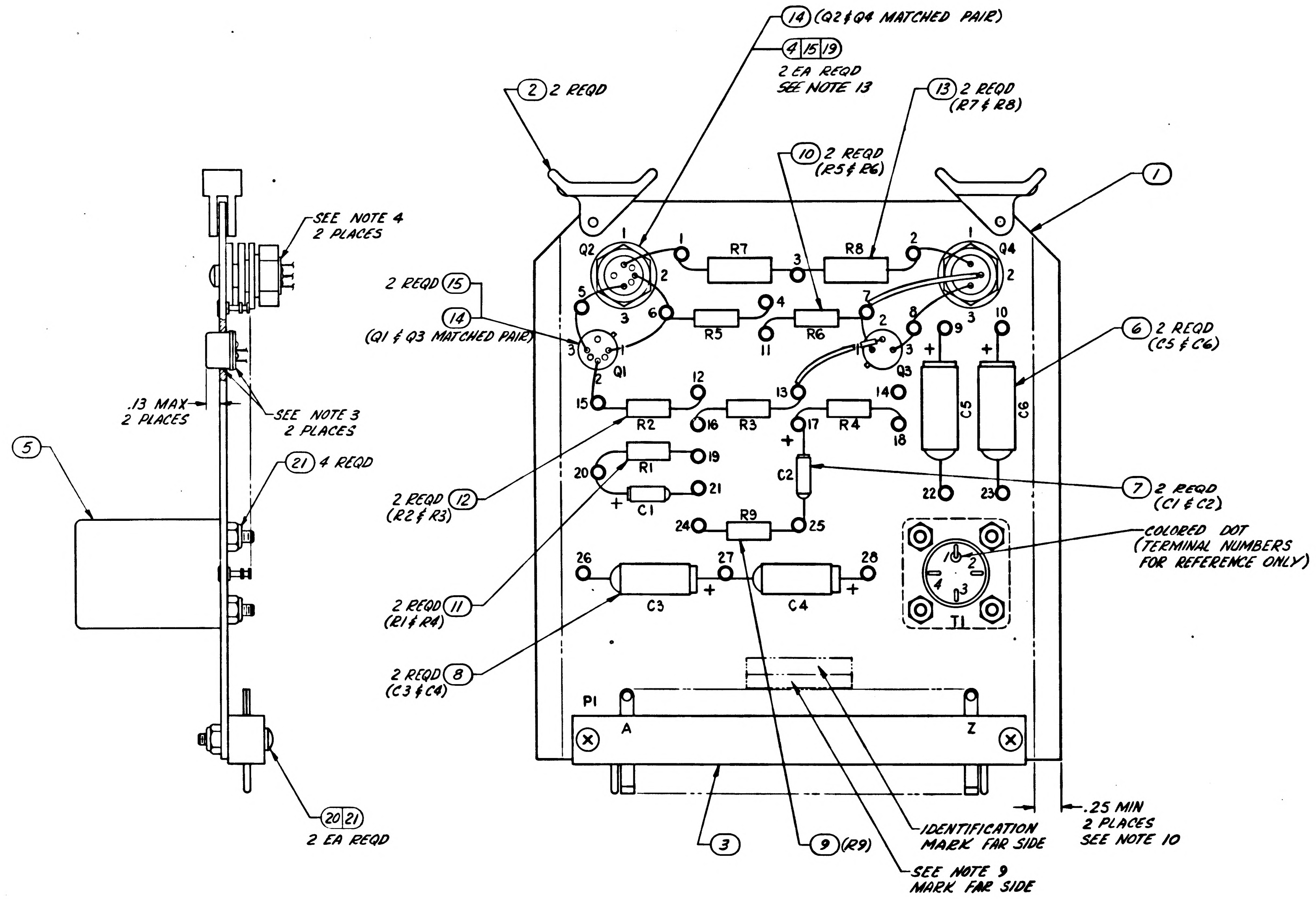
2900024 SH 2

1/2900024

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REPLACES REV - WITH CHANGE PER MXC 309488 WAS C SIZE	—	MAY 65	
B		REVISED PER MXC-203415	—	28 JUL 65	RWH
C		REVISED PER MXC 204751		3 SEP 65	
D		INITIAL RELEASE CLASS A PER TDRR 23557			

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEMS ㉓, OR ㉔ AND ㉕.
3. BOND ITEM ⑮ TO ITEM ⑭; AND ITEM ⑭ TO ITEM ① PER ND1002203.
4. BOND ITEM ⑮ TO ITEM ④ PER ND1002203.
5. SPOT TIE WIRES AS REQUIRED USING ITEM ㉒.
6. USE ITEM ⑯ AS REQUIRED ON LEADS OF ITEM ⑭.
7. USE ITEM ⑰ ON CONNECTED TERMINALS OF ITEM ③.
8. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES-267).
9. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .09 HIGH IN LOCATION SHOWN.
10. COMPONENTS AND WIRING NOT TO EXTEND INTO AREAS INDICATED.
11. VENDOR ITEM - SEE SPEC CONTROL DRAWING.
12. SERIALIZE PER ND1002023.
13. HEAT SINK, NUT CAP ITEM ④ LOCKING TORQUE 25-30 IN. OZ.



⑭ (Q2 & Q4 MATCHED PAIR)
④⑮⑲ 2 EA REQD SEE NOTE 13
② 2 REQD
⑬ 2 REQD (R7 & R8)
⑩ 2 REQD (R5 & R6)
①
SEE NOTE 4 2 PLACES
2 REQD ⑮
⑭ (Q1 & Q3 MATCHED PAIR)
⑥ 2 REQD (C5 & C6)
.13 MAX 2 PLACES
SEE NOTE 3 2 PLACES
⑤
㉑ 4 REQD
2 REQD ⑫ (R2 & R3)
⑦ 2 REQD (C1 & C2)
COLORED DOT (TERMINAL NUMBERS FOR REFERENCE ONLY)
2 REQD ⑪ (R1 & R4)
2 REQD ⑧ (C3 & C4)
Q2
Q4
Q1
Q3
R1
R2
R3
R4
R5
R6
R7
R8
R9
C1
C2
C3
C4
C5
C6
T1
P1
A
Z
⑳㉑ 2 EA REQD
③
⑨ (R9)
IDENTIFICATION MARK FAR SIDE
SEE NOTE 9 MARK FAR SIDE
.25 MIN 2 PLACES SEE NOTE 10

Ⓐ REPLACES REV - WITH CHANGE

	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	X		27	PS 2900059	PROCUREMENT SPECIFICATION
	X		26	2900082	SCHEMATIC DIAGRAM, ELEC
	AR		25	SN60WS	SOLDER QQ-S-571 (ES2175-1)
	AR		24	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
	AR		23	SN60WRAP	SOLDER QQ-S-571 (ES2175-3)
	AR		22	MIL-T-713	LACING TAPE, TYPE P, WAXED, BLACK (ES2732, SIZE 18)
SEE NOTE 11	6		21	1016151-004	NUT, SELF LOCKING
	2		20	MS35216-17	SCREW, PAN HD
	2		19	MS35216-11	SCREW, PAN HD
	1		18	2900081	WIRE LIST AA
SEE NOTE 11	7		17	1015864-079	INSULATION SLEEVING, ELEC
	AR		16	1006776-22	INSULATION SLEEVING, ELEC
SEE NOTE 11	4		15	1015870-001	INSULATOR, DISC
	2		14	1015928-004	TRANSISTOR, MATCHED PAIR (2N2243A)
	2		13	RC32GF302J	(1896953-074) RESISTOR MIL-R-11/6
	2		12	RC20GF474J	(1896952-113) MIL-R-11/3
	2		11	RC20GF364J	(1896952-110)
	2		10	RC20GF204J	(1896952-104)
	1		9	RC20GF202J	(1896952-056) RESISTOR MIL-R-11/3
	2		8	CS13AG100K	(1896954-176) CAPACITOR MIL-C-26655
	2		7	CS13AG010K	(1896954-158) CAPACITOR MIL-C-26655
	2		6	CS13AF470K	(1896954-156) CAPACITOR MIL-C-26655
SEE NOTE 11	1		5	1897205	TRANSFORMER, POWER STEP-UP
	2		4	1015872-001	HEAT SINK, TWO PIECE
	1		3	1015956-173	CONNECTOR, ADAPTER, ELEC
SEE NOTE 11	2		2	1015999-001	EJECTOR, CIRCUIT BOARD
	1		1	2900071	TERMINAL BOARD (INSEP ASSY)

QUANTITY REQUIRED — LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900024-011	2900024-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

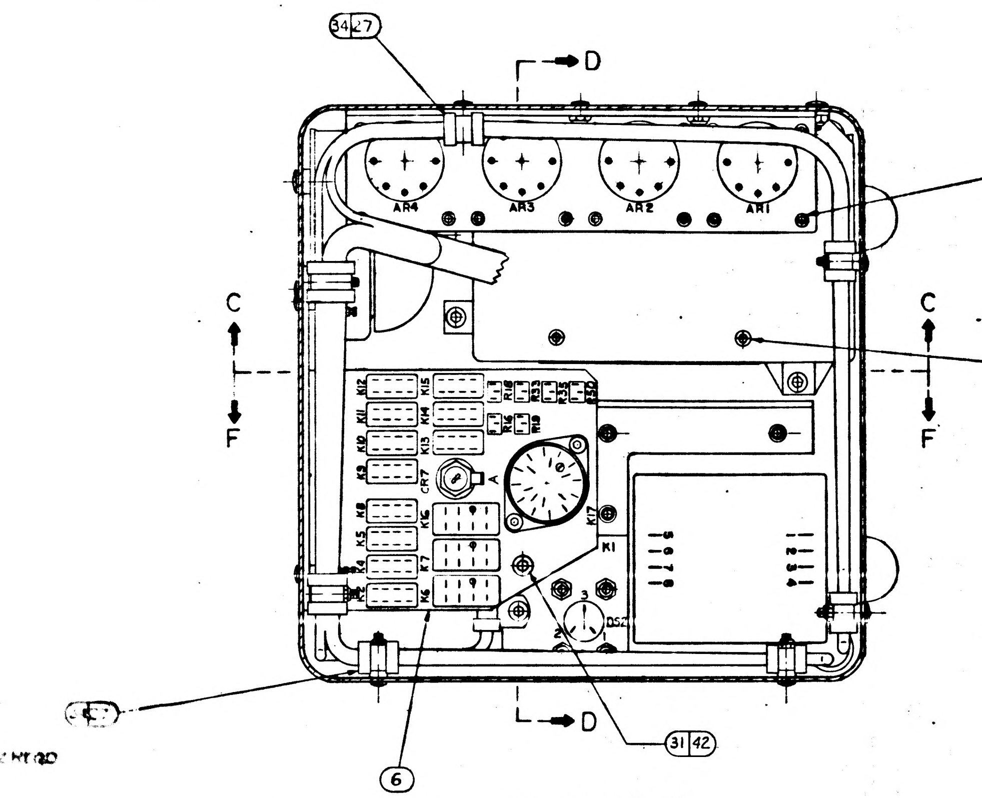
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN C. M. Kulo 29 MAR 65
CHECKED J. Stelma 29 MAR 65
APPROVAL 29 MAR 65
APPROVAL 10-22-65
NASA APPROVAL
MIT APPROVAL

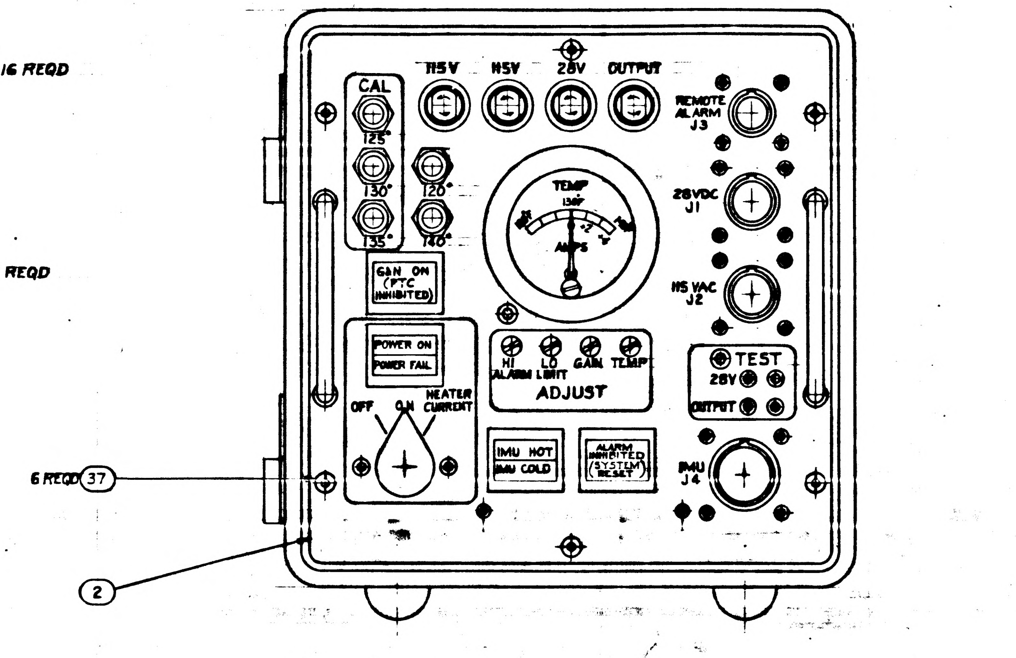
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BUFFER AMPLIFIER
ELECTRONIC COMPONENT
ASSEMBLY

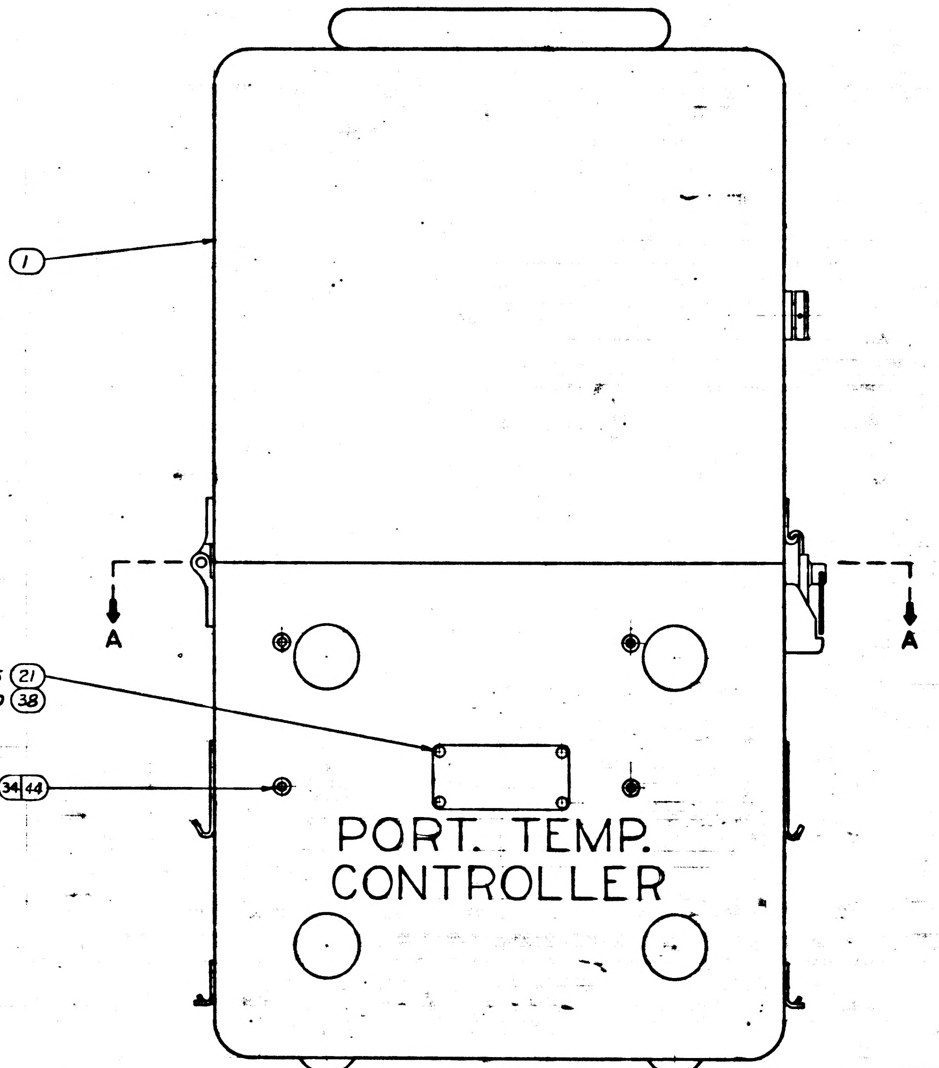
CODE IDENT NO 99974 SIZE E 2900059
SCALE 2:1 SHEET 1 OF 1

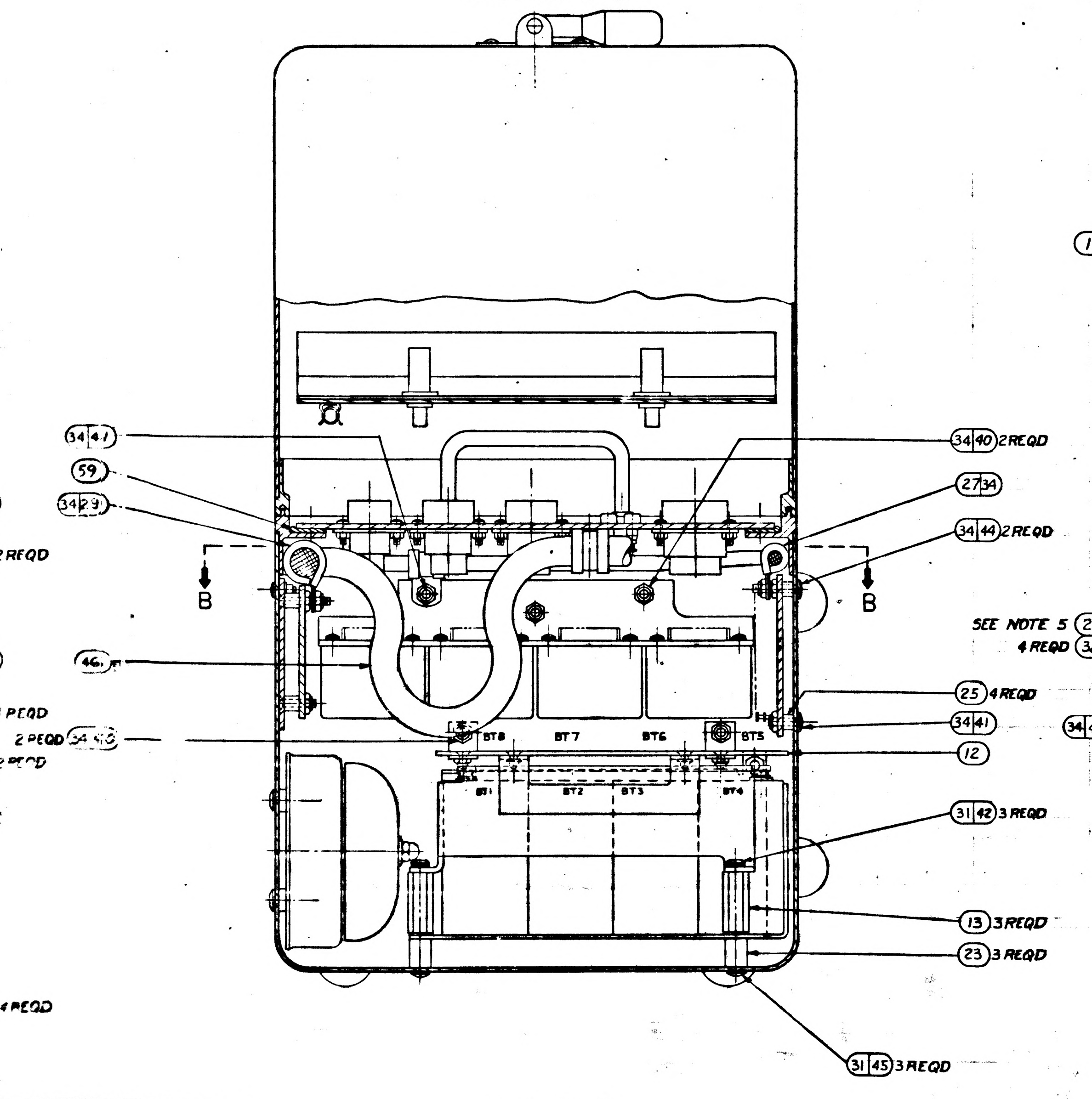

34 27
D
30 39 16 REQD
C
C
F
F
AR4
AR3
AR2
AR1
36 2 REQD
K12
K11
K10
K9
K8
K5
K4
K15
K14
K13
K16
K7
K6
K17
K1
CR7
31 42
6
D

SECTION B-B


CAL
115V
115V
28V
OUTPUT
REMOTE ALARM J3
125°
130°
135°
120°
140°
TEMP
AMPS
28VDC J1
115 VAC J2
GAIN ON (PTC INHIBITED)
POWER ON
POWER FAIL
OFF
ON
HEATER CURRENT
HI
LO
ALARM LIMIT
GAIN
TEMP
ADJUST
TEST
28V
OUTPUT
IMU HOT
IMU COLD
ALARM INHIBITED (SYSTEM) RESET
IMU J4
6 REQD 37
2

VIEW A - A
WITH COVER REMOVED


1
A
A
SEE NOTE 5 21
4 REQD 38
34 44
PORT. TEMP.
CONTROLLER


34 41
59
34 29
2 REQD
B
B
46
2 REQD 34 43
34 40 2 REQD
27 34
34 44 2 REQD
25 4 REQD
34 41
12
BT8
BT7
BT6
BT5
BT1
BT2
BT3
BT4
31 42 3 REQD
13 3 REQD
23 3 REQD
31 45 3 REQD

SECTION C - C

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
J		REPLACES REV (H) WITH CHANGE PER MXC 206049 WAS "D" SIZE		16 OCT 65	RLP MEM
K		REVISED PER MXC 206397		22 OCT 65	
L		INITIAL RELEASE CLASS A PER TDRR 24042		28 OCT 65	

				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 8				AR		60	MIL-A-5092 TYPE 2	ADHESIVE (ES2770-2)
SEE NOTE 8				1		59	2900742	GASKET, PANEL
				1		58	F02A250V4AS (1897099-113	FUSE, MIL-F-15160/02
				1		57	F02B125V3AS (1897099-130	FUSE, MIL-F-15160/02
				AR		56	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
				AR		55	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
				AR		54	SN 60 WS	SOLDER QQ-S-571 (ES2175-1)
SEE NOTE 3				1		53	2900862	CABLE INTERCONNECT - W 197
				1		52	2900861	W 196
				1		51	2900860	W 195
				1		50	2900859	W 194
SEE NOTE 3				1		49	2900856	CABLE INTERCONNECT - W 190
				X		48	2900133	SCHEMATIC DIAGRAM, ELEC
SEE NOTE 3				1		47	2900656	LEAD SET AA
				1		46	2900654	HARNESS A
SEE NOTE 6				3		45	1006783-104	SCREW, BUTTON HEAD 8-32 x 1
				5		44	1006783-103	
				2		43	1006783-46	10-32 x 3/4
				11		42	1006783-26	8-32 x 3/8
				6		41	1006783-23	x 1/2
				17		40	1006783-22	
				16		39	1006783-18	#4-40 x 1/4
				4		38	1006783-9	SCREW, BUTTON HEAD
				6		37	1010630-39	SCREW, FLAT HEAD x 1/2
				4		36	1010630-13	SCREW, FLAT HEAD
				1		35	1012525-006	NUT, SELF LOCKING #8-32
				23		34	1012525-004	#6-32
				2		33	1016151-010	
SEE NOTE 6				2		32	1016151-004	NUT, SELF LOCKING #4-40
				12		31	MS 35338-80	WASHER, LOCK #8
				16		30	MS35338-78	WASHER, LOCK
				1		29	MS 21919DG8 (1897073-108)	CLAMP, CUSHIONED DIA
				1		28	MS 21919DG6 (1897073-106)	CLAMP, CUSHIONED DIA
				3		27	MS 21919DG4 (1897073-104)	CLAMP, CUSHIONED
				4		26	MS21919DG3 (1897073-103)	CLAMP, CUSHIONED DIA
SEE NOTE 6				8		25	1015860-024	SPACER
				2		24	1015860-017	SPACER
SEE NOTE 6				3		23	1015860-008	SPACER
				6		22	2900796	LINK, BATTERY TERMINAL
				1		21	1004260-141	NAMEPLATE
SEE NOTE 6				8		20	1897268-001	BATTERY
				1		19	1897291	TRANSFORMER, POWER
SEE NOTE 6				1		18	2900520	BELL, ASSEMBLY
				1		17	CE71C5626 (1896872-119)	CAPACITOR, MIL-C-62/12
SEE NOTE 6				4		16	1897261	COMPARATOR
				1		15	2900795	BRACKET, ELECTRONIC COMPONENTS
				1		14	2900512-001	NUT, SLEEVE
				3		13	2900512-000	NUT, SLEEVE
				1		12	2900511	COVER, BATTERY RETAINER
				2		11	2900510	BRACKET, ANGLE
				1		10	2900509	TRAY, BATTERY
				1		9	2900508	RETAINER, BATTERY (INSEP ASSY)
				2		8	2900507	STRAP, RETAINING
				2		7	2900506	STRAP, RETAINING (INSEP ASSY)
				1		6	2900777-011	RELAY ASSEMBLY
				1		5	2900778-011	ELECTRONIC COMPONENTS ASSY
				1		4	2900513-011	ELECTRONIC COMPONENTS ASSY
				1		3	2900521-011	ELECTRONIC COMPONENT ASSY
				1		2	2900835-011	PANEL ASSEMBLY
SEE NOTE 9				1		1	2900525-011	CASE PORT. TEMP. CONTROLLER

QUANTITY REQUIRED
LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900063-011	2900030-011	011
2900030-011	2900030-011	011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9- [illegible]

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN COLEMAN DATE 3 AUG 65
CHECKED L STOLAR 7 AUG 65
APPROVAL [illegible] 9 AUG 65
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CONTROLLER,
TEMPERATURE, PORTABLE

CODE IDENT NO. 99974
SIZE J2
2900060
SCALE FULL
SHEET 1 OF 1

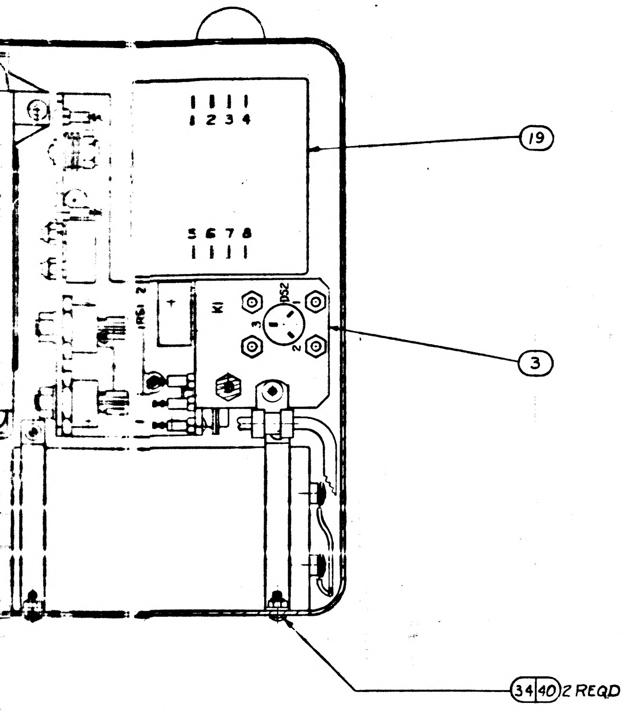
2 Charleston 7 OCT 65

3 Ty

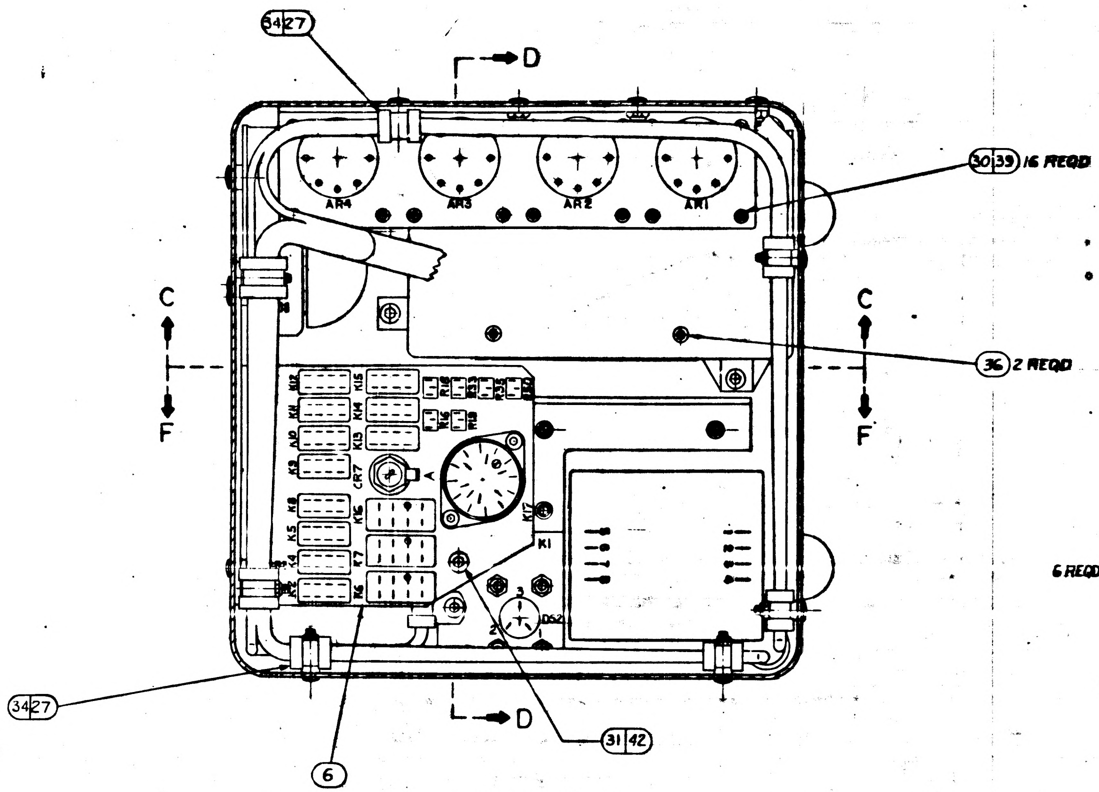
2900060 REV L SH 1

L 2900060

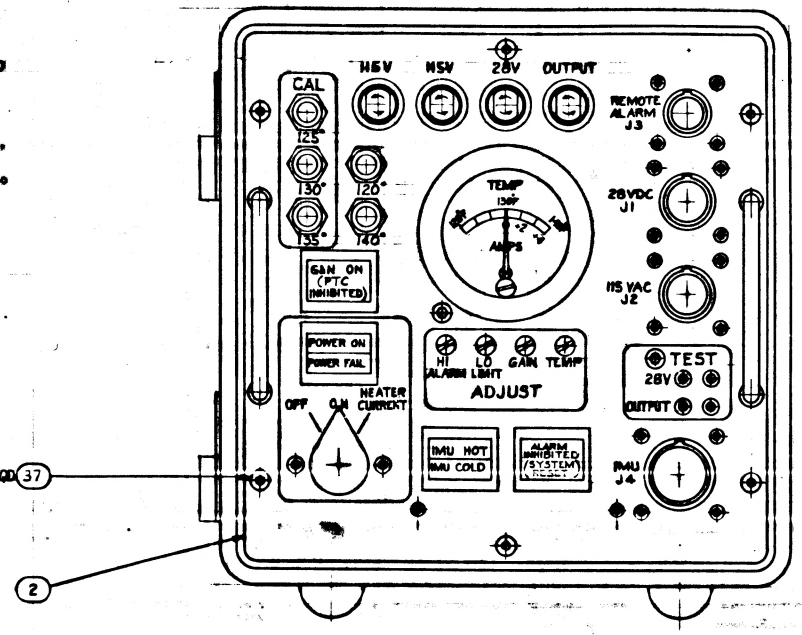
53


1 1 1 1
1 2 3 4
5 6 7 8
1 1 1 1
K1
DS2
19
3
34 40 2 REQD

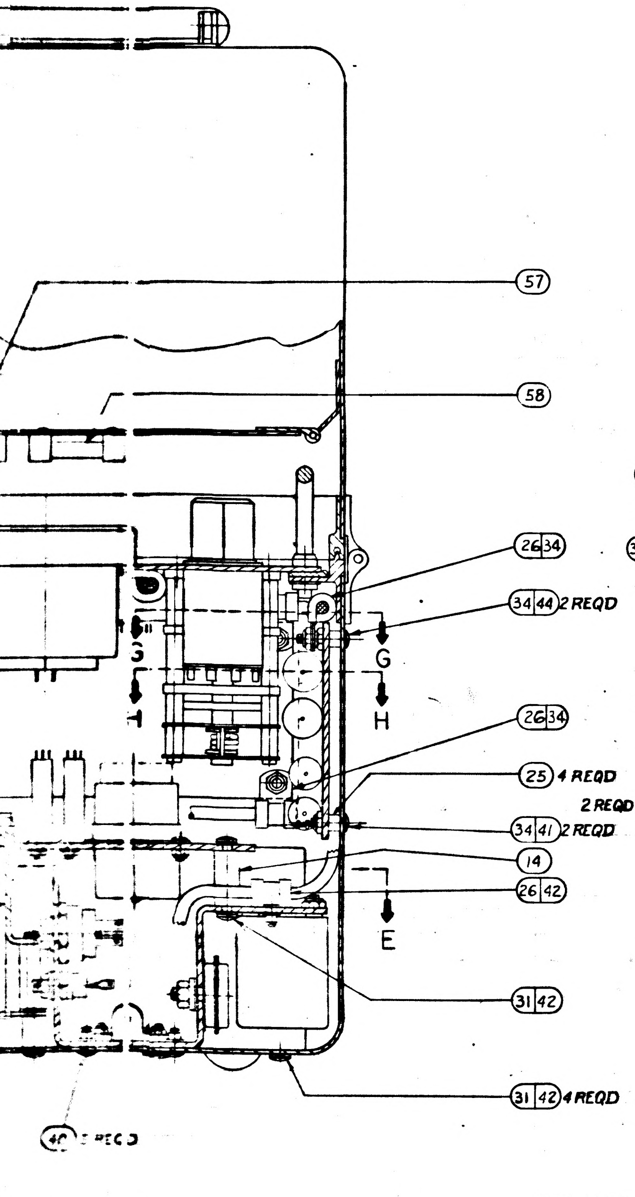
SECTION E-E


34 27
D
30 39 16 REQD
AR4
AR3
AR2
AR1
C
F
C
F
36 2 REQD
CR7
K1
DS2
6 REQD 37
34 27
6
31 42
L
D

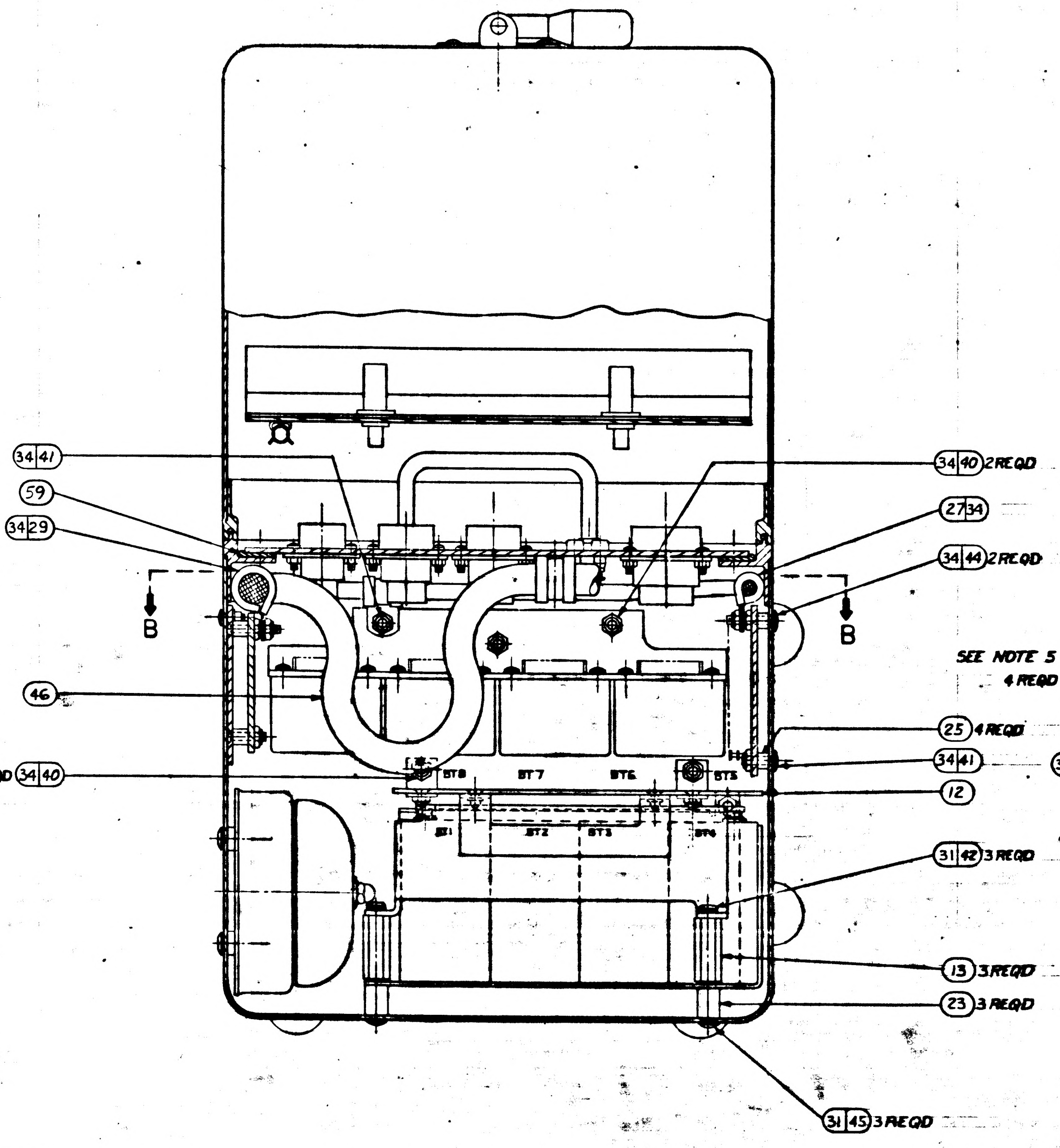
SECTION B-B


CAL
125
130
135
120
140
HSV
HSV
28V
OUTPUT
REMOTE ALARM J3
TEMP 130°
AMPS
28VDC J1
115 VAC J2
GAN ON (PTC INHIBITED)
POWER ON
POWER FAIL
HI
LO
GAIN
TEMP
ALARM LIMIT
ADJUST
TEST
28V
OUTPUT
OFF
ON
HEATER CURRENT
IMU HOT
IMU COLD
ALARM INHIBITED /SYSTEM RESET
IMU J4
2

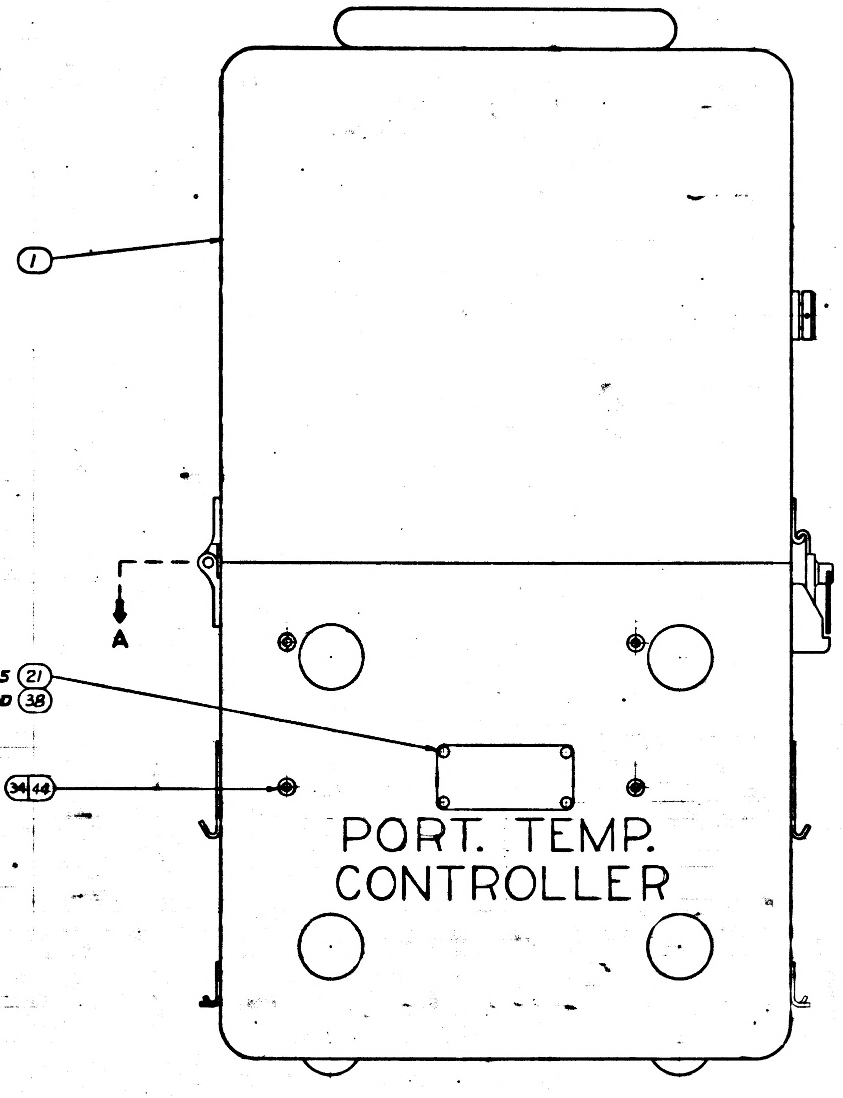
VIEW A - A
WITH COVER REMOVED


57
58
26 34
34 44 2 REQD
G
G
H
H
26 34
25 4 REQD
34 41 2 REQD
14
26 42
E
31 42
31 42 4 REQD
40 2 REQD

SECTION D-D


34 41
59
34 29
34 40 2 REQD
27 34
34 44 2 REQD
B
B
46
BT8
BT7
BT6
BT5
BT1
BT2
BT3
BT4
25 4 REQD
2 REQD 34 40
34 41
12
31 42 3 REQD
13 3 REQD
23 3 REQD
31 45 3 REQD

SECTION C-C


SEE NOTE 5 21
4 REQD 38
1
34 44
A
A
PORT. TEMP.
CONTROLLER

	QUANTITY REQUIRED			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
SEE NOTE 8				AR		60	MIL-A-5092 TYPE 2	ADHESIV
SEE NOTE 8				1		59	2900742	GASKET.
				1		58	F02A250V4AS (1897099-113	
				1		57	F02B125V3AS (1897099-130	
				AR		56	MIL-F-14256 TYPE A OR W	
				AR		55	SN 60 WRA	SOLDER
				AR		54	SN 60 WS	SOLDER
SEE NOTE 3				1		53	2900862	CABLE IN
				1		52	2900861	
				1		51	2900860	
				1		50	2900859	
SEE NOTE 3				1		49	2900856	CABLE IN
				X		48	2900133	SCHEMAT
SEE NOTE 3				1		47	2900656	LEAD S
				1		46	2900654	HARNES
SEE NOTE 6				3		45	1006783-104	SCREW,
				5		44	1006783-173	
				2		43	1006783-16	
				11		42	1006783-26	
				6		41	1006783-23	
				17		40	1006783-22	
				16		39	1006783-18	
				4		38	1006783-	SCREW,
				6		37	1010630-3	SCREW,
				4		36	1010630-1	SCREW, F
				1		35	1012525-016	NUT, SEL
				23		34	1012525-024	
				2		33	1016151-010	
SEE NOTE 6				2		32	1016151-006	NUT, SEL
				12		31	MS 35338-30	WASHER
				16		30	MS35338-8	WASHER
				1		29	MS 21919DG5 (1897073-105)	
				1		28	MS 21919DG6 (1897073-106)	
				3		27	MS 21919DG4 (1897073-104)	
				4		26	MS21919DG3 (1897073-103)	
SEE NOTE 6				8		25	1015860-024	SPACER
				2		24	1015860-017	SPACE
SEE NOTE 6				3		23	1015860-008	SPACER
				6		22	2900796	LINK, BAT
				1		21	1004260-41	NAMEPL
SEE NOTE 6				8		20	1897268-001	BATTER
				1		19	1897291	TRANSF
SEE NOTE 6				1		18	2900520	BELL
				1		17	CE71C562G (1896872-119)	CA
SEE NOTE 6				4		16	1897261	COMPAR
				1		15	2900795	BRACKET
				1		14	2900512-001	NUT, SL
				3		13	2900512-000	NUT, SL
						12	2900511	COVER
				2		11	2900510	BRACKE
						10	2900509	TRAY,
				1		9	2900508	RETAINER
				2		8	2900507	STRAP
				2		7	2900506	STRAP RE
				1		6	2900777-011	RELAY
				1		5	2900778-011	ELECTRO
				1		4	2900513-011	ELEC
				1		3	2900521-011	ELECTRO
				1		2	2900835-011	PANEL
SEE NOTE 8				1		1	2900525-011	CASE

LIST OF PARTS AND

SYM	ZONE	DESCRIPTION
J		REPLACES REV(H) WITH CHANGE PER MXC WAS "D" SIZE
K		REV. SEE PER
L		INITIAL RELEASE CLASS A PER T 4 4

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900063-011	2900030-011	011
2900030-011	2900030-011	011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ — + — + —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN COOKMAN 3 AUG 6
CHECKED L STELLAR 7 AUG
APPROVAL
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL

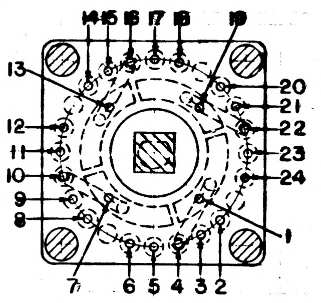
CON
TEMPERAT

CODE IDENT NO. 93974
SIZE J2
SCALE

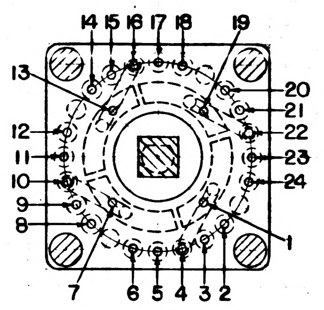
2900060	REV L	SH 1

NOTES:

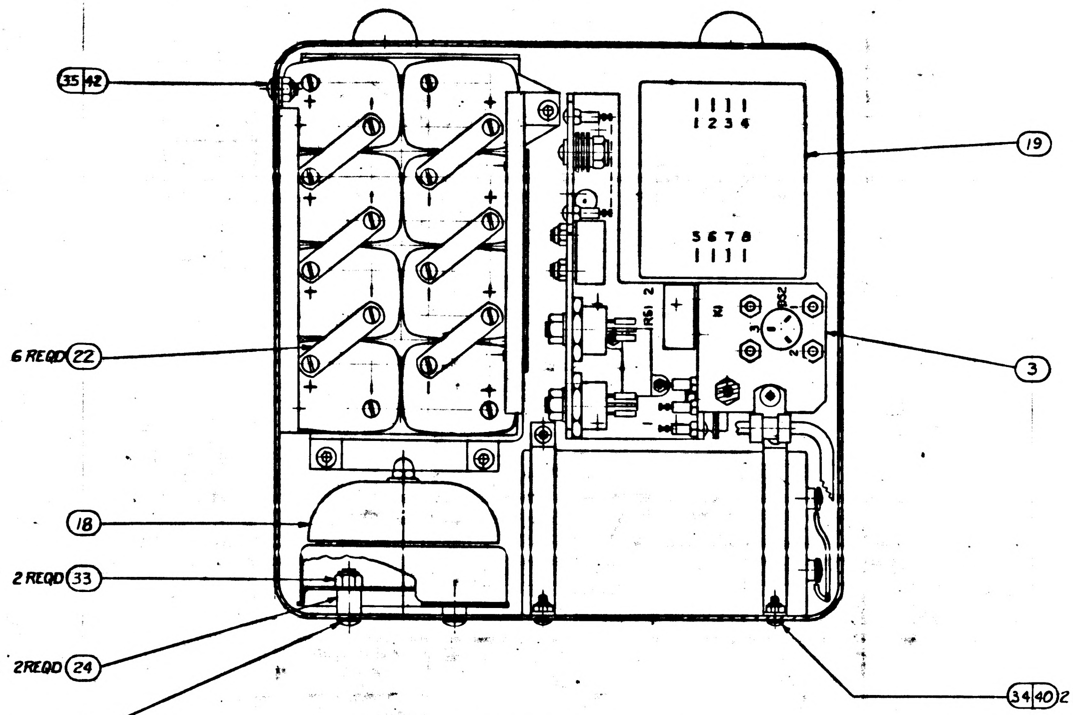
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 USING ITEMS (56) AND (54) OR (55).
3. THESE ITEMS ARE PART OF THIS ASSEMBLY.
4. DRAWING FOR REFERENCE:
   SCHEMATIC DIAGRAM ITEM (48)
5. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (21) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
6. VENDOR ITEM - SEE SOURCE OR SPECIFICATION CONTROL DRAWING.
7. PROCEDURE FOR CALIBRATING BRIDGES.
   AFTER COMPLETING CONTINUITY CHECKS, TURN ALL POTS FULLY CW (MAXIMUM RESISTANCE) EXCEPT R50, WHICH SHALL BE CCW. USE 28 VDC INPUT POWER WHILE ADJUSTING THE FOLLOWING VOLTAGES
   INDICATING BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 2505.5 Ω ACROSS J4-G AND J4-T. JUMPER J4-T TO J4-C. ADJUST R18 AND R19 CCW UNTIL THE FOLLOWING SIMULTANEOUS.
   READINGS OCCUR: 1.610 ± 1% VDC ACROSS R17 (TB2-52 AND TB2-45) AND 17.6 ± 1% VDC ACROSS R21 AND R22 (TB2-39 AND TB2-54).
   CONTROL BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 1560 Ω ACROSS J4-P AND J4-5. JUMPER J4-5 TO J4-C. TURN TEMP ADJUST POT TO MIDRANGE (25 Ω). ADJUST R33 AND R35 CCW UNTIL THE FOLLOWING SIMULTANEOUS READINGS OCCUR: 1.950 ± 1% VDC ACROSS R34 (TB2-56 AND TB2-47) AND 17.4 ± 1% VDC ACROSS R36, R38 AND R37 (TB2-42 AND TB2-12).
8. BOND ITEM (59) TO ITEM (1) USING ITEM (60).


14
15
16
17
18
19
13
12
11
10
9
8
20
21
22
23
24
1
7
6
5
4
3
2

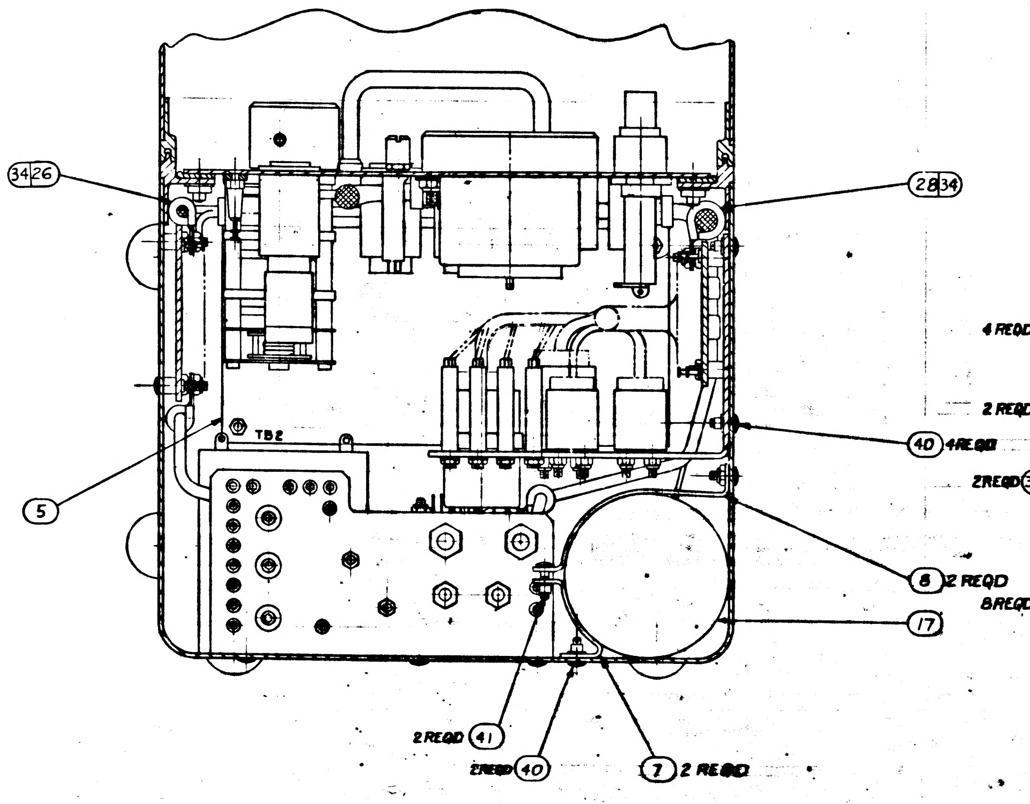
SECTION G-G
"A" DECK


14
15
16
17
18
19
13
12
11
10
9
8
20
21
22
23
24
1
7
6
5
4
3
2

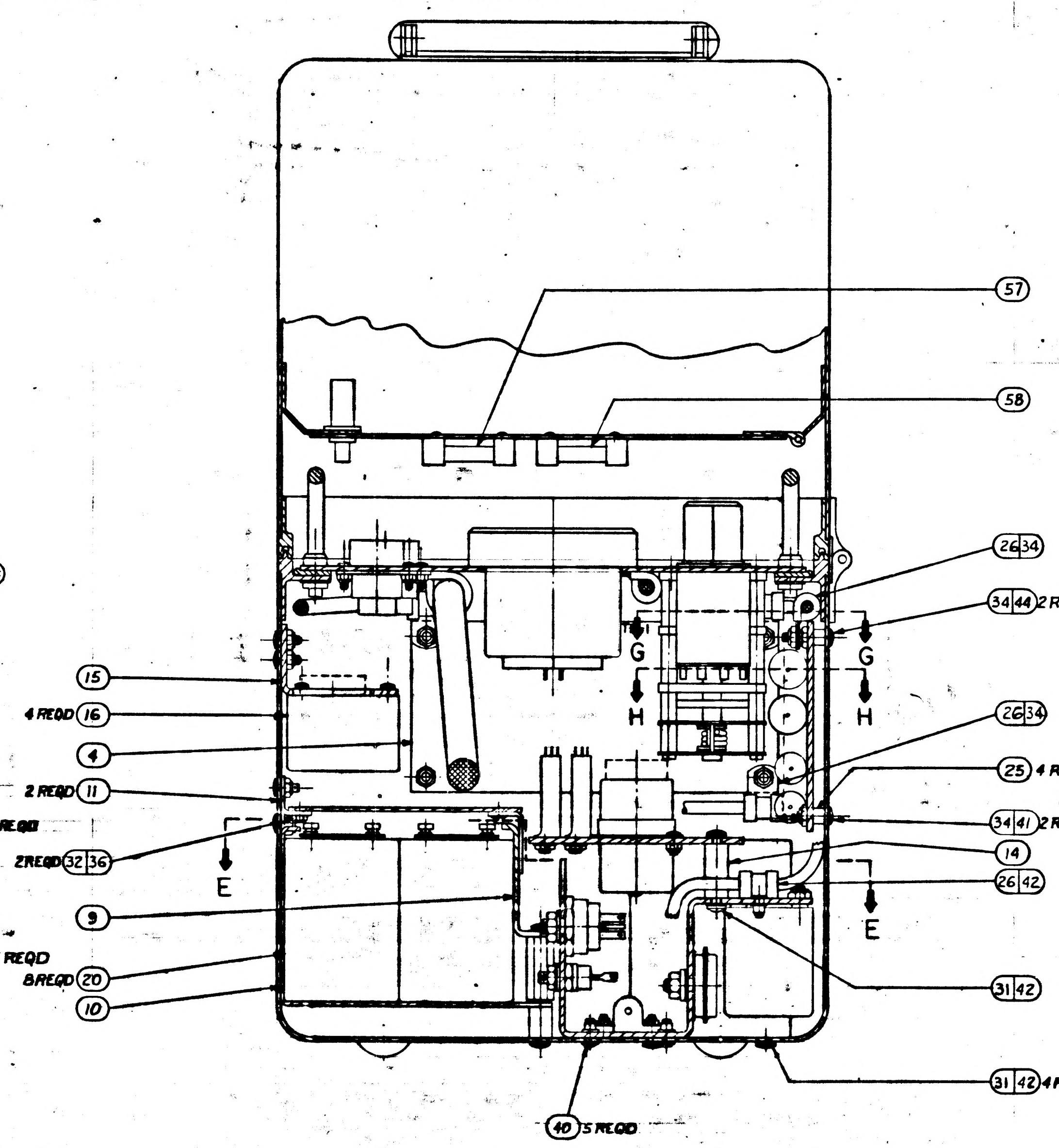
SECTION H-H
"B" DECK


35 42
6 REQD 22
18
2 REQD 33
2 REQD 24
2 REQD 43
19
3
34 40 2 REQD
1 2 3 4
5 6 7 8

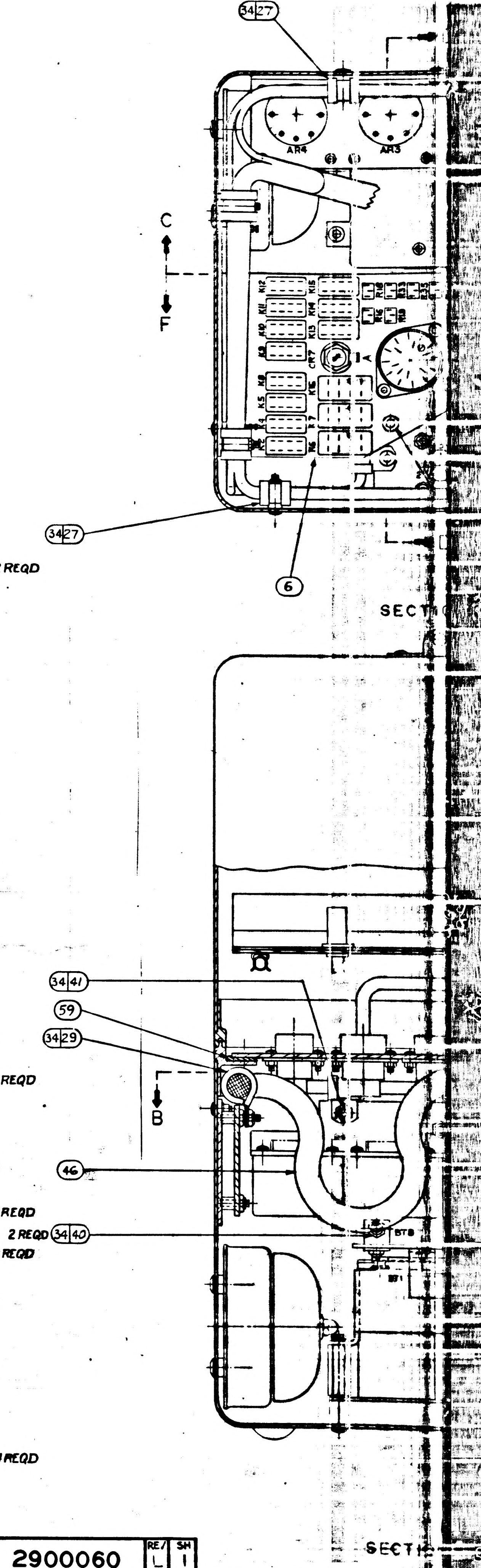
SECTION E-E


34 26
5
28 34
40 4 REQD
8 2 REQD
17
2 REQD 41
2 REQD 40
7 2 REQD
TB2

SECTION F-F
ROTATED 180°

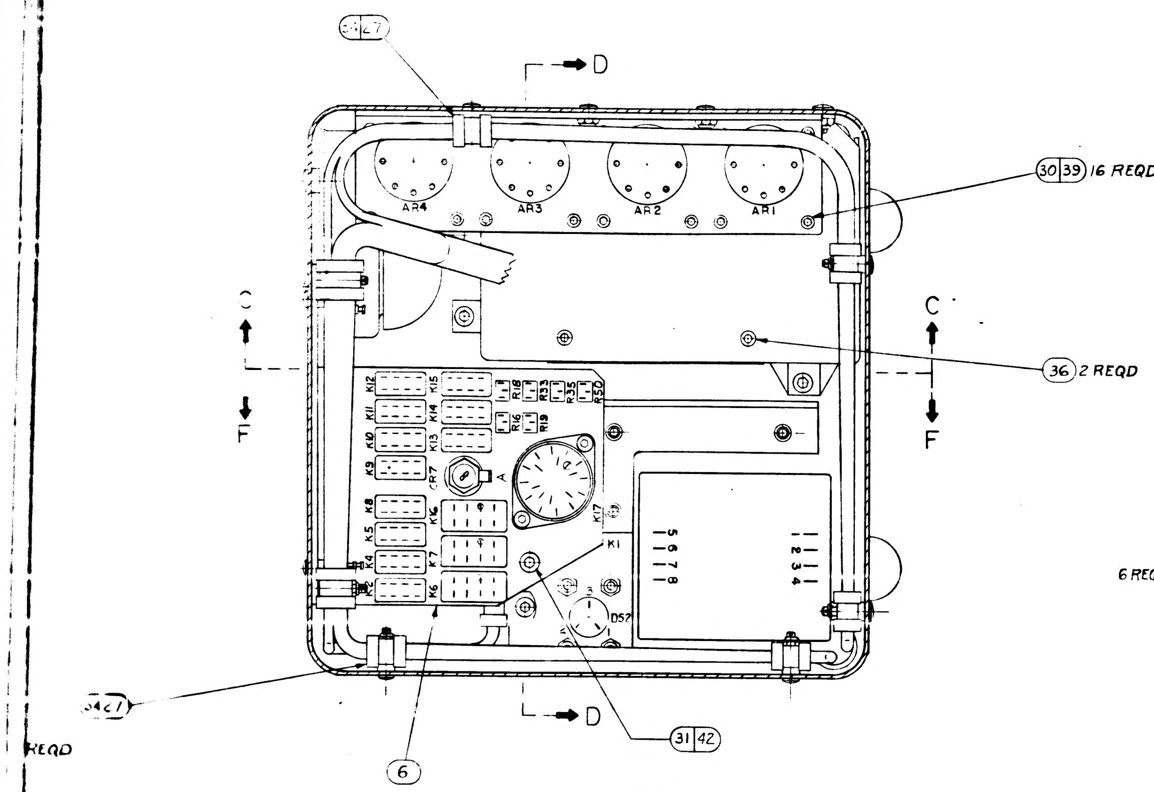

57
58
26 34
34 44 2 REQD
15
4 REQD 16
4
2 REQD 11
2 REQD 32 36
9
8 REQD 20
10
G
H
G
H
E
E
26 34
25 4 REQD
34 41 2 REQD
14
26 42
31 42
31 42 4 REQD
40 5 REQD

SECTION D-D
ROTATED 90° CCW


34 27
C
F
AR4
AR3
34 27
6
SECT
34 41
59
34 29
B
46
2 REQD 34 40
SECT

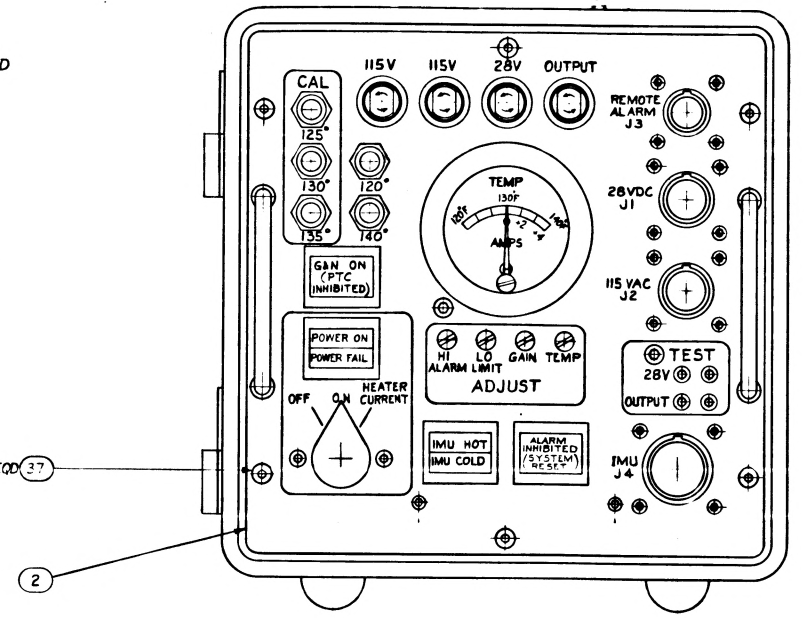
2900060 REV L SH 1

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
J		REPLACES REV(H) WITH CHANGE PER MXC 206049 WAS "D" SIZE		16 OCT 65	RLP
K		REVISED PER MXC 206397		26 OCT 65	JM
L		INITIAL RELEASE CLASS A PER TDRR 24042		25 OCT 65	WP
M		REVISED PER TDRR 25717		8-23 66	



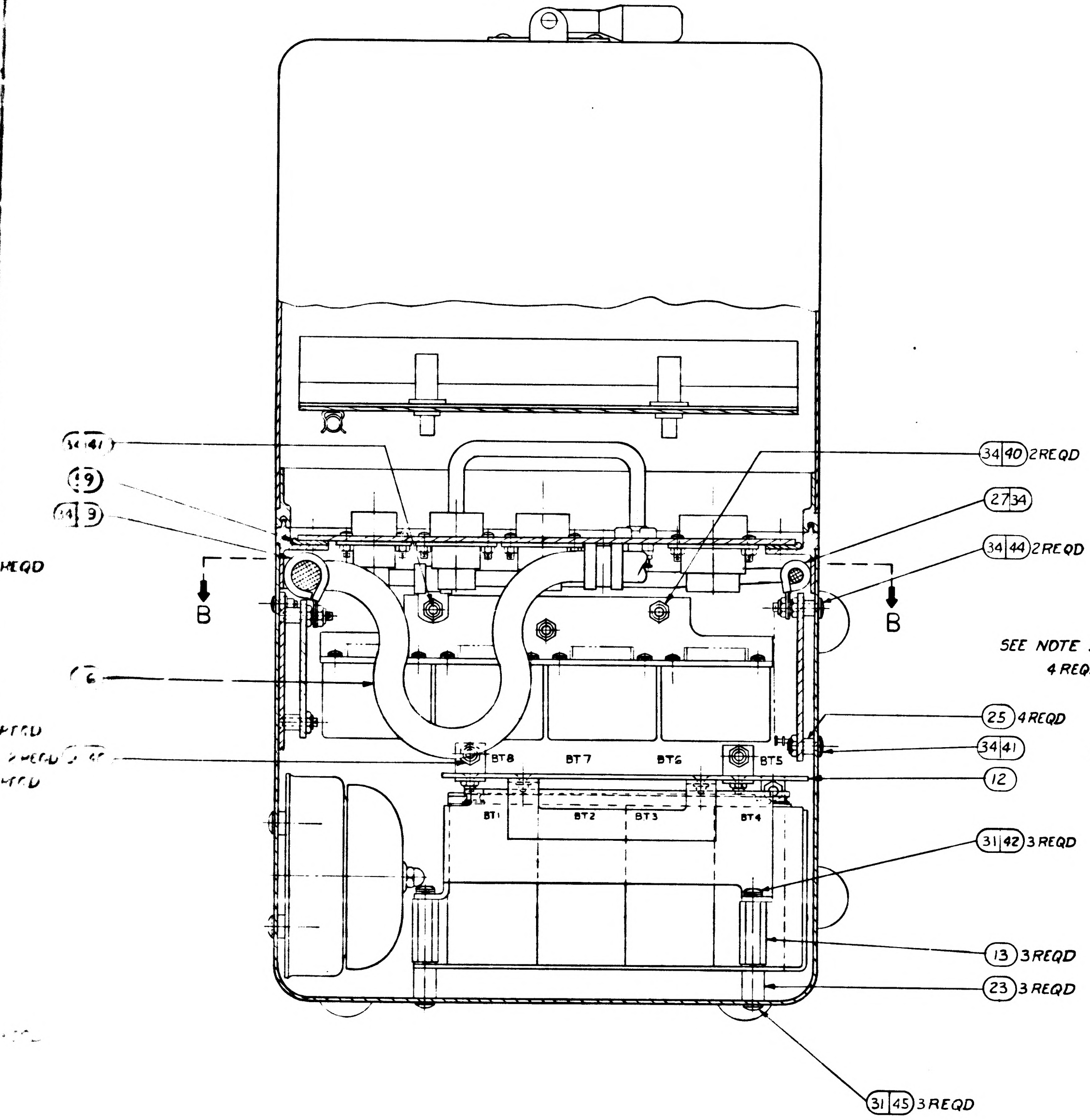
34 27
D
30 39 16 REQD
AR4
AR3
AR2
AR1
C
F
36 2 REQD
K12
K11
K10
K9
K8
K5
K4
K2
K15
K14
K13
K16
K7
K6
R18
R16
R33
R19
R35
R50
CR7
A
K17
K1
DS2
5 6 7 8
1 2 3 4
34 27
31 42
6

SECTION B-B



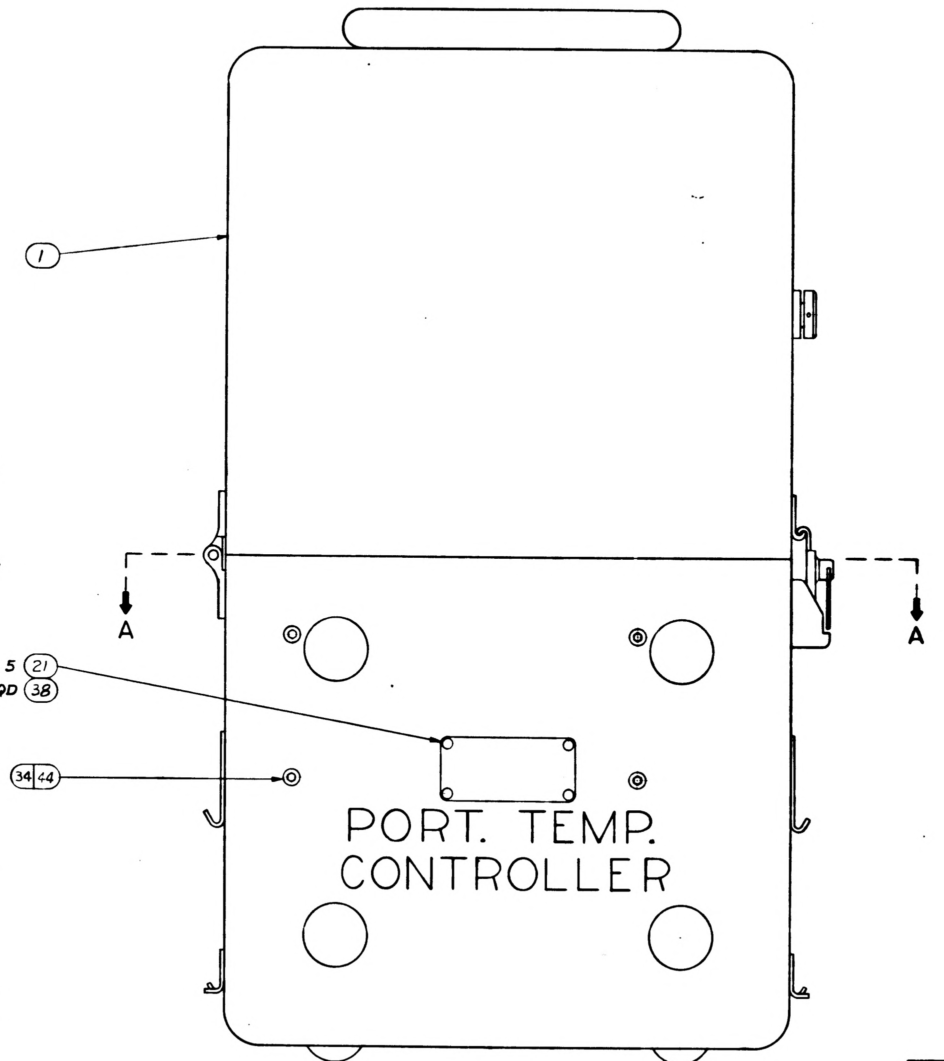
6 REQD 37
2
CAL
125°
130°
135°
120°
140°
115V
115V
28V
OUTPUT
REMOTE ALARM J3
TEMP
130F
120F
140F
AMPS
28VDC J1
115 VAC J2
GAN ON (PTC INHIBITED)
POWER ON
POWER FAIL
OFF
ON
HEATER CURRENT
HI ALARM
LO LIMIT
GAIN
TEMP
ADJUST
TEST
28V
OUTPUT
IMU HOT
IMU COLD
ALARM INHIBITED (SYSTEM RESET)
IMU J4

VIEW A - A
WITH COVER REMOVED



34 41
9
34 9
REQD
6
34 40 2REQD
27 34
34 44 2REQD
B
B
BT8
BT7
BT6
BT5
BT1
BT2
BT3
BT4
25 4REQD
34 41
12
31 42 3REQD
13 3REQD
23 3REQD
31 45 3REQD

SECTION C-C



1
A
A
SEE NOTE 5 21
4 REQD 38
34 44
PORT. TEMP.
CONTROLLER

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
				1		61	2900957	INSTRUCTION FOILCAL (PTC II)
SEE NOTE 8				AR		60	MIL-A-5092 TYPE 2	ADHESIVE (ES2770-2)
SEE NOTE 8				1		59	2900742	GASKET PANEL
				1		58	F02A250V4AS (1897099-113	FUSE, MIL-F-15160/02
				1		57	F02B125V3AS (1897099-130	FUSE, MIL-F-15160/02
				AR		56	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
				AR		55	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3
				AR		54	SN 60 WS	SOLDER QQ-S-571 (ES2175-1
SEE NOTE 3				1		53	2900862	CABLE INTERCONNECT - W 197
				1		52	2900861	W 196
				1		51	2900860	W 195
				1		50	2900859	W 194
SEE NOTE 3				1		49	2900856	CABLE INTERCONNECT - W 190
						48	2900133	SCHEMATIC DIAGRAM, ELEC
SEE NOTE 3				1		47	2900656	LEAD SET AA
				1		46	2900654	HARNESS A
SEE NOTE 6				3		45	1006783-104	SCREW, BUTTON HEAD
				5		44	1006783-103	
				2		43	1006783-46	
				11		42	1006783-26	
				6		41	1006783-23	
				17		40	1006783-22	
				16		39	1006783-18	
				4		38	1006783-9	SCREW, BUTTON HEAD
				6		37	1010630-39	SCREW, FLAT HEAD
				4		36	1010630-13	SCREW, FLAT HEAD
				1		35	1012525-006	NUT, SELF LOCKING
				23		34	1012525-004	
				2		33	1016151-010	
SEE NOTE 6				2		32	1016151-004	NUT, SELF LOCKING
				12		31	MS 35338-80	WASHER, LOCK
				16		30	MS35338-78	WASHER, LOCK
				1		29	MS 21919DG8 (1897073-108)	CLAMP, CUSHIONED
				1		28	MS 21919DG6 (1897073-106)	CLAMP, CUSHIONED
				3		27	MS 21919DG4 (1897073-104)	CLAMP, CUSHIONED
				4		26	MS 21919DG3 (1897073-103)	CLAMP, CUSHIONED
SEE NOTE 6				8		25	1015860-024	SPACER
				2		24	1015860-017	SPACER
SEE NOTE 6				3		23	1015860-008	SPACER
				6		22	2900796	LINK, BATTERY TERMINAL
				1		21	1004260-141	NAMEPLATE
SEE NOTE 6				8		20	1897268-001	BATTERY
				1		19	1897291	TRANSFORMER, POWER
SEE NOTE 6				1		18	2900520	BELL, ASSEMBLY
				1		17	CE71C562G (1896872-119)	CAPACITOR, MIL-C-62/12
SEE NOTE 6				4		16	1897261	COMPARATOR
				1		15	2900795	BRACKET, ELECTRONIC COMPONENTS
				1		14	2900512-001	NUT, SLEEVE
				3		13	2900512-000	NUT, SLEEVE
				1		12	2900511	COVER, BATTERY RETAINER
				2		11	2900510	BRACKET, ANGLE
				1		10	2900509	TRAY, BATTERY
				1		9	2900508	RETAINER, BATTERY (INSEP ASSY)
				2		8	2900507	STRAP, RETAINING
				2		7	2900506	STRAP, RETAINING (INSEP ASSY)
				1		6	2900777-011	RELAY ASSEMBLY
				1		5	2900778-011	ELECTRONIC COMPONENTS ASSY
				1		4	2900513-011	ELECTRONIC COMPONENTS ASSY
				1		3	2900521-011	ELECTRONIC COMPONENT ASSY
				1		2	2900835-011	PANEL ASSEMBLY
SEE NOTE 8				1		1	2900525-011	CASE, PORT. TEMP. CONTROLLER

LIST OF PARTS AND MATERIALS

2900060 M

2900063-011	2900030-011	011
2900030-011	2900030-011	011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN COOKMAN DATE 3 AUG 65
CHECKED J. STELMA 7 AUG 65
APPROVAL D. TECHMBOLD 9 AUG 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CONTROLLER,
TEMPERATURE, PORTABLE

CODE IDENT NO 99974
SIZE J2
2900060
SCALE FULL
SHEET 1 OF 1

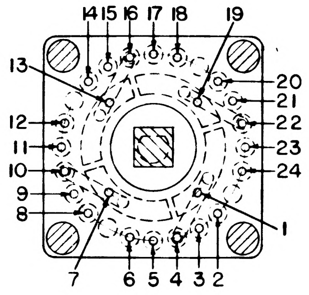
7 OCT 65

2900060 REV M SH 1

27 2900060

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 USING ITEMS (56) AND (54) OR (55).
3. THESE ITEMS ARE PART OF THIS ASSEMBLY.
4. DRAWING FOR REFERENCE:
   SCHEMATIC DIAGRAM ITEM (48)
5. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (21) IN ACCORDANCE WITH [illegible] 002023. LETTERS AND NUMERALS TO BE .06 HIGH.
6. VENDOR ITEM - SEE SOURCE OR SPECIFICATION CONTROL DRAWING.
7. PROCEDURE FOR CALIBRATING BRIDGES (PERFORM IN THE FOLLOWING SEQUENCE).
   - a. AFTER COMPLETING CONTINUITY CHECKS, TURN ALL POTS FULLY CW (MAXIMUM RESISTANCE) EXCEPT R50, WHICH SHALL BE CCW. APPLY 28 ± 1 VDC TO J1-K (HI) AND J1-L (LO).
   - b. INDICATING BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 2504.5 ± 0.1 OHMS ACROSS J4-G AND J4-T. JUMPER J4T TO J4-C. WITH THE POWER SWITCH ON, ADJUST R18 AND R19 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.610 ± 1% VDC ACROSS R17 (TB2-52 AND TB2-45) AND 17.6 ± 1% VDC ACROSS R21 AND R22 (TB2-39 AND TB2-54).
   - c. CONTROL BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 1560.0 ± 0.1 OHMS ACROSS J4-P AND J4-S. JUMPER J4-S TO J4-C. TURN TEMP ADJUST POT TO MIDRANGE (25 OHMS). WITH THE POWER SWITCH ON, ADJUST R33 AND AND R35 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.950 ± 1% VDC ACROSS R34 (TB2-56 AND TB2-47) AND 17.4 ± 1% VDC ACROSS R36, R38, AND R37 (TB2-42 AND TB2-12. TURN POWER SWITCH OFF.
   - d. CHARGING VOLTAGE CUTOFF: DISCONNECT CONDUCTOR NO. A11 FROM BT1-(+) AND CONNECT TO VOLTMETER (HI). TURN POWER SWITCH ON. APPLY 36.8 ± 0.1 % VDC AT TB2-19 (HI) AND TB2-55 (LO). SLOWLY TURN R16 CCW UNTIL VOLTAGE DROPS TO APPROXIMATELY 28 VDC ON CONDUCTOR NO. A11. AFTER DECREASING SUPPLY VOLTAGE TO APPROXIMATELY 30VDC, MOMENTARILY REMOVE AND REAPPLY. SLOWLY INCREASE SUPPLY VOLTAGE AND VERIFY THAT IT WILL REACH 36.8 ± 0.1 VDC BEFORE DROPPING TO APPROXIMATELY 28VDC. TURN POWER SWITCH OFF. REMOVE EXTERNAL DC VOLTAGE. RECONNECT CONDUCTOR NO. A11 TO BT1 (+). APPLY 115VAC POWER AT J2-M AND J2-J. TURN POWER SWITCH ON. A PLOT OF THE BATTERY VOLTAGE VS TIME WILL INDICATE TWO VOLTAGE PLATEAUS. VERIFY THAT THE CUTOFF VOLTAGE AT THE END OF THE SECOND PLATEAU IS 36.7 ± 0.3 VDC (COMPLETE BATTERY CHARGING REQUIRES 16-24 HOURS AND MAY BE INTERRUPTED IF NECESSARY).
   - e. OUTPUT VOLTAGE LIMIT: WITH A 9.0 ± 0.3 OHM LOAD AT J4-H AND J4-L, AND 1500 OHMS AT J4-P AND J4-S, APPLY 126.5 VAC 60 CPS AT J2-M AND J2-J. TURN POWER SWITCH ON. TURN R50 CW UNTIL OUTPUT VOLTAGE AT TP3 (HI) AND TP4 (LO) READS 32.5 VDC.
8. BOND ITEM (59) TO ITEM (1) USING ITEM (60).
9. CENTRALIZE ITEM (61) ON FLAT SURFACE OF INNER LID. ORIENT RIGHT SIDE OF ITEM (61) ADJACENT TO HINGE OF INNER LID.
10. INSPECT AND TEST PER PS 2900060.


14
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16
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11
23
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24
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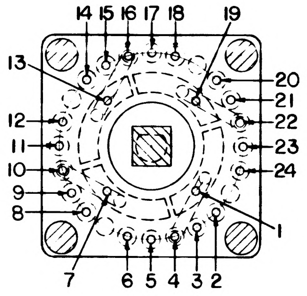
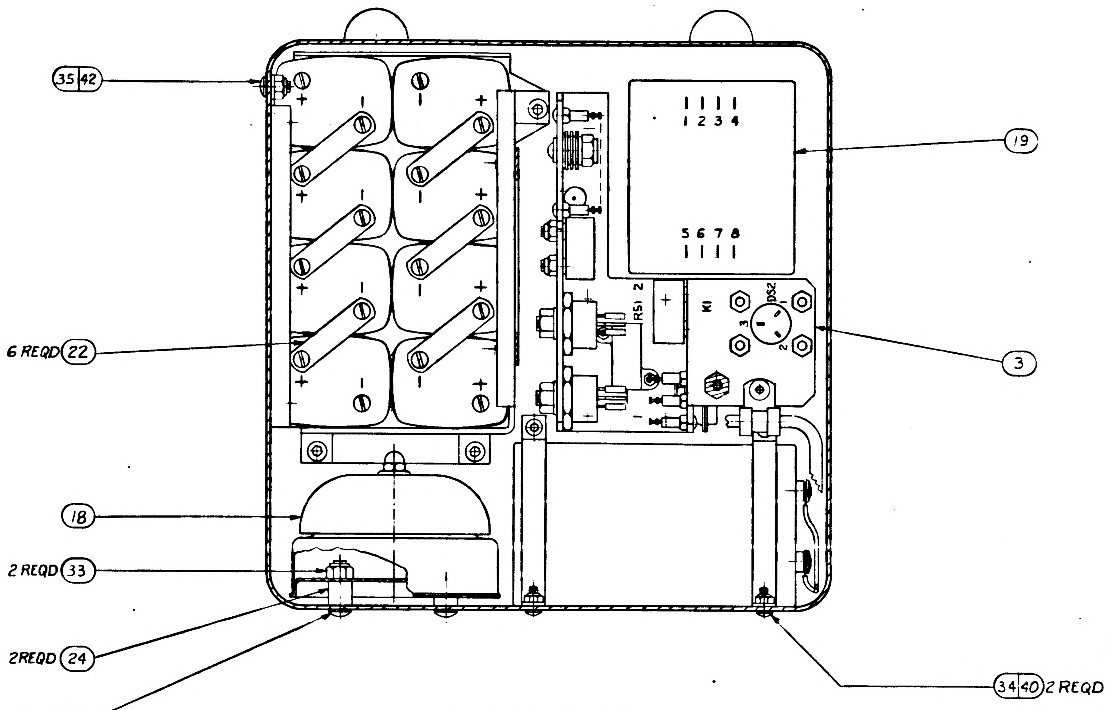
1
7
6
5
4
3
2

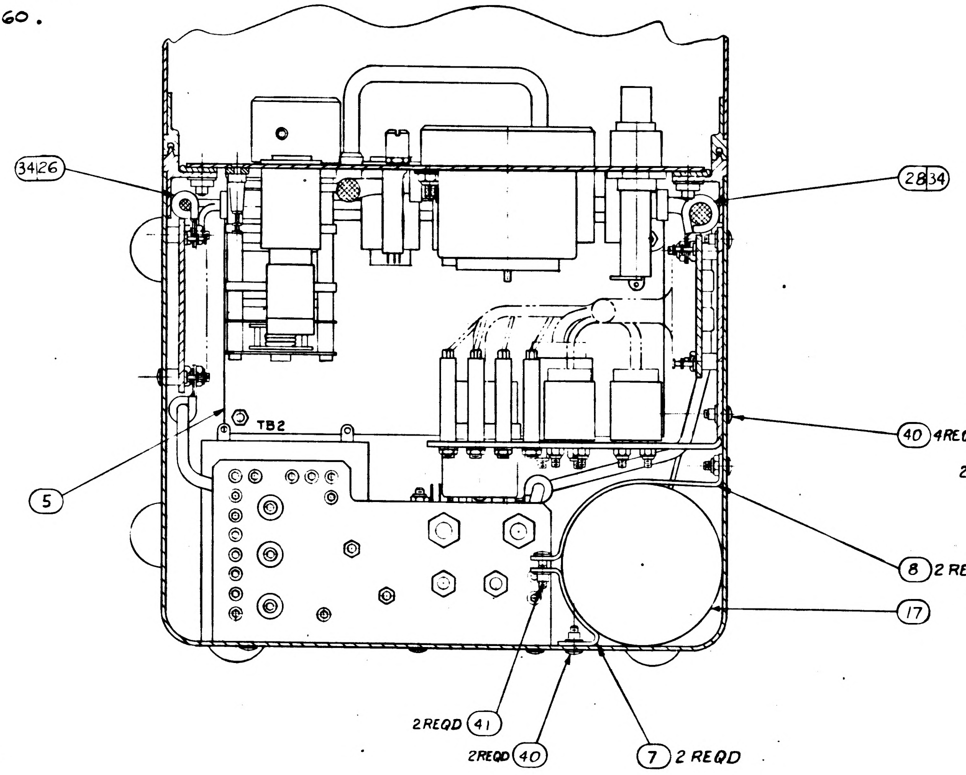
SECTION G-G
"A" DECK


14
15
16
17
18
19
13
20
21
12
22
11
23
10
24
9
8
1
7
6
5
4
3
2

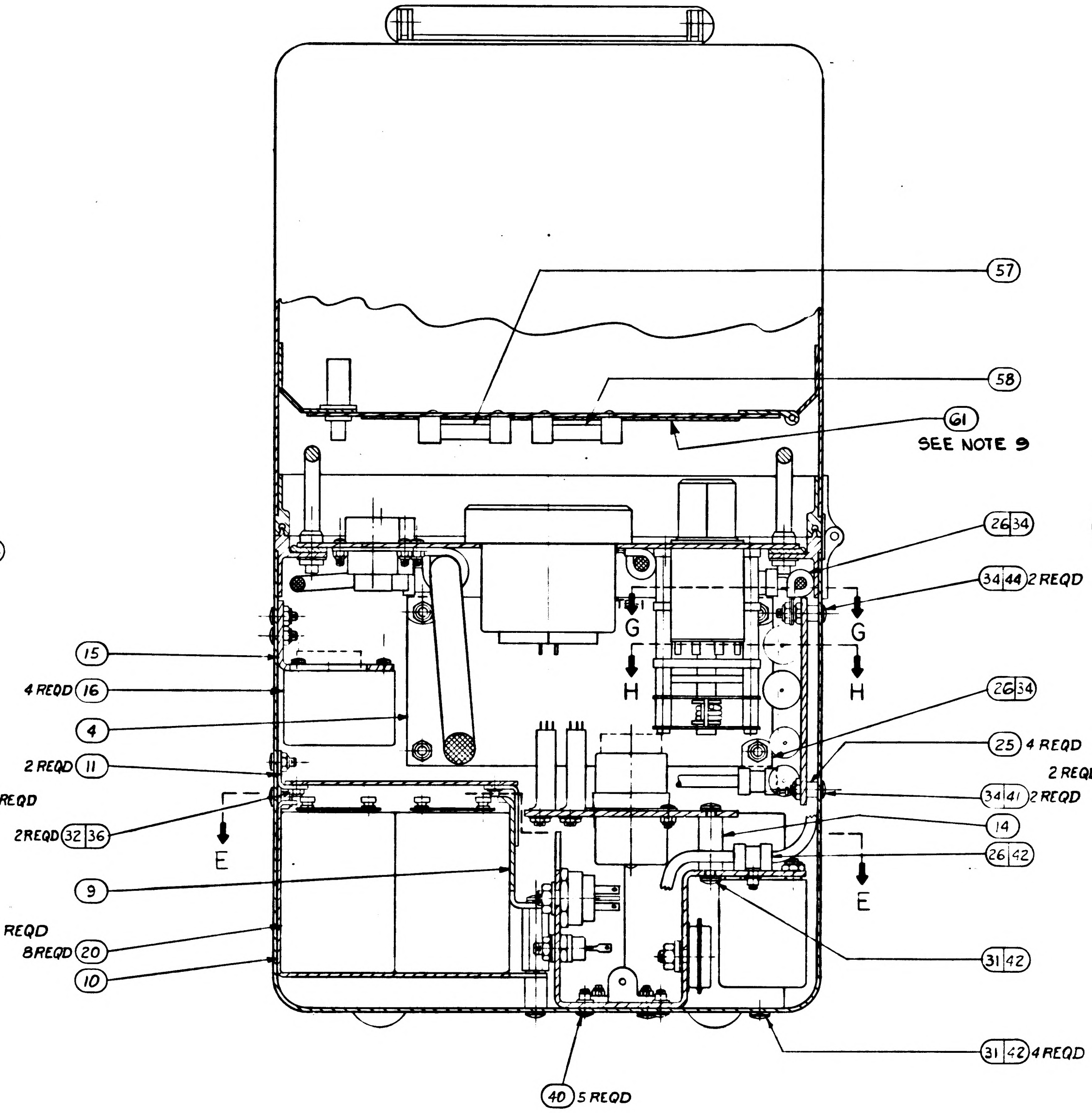
SECTION H-H
"B" DECK


35|42
1 1 1 1
1 2 3 4
19
5 6 7 8
1 1 1 1
RS1
K1
3
6 REQD (22)
(18)
2 REQD (33)
2REQD (24)
2REQD (43)
34|40 2 REQD

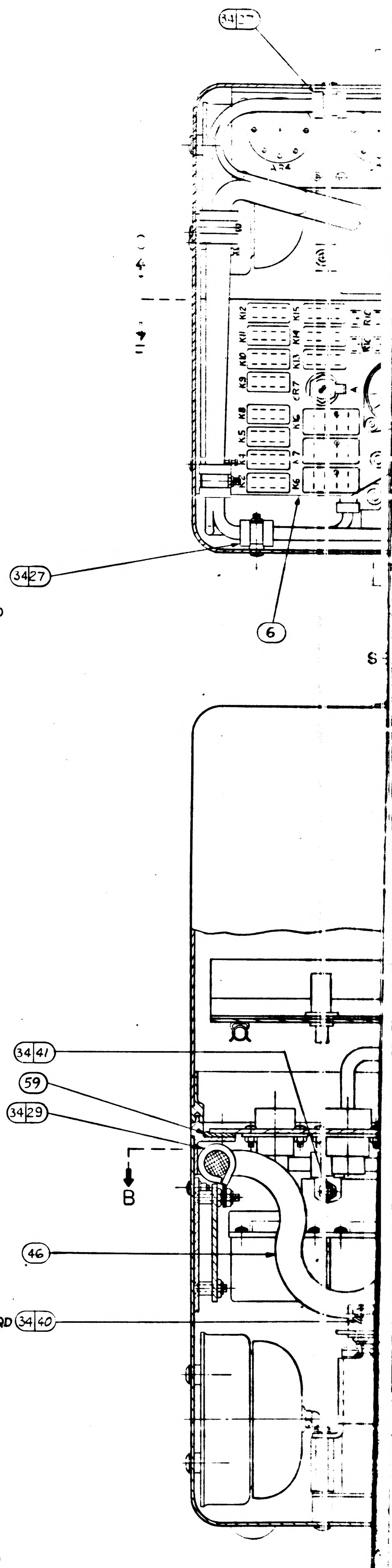
SECTION E-E


34|26
28|34
TB2
40 4REQD
5
8 2 REQD
17
2REQD 41
2REQD 40
7 2 REQD

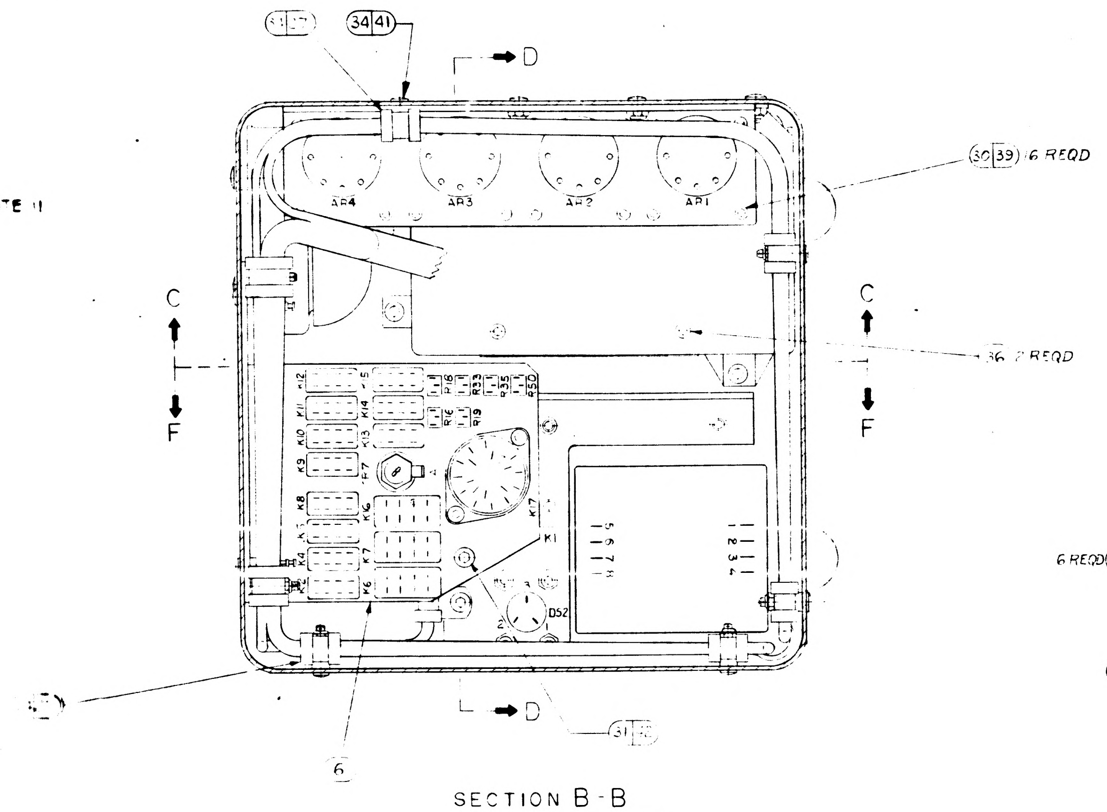
SECTION F-F
ROTATED 180°


57
58
61
SEE NOTE 9
26|34
34|44 2 REQD
G
H
G
H
15
4 REQD 16
4
2 REQD 11
26|34
25 4 REQD
34|41 2 REQD
2REQD 32|36
E
14
26|42
E
9
8REQD 20
10
31|42
31|42 4 REQD
40 5 REQD

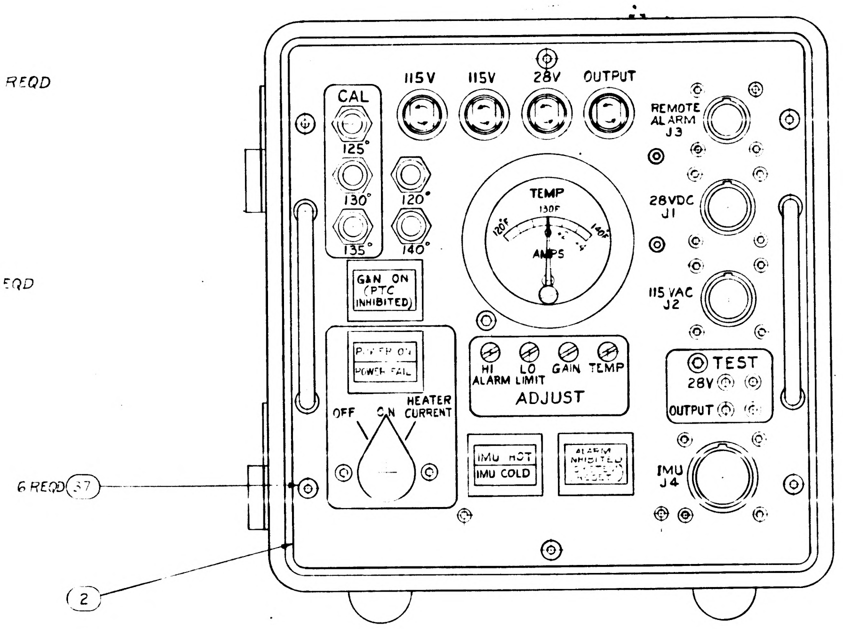
SECTION D-D
ROTATED 90° CCW


34|27
6
34|41
59
34|29
B
46
2 REQD 34|40

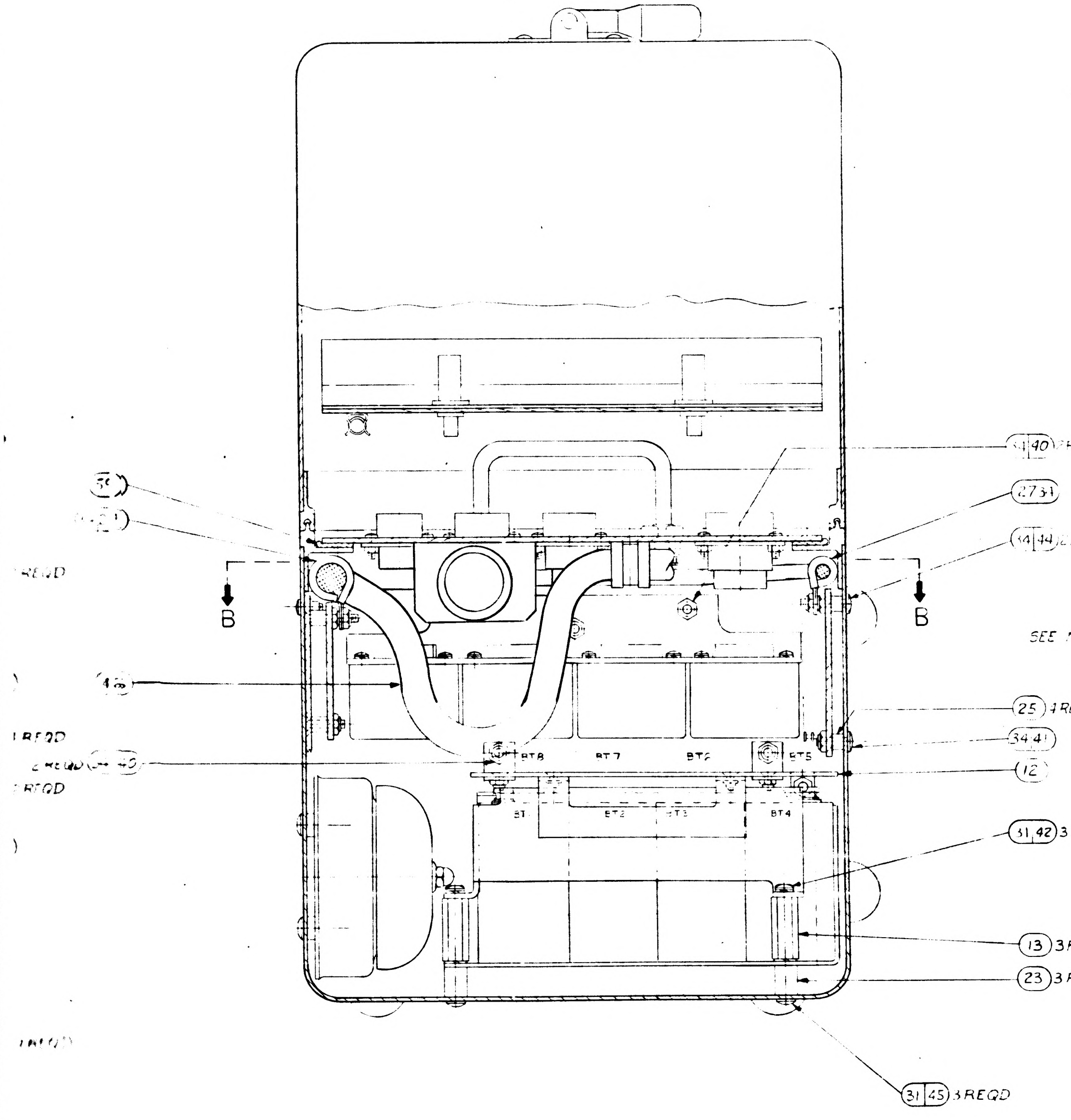
2900060 | REV M | SH 1


34 41
30 39 6 REQD
SEE NOTE 11
AR4
AR3
AR2
AR1
36 2 REQD
C
C
F
F
D
D
K1
DS2
6
31

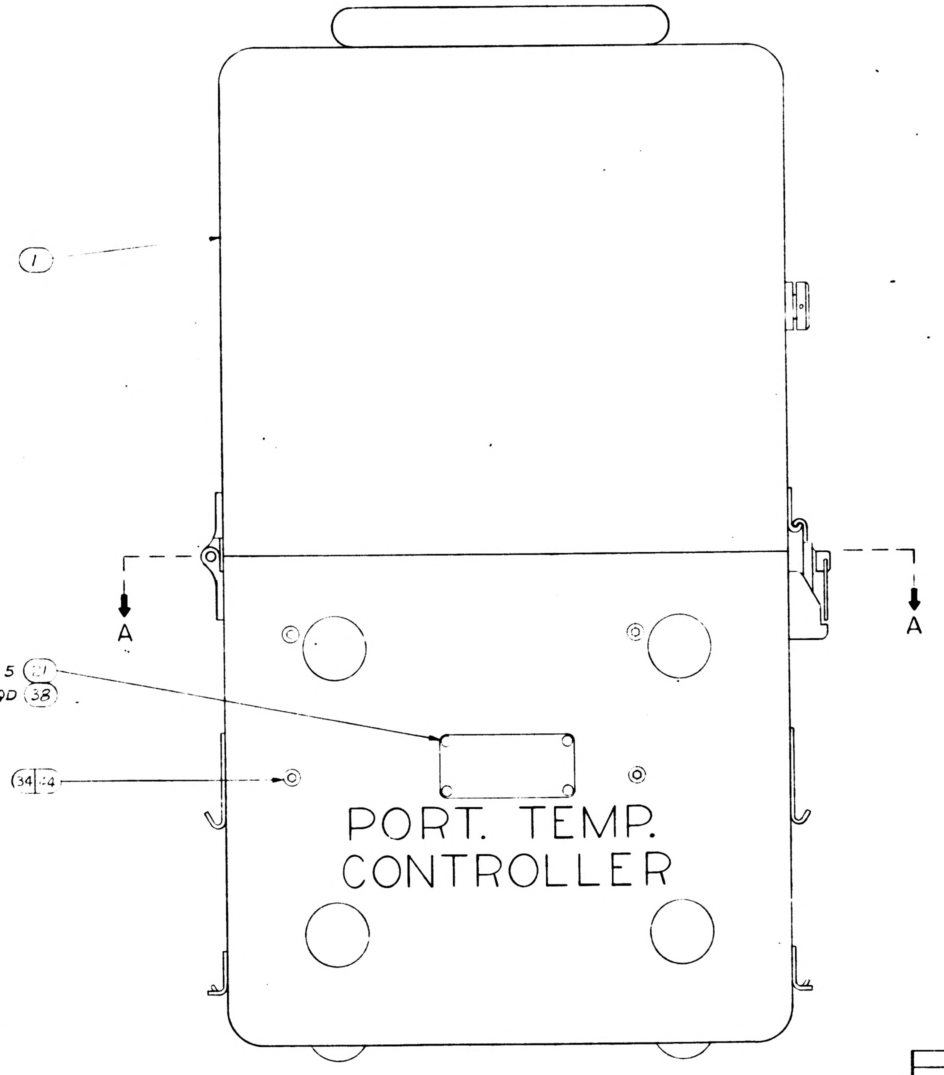
SECTION B-B


CAL
125°
130°
135°
120°
140°
115V
115V
28V
OUTPUT
REMOTE ALARM J3
28VDC J1
115 VAC J2
TEMP
AMPS
GAIN ON (PTC INHIBITED)
POWER FAIL
HI ALARM LIMIT
LO
GAIN
TEMP
ADJUST
TEST
28V
OUTPUT
OFF
ON
HEATER CURRENT
IMU HOT
IMU COLD
IMU J4
6 REQD 37
2

VIEW A - A
WITH COVER REMOVED


1 40 2 REQD
27 33
44 44 REQD
B
B
25 4 REQD
34 41
12
31 42 3 REQD
13 3 REQD
23 3 REQD
31 45 3 REQD
BT8
BT7
BT6
BT5
BT1
BT2
BT3
BT4

SECTION C-C


1
A
A
SEE NOTE 5
4 REQD 38
34 24
PORT. TEMP.
CONTROLLER

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
J		REPLACES REV (H) WITH CHANGE PER MXC 206049 WAS "D" SIZE		16 OCT 65	RUP
K		REVISED PER MXC 206397		26 OCT 65	Jm
-		INITIAL RELEASE CLASS A PER TDRR		28 OCT 65	WP
M		REVISED PER TDRR 25717		8 FEB 66	HTO
N		REVISED PER TDRR 26973		14 MAR 66	RUP AU

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
				AR		62	MIL-I-8660	SILICONE GREASE (ES 2311)
				1		61	2900957	INSTRUCTION FOILCAL PTC II)
SEE NOTE 8				AR		60	MIL-A-5092 TYPE 2	ADHESIVE (ES2770-2)
SEE NOTE 8				1		59	2900742	GASKET PANEL
				1		58	F02A250V4AS (1897099-113	FUSE, MIL-F-15160/02
				1		57	F02B125V3AS (1897099-130	FUSE, MIL-F-15160/02
				AR		56	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
				AR		55	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3
				AR		54	SN 60 WS	SOLDER QQ-S-571 (ES2175-1
SEE NOTE 3				1		53	2100862	CABLE INTERCONNECT - W 197
				1		52	2900861	W 196
				1		51	2900860	W 195
				1		50	2100859	W 194
SEE NOTE 3				1		49	2100856	CABLE INTERCONNECT - W 190
						48	2900133	SCHEMATIC DIAGRAM, ELEC
SEE NOTE 3				1		47	2900656	LEAD SET AA
				1		46	2900654	HARNESS A
SEE NOTE 6				3		45	1006783-104	SCREW, BUTTON HEAD
				5		44	1006783-103	
				2		43	1006783-46	
				11		42	1006783-26	
				6		41	1006783-23	
				17		40	1006783-22	
				16		39	1006783-18	
				4		38	1006783-9	SCREW, BUTTON HEAD
				6		37	1010630-39	SCREW, FLAT HEAD
				4		36	1010630-13	SCREW, FLAT HEAD
				1		35	1012525-006	NUT, SELF LOCKING
				23		34	1012525-004	
				2		33	1016151-010	
SEE NOTE 6				2		32	1016151-004	NUT, SELF LOCKING
				12		31	MS 35338-80	WASHER, LOCK
				16		30	MS35338-78	WASHER, LOCK
				1		29	MS 21919DG5 ([illegible]	CLAMP CUSHIONED
				1		28	MS 21919DG6 ([illegible]	CLAMP CUSHIONED
				3		27	MS 21919DG4 ([illegible]	CLAMP CUSHIONED
				4		26	MS 21919DG3 ([illegible]	CLAMP CUSHIONED
SEE NOTE 6				8		25	1015860-024	SPACER
				2		24	1015860-017	SPACER
SEE NOTE 6				3		23	1015860-008	SPACER
				6		22	2900796	LINK, BATTERY TERMINAL
				1		21	1004260-141	NAMEPLATE
SEE NOTE 6				8		20	1897268-001	BATTERY
				1		19	1897291	TRANSFORMER, POWER
SEE NOTE 6				1		18	[illegible]	BELL, [illegible]
				1		17	CE71C562G (1896872-119)	CAPACITOR, MIL-C-62/12
SEE NOTE 6				4		16	1897261	COMPARATOR
				1		15	2900795	BRACKET, ELECTRONIC COMPONENTS
				1		14	2900512-001	NUT, SLEEVE
				3		13	2900512-000	NUT, SLEEVE
				1		12	2900511	COVER, BATTERY RETAINER
				2		11	2900510	BRACKET ANGLE
				1		10	2900509	TRAY, BATTERY
				1		9	2900508	RETAINER, BATTERY (INSEP ASSY)
				2		8	2900507	STRAP, RETAINING
				2		7	2900506	STRAP, RETAINING (INSEP ASSY)
				1		6	2900777-011	RELAY ASSEMBLY
				1		5	2900778-011	ELECTRONIC COMPONENTS ASSY
				1		4	2900513-011	ELECTRONIC COMPONENTS ASSY
				1		3	2900521-011	ELECTRONIC COMPONENT ASSY
				1		2	2900835-011	PANEL ASSEMBLY
SEE NOTE 8				1		1	2900525-011	CASE PORT. TEMP. CONTROLLER

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
[illegible]	2900030-011	
2900030-011	2900030-011	011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN C COKMAN DATE 3 AUG 65
CHECKED J STELMA 7 AUG 65
APPROVAL D TSCHABOLD 9 AUG 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

CONTROLLER,
TEMPERATURE, PORTABLE

CODE IDENT NO 99974
SIZE J2
2900060
SCALE FULL
SHEET 1 OF 1

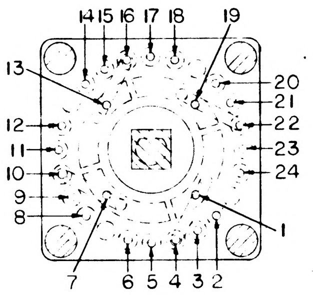
2900060 N

2900060 REV N SH 1

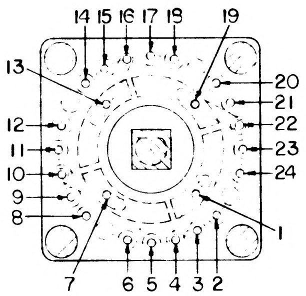
2/2900060

NOTES:

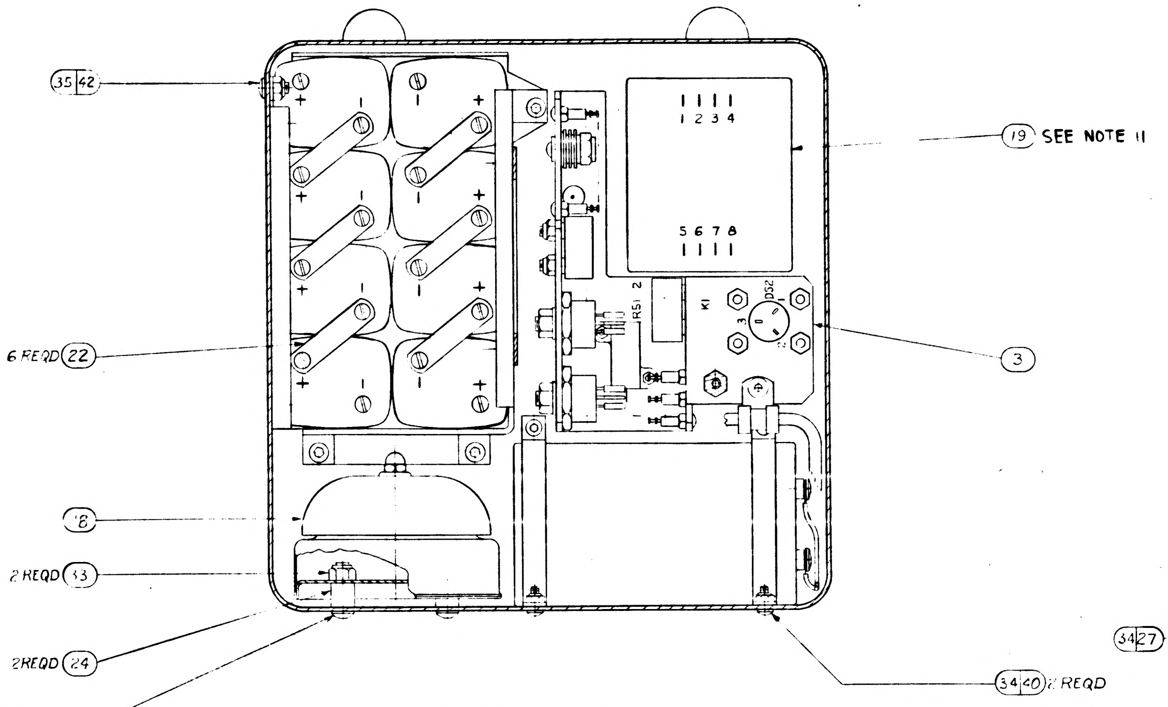
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 USING ITEMS (56) AND (54) OR (55).
3. THESE ITEMS ARE PART OF THIS ASSEMBLY.
4. DRAWING FOR REFERENCE:
   SCHEMATIC DIAGRAM ITEM (48)
5. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (21) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
6. VENDOR ITEM - SEE SOURCE OR SPECIFICATION CONTROL DRAWING.
7. PROCEDURE FOR CALIBRATING BRIDGES (PERFORM IN THE FOLLOWING SEQUENCE).
   a. AFTER COMPLETING CONTINUITY CHECKS, TURN ALL POTS FULLY CW (MAXIMUM RESISTANCE) EXCEPT R50, WHICH SHALL BE CCW. APPLY 28 ± 1 VDC TO J1-K (HI) AND J1-L (LO).
   b. INDICATING BRIDGE : CONNECT AN EXTERNAL RESISTOR OF 2504.5 ± 0.1 OHMS ACROSS J4-G AND J4-T. JUMPER J4T TO J4-C. WITH THE POWER SWITCH ON, ADJUST R18 AND R19 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR : 1.610 ± 1% VDC ACROSS R17 (TB2-52 AND TB2-45), AND 17.6 ± 1% VDC ACROSS R21 AND R22 (TB2-39 AND TB2-54).
   c. CONTROL BRIDGE : CONNECT AN EXTERNAL RESISTOR OF 1560.0 ± 0.1 OHMS ACROSS J4-P AND J4-S. JUMPER J4-S TO J4-C. TURN TEMP ADJUST POT TO MIDRANGE (25 OHMS). WITH THE POWER SWITCH ON, ADJUST R33 AND AND R35 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR : 1.950 ± 1% VDC ACROSS R34 (TB2-56 AND TB2-47) AND 17.4 ± 1% VDC ACROSS R36, R38, AND R37 (TB2-42 AND TB2-12. TURN POWER SWITCH OFF.
   d. CHARGING VOLTAGE CUTOFF : DISCONNECT CONDUCTOR NO. A11 FROM BT1-(+) AND CONNECT TO VOLTMETER (HI). TURN POWER SWITCH ON. APPLY 36.8 ± 0.1 % VDC AT TB2-19 (HI) AND TB2-55 (LO). SLOWLY TURN R16 CCW UNTIL VOLTAGE DROPS TO APPROXIMATELY 28 VDC ON CONDUCTOR NO. A11. AFTER DECREASING SUPPLY VOLTAGE TO APPROXIMATELY 30VDC, MOMENTARILY REMOVE AND REAPPLY. SLOWLY INCREASE SUPPLY VOLTAGE AND VERIFY THAT IT WILL REACH 36.8 ± 0.1 VDC BEFORE DROPPING TO APPROXIMATELY 28VDC. TURN POWER SWITCH OFF. REMOVE EXTERNAL DC VOLTAGE. RECONNECT CONDUCTOR NO. A11 TO BT1 (+). APPLY 115 VAC POWER AT J2-M AND J2-J. TURN POWER SWITCH ON. A PLOT OF THE BATTERY VOLTAGE VS TIME WILL INDICATE TWO VOLTAGE PLATEAUS. VERIFY THAT THE CUTOFF VOLTAGE AT THE END OF THE SECOND PLATEAU IS 36.7 ± 0.3 VDC (COMPLETE BATTERY CHARGING REQUIRES 16-24 HOURS AND MAY BE INTERRUPTED IF NECESSARY).
   e. OUTPUT VOLTAGE LIMIT : WITH A 9.0 ± 0.3 OHM LOAD AT J4-H AND J4-L, AND 1500 OHMS AT J4-P AND J4-S, APPLY 126.5 VAC 60 CPS AT J2-M AND J2-J. TURN POWER SWITCH ON. TURN R50 CW UNTIL OUTPUT VOLTAGE AT TP3 (HI) AND TP4 (LO) READS 32.5 VDC.
8. BOND ITEM (59) TO ITEM (1) USING ITEM (60).
9. CENTRALIZE ITEM (61) ON FLAT SURFACE OF INNER LID. ORIENT RIGHT SIDE OF ITEM (61) ADJACENT TO HINGE OF INNER LID.
10. INSPECT AND TEST PER PS 2900060.
11. MATING SURFACES OF ITEMS (1) AND (19) TO BE COATED WITH ITEM (62).


14 15 16 17 18 19
20
21
22
23
24
13
12
11
10
9
8
1
7
6 5 4 3 2

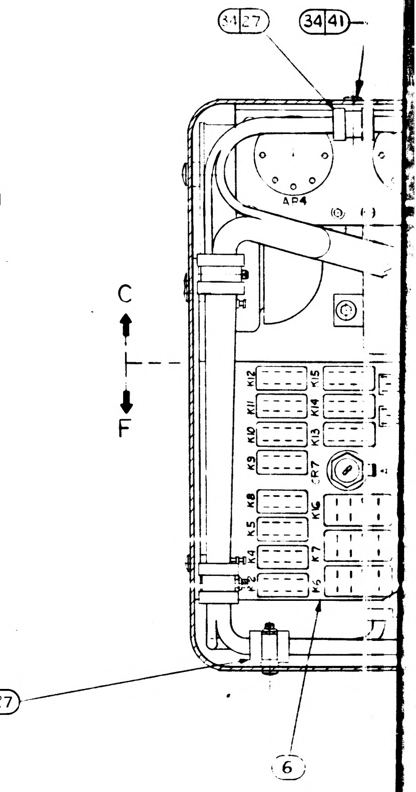
SECTION G-G
"A" DECK

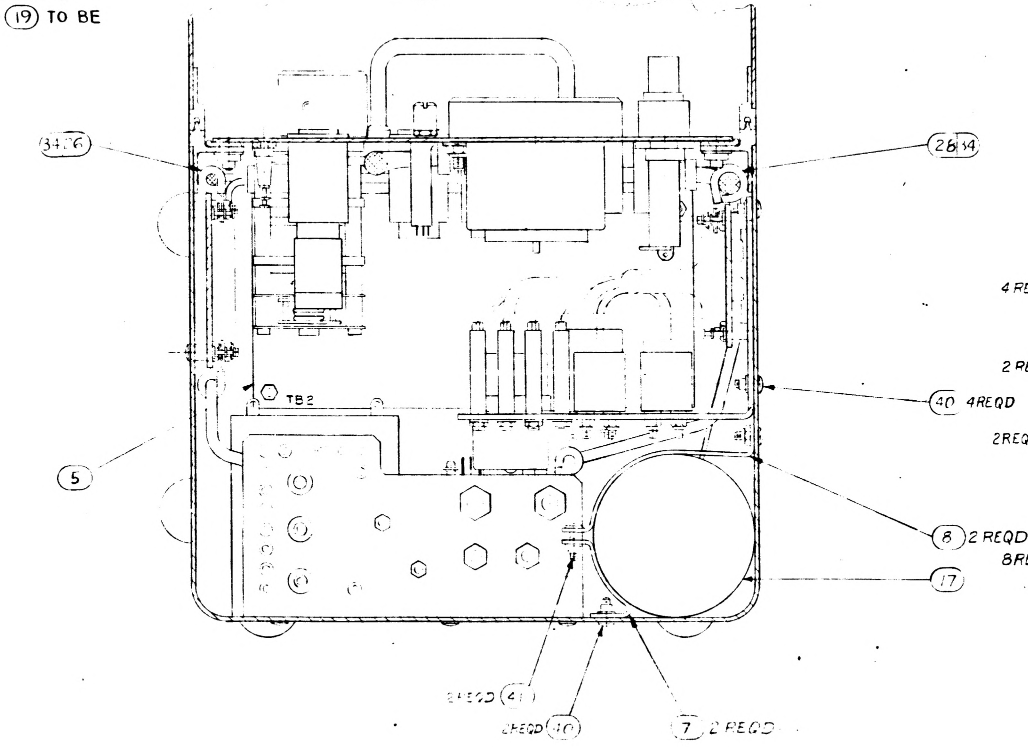

14 15 16 17 18 19
20
21
22
23
24
13
12
11
10
9
8
1
7
6 5 4 3 2

SECTION H-H
"B" DECK

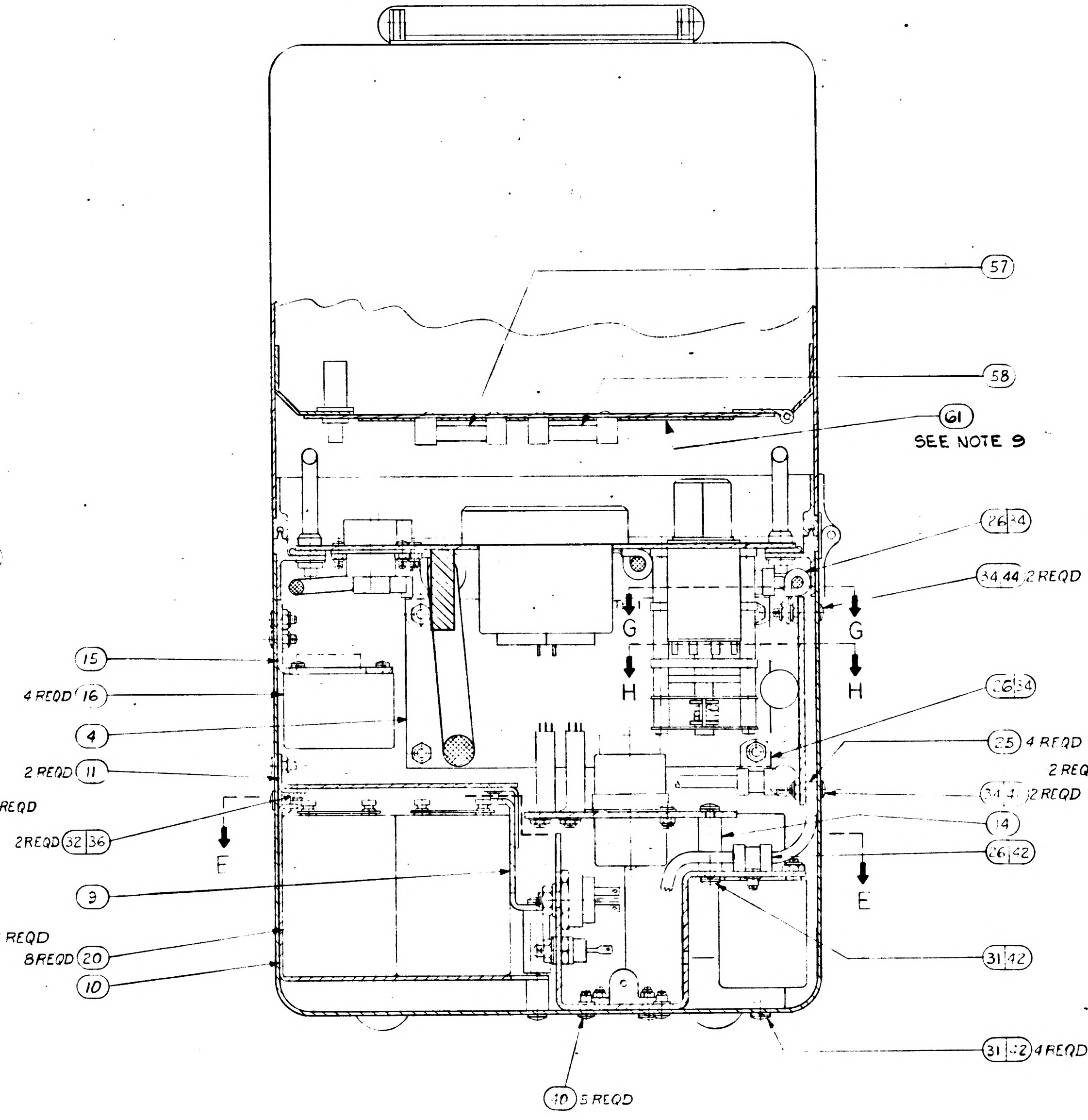

(35|42)
6 REQD (22)
(18)
2 REQD (33)
2 REQD (24)
2 REQD (43)
1 2 3 4
5 6 7 8
RS1 2
K1
DS2
(19) SEE NOTE 11
(3)
(34|40) 2 REQD

SECTION E-E

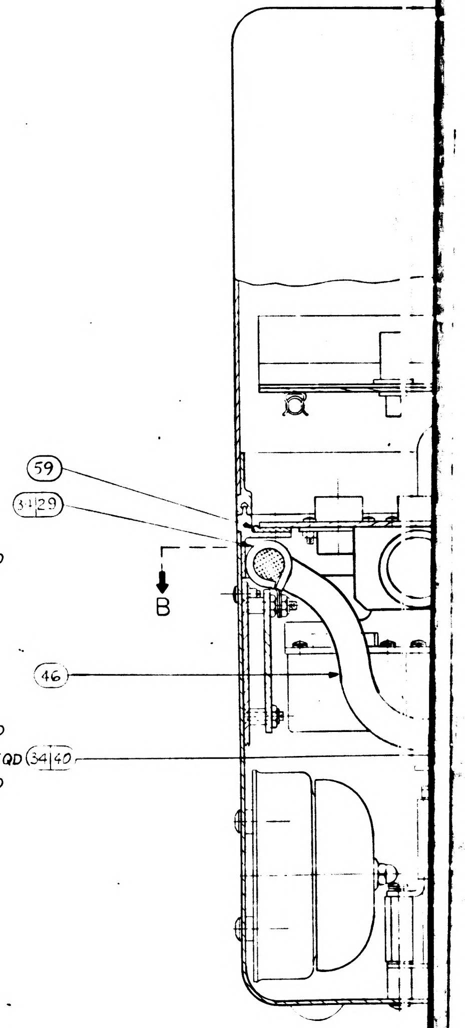

(34|27)
(34|41)
AR4
C
F
K12
K11
K10
K9
K8
K5
K4
K2
K15
K14
K13
CR7
K16
K7
K6
(34|27)
(6)


(34|26)
(26|34)
TB2
(40) 4 REQD
(5)
(8) 2 REQD
(17)
2 REQD (41)
2 REQD (40)
(7) 2 REQD

SECTION F-F
ROTATED 180°


(57)
(58)
(61)
SEE NOTE 9
(26|34)
(34|44) 2 REQD
G
G
H
H
(15)
4 REQD (16)
(4)
2 REQD (11)
2 REQD (32|36)
E
(9)
8 REQD (20)
(10)
(26|34)
(25) 4 REQD
(34|40) 2 REQD
(14)
(26|42)
E
(31|42)
(31|42) 4 REQD
(40) 5 REQD

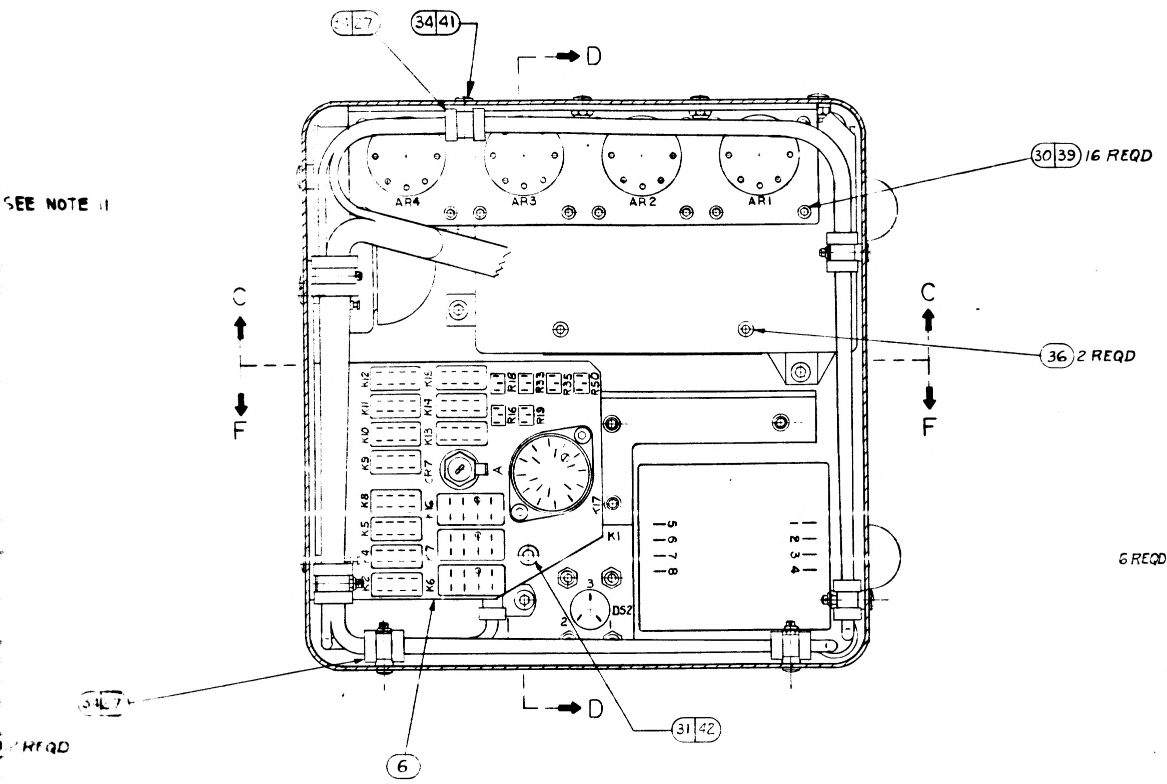
SECTION D-D
ROTATED 90° CCW


(59)
(34|29)
B
(46)
2 REQD (34|40)

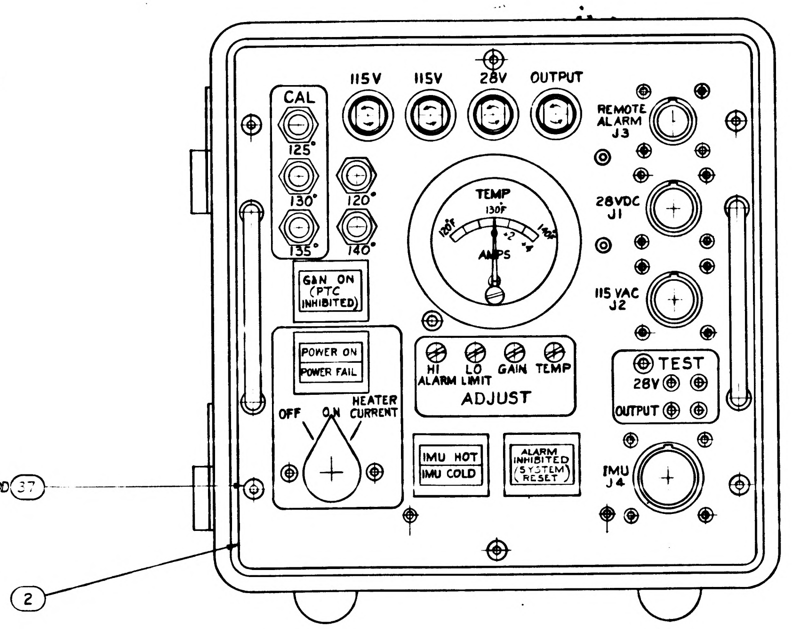
2900060	REV	SH
	N	1

1 / 2900060

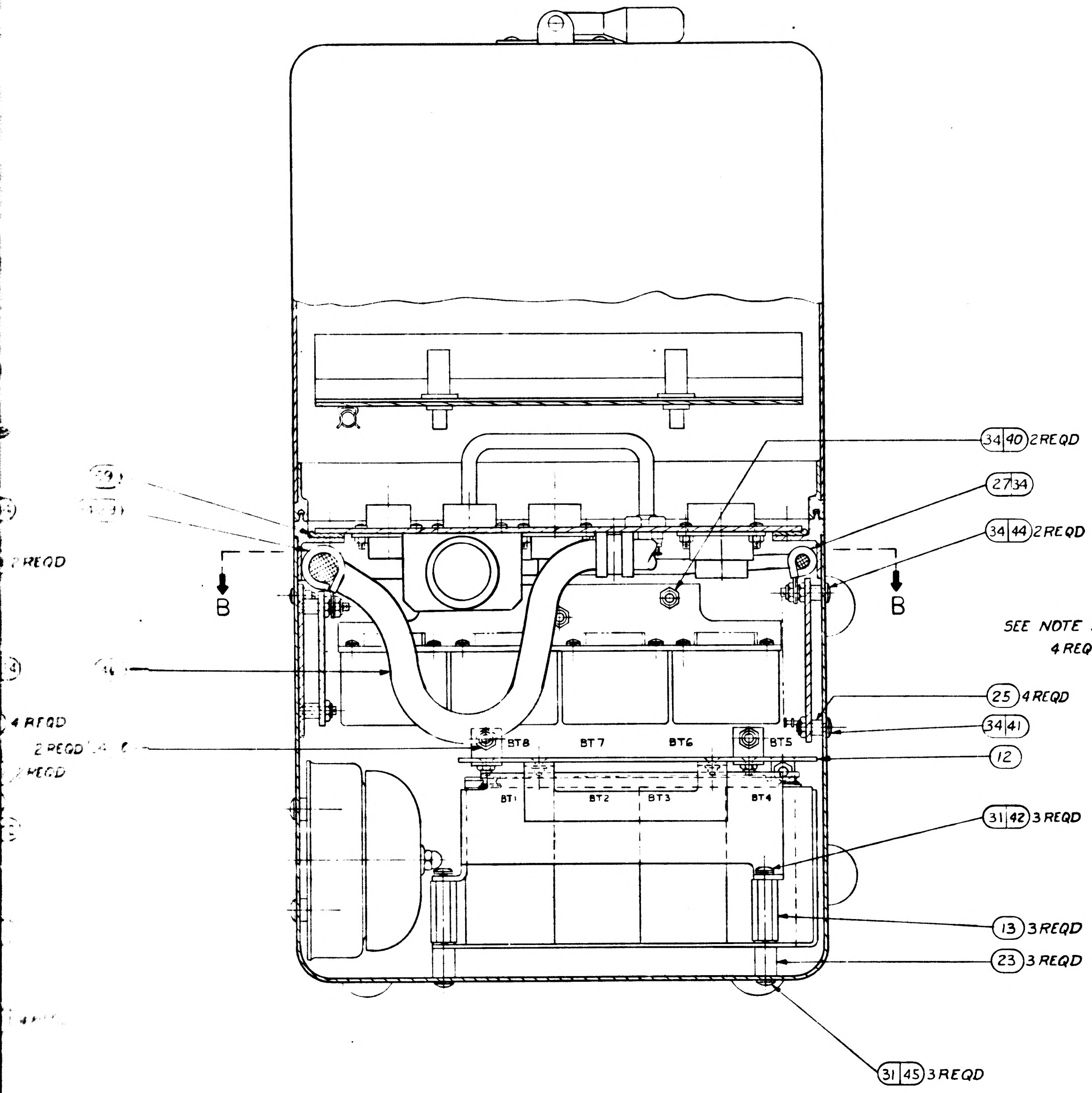
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
J		REPLACES REV (H) WITH CHANGE PER MXC 206049 WAS "D" SIZE		16 OCT 65	RLP
K		REVISED PER MXC 206397		26 OCT 65	
L		INITIAL RELEASE CLASS A PER TDRR 24042		23 OCT 65	
M		REVISED PER TDRR 25717		8 FEB 66	
N		REVISED PER TDRR 26973		14 MAR 66	RLP
P		REVISED PER TDRR 26979		6 MAR 66	


SEE NOTE 11
34 41
D
30 39 16 REQD
AR4
AR3
AR2
AR1
C
F
C
F
36 2 REQD
K1
DS2
34 47
2 REQD
6
31 42
D

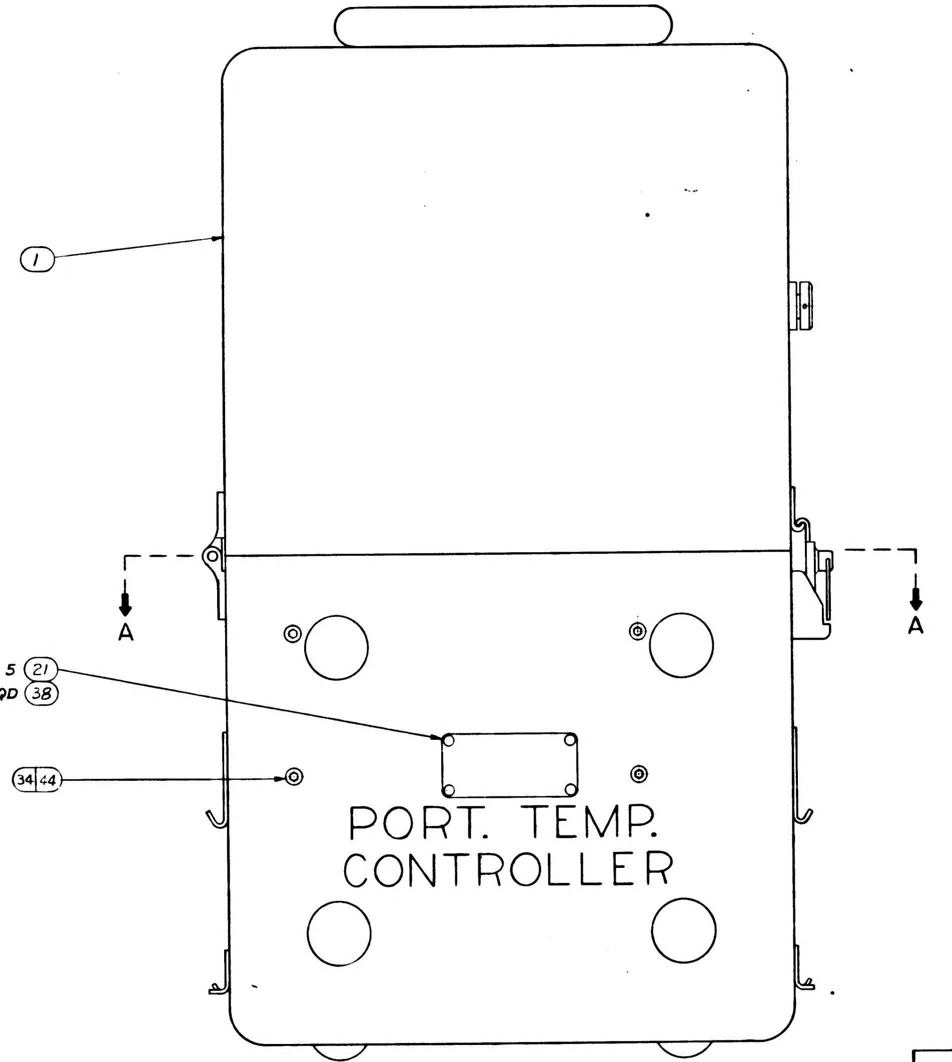
SECTION B-B


CAL
125°
130°
135°
120°
140°
115V
115V
28V
OUTPUT
REMOTE ALARM J3
TEMP
130°F
AMPS
28VDC J1
115 VAC J2
GAIN ON (PTC INHIBITED)
POWER ON
POWER FAIL
OFF
ON
HEATER CURRENT
HI
LO
ALARM LIMIT
GAIN
TEMP
ADJUST
TEST
28V
OUTPUT
IMU HOT
IMU COLD
ALARM INHIBITED (SYSTEM RESET)
IMU J4
6 REQD 37
2

VIEW A - A
WITH COVER REMOVED


34 40 2REQD
27 34
34 44 2REQD
B
B
2 REQD
4 REQD
2 REQD
25 4REQD
34 41
BT8
BT7
BT6
BT5
12
BT1
BT2
BT3
BT4
31 42 3REQD
13 3REQD
23 3REQD
31 45 3REQD

SECTION C-C


1
SEE NOTE 5 21
4 REQD 38
34 44
A
A
PORT. TEMP.
CONTROLLER

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	AR		62	MIL-I-8660	SILICONE GREASE (ES 2311)
	1		61	2900957	INSTRUCTION FOLDER, PTC II
SEE NOTE 8	AR		60	MIL-A-5092 TYPE 2	ADHESIVE (ES2770-2)
SEE NOTE 8	1		59	2900742	GASKET, PANEL
	1		58	F02A250V4AS (1897099-113)	FUSE, MIL-F-15160/02
	1		57	F02B125V3AS (1897099-130)	FUSE, MIL-F-15160/02
	AR		56	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
	AR		55	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
	AR		54	SN 60 WS	SOLDER QQ-S-571 (ES2175-1)
SEE NOTE 3	1		53	2900862	CABLE INTERCONNECT - W 197
	1		52	2900861	W 196
	1		51	2900860	W 195
	1		50	2900859	W 194
SEE NOTE 3	1		49	2900856	CABLE INTERCONNECT - W 190
	☒		48	2900133	SCHEMATIC DIAGRAM, ELEC
SEE NOTE 3	1		47	2900656	LEAD SET AA
	1		46	2900654	HARNESS A
SEE NOTE 6	3		45	1006783-104	SCREW, BUTTON HEAD
	5		44	1006783-103	
	2		43	1006783-46	
	11		42	1006783-26	
	6		41	1006783-23	
	17		40	1006783-22	
	16		39	1006783-18	
	4		38	1006783-9	SCREW, BUTTON HEAD
	6		37	1010630-39	SCREW, FLAT HEAD
	4		36	1010630-13	SCREW, FLAT HEAD
	1		35	1012525-006	NUT, SELF LOCKING
	23		34	1012525-004	
	2		33	1016151-010	
SEE NOTE 6	2		32	1016151-004	NUT, SELF LOCKING
	12		31	MS 35338-80	WASHER, LOCK
	16		30	MS35338-78	WASHER, LOCK
	1		29	MS 21919DG8 (1897073-108)	CLAMP, CUSHIONED
	1		28	MS 21919DG6 (1897073-106)	CLAMP, CUSHIONED
	3		27	MS 21919DG4 (1897073-104)	CLAMP, CUSHIONED
	4		26	MS 21919DG3 (1897073-103)	CLAMP, CUSHIONED
SEE NOTE 6	8		25	1015860-024	SPACER
	2		24	1015860-017	SPACER
SEE NOTE 6	3		23	1015860-008	SPACER
	6		22	2900796	LINK, BATTERY TERMINAL
	1		21	1004260-141	NAMEPLATE
SEE NOTE 6	8		20	1897268-001	BATTERY
	1		19	1897410	TRANSFORMER, POWER
SEE NOTE 6	1		18	2900520	BELL, ASSEMBLY
	1		17	CE71C562G (1896872-119)	CAPACITOR, MIL-C-62/12
SEE NOTE 6	4		16	1897261	COMPARATOR
	1		15	2900795	BRACKET, ELECTRONIC COMPONENTS
	1		14	2900512-001	NUT, SLEEVE
	3		13	2900512-000	NUT, SLEEVE
	1		12	2900511	COVER, BATTERY RETAINER
	2		11	2900510	BRACKET, ANGLE
	1		10	2900509	TRAY, BATTERY
	1		9	2900508	RETAINER, BATTERY (INSEP ASSY)
	2		8	2900507	STRAP, RETAINING
	2		7	2900506	STRAP, RETAINING (INSEP ASSY)
	1		6	2900777-011	RELAY ASSEMBLY
	1		5	2900778-011	ELECTRONIC COMPONENTS ASSY
	1		4	2900513-011	ELECTRONIC COMPONENTS ASSY
	1		3	2900521-011	ELECTRONIC COMPONENT ASSY
	1		2	2900835-011	PANEL ASSEMBLY
SEE NOTE 8	1		1	2900525-011	CASE PORT. TEMP. CONTROLLER

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900063-011	2900030-011	011
2900030-011	2900030-011	011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN COOKMAN DATE 3 AUG 65
CHECKED J. STELMA 7 AUG 65
APPROVAL D. TECHMBOLD 9 AUG 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CONTROLLER, TEMPERATURE, PORTABLE

CODE IDENT NO 99974
SIZE J2
2900060
SCALE FULL
SHEET 1 OF 1

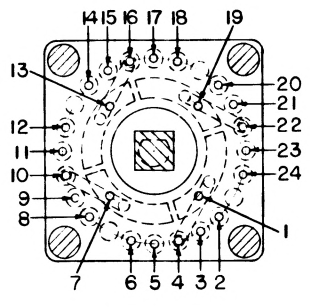
2900060 P

2900060 P 1

2/2900060

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 USING ITEMS (56) AND (54) OR (55).
3. THESE ITEMS ARE PART OF THIS ASSEMBLY.
4. DRAWING FOR REFERENCE:
   SCHEMATIC DIAGRAM ITEM (48)
5. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (21) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
6. VENDOR ITEM - SEE SOURCE OR SPECIFICATION CONTROL DRAWING.
7. PROCEDURE FOR CALIBRATING BRIDGES (PERFORM IN THE FOLLOWING SEQUENCE).
   a. AFTER COMPLETING CONTINUITY CHECKS, TURN ALL POTS FULLY CW (MAXIMUM RESISTANCE) EXCEPT R50, WHICH SHALL BE CCW. APPLY 28 ± 1 VDC TO J1-K (HI) AND J1-L (LO).
   b. INDICATING BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 2504.5 ± 0.1 OHMS ACROSS J4-G AND J4-T. JUMPER J4T TO J4-C. WITH THE POWER SWITCH ON, ADJUST R18 AND R19 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.610 ± 1% VDC ACROSS R17 (TB2-52 AND TB2-45) AND 17.6 ± 1% VDC ACROSS R21 AND R22 (TB2-39 AND TB2-54).
   c. CONTROL BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 1560.0 ± 0.1 OHMS ACROSS J4-P AND J4-S. JUMPER J4-S TO J4-C. TURN TEMP ADJUST POT TO MIDRANGE (25 OHMS). WITH THE POWER SWITCH ON, ADJUST R33 AND AND R35 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.950 ± 1% VDC ACROSS R34 (TB2-56 AND TB2-47) AND 17.4 ± 1% VDC ACROSS R36, R38, AND R37 (TB2-42 AND TB2-12. TURN POWER SWITCH OFF.
   d. CHARGING VOLTAGE CUTOFF: DISCONNECT CONDUCTOR NO. A11 FROM BT1-(+) AND CONNECT TO VOLTMETER (HI). TURN POWER SWITCH ON. APPLY 36.8 ± 0.1 % VDC AT TB2-19 (HI) AND TB2-55 (LO). SLOWLY TURN R16 CCW UNTIL VOLTAGE DROPS TO APPROXIMATELY 28 VDC ON CONDUCTOR NO. A11. AFTER DECREASING SUPPLY VOLTAGE TO APPROXIMATELY 30VDC, MOMENTARILY REMOVE AND REAPPLY. SLOWLY INCREASE SUPPLY VOLTAGE AND VERIFY THAT IT WILL REACH 36.8 ± 0.1 VDC BEFORE DROPPING TO APPROXIMATELY 28VDC. TURN POWER SWITCH OFF. REMOVE EXTERNAL DC VOLTAGE. RECONNECT CONDUCTOR NO. A11 TO BT1 (+). APPLY 115 VAC POWER AT J2-M AND J2-J. TURN POWER SWITCH ON. A PLOT OF THE BATTERY VOLTAGE VS TIME WILL INDICATE TWO VOLTAGE PLATEAUS. VERIFY THAT THE CUTOFF VOLTAGE AT THE END OF THE SECOND PLATEAU IS 36.7 ± 0.3 VDC (COMPLETE BATTERY CHARGING REQUIRES 16-24 HOURS AND MAY BE INTERRUPTED IF NECESSARY).
   e. OUTPUT VOLTAGE LIMIT: WITH A 9.0 ± 0.3 OHM LOAD AT J4-H AND J4-L, AND 1500 OHMS AT J4-P AND J4-S, APPLY 126.5 VAC 60 CPS AT J2-M AND J2-J. TURN POWER SWITCH ON. TURN R50 CW UNTIL OUTPUT VOLTAGE AT TP3 (HI) AND TP4 (LO) READS 32.5 VDC.
8. BOND ITEM (59) TO ITEM (1) USING ITEM (60).
9. CENTRALIZE ITEM (61) ON FLAT SURFACE OF INNER LID. ORIENT RIGHT SIDE OF ITEM (61) ADJACENT TO HINGE OF INNER LID.
10. INSPECT AND TEST PER PS 2900060.
11. MATING SURFACES OF ITEMS (1) AND (19) TO BE COATED WITH ITEM (62).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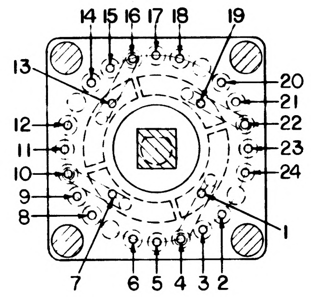
SECTION G-G
"A" DECK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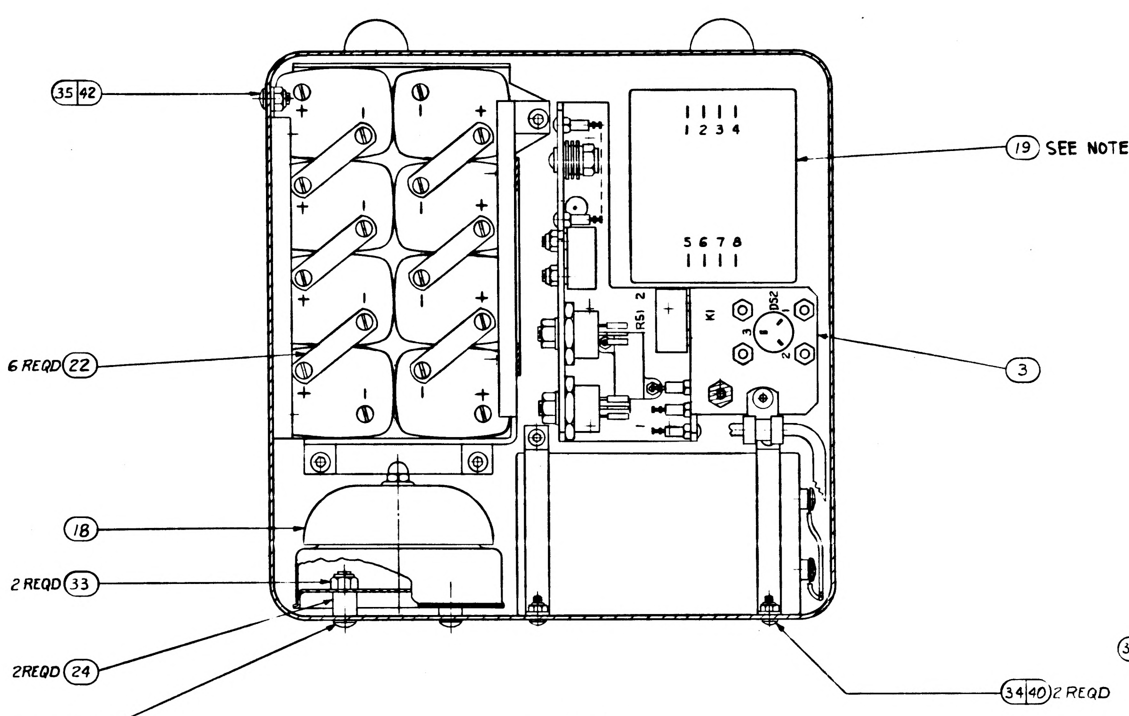
SECTION H-H
"B" DECK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1 2 3 4
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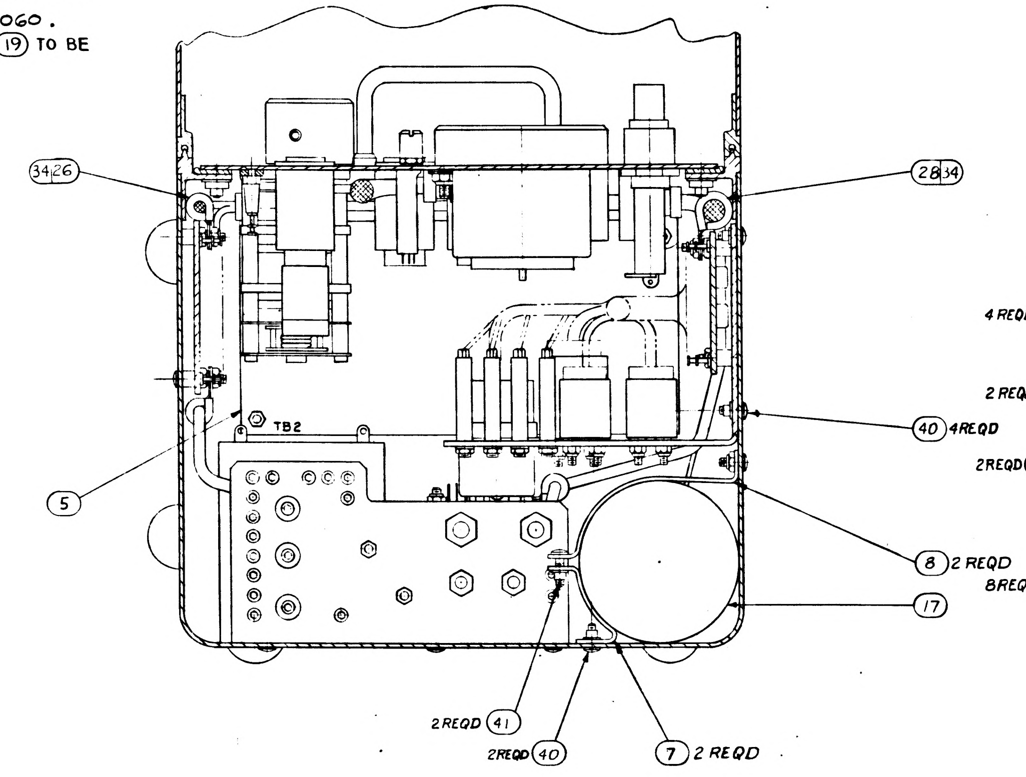
18
2 REQD 33
2 REQD 24
2 REQD 43
34 40 2 REQD

SECTION E-E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28 34
TB2
5
40 4 REQD
8 2 REQD
17
2 REQD 41
2 REQD 40
7 2 REQD

SECTION F-F
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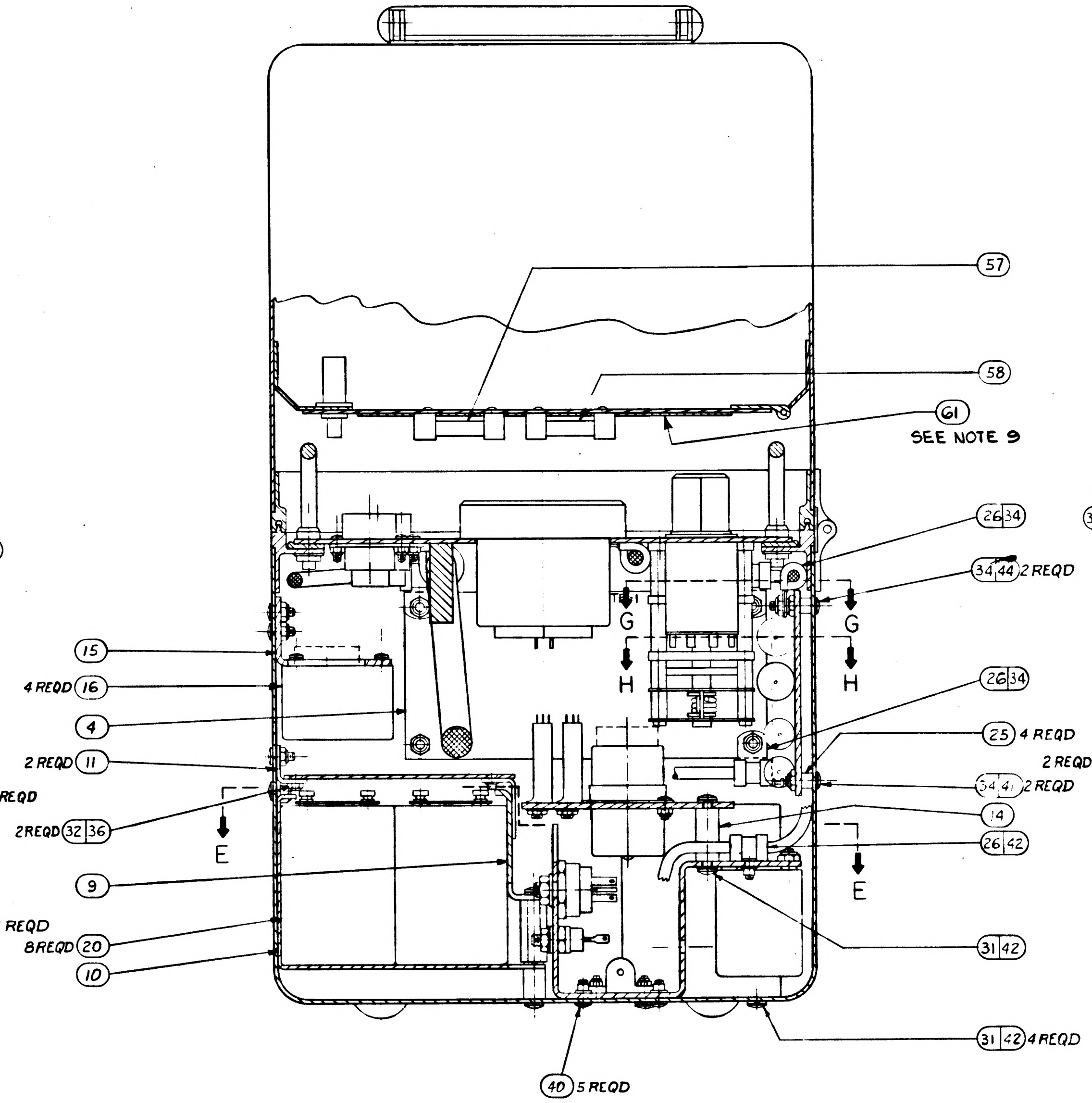
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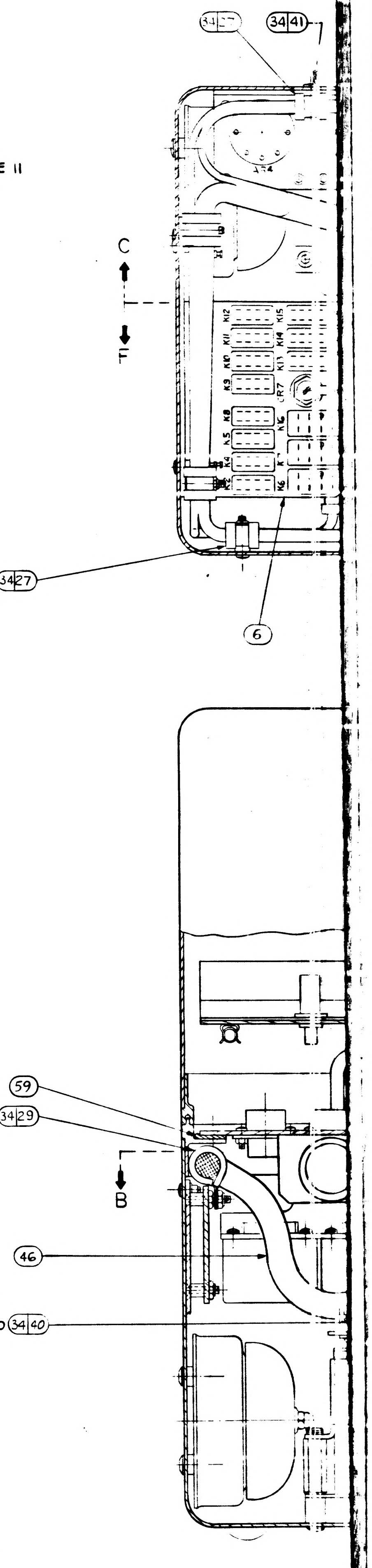
58
61
SEE NOTE 9
26 34
34 44 2 REQD
G
G
H
H
15
4 REQD 16
4
2 REQD 11
26 34
25 4 REQD
34 41 2 REQD
2 REQD 32 36
14
E
E
26 42
9
31 42
8 REQD 20
10
31 42 4 REQD
40 5 REQD

SECTION D-D
ROTATED 90° CCW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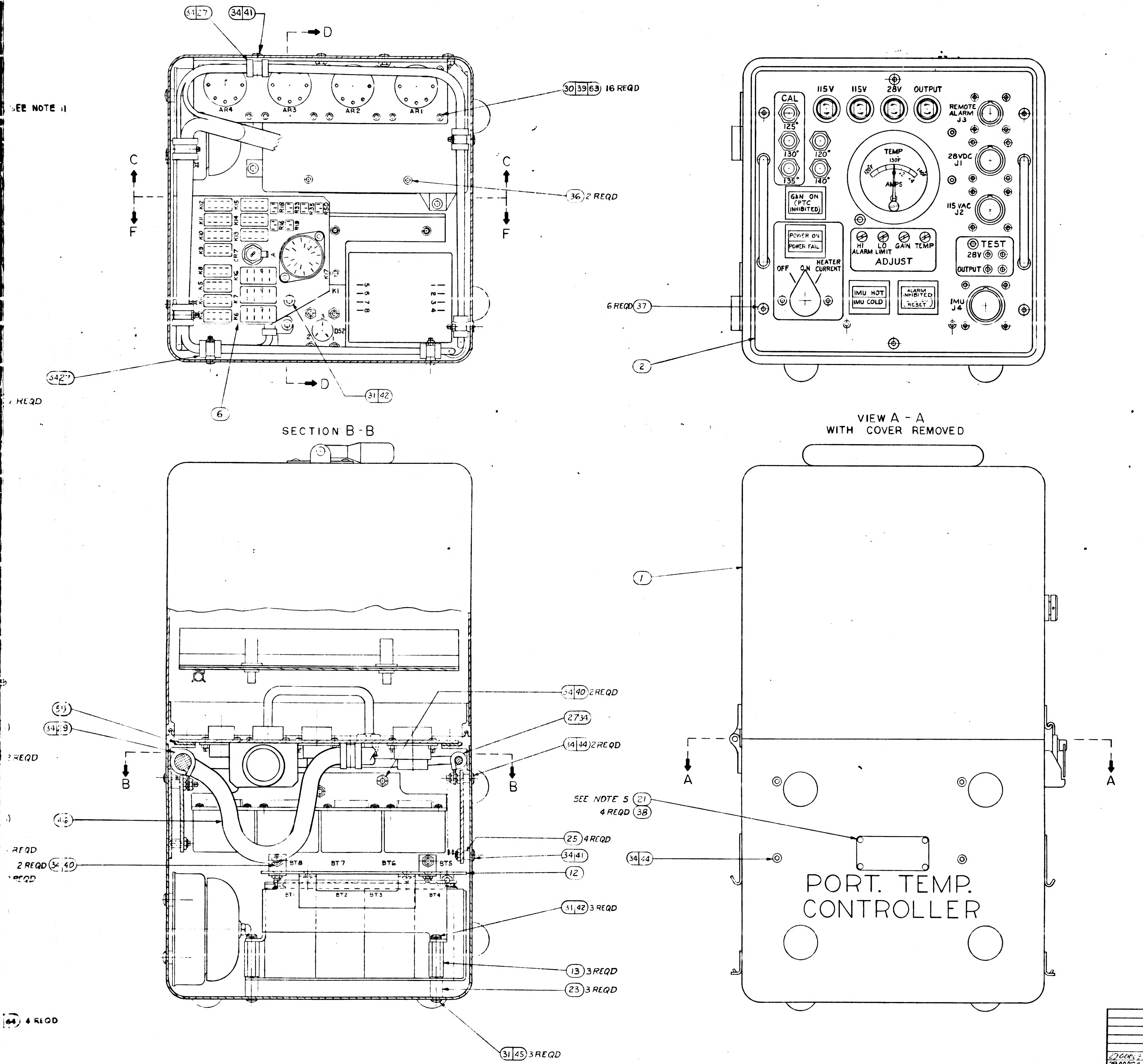
34 41
C
C
F
F
6
34 27
59
34 29
B
46
2 REQD 34 40

2900060	REV D	SH 1

1/2900060

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
J		REPLACES REV (H) WITH CHANGE PER MXC 206049 WAS "D" SIZE		16 OCT 65	RUP MEM
K		REVISED PER MXC 206397		26 OCT 65	Jm
L		INITIAL RELEASE CLASS A PER TDRR 24042		28 OCT 65	WP
M		REVISED PER TDRR 25717		8 FEB 66	HTO MEM
N		REVISED PER TDRR 26973		14 MAR 66	RUP AU
P		REVISED PER TDRR 26979		16 MAR 66	B.
R		REVISED PER TDRR 27542		4 APR 66	R.W.T.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34 41
D
30 39 63 16 REQD
AR4
AR3
AR2
AR1
SEE NOTE 11
C
F
36 2 REQD
K12
K11
K10
K9
K8
K5
K6
K15
K14
K13
CR7
A
K16
K7
K17
K1
R18
R16
R33
R19
R35
R50
DS2
5 6 7 8
1 2 3 4
34 27
REQD
31 42
6
CAL
125°
130°
135°
115V
115V
28V
OUTPUT
120°
140°
GAIN ON (PTC INHIBITED)
TEMP
130°F
AMPS
POWER ON
POWER FAIL
HI ALARM
LO LIMIT
GAIN
TEMP
ADJUST
OFF
ON
HEATER CURRENT
IMU HOT
IMU COLD
ALARM INHIBITED
RESET
REMOTE ALARM J3
28VDC J1
115 VAC J2
TEST
28V
OUTPUT
IMU J4
6 REQD 37
2
1
59
34 29
2 REQD
B
46
REQD
2 REQD 34 40
REQD
44 4 REQD
34 40 2 REQD
27 34
34 44 2 REQD
BT8
BT7
BT6
BT5
BT1
BT2
BT3
BT4
25 4 REQD
34 41
12
31 42 3 REQD
13 3 REQD
23 3 REQD
31 45 3 REQD
SEE NOTE 5 21
4 REQD 38
34 44
A
PORT. TEMP. CONTROLLER

SECTION B-B

VIEW A - A
WITH COVER REMOVED

SECTION C-C

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
				4		64	AN960-C8 (1897006-028	WASHER, FLAT
				16		63	AN960-C4 (1897006-024)	WASHER, FLAT
				AR		62	MIL-I-8660	SILICONE GREASE (ES 2311)
				1		61	2900957	INSTRUCTION FOILCAL (PTC II)
SEE NOTE 8				AR		60	MIL-A-5092 TYPE 2	ADHESIVE (ES2770-2)
SEE NOTE 8				1		59	2900742	GASKET, PANEL
				1		58	F02A250V4AS (1897099-113	FUSE, MIL-F-15160/02
				1		57	F02B125V3AS (1897099-130	FUSE, MIL-F-15160/02
				AR		56	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
				AR		55	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
				AR		54	SN 60 WS	SOLDER QQ-S-571 (ES2175-1)
SEE NOTE 3				1		53	2900862	CABLE INTERCONNECT - W 197
				1		52	2900861	W 196
				1		51	2900860	W 195
				1		50	2900859	W 194
SEE NOTE 3				1		49	2900856	CABLE INTERCONNECT - W 190
						48	2900133	SCHEMATIC DIAGRAM, ELEC
SEE NOTE 3				1		47	2900656	LEAD SET AA
				1		46	2900654	HARNESS A
SEE NOTE 6				3		45	1006783-104	SCREW, BUTTON HEAD
				5		44	1006783-103	
				2		43	1006783-46	
				11		42	1006783-26	
				6		41	1006783-23	
				17		40	1006783-22	
				16		39	1006783-18	
				4		38	1006783-9	SCREW, BUTTON HEAD
				6		37	1010630-39	SCREW, FLAT HEAD
				4		36	1010630-13	SCREW, FLAT HEAD
				1		35	1012525-006	NUT, SELF LOCKING
				23		34	1012525-004	
				2		33	1016151-010	
SEE NOTE 6				2		32	1016151-004	NUT, SELF LOCKING
				12		31	MS 35338-80	WASHER, LOCK
				16		30	MS 35338-78	WASHER, LOCK
				1		29	MS 21919DG8 (1897073-108)	CLAMP, CUSHIONED
				1		28	MS 21919DG6 (1897073-106)	CLAMP, CUSHIONED
				3		27	MS 21919DG4 (1897073-104)	CLAMP, CUSHIONED
				4		26	MS 21919DG3 (1897073-103)	CLAMP, CUSHIONED
SEE NOTE 6				8		25	1015860-024	SPACER
				2		24	1015860-017	SPACER
SEE NOTE 6				3		23	1015860-008	SPACER
				6		22	2900796	LINK, BATTERY TERMINAL
				1		21	1004260-141	NAMEPLATE
SEE NOTE 6				8		20	1897268-001	BATTERY
				1		19	1897410	TRANSFORMER, POWER
SEE NOTE 6				1		18	2900520	BELL, ASSEMBLY
				1		17	CE71C562G (1896872-119)	CAPACITOR, MIL-C-62/12
SEE NOTE 6				4		16	1897261	COMPARATOR
				1		15	2900795	BRACKET, ELECTRONIC COMPONENTS
				1		14	2900512-001	NUT, SLEEVE
				3		13	2900512-000	NUT, SLEEVE
				1		12	2900511	COVER, BATTERY RETAINER
				2		11	2900510	BRACKET, ANGLE
				1		10	2900509	TRAY, BATTERY
				1		9	2900508	RETAINER, BATTERY (INSEP ASSY)
				2		8	2900507	STRAP, RETAINING
				2		7	2900506	STRAP, RETAINING (INSEP ASSY)
				1		6	2900777-011	RELAY ASSEMBLY
				1		5	2900778-011	ELECTRONIC COMPONENTS ASSY
				1		4	2900513-011	ELECTRONIC COMPONENTS ASSY
				1		3	2900521-011	ELECTRONIC COMPONENT ASSY
				1		2	2900835-011	PANEL ASSEMBLY
SEE NOTE 8				1		1	2900525-011	CASE, PORT. TEMP. CONTROLLER

LIST OF PARTS AND MATERIALS

APPLICATION		
NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900033-011	2900030-011	011
2900030-011	2900030-011	011

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS
DRAWN COOKMAN DATE 3 AUG 65
CHECKED J. STELMA 7 AUG 65
APPROVAL D. TSCHABOLD 9 AUG 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

CONTROLLER, TEMPERATURE, PORTABLE

CODE IDENT NO 99974
SIZE J2
2900060
SCALE FULL
SHEET 1 OF 1

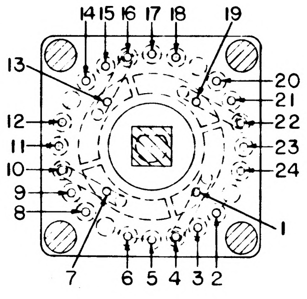
2900060 REV R SH 1

2900060 R

2/2900060

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 USING ITEMS (56) AND (54) OR (55).
3. THESE ITEMS ARE PART OF THIS ASSEMBLY.

4. DRAWING FOR REFERENCE: SCHEMATIC DIAGRAM ITEM (48)
5. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (21) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
6. VENDOR ITEM - SEE SOURCE OR SPECIFICATION CONTROL DRAWING.
7. PROCEDURE FOR CALIBRATING BRIDGES (PERFORM IN THE FOLLOWING SEQUENCE).
   a. AFTER COMPLETING CONTINUITY CHECKS, TURN ALL POTS FULLY CW (MAXIMUM RESISTANCE) EXCEPT R50, WHICH SHALL BE CCW. APPLY 28 ± 1 VDC TO J1-K (HI) AND J1-L (LO).
   b. INDICATING BRIDGE : CONNECT AN EXTERNAL RESISTOR OF 2504.5 ± 0.1 OHMS ACROSS J4-G AND J4-T. JUMPER J4T TO J4-C. WITH THE POWER SWITCH ON, ADJUST R18 AND R19 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR : 1.610 ± 1% VDC ACROSS R17 (TB2-52 AND TB2-45) AND 17.6 ± 1% VDC ACROSS R21 AND R22 (TB2-39 AND TB2-54).
   c. CONTROL BRIDGE : CONNECT AN EXTERNAL RESISTOR OF 1560.0 ± 0.1 OHMS ACROSS J4-P AND J4-S. JUMPER J4-S TO J4-C. TURN TEMP ADJUST POT TO MIDRANGE (25 OHMS). WITH THE POWER SWITCH ON, ADJUST R33 AND AND R35 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR : 1.950 ± 1% VDC ACROSS R34 (TB2-56 AND TB2-47) AND 17.4 ± 1% VDC ACROSS R36, R38, AND R37 (TB2-42 AND TB2-12. TURN POWER SWITCH OFF.
   d. CHARGING VOLTAGE CUTOFF : DISCONNECT CONDUCTOR NO. A11 FROM BT1-(+) AND CONNECT TO VOLTMETER (HI). TURN POWER SWITCH ON. APPLY 36.8 ± 0.1 % VDC AT TB2-19 (HI) AND TB2-55 (LO). SLOWLY TURN R16 CCW UNTIL VOLTAGE DROPS TO APPROXIMATELY 28 VDC ON CONDUCTOR NO. A11. AFTER DECREASING SUPPLY VOLTAGE TO APPROXIMATELY 30VDC, MOMENTARILY REMOVE AND REAPPLY. SLOWLY INCREASE SUPPLY VOLTAGE AND VERIFY THAT IT WILL REACH 36.8 ± 0.1 VDC BEFORE DROPPING TO APPROXIMATELY 28VDC. TURN POWER SWITCH OFF. REMOVE EXTERNAL DC VOLTAGE. RECONNECT CONDUCTOR NO. A11 TO BT1 (+). APPLY 115 VAC POWER AT J2-M AND J2-J. TURN POWER SWITCH ON. A PLOT OF THE BATTERY VOLTAGE VS TIME WILL INDICATE TWO VOLTAGE PLATEAUS. VERIFY THAT THE CUTOFF VOLTAGE AT THE END OF THE SECOND PLATEAU IS 36.7 ± 0.3 VDC (COMPLETE BATTERY CHARGING REQUIRES 16-24 HOURS AND MAY BE INTERRUPTED IF NECESSARY).
   e. OUTPUT VOLTAGE LIMIT : WITH A 9.0 ± 0.3 OHM LOAD AT J4-H AND J4-L, AND 1500 OHMS AT J4-P AND J4-S, APPLY 126.5 VAC 60 CPS AT J2-M AND J2-J. TURN POWER SWITCH ON. TURN R50 CW UNTIL OUTPUT VOLTAGE AT TP3 (HI) AND TP4 (LO) READS 32.5 VDC.
8. BOND ITEM (59) TO ITEM (1) USING ITEM (60).
9. CENTRALIZE ITEM (61) ON FLAT SURFACE OF INNER LID. ORIENT RIGHT SIDE OF ITEM (61) ADJACENT TO HINGE OF INNER LID.
10. INSPECT AND TEST PER PS 2900060.
11. MATING SURFACES OF ITEMS (1) AND (19) TO BE COATED WITH ITEM (62).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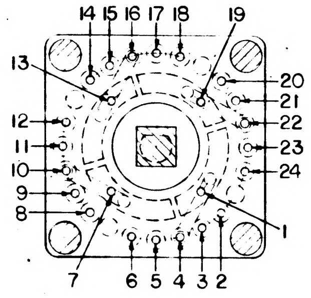
SECTION G-G
"A" DECK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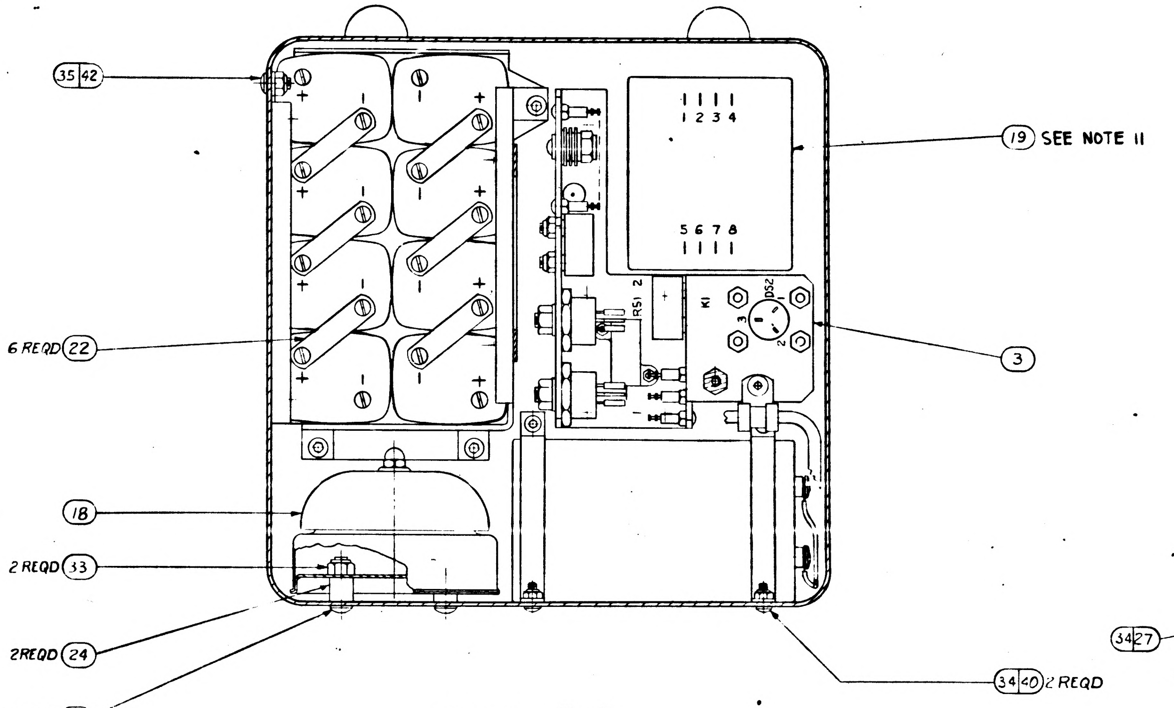
SECTION H-H
"B" DECK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DS2
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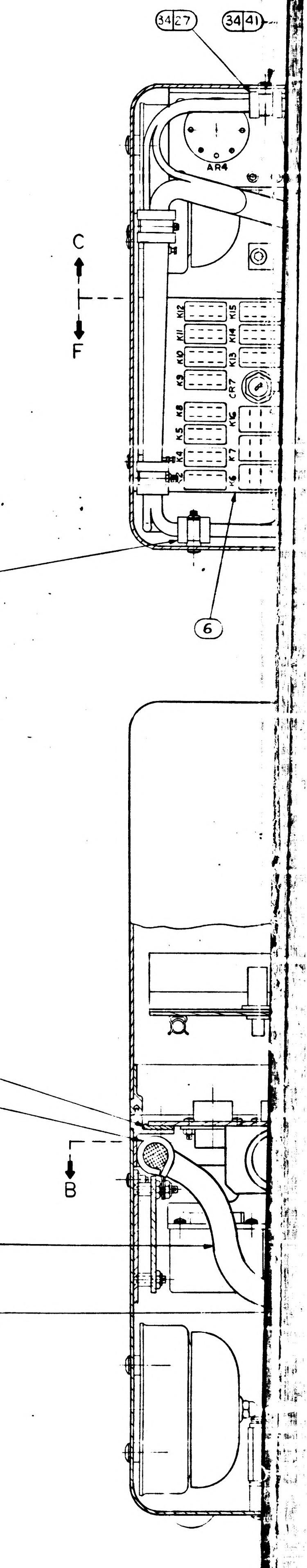
SECTION E-E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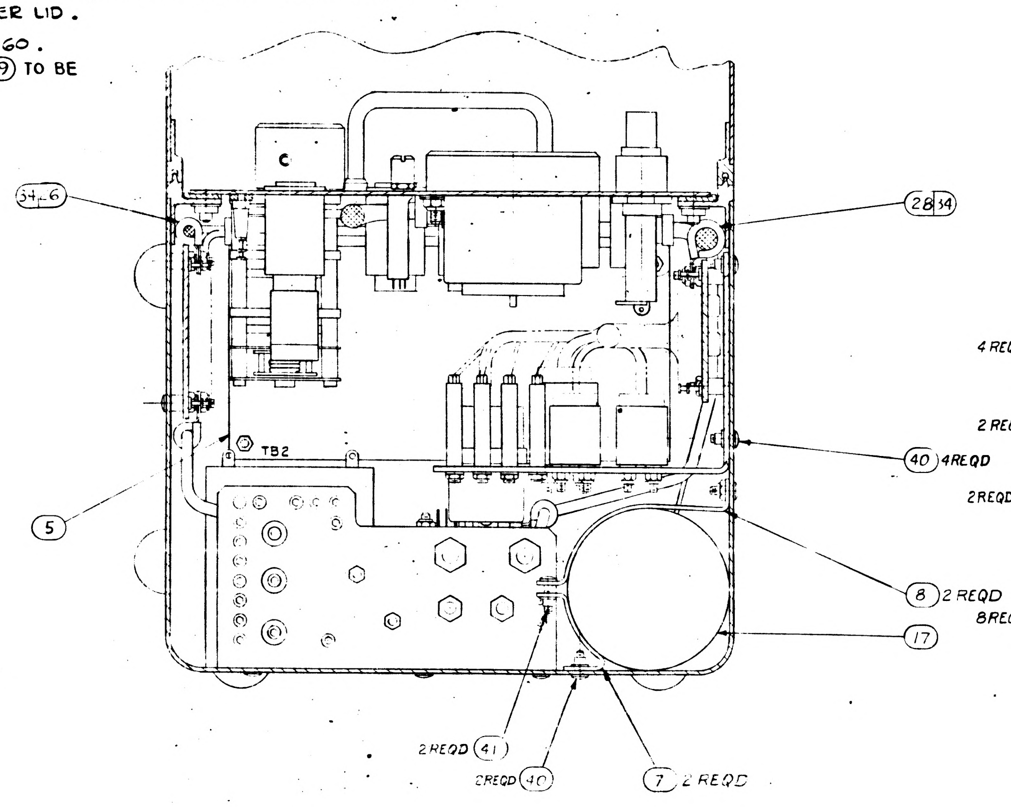
C
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8 2 REQD
17
2 REQD 41
2REQD 40
7 2 REQD

SECTION F-F
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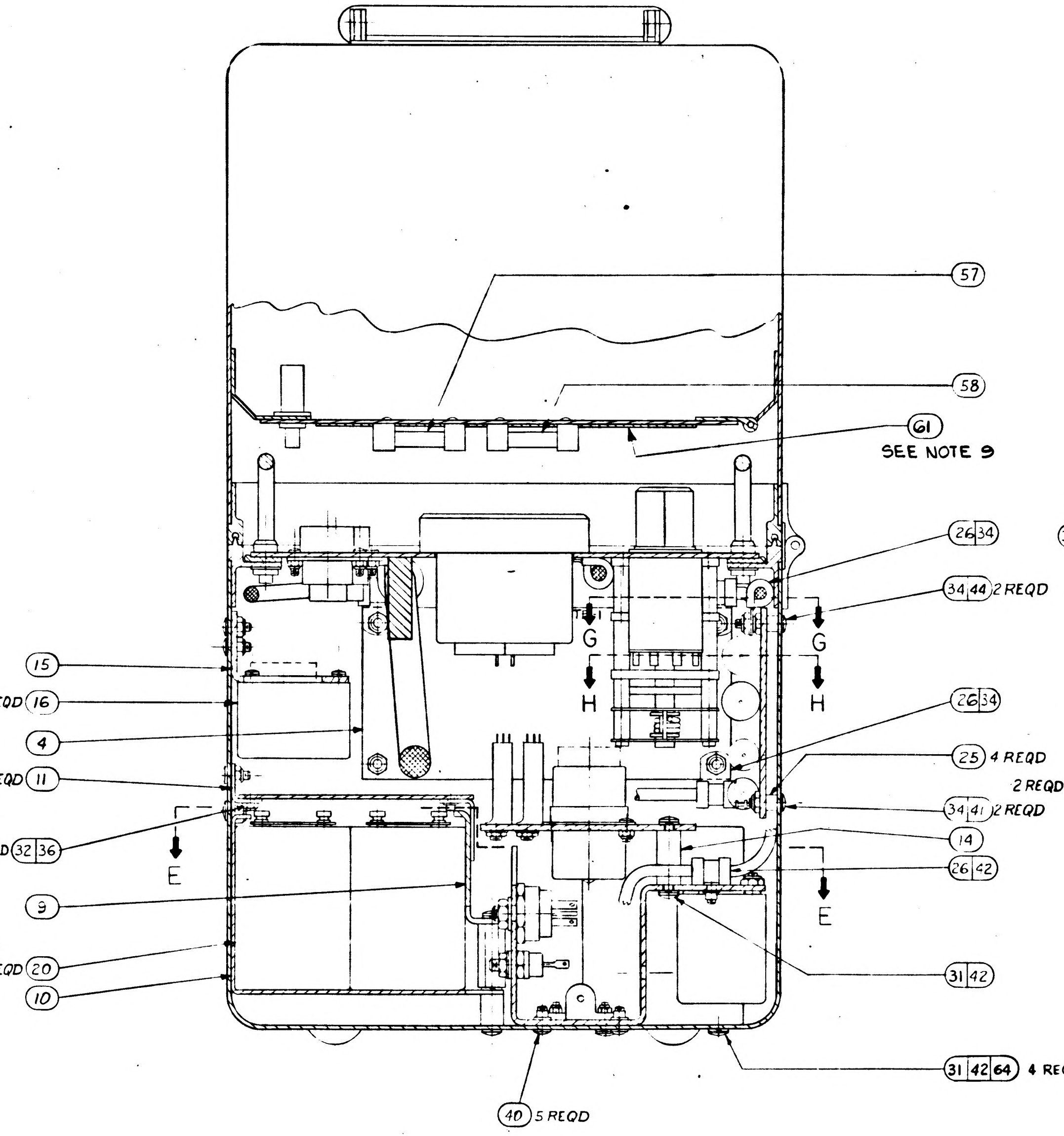
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61
SEE NOTE 9
26 34
34 44 2 REQD
G
G
H
H
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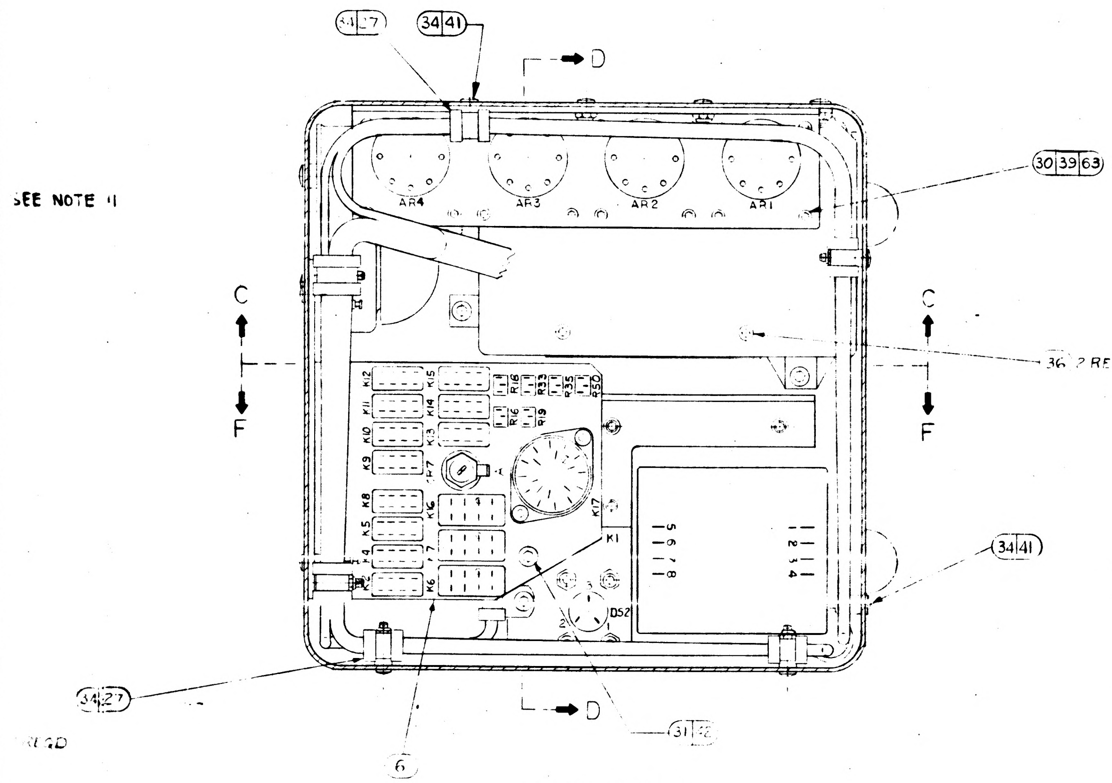
4 REQD 16
4
2 REQD 11
2REQD 32 36
E
9
8REQD 20
10
26 34
25 4 REQD
34 41 2 REQD
14
26 42
E
31 42
31 42 64 4 REQD
40 5 REQD

SECTION D-D
ROTATED 90° CCW

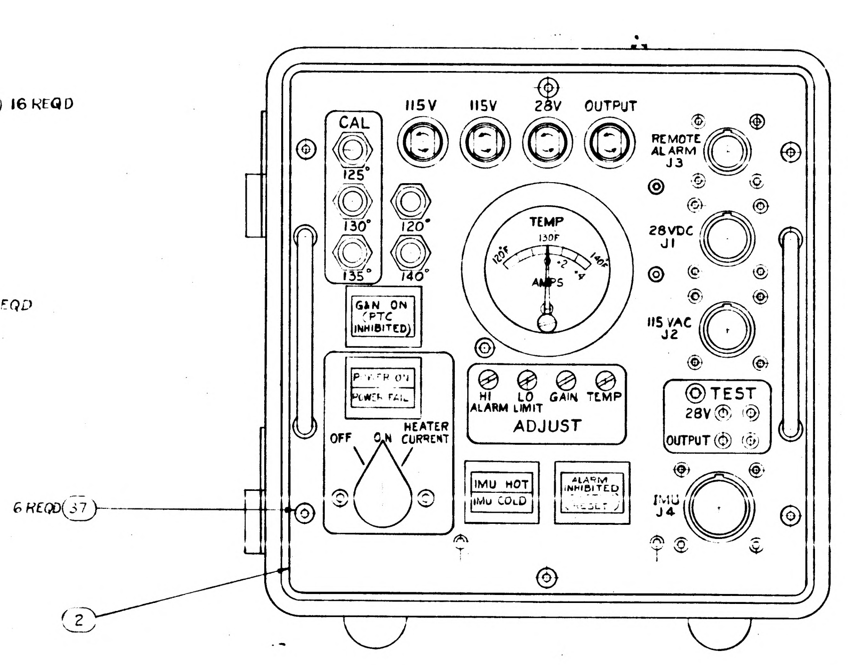
2900060	REV	SH
	R	1

1/2900060

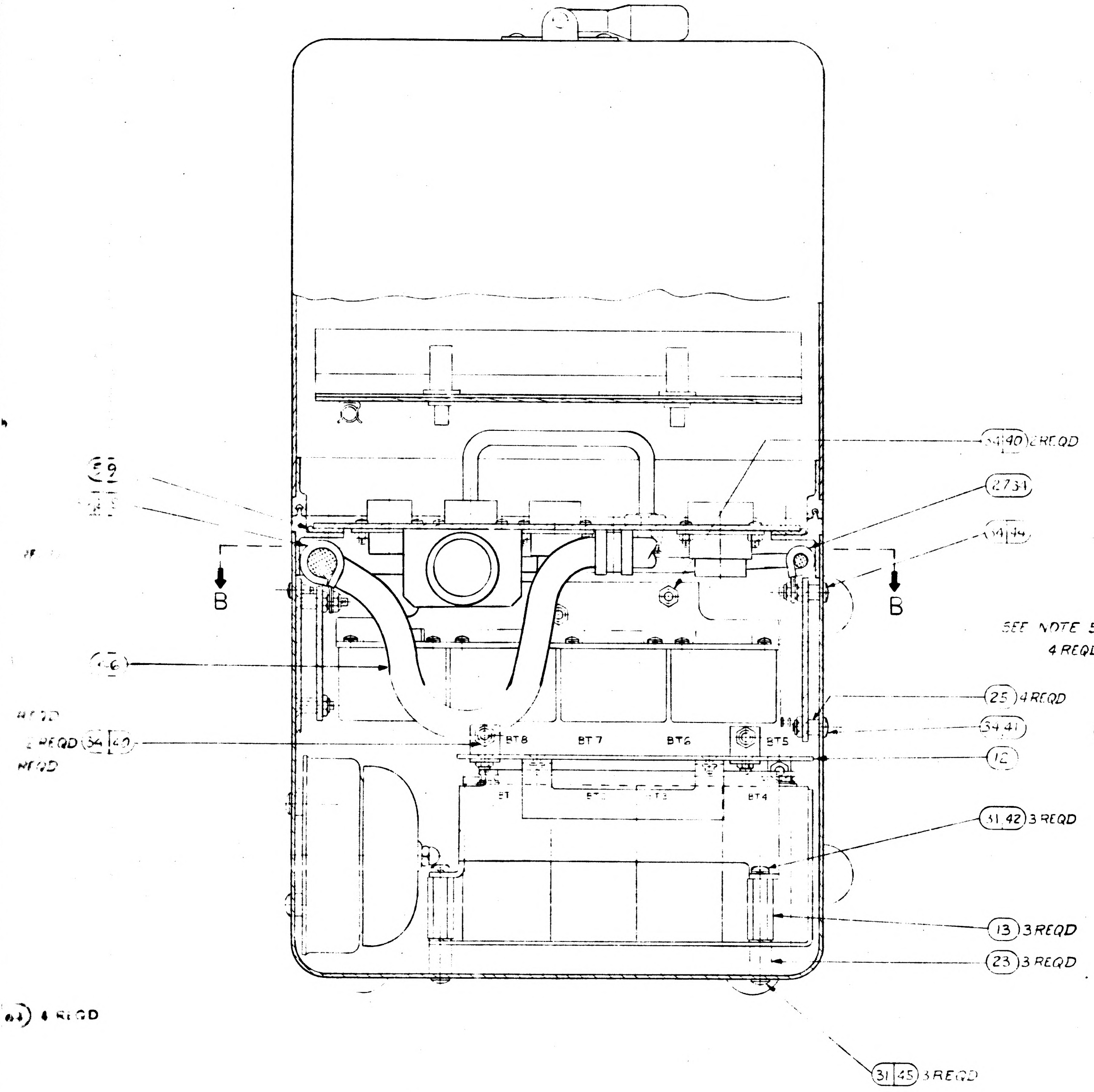
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
J		REPLACES REV(H) WITH CHANGE PER MXC 206049 WAS "D" SIZE		16 OCT 65	RLP
K		REVISED PER MXC 206397		26 OCT 65	Jm
L		INITIAL RELEASE CLASS A PER TDRR [illegible]		28 OCT 65	WP
M		REVISED PER TDRR 25717		8 FEB 66	HTO
N		REVISED PER TDRR 26973		14 MAR 66	RLP AU
P		REVISED PER TDRR 26979		16 MAR 66	JB.
R		REVISED PER TDRR 27542		4 APR 66	RWT
S		REVISED PER TDRR 27556		APR 66	JK. JAC


34 27
34 41
D
30 39 63 16 REQD
SEE NOTE 11
AR4
AR3
AR2
AR1
C
F
36 2 REQD
K1
D52
34 41
34 27
6
D
31 38

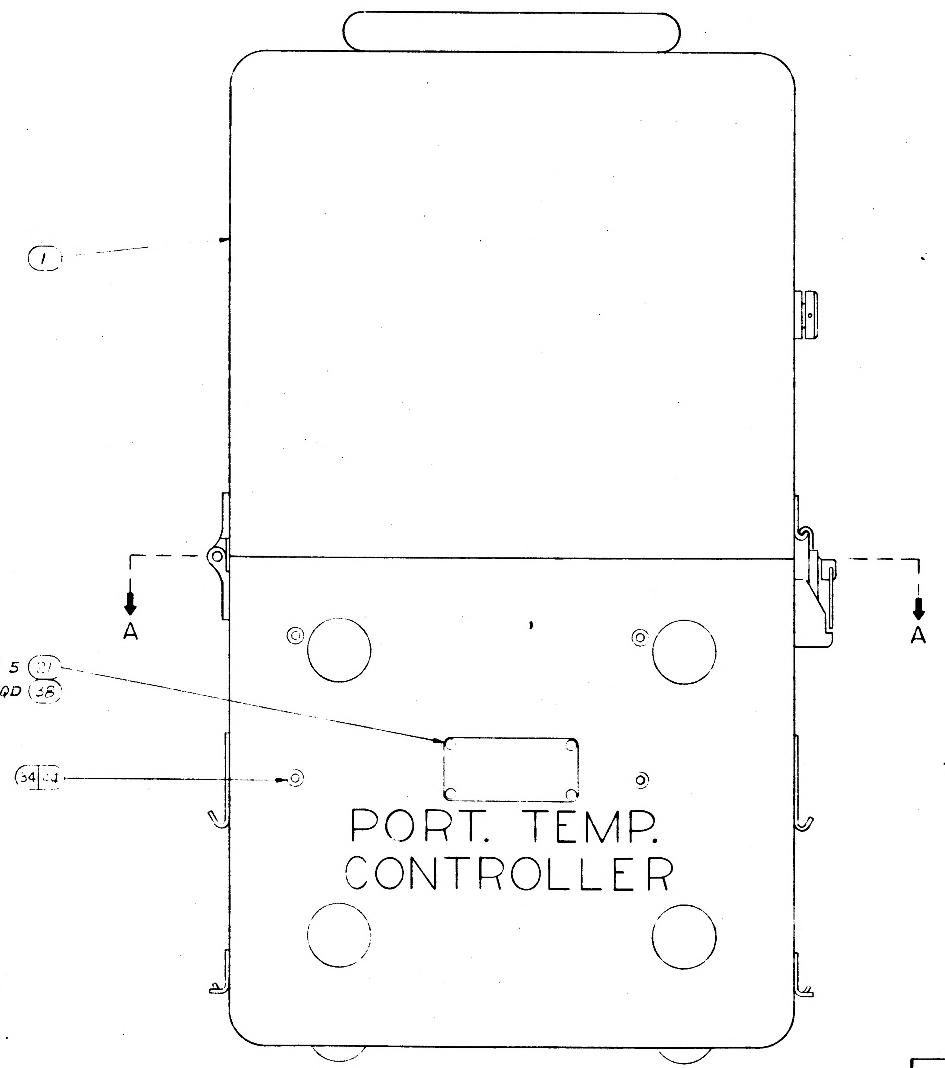
SECTION B-B


CAL
125°
130°
135°
120°
140°
115V
115V
28V
OUTPUT
REMOTE ALARM J3
TEMP
AMPS
28VDC J1
115 VAC J2
GAIN ON (PTC INHIBITED)
POWER ON
POWER FAIL
OFF
ON
HEATER CURRENT
HI ALARM
LO LIMIT
GAIN
TEMP
ADJUST
IMU HOT
IMU COLD
ALARM INHIBITED
TEST
28V
OUTPUT
IMU J4
6 REQD 37
2

VIEW A - A
WITH COVER REMOVED


34 40 2 REQD
27 31
34 44
B
B
6
25 4 REQD
34 41
12
4 REQD
2 REQD 34 40
BT8
BT7
BT6
BT5
BT1
BT4
31 42 3 REQD
13 3 REQD
23 3 REQD
4 REQD
31 45 3 REQD

SECTION C-C


1
A
A
SEE NOTE 5 21
4 REQD 36
34 44
PORT. TEMP.
CONTROLLER

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1		65	MS21919DG5 (1897013-105)	CLAMP, CUSHIONED
	4		64	AN960-C6 (1897006-028)	WASHER, FLAT
	16		63	AN960-C4 (1897006-024)	WASHER, FLAT
	AR		62	MIL-I-8660	SILICONE GREASE (ES 2311)
	1		61	2900957	INSTRUCTION FOILCAL (PTC II)
SEE NOTE 8	AR		60	MIL-A-5092 TYPE 2	ADHESIVE (ES2770-2)
SEE NOTE 8	1		59	2900742	GASKET PANEL
	1		58	F02A250V4AS (1897099-113	FUSE, MIL-F-15160/02
	1		57	F02B125V3AS (1897099-130	FUSE, MIL-F-15160/02
	AR		56	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
	AR		55	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
	AR		54	SN 60 WS	SOLDER QQ-S-571 (ES2175-1)
SEE NOTE 3	1		53	2900862	CABLE INTERCONNECT - W 197
	1		52	2900861	W 196
	1		51	2900860	W 195
	1		50	2900859	W 194
SEE NOTE 3	1		49	2900856	CABLE INTERCONNECT - W 190
			48	2900133	SCHEMATIC DIAGRAM, ELEC
SEE NOTE 3	1		47	2900656	LEAD SET AA
	1		46	2900654	HARNESS A
SEE NOTE 6	3		45	1006783-104	SCREW, BUTTON HEAD
	4		44	1006783-103	
	2		43	1006783-46	
	11		42	1006783-26	
	7		41	1006783-23	
	17		40	1006783-22	
	16		39	1006783-18	
	4		38	1006783-9	SCREW, BUTTON HEAD
	6		37	1010630-39	SCREW, FLAT HEAD
	4		36	1010630-13	SCREW, FLAT HEAD
	1		35	1012525-006	NUT, SELF LOCKING
	22		34	1012525-004	
	2		33	1016151-010	
SEE NOTE 6	2		32	1016151-004	NUT, SELF LOCKING
	12		31	MS35338-80	WASHER, LOCK
	16		30	MS35338-78	WASHER, LOCK
	1		29	MS21919DG8 [illegible]	CLAMP, CUSHIONED
	1		28	MS21919DG6 [illegible]	CLAMP, CUSHIONED
	3		27	MS21919DG4 [illegible]	CLAMP, CUSHIONED
	2		26	MS21919DG3 [illegible]	CLAMP, CUSHIONED
SEE NOTE 6	8		25	1015860-024	SPACER
	2		24	1015860-017	SPACER
SEE NOTE 6	3		23	1015860-008	SPACER
	6		22	2900796	LINK, BATTERY TERMINAL
	1		21	1004260-141	NAMEPLATE
SEE NOTE 6	8		20	1897268-001	BATTERY
	1		19	1897410	TRANSFORMER, POWER
SEE NOTE 6	1		18	[illegible]	BELL, ASSEMBLY
	1		17	CE71C562G (1896872-119)	CAPACITOR, MIL-C-62/12
SEE NOTE 6	4		16	1897261	COMPARATOR
	1		15	2900795	BRACKET, ELECTRONIC COMPONENTS
	1		14	2900512-001	NUT, SLEEVE
	3		13	2900512-000	NUT, SLEEVE
	1		12	2900511	COVER, BATTERY RETAINER
	2		11	2900510	BRACKET, ANGLE
	1		10	2900509	TRAY, BATTERY
	1		9	2900508	RETAINER, BATTERY (INSEP ASSY)
	2		8	2900507	STRAP, RETAINING
	2		7	2900506	STRAP, RETAINING (INSEP ASSY)
	1		6	2900777-011	RELAY ASSEMBLY
	1		5	2900778-011	ELECTRONIC COMPONENTS ASSY
	1		4	2900513-011	ELECTRONIC COMPONENTS ASSY
	1		3	2900521-011	ELECTRONIC COMPONENT ASSY
	1		2	2900835-011	PANEL ASSEMBLY
SEE NOTE 8	1		1	2900525-011	CASE PORT. TEMP. CONTROLLER

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO
[illegible]	2900030-011	
290003[illegible]-011	2900030-011	011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORPORATION
DRAWN CCOKMAN DATE 3 AUG 65
CHECKED J. STELMA 7 AUG 65
APPROVAL D. TSCHABOLD 9 AUG 65
APPROVAL [illegible]
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

CONTROLLER,
TEMPERATURE, PORTABLE

CODE IDENT NO 99974
SIZE J2
2900060
SCALE FULL
SHEET 1 OF 1

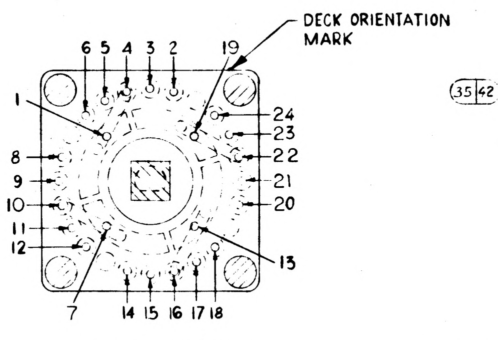
2900060 REV S

2900060	REV S	SH 1

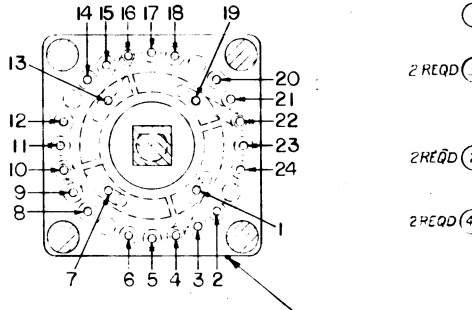
2/2900060

NOTES:

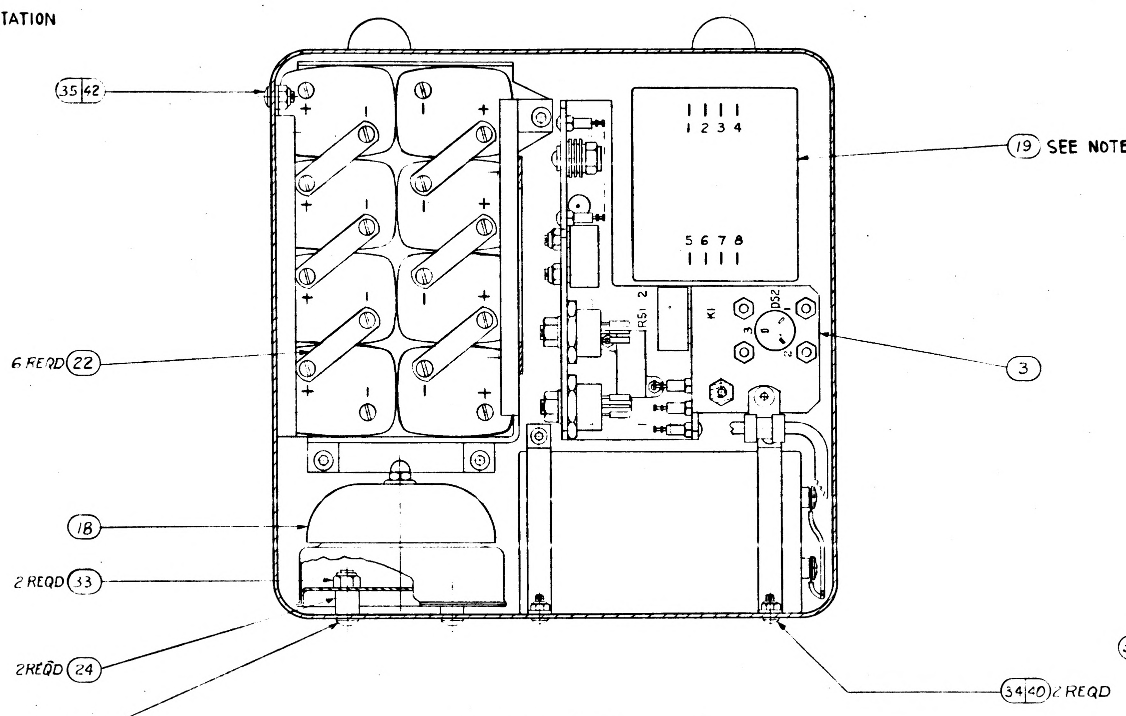
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 USING ITEMS (56) AND (54) OR (55).
3. THESE ITEMS ARE PART OF THIS ASSEMBLY.
4. DRAWING FOR REFERENCE:
   SCHEMATIC DIAGRAM ITEM (48)
5. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (21) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
6. VENDOR ITEM - SEE SOURCE OR SPECIFICATION CONTROL DRAWING.
7. PROCEDURE FOR CALIBRATING BRIDGES (PERFORM IN THE FOLLOWING SEQUENCE).
   - a. AFTER COMPLETING CONTINUITY CHECKS, TURN ALL POTS FULLY CW (MAXIMUM RESISTANCE) EXCEPT R50, WHICH SHALL BE CCW. APPLY 28 ± 1 VDC TO J1-K (HI) AND J1-L (LO).
   - b. INDICATING BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 2504.5 ± 0.1 OHMS ACROSS J4-G AND J4-T. JUMPER J4T TO J4-C. WITH THE POWER SWITCH ON, ADJUST R18 AND R19 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.610 ± 1% VDC ACROSS R17 (TB2-52 AND TB2-45), AND 17.6 ± 1% VDC ACROSS R21 AND R22 (TB2-39 AND TB2-54).
   - c. CONTROL BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 1560.0 ± 0.1 OHMS ACROSS J4-P AND J4-S. JUMPER J4-P TO J4-C. TURN TEMP ADJUST POT TO MIDRANGE (25 OHMS). WITH THE POWER SWITCH ON, ADJUST R33 AND AND R35 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.950 ± 1% VDC ACROSS R34 (TB2-56 AND TB2-47), AND 17.4 ± 1% VDC ACROSS R36, R38, AND R37 (TB2-42 AND TB2-12. TURN POWER SWITCH OFF.
   - d. CHARGING VOLTAGE CUTOFF: DISCONNECT CONDUCTOR NO. A11 FROM BT1-(+) AND CONNECT TO VOLTMETER (HI). TURN POWER SWITCH ON. APPLY 36.8 ± 0.1 % VDC AT TB2-19 (HI) AND TB2-55 (LO). SLOWLY TURN R16 CCW UNTIL VOLTAGE DROPS TO APPROXIMATELY 28 VDC ON CONDUCTOR NO. A11. AFTER DECREASING SUPPLY VOLTAGE TO APPROXIMATELY 30VDC, MOMENTARILY REMOVE AND REAPPLY. SLOWLY INCREASE SUPPLY VOLTAGE AND VERIFY THAT IT WILL REACH 36.8 ± 0.1 VDC BEFORE DROPPING TO APPROXIMATELY 28VDC. TURN POWER SWITCH OFF. REMOVE EXTERNAL DC VOLTAGE. RECONNECT CONDUCTOR NO. A11 TO BT1 (+). APPLY 115 VAC POWER AT J2-M AND J2-J. TURN POWER SWITCH ON. A PLOT OF THE BATTERY VOLTAGE VS TIME WILL INDICATE TWO VOLTAGE PLATEAUS. VERIFY THAT THE CUTOFF VOLTAGE AT THE END OF THE SECOND PLATEAU IS 36.7 ± 0.3 VDC (COMPLETE BATTERY CHARGING REQUIRES 16-24 HOURS AND MAY BE INTERRUPTED IF NECESSARY).
   - e. OUTPUT VOLTAGE LIMIT: WITH A 9.0 ± 0.3 OHM LOAD AT J4-H AND J4-L, AND 1500 OHMS AT J4-P AND J4-S, APPLY 126.5 VAC 60 CPS AT J2-M AND J2-J. TURN POWER SWITCH ON. TURN R50 CW UNTIL OUTPUT VOLTAGE AT TP3 (HI) AND TP4 (LO) READS 32.5 VDC.
8. BOND ITEM (59) TO ITEM (1) USING ITEM (60).
9. CENTRALIZE ITEM (61) ON FLAT SURFACE OF INNER LID. ORIENT RIGHT SIDE OF ITEM (61) ADJACENT TO HINGE OF INNER LID.
10. INSPECT AND TEST PER PS 2900060.
11. MATING SURFACES OF ITEMS (1) AND (19) TO BE COATED WITH ITEM (62).


6 5 4 3 2
19
DECK ORIENTATION MARK
1
24
23
22
21
20
8
9
10
11
12
13
7
14 15 16 17 18

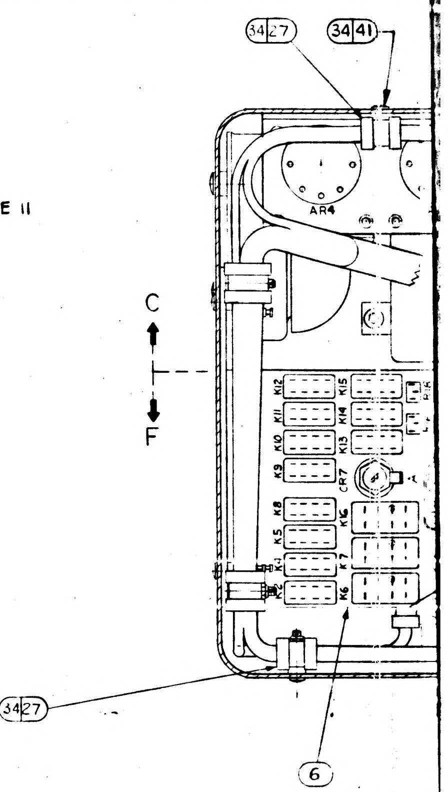
SECTION G-G
"A" DECK

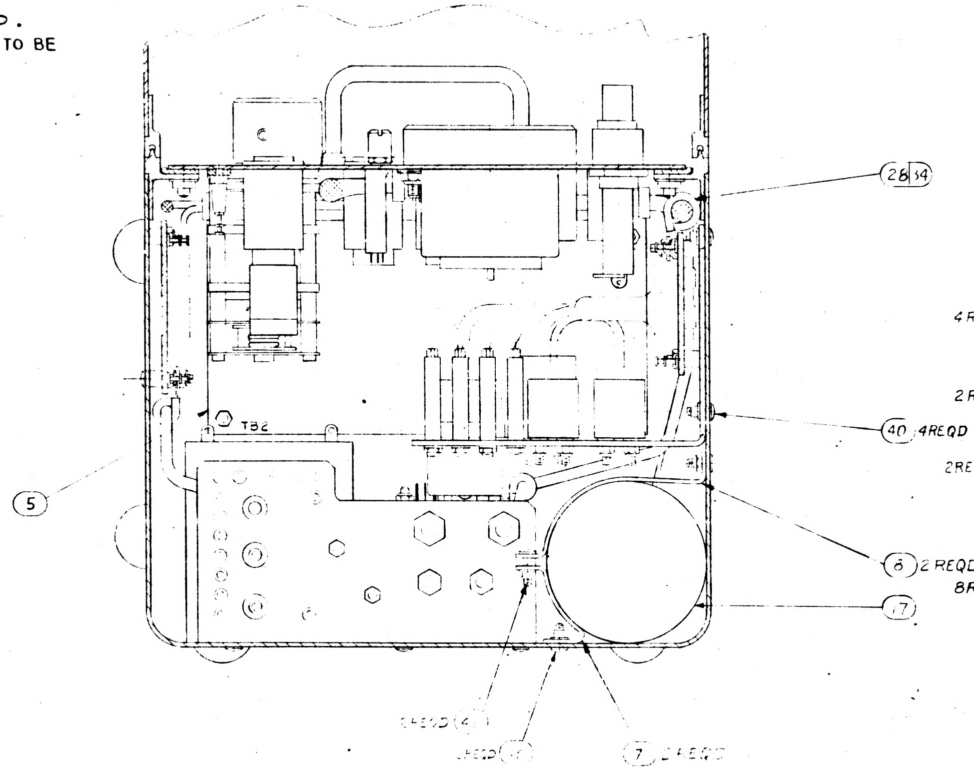

14 15 16 17 18
19
13
20
21
22
23
24
12
11
10
9
8
1
7
6 5 4 3 2
DECK ORIENTATION MARK

SECTION H-H
"B" DECK

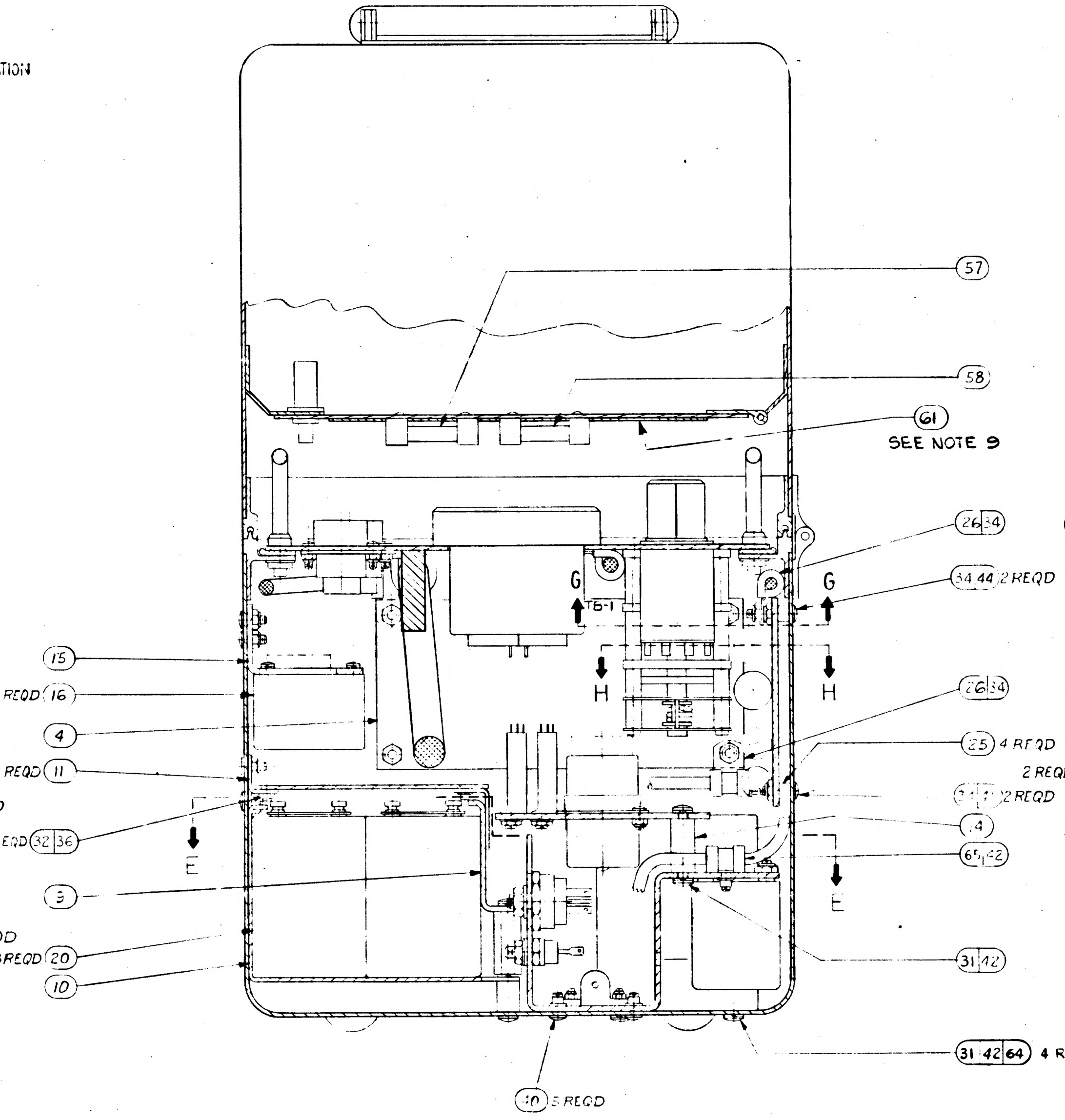

35 42
6 REQD 22
18
2 REQD 33
2REQD 24
2REQD 43
1 2 3 4
5 6 7 8
19 SEE NOTE 11
K1
DS2
3
34 40 2 REQD

SECTION E-E

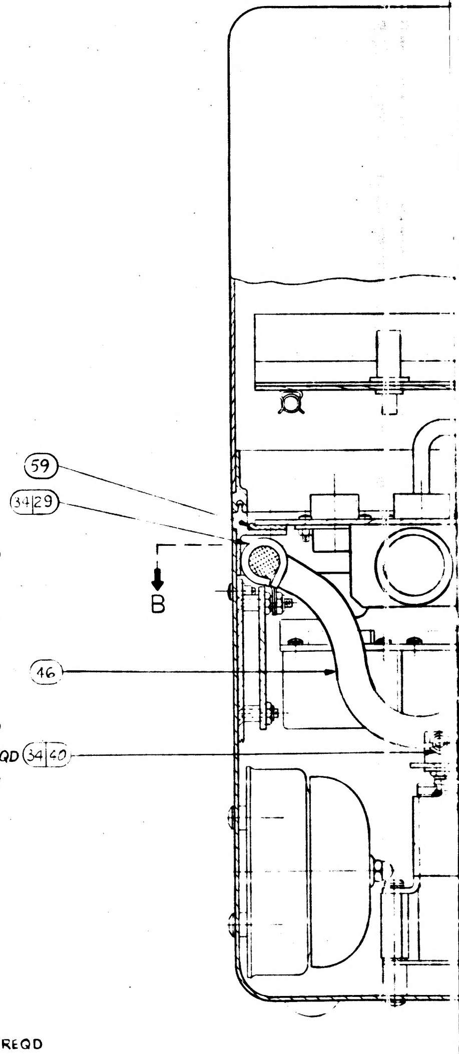

34 27
34 41
AR4
C
F
34 27
6


28 34
TB2
40 4REQD
5
6 2 REQD
17
2 REQD 14
7 2 REQD

SECTION F-F

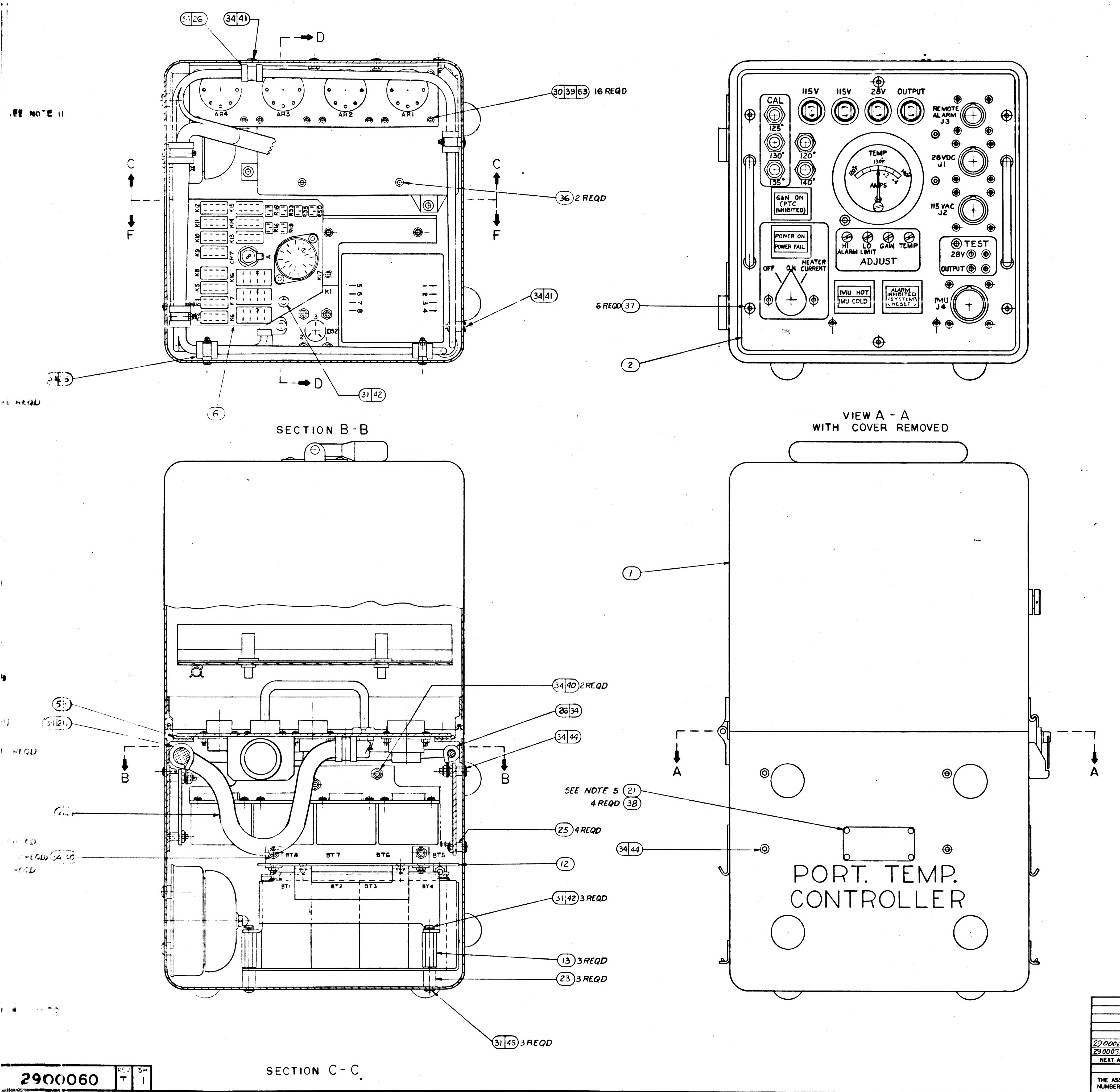

57
58
61
SEE NOTE 9
26 34
G
G
34 44 2 REQD
TB-1
H
H
15
4 REQD 16
4
2 REQD 11
2REQD 32 36
9
8REQD 20
10
26 34
25 4 REQD
4
65 42
E
E
31 42
31 42 64 4 REQD
30 2 REQD

SECTION D-D


59
34 29
B
46
2 REQD 34 40

2900060	REV	SH
	S	1

1/2900060


SEE NOTE 11
31 26
34 41
30 39 63 16 REQD
AR4
AR3
AR2
AR1
36 2 REQD
K11
K12
K15
K10
K14
K13
K9
K16
K8
CR7
K5
K17
K6
K7
K1
DS2
34 41
31 42
6
C
F
D
SECTION B-B
CAL
125°
130°
135°
120°
140°
115V
115V
28V
OUTPUT
REMOTE ALARM J3
28VDC J1
115 VAC J2
TEMP
AMPS
GAIN ON (PTC INHIBITED)
POWER ON
POWER FAIL
OFF
ON
HEATER CURRENT
HI
LO
ALARM LIMIT
GAIN
TEMP
ADJUST
TEST
28V
OUTPUT
IMU HOT
IMU COLD
ALARM INHIBITED (SYSTEM RESET)
IMU J4
6 REQD 37
2
VIEW A - A
WITH COVER REMOVED
34 40 2 REQD
26 34
34 44
B
A
25 4 REQD
12
31 42 3 REQD
13 3 REQD
23 3 REQD
31 45 3 REQD
BT8
BT7
BT6
BT5
BT1
BT2
BT3
BT4
1
SEE NOTE 5 21
4 REQD 38
34 44
PORT. TEMP.
CONTROLLER
SECTION C-C

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
J		REPLACES REV(H) WITH CHANGE PER MXC 206049 WAS "D" SIZE		16 OCT 65	RLP MEN
K		~~REVISED PER MXC 206397~~		26 OCT 65	
L		INITIAL RELEASE CLASS A PER TDRR 24042		29 OCT 65	
M		REVISED PER TDRR 25717		8 FEB 66	MEN
N		REVISED PER TDRR 26973		14 MAR 66	RLP
P		REVISED PER TDRR-26979		6 MAR 66	
R		REVISED PER TDRR 27542		4 APR 66	
S		REVISED PER TDRR 27556		6 APR 66	
T		REVISED PER TDRR 27603		7 APR 66	

			~~1~~		65	~~MS21919DG5(1897073-105)~~	~~CLAMP, CUSHIONED~~
			4		64	AN960-C8 (1897006-028)	WASHER, FLAT
			16		63	AN960-C4 (1897006-024)	WASHER, FLAT
			AR		62	MIL-I-8660	SILICONE GREASE (ES 2311)
			1		61	2900857	INSTRUCTION FOIL
SEE NOTE 8			AR		60	MIL-A-5092 TYPE 2	ADHESIVE (ES2770-2)
SEE NOTE 8			1		59	2900742	GASKET, PANEL
			1		58	F02A250V4AS (1897099-113	FUSE, MIL-F-15160/02
			1		57	F02B125V3AS (1897099-130	FUSE, MIL-F-15160/02
			AR		56	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
			AR		55	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3
			AR		54	SN 60 WS	SOLDER QQ-S-571 (ES2175-1)
SEE NOTE 3			1		53	2900862	CABLE INTERCONNECT - W 197
			1		52	2900861	W 196
			1		51	2900860	W 195
			1		50	2900859	W 194
SEE NOTE 3			1		49	2900856	CABLE INTERCONNECT - W 190
			X		48	2900133	SCHEMATIC DIAGRAM, ELEC
SEE NOTE 3			1		47	2900656	LEAD SET AA
			1		46	2900654	HARNESS A
SEE NOTE 6			3		45	1006783-105	SCREW, BUTTON HEAD
			3		44	1006783-104	
			2		43	1006783-047	
			11		42	1006783-26	
			8		41	1006783-23	
			17		40	1006783-22	
			16		39	1006783-18	
			4		38	1006783-9	SCREW, BUTTON HEAD
			6		37	1010630-38	SCREW, FLAT HEAD
			4		36	1010630-13	SCREW, FLAT HEAD
			1		35	1012525-006	NUT, SELF LOCKING
			21		34	1012525-004	
			2		33	1016151-010	
SEE NOTE 6			2		32	1016151-004	NUT, SELF LOCKING
			12		31	MS 35338-80	WASHER, LOCK
			16		30	MS35338-78	WASHER, LOCK
			~~1~~		29	~~MS 21919DG8 (1897073-108)~~	~~CLAMP, CUSHIONED~~
			~~1~~		28	~~MS 21919DG6 (1897073-106)~~	~~CLAMP, CUSHIONED~~
			~~3~~		27	~~MS 21919DG4 (1897073-104)~~	~~CLAMP, CUSHIONED~~
SEE NOTE 12			7		26	MS21919DG3 THRU 9 (1897073-103 THRU -109)	CLAMP, CUSHIONED
SEE NOTE 6			8		25	1015860-026	SPACER
			2		24	1015860-017	SPACER
SEE NOTE 6			3		23	1015860-008	SPACER
			6		22	2900796	LINK, BATTERY TERMINAL
			1		21	1004260-141	NAMEPLATE
SEE NOTE 6			8		20	1897268-001	BATTERY
			1		19	1897410	TRANSFORMER, POWER
SEE NOTE 6			1		18	2900520	BELL, ASSEMBLY
			1		17	CE71C562G (1896872-119)	CAPACITOR, MIL-C-62/12
SEE NOTE 6			4		16	1897261	COMPARATOR
			1		15	2900795	BRACKET, ELECTRONIC COMPONENTS
			1		14	2900512-001	NUT, SLEEVE
			3		13	2900512-000	NUT, SLEEVE
			1		12	2900511	COVER, BATTERY RETAINER
			2		11	2900510	BRACKET, ANGLE
			1		10	2900509	TRAY, BATTERY
			1		9	2900508	RETAINER, BATTERY (INSEP ASSY)
			2		8	2900507	STRAP, RETAINING
			2		7	2900506	STRAP, RETAINING (INSEP ASSY)
			1		6	2900777-011	RELAY ASSEMBLY
			1		5	2900778-011	ELECTRONIC COMPONENTS ASSY
			1		4	2900513-011	ELECTRONIC COMPONENTS ASSY
			1		3	2900521-011	ELECTRONIC COMPONENT ASSY
			1		2	2900835-011	PANEL ASSEMBLY
SEE NOTE 8			1		1	2900525-011	CASE, PORT. TEMP. CONTROLLER
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	QUANTITY REQUIRED				LIST OF PARTS AND MATERIALS		

2900063-011	2900030-011	011
2900030-011	2900030-011	011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — − DECIMALS + — − ANGLES + — −
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN COOKMAN DATE 3 AUG 65
CHECKED J. STELMA 7 AUG 65
APPROVAL D. TECHAROLD 9 AUG 65
APPROVAL L. Guiman
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CONTROLLER,
TEMPERATURE, PORTABLE

CODE IDENT NO. 99974
SIZE J2
2900060
SCALE FULL
SHEET 1 OF 1

2900060 REV T SH 1

2900060 T

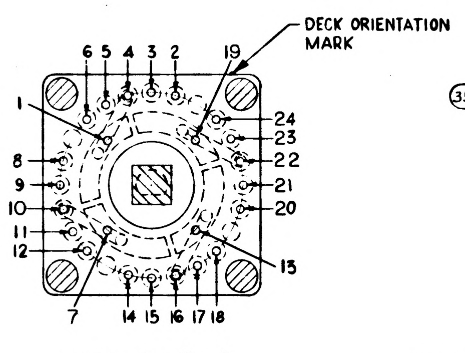
3r

7 OCT 65

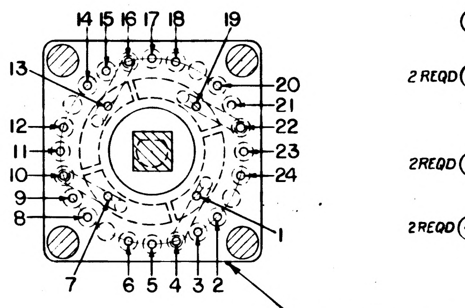
27290006 0

NOTES:

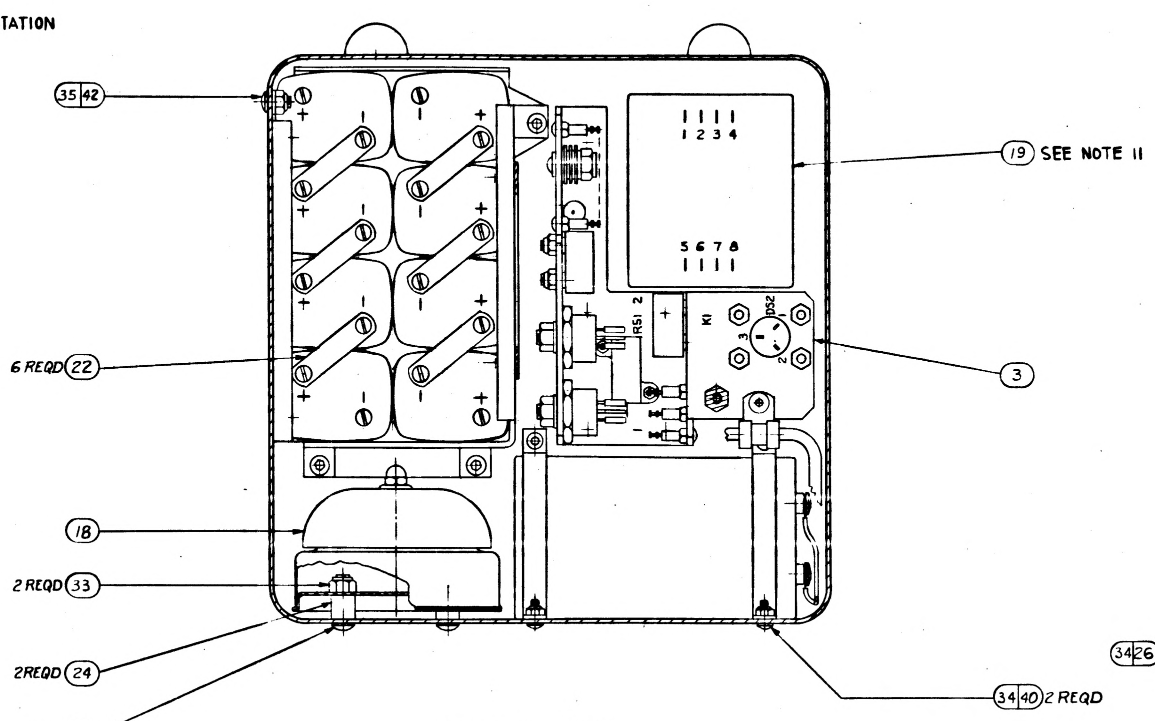
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 USING ITEMS (56) AND (54) OR (55).
3. THESE ITEMS ARE PART OF THIS ASSEMBLY.
4. DRAWING FOR REFERENCE: SCHEMATIC DIAGRAM ITEM (48)
5. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (21) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
6. VENDOR ITEM - SEE SOURCE OR SPECIFICATION CONTROL DRAWING.
7. PROCEDURE FOR CALIBRATING BRIDGES (PERFORM IN THE FOLLOWING SEQUENCE).
    - a. AFTER COMPLETING CONTINUITY CHECKS, TURN ALL POTS FULLY CW (MAXIMUM RESISTANCE) EXCEPT R50, WHICH SHALL BE CCW. APPLY 28 ± 1 VDC TO J1-K (HI) AND J1-L (LO).
    - b. INDICATING BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 2504.5 ± 0.1 OHMS ACROSS J4-G AND J4-T. JUMPER J4T TO J4-C. WITH THE POWER SWITCH ON, ADJUST R18 AND R19 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.610 ± 1% VDC ACROSS R17 (TB2-52 AND TB2-45) AND 17.6 ± 1% VDC ACROSS R21 AND R22 (TB2-39 AND TB2-54).
    - c. CONTROL BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 1560.0 ± 0.1 OHMS ACROSS J4-P AND J4-S. JUMPER J4-P TO J4-C. TURN TEMP ADJUST POT TO MIDRANGE (25 OHMS). WITH THE POWER SWITCH ON, ADJUST R33 AND AND R35 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.950 ± 1% VDC ACROSS R34 (TB2-56 AND TB2-47) AND 17.4 ± 1% VDC ACROSS R36, R38, AND R37 (TB2-42 AND TB2-12. TURN POWER SWITCH OFF.
    - d. CHARGING VOLTAGE CUTOFF: DISCONNECT CONDUCTOR NO. A11 FROM BT1-(+) AND CONNECT TO VOLTMETER (HI). TURN POWER SWITCH ON. APPLY 36.8 ± 0.1 % VDC AT TB2-19 (HI) AND TB2-55 (LO). SLOWLY TURN R16 CCW UNTIL VOLTAGE DROPS TO APPROXIMATELY 28 VDC ON CONDUCTOR NO. A11. AFTER DECREASING SUPPLY VOLTAGE TO APPROXIMATELY 30VDC, MOMENTARILY REMOVE AND REAPPLY. SLOWLY INCREASE SUPPLY VOLTAGE AND VERIFY THAT IT WILL REACH 36.8 ± 0.1 VDC BEFORE DROPPING TO APPROXIMATELY 28VDC. TURN POWER SWITCH OFF. REMOVE EXTERNAL DC VOLTAGE. RECONNECT CONDUCTOR NO. A11 TO BT1(+). APPLY 115 VAC POWER AT J2-M AND J2-J. TURN POWER SWITCH ON. A PLOT OF THE BATTERY VOLTAGE VS TIME WILL INDICATE TWO VOLTAGE PLATEAUS. VERIFY THAT THE CUTOFF VOLTAGE AT THE END OF THE SECOND PLATEAU IS 36.7 ± 0.3 VDC (COMPLETE BATTERY CHARGING REQUIRES 16-24 HOURS AND MAY BE INTERRUPTED IF NECESSARY).
    - e. OUTPUT VOLTAGE LIMIT: WITH A 9.0 ± 0.3 OHM LOAD AT J4-H AND J4-L, AND 1500 OHMS AT J4-P AND J4-S, APPLY 126.5 VAC 60 CPS AT J2-M AND J2-J. TURN POWER SWITCH ON. TURN R50 CW UNTIL OUTPUT VOLTAGE AT TP3 (HI) AND TP4 (LO) READS 32.5 VDC.
8. BOND ITEM (59) TO ITEM (1) USING ITEM (60).
9. CENTRALIZE ITEM (61) ON FLAT SURFACE OF INNER LID. ORIENT RIGHT SIDE OF ITEM (61) ADJACENT TO HINGE OF INNER LID.
10. INSPECT AND TEST PER PS 2900060.
11. MATING SURFACES OF ITEMS (1) AND (19) TO BE COATED WITH ITEM (62).
12. SELECT AS REQUIRED.


DECK ORIENTATION MARK
6 5 4 3 2 19
1
24
23
22
21
20
8
9
10
11
12
15
7 14 15 16 17 18

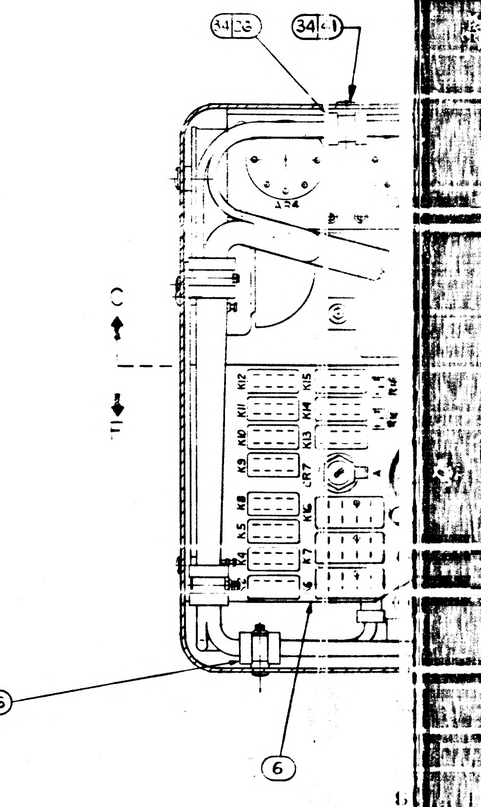
SECTION G-G
"A" DECK

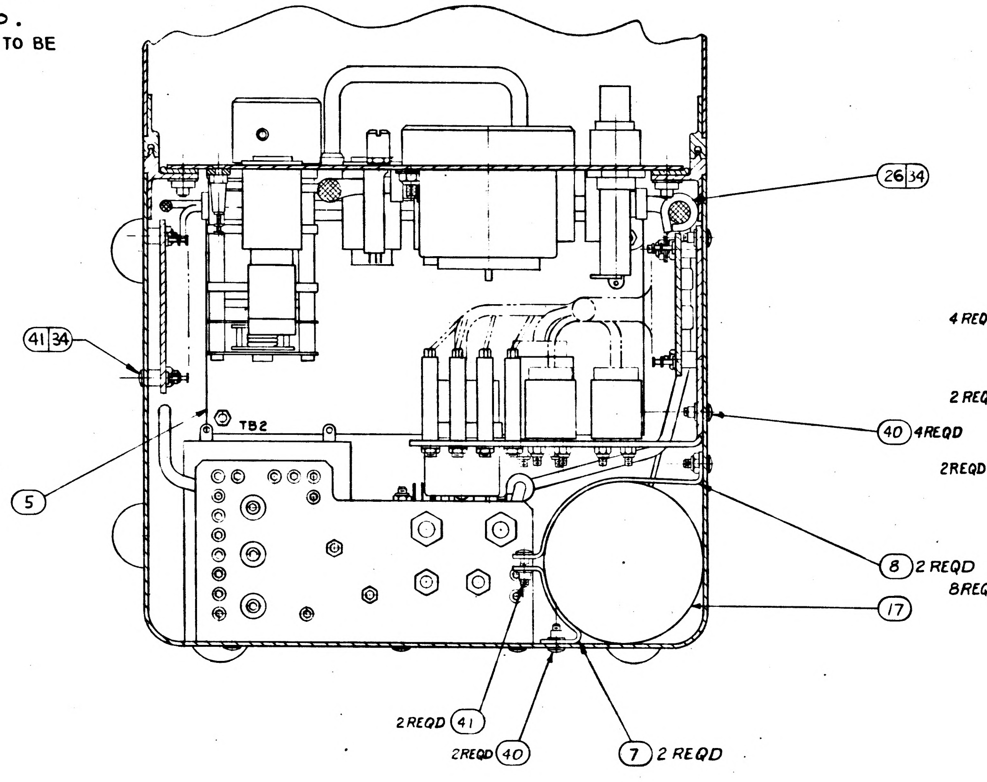

14 15 16 17 18 19
13
20
21
22
23
24
12
11
10
9
8
1
7 6 5 4 3 2
DECK ORIENTATION MARK

SECTION H-H
"B" DECK

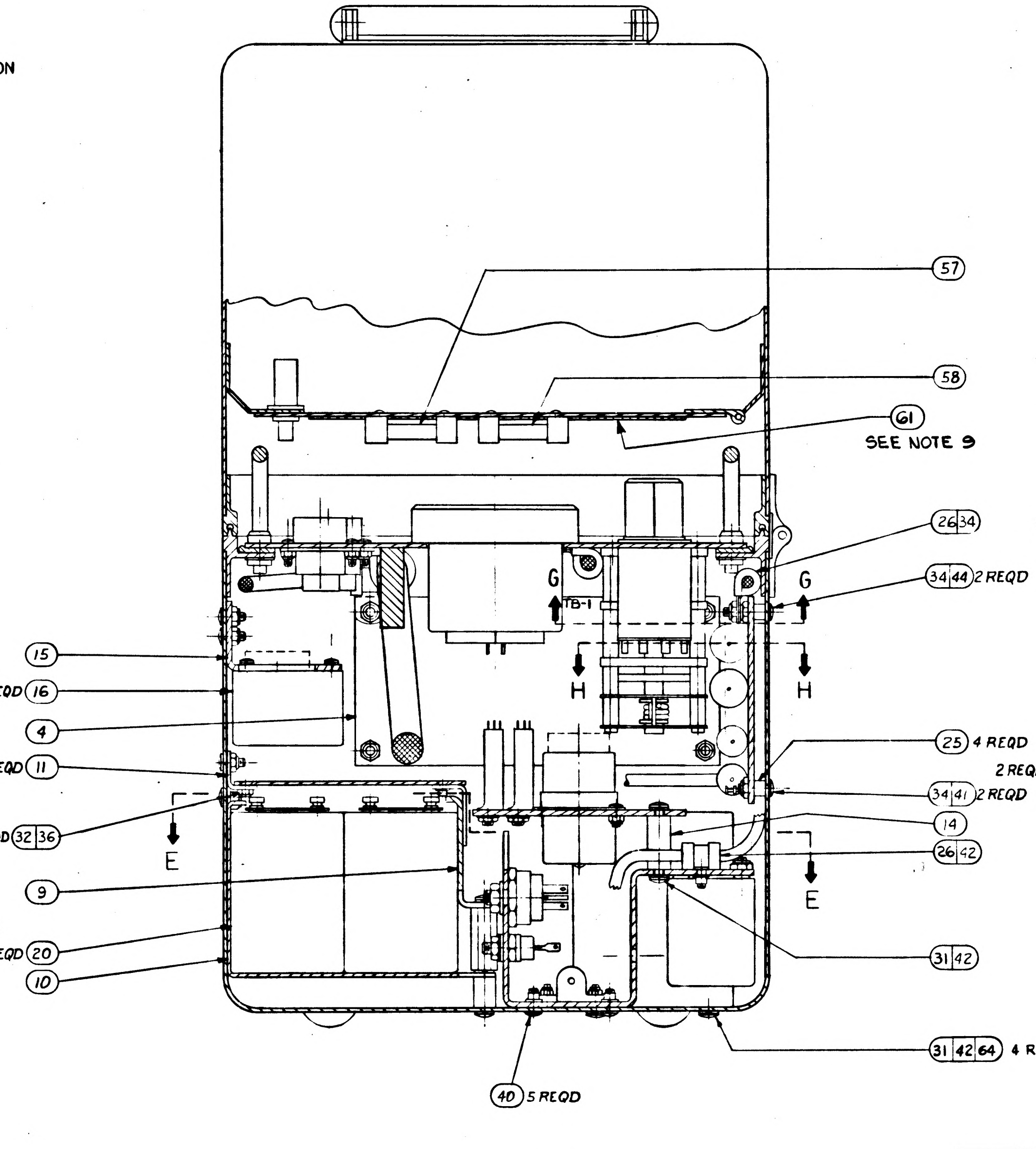

(35)(42)
(19) SEE NOTE 11
1 2 3 4
5 6 7 8
6 REQD (22)
(3)
(18)
2 REQD (33)
2REQD (24)
2REQD (43)
(34)(40) 2 REQD

SECTION E-E

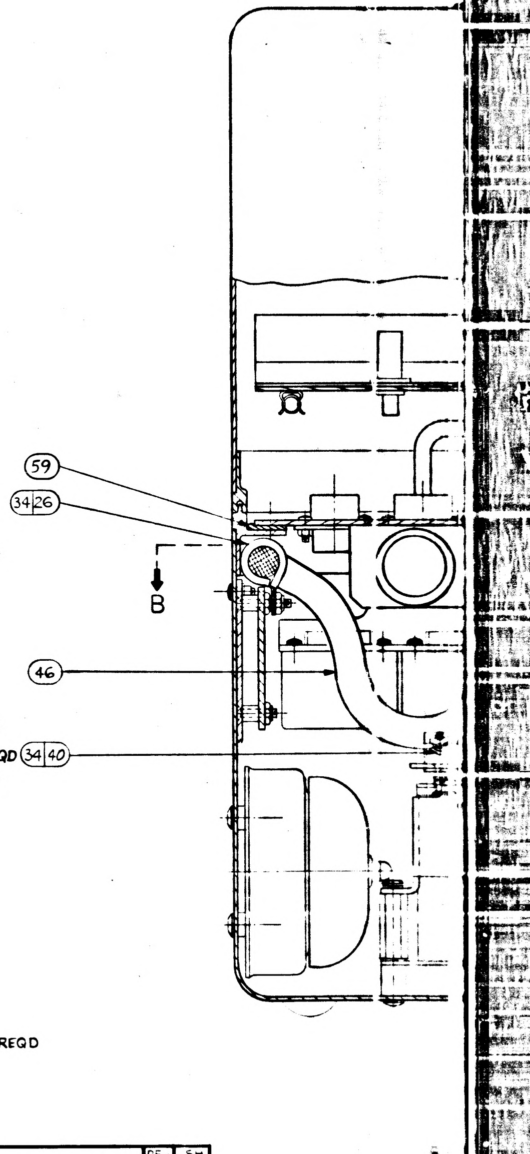



(26)(34)
(41)(34)
TB2
(40) 4 REQD
(5)
(8) 2 REQD
(17)
2 REQD (41)
2REQD (40)
(7) 2 REQD

SECTION F-F
ROTATED 180°


(57)
(58)
(61)
SEE NOTE 9
(26)(34)
(34)(44) 2 REQD
G
G
TB-1
H
H
(15)
4 REQD (16)
(4)
2 REQD (11)
2REQD (32)(36)
(9)
8REQD (20)
(10)
E
E
(25) 4 REQD
(34)(41) 2 REQD
(14)
(26)(42)
(31)(42)
(31)(42)(64) 4 REQD
(40) 5 REQD

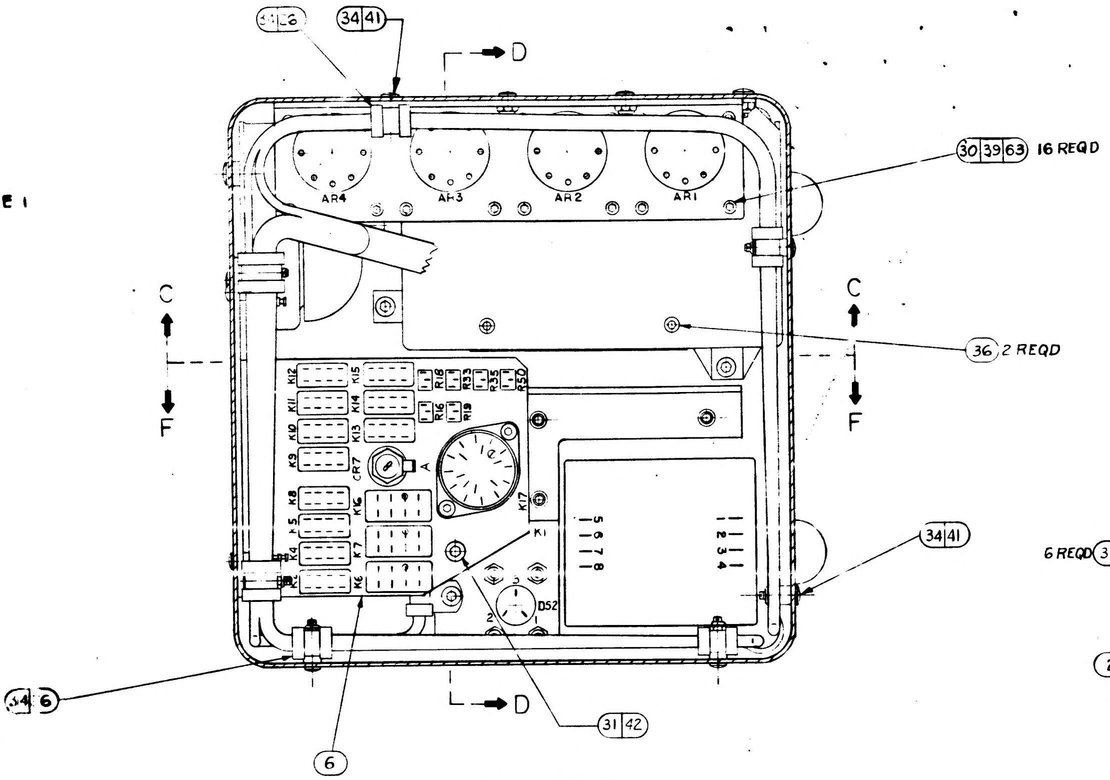
SECTION D-D
ROTATED 90° CCW


(59)
(34)(26)
B
(46)
2 REQD (34)(40)

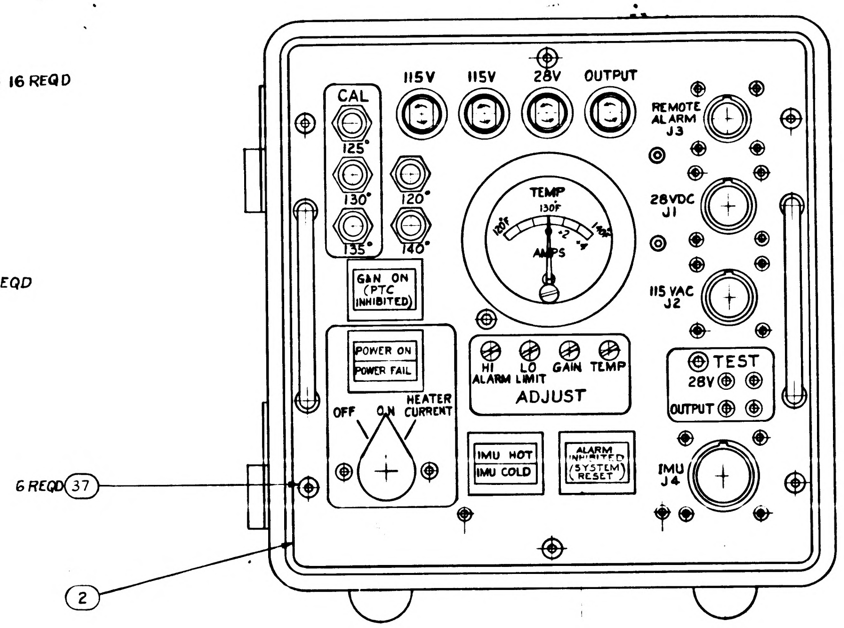
2900060	REV T	SH 1

1/2900060

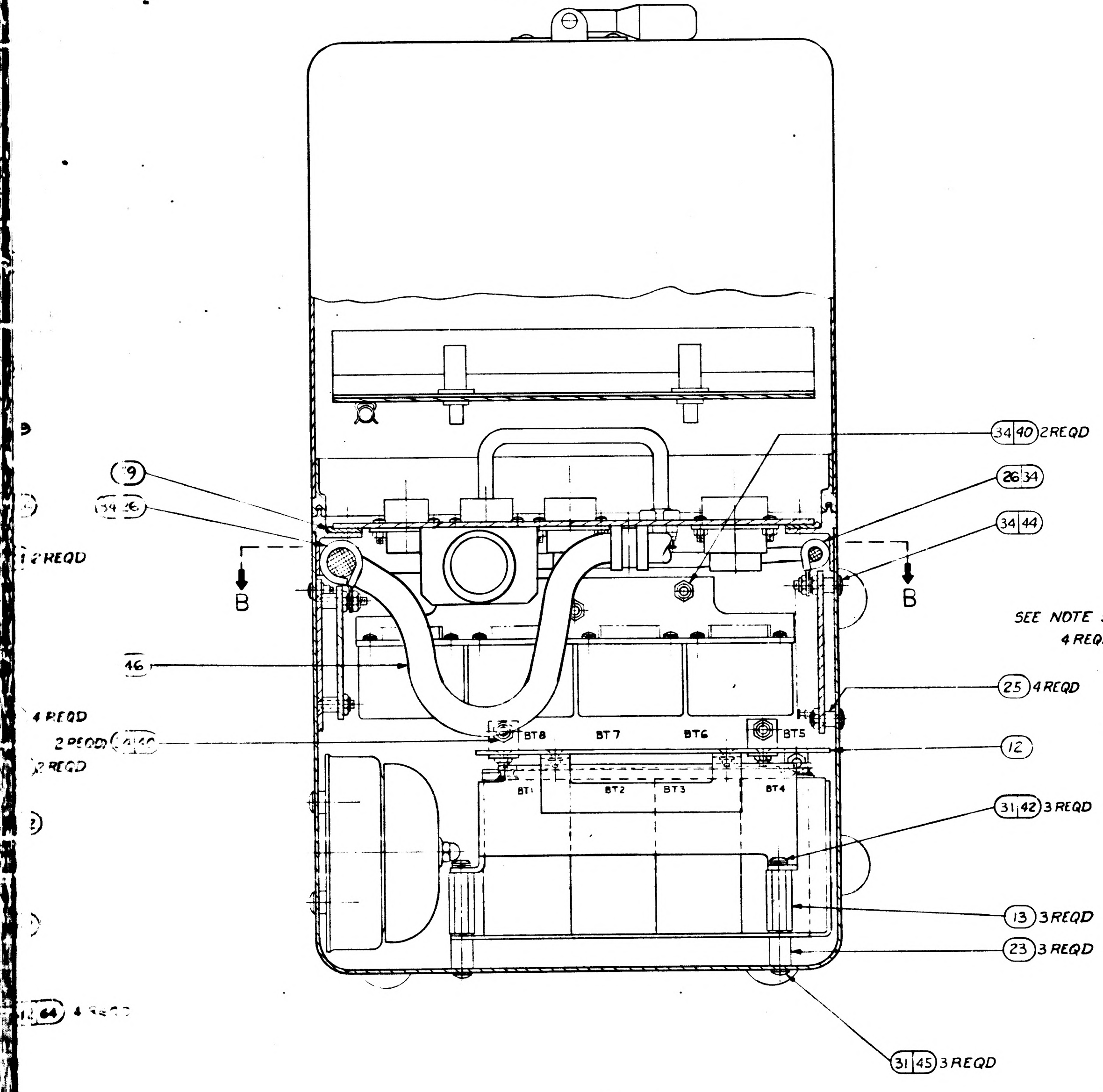
SEE NOTE 1


3L8
34|41
D
30|39|63 16 REQD
AR4
AR3
AR2
AR1
C
F
36 2 REQD
34|41
34|6
6
31|42
D52
1 2 3 4
5 6 7 8

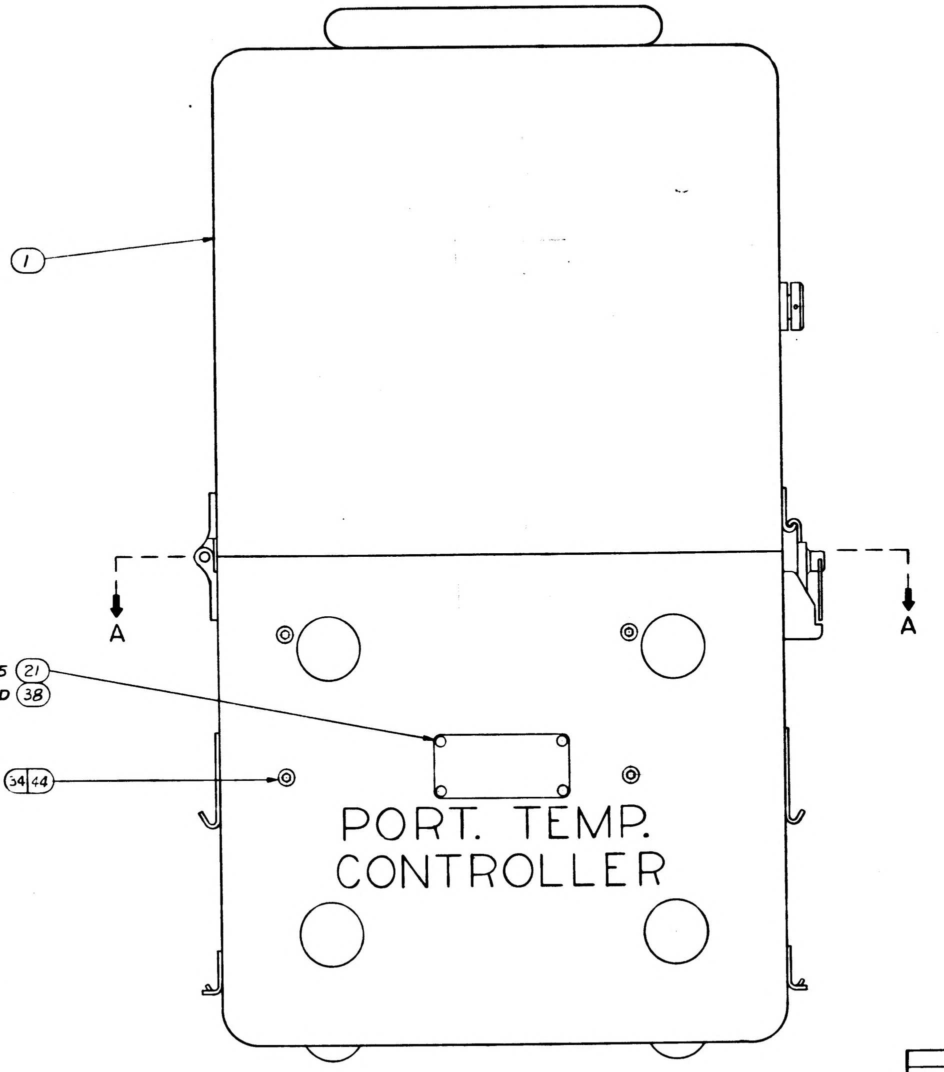
SECTION B-B


CAL
125°
130°
135°
120°
140°
115V
115V
28V
OUTPUT
REMOTE ALARM J3
TEMP
AMPS
28VDC J1
115 VAC J2
GAIN ON (PTC INHIBITED)
POWER ON
POWER FAIL
HI LO ALARM LIMIT
GAIN
TEMP
ADJUST
TEST
28V
OUTPUT
OFF
ON
HEATER CURRENT
IMU HOT
IMU COLD
ALARM INHIBITED (SYSTEM) RESET
IMU J4
6 REQD 37
2

VIEW A - A
WITH COVER REMOVED


1 REQD
9
34|40 2 REQD
26|34
34|44
B
B
46
25 4 REQD
4 REQD
2 REQD
2 REQD
12
BT8
BT7
BT6
BT5
BT1
BT2
BT3
BT4
31|42 3 REQD
13 3 REQD
23 3 REQD
31|45 3 REQD
34|64 4 REQD

SECTION C-C


1
A
A
SEE NOTE 5 21
4 REQD 38
34|44
PORT. TEMP.
CONTROLLER

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
J		REPLACES REV (H) WITH CHANGE PER MXC 206049 WAS "D" SIZE		16 OCT 65	RP
K		~~REVISED PER MXC~~ 206397		26 OCT 65	
L		INITIAL RELEASE CLASS A PER TDRR 24042		28 OCT 65	
M		REVISED PER TDRR 25717		8 FEB 66	
N		REVISED PER TDRR 26973		14 MAR 66	RP
P		REVISED PER TDRR - 26979		5 MAR 66	B.
R		REVISED PER TDRR 27542			
S		REVISED PER TDRR 27556			
T		REVISED PER TDRR 27603		7 APR 66	RP
U		REVISED PER TDRR 29040		27 MAY 66	

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED					EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
					011				
					+		65	~~MS 21919DG5(1897073-105~~	~~CLAMP, CUSHIONED~~
					4		64	AN960-C8 (1897006-028)	WASHER, FLAT
					16		63	AN960-C4 (1897006-024)	WASHER, FLAT
					AR		62	MIL-I-8660	SILICONE GREASE (ES 2311)
					1		61	2900957	INSTRUCTION FOILCAL (PTC II)
SEE NOTE 8					AR		60	MIL-A-5092 TYPE 2	ADHESIVE (ES2770-2)
SEE NOTE 8					1		59	2900742	GASKET PANEL
					1		58	F02A250V4AS (1897099-113	FUSE, MIL-F-15160/02
					1		57	F02B125V2AS (1897099-129	FUSE, MIL-F-15160/02
					AR		56	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
					AR		55	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
					AR		54	SN 60 WS	SOLDER QQ-S-571 (ES2175-1)
SEE NOTE 3					1		53	2900862	CABLE INTERCONNECT - W 197
					1		52	2900861	W 196
					1		51	2900860	W 195
					1		50	2900859	W 194
SEE NOTE 3					1		49	2900856	CABLE INTERCONNECT - W 190
					╳		48	2900133	SCHEMATIC DIAGRAM, ELEC
SEE NOTE 3					1		47	2900656	LEAD SET AA
					1		46	2900654	HARNESS A
SEE NOTE 6					3		45	1006783-105	SCREW, BUTTON HEAD
					3		44	1006783-104	
					2		43	1006783-047	
					11		42	1006783-26	
					8		41	1006783-23	
					17		40	1006783-22	
					16		39	1006783-18	
					4		38	1006783-9	SCREW, BUTTON HEAD
					6		37	1010630-38	SCREW, FLAT HEAD
					4		36	1010630-13	SCREW, FLAT HEAD
					1		35	1012525-006	NUT, SELF LOCKING
					21		34	1012525-004	
					2		33	1016151-010	
SEE NOTE 6					2		32	1016151-004	NUT, SELF LOCKING
					12		31	MS 35338-80	WASHER, LOCK
					16		30	MS35338-78	WASHER, LOCK
					~~1~~		29	~~MS 21919DG3~~ [illegible]	~~CLAMP, CUSHIONED~~
					~~1~~		28	~~MS 21919DG6~~ [illegible]	[illegible]
					~~3~~		27	~~MS 21919DG4~~ [illegible]	~~CLAMP~~ [illegible]
SEE NOTE 12					7		26	MS21919DG3 THRU 9 (1897073-[illegible]	[illegible] CLAMP, CUSHIONED
SEE NOTE 6					8		25	1015860-026	SPA[illegible]
					2		24	1015860-017	SPA[illegible]
SEE NOTE 6					3		23	1015860-008	SPAC[illegible]
					6		22	2900796	LINK, BATTERY TERMINAL
					1		21	1004260-141	NAMEPLATE
SEE NOTE 6					8		20	1897268-001	BATTERY
					1		19	1897410	TRANSFORMER, POWER
SEE NOTE 6					1		18	2900520	BELL, ASSEMBLY
					1		17	CE71C562G (1896872-119)	CAPACITOR, MIL-C-62/12
SEE NOTE 6					4		16	1897261	COMPARATOR
					1		15	2900795	BRACKET, ELECTRONIC COMPONENTS
					1		14	2900512-001	NUT, SLEEVE
					3		13	2900512-000	NUT, SLEEVE
					1		12	2900511	COVER, BATTERY RETAINER
					2		11	2900510	BRACKET, ANGLE
					1		10	2900509	TRAY, BATTERY
					1		9	2900508	RETAINER, BATTERY (INSEP ASSY)
					2		8	2900507	STRAP, RETAINING
					2		7	2900506	STRAP, RETAINING (INSEP ASSY)
					1		6	2900777-011	RELAY ASSEMBLY
					1		5	2900778-011	ELECTRONIC COMPONENTS ASSY
					1		4	2900513-011	ELECTRONIC COMPONENTS ASSY
					1		3	2900521-011	ELECTRONIC COMPONENT ASSY
					1		2	2900835-011	PANEL ASSEMBLY
SEE NOTE 8					1		1	2900525-011	CASE PORT. TEMP. CONTROLLER

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900063-011	2900030-011	011
2900030-011	2900030-011	011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN COOKMAN DATE 3 AUG 65
CHECKED J. STELMA 7 AUG 65
APPROVAL D. TECHMEROLD 9 AUG 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CONTROLLER
TEMPERATURE, PORTABLE

CODE IDENT NO. 99974
SIZE J2
2900060
SCALE FULL
SHEET 1 OF 1

7 OCT 65

U 2900060

2900060 U 1

2/2900060

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 USING ITEMS (56) AND (54) OR (55).
3. THESE ITEMS ARE PART OF THIS ASSEMBLY.
4. DRAWING FOR REFERENCE:
   SCHEMATIC DIAGRAM ITEM (49)
5. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (21) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
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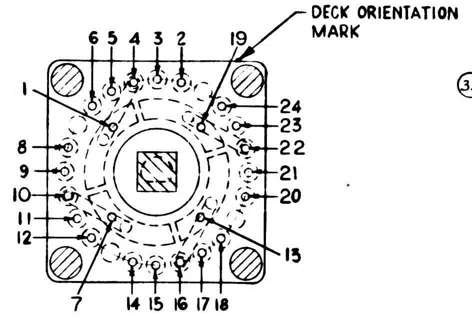
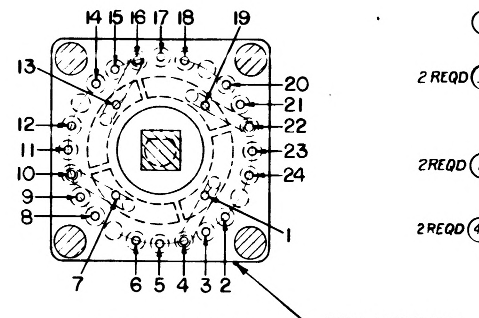
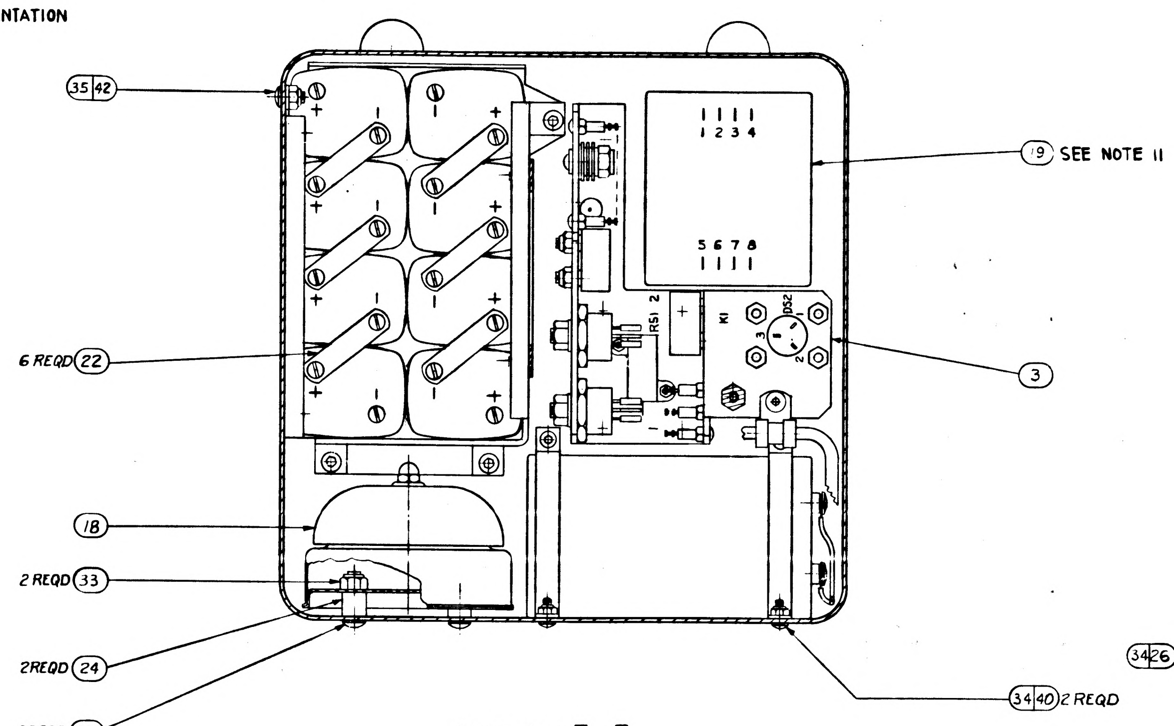
   b. INDICATING BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 2504.5 ± 0.1 OHMS ACROSS J4-G AND J4-T. JUMPER J4T TO J4-C. WITH THE POWER SWITCH ON, ADJUST R18 AND R19 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.610 ± 1% VDC ACROSS R17 (TB2-52 AND TB2-45) AND 17.6 ± 1% VDC ACROSS R21 AND R22 (TB2-39 AND TB2-54).
   c. CONTROL BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 1560.0 ± 0.1 OHMS ACROSS J4-P AND J4-S. JUMPER J4-P TO J4-C. TURN TEMP ADJUST POT TO MIDRANGE (25 OHMS). WITH THE POWER SWITCH ON, ADJUST R33 AND AND R35 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.950 ± 1% VDC ACROSS R34 (TB2-56 AND TB2-47) AND 17.4 ± 1% VDC ACROSS R36, R38, AND R37 (TB2-42 AND TB2-12. TURN POWER SWITCH OFF.
   d. CHARGING VOLTAGE CUTOFF: DISCONNECT CONDUCTOR NO. A11 FROM BT1-(+) AND CONNECT TO VOLTMETER (HI). TURN POWER SWITCH ON. APPLY 36.8 ± 0.1 % VDC AT TB2-19 (HI) AND TB2-55 (LO). SLOWLY TURN R16 CCW UNTIL VOLTAGE DROPS TO APPROXIMATELY 28 VDC ON CONDUCTOR NO. A11. AFTER DECREASING SUPPLY VOLTAGE TO APPROXIMATELY 30VDC, MOMENTARILY REMOVE AND REAPPLY. SLOWLY INCREASE SUPPLY VOLTAGE AND VERIFY THAT IT WILL REACH 36.8 ± 0.1 VDC BEFORE DROPPING TO APPROXIMATELY 28VDC. TURN POWER SWITCH OFF. REMOVE EXTERNAL DC VOLTAGE. RECONNECT CONDUCTOR NO. A11 TO BT1(+). APPLY 115VAC POWER AT J2-M AND J2-J. TURN POWER SWITCH ON. A PLOT OF THE BATTERY VOLTAGE VS TIME WILL INDICATE TWO VOLTAGE PLATEAUS. VERIFY THAT THE CUTOFF VOLTAGE AT THE END OF THE SECOND PLATEAU IS 36.7 ± 0.3 VDC (COMPLETE BATTERY CHARGING REQUIRES 16-24 HOURS AND MAY BE INTERRUPTED IF NECESSARY).
   e. OUTPUT VOLTAGE LIMIT: WITH A 9.0 ± 0.3 OHM LOAD AT J4-H AND J4-L, AND 1500 OHMS AT J4-P AND J4-S, APPLY 126.5 VAC 60 CPS AT J2-M AND J2-J. TURN POWER SWITCH ON. TURN R50 CW UNTIL OUTPUT VOLTAGE AT TP3 (HI) AND TP4 (LO) READS 32.5 VDC.
8. BOND ITEM (59) TO ITEM (1) USING ITEM (60).
9. CENTRALIZE ITEM (61) ON FLAT SURFACE OF INNER LID. ORIENT RIGHT SIDE OF ITEM (61) ADJACENT TO HINGE OF INNER LID.
10. INSPECT AND TEST PER PS 2900060.
11. MATING SURFACES OF ITEMS (1) AND (19) TO BE COATED WITH ITEM (62).
12. SELECT AS REQUIRED.


DECK ORIENTATION MARK
6 5 4 3 2 19
1
8
9
10
11
12
24
23
22
21
20
15
7
14 15 16 17 18

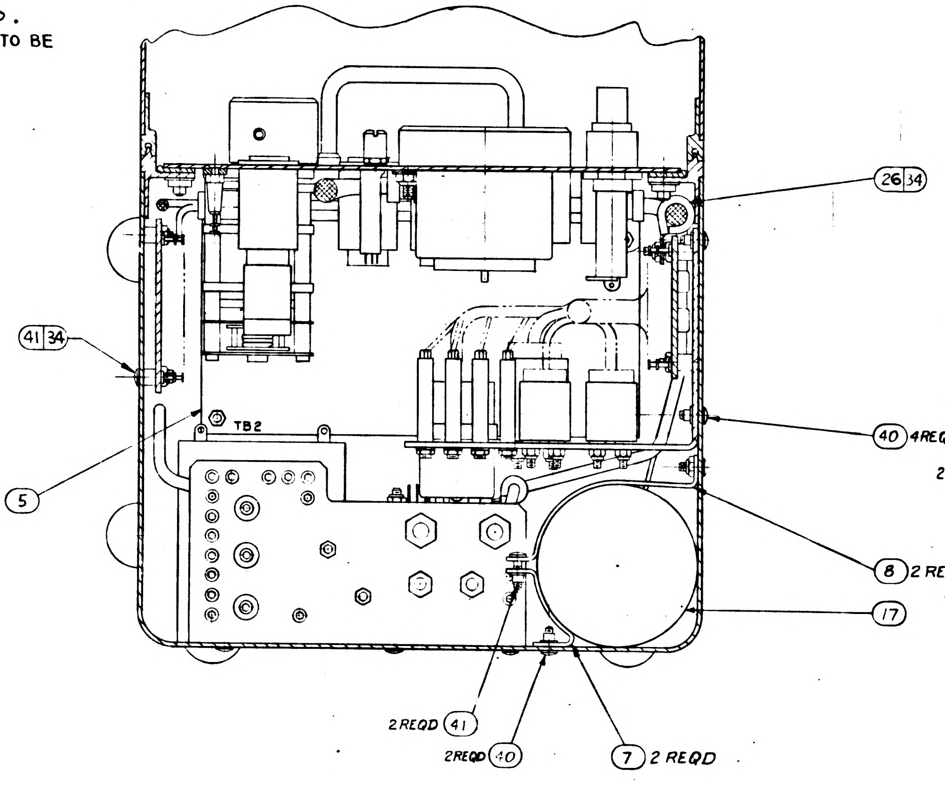
SECTION G-G
"A" DECK


14 15 16 17 18 19
13
12
11
10
9
8
20
21
22
23
24
1
7
6 5 4 3 2
DECK ORIENTATION MARK

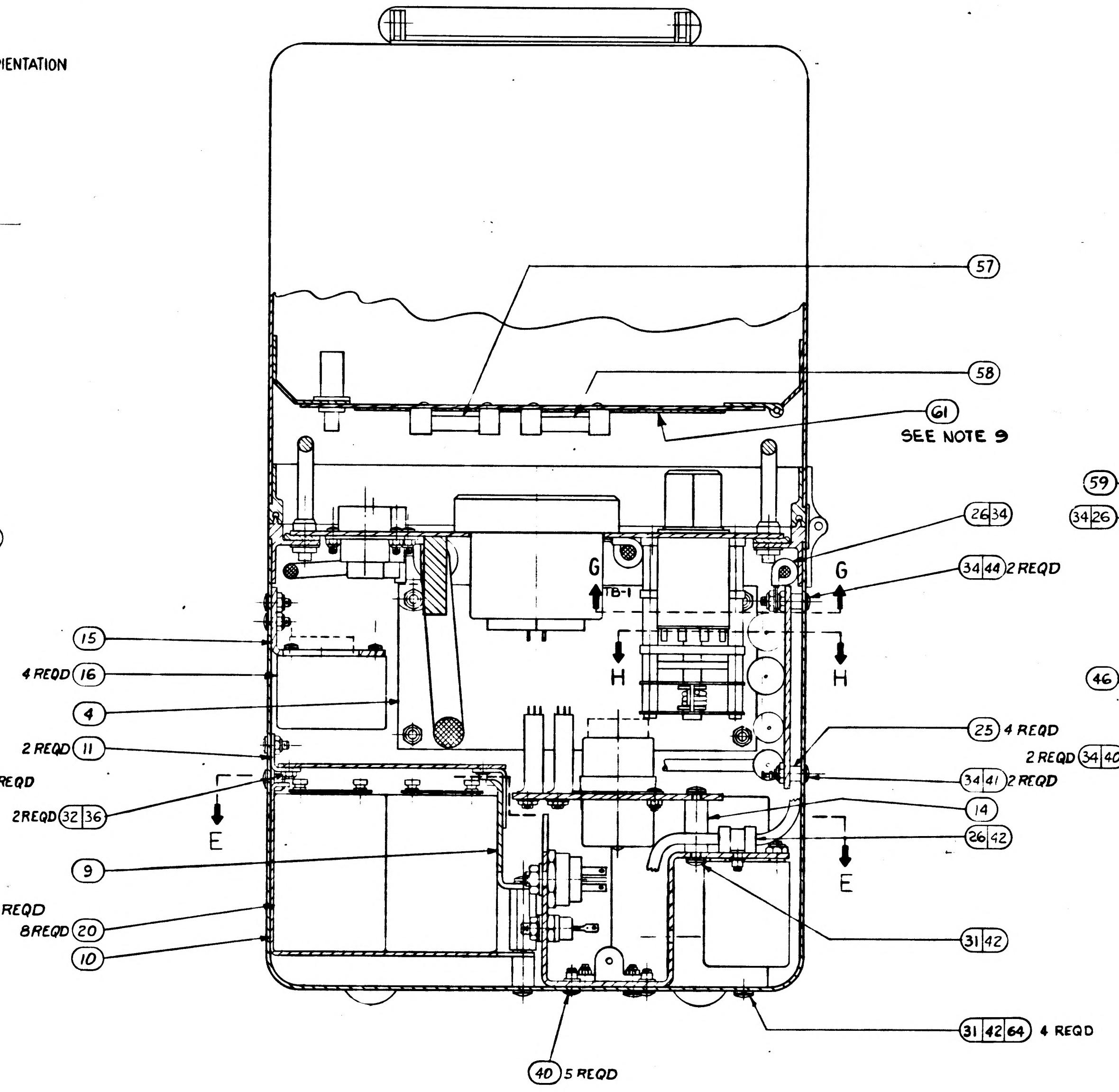
SECTION H-H
"B" DECK


(35)(42)
6 REQD (22)
(18)
2 REQD (33)
2 REQD (24)
2 REQD (43)
(9) SEE NOTE 11
1 2 3 4
5 6 7 8
(3)
(34)(40) 2 REQD
R51
K1

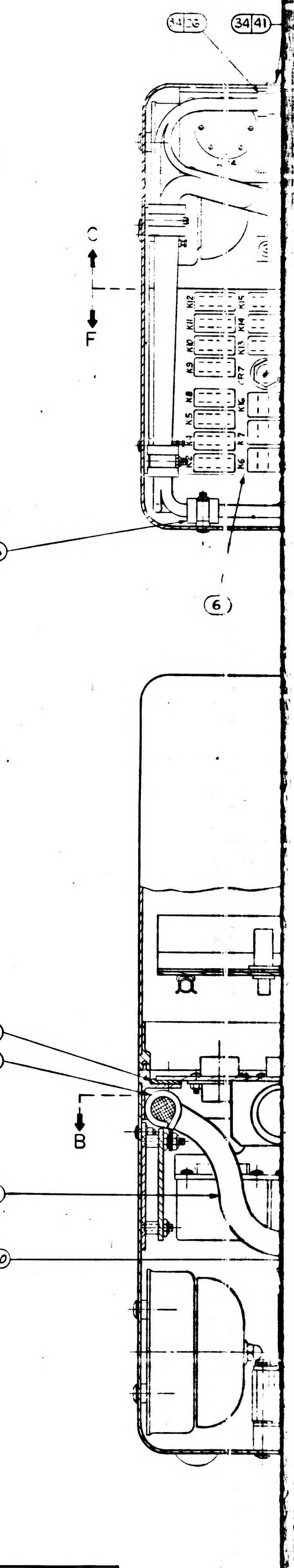
SECTION E-E


(26)(34)
(41)(34)
(40) 4 REQD
(5)
TB2
(8) 2 REQD
(17)
2 REQD (41)
2 REQD (40)
(7) 2 REQD

SECTION F-F
ROTATED 180°

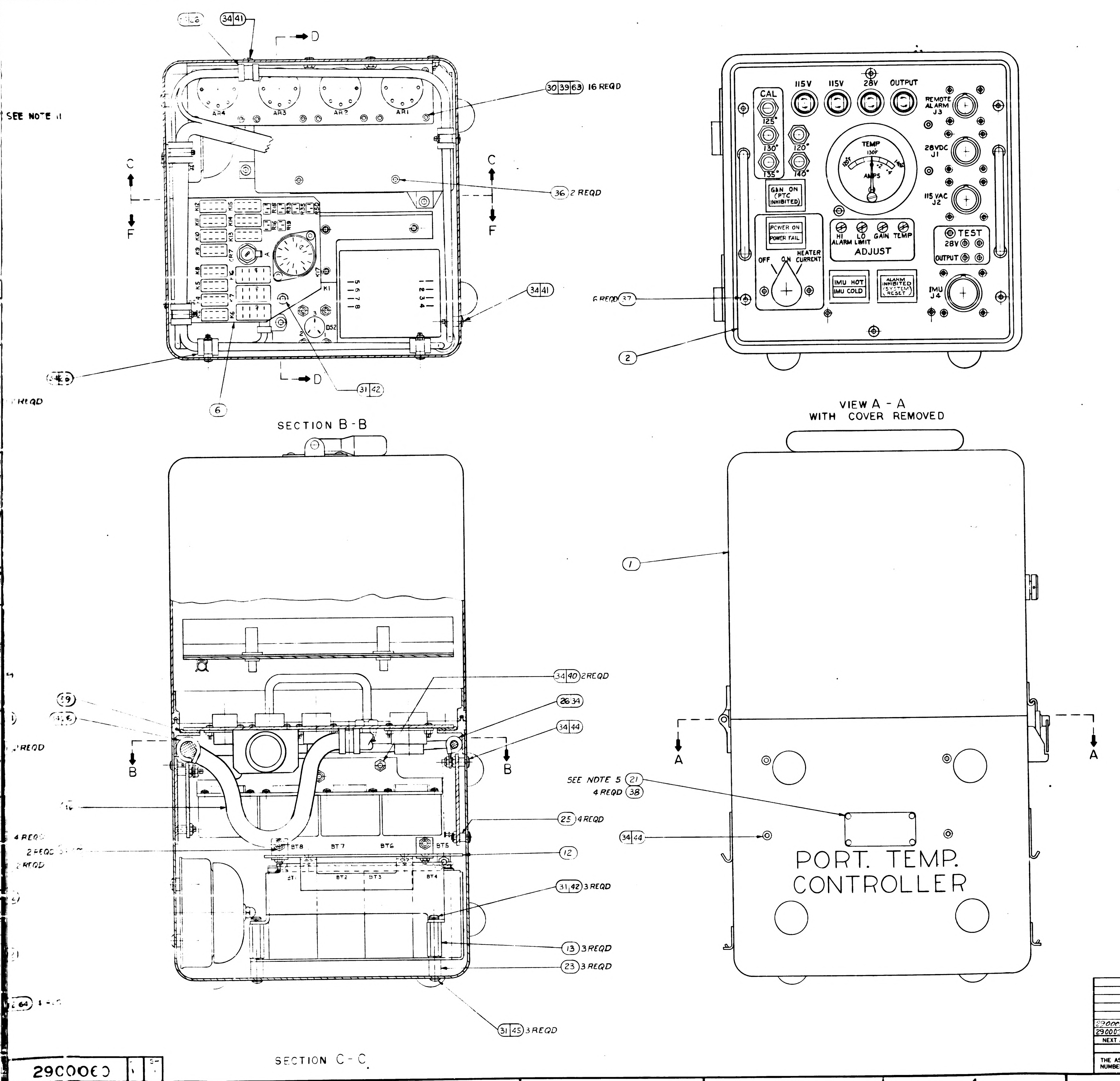

(57)
(58)
(61)
SEE NOTE 9
(26)(34)
(34)(44) 2 REQD
G
G
TB-1
H
H
(15)
4 REQD (16)
(4)
2 REQD (11)
2 REQD (32)(36)
(9)
8 REQD (20)
(10)
E
E
(25) 4 REQD
(34)(41) 2 REQD
(14)
(26)(42)
(31)(42)
(31)(42)(64) 4 REQD
(40) 5 REQD

SECTION D-D
ROTATED 90° CCW


(44)(26)
(34)(41)
C
F
(34)(26)
(6)
(59)
(34)(26)
B
(46)
2 REQD (34)(40)

2900060	REV	SH
	J	1

1/2900060


SEE NOTE 11
34 41
30 39 63 16 REQD
AR4
AR3
AR2
AR1
36 2 REQD
C
F
D
K12 K11 K10 K9 K8 K7 K6 K5 K4 K3 K2 K1
K15 K14 K13 K16 K17 K18 K19
CR7
DS2
34 41
6 REQD 37
2
31 42
6
SECTION B-B
CAL
125°
130°
135°
120°
140°
115V
115V
28V
OUTPUT
REMOTE ALARM J3
28VDC J1
115 VAC J2
TEMP
130F
AMPS
GAIN ON (PTC INHIBITED)
POWER ON
POWER FAIL
OFF
ON
HEATER CURRENT
HI ALARM
LO LIMIT
GAIN
TEMP
ADJUST
TEST
28V
OUTPUT
IMU HOT
IMU COLD
ALARM INHIBITED (SYSTEM) RESET
IMU J4
VIEW A - A
WITH COVER REMOVED
REQD
34 40 2REQD
26 34
34 44
B
B
BT8 BT7 BT6 BT5
BT1 BT2 BT3 BT4
25 4 REQD
12
31 42 3 REQD
13 3 REQD
23 3 REQD
31 45 3 REQD
4 REQD
2 REQD
REQD
64
SECTION C-C
1
SEE NOTE 5 21
4 REQD 38
34 44
A
A
PORT. TEMP.
CONTROLLER

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
J		REPLACES REV (H) WITH CHANGE PER MXC 206049 WAS "D" SIZE		16 OCT 65	RLP
K		~~REVISED PER MXC~~ 206397		26 OCT 65	
L		INITIAL RELEASE CLASS A PER TDRR 24042		29 OCT 65	
M		REVISED PER TDRR 25717		8 FEB 66	
N		REVISED PER TDRR 26973		14 MAR 66	RLP
P		REVISED PER TDRR 26979		6 MAR 66	
R		REVISED PER TDRR 27542		4 APR 66	
S		REVISED PER TDRR 27556		5 APR 66	
T		REVISED PER TDRR 27603		7 APR 66	
U		REVISED PER TDRR 29040		27 MAY 66	
V		REVISED PER TDRR 2868		23 JUN 66	

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	~~1~~		65	~~MS21919DG5(1897073-105)~~	~~CLAMP, CUSHIONED~~
	4		64	AN960-C8(1897006-028)	WASHER, FLAT
	16		63	AN960-C4(1897006-024)	WASHER, FLAT
	AR		62	MIL-I-8660	SILICONE GREASE (ES 2311)
	1		61	2900257	INSTRUCTION FOILCAL (PTC II)
SEE NOTE 8	AR		60	MIL-A-5092 TYPE 2	ADHESIVE (ES2770-2)
SEE NOTE 8	1		59	2900742	GASKET, PANEL
	1		58	F02A250V4AS(1897099-113	FUSE, MIL-F-15160/02
	1		57	F02B125V2AS(1897099-129	FUSE, MIL-F-15160/02
	AR		56	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
	AR		55	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
	AR		54	SN 60 WS	SOLDER QQ-S-571 (ES2175-1)
SEE NOTE 3	1		53	2900862	CABLE INTERCONNECT - W 197
	1		52	2900861	W 196
	1		51	2900860	W 195
	1		50	2900859	W 194
SEE NOTE 3	1		49	2900856	CABLE INTERCONNECT - W 190
	X		48	2900133	SCHEMATIC DIAGRAM, ELEC
SEE NOTE 3	1		47	2900656	LEAD SET AA
	1		46	2900654	HARNESS A
SEE NOTE 6	3		45	1006783-105	SCREW, BUTTON HEAD
	3		44	1006783-104	
	2		43	1006783-047	
	11		42	1006783-26	
	8		41	1006783-23	
	17		40	1006783-22	
	16		39	1006783-18	
	4		38	1006783-9	SCREW, BUTTON HEAD
	6		37	1010630-38	SCREW, FLAT HEAD
	4		36	1010630-13	SCREW, FLAT HEAD
	1		35	1012525-006	NUT, SELF LOCKING
	21		34	1012525-004	
SEE NOTE 6	2		33	1016151-010	
	2		32	1016151-004	NUT, SELF LOCKING
	12		31	MS35338-80	WASHER, LOCK
	16		30	MS35338-78	WASHER, LOCK
	~~1~~		29	~~MS21919DG8 (1897073-108)~~	~~CLAMP, CUSHIONED~~
	~~1~~		28	~~MS21919DG6 (1897073-106)~~	~~CLAMP, CUSHIONED~~
	~~3~~		27	~~MS21919DG4 (1897073-104)~~	~~CLAMP, CUSHIONED~~
SEE NOTE 12	7		26	MS21919DG3 THRU 9(1897073-103 THRU-109)	CLAMP, CUSHIONED
SEE NOTE 6	8		25	1015860-026	SPACER
	2		24	1015860-017	SPACER
SEE NOTE 6	3		23	1015860-008	SPACER
	6		22	2900796	LINK, BATTERY TERMINAL
	1		21	1004260-141	NAMEPLATE
SEE NOTE 6	8		20	1897268-001	BATTERY
	1		19	1897410	TRANSFORMER, POWER
SEE NOTE 6	1		18	2900520	BELL, ASSEMBLY
	1		17	CE71C562G (1896872-119)	CAPACITOR, MIL-C-62/12
SEE NOTE 6	4		16	1897261	COMPARATOR
	1		15	2900795	BRACKET, ELECTRONIC COMPONENTS
	1		14	2900512-001	NUT, SLEEVE
	3		13	2900512-000	NUT, SLEEVE
	1		12	2900511	COVER, BATTERY RETAINER
	2		11	2900510	BRACKET, ANGLE
	1		10	2900509	TRAY, BATTERY
	1		9	2900508	RETAINER, BATTERY (INSEP ASSY)
	2		8	2900507	STRAP, RETAINING
	2		7	2900506	STRAP, RETAINING (INSEP ASSY)
	1		6	2900777-011	RELAY ASSEMBLY
	1		5	2900778-011	ELECTRONIC COMPONENTS ASSY
	1		4	2900513-011	ELECTRONIC COMPONENTS ASSY
	1		3	2900521-011	ELECTRONIC COMPONENT ASSY
	1		2	2900835-011	PANEL ASSEMBLY
SEE NOTE 8	1		1	2900525-011	CASE PORT. TEMP. CONTROLLER

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900043-011	2900030-011	011
2900030-011	2900030-011	011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN COOKMAN DATE 3 AUG 65
CHECKED J. STELMA 7 AUG 65
APPROVAL D. TSCHABOLD 9 AUG 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CONTROLLER, TEMPERATURE, PORTABLE

CODE IDENT NO. 99974
SIZE J2
2900060
SCALE FULL
SHEET 1 OF 1

2900060 V

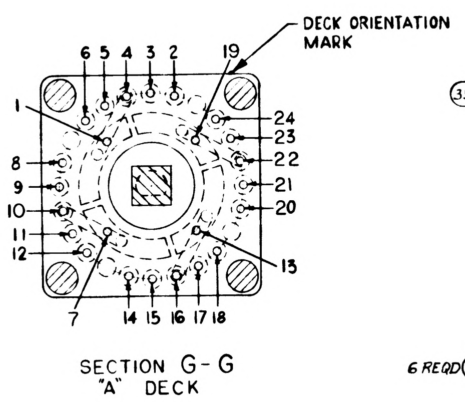
2900060

2/2900060

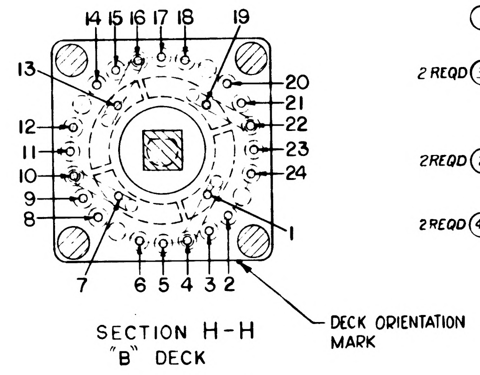
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 USING ITEMS (56) AND (54) OR (55).
3. THESE ITEMS ARE PART OF THIS ASSEMBLY.
4. DRAWING FOR REFERENCE: SCHEMATIC DIAGRAM ITEM (48)
5. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (21) IN ACCORDANCE WITH ND 002023. LETTERS AND NUMERALS TO BE .06 HIGH.
6. VENDOR ITEM - SEE SOURCE OR SPECIFICATION CONTROL DRAWING.
7. PROCEDURE FOR CALIBRATING BRIDGES (PERFORM IN THE FOLLOWING SEQUENCE).
   a. AFTER COMPLETING CONTINUITY CHECKS, TURN ALL POTS FULLY CW (MAXIMUM RESISTANCE) EXCEPT R50, WHICH SHALL BE CCW. APPLY 28 ± 1 VDC TO J1-K (HI) AND J1-L (LO).
   b. INDICATING BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 2504.5 ± 0.1 OHMS ACROSS J4-G AND J4-T. JUMPER J4T TO J4-C. WITH THE POWER SWITCH ON, ADJUST R18 AND R19 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.610 ± 1% VDC ACROSS R17 (TB2-52 AND TB2-45) AND 17.6 ± 1% VDC ACROSS R21 AND R22 (TB2-39 AND TB2-54).
   c. CONTROL BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 1560.0 ± 0.1 OHMS ACROSS J4-P AND J4-S. JUMPER J4-P TO J4-C. TURN TEMP ADJUST POT TO MIDRANGE (25 OHMS). WITH THE POWER SWITCH ON, ADJUST R33 AND AND R35 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.950 ± 1% VDC ACROSS R34 (TB2-56 AND TB2-47) AND 17.4 ± 1% VDC ACROSS R36, R38, AND R37 (TB2-42 AND TB2-12. TURN POWER SWITCH OFF.
   d. CHARGING VOLTAGE CUTOFF: DISCONNECT CONDUCTOR NO. A11 FROM BT1-(+) AND CONNECT TO VOLTMETER (HI). TURN POWER SWITCH ON. APPLY 36.8 ± 0.1 % VDC AT TB2-19 (HI) AND TB2-55 (LO). SLOWLY TURN R16 CCW UNTIL VOLTAGE DROPS TO APPROXIMATELY 28 VDC ON CONDUCTOR NO. A11. AFTER DECREASING SUPPLY VOLTAGE TO APPROXIMATELY 30VDC, MOMENTARILY REMOVE AND REAPPLY. SLOWLY INCREASE SUPPLY VOLTAGE AND VERIFY THAT IT WILL REACH 36.8 ± 0.1 VDC BEFORE DROPPING TO APPROXIMATELY 28VDC. TURN POWER SWITCH OFF. REMOVE EXTERNAL DC VOLTAGE. RECONNECT CONDUCTOR NO. A11 TO BT1 (+). APPLY 115 VAC POWER AT J2-M AND J2-J. TURN POWER SWITCH ON. A PLOT OF THE BATTERY VOLTAGE VS TIME WILL INDICATE TWO VOLTAGE PLATEAUS. VERIFY THAT THE CUTOFF VOLTAGE AT THE END OF THE SECOND PLATEAU IS 36.7 ± 0.3 VDC (COMPLETE BATTERY CHARGING REQUIRES 16-24 HOURS AND MAY BE INTERRUPTED IF NECESSARY).
   e. OUTPUT VOLTAGE LIMIT: WITH A 9.0 ± 0.3 OHM LOAD AT J4-H AND J4-L, AND 1500 OHMS AT J4-P AND J4-S, APPLY 126.5 VAC 60 CPS AT J2-M AND J2-J. TURN POWER SWITCH ON. TURN R50 CW UNTIL OUTPUT VOLTAGE AT TP3 (HI) AND TP4 (LO) READS 32.5 VDC.
8. BOND ITEM (59) TO ITEM (1) USING ITEM (60).
9. CENTRALIZE ITEM (61) ON FLAT SURFACE OF INNER LID. ORIENT RIGHT SIDE OF ITEM (61) ADJACENT TO HINGE OF INNER LID.
10. INSPECT AND TEST PER PS 2900060.
11. MATING SURFACES OF ITEMS (1) AND (19) TO BE COATED WITH ITEM (62).
12. SELECT AS REQUIRED.
13. PIN CHART FOR POWER SWITCH (SEE SECTIONS G-G AND H-H)

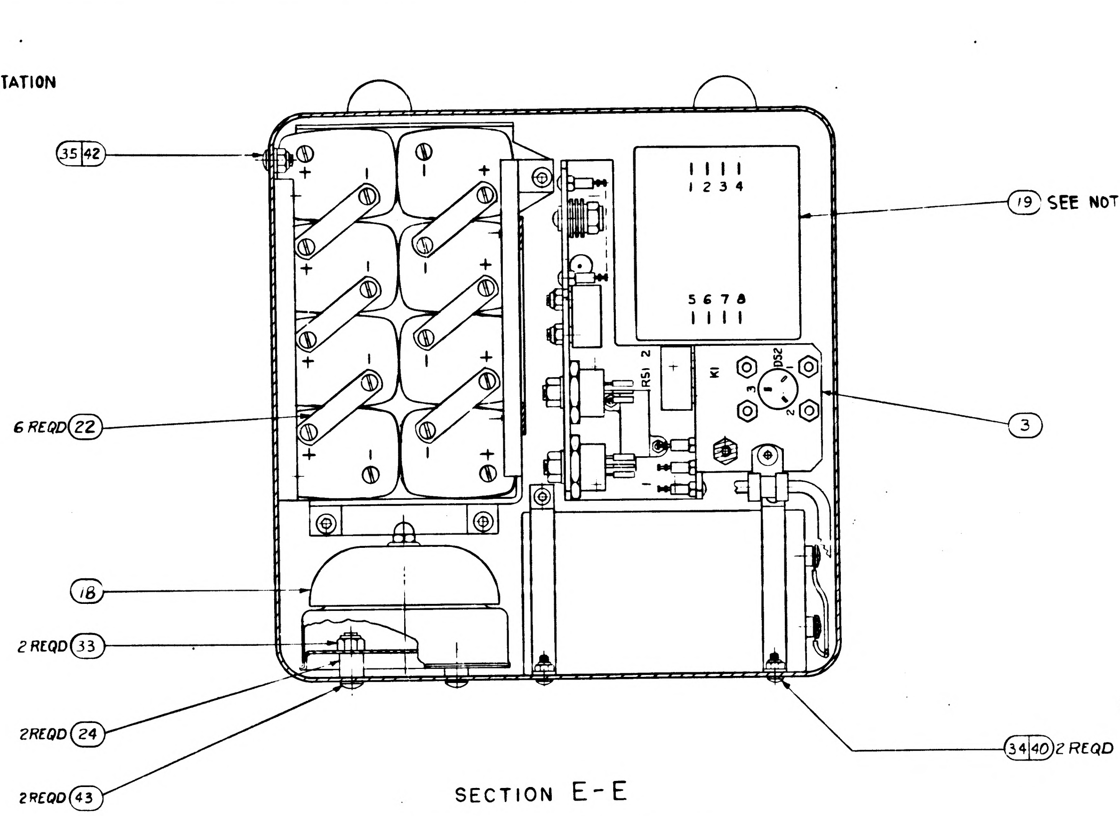
WIPER PIN	CORRESPONDING CONTACT PINS
1	2, 3, 4, 5, 6.
7	8, 9, 10, 11, 12.
13	14, 15, 16, 17, 18.
19	20, 21, 22, 23, 24.


6 5 4 3 2 19
DECK ORIENTATION MARK
1
24
23
22
21
20
8
9
10
11
12
13
7
14 15 16 17 18

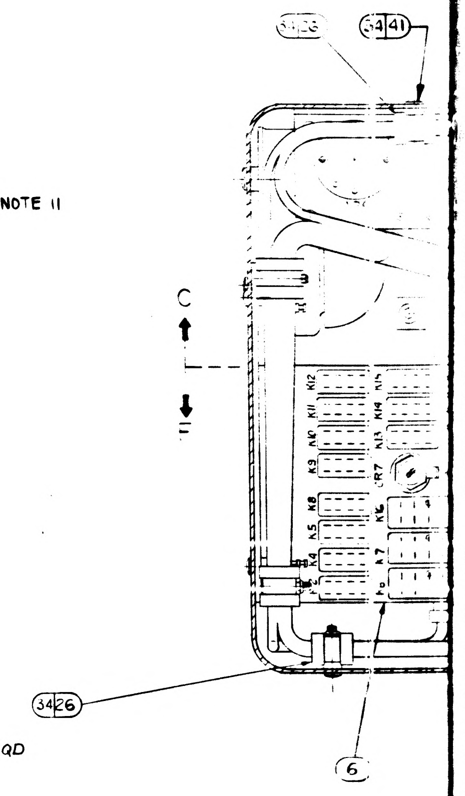
SECTION G-G
"A" DECK

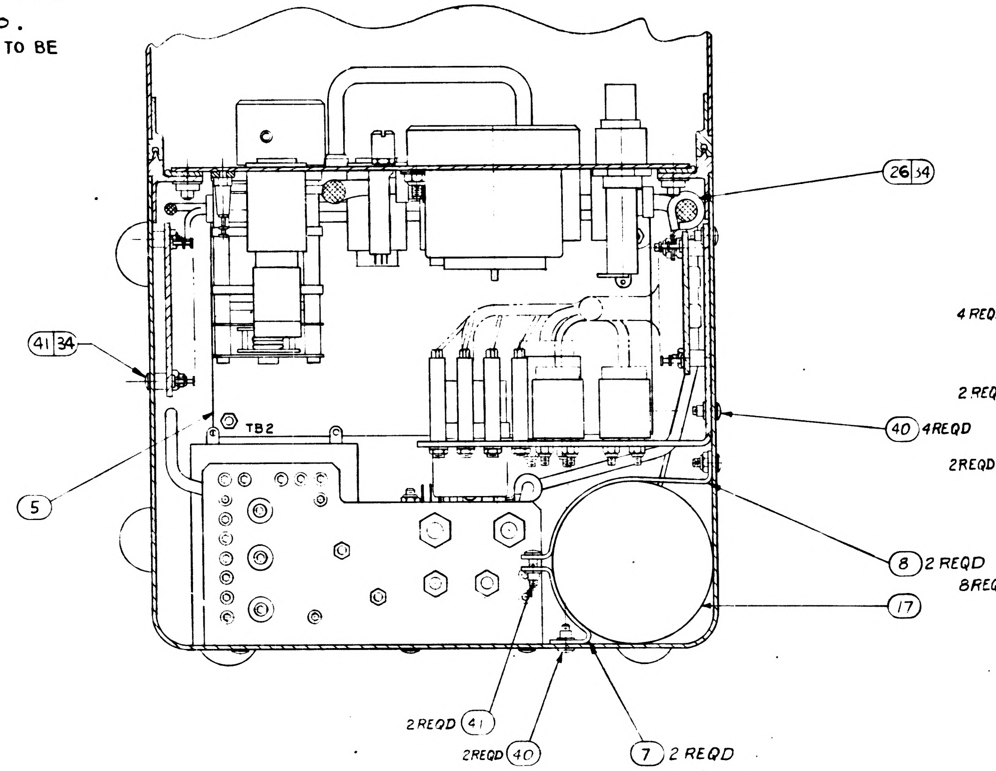

14 15 16 17 18 19
13
20
21
22
23
24
12
11
10
9
8
1
7 6 5 4 3 2
DECK ORIENTATION MARK

SECTION H-H
"B" DECK

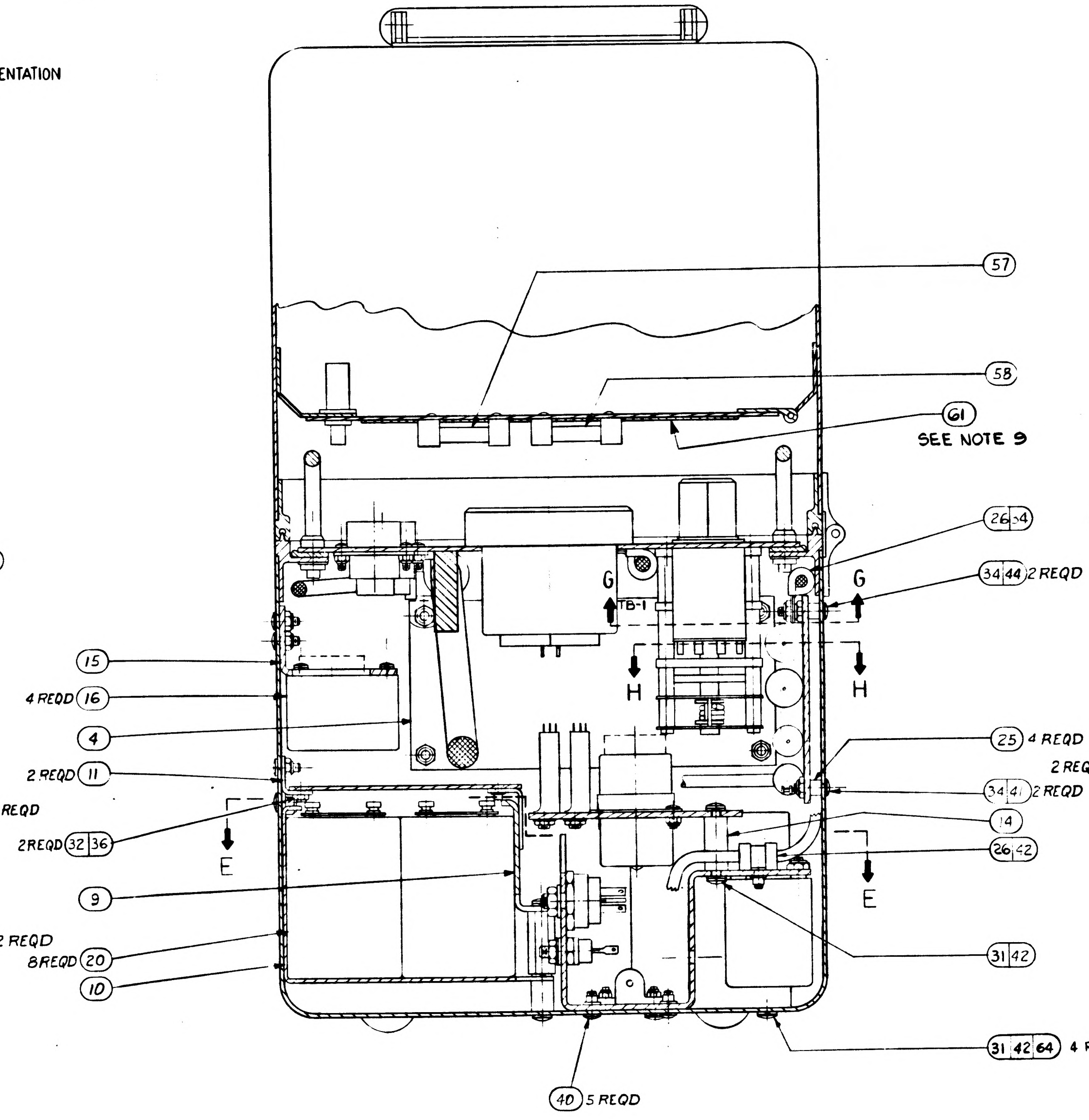

35|42
6 REQD (22)
(18)
2 REQD (33)
2 REQD (24)
2 REQD (43)
1 1 1 1
1 2 3 4
5 6 7 8
1 1 1 1
K1
DS2
R51
(19) SEE NOTE 11
(3)
34|40 2 REQD

SECTION E-E

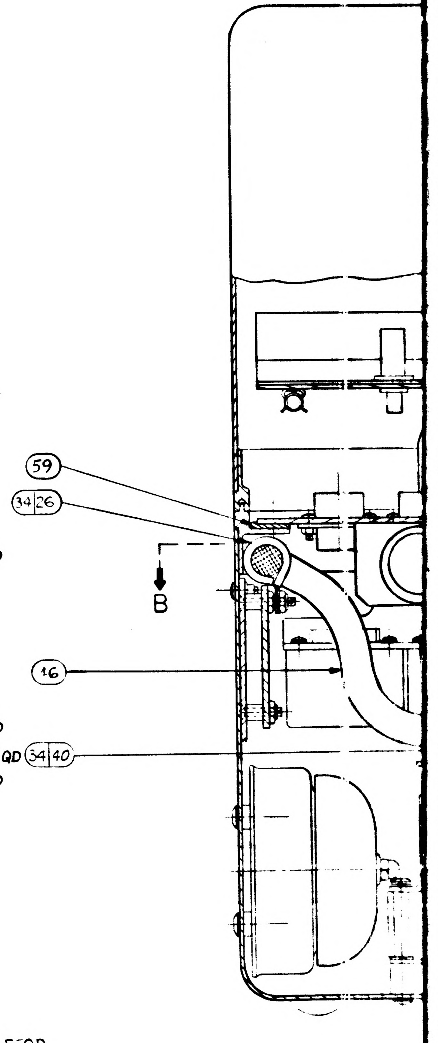

34|41
C
34|26
(6)


C
TB2
26|34
41|34
40 4 REQD
(5)
8 2 REQD
(17)
2 REQD (41)
2 REQD (40)
(7) 2 REQD

SECTION F-F
ROTATED 180°


(57)
(58)
(61)
SEE NOTE 9
26|34
34|44 2 REQD
G
G
TB-1
H
H
(15)
4 REQD (16)
(4)
2 REQD (11)
2 REQD 32|36
E
E
(9)
8 REQD (20)
(10)
25 4 REQD
34|41 2 REQD
(14)
26|42
31|42
31|42|64 4 REQD
40 5 REQD

SECTION D-D
ROTATED 90° CCW


(59)
34|26
B
(16)
2 REQD 34|40

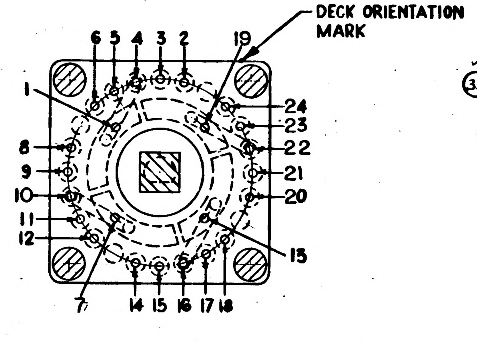
2900060	REV	SH
	V	1

1/2900060

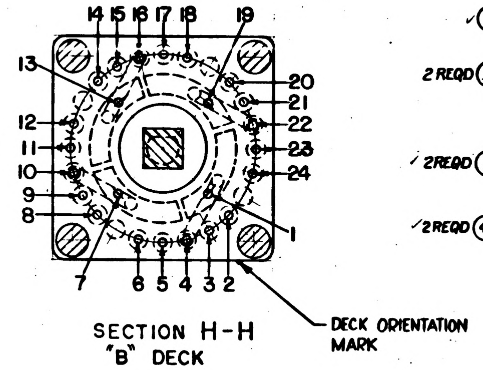
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 USING ITEMS (56) AND (54) OR (55).
3. THESE ITEMS ARE PART OF THIS ASSEMBLY.
4. DRAWINGS FOR REFERENCE: SCHEMATIC DIAGRAM ITEM ㊽ (011), ITEM (74) (021)
5. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM ㉑ IN ACCORDANCE WITH MD 1002023. LETTERS AND NUMBERALS TO BE .06 HIGH.
6. VENDOR ITEM - SEE SOURCE OR SPECIFICATION CONTROL DRAWING.
7. PROCEDURE FOR CALIBRATING BRIDGES (PERFORM IN THE FOLLOWING SEQUENCE).
   - a. AFTER COMPLETING CONTINUITY CHECKS, TURN ALL POTS FULLY CW (MAXIMUM RESISTANCE) EXCEPT R50, WHICH SHALL BE CCW. APPLY 28± 1 VDC TO J1-K (HI) AND J1-L (LO).
   - b. INDICATING BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 2504.5 ± 0.1 OHMS ACROSS J4-G AND J4-T. JUMPER J4T TO J4-C WITH THE POWER SWITCH ON, ADJUST R18 AND R19 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.610 ± 1% VDC ACROSS R17 (TB2-52 AND TB2-45) AND 17.6 ± 1% VDC ACROSS R21 AND R22 (TB2-39 AND TB2-54).
   - c. CONTROL BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 1560.0 ± 0.1 OHMS ACROSS J4-P AND J4-S. JUMPER J4-P TO J4-C. TURN TEMP ADJUST POT TO MIDRANGE (25 OHMS). WITH THE POWER SWITCH ON, ADJUST R33 AND R35 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.950 ± 1% VDC ACROSS R34 (TB2-56 AND TB2-47) AND 17.4 ± 1% VDC ACROSS R36, R38, AND R37 (TB2-42 AND TB2-12).TURN POWER SWITCH OFF.
   - d. CHARGING VOLTAGE CUTOFF: DISCONNECT CONDUCTOR NO. A11 FROM BT1-(+) AND CONNECT TO VOLTMETER (HI). TURN POWER SWITCH ON. APPLY 36.8 ± 0.1% VDC AT TB2-19 (HI) AND TB2-55 (LO). SLOWLY TURN R16 CCW UNTIL VOLTAGE DROPS TO APPROXIMATELY 28 VDC ON CONDUCTOR NO. A11 AFTER DECREASING SUPPLY VOLTAGE TO APPROXIMATELY 30VDC, MOMENTARILY REMOVE AND REAPPLY. SLOWLY INCREASE SUPPLY VOLTAGE AND VERIFY THAT IT WILL REACH 36.8 ± 0.1 VDC BEFORE DROPPING TO APPROXIMATELY 28 VDC. TURN POWER SWITCH OFF. REMOVE BOTH DC VOLTAGES. RECONNECT CONDUCTOR NO. A11 TO BT1(+). APPLY 115 VAC POWER AT J2-M AND J2-J. TURN POWER SWITCH ON. A PLOT OF THE BATTERY VOLTAGE VS TIME WILL INDICATE TWO VOLTAGE PLATEAUS. VERIFY THAT THE CUTOFF VOLTAGE AT THE END OF THE SECOND PLATEAU IS 36.7 ± 0.3 VDC (COMPLETE BATTERY CHARGING REQUIRES 16-24 HOURS AND MAY BE INTERRUPTED IF NECESSARY)(021-BATTERY VOLTAGE SHALL BE MONITORED AT J1-H (HI) AND J1-J (LO)].
   - e. OUTPUT VOLTAGE LIMIT: WITH A 9.0 ± 0.3 OHM LOAD AT J4-H AND J4-L, AND 1500 OHMS AT J4-P AND J4-S, APPLY 126.5 VAC 60 CPS AT J2-M AND J2-J. TURN POWER SWITCH ON. TURN R50 CW UNTIL OUTPUT VOLTAGE AT TP3 (HI) AND TP4 (LO) READS 32.5 VDC.
8. BOND ITEM 59 TO ITEM ① USING ITEM (60).
9. CENTRALIZE ITEM (61) OR (76) ON FLAT SURFACE OF INNER LID. ORIENT RIGHT SIDE OF ITEM (61) OR (76) ADJACENT TO HINGE OF INNER LID.
10. INSPECT AND TEST: PER PS 2016129(021)
    PER PS 2900060(011)
11. MATING SURFACES OF ITEMS ① AND ⑲ TO BE COATED WITH ITEM (62).
12. SELECT AS REQUIRED.
13. PIN CHART FOR POWER SWITCH (SEE SECTIONS G-G AND H-H)

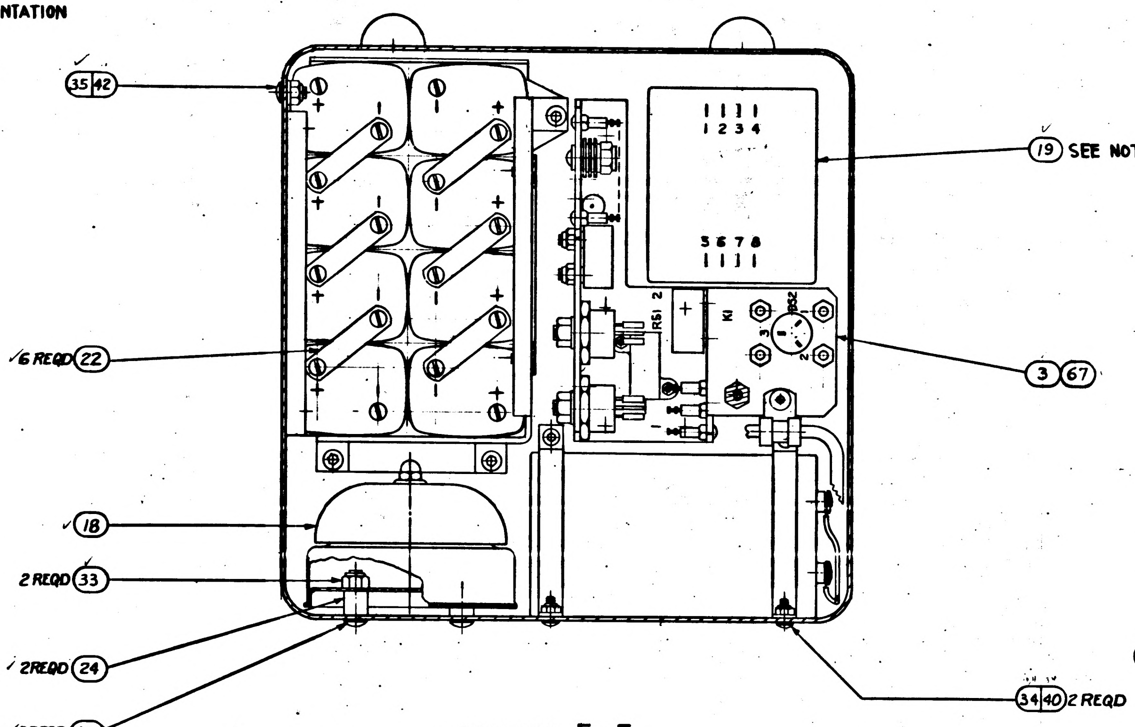
WIPER PIN	CORRESPONDING CONTACT PINS
1	2,3,4,5,6,
7	8,9,10,11,12,
13	14,15,16,17,18,
19	20,21,22,23,24.


6
5
4
3
2
19
DECK ORIENTATION MARK
1
24
23
22
21
20
8
9
10
11
12
15
7
14
15
16
17
18

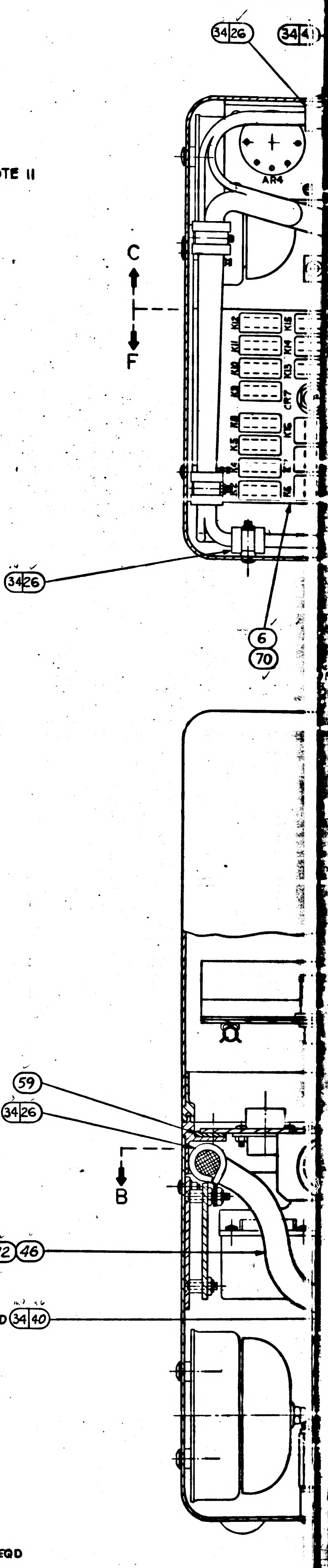
SECTION G-G
"A" DECK

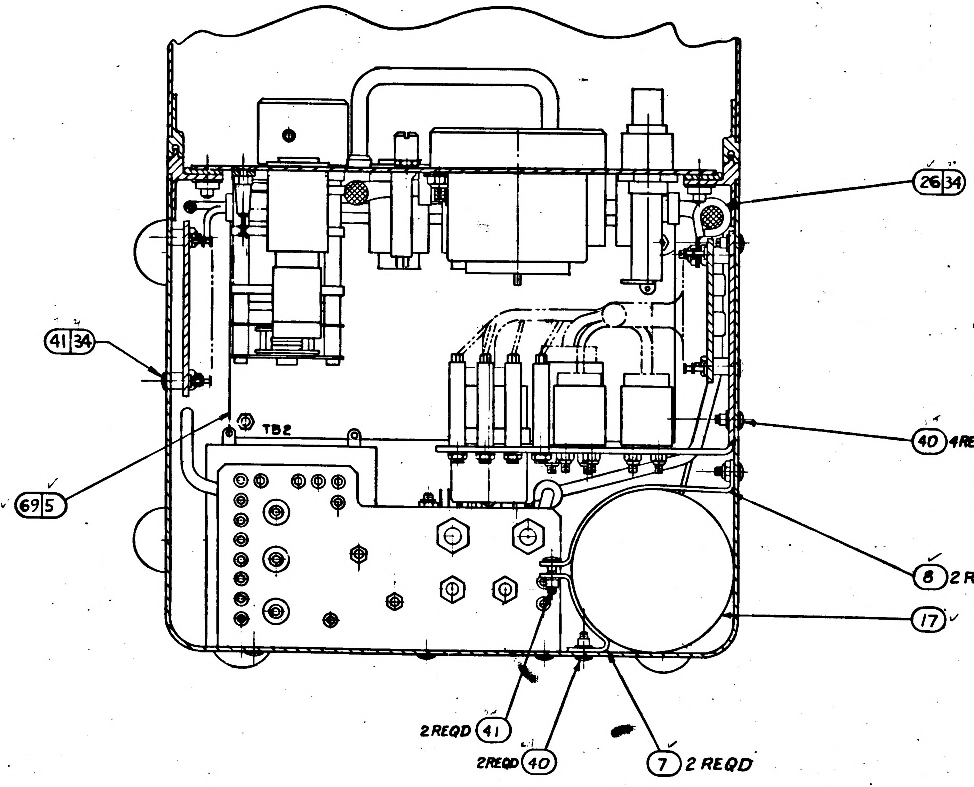

14
15
16
17
18
19
13
20
21
22
23
24
12
11
10
9
8
1
7
6
5
4
3
2
DECK ORIENTATION MARK

SECTION H-H
"B" DECK

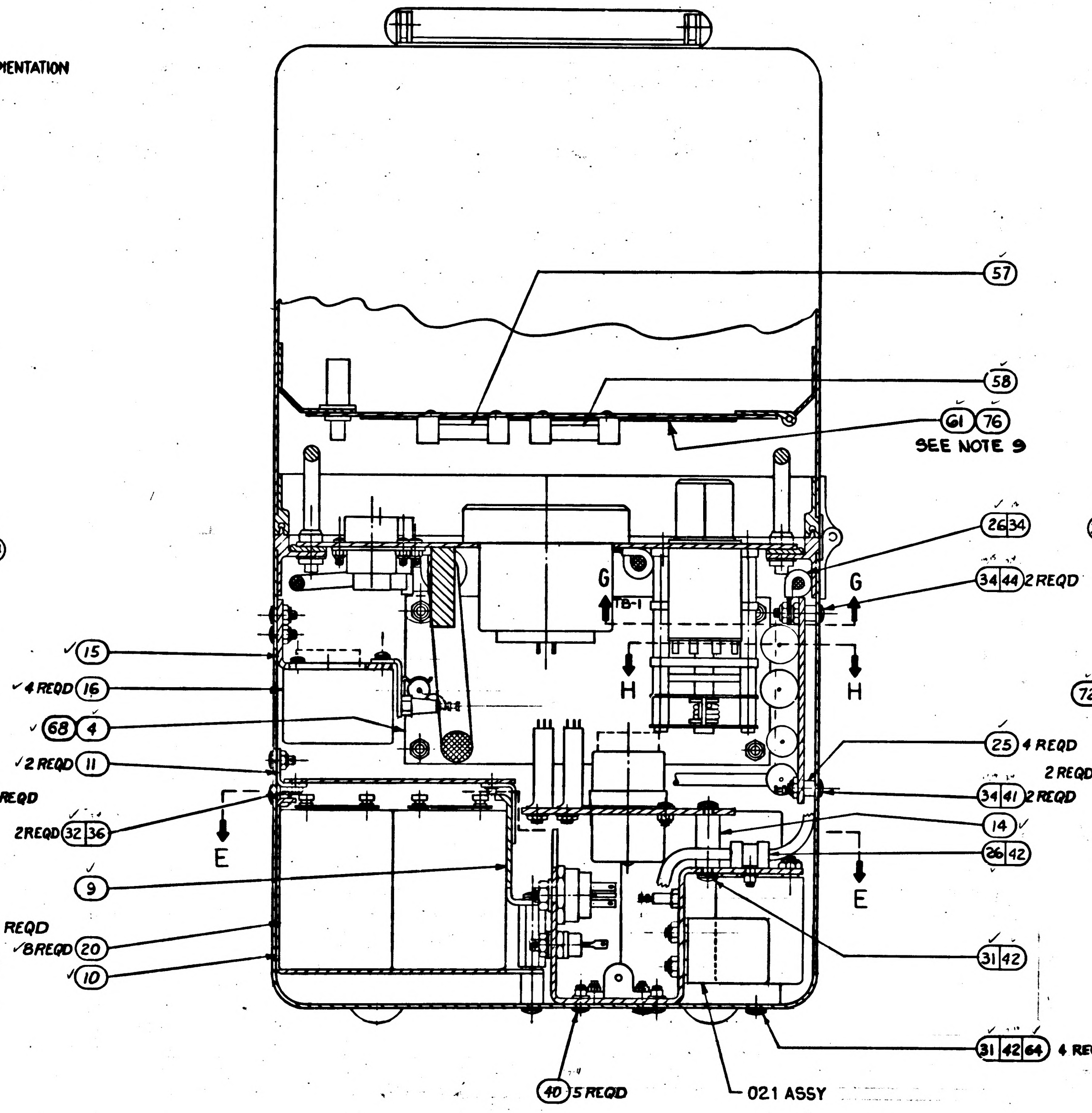

35 42
6 REQD 22
18
2 REQD 33
2 REQD 24
2 REQD 43
34 40 2 REQD
19 SEE NOTE 11
3 67
C
F
1 1 1 1
1 2 3 4
5 6 7 8
1 1 1 1

SECTION E-E


34 26
34 41
AR4
34 26
6
70
59
34 26
B
72 46


26 34
41 34
40 4 REQD
69 5
TB2
8 2 REQD
17
2 REQD 41
2 REQD 40
7 2 REQD

SECTION F-F
ROTATED 180°


57
58
61 76
SEE NOTE 9
26 34
34 44 2 REQD
G
G
TB-1
H
H
15
4 REQD 16
68 4
2 REQD 11
2 REQD 32 36
E
E
9
8 REQD 20
10
25 4 REQD
2 REQD 34 40
34 41 2 REQD
14
26 42
31 42
31 42 64 4 REQD
40 5 REQD
021 ASSY

SECTION D-D
ROTATED 90° CCW

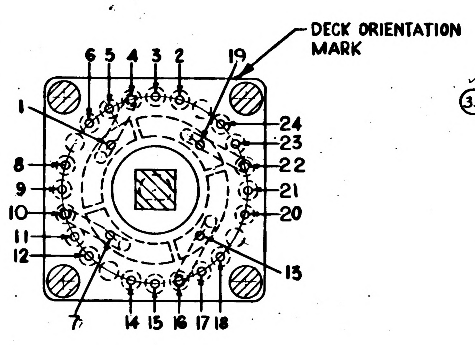
2900060	REV W	SH 1

1/2900060

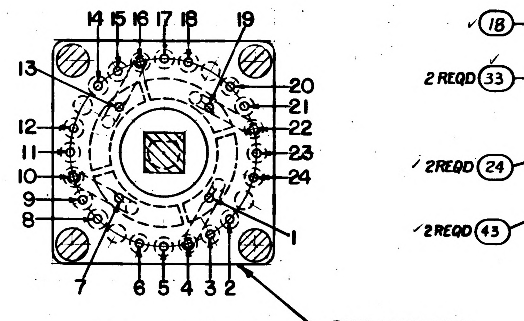
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 USING ITEMS (56) AND (54) OR (55).
3. THESE ITEMS ARE PART OF THIS ASSEMBLY.
4. DRAWINGS FOR REFERENCE: SCHEMATIC DIAGRAM ITEM (48) (011), ITEM (74) (021)
5. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (21) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMBERALS TO BE .06 HIGH.
6. VENDOR ITEM - SEE SOURCE OR SPECIFICATION CONTROL DRAWING.
7. PROCEDURE FOR CALIBRATING BRIDGES (PERFORM IN THE FOLLOWING SEQUENCE).
    - a. AFTER COMPLETING CONTINUITY CHECKS, TURN ALL POTS FULLY CW (MAXIMUM RESISTANCE) EXCEPT R50, WHICH SHALL BE CCW. APPLY 28± 1 VDC TO J1-K (HI) AND J1-L (LO).
    - b. INDICATING BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 2504.5 ± 0.1 OHMS ACROSS J4-G AND J4-T. JUMPER J4T TO J4-C WITH THE POWER SWITCH ON, ADJUST R18 AND R19 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.610 ± 1% VDC ACROSS R17 (TB2-52 AND TB2-45) AND 17.6 ± 1% VDC ACROSS R21 AND R22 (TB2-39 AND TB2-54).
    - c. CONTROL BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 1560.0 ± 0.1 OHMS ACROSS J4-P AND J4-S. JUMPER J4-P TO J4-C. TURN TEMP ADJUST POT TO MIDRANGE (25 OHMS). WITH THE POWER SWITCH ON, ADJUST R33 AND R35 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.950 ± 1% VDC ACROSS R34 (TB2-56 AND TB2-47) AND 17.4 ± 1% VDC ACROSS R36, R38, AND R37 (TB2-42 AND TB2-12).TURN POWER SWITCH OFF.
    - d. CHARGING VOLTAGE CUTOFF: DISCONNECT CONDUCTOR NO. A11 FROM BT1-(+) AND CONNECT TO VOLTMETER (HI). TURN POWER SWITCH ON. APPLY 36.8 ± 0.1% VDC AT TB2-19 (HI) AND TB2-55 (LO). SLOWLY TURN R16 CCW UNTIL VOLTAGE DROPS TO APPROXIMATELY 28 VDC ON CONDUCTOR NO. A11 AFTER DECREASING SUPPLY VOLTAGE TO APPROXIMATELY 30VDC, MOMENTARILY REMOVE AND REAPPLY. SLOWLY INCREASE SUPPLY VOLTAGE AND VERIFY THAT IT WILL REACH 36.8 ± 0.1 VDC BEFORE DROPPING TO APPROXIMATELY 28 VDC. TURN POWER SWITCH OFF. REMOVE BOTH DC VOLTAGES. RECONNECT CONDUCTOR NO. A11 TO BT1(+). APPLY 115 VAC POWER AT J2-M AND J2-J. TURN POWER SWITCH ON. A PLOT OF THE BATTERY VOLTAGE VS TIME WILL INDICATE TWO VOLTAGE PLATEAUS. VERIFY THAT THE CUTOFF VOLTAGE AT THE END OF THE SECOND PLATEAU IS 36.7 ± 0.3 VDC (COMPLETE BATTERY CHARGING REQUIRES 16-24 HOURS AND MAY BE INTERRUPTED IF NECESSARY)(021-BATTERY VOLTAGE SHALL BE MONITORED AT J1-H (HI) AND J1-J (LO)].
    - e. OUTPUT VOLTAGE LIMIT: WITH A 9.0 ± 0.3 OHM LOAD AT J4-H AND J4-L, AND 1500 OHMS AT J4-P AND J4-S, APPLY 126.5 VAC 60 CPS AT J2-M AND J2-J. TURN POWER SWITCH ON. TURN R50 CW UNTIL OUTPUT VOLTAGE AT TP3 (HI) AND TP4 (LO) READS 32.5 VDC.
8. BOND ITEM 59 TO ITEM (1) USING ITEM (60).
9. CENTRALIZE ITEM (61) OR (76) ON FLAT SURFACE OF INNER LID. ORIENT RIGHT SIDE OF ITEM (61) OR (76) ADJACENT TO HINGE OF INNER LID.
10. INSPECT AND TEST: PER PS 2016129(021)
    PER PS 2900060(011)
11. MATING SURFACES OF ITEMS (1) AND (19) TO BE COATED WITH ITEM (62).
12. SELECT AS REQUIRED.
13. PIN CHART FOR POWER SWITCH (SEE SECTIONS G-G AND H-H)

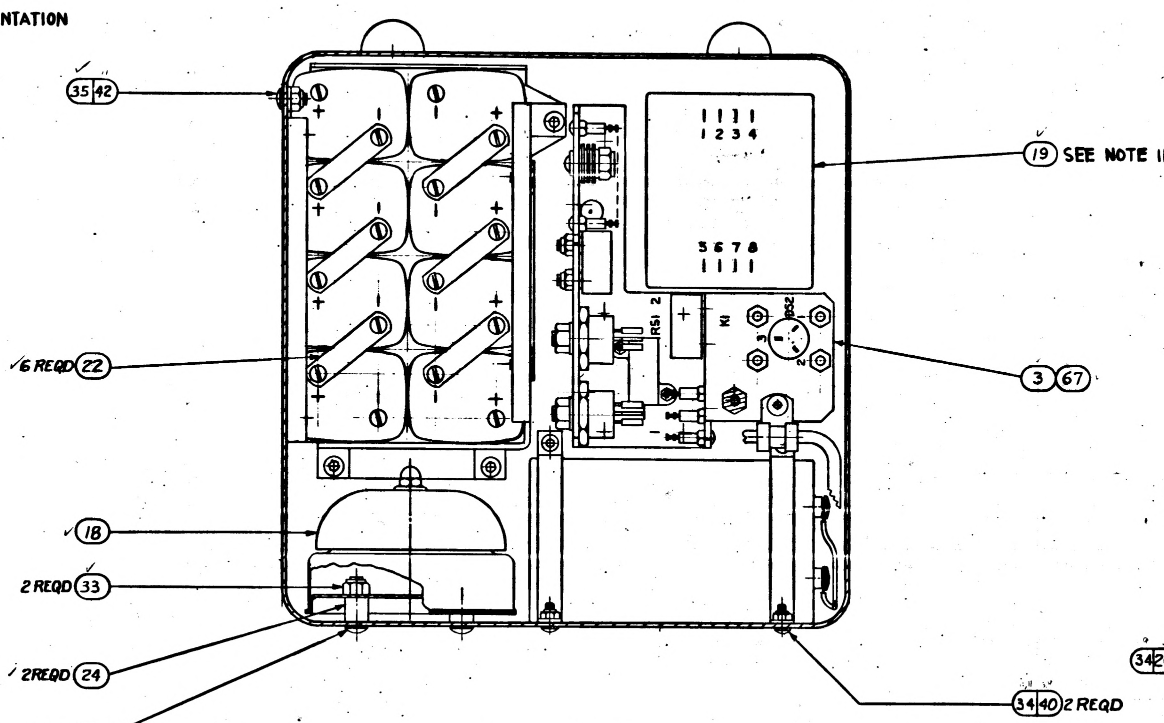
WIPER PIN	CORRESPONDING CONTACT PINS
1	2,3,4,5,6,
7	8,9,10,11,12,
13	14,15,16,17,18,
19	20,21,22,23,24.


6 5 4 3 2
19
DECK ORIENTATION MARK
1
8
9
10
11
12
24
23
22
21
20
15
7
14 15 16 17 18

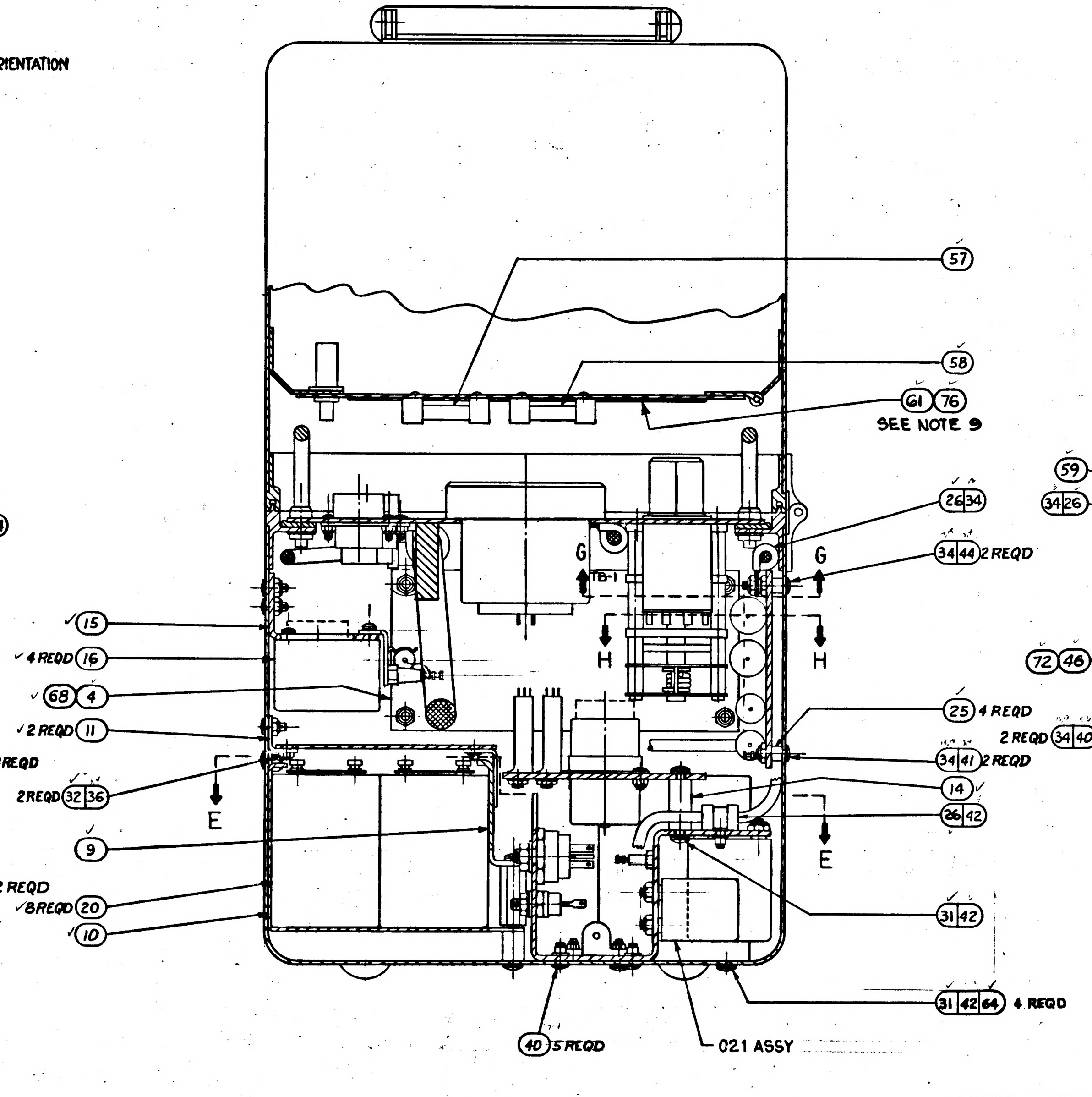
SECTION G-G
"A" DECK


14 15 16 17 18
19
13
12
11
10
9
8
20
21
22
23
24
1
7
6 5 4 3 2
DECK ORIENTATION MARK

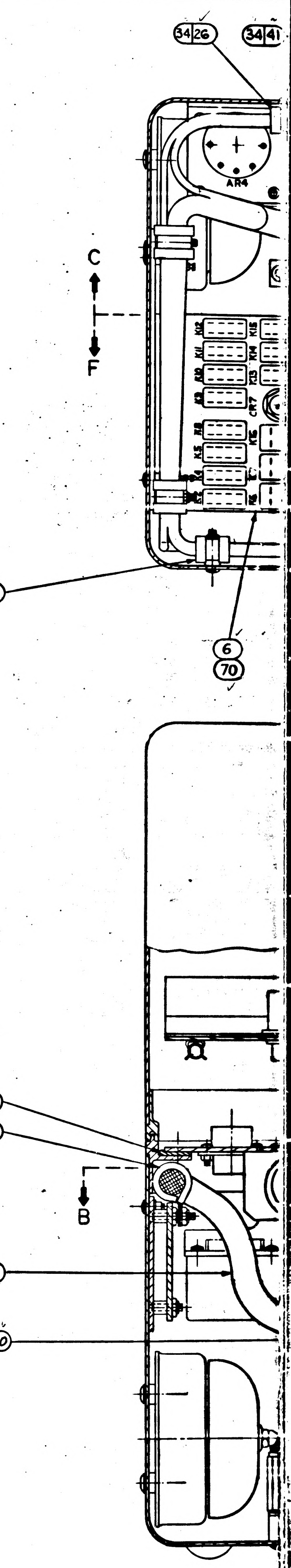
SECTION H-H
"B" DECK

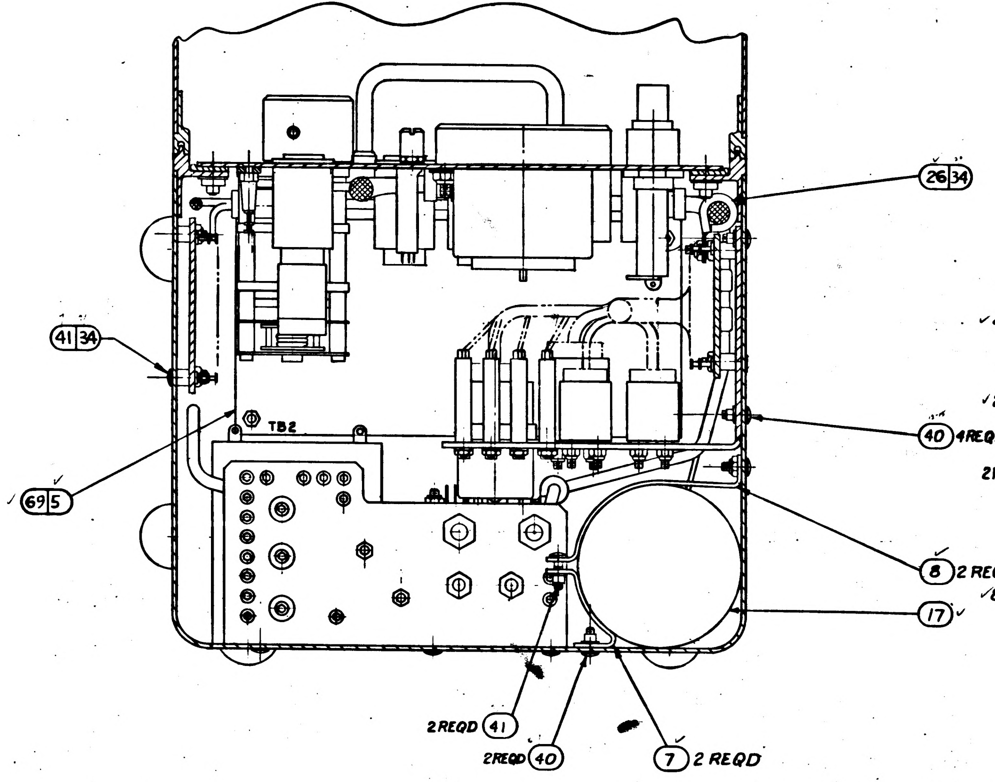

35 42
19 SEE NOTE 11
1 1 1 1
1 2 3 4
5 6 7 8
1 1 1 1
6 REQD 22
3 67
18
2 REQD 33
2 REQD 24
2 REQD 43
34 40 2 REQD

SECTION E-E


57
58
61 76
SEE NOTE 9
26 34
34 44 2 REQD
G
G
TB-1
H
H
15
4 REQD 16
68 4
2 REQD 11
25 4 REQD
2 REQD 34 40
34 41 2 REQD
2 REQD 32 36
14
26 42
E
E
9
8 REQD 20
10
31 42
31 42 64 4 REQD
40 5 REQD
021 ASSY

SECTION D-D
ROTATED 90° CCW


34 26
34 41
AR4
C
F
6
70
34 26
59
34 26
B
72 46

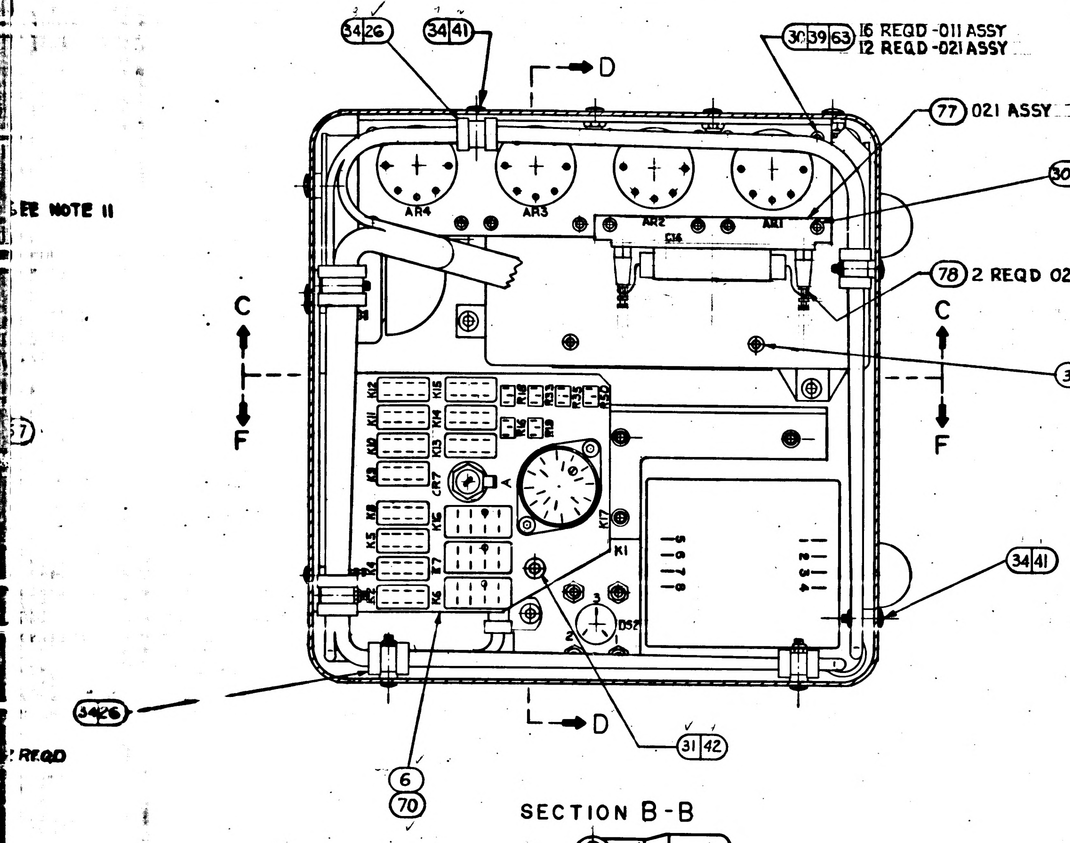

26 34
41 34
TB2
69 5
40 4 REQD
8 2 REQD
17
2 REQD 41
2 REQD 40
7 2 REQD

SECTION F-F
ROTATED 180°

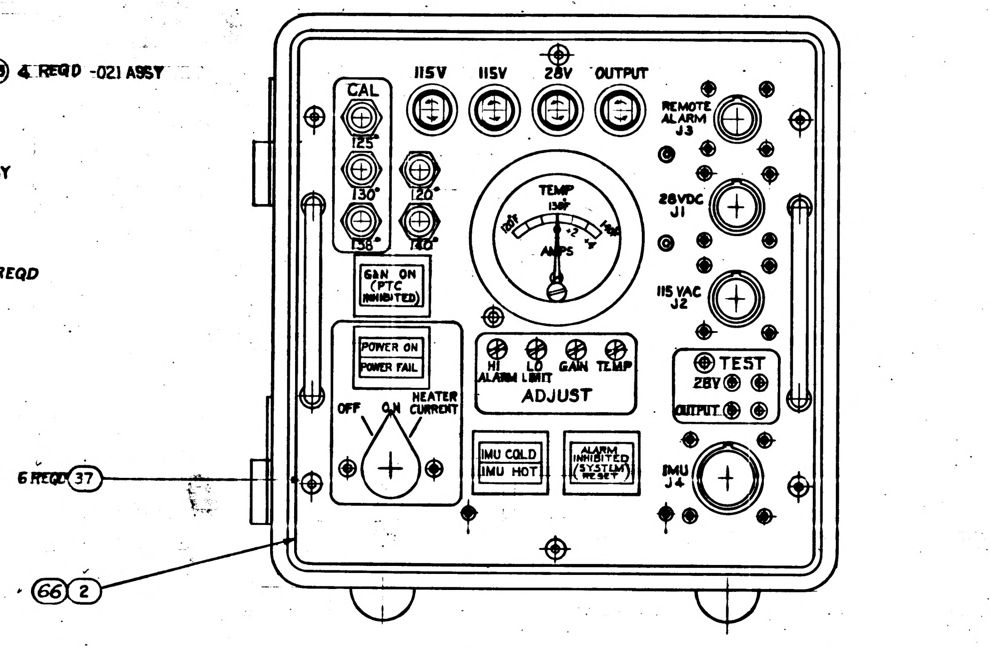
2900060	REV W	SH 1

1/2900060

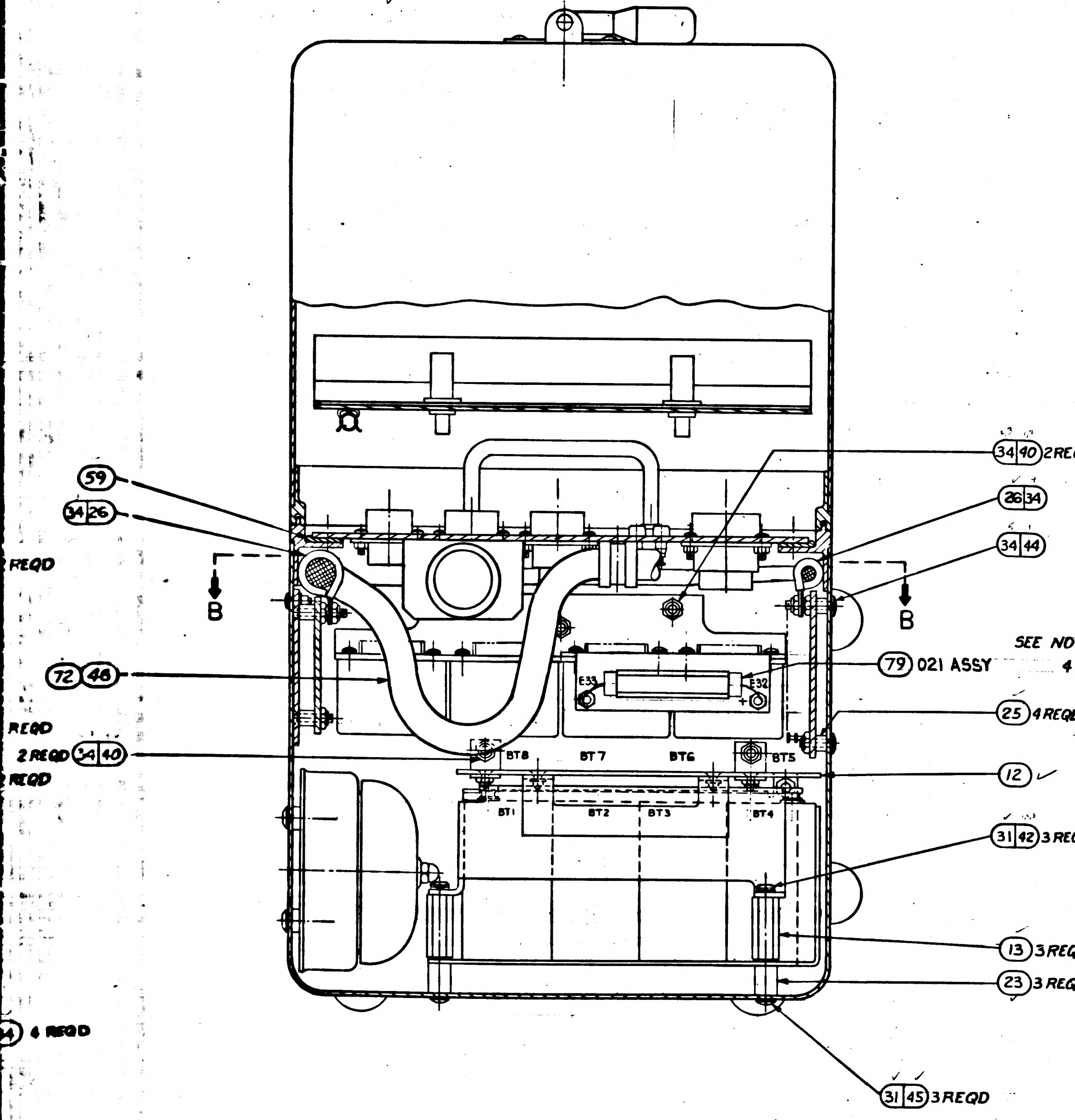
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
W		REPLACES REV "V" WITH CHANGE PER TDRR 32152		15 DEC 66	JIM


SEE NOTE 11
34 26
34 41
30 39 63 16 REQD -011 ASSY
12 REQD -021 ASSY
77 021 ASSY
30 75 63 4 REQD -021 ASSY
78 2 REQD 021 ASSY
36 2 REQD
34 41
34 26
2 REQD
6
70
31 42
D
C
F
AR4
AR3
AR2
AR1
K1
DS7

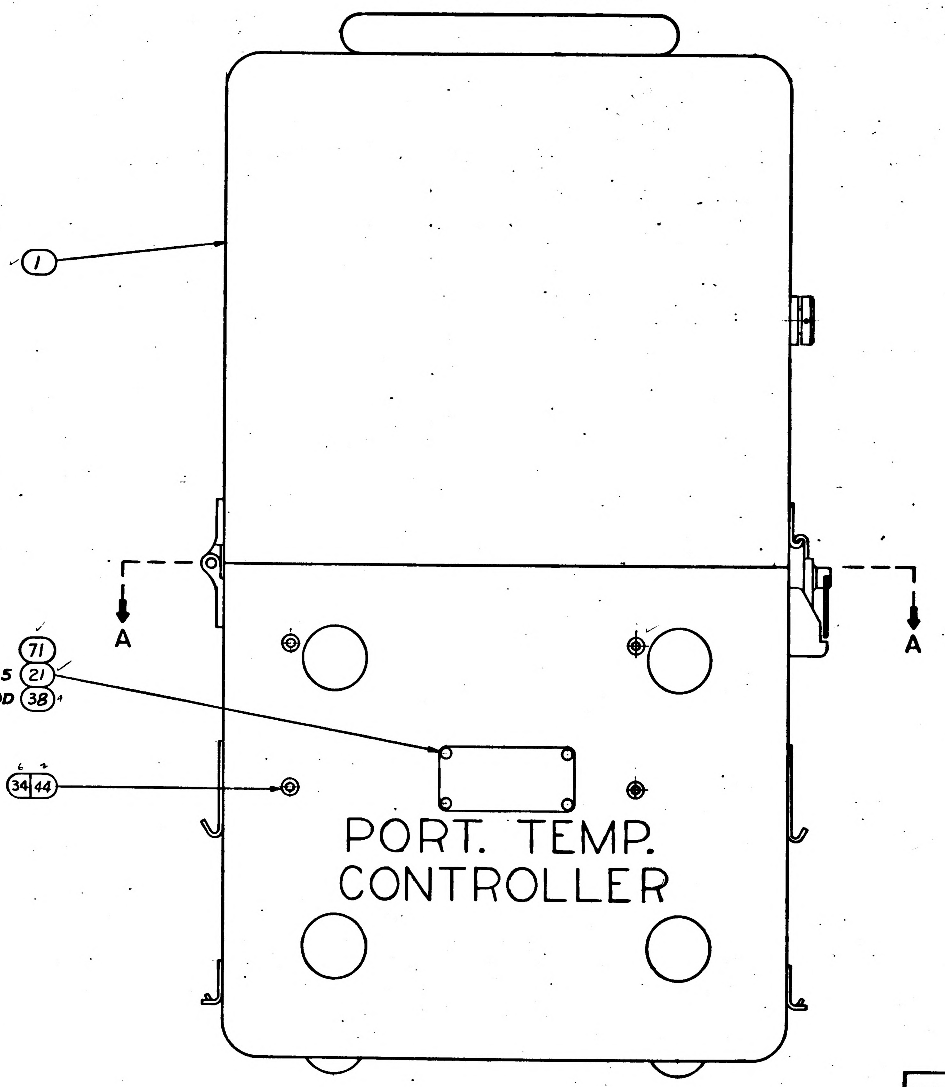
SECTION B-B


CAL
125°
130°
135°
120°
140°
115V
115V
28V
OUTPUT
REMOTE ALARM J3
TEMP
AMPS
28VDC J1
115 VAC J2
GAIN ON (PTC INHIBITED)
POWER ON
POWER FAIL
HI ALARM LIMIT
LO
GAIN
TEMP
ADJUST
TEST
28V
OUTPUT
OFF
ON
HEATER CURRENT
IMU COLD
IMU HOT
ALARM INHIBITED (SYSTEM RESET)
IMU J4
6 REQD 37
66 2

VIEW A - A
WITH COVER REMOVED


59
34 26
34 40 2 REQD
26 34
34 44
B
B
72 48
79 021 ASSY
25 4 REQD
REQD
2 REQD 34 40
REQD
12
BT8
BT7
BT6
BT5
BT1
BT2
BT3
BT4
E53
E52
31 42 3 REQD
13 3 REQD
23 3 REQD
4 REQD
31 45 3 REQD

SECTION C-C


1
A
A
71
SEE NOTE 5 21
4 REQD 38
34 44
PORT. TEMP.
CONTROLLER

		QUANTITY REQUIRED						
			021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			1			79	CL25BL700UP3(1897081-324)	CAPACITOR
SEE NOTE 6			2			78	1896962-004	TERMINAL STUD
			1			77	2901556	ELECTRONIC COMP BRACKET
			1			76	2901584	INSTRUCTION FOILCAL (PTC II)
SEE NOTE 6			4			75	1006783-95	SCREW, BUTTON HEAD
			X			74	2901543	SCHEMATIC DIAGRAM, ELEC
SEE NOTE 3			1			73	2901550	LEAD SET A-A
			1			72	2901546	WIRING HARNESS A
			1			71	1004260-535	NAMEPLATE
			1			70	2900777-021	RELAY ASSEMBLY
			1			69	2900778-021	ELECTRONIC COMPONENTS ASSY (TB2)
			1			68	2900513-021	ELECTRONIC COMPONENTS ASSY (TB1)
			1			67	2900521-021	ELECTRONIC COMPONENTS ASSY
			1			66	2900835-021	PANEL ASSY
						65		
			4	4		64	AN960-C8(1897006-028)	WASHER, FLAT
			16	16		63	AN960-C4(1897006-024)	WASHER, FLAT
			AR	AR		62	MIL-I-8660	SILICONE GREASE (ES 2311)
				1		61	2900957	INSTRUCTION FOILCAL (PTC II)
SEE NOTE 8			AR	AR		60	MIL-A-5092 TYPE 2	ADHESIVE (ES 2770-2)
SEE NOTE 8			1	1		59	2900742	GASKET PANEL
			1	1		58	F02A250V4AS(1897099-113)	FUSE, MIL-F-15160/02
			1	1		57	F02B125V2AS(1897099-129)	FUSE, MIL-F-15160/02
			AR	AR		56	MIL-F-14256 TYPE A OR W	FLUX, (ES 2798)
			AR	AR		55	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
			AR	AR		54	SN 60 WS	SOLDER QQ-S-571 (ES 2175-1)
SEE NOTE 3			1	1		53	2900862	CABLE INTERCONNECT-W 197
			1	1		52	2900861	W 196
			1	1		51	2900860	W 195
			1	1		50	2900859	W 194
SEE NOTE 3			1	1		49	2900856	CABLE INTERCONNECT-W 190
				X		48	2900133	SCHEMATIC DIAGRAM, ELEC
SEE NOTE 3				1		47	2900656	LEAD SET AA
				1		46	2900654	HARNESS A
SEE NOTE 6			3	3		45	1006783-105	SCREW, BUTTON HEAD
			3	3		44	1006783-104	
			2	2		43	1006783-047	
			11	11		42	1006783-26	
			8	8		41	1006783-23	
			17	17		40	1006783-22	
			12	16		39	1006783-18	
			4	4		38	1006783-9	SCREW, BUTTON HEAD
			6	6		37	1010630-38	SCREW, FLAT HEAD
			4	4		36	1010630-13	SCREW, FLAT HEAD
			1	1		35	1012525-006	NUT, SELF LOCKING
			21	21		34	1012525-004	
			2	2		33	1016151-010	
SEE NOTE 6			2	2		32	1016151-004	NUT, SELF LOCKING
			12	12		31	MS35338-80	WASHER, LOCK
			16	16		30	MS35338-78	WASHER, LOCK
						29		
						28		
						27		
SEE NOTE 12			7	7		26	MS21919DG3THRU9(1897073-103THRU-109)	CLAMP, CUSHIONED
SEE NOTE 6			8	8		25	1015860-026	SPACER
			2	2		24	1015860-017	SPACER
SEE NOTE 6			3	3		23	1015860-008	SPACER
			6	6		22	2900796	LINK, BATTERY TERMINAL
				1		21	1004260-141	NAMEPLATE
SEE NOTE 6			8	8		20	1897268-001	BATTERY
			1	1		19	1897410	TRANSFORMER, POWER
SEE NOTE 6			1	1		18	2900520	BELL, ASSEMBLY
			1	1		17	CE71C5626(1896872-119)	CAPACITOR, MIL-C-62/12
SEE NOTE 16			4	4		16	1897261	COMPARATOR
			1	1		15	2900795	BRACKET, ELECTRONIC COMPONENTS
			1	1		14	2900512-001	NUT SLEEVE
			3	3		13	2900512-000	NUT SLEEVE
			1	1		12	2900511	COVER, BATTERY RETAINER
			2	2		11	2900510	BRACKET, ANGLE
			1	1		10	2900509	TRAY, BATTERY
			1	1		9	2900508	RETAINER, BATTERY (INSEP ASSY)
			2	2		8	2900507	STRAP, RETAINING
			2	2		7	2900506	STRAP, RETAINING (INSEP ASSY)
				1		6	2900777-011	RELAY ASSEMBLY
				1		5	2900778-011	ELECTRONIC COMPONENTS ASSY(TB2)
				1		4	2900513-011	ELECTRONIC COMPONENTS ASSY(TB1)
				1		3	2900521-011	ELECTRONIC COMPONENT ASSY
				1		2	2900835-011	PANEL ASSEMBLY
			1	1		1	2900525-011	CASE PORT. TEMP. CONTROLLER

LIST OF PARTS AND MATERIALS

APPLICATION		
NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030	1900030	-021
2900063-021	1900030	-021
2900063-011	1900030	-011
1900030	1900030	-011

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.
DRAWN COOKMAN DATE 3 AUG 65
CHECKED J. STELMAR 7 AUG 65
APPROVAL D. TSCHABOLD 9 AUG 65
APPROVAL
NASA APPROVAL CEB
MIT APPROVAL

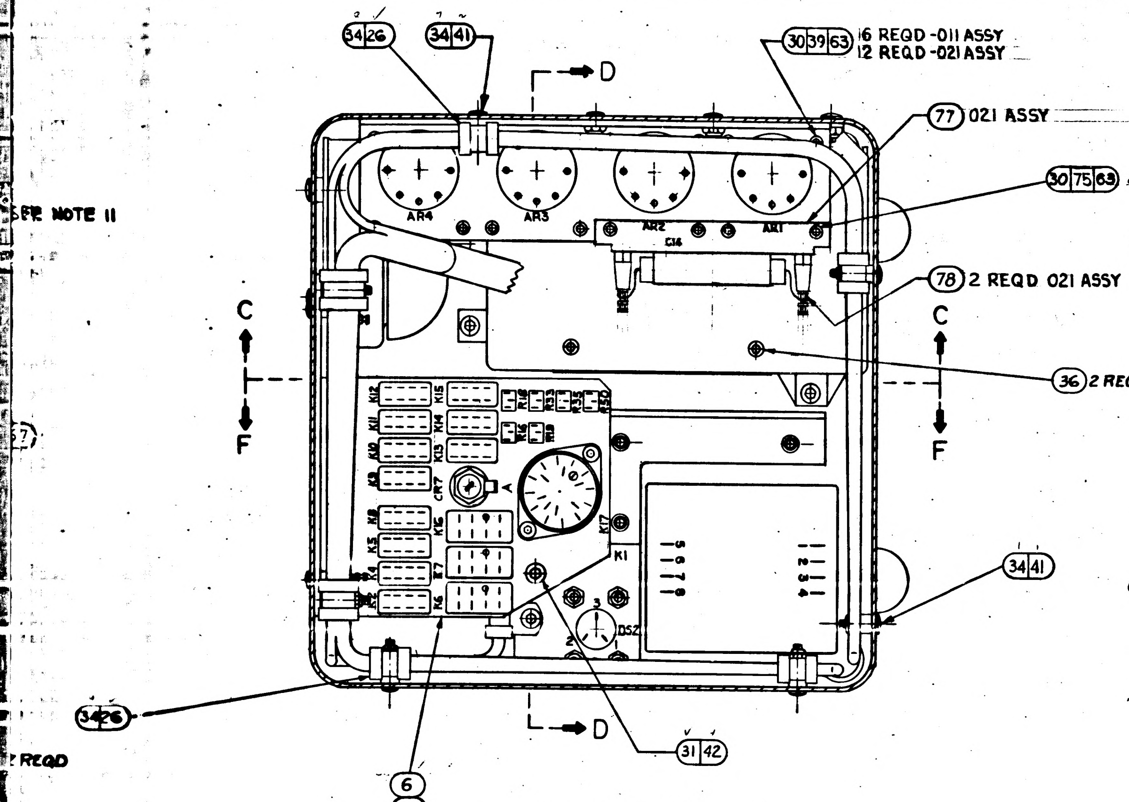
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CONTROLLER,
TEMPERATURE, PORTABLE

CODE IDENT NO. 99974
SIZE J2
2900060
SCALE FULL
SHEET 1 OF 1

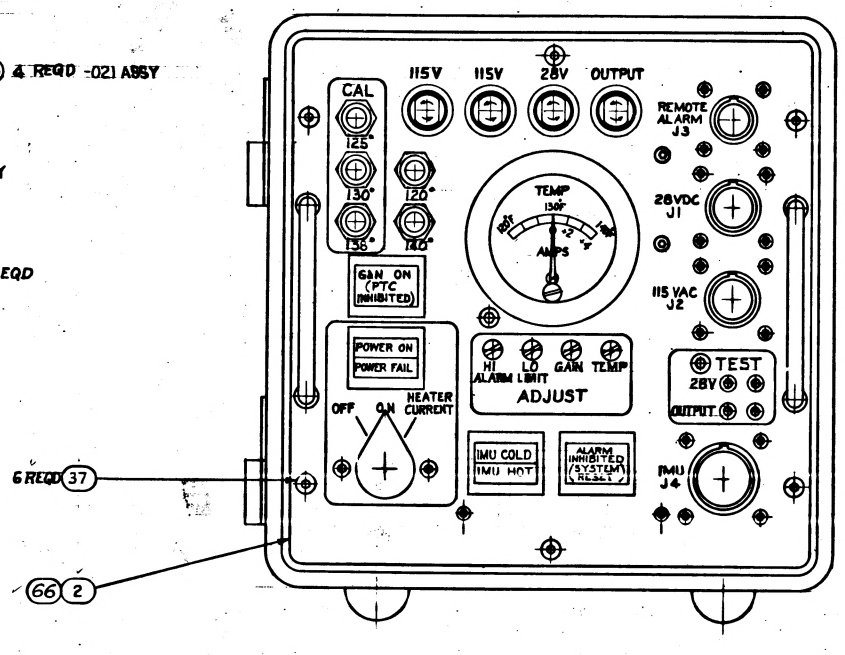
2 Charleston
7 OCT 65

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
REVISIONS					
W		REPLACES REV "V" WITH CHANGE PER TDRR 32152		15 DEC 66	JIM



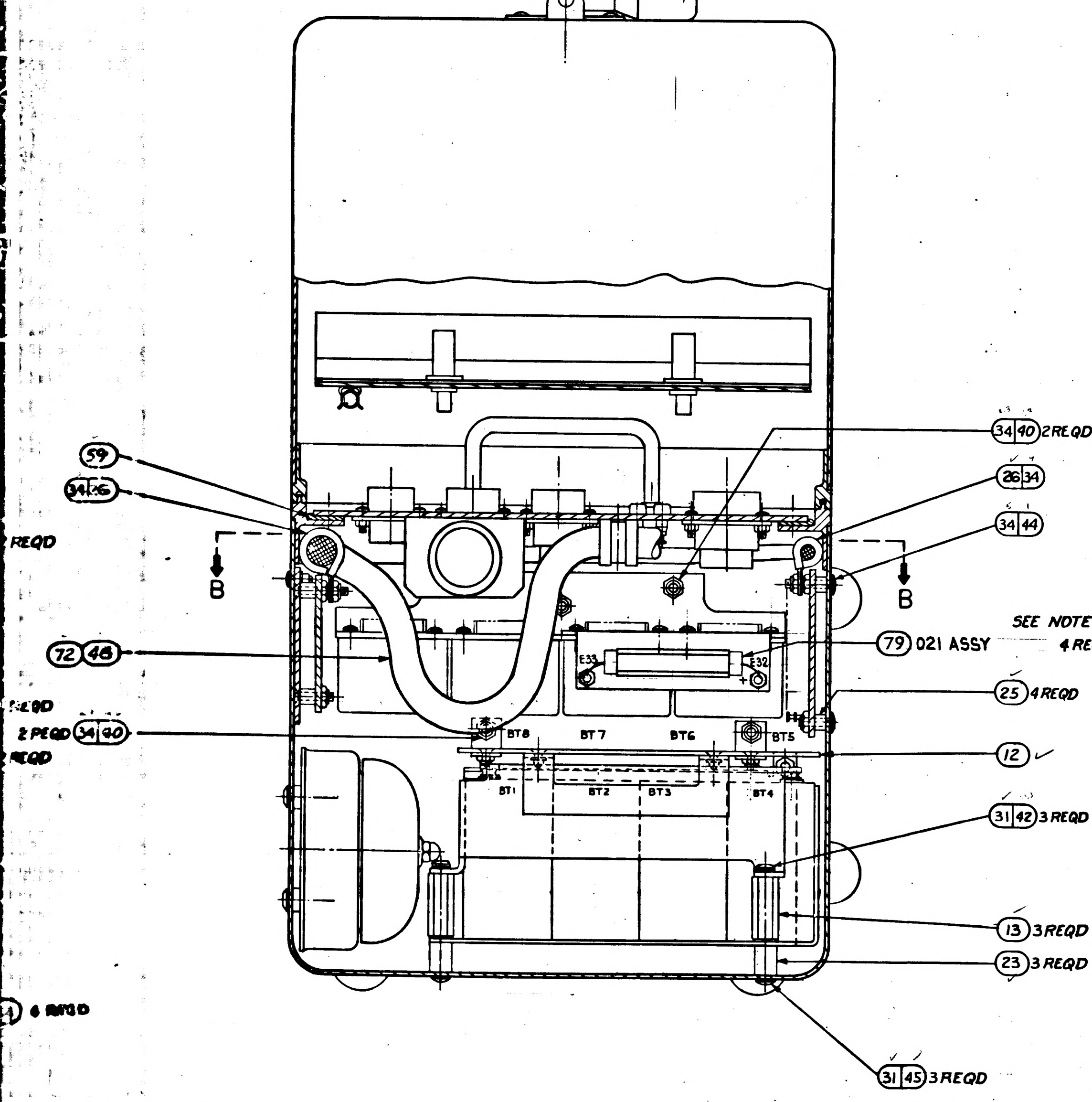
34 26
34 41
30 39 63 16 REQD -011 ASSY
12 REQD -021 ASSY
77 021 ASSY
30 75 63 4 REQD -021 ASSY
78 2 REQD 021 ASSY
36 2 REQD
34 41
31 42
6
70
34 26
SEE NOTE 11
REQD
C
F
C
F
D
D
AR4
AR3
AR2
AR1
C16
K1
CR7
DS2

SECTION B-B



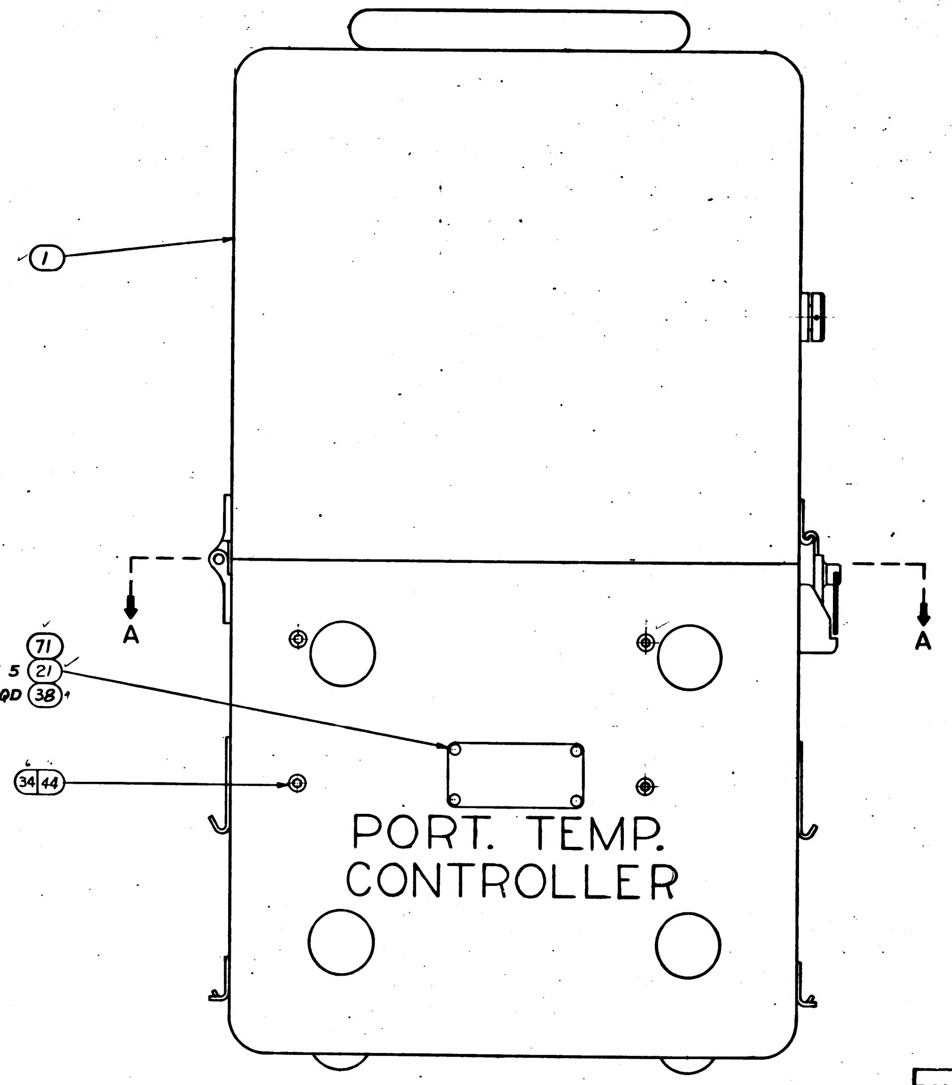
CAL
125°
130°
135°
115V
115V
28V
OUTPUT
120°
140°
GAIN ON (PTC INHIBITED)
TEMP
AMPS
REMOTE ALARM J3
28VDC J1
115 VAC J2
POWER ON
POWER FAIL
OFF
ON
HEATER CURRENT
HI LO ALARM LIMIT
GAIN
TEMP
ADJUST
TEST
28V
OUTPUT
IMU COLD
IMU HOT
ALARM INHIBITED (SYSTEM RESET)
IMU J4
6 REQD 37
66 2
A

VIEW A - A
WITH COVER REMOVED



34 40 2 REQD
26 34
34 44
59
34 26
B
B
REQD
72 48
79 021 ASSY
25 4 REQD
12
31 42 3 REQD
13 3 REQD
23 3 REQD
31 45 3 REQD
2 REQD 34 40
REQD
6 REQD
BT8
BT7
BT6
BT5
BT1
BT2
BT3
BT4
E33
E32

SECTION C-C



1
71
SEE NOTE 5 21
4 REQD 38
34 44
A
A
PORT. TEMP. CONTROLLER

			021	011	EFFEC-TIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			1			79	CL25BL700UP3(1897081-324)	CAPACITOR
SEE NOTE 6			2			78	1896962-004	TERMINAL STUD
			1			77	2901556	ELECTRONIC COMP BRACKET
			1			76	2901584	INSTRUCTION FOILCAL (PTC II)
SEE NOTE 6			4			75	1006783-95	SCREW, BUTTON HEAD
			X			74	2901543	SCHEMATIC DIAGRAM, ELEC
SEE NOTE 3			1			73	2901550	LEAD SET A-A
			1			72	2901546	WIRING HARNESS A
			1			71	1004260-535	NAMEPLATE
			1			70	2900777-021	RELAY ASSEMBLY
			1			69	2900778-021	ELECTRONIC COMPONENTS ASSY (TB2)
			1			68	2900513-021	ELECTRONIC COMPONENTS ASSY (TB1)
			1			67	2900521-021	ELECTRONIC COMPONENTS ASSY
			1			66	2900835-021	PANEL ASSY
						65		
			4	4		64	AN960-C8(1897006-028)	WASHER, FLAT
			16	16		63	AN960-C4(1897006-024)	WASHER, FLAT
			AR	AR		62	MIL-I-8660	SILICONE GREASE (ES 2311)
				1		61	2900957	INSTRUCTION FOILCAL (PTC II)
SEE NOTE 8			AR	AR		60	MIL-A-5092 TYPE 2	ADHESIVE (ES 2770-2)
SEE NOTE 8			1	1		59	2900742	GASKET PANEL
			1	1		58	F02A250V4AS(1897099-113)	FUSE, MIL-F-15160/02
			1	1		57	F02B125V2AS(1897099-129)	FUSE, MIL-F-15160/02
			AR	AR		56	MIL-F-14256 TYPE A OR W	FLUX, (ES 2798)
			AR	AR		55	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
			AR	AR		54	SN 60 WS	SOLDER QQ-S-571 (ES 2175-1)
SEE NOTE 3			1	1		53	2900862	CABLE INTERCONNECT-W 197
			1	1		52	2900861	W 196
			1	1		51	2900860	W 195
			1	1		50	2900859	W 194
SEE NOTE 3			1	1		49	2900856	CABLE INTERCONNECT-W 190
				X		48	2900133	SCHEMATIC DIAGRAM, ELEC
SEE NOTE 3				1		47	2900656	LEAD SET AA
				1		46	2900654	HARNESS A
SEE NOTE 6			3	3		45	1006783-105	SCREW, BUTTON HEAD
			3	3		44	1006783-104	
			2	2		43	1006783-047	
			11	11		42	1006783-26	
			8	8		41	1006783-23	
			17	17		40	1006783-22	
			12	16		39	1006783-18	
			4	4		38	1006783-9	SCREW, BUTTON HEAD
			6	6		37	1010630-38	SCREW, FLAT HEAD
			4	4		36	1010630-13	SCREW, FLAT HEAD
			1	1		35	1012525-006	NUT, SELF LOCKING
			21	21		34	1012525-004	
			2	2		33	1016151-010	
SEE NOTE 6			2	2		32	1016151-004	NUT, SELF LOCKING
			12	12		31	MS35338-80	WASHER, LOCK
			16	16		30	MS35338-78	WASHER, LOCK
						29		
						28		
						27		
SEE NOTE 12			7	7		26	MS21919DG3THRU9(1897073-103THRU-109)	CLAMP, CUSHIONED
SEE NOTE 6			8	8		25	1015860-026	SPACER
			2	2		24	1015860-017	SPACER
SEE NOTE 6			3	3		23	1015860-008	SPACER
			6	6		22	2900796	LINK, BATTERY TERMINAL
				1		21	1004260-141	NAMEPLATE
SEE NOTE 6			8	8		20	1897268-001	BATTERY
			1	1		19	1897410	TRANSFORMER, POWER
SEE NOTE 6			1	1		18	2900520	BELL, ASSEMBLY
			1	1		17	CE71C5626(1896872-119)	CAPACITOR, MIL-C-62/12
SEE NOTE 16			4	4		16	1897261	COMPARATOR
			1	1		15	2900795	BRACKET, ELECTRONIC COMPONENTS
			1	1		14	2900512-001	NUT SLEEVE
			3	3		13	2900512-000	NUT SLEEVE
			1	1		12	2900511	COVER, BATTERY RETAINER
			2	2		11	2900510	BRACKET, ANGLE
			1	1		10	2900509	TRAY, BATTERY
			1	1		9	2900508	RETAINER, BATTERY (INSEP ASSY)
			2	2		8	2900507	STRAP, RETAINING
			2	2		7	2900506	STRAP, RETAINING (INSEP ASSY)
				1		6	2900777-011	RELAY ASSEMBLY
				1		5	2900778-011	ELECTRONIC COMPONENTS ASSY(TB2)
				1		4	2900513-011	ELECTRONIC COMPONENTS ASSY(TB1)
				1		3	2900521-011	ELECTRONIC COMPONENT ASSY
				1		2	2900835-011	PANEL ASSEMBLY
			1	1		1	2900525-011	CASE PORT. TEMP. CONTROLLER
	QUANTITY REQUIRED						LIST OF PARTS AND MATERIALS	

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030	1900030	-021
2900063-021	1900030	-021
2900063-011	1900030	-011
1900030	1900030	-011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.
DRAWN COOKMAN DATE 3 AUG 65
CHECKED J. STELMA 7 AUG 65
APPROVAL D. TSCHABOLD 9 AUG 65
APPROVAL L. Gehman 9/9/65
NASA APPROVAL
MIT APPROVAL
2 Charleston 7 OCT 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CONTROLLER,
TEMPERATURE, PORTABLE

CODE IDENT NO. 99974
SIZE J2
2900060
SCALE FULL
SHEET 1 OF 1

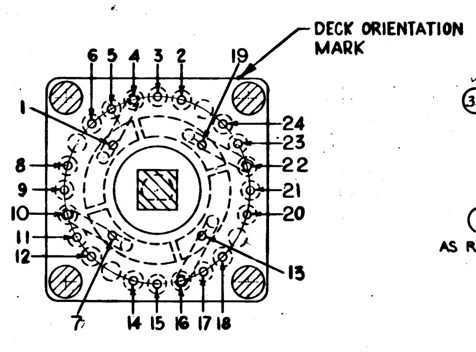
2900060 REV W SH 1

2/2900060

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 USING ITEMS (56) AND (54) OR (55).
3. THESE ITEMS ARE PART OF THIS ASSEMBLY.
4. DRAWINGS FOR REFERENCE: SCHEMATIC DIAGRAM ITEM (48) (011), ITEM (74) (021)
5. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (21) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMBERALS TO BE .06 HIGH.
6. VENDOR ITEM - SEE SOURCE OR SPECIFICATION CONTROL DRAWING.
7. PROCEDURE FOR CALIBRATING BRIDGES (PERFORM IN THE FOLLOWING SEQUENCE).
    a. AFTER COMPLETING CONTINUITY CHECKS, TURN ALL POTS FULLY CW (MAXIMUM RESISTANCE) EXCEPT R50, WHICH SHALL BE CCW. APPLY 28± 1 VDC TO J1-K (HI) AND J1-L (LO).
    b. INDICATING BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 2504.5 ± 0.1 OHMS ACROSS J4-G AND J4-T. JUMPER J4T TO J4-C WITH THE POWER SWITCH ON, ADJUST R18 AND R19 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.610 ± 1% VDC ACROSS R17 (TB2-52 AND TB2-45) AND 17.6 ± 1% VDC ACROSS R21 AND R22 (TB2-39 AND TB2-54).
    c. CONTROL BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 1560.0 ± 0.1 OHMS ACROSS J4-P AND J4-S. JUMPER J4-P TO J4-C. TURN TEMP ADJUST POT TO MIDRANGE (25 OHMS). WITH THE POWER SWITCH ON, ADJUST R33 AND R35 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.950 ± 1% VDC ACROSS R34 (TB2-56 AND TB2-47) AND 17.4 ± 1% VDC ACROSS R36, R38, AND R37 (TB2-42 AND TB2-12).TURN POWER SWITCH OFF.
    d. CHARGING VOLTAGE CUTOFF: DISCONNECT CONDUCTOR NO. A11 FROM BT1-(+) AND CONNECT TO VOLTMETER (HI). TURN POWER SWITCH ON. APPLY 36.8 ± 0.1% VDC AT TB2-19 (HI) AND TB2-55 (LO). SLOWLY TURN R16 CCW UNTIL VOLTAGE DROPS TO APPROXIMATELY 28 VDC ON CONDUCTOR NO. A11 AFTER DECREASING SUPPLY VOLTAGE TO APPROXIMATELY 30VDC, MOMENTARILY REMOVE AND REAPPLY. SLOWLY INCREASE SUPPLY VOLTAGE AND VERIFY THAT IT WILL REACH 36.8 ± 0.1 VDC BEFORE DROPPING TO APPROXIMATELY 28 VDC. TURN POWER SWITCH OFF. REMOVE BOTH DC VOLTAGES. RECONNECT CONDUCTOR NO. A11 TO BT1(+). APPLY 115 VAC POWER AT J2-M AND J2-J. TURN POWER SWITCH ON. A PLOT OF THE BATTERY VOLTAGE VS TIME WILL INDICATE TWO VOLTAGE PLATEAUS. VERIFY THAT THE CUTOFF VOLTAGE AT THE END OF THE SECOND PLATEAU IS 36.7 ± 0.3 VDC (COMPLETE BATTERY CHARGING REQUIRES 16-24 HOURS AND MAY BE INTERRUPTED IF NECESSARY)(021-BATTERY VOLTAGE SHALL BE MONITORED AT J1-H (HI) AND J1-J (LO)].
    e. OUTPUT VOLTAGE LIMIT: WITH A 9.0 ± 0.3 OHM LOAD AT J4-H AND J4-L, AND 1500 OHMS AT J4-P AND J4-S, APPLY 126.5 VAC 60 CPS AT J2-M AND J2-J. TURN POWER SWITCH ON. TURN R50 CW UNTIL OUTPUT VOLTAGE AT TP3 (HI) AND TP4 (LO) READS 32.5 VDC.
8. BOND ITEM 59 TO ITEM (1) USING ITEM (60).
9. CENTRALIZE ITEM (61) OR (76) ON FLAT SURFACE OF INNER LID. ORIENT RIGHT SIDE OF ITEM (61) OR (76) ADJACENT TO HINGE OF INNER LID.
10. INSPECT AND TEST: PER PS 2016129(021)
    PER PS 2900060(011)
11. MATING SURFACES OF ITEMS (1) AND (19) TO BE COATED WITH ITEM (62).
12. SELECT AS REQUIRED.
13. PIN CHART FOR POWER SWITCH (SEE SECTIONS G-G AND H-H)

WIPER PIN	CORRESPONDING CONTACT PINS
1	2,3,4,5,6,
7	8,9,10,11,12,
13	14,15,16,17,18,
19	20,21,22,23,24.


6 5 4 3 2
19
DECK ORIENTATION MARK
1
24
23
8
22
9
21
10
20
11
12
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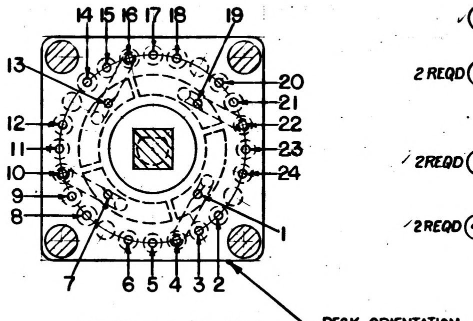
7
14 15 16 17 18

SECTION G-G
"A" DECK


14 15 16 17 18
19
13
20
21
12
22
11
23
10
24
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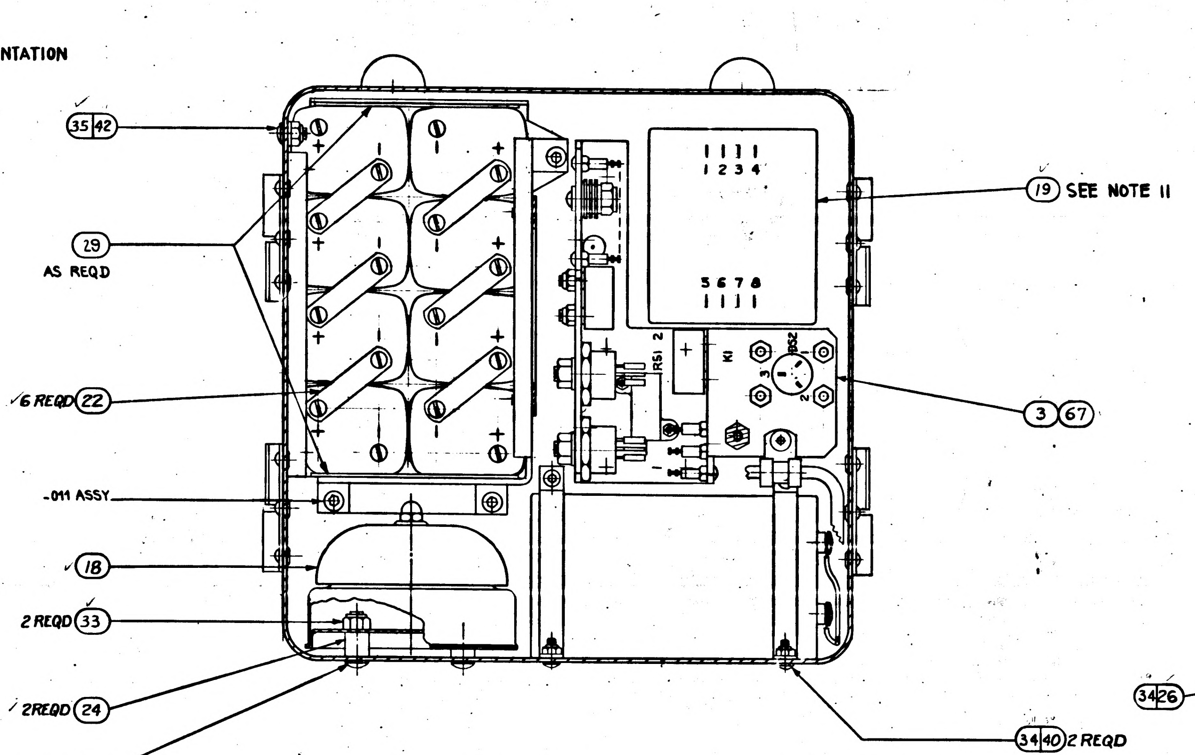
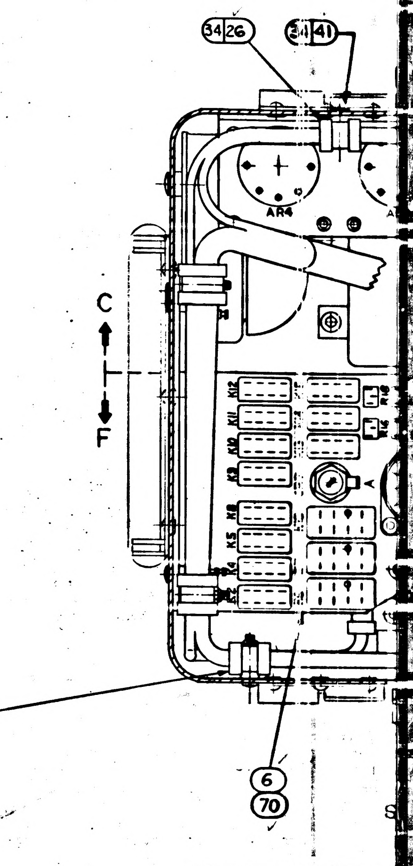
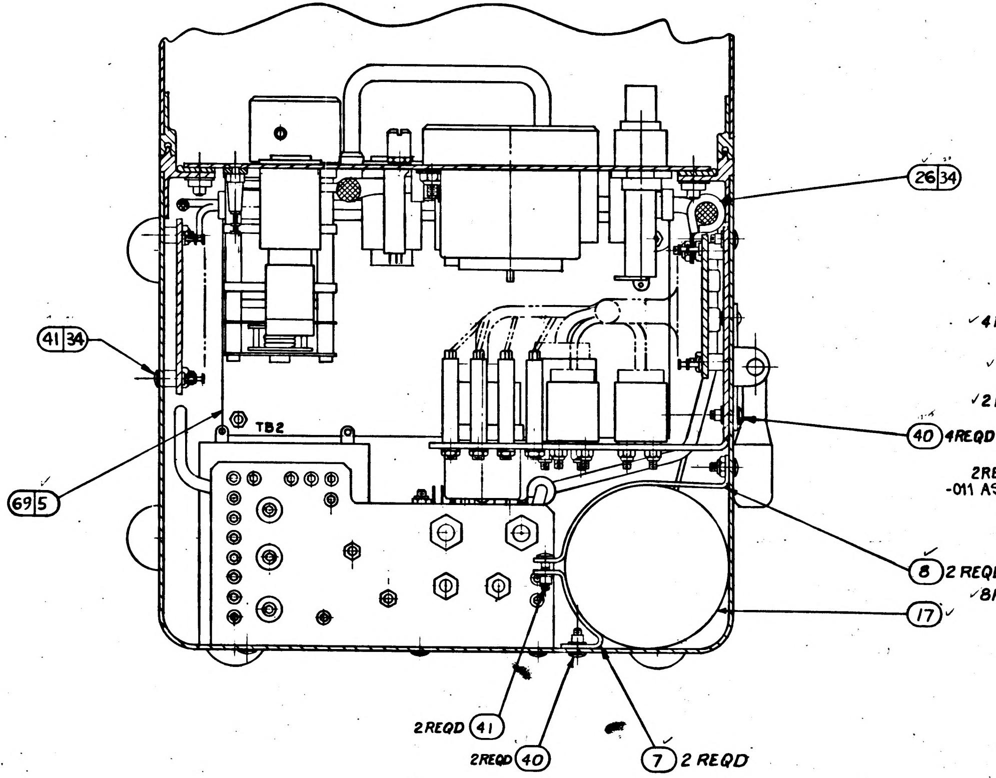
8
1
7
6 5 4 3 2
DECK ORIENTATION MARK

SECTION H-H
"B" DECK

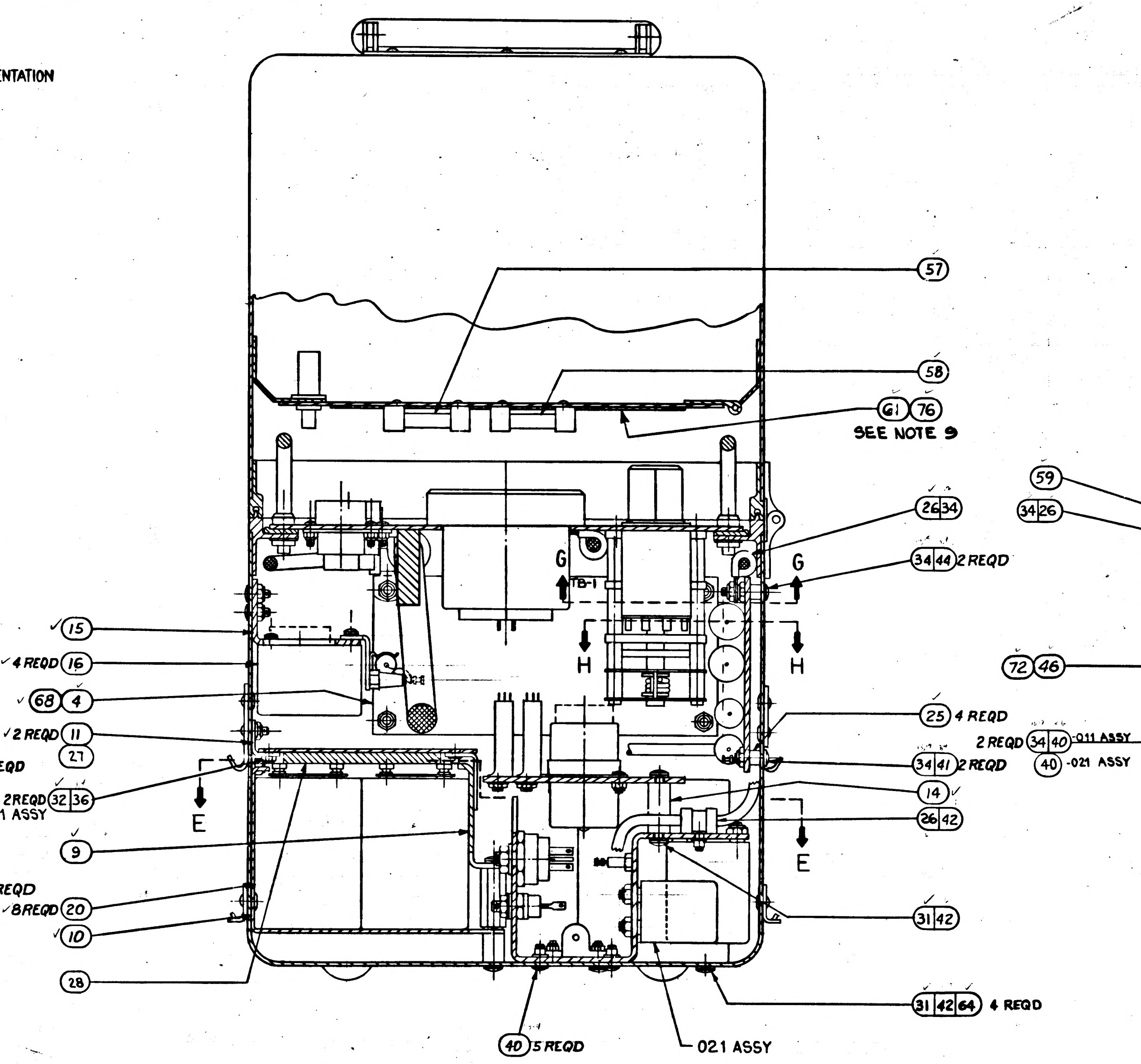

35 42
29
AS REQD
6 REQD 22
-011 ASSY
18
2 REQD 33
2 REQD 24
2 REQD 43
1 1 1 1
1 2 3 4
5 6 7 8
1 1 1 1
19 SEE NOTE 11
3 67
34 40 2 REQD

SECTION E-E

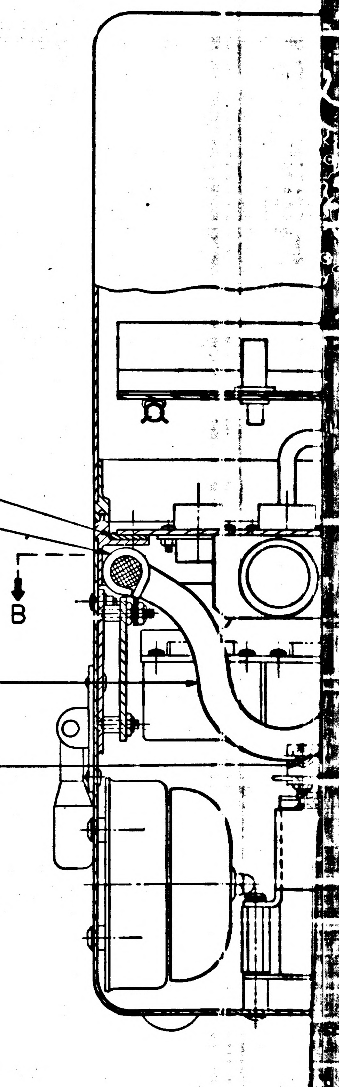

34 26
24 41
AR4
C
F
34 26
6
70


26 34
41 34
TB2
69 5
40 4 REQD
8 2 REQD
17
2 REQD 41
2 REQD 40
7 2 REQD

SECTION F-F
ROTATED 180°


57
58
61 76
SEE NOTE 9
26 34
G
TB-1
G
34 44 2 REQD
H
H
15
4 REQD 16
68 4
2 REQD 11
27
2 REQD 32 36
-011 ASSY
E
9
E
8 REQD 20
10
28
25 4 REQD
2 REQD 34 40 -011 ASSY
40 -021 ASSY
34 41 2 REQD
14
26 42
31 42
31 42 64 4 REQD
40 5 REQD
021 ASSY
59
34 26
72 46

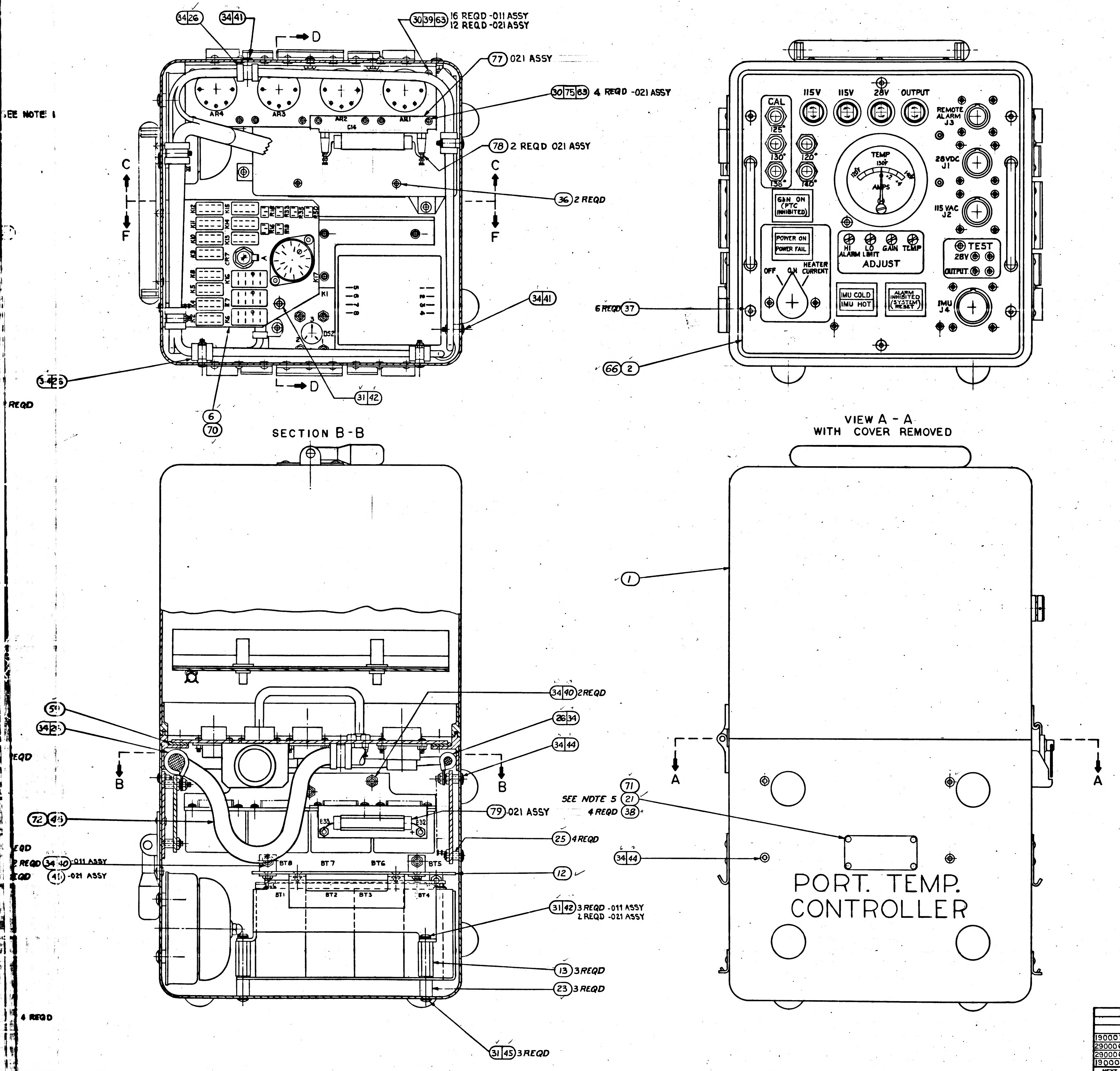
SECTION D-D
ROTATED 90° CCW



2900060	REV Y	SH 1

1/2900060

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
W		REPLACES REV "V" WITH CHANGE PER TDRR 32152		15 DEC 66	JIM
Y		REVISED PER TDRR 32734		27 JAN	JWE



SEE NOTE 1
34 26
34 41
30 39 63 16 REQD -011 ASSY
12 REQD -021 ASSY
D
77 021 ASSY
30 75 63 4 REQD -021 ASSY
AR4
AR3
AR2
AR1
C14
78 2 REQD 021 ASSY
C
F
36 2 REQD
K12
K11
K10
K9
K8
K5
K4
K2
K15
K14
K13
K16
K7
K6
K17
K1
CR7
A
R18
R33
R35
R30
R16
R19
DS2
5 6 7 8
1 2 3 4
34 41
34 25
REQD
6
70
31 42
CAL
125
130°
135°
120°
140°
115V
115V
28V
OUTPUT
REMOTE ALARM J3
28VDC J1
115 VAC J2
IMU J4
TEMP
130F
AMPS
GSN ON (PTC INHIBITED)
POWER ON
POWER FAIL
OFF
ON
HEATER CURRENT
HI
LO
ALARM LIMIT
GAIN
TEMP
ADJUST
IMU COLD
IMU HOT
ALARM INHIBITED (SYSTEM) (RESET)
TEST
28V
OUTPUT
6 REQD 37
66 2
1
A
B
59
34 25
REQD
72 46
EQD
2 REQD 34 40 -011 ASSY
EQD 41 -021 ASSY
4 REQD
34 40 2 REQD
26 34
34 44
71
SEE NOTE 5 21
4 REQD 38
79 -021 ASSY
E33
E32
25 4 REQD
34 44
BT8
BT7
BT6
BT5
BT1
BT2
BT3
BT4
12
31 42 3 REQD -011 ASSY
2 REQD -021 ASSY
13 3 REQD
23 3 REQD
31 45 3 REQD
PORT. TEMP. CONTROLLER

SECTION B-B

VIEW A-A
WITH COVER REMOVED

SECTION C-C

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			021	011				
			1			79	CL25BL700UP3(1897081-324)	CAPACITOR
SEE NOTE 6			2			78	1896962-004	TERMINAL STUD
			1			77	2901556	ELECTRONIC COMP BRACKET
			1			76	2901584	INSTRUCTION FOILCAL (PTC II)
SEE NOTE 6			4			75	1006783-95	SCREW, BUTTON HEAD
			X			74	2901543	SCHEMATIC DIAGRAM, ELEC
SEE NOTE 3			1			73	2901550	LEAD SET A-A
			1			72	2901546	WIRING HARNESS A
			1			71	1004260-535	NAMEPLATE
			1			70	2900777-021	RELAY ASSEMBLY
			1			69	2900778-021	ELECTRONIC COMPONENTS ASSY (TB2)
			1			68	2900513-021	ELECTRONIC COMPONENTS ASSY (TB1)
			1			67	2900521-021	ELECTRONIC COMPONENTS ASSY
			1			66	2900835-021	PANEL ASSY
						65		
			4	4		64	AN960-C8(1897006-028)	WASHER, FLAT
			16	16		63	AN960-C4(1897006-024)	WASHER, FLAT
			AR	AR		62	MIL-I-8660	SILICONE GREASE (ES 2311)
				1		61	2900957	INSTRUCTION FOILCAL (PTC II)
SEE NOTE 8			AR	AR		60	MIL-A-5092 TYPE 2	ADHESIVE (ES 2770-2)
SEE NOTE 8			1	1		59	2900742	GASKET PANEL
			1	1		58	F02A250V4AS(1897099-113)	FUSE, MIL-F-15160/02
			1	1		57	F02B125V2AS(1897099-129)	FUSE, MIL-F-15160/02
			AR	AR		56	MIL-F-14256 TYPE A OR W	FLUX, (ES 2798)
			AR	AR		55	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
			AR	AR		54	SN 60 WS	SOLDER QQ-S-571 (ES 2175-1)
SEE NOTE 3			1	1		53	2900862	CABLE INTERCONNECT-W 197
			1	1		52	2900861	W 196
			1	1		51	2900860	W 195
			1	1		50	2900859	W 194
SEE NOTE 3			1	1		49	2900856	CABLE INTERCONNECT-W 190
				X		48	2900133	SCHEMATIC DIAGRAM, ELEC
SEE NOTE 3				1		47	2900656	LEAD SET AA
				1		46	2900654	HARNESS A
SEE NOTE 6			3	3		45	1006783-105	SCREW, BUTTON HEAD
			3	3		44	1006783-104	
			2	2		43	1006783-047	
			10	11		42	1006783-26	
			8	8		41	1006783-23	
			17	17		40	1006783-22	
			12	16		39	1006783-18	
			4	4		38	1006783-9	SCREW, BUTTON HEAD
			6	6		37	1010630-38	SCREW, FLAT HEAD
			2	4		36	1010630-13	SCREW, FLAT HEAD
			1	1		35	1012525-006	NUT, SELF LOCKING
			19	21		34	1012525-004	
			2	2		33	1016151-010	
SEE NOTE 6			-	2		32	1016151-004	NUT, SELF LOCKING
			11	12		31	MS35338-80	WASHER, LOCK
			16	16		30	MS35338-78	WASHER, LOCK
			2	-		29	2901588-002	PAD, CUSHIONING
			1	-		28	2901588-001	PAD, CUSHIONING
			2	-		27	2901587	BRACKET, BATT RETAINER COVER
SEE NOTE 12			7	7		26	MS21919D63THRU9(1897073-103THRU-109)	CLAMP, CUSHIONED
SEE NOTE 6			8	8		25	1015860-026	SPACER
			2	2		24	1015860-017	SPACER
SEE NOTE 6			3	3		23	1015860-008	SPACER
			6	6		22	2900796	LINK, BATTERY TERMINAL
				1		21	1004260-141	NAMEPLATE
SEE NOTE 6			8	8		20	1897268-001	BATTERY
			1	1		19	1897410	TRANSFORMER, POWER
SEE NOTE 6			1	1		18	2900520	BELL, ASSEMBLY
			1	1		17	CE71C562G(1896872-119)	CAPACITOR, MIL-C-62/12
SEE NOTE 16			4	4		16	1897261	COMPARATOR
			1	1		15	2900795	BRACKET, ELECTRONIC COMPONENTS
			1	1		14	2900512-001	NUT SLEEVE
			3	3		13	2900512-000	NUT SLEEVE
			1	1		12	2900511	COVER, BATTERY RETAINER
			-	2		11	2900510	BRACKET, ANGLE
			1	1		10	2900509	TRAY, BATTERY
			1	1		9	2900508	RETAINER, BATTERY (INSEP ASSY)
			2	2		8	2900507	STRAP, RETAINING
			2	2		7	2900506	STRAP, RETAINING (INSEP ASSY)
				1		6	2900777-011	RELAY ASSEMBLY
				1		5	2900778-011	ELECTRONIC COMPONENTS ASSY(TB2)
				1		4	2900513-011	ELECTRONIC COMPONENTS ASSY(TB1)
				1		3	2900521-011	ELECTRONIC COMPONENT ASSY
				1		2	2900835-011	PANEL ASSEMBLY
			1	1		1	2900525-011	CASE PORT. TEMP. CONTROLLER

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030	1900030	-021
2900063-021	1900030	-021
2900063-011	1900030	-011
1900030	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.
DRAWN COOKMAN DATE 3 AUG 65
CHECKED J. STELMA 7 AUG 65
APPROVAL D. TECHABOLD 9 AUG 65
APPROVAL L. Gedeman
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CONTROLLER, TEMPERATURE, PORTABLE

CODE IDENT NO. 99974
SIZE J2
2900060
SCALE FULL
SHEET 1 OF 1

Charleston
7 OCT 65

2900060 REV Y SH 1

27 2900060

2900060

NOTES:

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2. SOLDER PER MIL-S-6872 USING ITEMS (56) AND (54) OR (55).
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5. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (21) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
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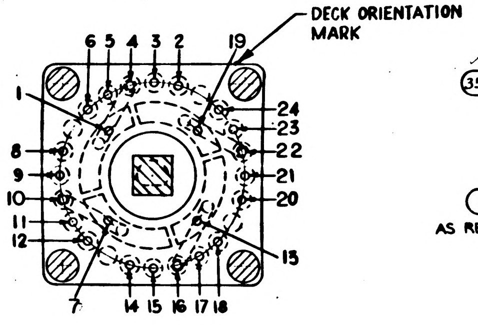
   a. AFTER COMPLETING CONTINUITY CHECKS, TURN ALL POTS FULLY CW (MAXIMUM RESISTANCE) EXCEPT R50, WHICH SHALL BE CCW. APPLY 28± 1 VDC TO J1-K (HI) AND J1-L (LO).
   b. INDICATING BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 2504.5 ± 0.1 OHMS ACROSS J4-G AND J4-T. JUMPER J4T TO J4-C WITH THE POWER SWITCH ON, ADJUST R18 AND R19 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.610 ± 1% VDC ACROSS R17 (TB2-52 AND TB2-45) AND 17.6 ± 1% VDC ACROSS R21 AND R22 (TB2-39 AND TB2-54).
   c. CONTROL BRIDGE: CONNECT AN EXTERNAL RESISTOR OF 1560.0 ± 0.1 OHMS ACROSS J4-P AND J4-S. JUMPER J4-P TO J4-C. TURN TEMP ADJUST POT TO MIDRANGE (25 OHMS). WITH THE POWER SWITCH ON, ADJUST R33 AND R35 CCW UNTIL THE FOLLOWING SIMULTANEOUS VOLTAGE READINGS OCCUR: 1.950 ± 1% VDC ACROSS R34 (TB2-56 AND TB2-47) AND 17.4 ± 1% VDC ACROSS R36, R38, AND R37 (TB2-42 AND TB2-12).TURN POWER SWITCH OFF.
   d. CHARGING VOLTAGE CUTOFF: DISCONNECT CONDUCTOR NO. A11 FROM BT1-(+) AND CONNECT TO VOLTMETER (HI). TURN POWER SWITCH ON. APPLY 36.8 ± 0.1% VDC AT TB2-19 (HI) AND TB2-55 (LO). SLOWLY TURN R16 CCW UNTIL VOLTAGE DROPS TO APPROXIMATELY 28 VDC ON CONDUCTOR NO. A11 AFTER DECREASING SUPPLY VOLTAGE TO APPROXIMATELY 30VDC, MOMENTARILY REMOVE AND REAPPLY. SLOWLY INCREASE SUPPLY VOLTAGE AND VERIFY THAT IT WILL REACH 36.8 ± 0.1 VDC BEFORE DROPPING TO APPROXIMATELY 28 VDC. TURN POWER SWITCH OFF. REMOVE BOTH DC VOLTAGES. RECONNECT CONDUCTOR NO. A11 TO BT1(+). APPLY 115 VAC POWER AT J2-M AND J2-J. TURN POWER SWITCH ON. A PLOT OF THE BATTERY VOLTAGE VS TIME WILL INDICATE TWO VOLTAGE PLATEAUS. VERIFY THAT THE CUTOFF VOLTAGE AT THE END OF THE SECOND PLATEAU IS 36.7 ± 0.3 VDC (COMPLETE BATTERY CHARGING REQUIRES 16-24 HOURS AND MAY BE INTERRUPTED IF NECESSARY)(021-BATTERY VOLTAGE SHALL BE MONITORED AT J1-H (HI) AND J1-J (LO)].
   e. OUTPUT VOLTAGE LIMIT: WITH A 9.0 ± 0.3 OHM LOAD AT J4-H AND J4-L, AND 1500 OHMS AT J4-P AND J4-S, APPLY 126.5 VAC 60 CPS AT J2-M AND J2-J. TURN POWER SWITCH ON. TURN R50 CW UNTIL OUTPUT VOLTAGE AT TP3 (HI) AND TP4 (LO) READS 32.5 VDC.
8. BOND ITEM 59 TO ITEM (1) USING ITEM (60).
9. CENTRALIZE ITEM (61) OR (76) ON FLAT SURFACE OF INNER LID. ORIENT RIGHT SIDE OF ITEM (61) OR (76) ADJACENT TO HINGE OF INNER LID.
10. INSPECT AND TEST: PER PS 2016129(021)
    PER PS 2900060(011)
11. MATING SURFACES OF ITEMS (1) AND (19) TO BE COATED WITH ITEM (62).
12. SELECT AS REQUIRED.
13. PIN CHART FOR POWER SWITCH (SEE SECTIONS G-G AND H-H)

WIPER PIN	CORRESPONDING CONTACT PINS
1	2,3,4,5,6,
7	8,9,10,11,12,
13	14,15,16,17,18,
19	20,21,22,23,24.


DECK ORIENTATION MARK
6 5 4 3 2
19
1
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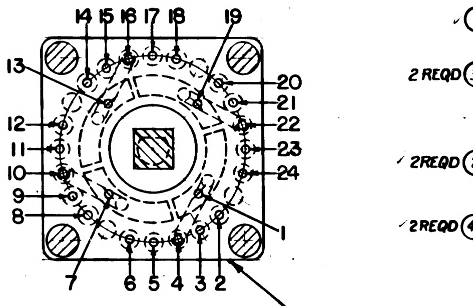
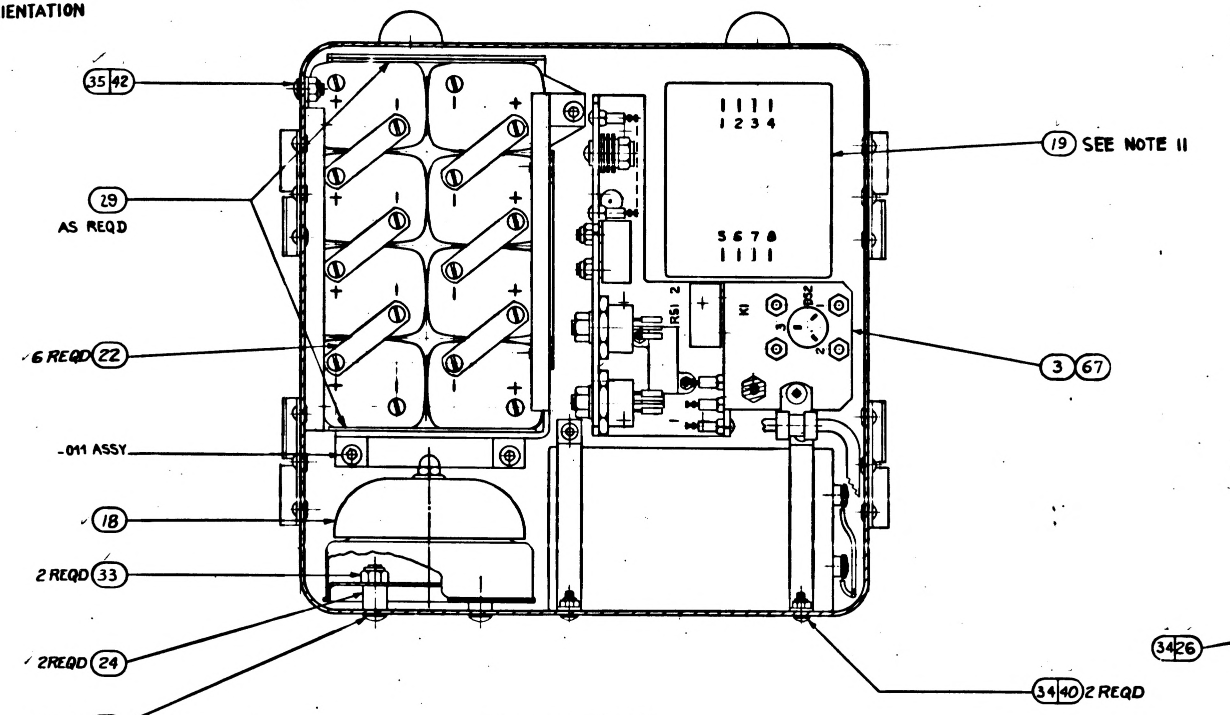
14 15 16 17 18

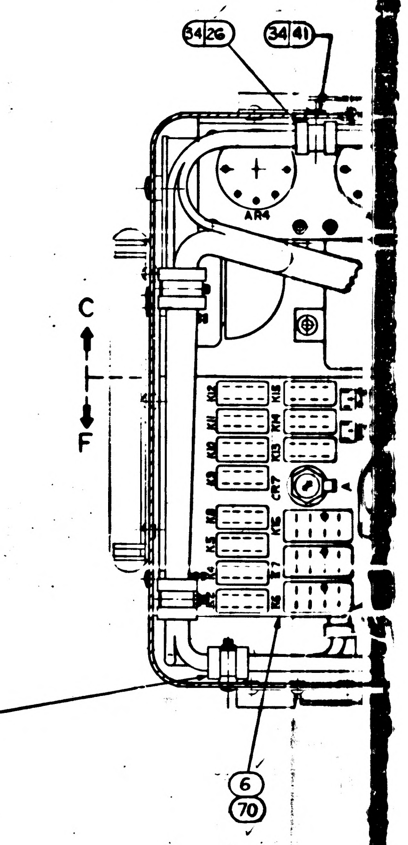
SECTION G-G
"A" DECK

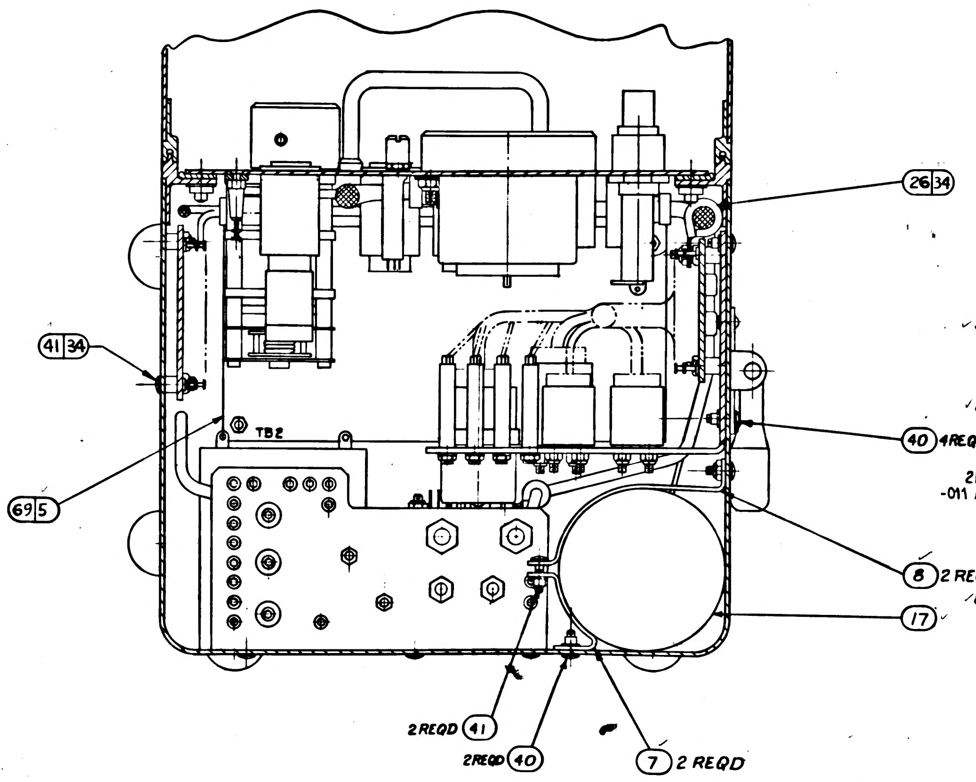

14 15 16 17 18
19
13
12
11
10
9
8
20
21
22
23
24
1
7
6 5 4 3 2
DECK ORIENTATION MARK

SECTION H-H
"B" DECK

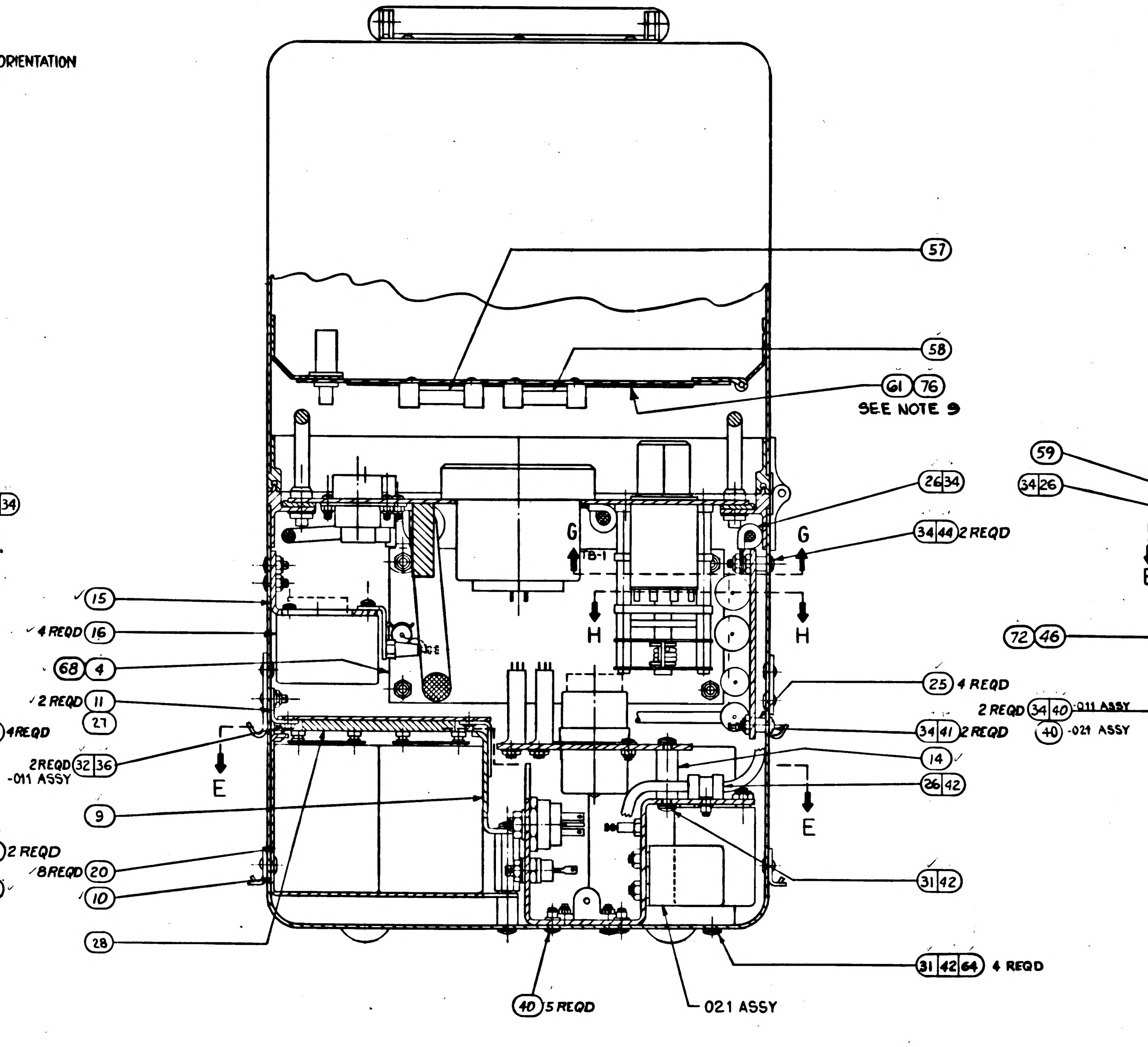

35 42
29
AS REQD
6 REQD 22
-011 ASSY
18
2 REQD 33
2 REQD 24
2 REQD 43
19 SEE NOTE 11
1 1 1 1
1 2 3 4
5 6 7 8
3 67
34 40 2 REQD
34 26

SECTION E-E

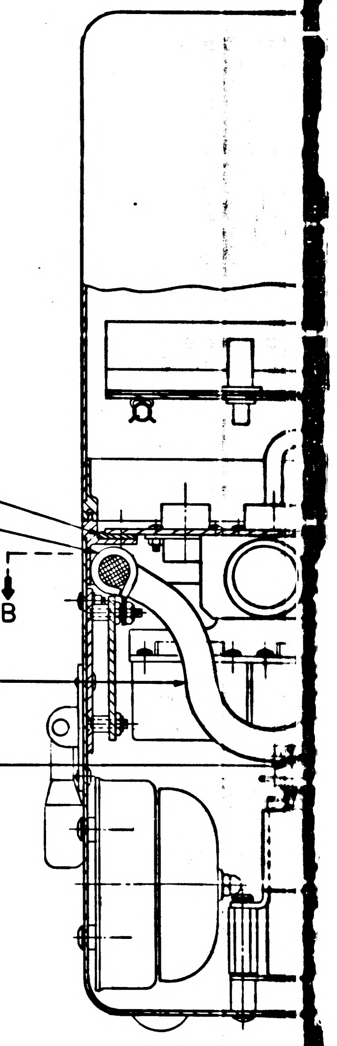

34 26
34 41
AR4
C
F
6
70


26 34
41 34
TB2
40 4 REQD
69 5
8 2 REQD
17
2 REQD 41
2 REQD 40
7 2 REQD

SECTION F-F
ROTATED 180°


57
58
61 76
SEE NOTE 9
26 34
34 44 2 REQD
G
TB-1
H
15
4 REQD 16
68 4
2 REQD 11
27
2 REQD 32 36
-011 ASSY
E
9
8 REQD 20
10
28
25 4 REQD
2 REQD 34 40 -011 ASSY
40 -021 ASSY
34 41 2 REQD
14
26 42
31 42
31 42 64 4 REQD
40 5 REQD
021 ASSY
59
34 26
72 46

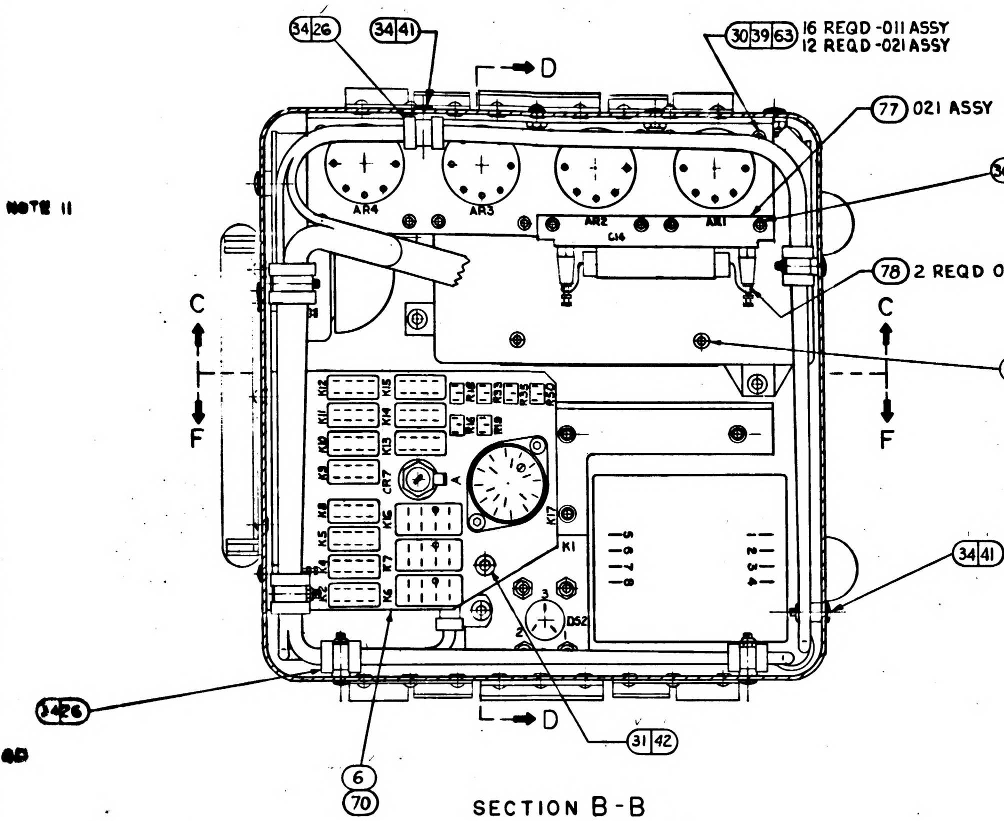
SECTION D-D
ROTATED 90° CCW



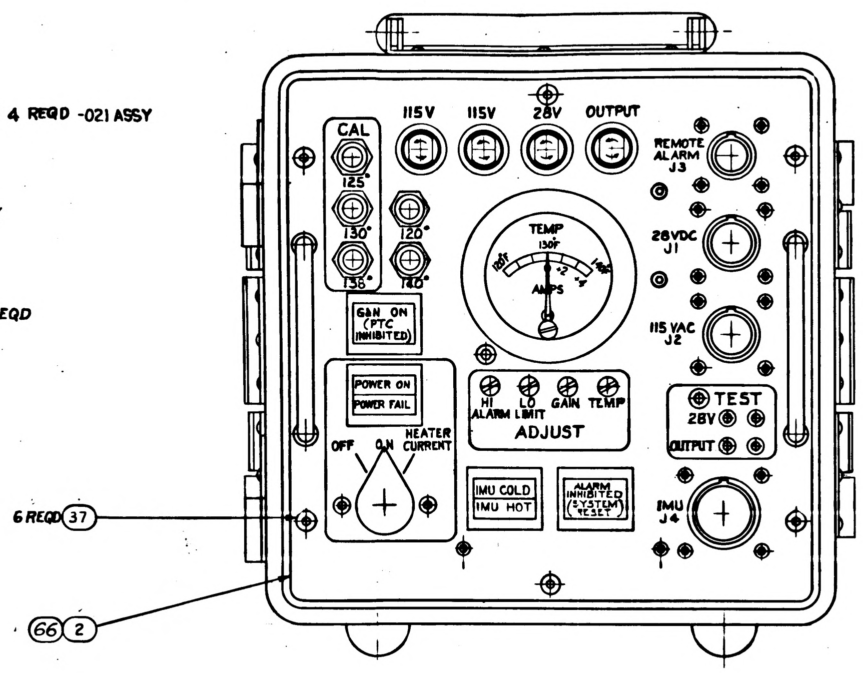
2900060	REV Z	SH 1

1/2900060

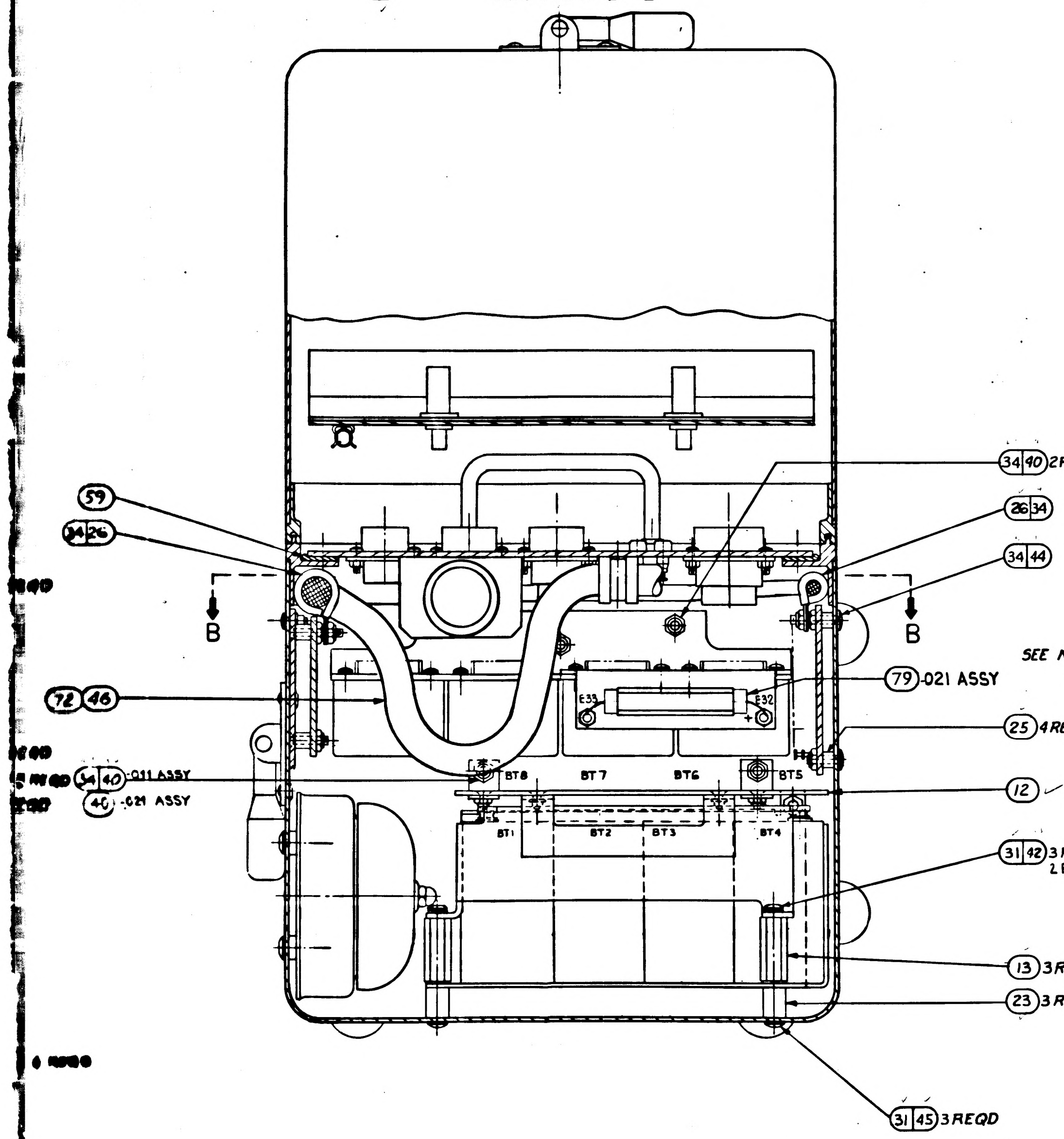
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
W		REPLACES REV "V" WITH CHANGE PER TDRR 32152		5 DEC 66	JIM
Y		REVISED PER TDRR 32734		5 JAN 67	JWE
Z		REVISED PER TDRR 33647		26 APR 67	ME


34 26
34 41
30 39 63 16 REQD -011 ASSY
12 REQD -021 ASSY
77 021 ASSY
30 75 63 4 REQD -021 ASSY
78 2 REQD 021 ASSY
36 2 REQD
34 41
34 26
6
70
31 42
C
F
C
F
D
D
AR4
AR3
AR2
AR1
C14
K1
K5
K6
K7
K8
K9
K10
K11
K12
K13
K14
K15
K16
K17
CR7
DS2

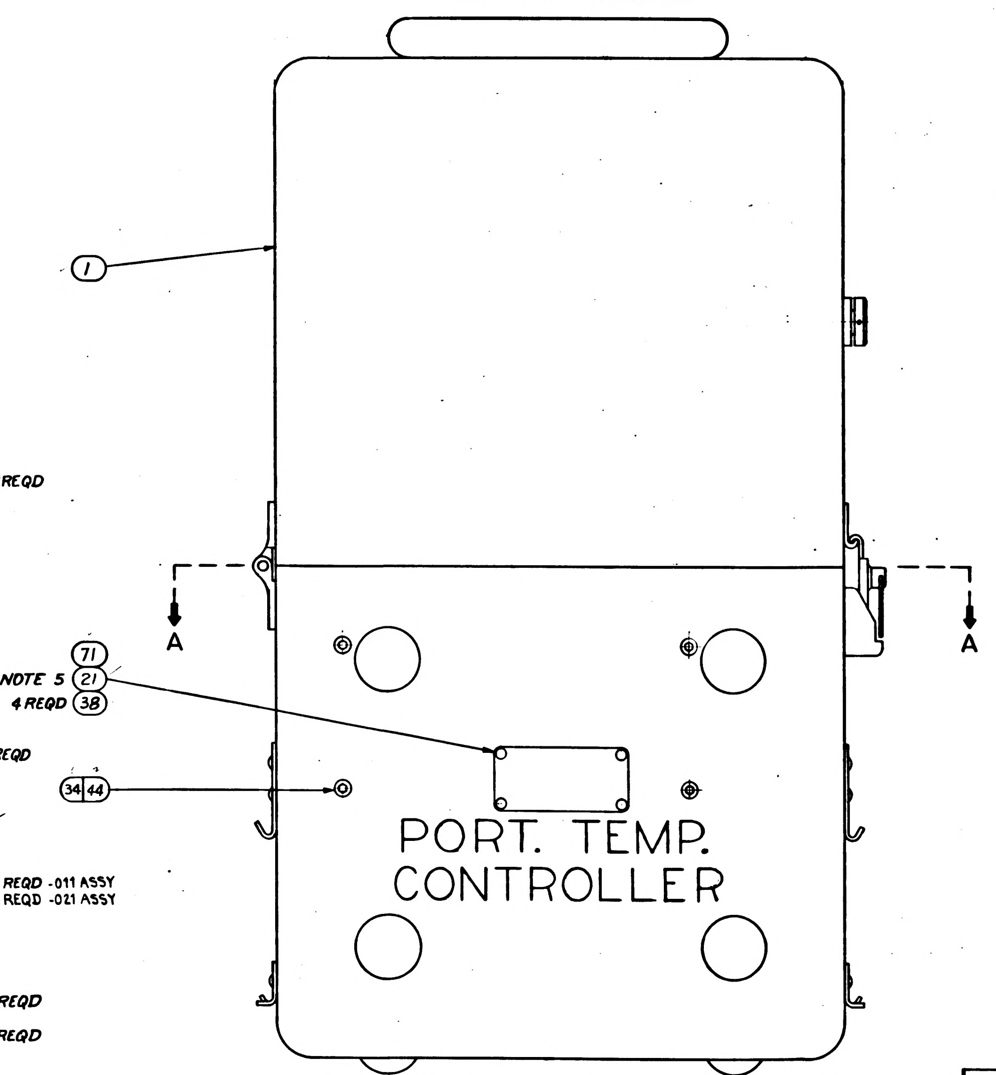
SECTION B-B


CAL
125°
130°
135°
115V
115V
28V
OUTPUT
120°
140°
GAIN ON (PTC INHIBITED)
POWER ON
POWER FAIL
OFF
ON
HEATER CURRENT
TEMP
AMPS
HI
LO
ALARM LIMIT
GAIN
TEMP
ADJUST
IMU COLD
IMU HOT
ALARM INHIBITED (SYSTEM TEST)
REMOTE ALARM J3
28VDC J1
115 VAC J2
TEST
28V
OUTPUT
IMU J4
6 REQD 37
66 2

VIEW A - A
WITH COVER REMOVED


59
34 26
72 46
34 40 -011 ASSY
40 -021 ASSY
34 40 2REQD
26 34
34 44
79 -021 ASSY
25 4REQD
12
31 42 3 REQD -011 ASSY
2 REQD -021 ASSY
13 3REQD
23 3REQD
31 45 3REQD
B
B
E33
E32
BT1
BT2
BT3
BT4
BT5
BT6
BT7
BT8

SECTION C-C


1
71
SEE NOTE 5 21
4 REQD 38
34 44
A
A
PORT. TEMP.
CONTROLLER

			021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			1			79	CL25BL700UP3(1897081-324)	CAPACITOR
SEE NOTE 6			2			78	1896962-004	TERMINAL STUD
			1			77	2901556	ELECTRONIC COMP BRACKET
			1			76	2901584	INSTRUCTION FOILCAL (PTC II)
SEE NOTE 6			4			75	1006783-95	SCREW, BUTTON HEAD
			X			74	2901543	SCHEMATIC DIAGRAM, ELEC
SEE NOTE 3			1			73	2901550	LEAD SET A-A
			1			72	2901546	WIRING HARNESS A
			1			71	1004260-535	NAMEPLATE
			1			70	2900777-021	RELAY ASSEMBLY
			1			69	2900778-021	ELECTRONIC COMPONENTS ASSY (TB2)
			1			68	2900513-021	ELECTRONIC COMPONENTS ASSY (TB1)
			1			67	2900521-021	ELECTRONIC COMPONENTS ASSY
			1			66	2900835-021	PANEL ASSY
						65		
			4	4		64	AN960-C8(1897006-028)	WASHER, FLAT
			16	16		63	AN960-C4(1897006-024)	WASHER, FLAT
			AR	AR		62	MIL-I-8660	SILICONE GREASE (ES 2311)
				1		61	2900957	INSTRUCTION FOILCAL (PTC II)
SEE NOTE 8			AR	AR		60	MIL-A-5092 TYPE 2	ADHESIVE (ES 2770-2)
SEE NOTE 8			1	1		59	2900742	GASKET PANEL
			1	1		58	F02A250V4AS(1897099-113)	FUSE, MIL-F-15160/02
			1	1		57	F028125V2AS(1897099-129)	FUSE, MIL-F-15160/02
			AR	AR		56	MIL-F-14256 TYPE A OR W	FLUX, (ES 2798)
			AR	AR		55	SN 60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
			AR	AR		54	SN 60 WS	SOLDER QQ-S-571 (ES 2175-1)
SEE NOTE 3			1	1		53	2900862	CABLE INTERCONNECT-W 197
			1	1		52	2900861	W 196
			1	1		51	2900860	W 195
			1	1		50	2900859	W 194
SEE NOTE 3			1	1		49	2900856	CABLE INTERCONNECT-W 190
				X		48	2900133	SCHEMATIC DIAGRAM, ELEC
SEE NOTE 3				1		47	2900656	LEAD SET AA
				1		46	2900654	HARNESS A
SEE NOTE 6			3	3		45	1006783-105	SCREW, BUTTON HEAD
			3	3		44	1006783-104	
			2	2		43	1006783-047	
			10	11		42	1006783-26	
			8	8		41	1006783-23	
			17	17		40	1006783-22	
			12	16		39	1006783-18	
			4	4		38	1006783-9	SCREW, BUTTON HEAD
			6	6		37	1010630-38	SCREW, FLAT HEAD
			2	4		36	1010630-13	SCREW, FLAT HEAD
			1	1		35	1012525-006	NUT, SELF LOCKING
			19	21		34	1012525-004	
			2	2		33	1016151-010	
SEE NOTE 6			-	2		32	1016151-004	NUT, SELF LOCKING
			11	12		31	MS35338-80	WASHER, LOCK
			16	16		30	MS35338-78	WASHER, LOCK
			2	-		29	2901588-002	PAD, CUSHIONING
			1	-		28	2901588-001	PAD, CUSHIONING
			2	-		27	2901587	BRACKET, BATT RETAINER COVER
SEE NOTE 12			7	7		26	MS21919D63THRU9(1897073-103THRU-109)	CLAMP, CUSHIONED
SEE NOTE 6			8	8		25	1015860-026	SPACER
			2	2		24	1015860-017	SPACER
SEE NOTE 6			3	3		23	1015860-008	SPACER
			6	6		22	2900796	LINK, BATTERY TERMINAL
				1		21	1004260-141	NAMEPLATE
SEE NOTE 6			8	8		20	1897268-002	BATTERY
			1	1		19	1897410	TRANSFORMER, POWER
SEE NOTE 6			1	1		18	2900520	BELL, ASSEMBLY
			1	1		17	CE71C5626(1896872-119)	CAPACITOR, MIL-C-62/12
SEE NOTE 16			4	4		16	1897261	COMPARATOR
			1	1		15	2900795	BRACKET, ELECTRONIC COMPONENTS
			1	1		14	2900512-001	NUT SLEEVE
			3	3		13	2900512-000	NUT SLEEVE
			1	1		12	2900511	COVER, BATTERY RETAINER
			-	2		11	2900510	BRACKET, ANGLE
			1	1		10	2900509	TRAY, BATTERY
			1	1		9	2900508	RETAINER, BATTERY (INSEP ASSY)
			2	2		8	2900507	STRAP, RETAINING
			2	2		7	2900506	STRAP, RETAINING (INSEP ASSY)
				1		6	2900777-011	RELAY ASSEMBLY
				1		5	2900778-011	ELECTRONIC COMPONENTS ASSY(TB2)
				1		4	2900513-011	ELECTRONIC COMPONENTS ASSY(TB1)
				1		3	2900521-011	ELECTRONIC COMPONENT ASSY
				1		2	2900835-011	PANEL ASSEMBLY
			1	1		1	2900525-011	CASE PORT. TEMP. CONTROLLER
			QUANTITY REQUIRED				LIST OF PARTS AND MATERIALS	

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030	1900030	-021
2900063-021	1900030	-021
2900063-011	1900030	-011
1900030	1900030	-011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN COOKMAN DATE 3 AUG 65
CHECKED J. STELMA 7 AUG 65
APPROVAL D. TECHARDLD 9 AUG 65
APPROVAL L Gehman 9/2/65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CONTROLLER,
TEMPERATURE, PORTABLE

CODE IDENT NO. 99974
SIZE J2
2900060
SCALE FULL
SHEET 1 OF 1

Charleston
7 OCT 65

	REV	SH
2900060	Z	1

27 2900060

APOLLO G&N Specification
PS2900060 REV—
Original Issue Date:
Release Authority: TDRR 25594
Class A Release
CODE IDENT NO. 99974

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

CONTROLLER, TEMPERATURE, PORTABLE

DRAWING NO. 2900060

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA

This specification consists of page 1 to 19 inclusive.

APPROVALS	C. METZGER NASA/MSC	1-21-66 CO J. M. Walton	1-25-66 MIT/IL	12-10-65 ACSP 1/30

b. With the 125° CAL switch depressed and held, meter M3 shall indicate full power output. The CAL switch shall be released and the system reset by depressing the ALARM INHIBITED (SYSTEM RESET) switch.

c. With the 60 cps input voltage increased to 126.5 vac and the 125° CAL switch depressed and held, the output voltage indicated by meter M3 shall be 32.5 vdc maximum.

4.3.8 PTC Interlock. The PTC interlock test shall be performed as follows:

a. Resistor R1 shall be adjusted for full power output as indicated on meters M3 and M6.

b. With 25.2 vdc applied to J4-A (Hi) and J4-B (Lo), meters M3 and M6 shall indicate zero power output, the G&N ON (PTC INHIBITED) lamp shall illuminate, continuity shall exist between J3-C and J3-B, and continuity shall not exist between J3-J and J4-C.

c. With the 115 vac input removed, the POWER FAIL lamp shall illuminate and the alarm bell shall ring. With the 115 vac input reapplied, the POWER FAIL lamp shall extinguish and the alarm bell shall cease ringing.

d. With the 25.2 vdc input removed from pins J4-A and J4-B, the output power shall be restored as indicated by meters M3 and M6, and continuity shall exist between J3-J and J4-C.

4.3.9 Indicating Bridge Failure. With the control power at approximately the half power level, E7 or TB1-58 jumpered to test point TP4, the IMU HOT and IMU COLD lamps shall be flashing, the alarm bell shall be ringing, and control shall be restored to the same level. With the jumper removed, the system shall be reset by depressing the ALARM INHIBITED (SYSTEM RESET) switch.

4.3.10 Output Cable Separation. With all leads removed from J4, the IMU COLD lamp shall flash and the alarm bell shall ring. The leads on J4 shall be replaced and the system reset by depressing the ALARM INHIBITED (SYSTEM RESET) switch.

4.3.11 Efficiency. With the 60 cps input power removed, switch S2 opened, the dc source adjusted to 28 vdc, resistor R1 adjusted for full output as indicated by meters M3 and M6, the proportion of output power (M3 reading X M6 reading) to input power (M1 reading X M5 reading) shall be 80 percent or greater. R1 shall be adjusted to the half power output level.

4.3.12 Remote Temperature Reset

4.3.12.1 Remote Temperature Reset (Cold). The remote temperature reset (cold) test shall be performed as follows:

a. With the 125° CAL switch depressed and held, meters M3 and M6 shall indicate full output power, the IMU COLD lamp shall be flashing and the alarm bell shall be ringing.

b. With J3-E jumpered to J3-J, full power output shall continue to be indicated by meters M3 and M6, the IMU COLD lamp shall be extinguished and the alarm bell shall cease ringing.

c. With the jumper between J3-E and J3-J removed, full power output shall continue to be indicated by meters M3 and M6, the IMU COLD lamp shall be flashing and the alarm bell shall be ringing.

d. With the 125° CAL switch released and J3-E jumpered momentarily to J3-J, meters M3 and M6 shall indicate half power output, the IMU COLD lamp shall be extinguished and the alarm bell shall cease ringing.

4.3.12.2 Remote Temperature Reset (Hot). The remote temperature reset (hot) test shall be performed as follows:

a. With the 135° CAL switch depressed and held, meters M3 and M6 shall indicate zero power output, the IMU HOT lamp shall be flashing and the alarm bell shall be ringing.

b. With J3-E jumpered to J3-J, meters M3 and M6 shall continue to indicate zero power output, the IMU HOT lamp shall be extinguished and the alarm bell shall cease ringing.

c. With the jumper between J3-E and J3-J removed, the indications specified in 4.3.12.2.a. shall appear.

d. With the 135° CAL switch released, and J3-E jumpered momentarily to J3-J, meters M3 and M6 shall indicate half power output, the IMU HOT lamp shall be extinguished and the alarm bell shall cease ringing.

4.3.13 Alternate Control Sensor. With the POWER SWITCH in the "OFF" position, the lead from J4-P removed and connected to J4-K, resistor R1 set to 742 ohms and the POWER SWITCH placed in the "ON" position, the TEMP ADJUST control shall vary the power output from zero to full output when rotated. This test shall be repeated with R1 set to 760 ohms.

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES. None.

C 2900063

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		REDRAWN - NO CHANGE		2-SEP 65	A.J.F.
B		REVISED PER MXC 205552		9 OCT 65	A.N. EF
C		UPGRADED TO CLASS A PER TDRR 25325	—	7 DEC 65	J J J

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

CONFIGURATION INCOMPLETE

QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			011				
			1			2900812-011	LIFTING BATTERY PACK
			1			2900060-011	PORTABLE TEMPERATURE CONTROLLER

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030		

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.
DRAWN DATE 30 MAR 65
CHECKED Ed Foster 30 MAR 65
APPROVAL 1 APR 65
APPROVAL 1-13-66
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CONTROLLER, TEMPERATURE, IMU LIFTING

CODE IDENT NO. 99974
SIZE D
2900063
SCALE —
SHEET 1 OF 1

MIL 10780-F

D 2900063

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REDRAWN - NO CHANGE		2-SEP 65	A.J.F.
B		REVISED PER MXC 205552		9 OCT 65	A.N.
C		UPGRADED TO CLASS A PER TDRR 25325	—	7 DEC 65	
D		REVISED PER TDRR 25567		8 FEB 66	RLP CP

QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
X			2900982	INSTALLATION DRAWING, ILTC
1			2900812-011	LIFTING BATTERY PACK
1			2900060-011	PORTABLE TEMPERATURE CONTROLLER

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
	1900030	011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN B. Olson DATE 30 MAR 65
CHECKED Ed Foster 30 MAR 65
APPROVAL J.E. Hams 1 APR. 65
APPROVAL 1-13-66
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CONTROLLER, TEMPERATURE, IMU LIFTING

CODE IDENT NO 99974
SIZE D
2900063
SCALE —
SHEET 1 OF 1

MIL 10780-F

2900063 E

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. INSPECT AND TEST PER PS 2900063.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REDRAWN - NO CHANGE		2-SEP 65	A.J.F. / A.J.K.
B		REVISED PER MXC 205552		9 OCT 65	A.N. / E.F.
C		UPGRADED TO CLASS A PER TDRR 25325	—	7 DEC 65	J.J.
D		REVISED PER TDRR 25567		8 FEB 66	RLP / CP
E		REVISED PER TDRR 27546		6 APR 66	N.G. / E.F.

QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
X			2900982	INSTALLATION DRAWING, ILTC
1			2900812-011	LIFTING BATTERY PACK
1			2900060-011	PORTABLE TEMPERATURE CONTROLLER

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
	1900030	011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± __ DECIMALS ± __ ANGLES ± __

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS

DRAWN C. Ohlson DATE 30 MAR 65
CHECKED Ed Foster 30 MAR 65
APPROVAL L.E. Harms 1 APR. 65
APPROVAL 1-13-66
NASA APPROVAL MELTZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CONTROLLER, TEMPERATURE, LIFTING

CODE IDENT NO. 99974
SIZE D
2900063

SCALE —
SHEET 1 OF 1

MIL 10780-F

F 2900063

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. INSPECT AND TEST PER PS 2900063-011
PER PS 2016128-021

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		REDRAWN - NO CHANGE		2-SEP 65	A.J.F.
B		REVISED PER MXC 205552		9 OCT 65	A.N. EF
C		UPGRADED TO CLASS A PER TDRR 25325	—	7 DEC 65	J J J
D		REVISED PER TDRR 25567		8 FEB 66	RLP CP
E		REVISED PER TDRR 27546		6 APR 66	N.G EF
F		REVISED PER TDRR 32141		5 DEC 66	TD

LIST OF PARTS AND MATERIALS

QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
		021	011				
		1	-			2900812-021	LIFTING BATTERY PACK
		1	-			2900060-021	PORTABLE TEMPERATURE CONTROLLER
		X	X			2900982	INSTALLATION DRAWING, LTC
		—	1			2900812-011	LIFTING BATTERY PACK
		—	1			2900060-011	PORTABLE TEMPERATURE CONTROLLER

NEXT ASSY	USED ON	APPLICABLE DASH NO.
	1900030	021
	1900030	011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — − DECIMALS + — − ANGLES + — −
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.
DRAWN B.Wilson DATE 30 MAR 65
CHECKED Ed Foster 30 MAR 65
APPROVAL E.E. Hawes 1 APR. 65
APPROVAL 1-13-66
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CONTROLLER, TEMPERATURE, LIFTING

CODE IDENT NO. 99974
SIZE D
2900063
SCALE —
SHEET 1 OF 1

2900065 F

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		REVISED PER MXC 206094		19 OCT 65	J.H.P. CP
B		REVISED PER MXC 206512		3 NOV 65	RLP
C		REVISED PER MXC 206938		17 NOV 65	RLP
D		REVISED PER MXC 207157		30 NOV 65	
E		REVISED PER MXC 207900		28 DEC 65	MEM
F		INITIAL RELEASE CLASS A PER TDRR 25565		29 DEC 65	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

COVER P/N	FOR USE ON	
	CONNECTOR P/N	REFERENCE DESIGNATION
MS 3180-8	1010929-017	56P14
MS 3180-14	1010929-109	56P1
MS 3180-16	1010929-005, 108, 105, 008	56P2, 56P7, 56P8, 56P21
MS 3180-18	1010929-101, 102, 103, 104, 001, 004, 002, 003	56P3, 56P4, 56P5, 56P6, 56P12, 56P24 56P20, 56P22, 56P32, 56P25
~~MS 3181-8~~	~~1010930-019~~	~~50J2, 50J3~~
~~MS 3181-10~~	~~1010937-014~~	~~45J2~~
MS3181-14	1010930-009, ~~011~~	~~35A2J15~~, 56J1
MS3181-16	1010937 ~~006, 007~~, 108	~~45J1, 45J3, 45J4~~ 30J2
	1010930-105	56J2
MS3181-18	1010930-101, 104, 002, 001, 003	35A2J14, 50J1, 56J3, 56J4, 56J5
	1010937-001, 102	30J3, 30J1
MS3182A-19	1010771-207	56P23
MS3182A-27	1010771-201	56P13
1897377-001	1010965-1, 2	56P16, 56P15
2900920	1010921-1, 2	56P30, 56P31
2900929	2014744	56P17
2900930	2014742, 2014745	56P18, 56P26
2900931	2014748, 2014746	56P27, 56P28
2900932	2014743, 2014747	56P19, 56P29
6900059	2014749	56P10
6900060	2014741	56P9

QUANTITY REQUIRED							
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			1			6900060	COVER, ELECTRICAL CONNECTOR
			1			6900059	
			2			2900932	
			2			2900931	
			2			2900930	
			1			2900929	
			2			2900920	
			2			1897377-001	COVER, ELECTRICAL CONNECTOR
			~~1~~			~~MS 3181-10~~	~~CAP, PROTECTIVE, ELEC, CONN, RECEP~~
			~~2~~			~~MS 3181-8~~	~~RECEP~~
			1			MS3182A-27(1897276-001)	PLUG
			1			MS3182A-19(1897276-002)	PLUG
			7			↑ -18	↑
			2			-16	
			1			MS 3181 -14	RECP
			10			↑ -18	↑
			4			-16	
			1			-14	
			1			MS 3180-8	CAP, PROTECTIVE, ELEC, CONN, PLUG

LIST OF PARTS AND MATERIALS

1900030		
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	+ —	+ —
— —	— —	— —

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.

DRAWN Belden DATE 30 MAR 65
CHECKED Ed Foster 30 MAR 65
APPROVAL C.E. Hanna 1 APR 65
APPROVAL C Feldman 1/24/66
NASA APPROVAL A. C. METZGER
MIT APPROVAL McMurley 1-25-66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

COVER SET,
ELECTRICAL CONNECTOR

CODE IDENT NO. 99974
SIZE D
2900065
SCALE —
SHEET 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

COVER P/N	FOR USE ON CONNECTOR P/N	 REFERENCE DESIGNATION
MS 3180-8	1010929-017	56P14
MS 3180-14	1010929-109	56P1
MS 3180-16	1010929-005,108,105,008	56P2,56P7,56P8,56P21
MS 3180-18	1010929-101,102,103,104, 001,004,002,003	56P3,56P4,56P5,56P6,56P12,56P24 56P20,56P22,56P32,56P25
~~MS 3181-8~~	~~1010930-019~~	~~50J2, 50J3~~
~~MS 3181-10~~	~~1010937-014~~	~~45J2~~
MS 3181-14	1010930-009, ~~011~~	~~35A2J15~~, 56J1
MS 3181-16	1010937 ~~006,007~~, 108 1010930-105	~~45J1, 45J3, 45J1~~ 30J2 56J2
MS 3181-18	1010930-101,104,002,001,003 1010937-001,102	35A2J14,50J1,56J3,56J4,56J5 30J3,30J1
MS 3182A-19	1010771-207	56P23
MS 3182A-27	1010771-201	56P13
1897377-001	1010965-1,2	56P16, 56P15
2900920	1010921-1,2	56P30, 56P31
2900929	2014744	56P17
2900930	2014742, 2014745	56P18, 56P26
2900931	2014748, 2014746	56P27, 56P28
2900932	2014743, 2014747	56P19, 56P29
6900059	2014749	56P10
6900060	2014741	56P9
MS 3181-8	1010930-017	56J6, 56J7

G 2900065

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
A		*REVISED PER MXC 206094*		19 OCT 65	J.H.P. CF
B		REVISED PER MXC 206512		3 NOV 65	RLP
C		REVISED PER MXC 206938		17 NOV 65	RLP
D		REVISED PER MXC 207157		30 NOV 65	TR
E		REVISED PER MXC 207900		28 DEC 65	JJK MEM
F		INITIAL RELEASE CLASS A PER TDRR 25565		29 DEC 65	JJK
G		REVISED PER TDRR 26730		8 MAR 66	PHG

			2			MS 3181-8	CAP, PROTECTIVE ELEC. CONN. RECEP
			1			6900060	COVER, ELECTRICAL CONNECTOR
			1			6900059	
			2			2900932	
			2			2900931	
			2			2900930	
			1			2900929	
			2			2900920	
			2			1897377-001	COVER, ELECTRICAL CONNECTOR
			~~1~~			~~MS 3181-10~~	~~CAP, PROTECTIVE, ELEC, CONN, RECEP~~
			~~2~~			~~MS 3181-8~~	~~RECEP~~
			1			MS3182A-27(1897276-001)	PLUG
			1			MS3182A-19(1897276-002)	PLUG
			7			↑ -18	↑
			2			-16	
			1			*MS 3181 -14*	*RECP*
			10			↑ -18	↑
			4			-16	
			1			-14	
			1			*MS 3180-8*	*CAP, PROTECTIVE, ELEC, CONN, PLUG*
			011	EFFEC-TIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030		
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT *NAS 9-497*

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN 30 MAR 65 DATE
CHECKED Ed Foster 30 MAR 65
APPROVAL C. E. Harms 1 APR 65
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL 1-25-66

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

COVER SET,
ELECTRICAL CONNECTOR

CODE IDENT NO. 99974
SIZE D
2900065
SCALE —
SHEET *1 OF 1*

MIL 10780-P

H 2900065

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
A		REVISED PER MXC 206094		19 OCT 65	J.H.P. CP
B		REVISED PER MXC 206512		3 NOV 65	RLP
C		REVISED PER MXC 206938		17 NOV 65	RLP
D		REVISED PER MXC 207157		30 NOV 65	
E		REVISED PER MXC 207900		28 DEC 65	JJK MEM
F		INITIAL RELEASE CLASS A PER TDRR 25565		29 DEC 65	JJK
G		REVISED PER TDRR 26730		8 MAR 66	PHG
H		REVISED PER TDRR 27655		6 APR 66	RWH

Ⓜ

COVER P/N	FOR USE ON	
	CONNECTOR P/N	REFERENCE DESIGNATION
MS 3180-8	1010929-017	56P14
MS 3180-14	1010929-109	56P1
MS 3180-16	1010929-005, 108, 105, 008	56P2, 56P7, 56P8, 56P21
MS 3180-18	1010929-101, 102, 103, 104, 001, 004, 002, 003	56P3, 56P4, 56P5, 56P6, 56P12, 56P24 56P20, 56P22, 56P32, 56P25
~~MS 3181-8~~	~~1010930-019~~	~~50J2, 50J3~~
~~MS 3181-10~~	~~1010937-014~~	~~45J2~~
MS 3181-14	1010930-009, ~~011~~	~~35A2J15~~, 56J1
MS 3181-16	1010937 ~~-006, 007~~, 108	~~45J1, 45J3, 45J4~~ 30J2
	1010930-105	56J2
MS 3181-18	1010930-101, 104, 002, 001, 003	35A2J14, 50J1, 56J3, 56J4, 56J5
	1010937-001, 102	30J3, 30J1
MS 3182A-19	1010771-207	56P23
MS 3182A-27	1010771-201	56P13
1897377-002	1010965-1, 2	56P16, 56P15
2900920	1010921-1, 2	56P30, 56P31
2900929	2014744	56P17
2900930	2014742, 2014745	56P18, 56P26
2900931	2014748, 2014746	56P27, 56P28
2900932	2014743, 2014747	56P19, 56P29
6900059	2014749	56P10
6900060	2014741	56P9
MS 3181-8	1010930-017	56J6, 56J7

			2			MS 3181-8	CAP, PROTECTIVE ELEC. CONN. RECEP
			1			6900060	COVER, ELECTRICAL CONNECTOR
			1			6900059	
			2			2900932	
			2			2900931	
			2			2900930	
			1			2900929	
			2			2900920	
			2			1897377-002	COVER, ELECTRICAL CONNECTOR
			~~1~~			~~MS 3181-10~~	~~CAP, PROTECTIVE, ELEC, CONN, RECEP~~
			~~2~~			~~MS 3181-8~~	~~RECEP~~
			1			MS3182A-27(1897276-001)	PLUG
			1			MS3182A-19(1897276-002)	PLUG
			7			↑ -18	↑
			2			-16	
			1			MS 3181 -14	RECP
			10			↑ -18	↑
			4			-16	
			1			-14	
			1			MS 3180-8	CAP, PROTECTIVE, ELEC, CONN, PLUG
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED						LIST OF PARTS AND MATERIALS	

1900030		
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+—	+—	+—
——	——	——

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS

DRAWN 30 MAR 65 DATE
CHECKED Ed Foster 30 MAR 65
APPROVAL C. E. Hanns 1 APR 65
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

COVER SET, ELECTRICAL CONNECTOR

CODE IDENT NO. 99974
SIZE D
2900065
SCALE —
SHEET 1 OF 1

MIL 10780-P

2900065 J

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		REVISED PER MXC 206094		19 OCT 65	J.N.P. CP
B		REVISED PER MXC 206512		3 NOV 65	RLP
C		REVISED PER MXC 206938		17 NOV 65	RLP
D		REVISED PER MXC 207157		30 NOV 65	TK
E		REVISED PER MXC 207900		28 DEC 65	JJK MEM
F		INITIAL RELEASE CLASS A PER TDRR 25565		29 DEC 65	JJK
Ⓜ G		REVISED PER TDRR 26730		8 MAR 66	PHG
⑪ H		REVISED PER TDRR 27655		6 APR 66	RWH
J		REVISED PER TDRR 29899		13 JUL 66	RWH

COVER P/N	FOR USE ON	
	CONNECTOR P/N	REFERENCE DESIGNATION
MS 3180-8	1010929-017	56P14
MS 3180-14	1010929-109	56P1
MS 3180-16	1010929-005,108,105,008	56P2,56P7,56P8,56P21
MS 3180-18	1010929-101,102,103,104, 001,004,002,003	56P3,56P4,56P5,56P6,56P12,56P24 56P20,56P22,56P32,56P25
~~MS 3181-8~~	~~1010930-019~~	~~50J2, 50J3~~
~~MS 3181-10~~	~~1010937-014~~	~~45J2~~
MS 3181-14	1010930-009,~~011~~	~~35A2J15~~, 56J1
MS 3181-16	1010937 ~~006,007~~,108 1010930-105	~~45J1, 45J3, 45J4~~ 30J2 56J2
MS 3181-18	1010930-101,104,002,001,003 1010937-001,102	35A2J14,50J1,56J3,56J4,56J5 30J3,30J1
MS 3182A-19	1010771-207	56P23
MS 3182A-27	1010771-201	56P13
1897377-002	1010965-1,2	56P16, 56P15
2900920	1010921-1,2	56P30, 56P31
2900929	2014744	56P17
2900930	2014742, 2014745	56P18, 56P26
2900931	2014748, 2014746	56P27, 56P28
2900932	2014743, 2014747	56P19, 56P29
6900059	2014749	56P10
6900060	2014741	56P9
MS 3181-8	1010930-017	56J6, 56J7, 56J8

			3			MS 3181-8	CAP, PROTECTIVE ELEC. CONN. RECEP
			1			6900060	COVER, ELECTRICAL CONNECTOR
			1			6900059	
			2			2900932	
			2			2900931	
			2			2900930	
			1			2900929	
			2			2900920	
			2			1897377-002	COVER, ELECTRICAL CONNECTOR
			~~1~~			~~MS 3181-10~~	~~CAP, PROTECTIVE, ELEC, CONN, RECEP~~
			~~2~~			~~MS 3181-8~~	~~RECEP~~
			1			MS3182A-27(1897276-001)	PLUG
			1			MS3182A-19(1897276-002)	PLUG
			7			↑ -18	↑
			2			-16	
			1			MS 3181 -14	RECP
			10			↑ -18	↑
			4			-16	
			1			-14	
			1			MS 3180-8	CAP, PROTECTIVE, ELEC, CONN, PLUG
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED						LIST OF PARTS AND MATERIALS	

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030		

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS +— −— DECIMALS +— −— ANGLES +— −—

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS.

DRAWN 30 MAR 65 DATE
CHECKED Ed Foster 30 MAR 65
APPROVAL C. E. Hammer 1 APR 65
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL 1-25-66

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

COVER SET,
ELECTRICAL CONNECTOR

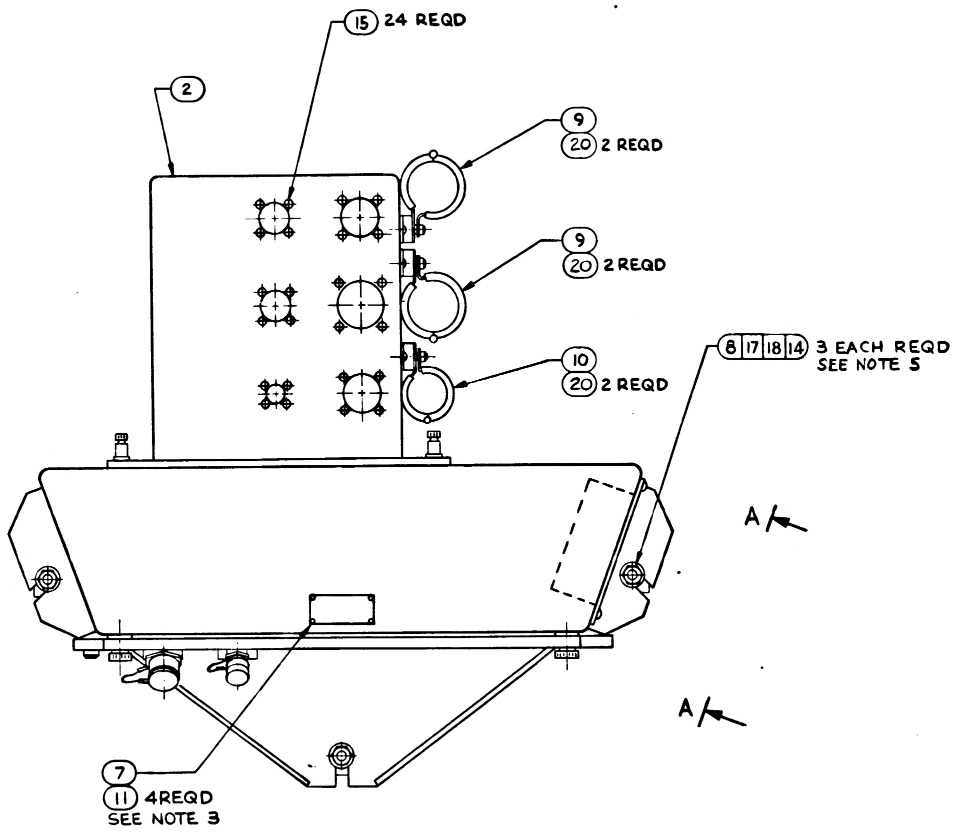
CODE IDENT NO. 99974
SIZE D
2900065
SCALE —
SHEET 1 OF 1

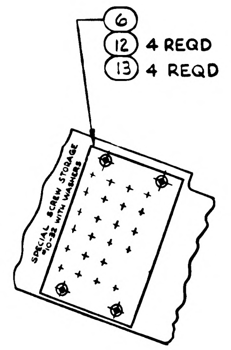
MIL 10780-F

REVISIONS 23387					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
G		REVISED PER MXC 206100	—	9 OCT 65	RTD
H		INITIAL RELEASE CLASS A PER TDRR 23387		9 OCT 65	WEB

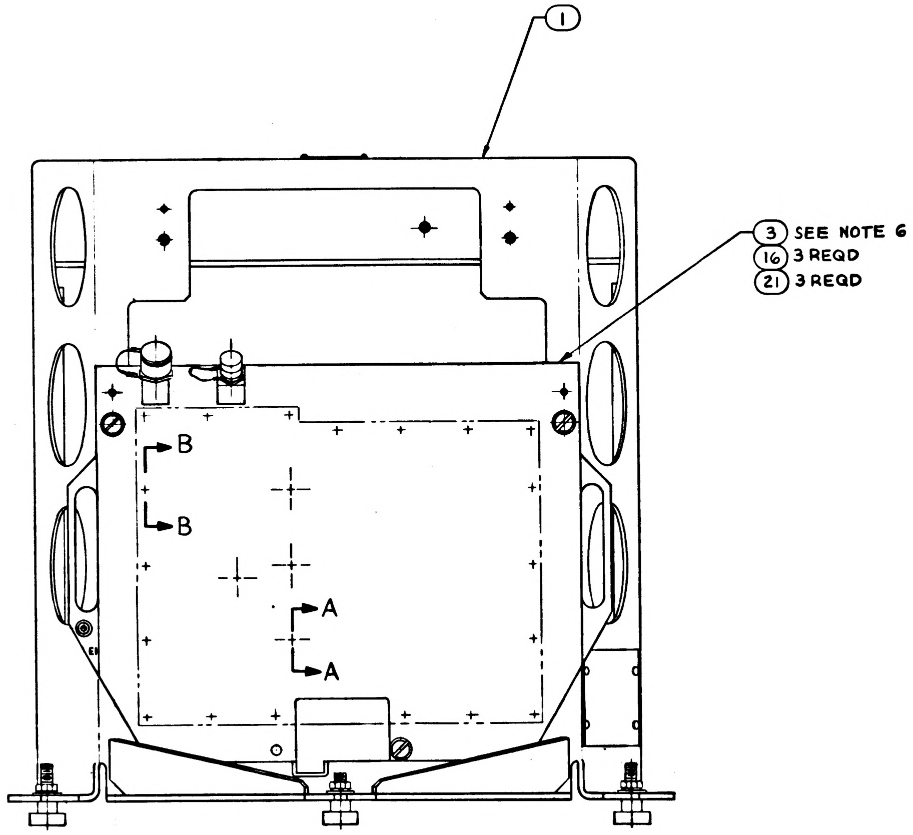
NOTES:

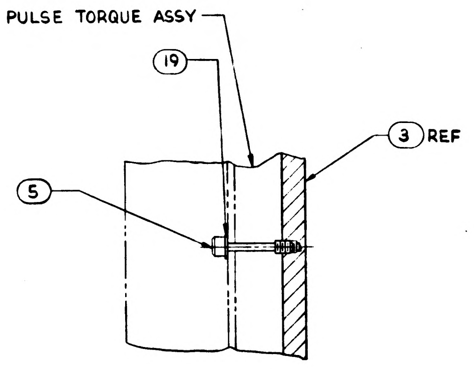
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
3. APPLY ITEM (22) TO THREAD OF ITEM (11).
4. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (7) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.
5. LOOSE HARDWARE FOR INSTALLATION OF (OR ON TO) ASSOCIATED EQUIPMENT IS SHOWN IN THE INSTALLED POSITION. ITEMS (4|5|9) SHALL BE SECURED INTO ITEM (6) WHEN NOT INSTALLED WITH ASSOCIATED EQUIPMENT.
6. ITEM (3) IS SHOWN INSTALLED WITH THE COOLING SURFACE ON FAR SIDE. ALTERNATE POSITION WITH COOLING SURFACE ON NEAR SIDE IS NOT SHOWN.



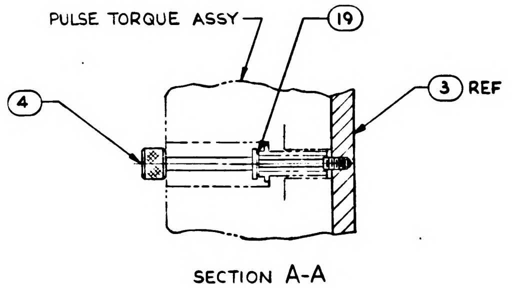


PARTIAL VIEW A-A





SECTION B-B
19 PLACES
SCALE-FULL



SECTION A-A
4 PLACES
SCALE-FULL

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
				AR		22	MIL-S-22473 GRADE HV	SEALING & RETAINING COMPOUND (ES2544-6)
SEE NOTE 2				3		21	1006982-7	WASHER, NYLON
SEE NOTE 2				6		20	1006783-27	SCREW, BUTTON HEAD
SEE NOTE 2				23		19	1006982-5	WASHER, NYLON
				3		18	MS35338-84	WASHER, LOCK
				3		17	MS15795-815	WASHER, FLAT
SEE NOTE 2				3		16	1897312-004	SCREW, EXTERNALLY RELIEVED BODY
				24		15	MS35216-12	SCREW, MACHINE, PAN HD
				3		14	AN335-6	(1896987-060) NUT, HEX
SEE NOTE 2				4		13	1016151-008	NUT, SELF LOCKING
				4		12	1006783-28	SCREW, BUTTON HEAD
				4		11	1006783-9	SCREW, BUTTON HEAD
				1		10	1010400-8	CLAMP, LOOP, HINGED
SEE NOTE 2				2		9	1010400-11	CLAMP, LOOP, HINGED
				3		8	1900553	T-BOLT
				1		7	1004260-126	NAMEPLATE
				1		6	2900431	HOLDER, SCREW STORAGE
				19		5	2900430-001	SCREW, CAP, SOCKET HEAD
				4		4	2900429-001	SCREW, EXTERNALLY RELIEVED BODY
				1		3	2900423-011	COLD PLATE, PTA/PEA FIXTURE
				1		2	2900422	BRACKET, ELECTRICAL CONN (INSEP ASSY)
				1		1	2900420	FRAME, MOUNTING (INSEP ASSY)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030		

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R.G. OLSON DATE 11-AUG-65
CHECKED Ed Foster 15 JUL 65
APPROVAL 16 JUL 65
APPROVAL 7-17-65
NASA APPROVAL
MIT APPROVAL
Charleston 16 JUL 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

FIXTURE, MOUNTING,
PTA/PEA

CODE IDENT NO. 99974
SIZE E
2900066
SCALE 1:2
SHEET OF

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.

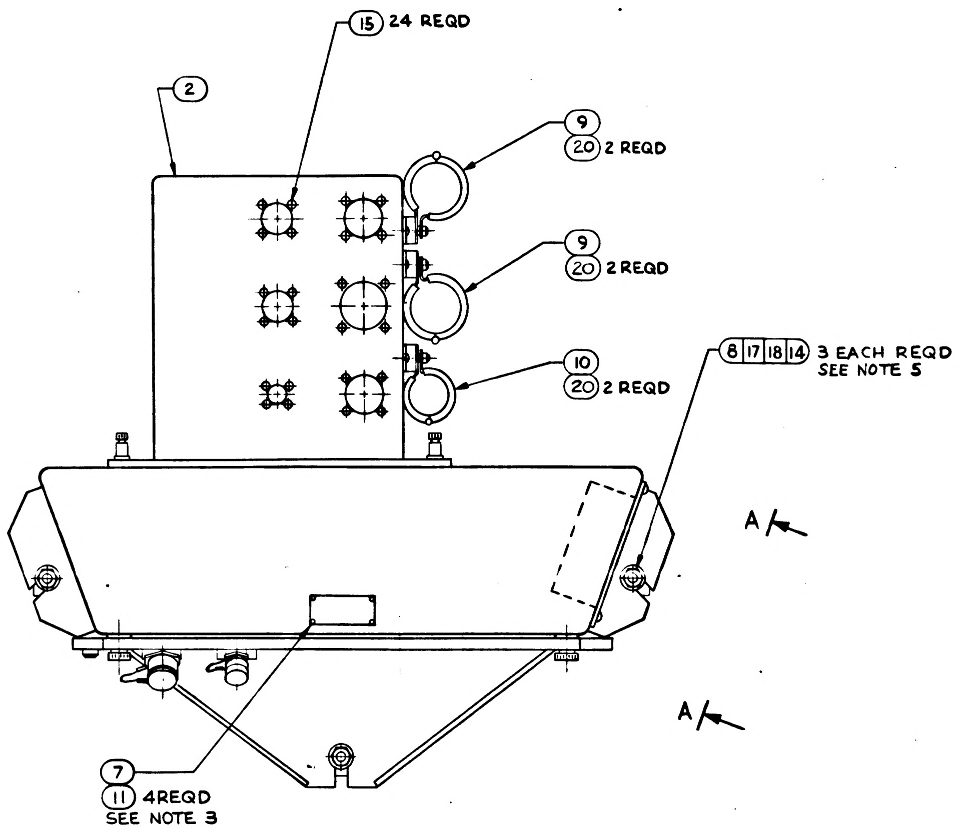
3. APPLY ITEM (22) TO THREAD OF ITEM (11).

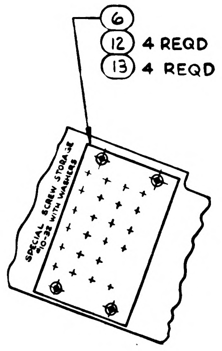
4. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (7) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.

5. LOOSE HARDWARE FOR INSTALLATION OF (OR ON TO) ASSOCIATED EQUIPMENT IS SHOWN IN THE INSTALLED POSITION. ITEMS (4|5|19) SHALL BE SECURED INTO ITEM (6) WHEN NOT INSTALLED WITH ASSOCIATED EQUIPMENT.

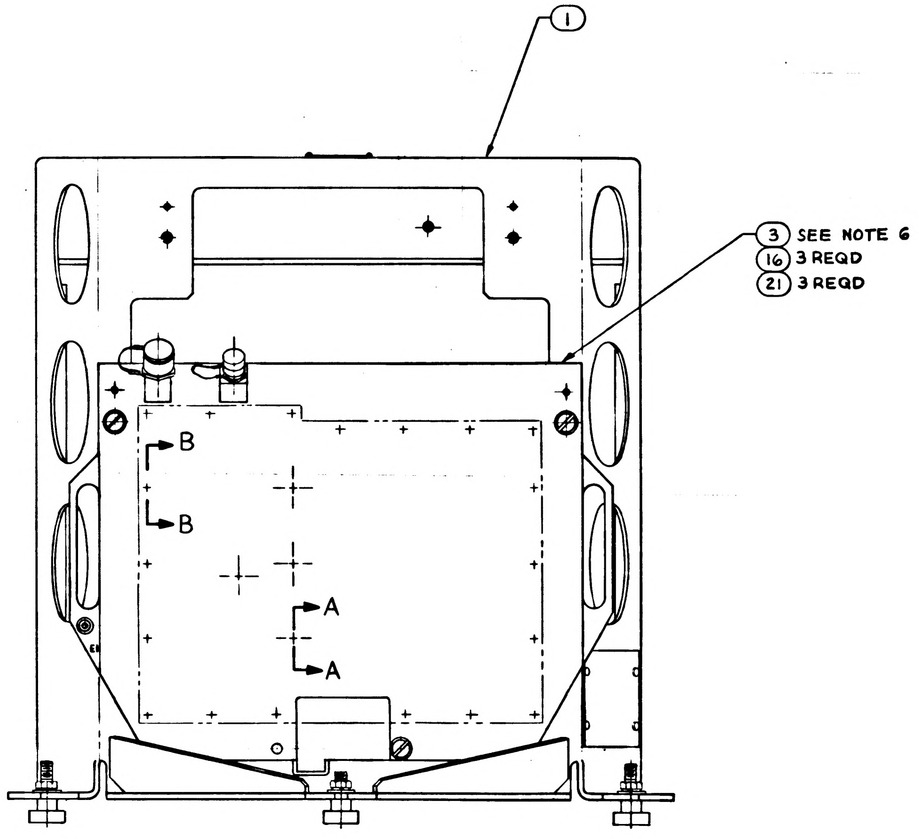
6. ITEM (3) IS SHOWN INSTALLED WITH THE COOLING SURFACE ON FAR SIDE. ALTERNATE POSITION WITH COOLING SURFACE ON NEAR SIDE IS NOT SHOWN.

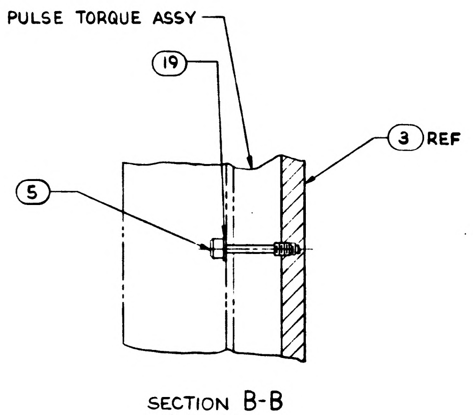
REVISIONS 23357					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
G		REVISED PER MXC 206100	—	3 OCT 65	RTP
H		INITIAL RELEASE CLASS A PER TDRR 23357		19 OCT 65	WEB
J		REVISED PER TDRR 24719	-	20 DEC 65	



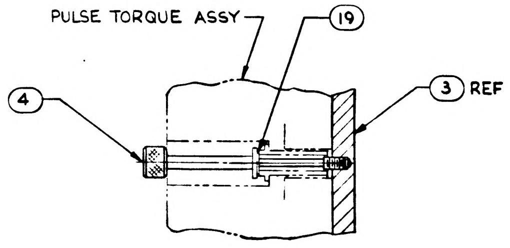


PARTIAL VIEW A-A





SECTION B-B
19 PLACES
SCALE-FULL



SECTION A-A
4 PLACES
SCALE-FULL

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	AR		22	MIL-S-22473 GRADE HV	SEALING & RETAINING COMPOUND (ES2544-6)
SEE NOTE 2	3		21	1006982-7	WASHER, NYLON
SEE NOTE 2	6		20	1006783-27	SCREW, BUTTON HEAD
SEE NOTE 2	23		19	AN960C10L	(1897006-019) WASHER, FLAT
	3		18	MS35338-84	WASHER, LOCK
	3		17	MS15795-815	WASHER, FLAT
SEE NOTE 2	3		16	897312-004	SCREW, EXTERNALLY RELIEVED BODY
	24		15	MS35216-12	SCREW, MACHINE, PAN HD
	3		14	AN335-6	(1896987-060) NUT, HEX
SEE NOTE 2	4		13	1016151-008	NUT, SELF LOCKING
	4		12	1006783-28	SCREW, BUTTON HEAD
	4		11	1006783-9	SCREW, BUTTON HEAD
	1		10	1010400-8	CLAMP, LOOP, HINGED
SEE NOTE 2	2		9	1010400-11	CLAMP, LOOP, HINGED
	3		8	1900553	T-BOLT
	1		7	1004260-126	NAMEPLATE
	1		6	2900431	HOLDER, SCREW STORAGE
	19		5	2900430-001	SCREW, CAP, SOCKET HEAD
	4		4	2900429-001	SCREW, EXTERNALLY RELIEVED BODY
	1		3	2900423-011	COLD PLATE, PTA, PEA FIXTURE
	1		2	2900422	BRACKET, ELECTRICAL CONN (INSEP ASSY)
	1		1	2900420	FRAME, MOUNTING (INSEP ASSY)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030		
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS.
DRAWN R.G. OLSON DATE 11-AUG-65
CHECKED Ed Foster 15 JUL 65
APPROVAL 16 JUL 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

FIXTURE, MOUNTING,
PTA/PEA

CODE IDENT NO 99974
SIZE E
2900066
SCALE 1:2
SHEET 1 OF 1

16 JUL 65

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

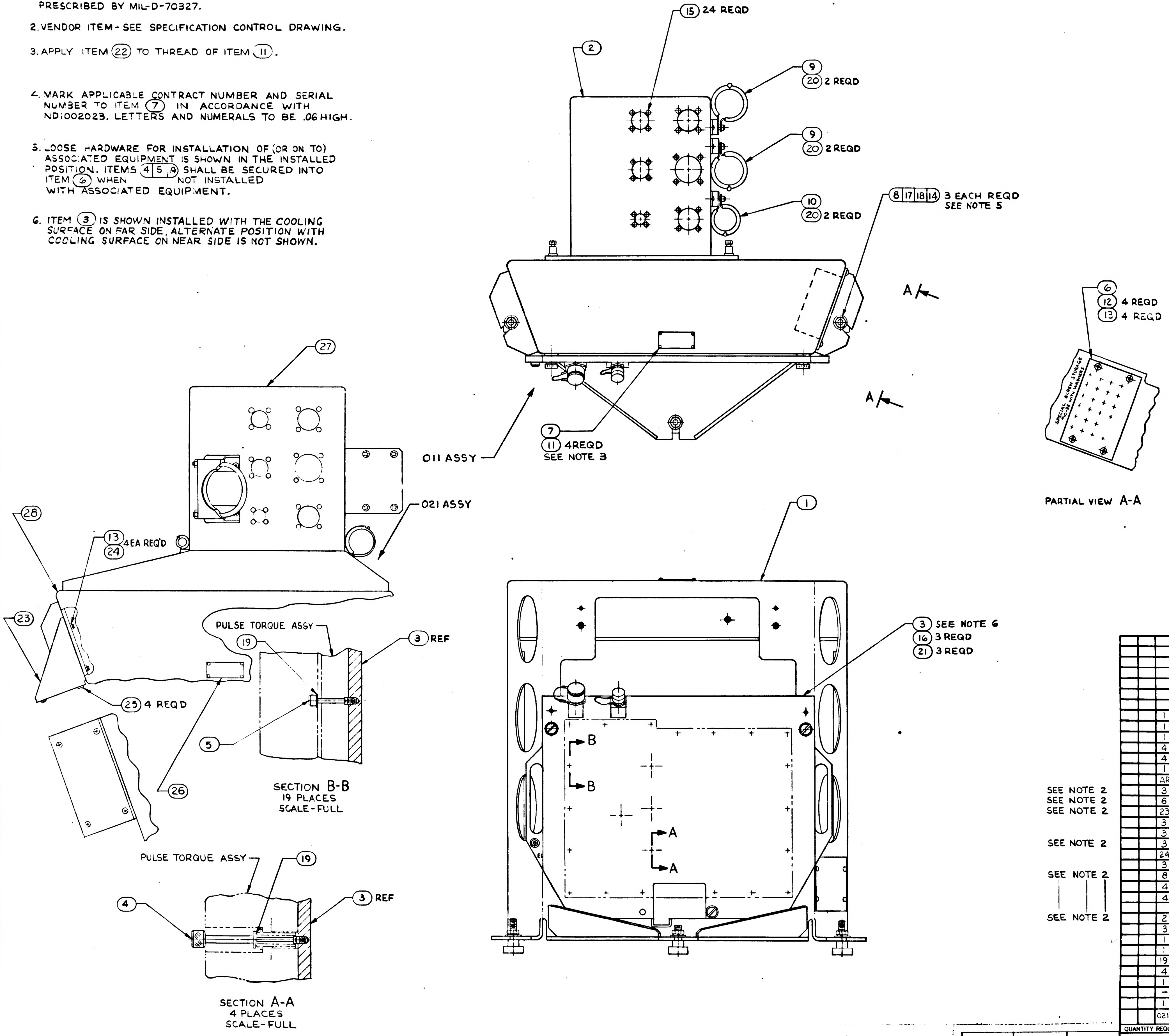
2. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.

3. APPLY ITEM (22) TO THREAD OF ITEM (11).

4. MARK APPLICABLE CONTRACT NUMBER AND SERIAL NUMBER TO ITEM (7) IN ACCORDANCE WITH ND1002023. LETTERS AND NUMERALS TO BE .06 HIGH.

5. LOOSE HARDWARE FOR INSTALLATION OF (OR ON TO) ASSOCIATED EQUIPMENT IS SHOWN IN THE INSTALLED POSITION. ITEMS (4|5|19) SHALL BE SECURED INTO ITEM (6) WHEN NOT INSTALLED WITH ASSOCIATED EQUIPMENT.

6. ITEM (3) IS SHOWN INSTALLED WITH THE COOLING SURFACE ON FAR SIDE, ALTERNATE POSITION WITH COOLING SURFACE ON NEAR SIDE IS NOT SHOWN.



PARTIAL VIEW A-A

SECTION B-B
19 PLACES
SCALE-FULL

SECTION A-A
4 PLACES
SCALE-FULL

REVISIONS 23357					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
G		REVISED PER MXC 206100	—	9 OCT 65	RTD
H		INITIAL RELEASE CLASS A PER TDRR 23357		19 OCT 65	WEB
J		REVISED PER TDRR 24719	-	30 DEC 65	
K		REVISED PER TDRR 28558			

			021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			1			28	2901372	FRAME, MOUNTING (INSEP ASSY)
			1			27	2901185-011	PTA-PEA CONNECTOR BRACKET ASSY
			1			26	1004260-187	NAMEPLATES, APOLLO G&N-GSE
			4			25	MS51957-45	SCREW, MACH PAN HD
			4			24	MS51957-46	SCREW, MACH PAN HD
			1			23	2901170	BRACKET, ELECTRICAL CONN (INSEP ASSY)
			AR	AR		22	MIL-S-22473 GRADE HV	SEALING & RETAINING COMPOUND (ES2544-6)
SEE NOTE 2			3	3		21	1006982-7	WASHER, NYLON
SEE NOTE 2			6	6		20	1006783-27	SCREW, BUTTON HEAD
SEE NOTE 2			23	23		19	AN960C10L	(1897006-019) WASHER, FLAT
			3	3		18	MS35338-84	WASHER, LOCK
			3	3		17	MS15795-815	WASHER, FLAT
SEE NOTE 2			3	3		16	897312-004	SCREW, EXTERNALLY RELIEVED BODY
			24	24		15	MS35216-12	SCREW, MACHINE, PAN HD
			3	3		14	AN335-6	(896987-060) NUT, HEX
SEE NOTE 2			8	4		13	1016151-008	NUT, SELF LOCKING
			4	4		12	1006783-28	SCREW, BUTTON HEAD
			4	4		11	1006783-9	SCREW, BUTTON HEAD
				1		10	1010400-8	CLAMP, LOOP, HINGED
SEE NOTE 2			2	2		9	1010400-11	CLAMP, LOOP, HINGED
			3	3		8	1900553	T-BOLT
			1	1		7	1004260-126	NAMEPLATE
			1	1		6	2900431	HOLDER, SCREW STORAGE
			19	19		5	2900430-001	SCREW, CAP, SOCKET HEAD
			4	4		4	2900429-001	SCREW, EXTERNALLY RELIEVED BODY
			1	1		3	2900423-011	COLD PLATE, PTA/PEA FIXTURE
			-	1		2	2900422	BRACKET, ELECTRICAL CONN (INSEP ASSY)
			1	1		1	2900420	FRAME, MOUNTING (INSEP ASSY)
	QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

1900030		
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS.
DRAWN R.G. OLSON DATE 11-AUG-65
CHECKED Ed Foster 15 JUL 65
APPROVAL 16 JUL 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

FIXTURE, MOUNTING,
PTA/PEA

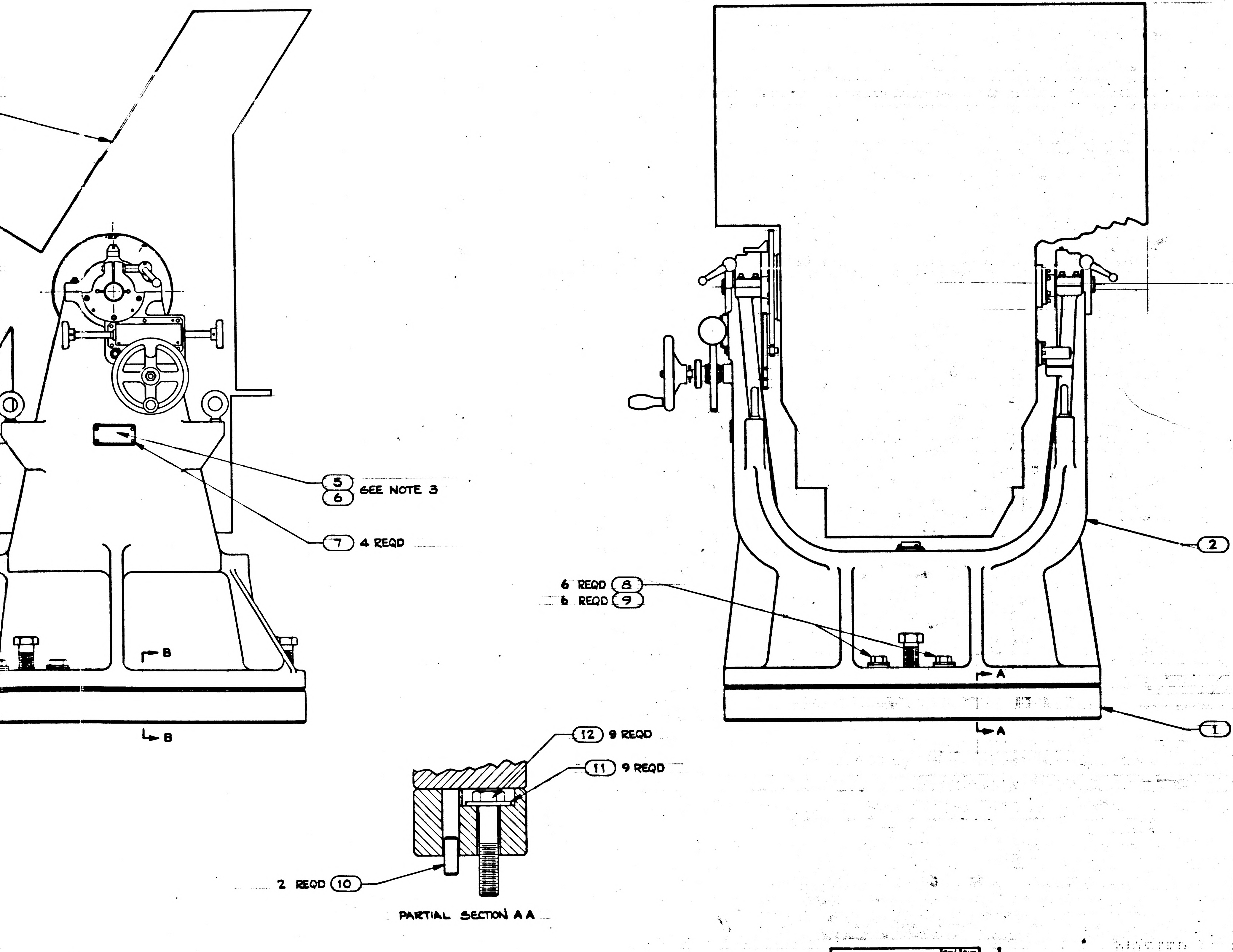
CODE IDENT NO. 99974
SIZE E
2900066
SCALE 1:2
SHEET 1 OF 1

K
2900066

Chk 16 JUL 65

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APP'D
J		REPLACE REV (H) WITH CHANGE PER MXC 209165		14 FEB 66	JRC
K		INITIAL RELEASE CLASS A PER TDRR 26766		15 FEB 66	JJJ



PARTIAL SECTION A A

			-021	-011	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	CODE IDENT
			3	3	13	MS16556-104	PIN, STRAIGHT	
			9	9	12	MS35305-242	SCREW, CAP	
			9	9	11	MS15795-126	WASHER, FLAT	
			2	2	10	MS16556-101	PIN, STRAIGHT	
			6	6	9	MS35305-240	SCREW, CAP	
SEE NOTE 2			6	6	8	1016095-007	WASHER, SPHERICAL	
SEE NOTE 2			4	4	7	1006783-9	SCREW, BUTTON HD	
			1	—	6	1004260-176	NAMEPLATE	
			—	1	5	1004260-132	NAMEPLATE	
SEE NOTE 4			1	—	4	1902582-011	CRADLE ASSY	
SEE NOTE 4			1	1	3	2900673-011	CRADLE ASSY	
			1	1	2	2901175-011	BASE ASSY, LOWER	
			1	1	1	1900622	RING, BASE	

QUANTITY REQUIRED — LIST OF PARTS AND MATERIALS

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

NEXT ASSY	USED ON	APPLICABLE DASH NO.
		-021
1900030	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —

MATERIAL —

APPROVAL

REFERENCE (ACSK ONLY) RO. 61466

DRAFTSMAN 28 Jan 66
CHECKER Ed Foster 7 Feb 66
ENGINEER
APPROVAL
CONTRACT NAS9-497
DESIGN ACTIVITY APPROVAL MIT/IL OCB
MSC
OTHER APPROVAL A. C. METZGER

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.

FIXTURE, MOUNTING, G AND N

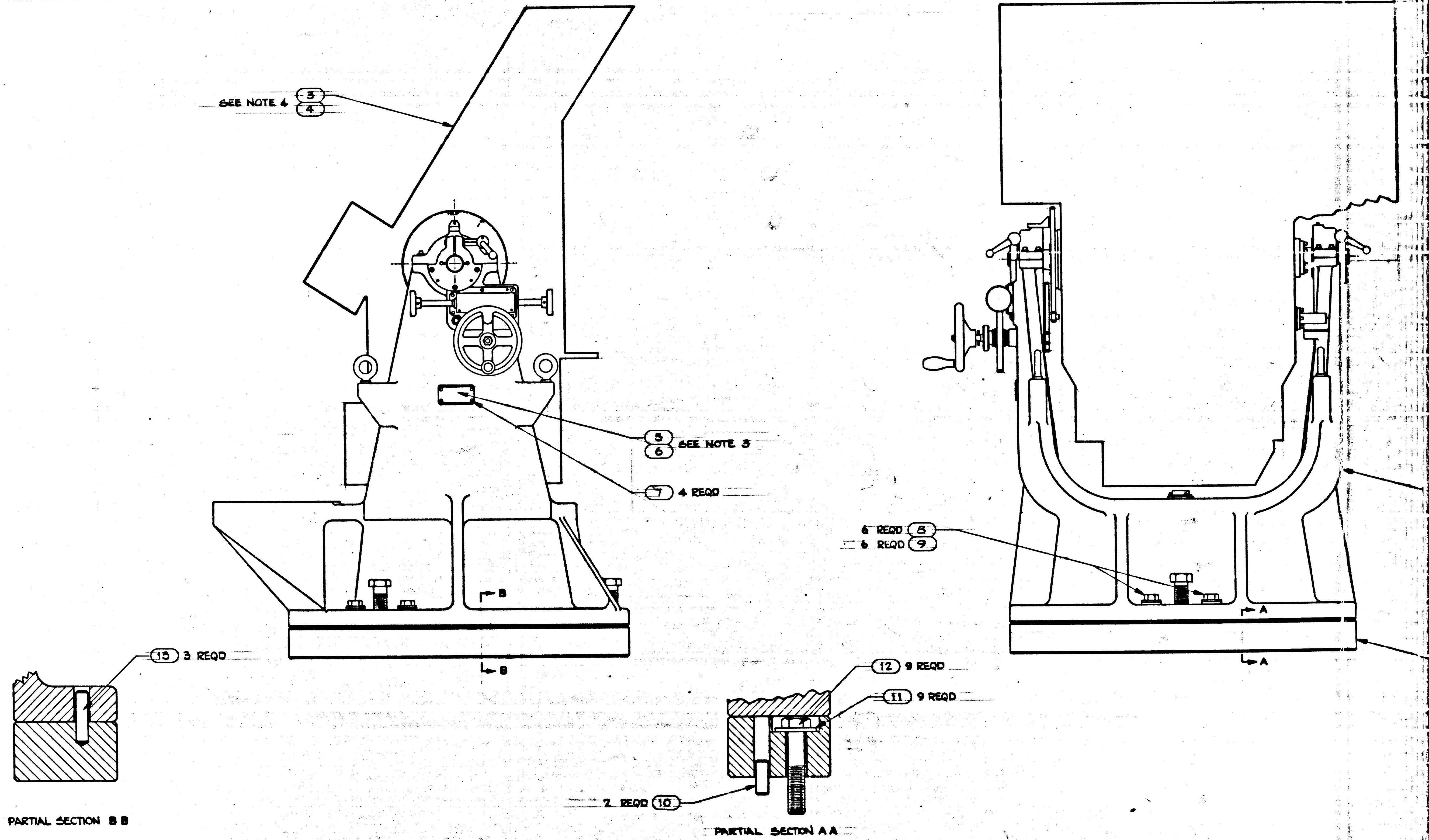
SIZE J2
CODE IDENT NO. 99974
2900067
SCALE 1:4
SHEET 1 of 1

2900067 REV K SHT 1

MASTER

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM - SEE SPEC CONTROL DRAWING.
3. MARK APPLICABLE CONTRACT NO. AND SERIAL NO. ON ITEM (5) OR (6) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .12 HIGH.
4. THE -02 ASSEMBLY SHALL INCLUDE TWO CRADLE ASSEMBLIES, ONE OF WHICH SHALL BE FURNISHED AS A LOOSE ITEM.

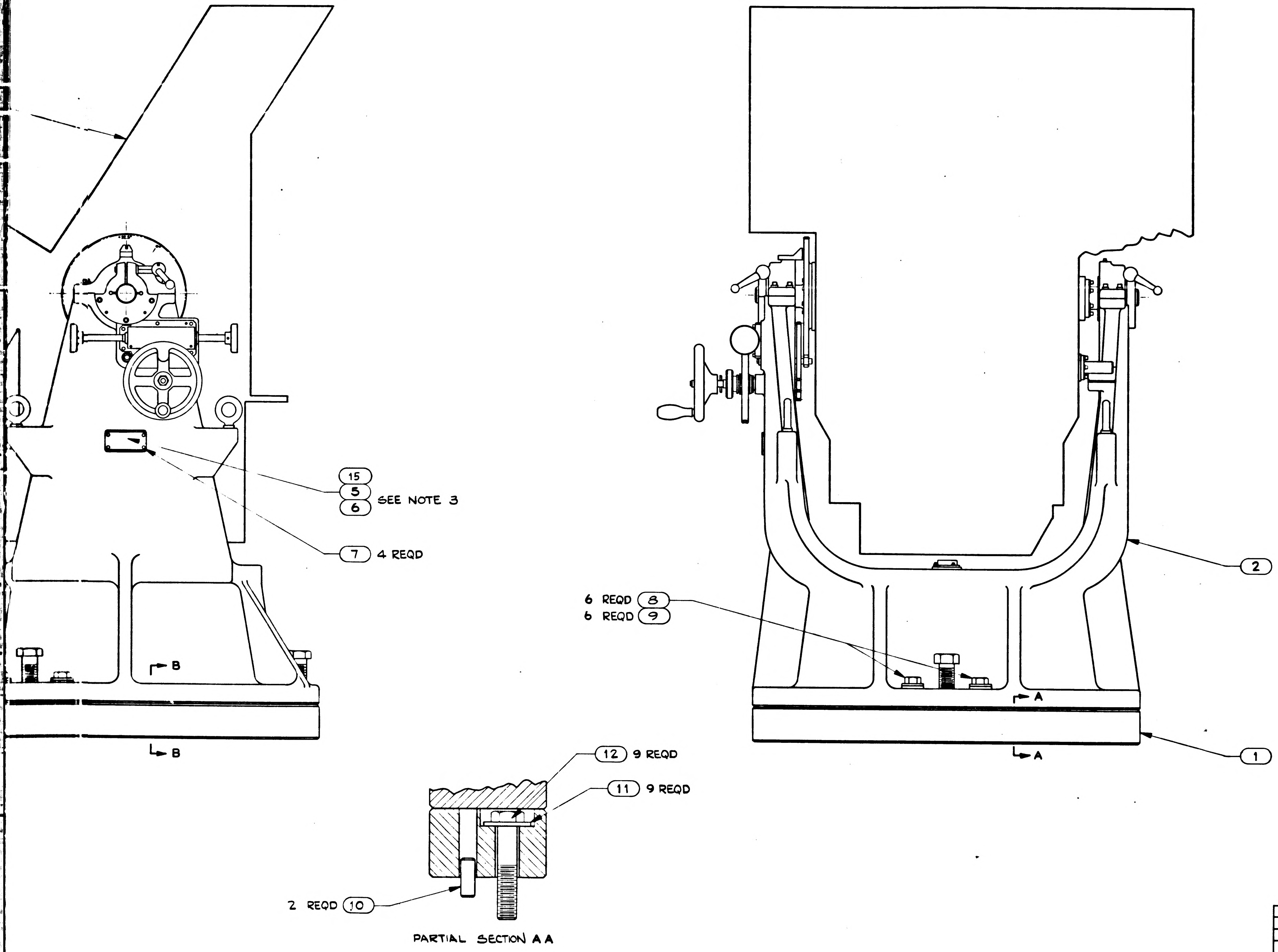

SEE NOTE 4 (3) (4)
(5) (6) SEE NOTE 3
(7) 4 REQD
6 REQD (8)
6 REQD (9)
B
B
A
A
(13) 3 REQD
(12) 9 REQD
(11) 9 REQD
2 REQD (10)

PARTIAL SECTION B B

PARTIAL SECTION A A

2900067 REV K SHT 1

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
J		REPLACE REV (H) WITH CHANGE PER MXC 209165		14 FEB 66	JAC
K		INITIAL RELEASE CLASS A PER TDRR 26766		15 FEB 65	
L		REVISED PER TDRR 29968		15-JUL-66	



	1	—	—	15	1004260-526	NAMEPLATE	
SEE NOTE 4	1	—	—	14	1902582-021	CRADLE ASSEMBLY	
	3	3	3	13	MS16556-104	PIN, STRAIGHT	
	9	9	9	12	MS35305-242	SCREW, CAP	
	9	9	9	11	MS15795-126	WASHER, FLAT	
	2	2	2	10	MS16556-101	PIN, STRAIGHT	
	6	6	6	9	MS35305-240	SCREW, CAP	
SEE NOTE 2	6	6	6	8	1016095-007	WASHER, SPHERICAL	
SEE NOTE 2	4	4	4	7	1006783-9	SCREW, BUTTON HD	
	—	1	—	6	1004260-176	NAMEPLATE	
	—	—	1	5	1004260-132	NAMEPLATE	
SEE NOTE 4	—	1	—	4	1902582-011	CRADLE ASSY	
SEE NOTE 4	1	1	1	3	2900673-011	CRADLE ASSY	
	1	1	1	2	2901175-011	BASE ASSY, LOWER	
	1	1	1	1	1900622	RING, BASE	
	-031	-021	-011	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	CODE IDENT
	QUANTITY REQUIRED			LIST OF PARTS AND MATERIALS			

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

		-021
1900030	1900030	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± — 3 PLACE DECIMALS ± — ANGLES ± —

MATERIAL —

APPROVAL

REFERENCE (ACSK ONLY) DO.61464

DRAFTSMAN Jenquin 28 Jan 66 DAY MO YR
CHECKER Ed Foster 7 Feb 66
ENGINEER R.C. [illegible]
APPROVAL [illegible] 2/28
CONTRACT NAS 9-497
DESIGN ACTIVITY APPROVAL
OTHER APPROVAL

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.

FIXTURE, MOUNTING, G AND N

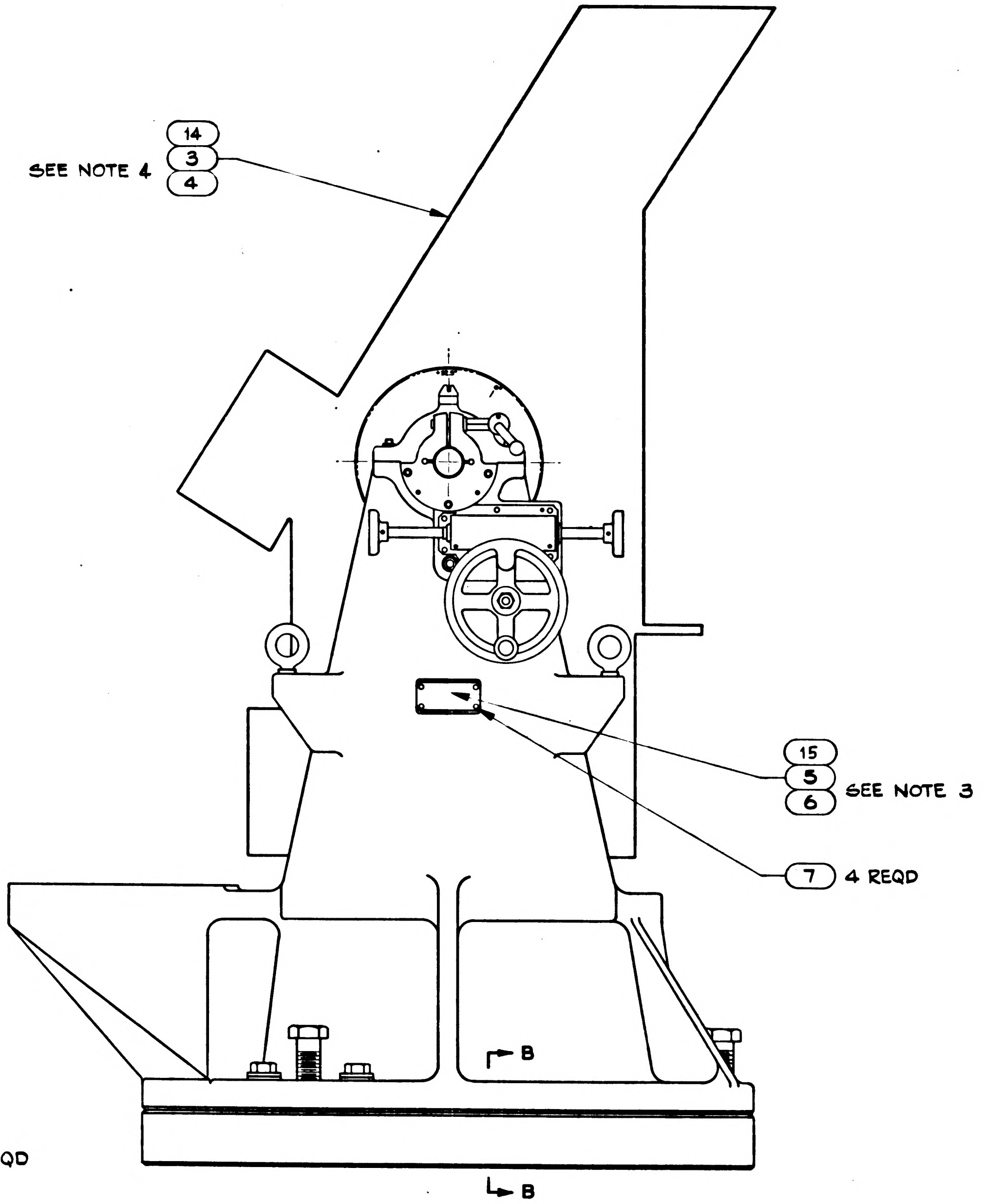
SIZE J2 | CODE IDENT NO. 99974 | 2900067
SCALE 1:4 | SHEET 1 OF 1

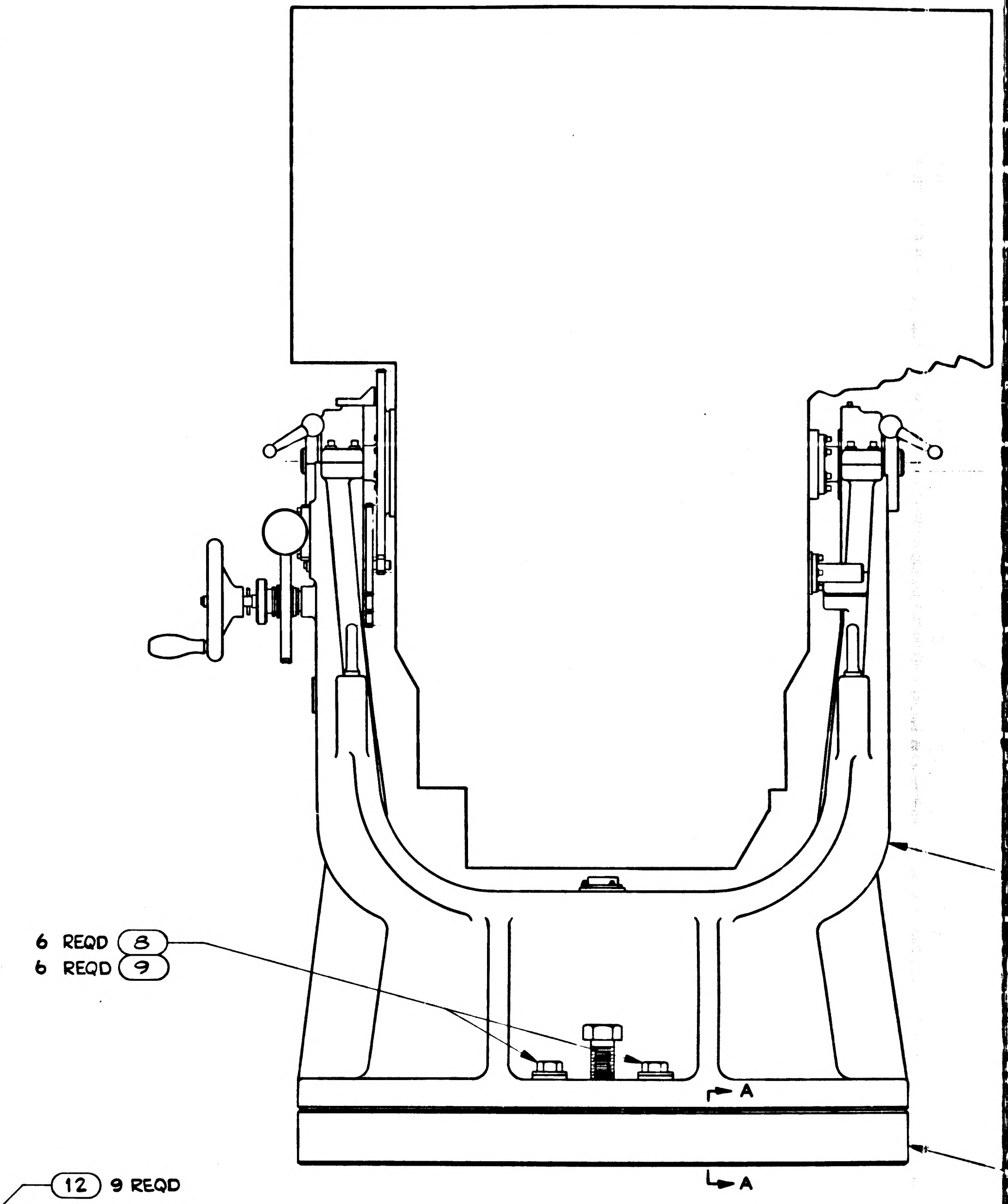
2900067 REV L SHT 1

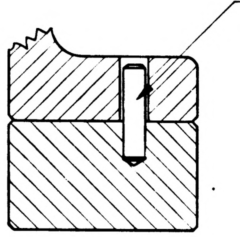
2/29000067

NOTES:

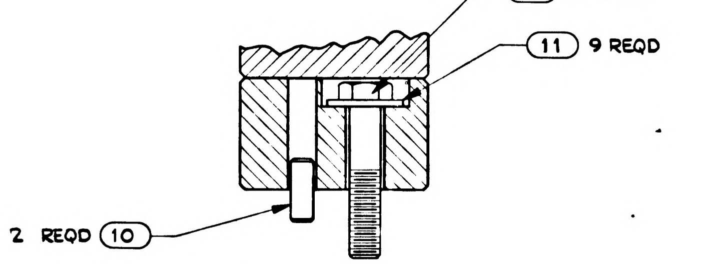
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM - SEE SPEC CONTROL DRAWING.
3. MARK APPLICABLE CONTRACT NO. AND SERIAL NO. ON ITEM ⑤ OR ⑥ OR ⑮ IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .12 HIGH.
4. THE -021 & -031 ASSEMBLIES SHALL INCLUDE TWO CRADLE ASSEMBLIES, ONE OF WHICH SHALL BE FURNISHED AS A LOOSE ITEM.


SEE NOTE 4
⑭
③
④
⑮
⑤
⑥
SEE NOTE 3
⑦ 4 REQD
B
B


6 REQD ⑧
6 REQD ⑨
A
A



PARTIAL SECTION B B


⑫ 9 REQD
⑪ 9 REQD
2 REQD ⑩

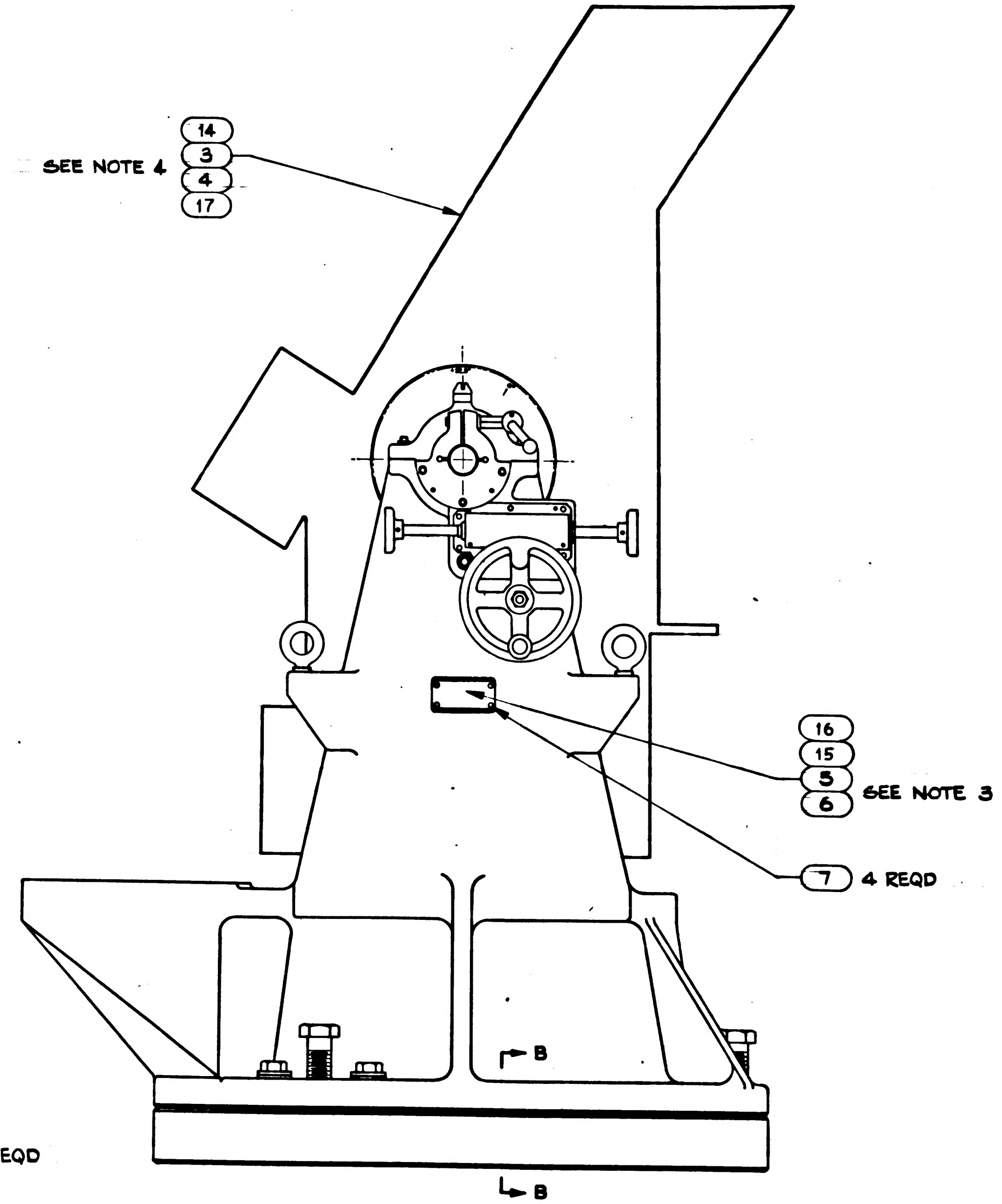
PARTIAL SECTION A A

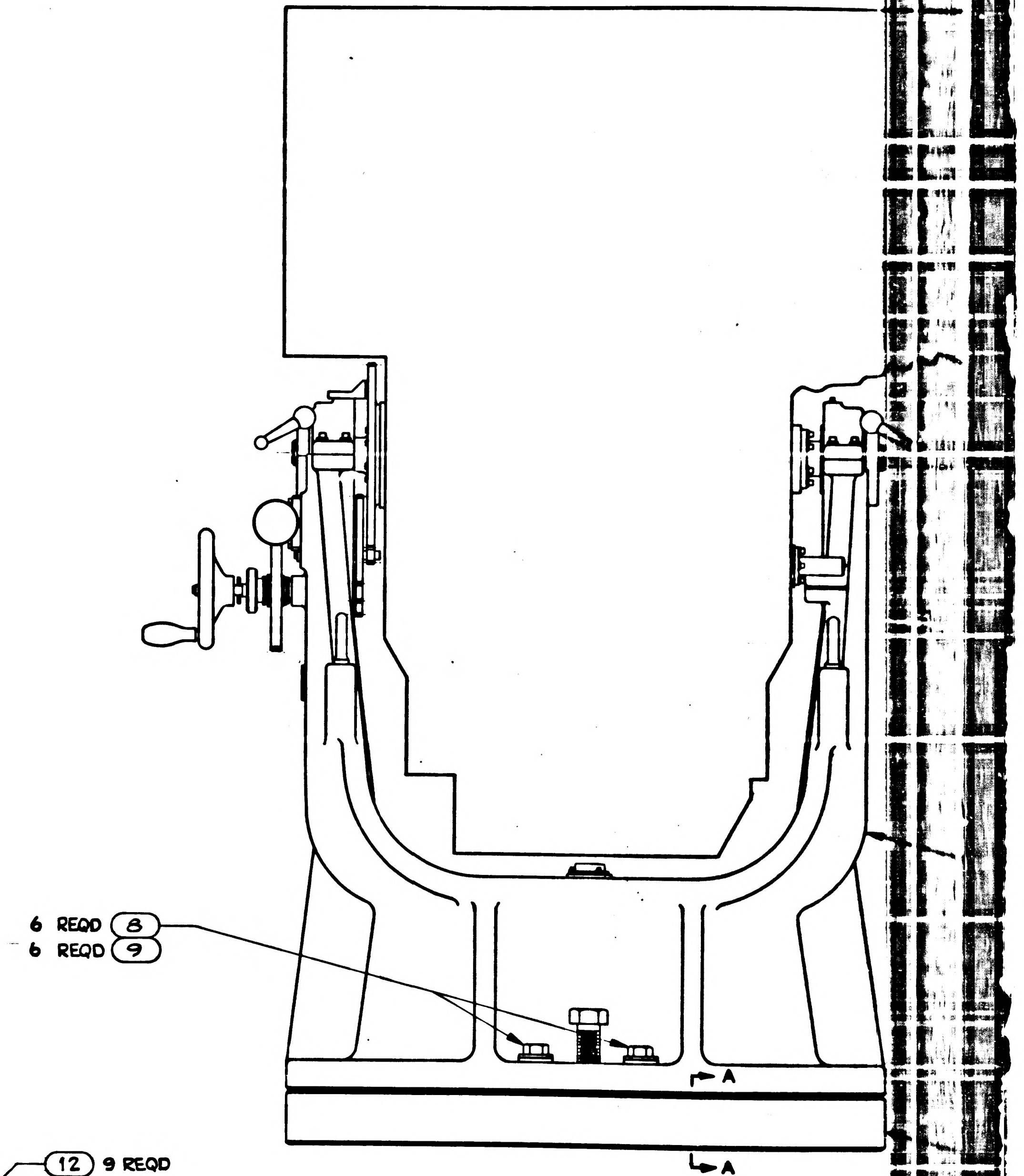
2900067 REV - SHT 1

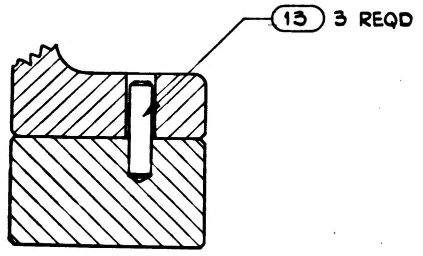
1/2900067

NOTES:

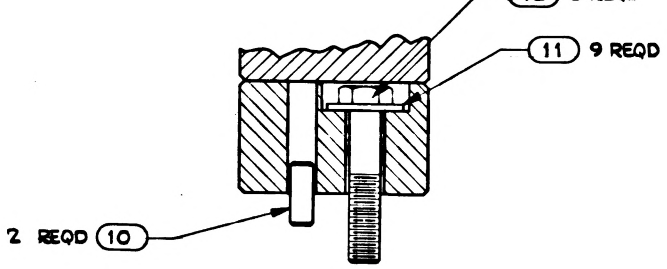
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM - SEE SPEC CONTROL DRAWING.
3. MARK APPLICABLE CONTRACT NO. AND SERIAL NO. ON ITEM (5) OR (6) OR (15) IN ACCORDANCE WITH ND 1002023. LETTERS AND NUMERALS TO BE .12 HIGH.
4. THE -021 AND -031 AND -041 ASSEMBLIES SHALL INCLUDE TWO CRADLE ASSEMBLIES, ONE OF WHICH SHALL BE FURNISHED AS A LOOSE ITEM.


SEE NOTE 4
14
3
4
17
16
15
5
6
SEE NOTE 3
7 4 REQD
B
B


6 REQD 8
6 REQD 9
A
A



PARTIAL SECTION B B

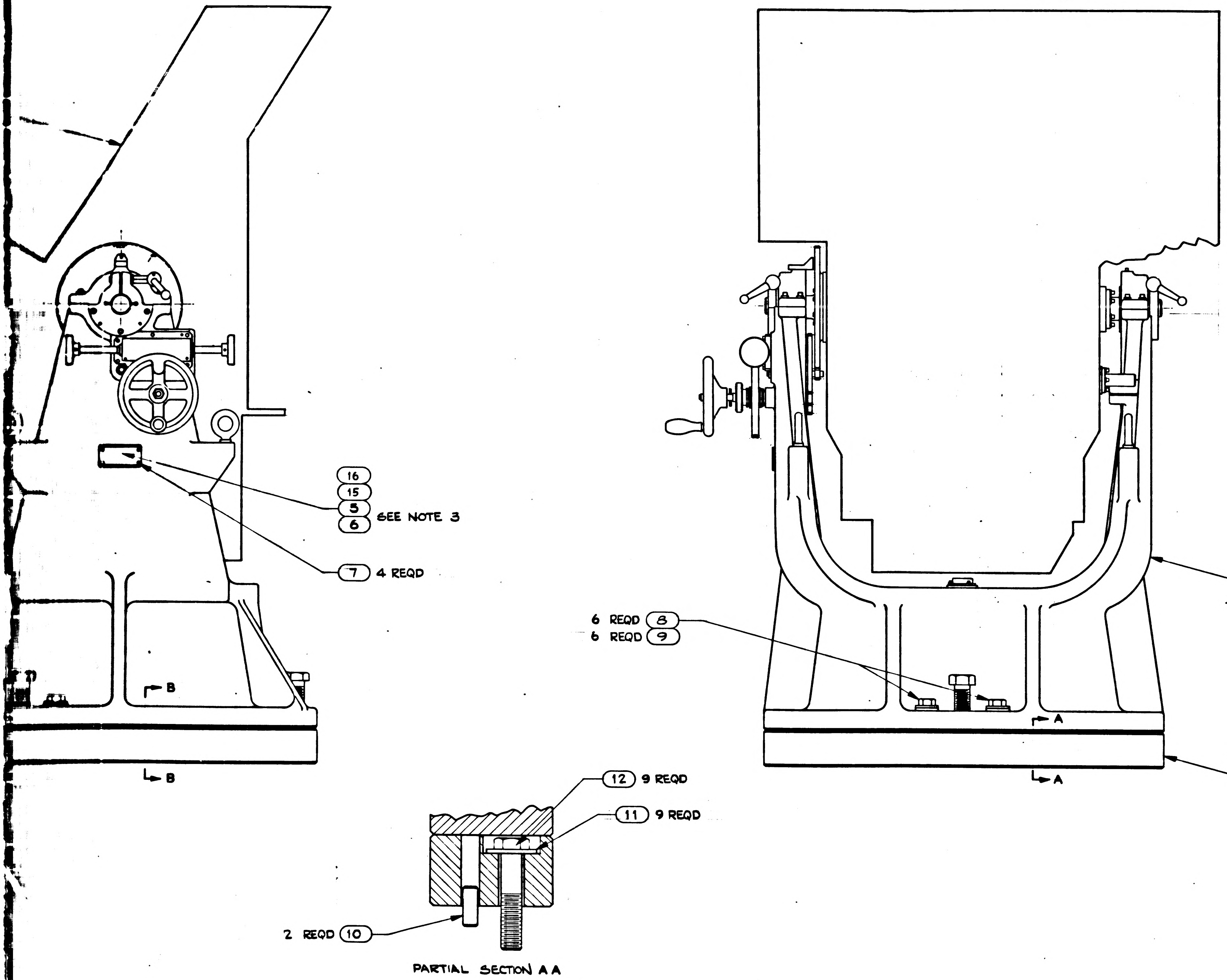

12 9 REQD
11 9 REQD
2 REQD 10

PARTIAL SECTION A A

2900067 REV V SHT 1

1/2900067

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
J		REPLACE REV (H) WITH CHANGE PER MXC 209165		14 FEB 66	JHC
Ⓜ K		INITIAL RELEASE CLASS A PER TDRR 26766		15 FEB 66	J J
L		REVISED PER TDRR 29968		15 JUL 66	3
M		REVISED PER TDRR 33555		19 APR 67	JC RCB



	-041	-031	-021	-011	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	CODE IDENT
	1	–	–	–	17	2900673-021	CRADLE ASSY	
	1	–	–	–	16	1004260-556	NAMEPLATE	
	–	1	–	–	15	1004260-526	NAMEPLATE	
SEE NOTE 4	1	1	–	–	14	1902582-021	CRADLE ASSEMBLY	
	3	3	3	3	13	MS16556-104	PIN, STRAIGHT	
	9	9	9	9	12	MS35305-242	SCREW, CAP	
	9	9	9	9	11	MS15795-126	WASHER, FLAT	
	2	2	2	2	10	MS16556-101	PIN, STRAIGHT	
	6	6	6	6	9	MS35305-240	SCREW, CAP	
SEE NOTE 2	6	6	6	6	8	1016095-007	WASHER, SPHERICAL	
SEE NOTE 2	4	4	4	4	7	1006783-9	SCREW, BUTTON HD	
	–	–	1	–	6	1004260-176	NAMEPLATE	
	–	–	–	1	5	1004260-132	NAMEPLATE	
SEE NOTE 4	–	–	1	–	4	1902582-011	CRADLE ASSY	
SEE NOTE 4	–	1	1	1	3	2900673-011	CRADLE ASSY	
	1	1	1	1	2	2901175-011	BASE ASSY, LOWER	
	1	1	1	1	1	1900622	RING, BASE	

QUANTITY REQUIRED — LIST OF PARTS AND MATERIALS

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

NEXT ASSY	USED ON	APPLICABLE DASH NO.
		-021
1900030	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON
2 PLACE DECIMALS ± — 3 PLACE DECIMALS ± — ANGLES ± —
MATERIAL —
APPROVAL
REFERENCE (ACSK ONLY) DO. 61464

DRAFTSMAN Jenquin 28 Jan 66
CHECKER Ed Foster 7 Feb 66
ENGINEER
APPROVAL
CONTRACT NAS9-497
MIT/ILCCB
DESIGN ACTIVITY APPROVAL
MSC
OTHER APPROVAL A. C. METZGER

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.

FIXTURE, MOUNTING, G AND N

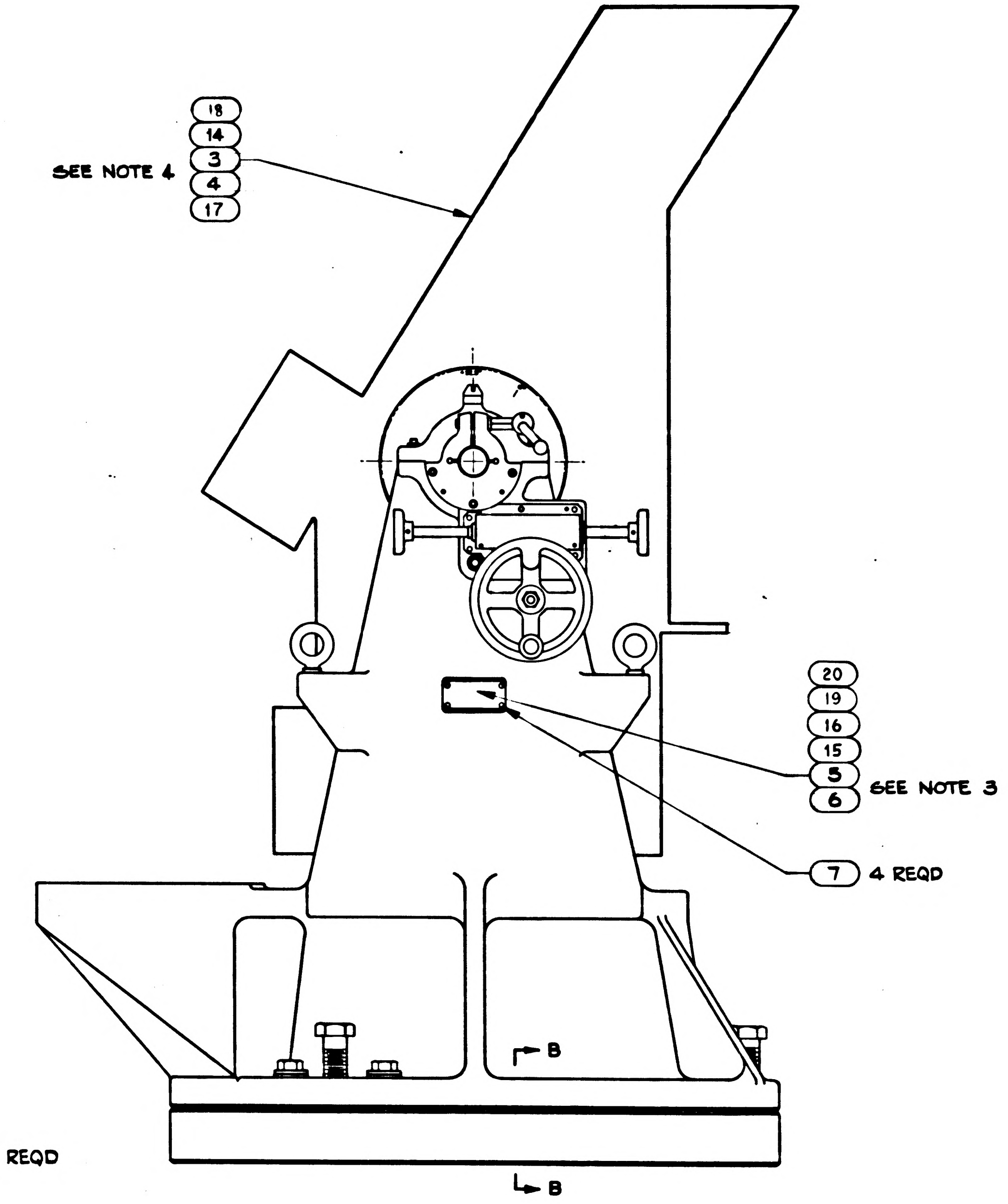
SIZE J2 CODE IDENT NO. 99974 2900067
SCALE 1:4 SHEET 1 of 1

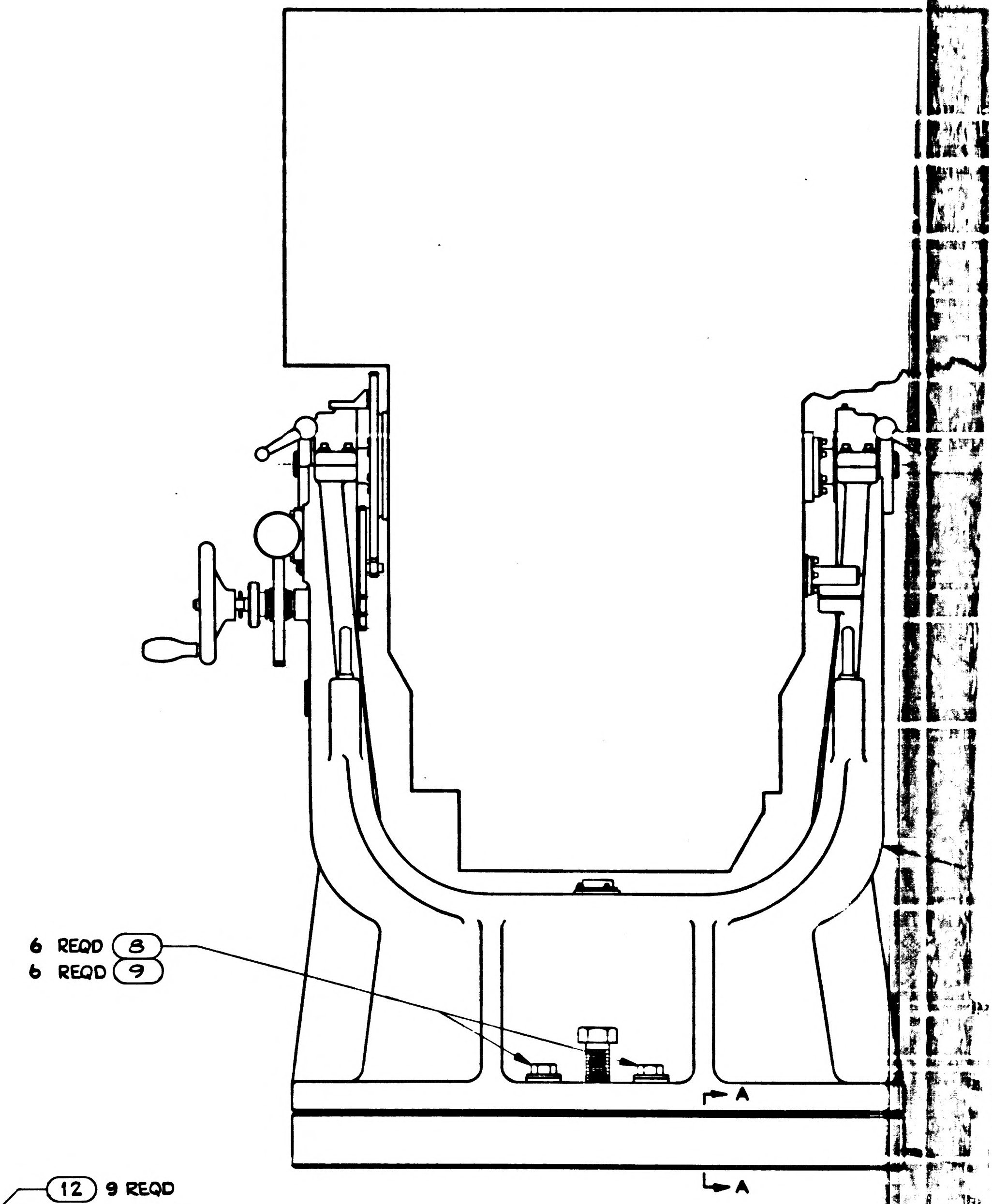
2900067 REV M SHT 1

242900067

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM - SEE SPEC CONTROL DRAWING.
3. MARK APPLICABLE CONTRACT NO. AND SERIAL NO. ON ITEM (5) OR (6) OR (15) OR (16) OR (19) OR (20) IN ACCORDANCE WITH ND1002023.
   LETTERS AND NUMERALS TO BE .12 HIGH.
4. THE -021 AND -031 AND -041 AND -051 ASSEMBLIES SHALL INCLUDE TWO CRADLE ASSEMBLIES, ONE OF WHICH SHALL BE FURNISHED AS A LOOSE ITEM.


18
14
3
4
17
SEE NOTE 4
20
19
16
15
5
6
SEE NOTE 3
7 4 REQD
B
B


6 REQD 8
6 REQD 9
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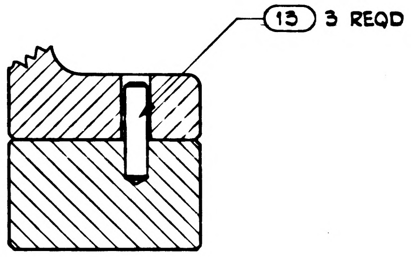
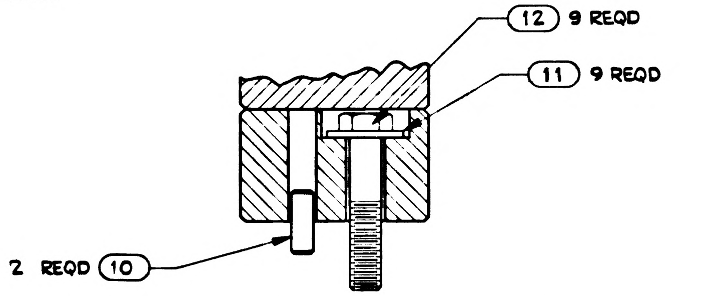


PARTIAL SECTION B B

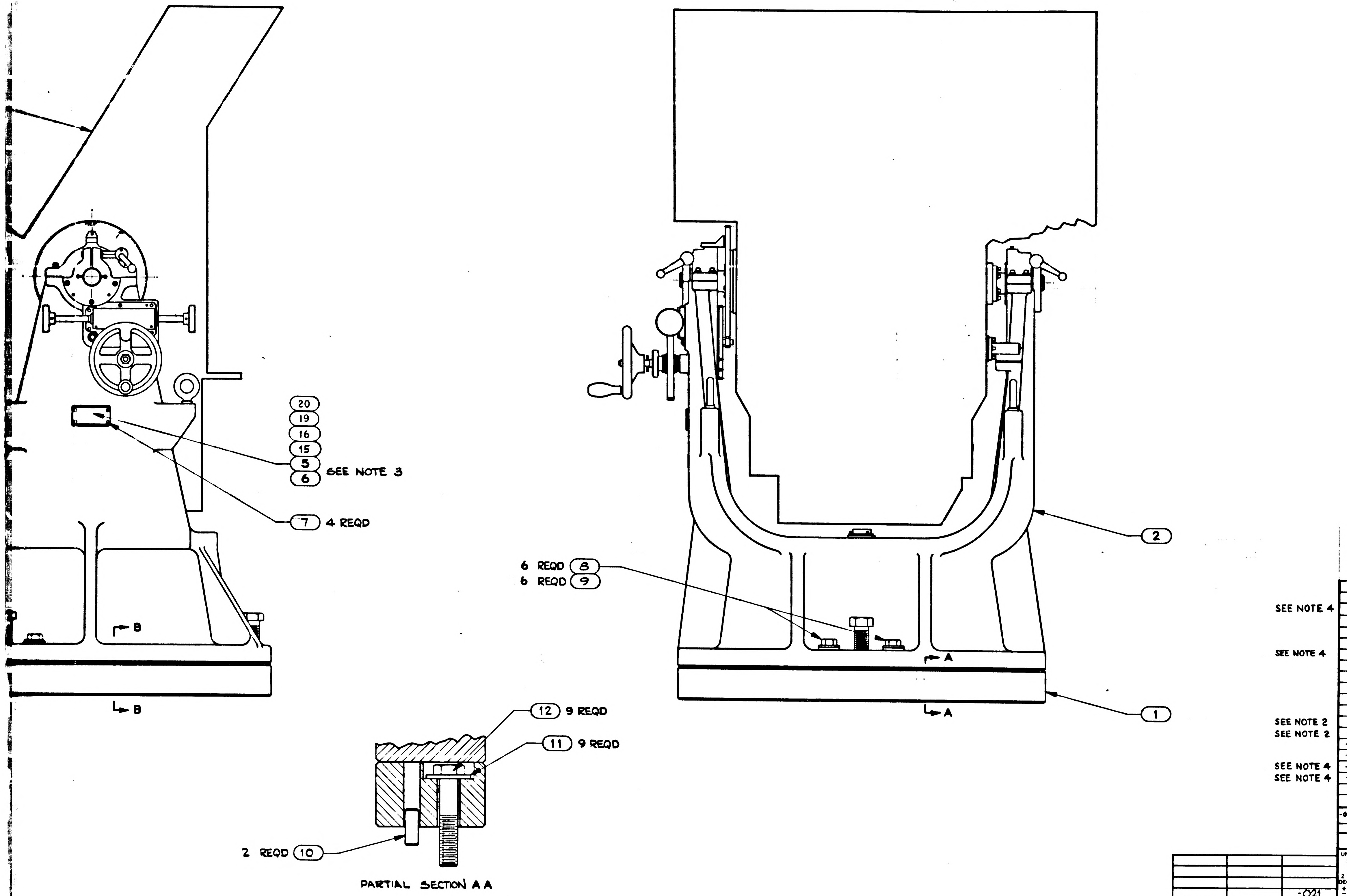

12 9 REQD
11 9 REQD
2 REQD 10

PARTIAL SECTION A A

2900067 REV V SHT 1

1/2900067

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
J		REPLACE REV (H) WITH CHANGE PER MXC 209165		14 FEB 66	JRC
(M) K		INITIAL RELEASE CLASS A PER TDRR 26760		15 FEB	
L		REVISED PER TDRR 29968			
M		REVISED PER TDRR 33555		APR	JC RCB
N		REVISED PER TDRR 35680		FEB	



	-061	-051	-041	-031	-021	-011	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1	–	–	–	–	–	20	1004260-576	NAMEPLATE
	–	1	–	–	–	–	19	1004260-572	NAMEPLATE
SEE NOTE 4	1	1	–	–	–	–	18	2900673-031	CRADLE ASSY
	–	–	1	–	–	–	17	2900673-021	CRADLE ASSY
	–	–	1	–	–	–	16	1004260-556	NAMEPLATE
	–	–	–	1	–	–	15	1004260-526	NAMEPLATE
SEE NOTE 4	–	1	1	1	–	–	14	1902582-021	CRADLE ASSEMBLY
	3	3	3	3	3	3	13	MS16556-104	PIN, STRAIGHT
	9	9	9	9	9	9	12	MS35305-242	SCREW, CAP
	9	9	9	9	9	9	11	MS15795-126	WASHER, FLAT
	2	2	2	2	2	2	10	MS16556-101	PIN, STRAIGHT
	6	6	6	6	6	6	9	MS35305-240	SCREW, CAP
SEE NOTE 2	6	6	6	6	6	6	8	1016095-007	WASHER, SPHERICAL
SEE NOTE 2	4	4	4	4	4	4	7	1006783-9	SCREW, BUTTON HD
	–	–	–	–	1	–	6	1004260-176	NAMEPLATE
	–	–	–	–	–	1	5	1004260-132	NAMEPLATE
SEE NOTE 4	–	–	–	–	1	–	4	1902582-011	CRADLE ASSY
SEE NOTE 4	–	–	–	1	1	1	3	2900673-011	CRADLE ASSY
	1	1	1	1	1	1	2	2901175-011	BASE ASSY, LOWER
	1	1	1	1	1	1	1	1900622	[illegible] G, BASE
	QUANTITY REQUIRED						LIST OF PARTS AND MATERIALS		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

NEXT ASSY	USED ON	APPLICABLE DASH NO
		-021
1900030	1900030	-011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON
2 PLACE DECIMALS ± — 3 PLACE DECIMALS ± — ANGLES ± —
MATERIAL —
APPROVAL
REFERENCE (ACSK ONLY) DO. 61464

DRAFTSMAN Jenquin 28 Jan 66 DAY MO YR
CHECKER Ed Foster 7 Feb 66
ENGINEER R.C. Hilbrandt
APPROVAL
CONTRACT NAS9-497
DESIGN ACTIVITY APPROVAL
NASC
OTHER APPROVAL A. G. Metzger

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.

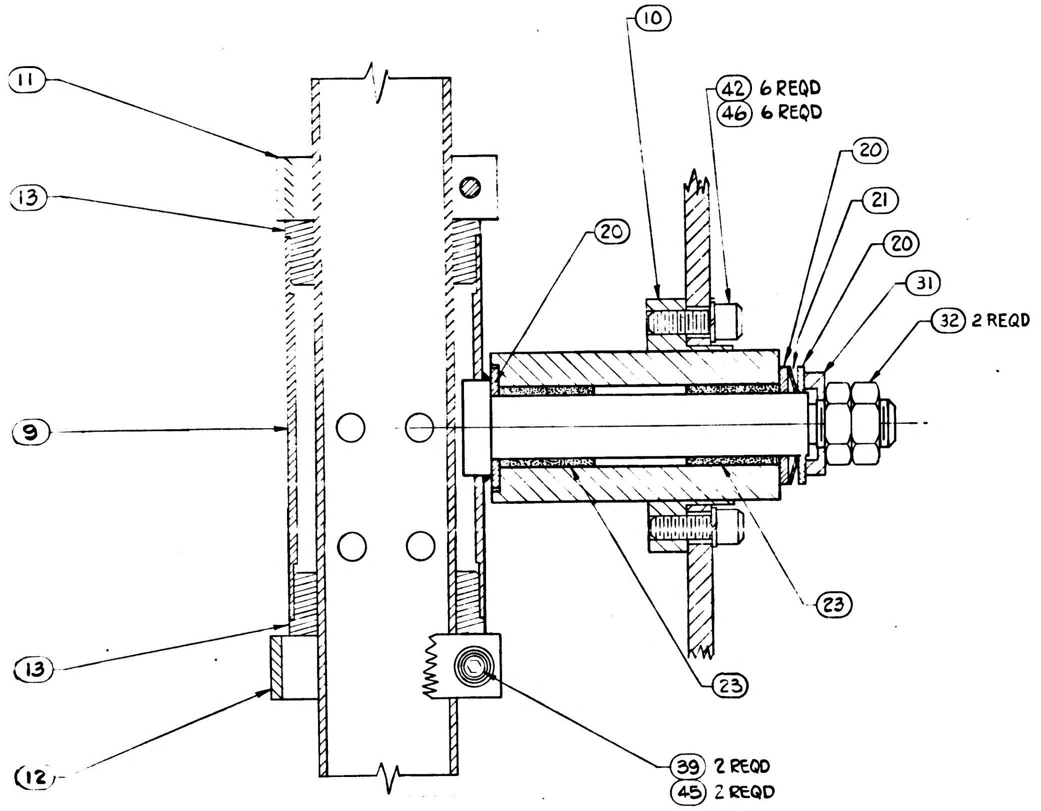
FIXTURE, MOUNT G, G AN

SIZE J2 | CODE IDENT NO 99974 | 2900067
SCALE 1:4 | SHEET 1 OF 1

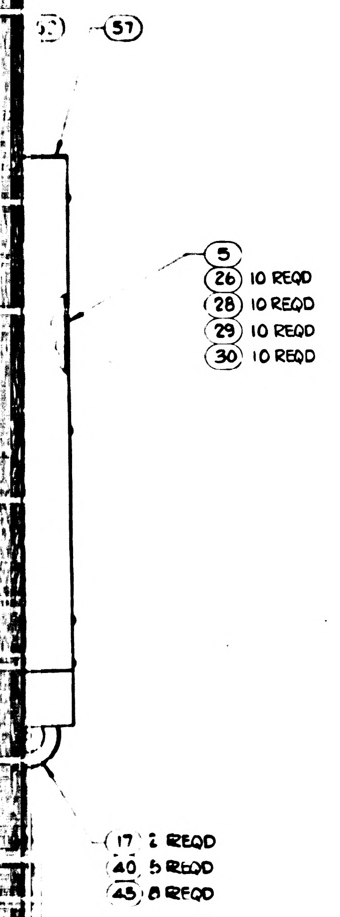
2900067 REV N SHT 1

27 2900067

REVISIONS 23379					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
C	—	REPLACES REV B WITH CHANGE PER MXC-203746	—	- AUG-65	B. RWH
D	—	REVISED PER MXC 204343	—	3 SEPT 65	
E	-	REVISED PER MXC-205057		22 SEP 65	RJJ
F	-	REVISED PER MXC 205610	—	OCT 65	
G		INITIAL RELEASE CLASS A PER TDRR 23379		5 OCT 65	



PARTIAL SECTION A-A
SCALE 1:1



				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				8		67	MS35338-82	WASHER, SPRING LOCK
				6		66	MS16996-24	SCREW, SOC. HD
				2		65	MS16996-23	SCREW, SOC. HD
				1		64	2900803	BAR, BUS
				AR		63	MIL-I-8660	SILICON GREASE (ES2311)
SEE NOTE 3				AR		62	1016201	CURING AGENT
SEE NOTE 3				AR		61	1016200	FILLER CALCIUM
SEE NOTE 3				AR		60	1016199	RESIN EPOXY
				1		59	2900345-006	CUSHION
				1		58	2900345-005	CUSHION
				1		57	2900345-004	CUSHION
				1		56	2900345-003	CUSHION
				1		55	2900345-002	CUSHION
				1		54	2900345-001	CUSHION
				1		53	2900345-008	CUSHION
				1		52	2900345-007	CUSHION
						51		
						50		
				4		49	MS 21083-C6	NUT - SELF LOCKING
				16		48	MS 21083-C08	NUT - SELF LOCKING
				2		47	AN960-C10	(1897006-017) WASHER FLAT
				6		46	MS 35338-84	WASHER, LOCK
				18		45	MS 35338-83	WASHER, LOCK
				12		44	MS 35338-81	WASHER, LOCK
				16		43	MS 35200-43	SCREW, FLAT HD
				6		42	MS 16995-81	SCREW, SOC HD
				4		41	MS 16996-40	SCREW, SOC HD
				16		40	MS 16995-78	SCREW, SOC HD
				2		39	MS 16996-34	SCREW, SOC HD
						38		
				8		37	MS 16995-26	SCREW, SOC HD
SEE NOTE 3				1		36	1897363-001	RUBBER CHANNEL, 8.00 FT LONG
				16		35	2900344	SHIM, SLIDE BRACKET
SEE NOTE 3				4		34	1000250-2	SCREW, BUTTON HD
				1		33	1004260-135	NAMEPLATE
				2		32	MS 35691-1230	NUT, PLAIN, HEX
				1		31	2900785	WASHER, THRUST
SEE NOTE 3				38		30	1015857-1	WASHER, RETAINER
				38		29	1016061-001	SPRING, EJECTOR
				38		28	1016062-001	WASHER, WEAR
				6		27	1897295-014	FASTENER, STUD
				32		26	1897295-011	FASTENER, STUD
SEE NOTE 3				4		25	1010400-15	CLAMP, LOOP
				4		24	1016105-010	CLAMP, STRAP
SEE NOTE 7				2		23	MS 17795-143	BEARING
						22		
				1		21	1900720	WASHER, SPRING
				3		20	1900641	WASHER, THRUST
SEE NOTE 3				1		19	1897297	SLIDE L.H.
				1		18	1897298	SLIDE R.H.
				2		17	1897272	CASTER, SWIVEL
SEE NOTE 5				2		16	1897271	CASTER, BRAKE
						15		
SEE NOTE 6						14		
				2		13	2900347	BEARING, FLANGE
				1		12	2900337	CLAMP, LOWER
				1		11	2900336	CLAMP, UPPER
				1		10	2900338	HUB, FULCRUM
				1		9	2900333	SUPPORT, ROTATING (INSEP ASSY)
				1		8	2900329	ARM, CONDUIT (INSEP ASSY)
				1		7	2900331	BRACKET, SLIDE SUPPORT L.H.
				1		6	2900332	BRACKET, SLIDE SUPPORT R.H.
				1		5	2900343	COVER, REAR (INSEP ASSY)
				1		4	2900342	COVER, RIGHT SIDE (INSEP ASSY)
				1		3	2900341	COVER, LEFT SIDE (INSEP ASSY)
				1		2	2900339	COVER, FRONT (INSEP ASSY)
				1		1	2900330	SUB SYSTEM MTG FIXT (INSEP ASSY)

QUANTITY REQUIRED
LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900070-011	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 30-MAR-65
CHECKED Ed Foster 2 AUG 65
APPROVAL E. F. Harms 3 AUG 65
APPROVAL L. Jelsman
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SUB SYSTEM MOUNTING FIXTURE
CART ASSEMBLY

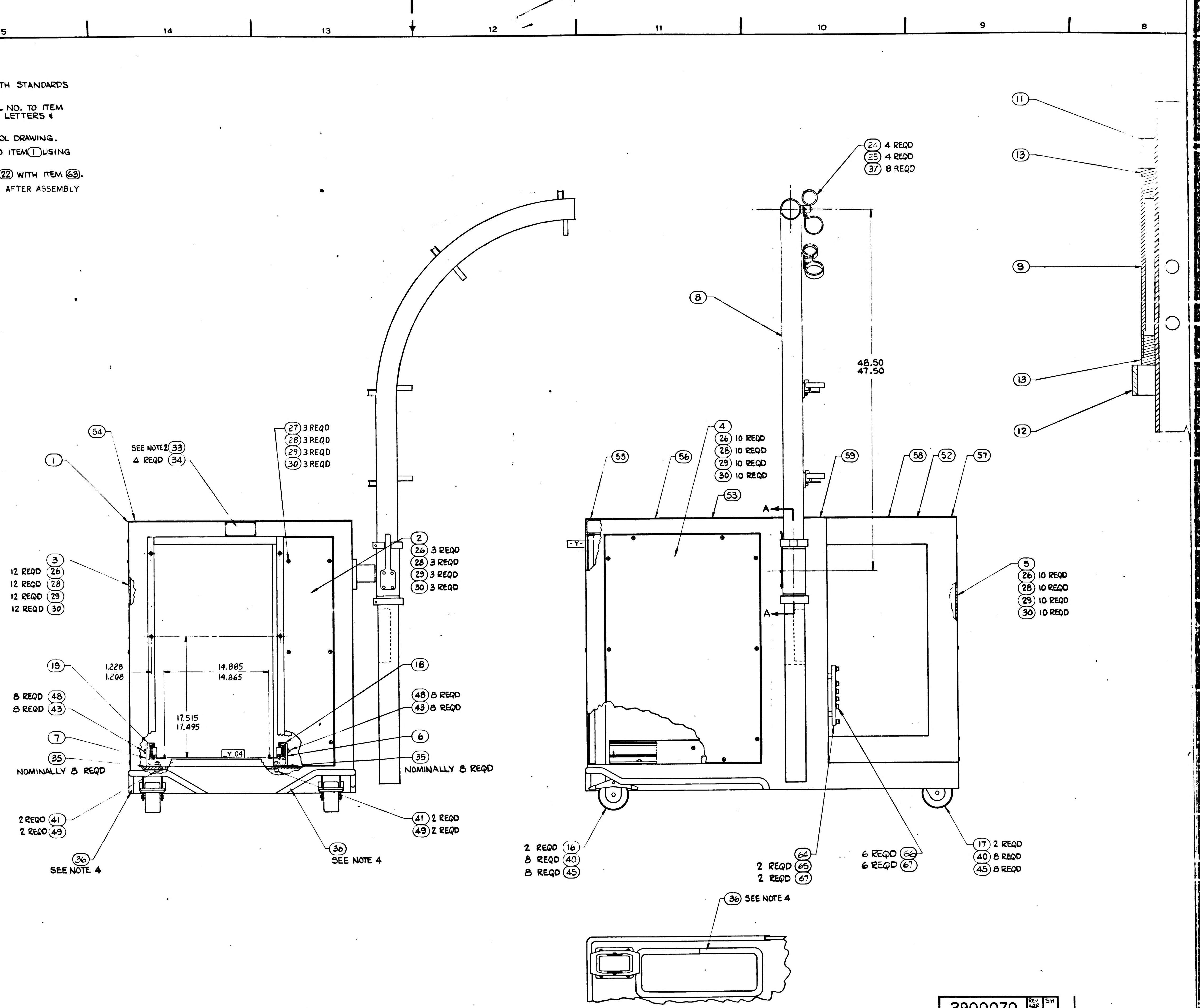
CODE IDENT NO. 99974
SIZE 2
2900070
SCALE 1:4
SHEET 1 OF 1

2900070 REV SH 1

2900070

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK APPLICABLE CONTRACT NO. & SERIAL NO. TO ITEM (33) IN ACCORDANCE WITH ND 1002023. LETTERS & NUMERALS TO BE .100-.140 HIGH.
3. VENDOR ITEM- SEE SPECIFICATION CONTROL DRAWING.
4. BOND ITEM (36) & ITEMS (52) THRU (59) TO ITEM (1) USING ITEMS (60), (61) & (62).
5. COAT MATING SURFACE OF ITEMS (20), (21) & (22) WITH ITEM (63).
6. SIZE ITEMS (23) TO 1.002-1.010 INSIDE DIA AFTER ASSEMBLY TO ITEM [illegible], IF NECESSARY.



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SEE NOTE 2 (33)
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(30) 3 REQD
(3)
12 REQD (26)
12 REQD (28)
12 REQD (29)
12 REQD (30)
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(26) 3 REQD
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(29) 3 REQD
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1.208
14.885
14.865
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SEE NOTE 4
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SEE NOTE 4
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(36) SEE NOTE 4
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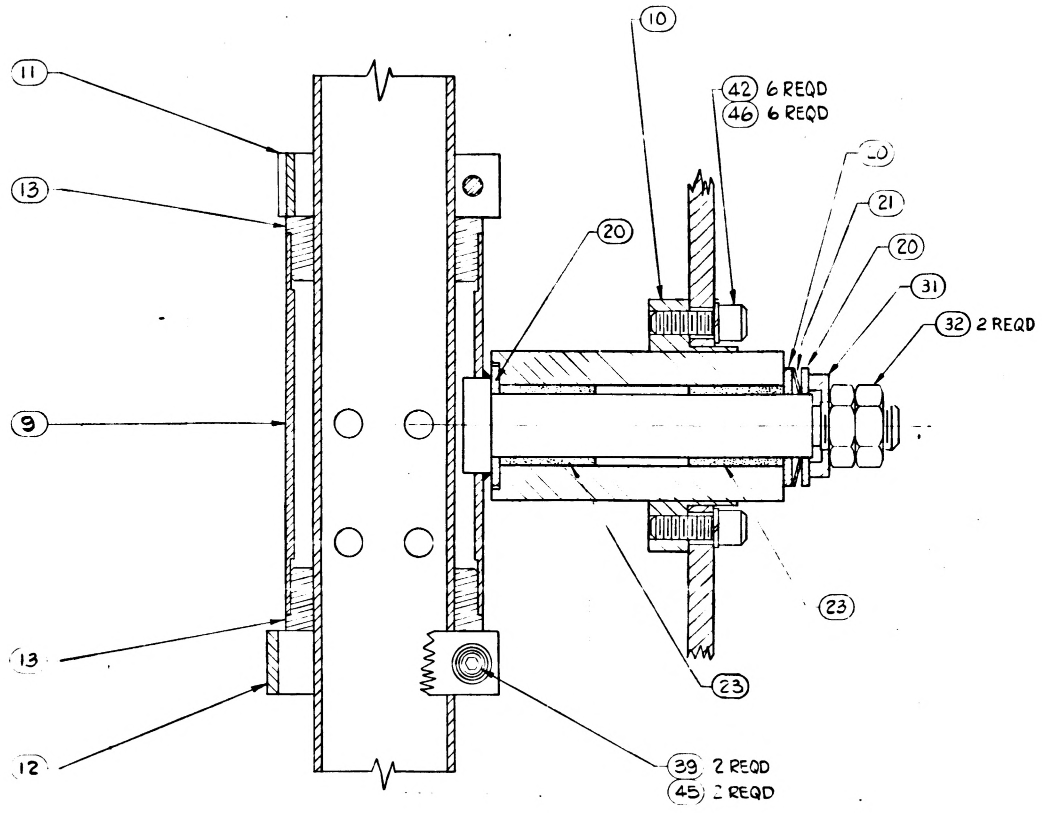
2900070	REV	SH 1

1/2900070

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
		REVISIONS 23379			
C	—	REPLACES REV B WITH CHANGE PER MXC-203746	—	11-AUG-65	B. RWH
D	—	REVISED PER MXC 204343	—	3 SEPT 65	NTY
E	-	REVISED PER MXC-205057		22 SEP 65	RJJ
F	-	REVISED PER MXC 205610	—	11 OCT 65	LK
G		INITIAL RELEASE CLASS A PER TDRR 23379		18 OCT 65	JR
H		REVISED PER TDRR 24336		30 NOV 65	BLP



2) (57)

PARTIAL SECTION A-A
SCALE 1:1

5
26 10 REQD
28 10 REQD
29 10 REQD
30 10 REQD

17 2 REQD
40 8 REQD
46 8 REQD

				011	EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				8		67	MS35338-82	WASHER, SPRING LOCK
				6		66	MS16996-24	SCREW, SOC. HD
				2		65	MS16996-23	SCREW, SOC. HD
				1		64	2900803	BAR, BUS
				AR		63	MIL-I-8660	SILICON GREASE (ES2311)
SEE NOTE 3				AR		62	1016201	CURING AGENT
SEE NOTE 3				AR		61	1016200	FILLER CALCIUM
SEE NOTE 3				AR		60	1016199	RESIN EPOXY
				1		59	2900345-006	CUSHION
				1		58	2900345-005	CUSHION
				1		57	2900345-004	CUSHION
				1		56	2900345-003	CUSHION
				1		55	2900345-002	CUSHION
				1		54	2900345-001	CUSHION
				1		53	2900345-008	CUSHION
				1		52	2900345-007	CUSHION
						51		
						50		
				4		49	MS 21083-C6	NUT - SELF LOCKING
				16		48	MS 21083-C08	NUT - SELF LOCKING
				2		47	AN960-C10	(1897006-017) WASHER FLAT
				22		46	MS 35338-84	WASHER, LOCK
				2		45	MS 35338-83	WASHER, LOCK
				12		44	MS 35338-81	WASHER, LOCK
				16		43	MS 35200-43	SCREW, FLAT HD
				6		42	MS 16995-81	SCREW, SOC HD
				4		41	MS 16996-40	SCREW, SOC HD
				16		40	MS 16995-78	SCREW, SOC HD
				2		39	MS 16996-34	SCREW, SOC HD
						38		
				8		37	MS 16995-26	SCREW, SOC HD
SEE NOTE 3				1		36	1897363-001	RUBBER CHANNEL, 8.00 FT LONG
				16		35	2900344	SHIM, SLIDE BRACKET
SEE NOTE 3				4		34	1000250-2	SCREW, BUTTON HD
				1		33	1004260-135	NAMEPLATE
				2		32	MS 35691-1230	NUT, PLAIN, HEX
				1		31	2900785	WASHER, THRUST
SEE NOTE 3				38		30	1015857-1	WASHER, RETAINER
				38		29	1016061-001	SPRING, EJECTOR
				38		28	1016062-001	WASHER, WEAR
				6		27	1897295-014	FASTENER, STUD
				32		26	1897295-011	FASTENER, STUD
SEE NOTE 3				4		25	1010400-15	CLAMP, LOOP
				4		24	1016105-010	CLAMP, STRAP
SEE NOTE 7				2		23	MS 17795-143	BEARING
						22		
				1		21	1900720	WASHER, SPRING
				3		20	1900641	WASHER, THRUST
SEE NOTE 3				1		19	1897297	SLIDE L.H.
				1		18	1897298	SLIDE R.H.
				2		17	1897272	CASTER, SWIVEL
SEE NOTE 3				2		16	1897271	CASTER, BRAKE
						15		
SEE NOTE 6						14		
				2		13	2900347	BEARING, FLANGE
				1		12	2900337	CLAMP, LOWER
				1		11	2900336	CLAMP, UPPER
				1		10	2900338	HUB, FULCRUM
				1		9	2900333	SUPPORT, ROTATING (INSEP ASSY)
				1		8	2900329	ARM, CONDUIT (INSEP ASSY)
				1		7	2900331	BRACKET, SLIDE SUPPORT L.H.
				1		6	2900332	BRACKET, SLIDE SUPPORT R.H.
				1		5	2900343	COVER, REAR (INSEP ASSY)
				1		4	2900342	COVER, RIGHT SIDE (INSEP ASSY)
				1		3	2900341	COVER, LEFT SIDE (INSEP ASSY)
				1		2	2900339	COVER, FRONT (INSEP ASSY)
				1		1	2900330	SUB SYSTEM MTG FIXT (INSEP ASSY)

QUANTITY REQUIRED — LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO
2900070-011	1900030	011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN 30-MAR 65
CHECKED Ed Foote 2 AUG 65
APPROVAL R. F. Narmi 3 Aug 65
APPROVAL L Yeoman
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SUB SYSTEM MOUNTING FIXTURE
CART ASSEMBLY

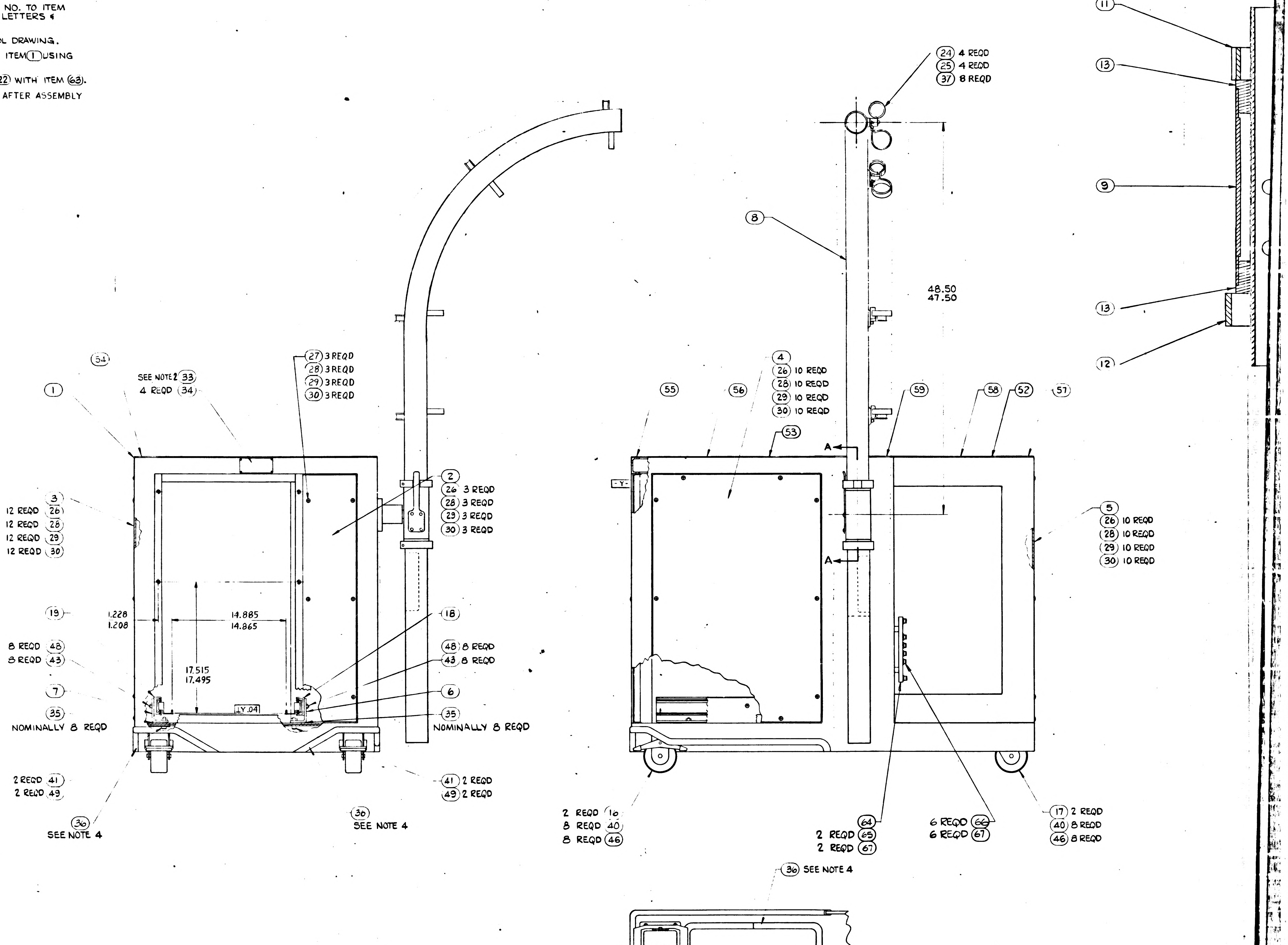
CODE IDENT NO 99974
SIZE 2
2900070
SCALE 1:4
SHEET 1 OF 1

2900070 REV H SH 1

27 2900070

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK APPLICABLE CONTRACT NO. & SERIAL NO. TO ITEM ㉝ IN ACCORDANCE WITH ND 1002023. LETTERS & NUMERALS TO BE .100-.140 HIGH.
3. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
4. BOND ITEM ㊱ & ITEMS (52) THRU (59) TO ITEM ① USING ITEMS (60), (61) & (62).
5. COAT MATING SURFACE OF ITEMS ⑳, ㉑ & ㉒ WITH ITEM (63).
7. SIZE ITEMS ㉓ TO 1.002-1.010 INSIDE DIA AFTER ASSEMBLY TO ITEM ⑩, IF NECESSARY.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①
SEE NOTE 2 ㉝
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12 REQD ㉖
12 REQD ㉘
12 REQD ㉙
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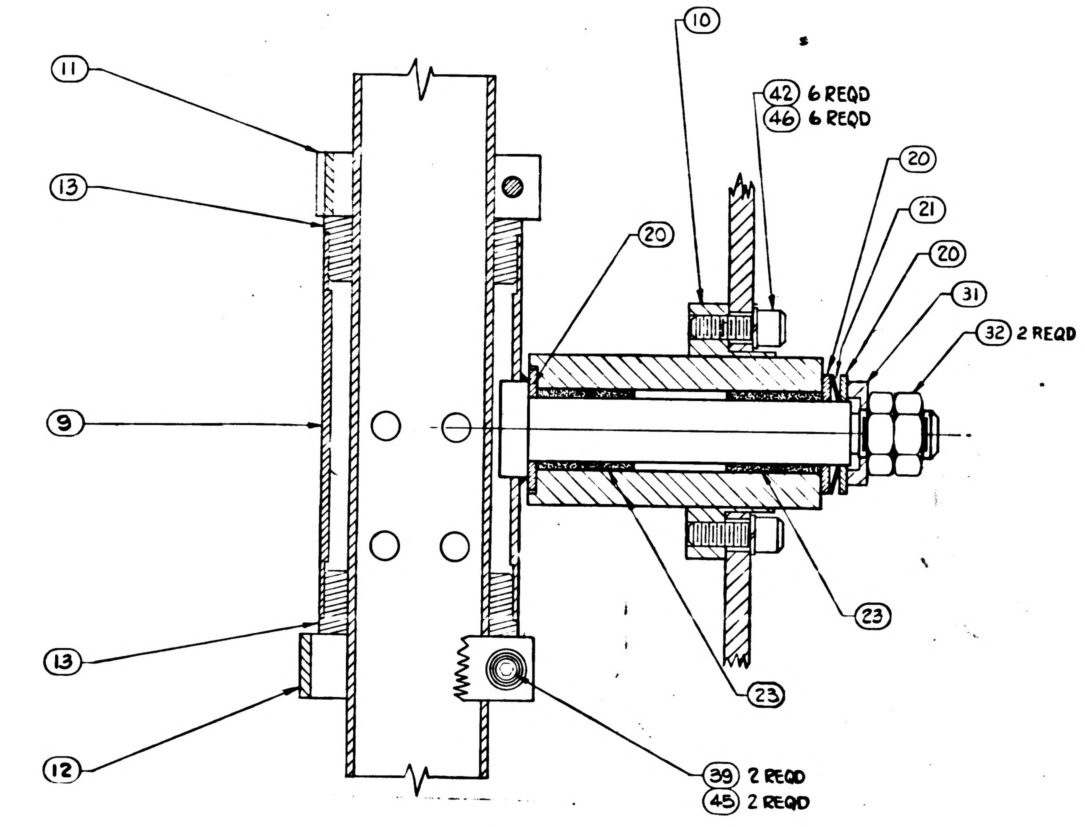
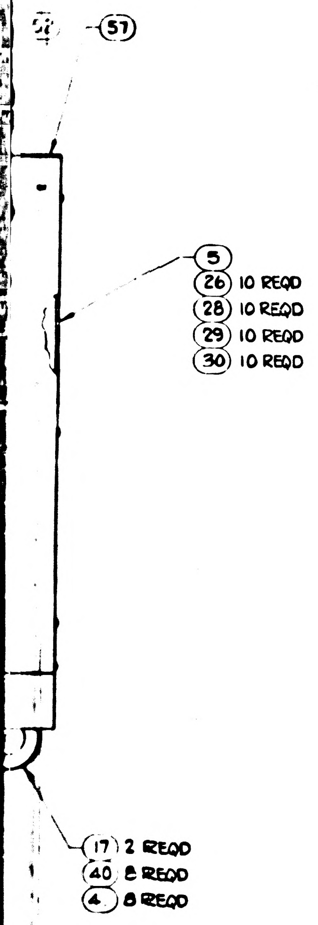
2900070 REV LTR H SH 1

1729000070

REVISIONS		23379			
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
C	—	REPLACES REV B WITH CHANGE PER MXC-203746	—	11-AUG-65	B. RWH
D	—	REVISED PER MXC 204343	—	3 SEPT 65	
E	-	REVISED PER MXC-205057		22 SEP 65	RJJ
F	-	REVISED PER MXC 205610	—	11 OCT 65	LK
G		INITIAL RELEASE CLASS A PER TDRR 23379		18 OCT 65	JR
H		REVISED PER TDRR 24336		30 NOV 65	
J		REVISED PER TDRR 24126		1 DEC 65	



PARTIAL SECTION A-A
SCALE 1:1



	QUANTITY REQUIRED							
				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				8		67	MS35338-82	WASHER, SPRING LOCK
				6		66	MS16996-24	SCREW, SOC. HD
				2		65	MS16996-23	SCREW, SOC. HD
				1		64	2900803	BAR, BUS
				AR		63	MIL-I-8660	SILICON GREASE (ES2311)
SEE NOTE 3				AR		62	1016201	CURING AGENT
SEE NOTE 3				AR		61	1016200	FILLER CALCIUM
SEE NOTE 3				AR		60	1016199	RESIN EPOXY
				1		59	2900345-006	CUSHION
				1		58	2900345-005	CUSHION
				1		57	2900345-004	CUSHION
				1		56	2900345-003	CUSHION
				1		55	2900345-002	CUSHION
				1		54	2900345-001	CUSHION
				1		53	2900345-008	CUSHION
				1		52	2900345-007	CUSHION
						51		
						50		
				4		49	MS 21083-C6	NUT - SELF LOCKING
				16		48	MS 21083-C08	NUT - SELF LOCKING
				2		47	AN960-C10	(1897006-017) WASHER FLAT
				22		46	MS 35338-84	WASHER, LOCK
				2		45	MS 35338-83	WASHER, LOCK
				12		44	MS 35338-81	WASHER, LOCK
				16		43	MS 35200-43	SCREW, FLAT HD
				6		42	MS 6995-81	SCREW, SOC HD

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED							
				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				4		41	MS 16996-40	SCREW, SOC HD
				16		40	MS 16995-79	SCREW, SOC HD
				2		39	MS 16996-34	SCREW, SOC HD
						38		
				8		37	MS 16995-26	SCREW, SOC HD
SEE NOTE 3				1		36	1897363-001	RUBBER CHANNEL, 8.00 FT LONG
				16		35	2900344	SHIM, SLIDE BRACKET
SEE NOTE 3				4		34	1000250-2	SCREW, BUTTON HD
				1		33	1004260-135	NAMEPLATE
				2		32	MS 35691-1230	NUT, PLAIN, HEX
				1		31	2900785	WASHER, THRUST
SEE NOTE 3				38		30	1015857-1	WASHER, RETAINER
				38		29	1016061-001	SPRING, EJECTOR
				38		28	1016062-001	WASHER, WEAR
				6		27	1897295-014	FASTENER, STUD
SEE NOTE 3				32		26	1897295-011	FASTENER, STUD
				4		25	1010400-15	CLAMP, LOOP
				4		24	1016105-010	CLAMP, STRAP
SEE NOTE 7				2		23	MS 17795-143	BEARING
						22		
				1		21	1900720	WASHER, SPRING
				3		20	1900641	WASHER, THRUST
SEE NOTE 3				1		19	1897297	SLIDE L.H.
				1		18	1897298	SLIDE R.H.
				2		17	1897272	CASTER, SWIVEL
SEE NOTE 3				2		16	1897271	CASTER, BRAKE
						15		
SEE NOTE 6						14		
				2		13	2900347	BEARING, FLANGE
				1		12	2900337	CLAMP, LOWER
				1		11	2900336	CLAMP, UPPER
				1		10	2900338	HUB, FULCRUM
				1		9	2900333	SUPPORT, ROTATING (INSEP ASSY)
				1		8	2900329	ARM, CONDUIT (INSEP ASSY)
				1		7	2900331	BRACKET, SLIDE SUPPORT L.H.
				1		6	2900332	BRACKET, SLIDE SUPPORT R.H.
				1		5	2900343	COVER, REAR (INSEP ASSY)
				1		4	2900342	COVER, RIGHT SIDE (INSEP ASSY)
				1		3	2900341	COVER, LEFT SIDE (INSEP ASSY)
				1		2	2900339	COVER, FRONT (INSEP ASSY)
				1		1	2900330	SUB SYSTEM MTG FIXT (INSEP ASSY

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900070-011	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS + − ANGLES + −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN 30-MAR-65
CHECKED Ed Foster 2 AUG 65
APPROVAL E. F. Nam 13 Aug 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SUB SYSTEM MOUNTING FIXTURE
CART ASSEMBLY

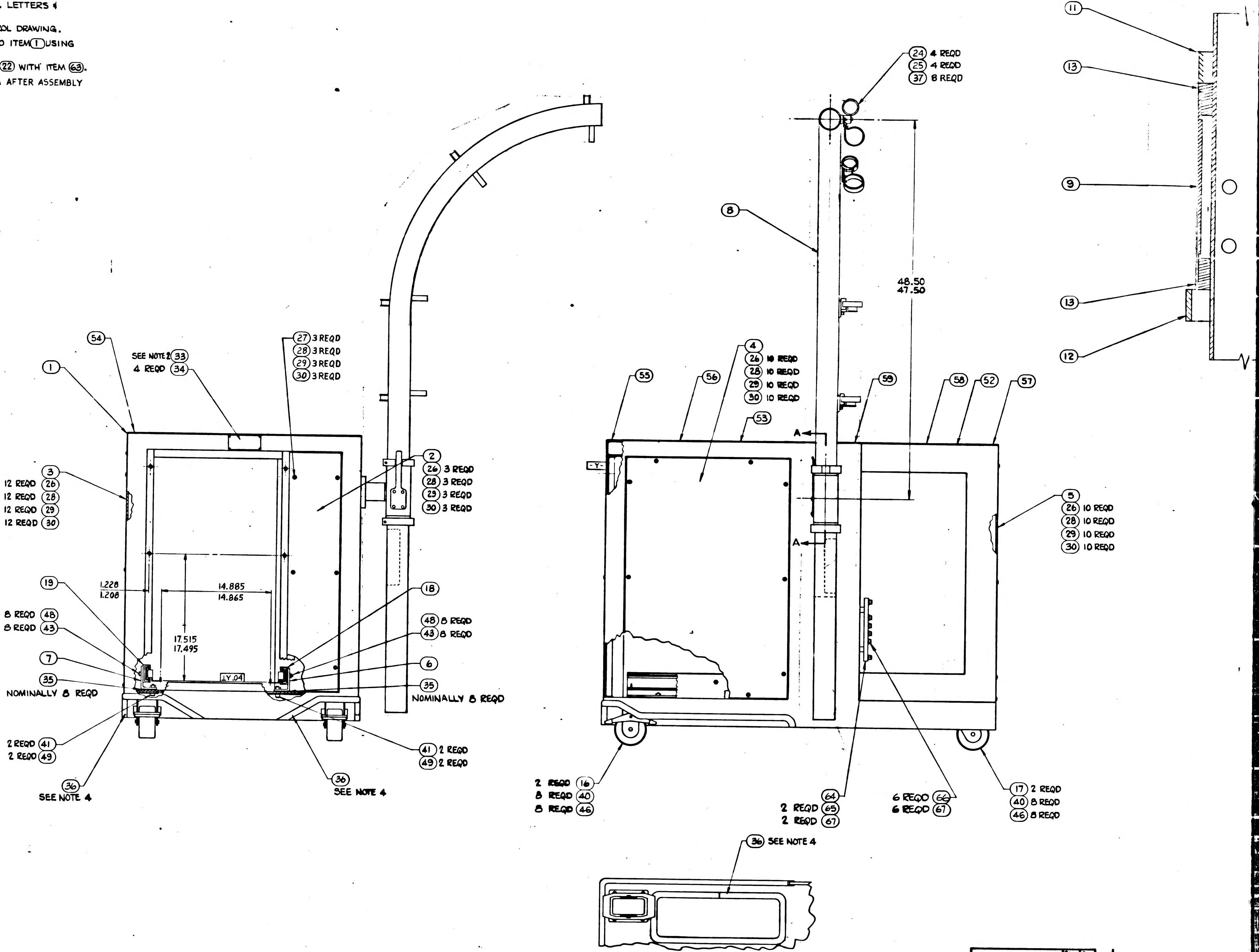
CODE IDENT NO. 99974
SIZE J2
2900070
SCALE 1:4
SHEET 1 OF 1

2900070 REV J SH 1

2/2900070

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK APPLICABLE CONTRACT NO. & SERIAL NO. TO ITEM (33) IN ACCORDANCE WITH ND 1002023. LETTERS & NUMERALS TO BE .100-.140 HIGH.
3. VENDOR ITEM- SEE SPECIFICATION CONTROL DRAWING.
4. BOND ITEM (36) & ITEMS (52) THRU (59) TO ITEM (1) USING ITEMS (60), (61) & (62).
5. COAT MATING SURFACE OF ITEMS (20), (21) & (22) WITH ITEM (63).
7. SIZE ITEMS (23) TO 1.002-1.010 INSIDE DIA AFTER ASSEMBLY TO ITEM (10), IF NECESSARY.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SEE NOTE 2 (33)
4 REQD (34)
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(27) 3 REQD
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(3)
12 REQD (26)
12 REQD (28)
12 REQD (29)
12 REQD (30)
(2)
(26) 3 REQD
(28) 3 REQD
(29) 3 REQD
(30) 3 REQD
(19)
1.228
1.208
14.885
14.865
17.515
17.495
8 REQD (48)
8 REQD (43)
(7)
(35)
NOMINALLY 8 REQD
(18)
(48) 8 REQD
(43) 8 REQD
(6)
(35)
NOMINALLY 8 REQD
2 REQD (41)
2 REQD (49)
(36)
SEE NOTE 4
(36)
SEE NOTE 4
(41) 2 REQD
(49) 2 REQD
(24) 4 REQD
(25) 4 REQD
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(26) 10 REQD
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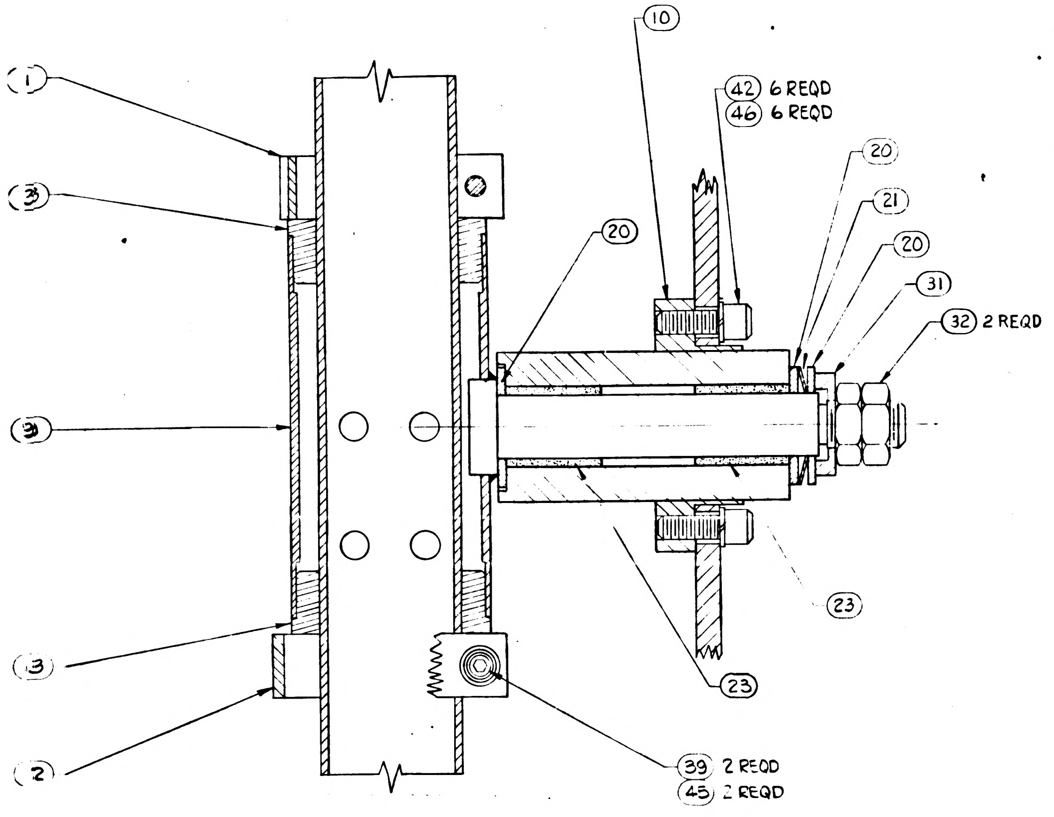
2 REQD (16)
8 REQD (40)
8 REQD (46)
(64)
2 REQD (65)
2 REQD (67)
6 REQD (66)
6 REQD (67)
(17) 2 REQD
(40) 8 REQD
(46) 8 REQD
(36) SEE NOTE 4

2900070 REV J SH 1

1/2900070

REVISIONS 23379					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
C	—	REPLACES REV B WITH CHANGE PER MXC-203746	—	11-AUG-65	B. RWH
D	—	REVISED PER MXC 204343	—	3 SEPT 65	NTY
E	-	REVISED PER MXC-205057		22 SEP 65	RJJ
F	-	REVISED PER MXC 205610	—	11 OCT 65	LK
G		INITIAL RELEASE CLASS A PER TDRR 23379		18 OCT 65	JR
H		REVISED PER TDRR 24336		30 NOV 65	RLP
J		REVISED PER TDRR 24126		1 DEC 65	
K		REVISED PER TDRR 24725		20 DEC 65	RLP



PARTIAL SECTION A-A
SCALE 1:1

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(26) 10 REQD
(28) 10 REQD
(29) 10 REQD
(30) 10 REQD

(17) 2 REQD
(40) 8 REQD
(46) 8 REQD

				011	EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				8		67	MS35338-82	WASHER, SPRING LOCK
				6		66	MS16996-24	SCREW, SOC. HD
				2		65	MS16996-23	SCREW, SOC. HD
				1		64	2900803	BAR, BUS
				AR		63	MIL-I-8660	SILICON GREASE (ES2311)
SEE NOTE 3				AR		62	1016201	CURING AGENT
SEE NOTE 3				AR		61	1016200	FILLER CALCIUM
SEE NOTE 3				AR		60	1016199	RESIN EPOXY
				1		59	2900345-006	CUSHION
				1		58	2900345-005	CUSHION
				1		57	2900345-004	CUSHION
				1		56	2900345-003	CUSHION
				1		55	2900345-002	CUSHION
				1		54	2900345-001	CUSHION
				1		53	2900345-008	CUSHION
				1		52	2900345-007	CUSHION
						51		
						50		
				4		49	MS 21083-C6	NUT - SELF LOCKING
				16		48	MS 21083-C08	NUT - SELF LOCKING
				2		47	AN960-C10	(1897006-017) WASHER FLAT
				22		46	MS 35338-84	WASHER, LOCK
				2		45	MS 35338-83	WASHER, LOCK
				12		44	MS 35338-81	WASHER, LOCK
				16		43	MS 35200-43	SCREW, FLAT HD
				6		42	MS 16995-81	SCREW, SOC HD
	QUANTITY REQUIRED						LIST OF PARTS AND MATERIALS	

				011	EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				4		41	MS 16996-40	SCREW, SOC HD
				16		40	MS 16995-79	SCREW, SOC HD
				2		39	MS 16996-34	SCREW, SOC HD
						38		
				8		37	MS 16995-26	SCREW, SOC HD
SEE NOTE 3				1		36	1897363-001	RUBBER CHANNEL, 8.00 FT LONG
				16		35	2900344	SHIM, SLIDE BRACKET
SEE NOTE 3				4		34	1000250-2	SCREW, BUTTON HD
				1		33	1004260-135	NAMEPLATE
				2		32	MS 35691-1230	NUT, PLAIN, HEX
				1		31	2900785	WASHER, THRUST
SEE NOTE 3				38		30	1015857-1	WASHER, RETAINER
				38		29	1016061-001	SPRING, EJECTOR
				38		28	1016062-001	WASHER, WEAR
				6		27	1015854-017	FASTENER, STUD
				32		26	1015854-014	FASTENER, STUD
SEE NOTE 3				4		25	1010400-15	CLAMP, LOOP
				4		24	1016105-010	CLAMP, STRAP
SEE NOTE 7				2		23	MS 17795-143	BEARING
						22		
				1		21	1900720	WASHER, SPRING
				3		20	1900641	WASHER, THRUST
SEE NOTE 3				1		19	1897297	SLIDE L.H.
				1		18	1897298	SLIDE R.H.
				2		17	1897272	CASTER, SWIVEL
SEE NOTE 3				2		16	1897271	CASTER, BRAKE
						15		
SEE NOTE 6						14		
				2		13	2900347	BEARING, FLANGE
				1		12	2900337	CLAMP, LOWER
				1		11	2900336	CLAMP, UPPER
				1		10	2900338	HUB, FULCRUM
				1		9	2900333	SUPPORT, ROTATING (INSEP ASSY)
				1		8	2900329	ARM, CONDUIT (INSEP ASSY)
				1		7	2900331	BRACKET, SLIDE SUPPORT L.H.
				1		6	2900332	BRACKET, SLIDE SUPPORT R.H.
				1		5	2900343	COVER, REAR (INSEP ASSY)
				1		4	2900342	COVER, RIGHT SIDE (INSEP ASSY)
				1		3	2900341	COVER, LEFT SIDE (INSEP ASSY)
				1		2	2900339	COVER, FRONT (INSEP ASSY)
				1		1	2900330	SUB SYSTEM MTG FIXT (INSEP ASSY)
	QUANTITY REQUIRED						LIST OF PARTS AND MATERIALS	

NEXT ASSY	USED ON	APPLICABLE DASH NO
2900070 011	1900030	011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS
DRAWN 30-MAR 65 DATE
CHECKED Ed Foster 2 AUG 65
APPROVAL 2 AUG 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

SUB SYSTEM MOUNTING FIXTURE
CART ASSEMBLY

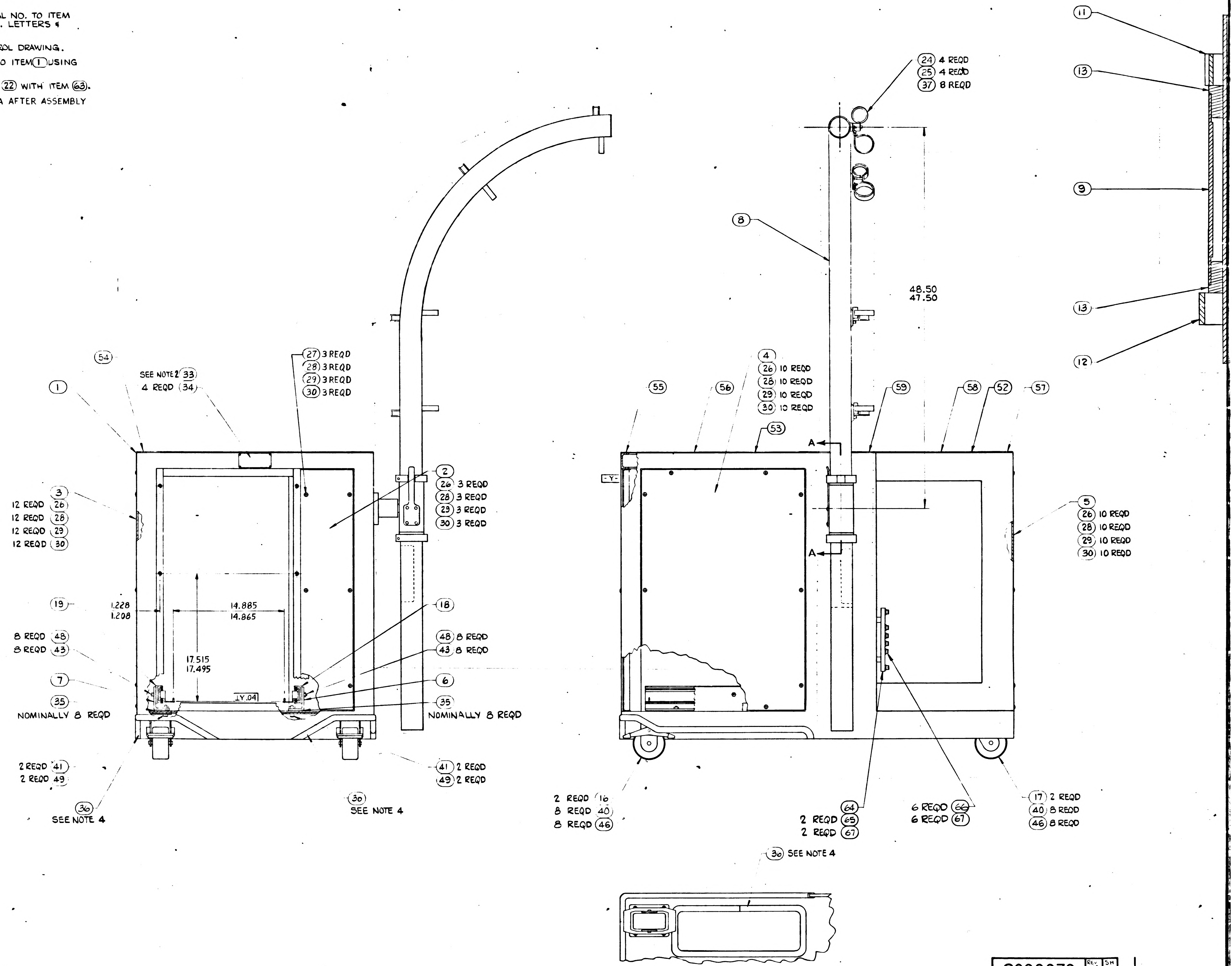
CODE IDENT NO 99974
SIZE -2
2900070
SCALE 1:4
SHEET 1 OF 1

2900070	REV K	SH 1

2/2900070

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK APPLICABLE CONTRACT NO. & SERIAL NO. TO ITEM ㉝ IN ACCORDANCE WITH ND 1002023. LETTERS & NUMERALS TO BE .100-.140 HIGH.
3. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
4. BOND ITEM ㊱ & ITEMS (52) THRU (59) TO ITEM ① USING ITEMS (60), (61) & (62).
5. COAT MATING SURFACE OF ITEMS ⑳, ㉑ & ㉒ WITH ITEM (63).
7. SIZE ITEMS ㉓ TO 1.002-1.010 INSIDE DIA AFTER ASSEMBLY TO ITEM ⑩, IF NECESSARY.



(54)
SEE NOTE 2 ㉝
4 REQD ㉞
①
㉗ 3 REQD
㉘ 3 REQD
㉙ 3 REQD
㉚ 3 REQD
③
12 REQD ㉖
12 REQD ㉘
12 REQD ㉙
12 REQD ㉚
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㉚ 3 REQD
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1.228
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NOMINALLY 8 REQD
2 REQD (41)
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SEE NOTE 4
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8 REQD ㊵
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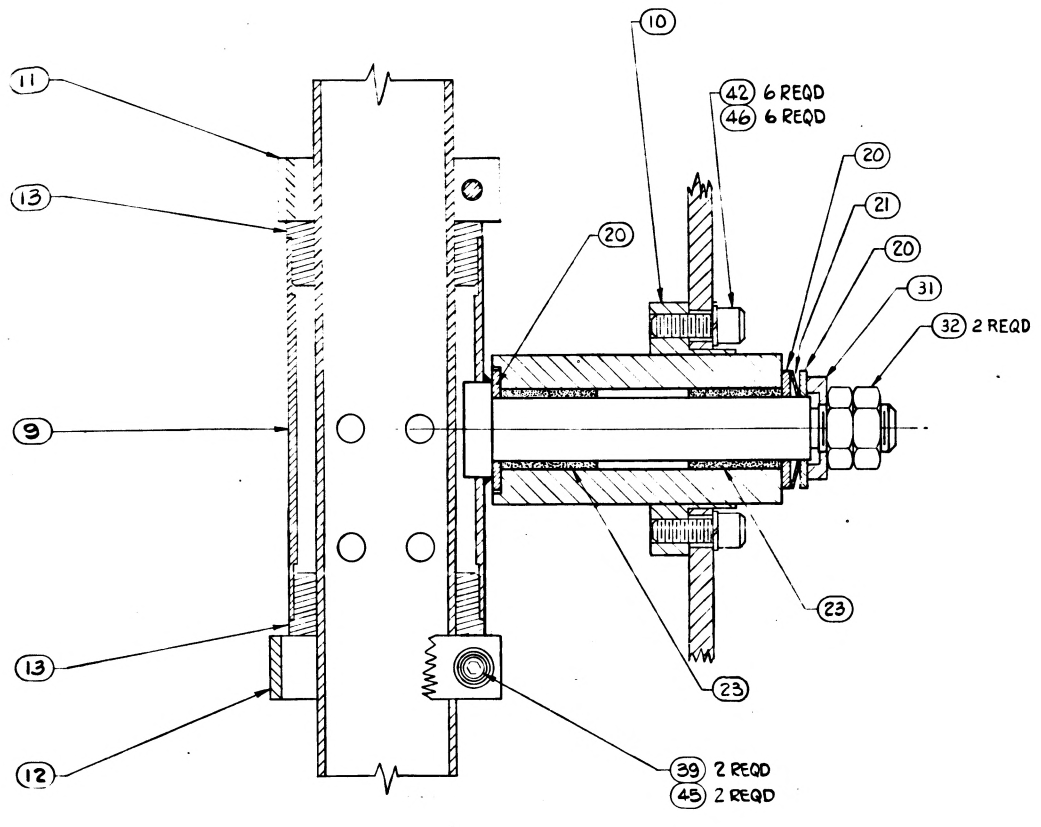
(64)
2 REQD (65)
2 REQD (67)
6 REQD (66)
6 REQD (67)
⑰ 2 REQD
㊵ 8 REQD
(46) 8 REQD
㊱ SEE NOTE 4

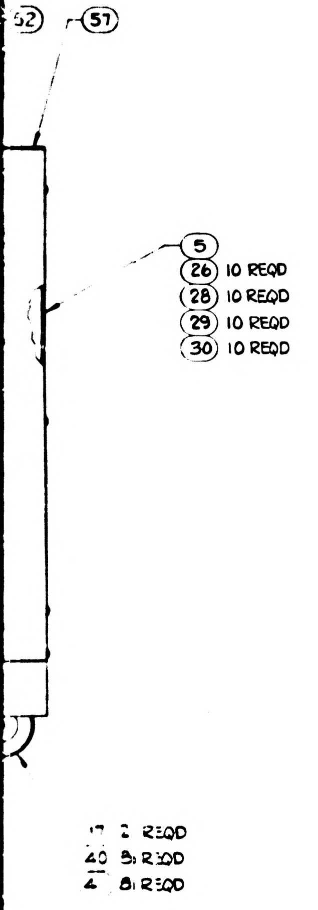
2900070 REV K SH 1

17-2900070

REVISIONS		23379			
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
C	—	REPLACES REV B WITH CHANGE PER MXC-203746	—	AUG 65	B. RWH
D	—	REVISED PER MXC 204343	—	3 SEPT 65	[illegible]
E	-	REVISED PER MXC-205057		22 SEP 65	RJJ
F	-	REVISED PER MXC 205610	—	1 OCT 65	[illegible]
G		INITIAL RELEASE CLASS A PER TDRR 23379		8 OCT 65	[illegible]
H		REVISED PER TDRR 24336		30 NOV 65	[illegible]
J		REVISED PER TDRR 24126		1 DEC 65	[illegible]
K		REVISED PER TDRR 24725		20 DEC 65	[illegible]
L		REVISED PER TDRR 24705		[illegible] DEC 65	[illegible]



PARTIAL SECTION A-A
SCALE 1:1



	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
				8		67	MS35338-82	WASHER, SPRING LOCK
				6		66	MS16996-24	SCREW, SOC. HD
				2		65	MS16996-23	SCREW, SOC. HD
				1		64	2900803	BAR, BJS
				AR		63	MIL-I-8660	SILICON GREASE (ES2311)
SEE NOTE 3				AR		62	1016201	CURING AGENT
SEE NOTE 3				AR		61	1016200	FILLER CALCIUM
SEE NOTE 3				AR		60	1016199	RESIN EPOXY
				1		59	2900345-006	CUSHION
				1		58	2900345-005	CUSHION
				1		57	2900345-004	CUSHION
				1		56	2900345-003	CUSHION
				1		55	2900345-002	CUSHION
				1		54	2900345-001	CUSHION
				1		53	2900345-008	CUSHION
				1		52	2900345-007	CUSHION
						51		
						50		
				4		49	MS 21083-C6	NUT - SELF LOCKING
				16		48	MS 21083-C08	NUT - SELF LOCKING
				2		47	AN960-C10	(1897006-017) WASHER FLAT
				22		46	MS 35338-84	WASHER, LOCK
				2		45	MS 35338-83	WASHER, LOCK
				12		44	MS 35338-81	WASHER, LOCK
				16		43	MS 35200-43	SCREW, FLAT HD
				6		42	MS 16995-81	SCREW, SOC HD
				4		41	MS 16996-40	SCREW, SOC HD
				16		40	MS 16995-79	SCREW, SOC HD
				2		39	MS 16996-34	SCREW, SOC HD
						38		
				8		37	MS 16995-26	SCREW, SOC HD
SEE NOTE 3				1		36	1897363-001	RUBBER CHANNEL, 8.00 FT LONG
				16		35	2900344	SHIM, SLIDE BRACKET
SEE NOTE 3				4		34	1000250-2	SCREW, BUTTON HD
				1		33	1004260-135	NAMEPLATE
				2		32	MS 35691-1230	NUT, PLAIN, HEX
				1		31	2900785	WASHER, THRUST
SEE NOTE 3				38		30	1015857-1	WASHER, RETAINER
				38		29	1016061-001	SPRING, EJECTOR
				38		28	1016062-001	WASHER, WEAR
				6		27	1015854-017	FASTENER, STUD
				32		26	1015854-014	FASTENER, STUD
SEE NOTE 3				4		25	1010400-15	CLAMP, LOOP
				4		24	1016105-010	CLAMP, STRAP
SEE NOTE 7				2		23	MS 17795-143	BEARING
						22		
				1		21	1900720	WASHER, SPRING
				3		20	1900641	WASHER, THRUST
SEE NOTE 3				1		19	1897297	SLIDE L.H.
				1		18	1897298	SLIDE R.H.
				2		17	1897272	CASTER, SWIVEL
SEE NOTE 3				2		16	1897271	CASTER, BRAKE
						15		
SEE NOTE 6						14		
				2		13	2900347	BEARING, FLANGE
				1		12	2900337	CLAMP, LOWER
				1		11	2900336	CLAMP, UPPER
				1		10	2900338	HUB, FULCRUM
				1		9	2900333	SUPPORT, ROTATING (INSEP ASSY)
				1		8	2900329	ARM, CONDUIT (INSEP ASSY)
				1		7	2900331	BRACKET, SLIDE SUPPORT L.H.
				1		6	2900332	BRACKET, SLIDE SUPPORT R.H.
				1		5	2900343	COVER, REAR (INSEP ASSY)
				1		4	2900342	COVER, RIGHT SIDE (INSEP ASSY)
				1		3	2900341	COVER, LEFT SIDE (INSEP ASSY)
				1		2	2900339	COVER, FRONT (INSEP ASSY)
				1		1	2900330	SUB SYSTEM MTG FIXT (INSEP ASSY)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900070-011	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN 30-MAR 65
CHECKED Ed Fxt 2 AUG 65
APPROVAL 3 AUG 65
APPROVAL 10/14/65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SUB SYSTEM MOUNTING FIXTURE CART ASSEMBLY

CODE IDENT NO 99974
SIZE -2
2900070
SCALE 1:4
SHEET 1 OF 1

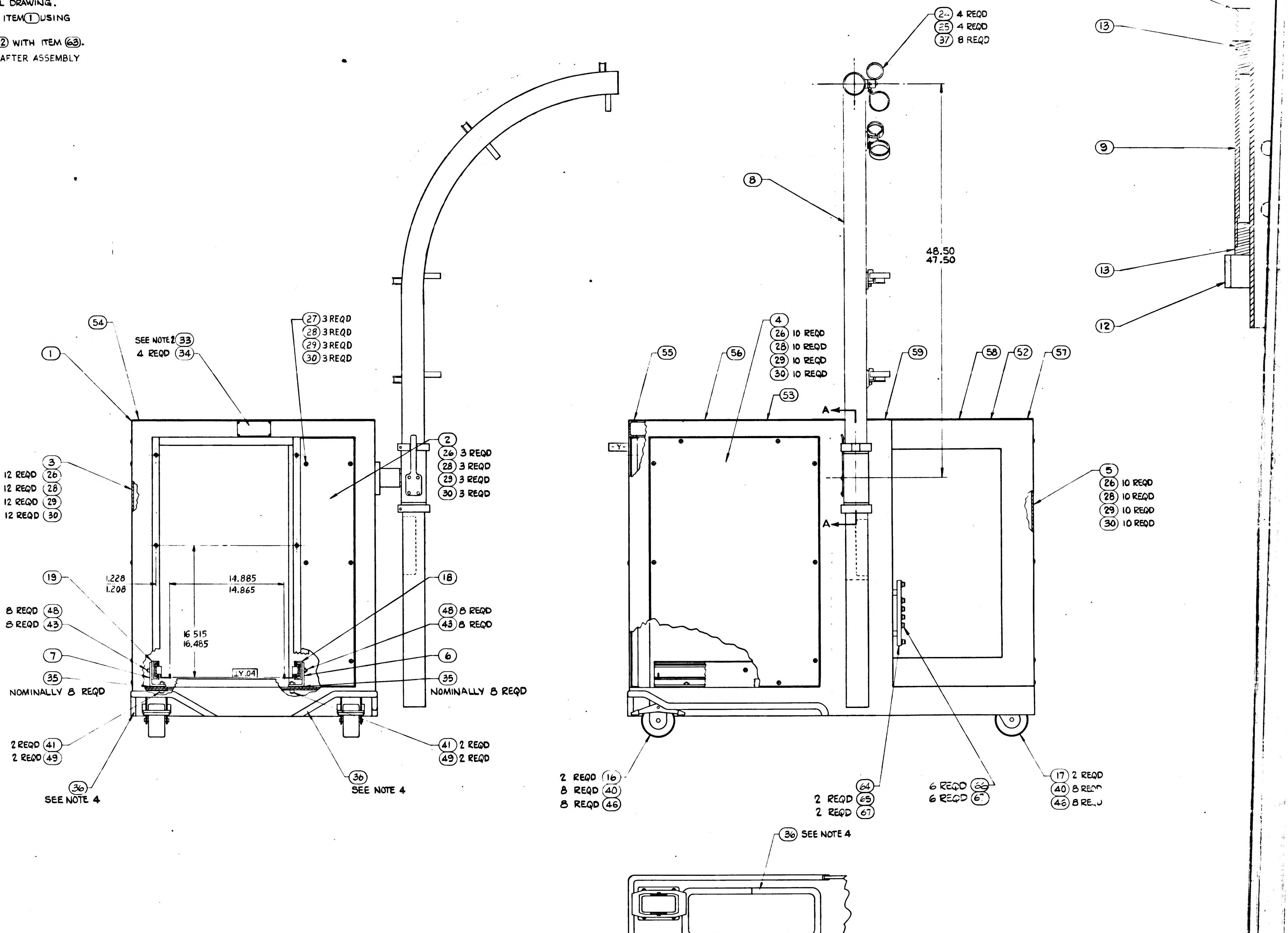
2900070

~~0070~~	REV K	SH 1

27 2900070

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK APPLICABLE CONTRACT NO. & SERIAL NO. TO ITEM ㉝ IN ACCORDANCE WITH ND 1002023. LETTERS & NUMERALS TO BE .100-.140 HIGH.
3. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
4. BOND ITEM ㊱ & ITEMS (52) THRU (59) TO ITEM ① USING ITEMS (60), (61) & (62).
5. COAT MATING SURFACE OF ITEMS ⑳, ㉑ & ㉒ WITH ITEM (63).
7. SIZE ITEMS ㉓ TO 1.002-1.010 INSIDE DIA AFTER ASSEMBLY TO ITEM [illegible], IF NECESSARY.



① ㊾ (54)
SEE NOTE 2 ㉝
4 REQD ㉞
㉗ 3 REQD
㉘ 3 REQD
㉙ 3 REQD
㉚ 3 REQD
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SEE NOTE 4
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SEE NOTE 4
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㊱ SEE NOTE 4
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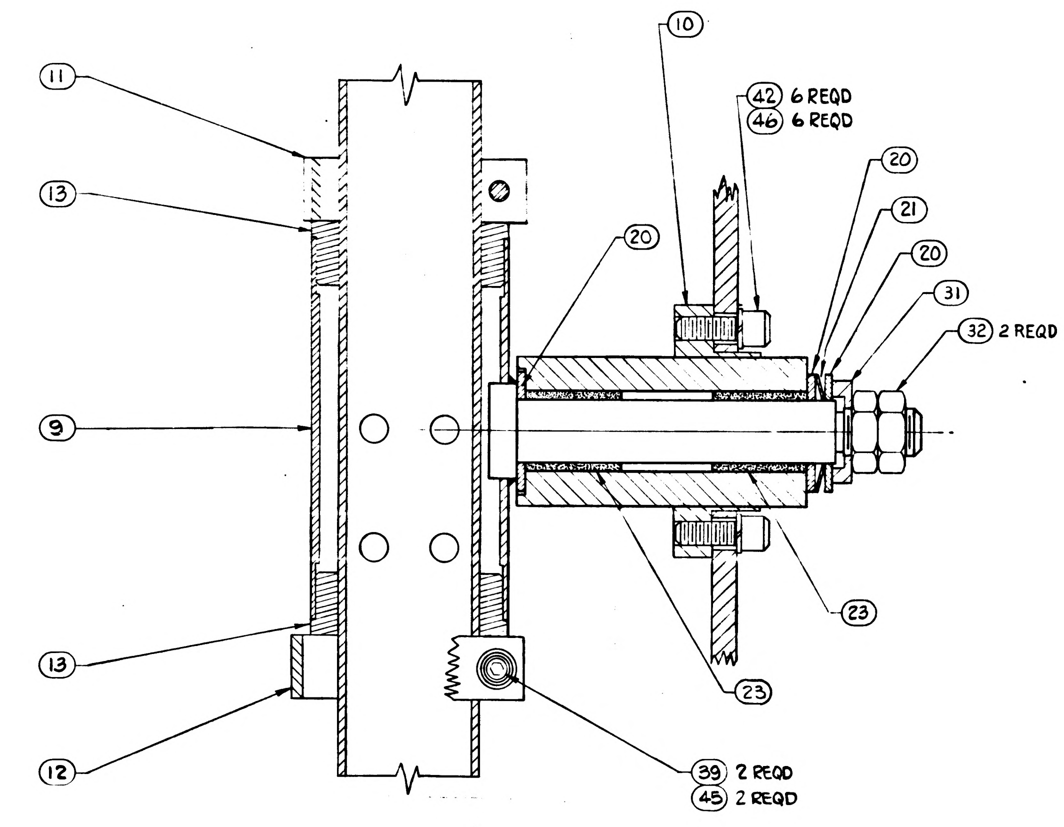
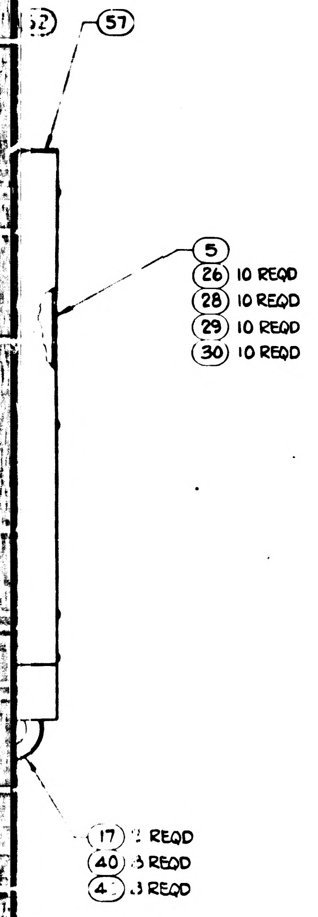
2900070 REV NC SH 1

1729000070

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
		REVISIONS 23379			
C	—	REPLACES REV B WITH CHANGE PER MXC-203746	—	AUG 65	B. RWH
D	—	REVISED PER MXC 204343	—	3 SEPT 65	
E	-	REVISED PER MXC-205057		22 SEP 65	RJJ
F	-	REVISED PER MXC 205610	—	1 OCT 65	LK
G		INITIAL RELEASE CLASS A PER TDRR 23379		8 OCT 65	JR
H		REVISED PER TDRR 24336		30 NOV 65	
J		REVISED PER TDRR 24126		1 DEC 65	
K		REVISED PER TDRR 24725		20 DEC 65	
L		REVISED PER TDRR 24705		DEC 65	
M		REVISED PER TDRR 25280		20 JAN 66	



PARTIAL SECTION A-A
SCALE 1:1



				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				8		67	MS35338-82	WASHER, SPRING LOCK
				6		66	MS16996-24	SCREW, SOC. HD
				2		65	MS16996-23	SCREW, SOC. HD
				1		64	2900803	BAR, BJS
				AR		63	MIL-I-8660	SILICON GREASE (ES2311)
~~SEE NOTE 3~~				~~AR~~		~~62~~	~~1016201~~	~~CURING AGENT~~
~~SEE NOTE 3~~				~~AR~~		~~61~~	~~1016200~~	~~FILLER CALCIUM~~
~~SEE NOTE 3~~				AR		60	MIL-A-5092 TYPE II	ADHESIVE
				1		59	2900345-006	CUSHION
				1		58	2900345-005	CUSHION
				1		57	2900345-004	CUSHION
				1		56	2900345-003	CUSHION
				1		55	2900345-002	CUSHION
				1		54	2900345-001	CUSHION
				1		53	2900345-008	CUSHION
				1		52	2900345-007	CUSHION
						51		
						50		
				4		49	MS 21083-C6	NUT - SELF LOCKING
				16		48	MS 21083-C08	NUT - SELF LOCKING
				2		47	AN960-C10	(1897006-017) WASHER FLAT
				22		46	MS 35338-84	WASHER, LOCK
				2		45	MS 35338-83	WASHER, LOCK
				12		44	MS 35338-81	WASHER, LOCK
				16		43	MS 35200-43	SCREW, FLAT HD
				6		42	MS 16995-81	SCREW, SOC HD
	QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				4		41	MS 16996-40	SCREW, SOC HD
				16		40	MS 16995-79	SCREW, SOC HD
				2		39	MS 16996-34	SCREW, SOC HD
						38		
				8		37	MS 16995-26	SCREW, SOC HD
SEE NOTE 3				1		36	1897363-001	RUBBER CHANNEL, 8.00 FT LONG
				16		35	2900344	SHIM, SLIDE BRACKET
SEE NOTE 3				4		34	1000250-2	SCREW, BUTTON HD
				1		33	1004260-135	NAMEPLATE
				2		32	MS 35691-1230	NUT, PLAIN, HEX
				1		31	2900785	WASHER, THRUST
SEE NOTE 3				38		30	1015857-1	WASHER, RETAINER
				38		29	1016061-001	SPRING, EJECTOR
				38		28	1016062-001	WASHER, WEAR
				6		27	1015854-017	FASTENER, STUD
				32		26	1015854-014	FASTENER, STUD
SEE NOTE 3				4		25	1010400-15	CLAMP, LOOP
				4		24	1016105-010	CLAMP, STRAP
SEE NOTE 7				2		23	MS 17795-143	BEARING
						22		
				1		21	1900720	WASHER, SPRING
				3		20	1900641	WASHER, THRUST
SEE NOTE 3				1		19	1897297	SLIDE L.H.
				1		18	1897298	SLIDE R.H.
				2		17	1897272	CASTER, SWIVEL
SEE NOTE 5				2		16	1897271	CASTER, BRAKE
						15		
SEE NOTE 6						14		
				2		13	2900347	BEARING, FLANGE
				1		12	2900337	CLAMP, LOWER
				1		11	2900336	CLAMP, UPPER
				1		10	2900338	HUB, FULCRUM
				1		9	2900333	SUPPORT, ROTATING (INSEP ASSY)
				1		8	2900329	ARM, CONDUIT (INSEP ASSY)
				1		7	2900331	BRACKET, SLIDE SUPPORT L.H.
				1		6	2900332	BRACKET, SLIDE SUPPORT R.H.
				1		5	2900343	COVER, REAR (INSEP ASSY)
				1		4	2900342	COVER, RIGHT SIDE (INSEP ASSY)
				1		3	2900341	COVER, LEFT SIDE (INSEP ASSY)
				1		2	2900339	COVER, FRONT (INSEP ASSY)
				1		1	2900330	SUB SYSTEM MTG FIXT (INSEP ASSY)
	QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

M 2900070 B

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900070-011	1900030	011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + _ - DECIMALS + _ - ANGLES + _ -
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN 30-MAR-65 DATE
CHECKED Ed Foster 2 AUG 65
APPROVAL 3 AUG 65
APPROVAL L Jedman
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

SUB SYSTEM MOUNTING FIXTURE
CART ASSEMBLY

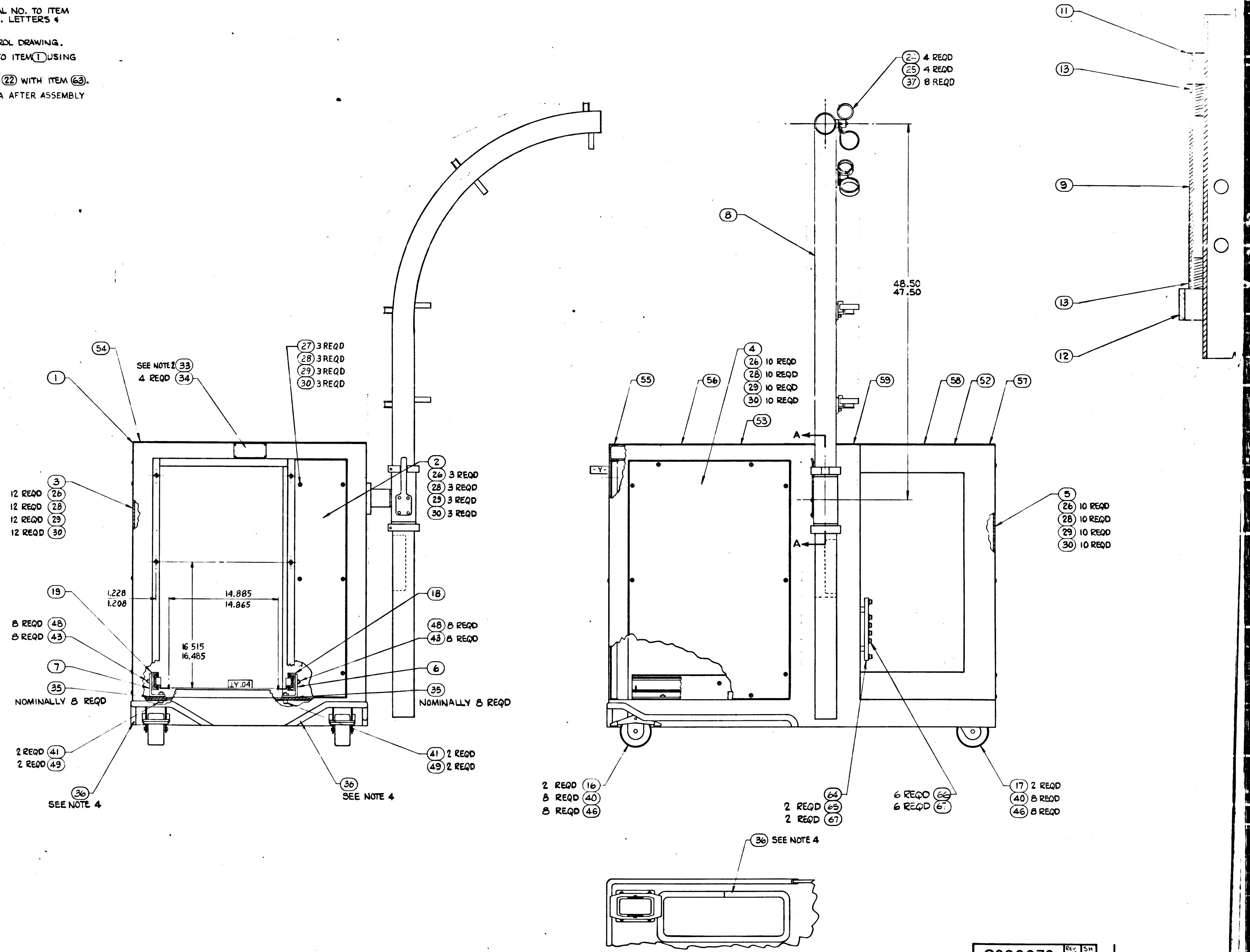
CODE IDENT NO 99974
SIZE -2
2900070
SCALE 1:4
SHEET 1 OF 1

2900070 REV LTR M SH 1

2/2900070

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK APPLICABLE CONTRACT NO. & SERIAL NO. TO ITEM ㉝ IN ACCORDANCE WITH ND 1002023. LETTERS & NUMERALS TO BE .100-.140 HIGH.
3. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
4. BOND ITEM ㉝ & ITEMS (52) THRU (59) TO ITEM ① USING ITEM (60), ~~(61) & (62)~~
5. COAT MATING SURFACE OF ITEMS ⑳, ㉑ & ㉒ WITH ITEM (63).
7. SIZE ITEMS ㉓ TO 1.002-1.010 INSIDE DIA AFTER ASSEMBLY TO ITEM ⑩, IF NECESSARY.



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6 REQD (67)
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(40) 8 REQD
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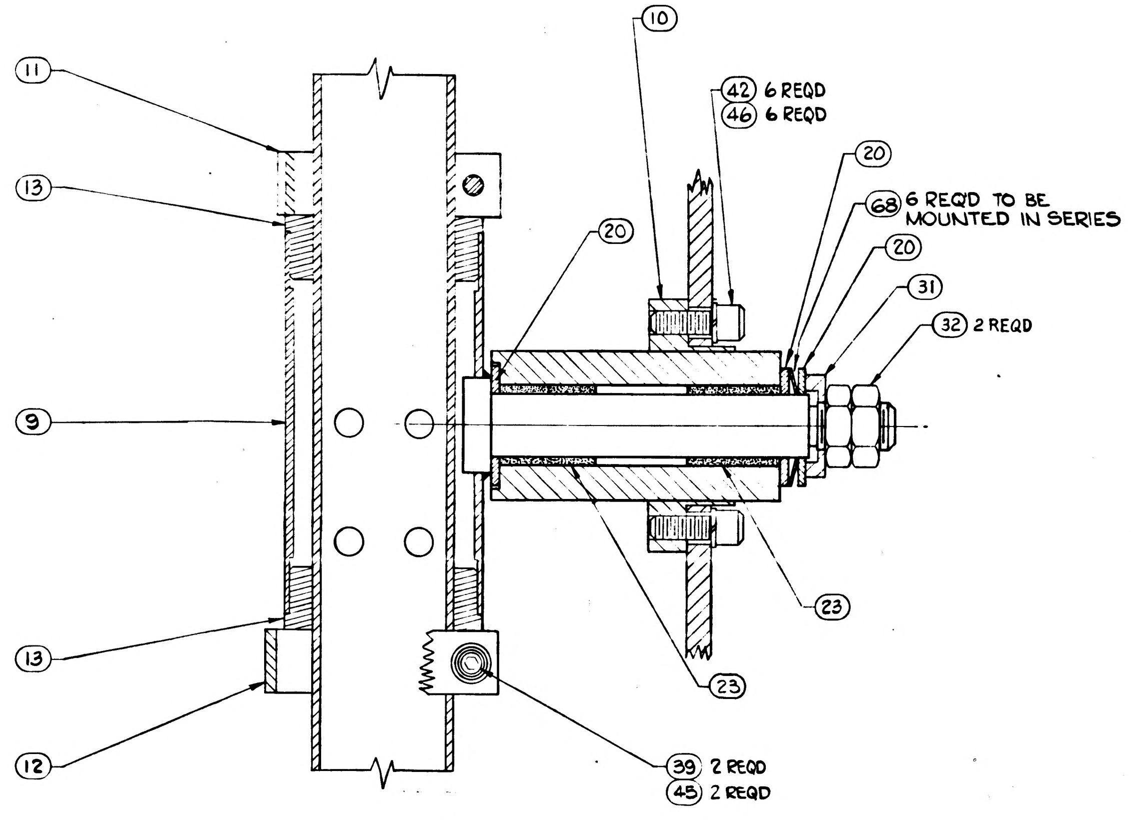
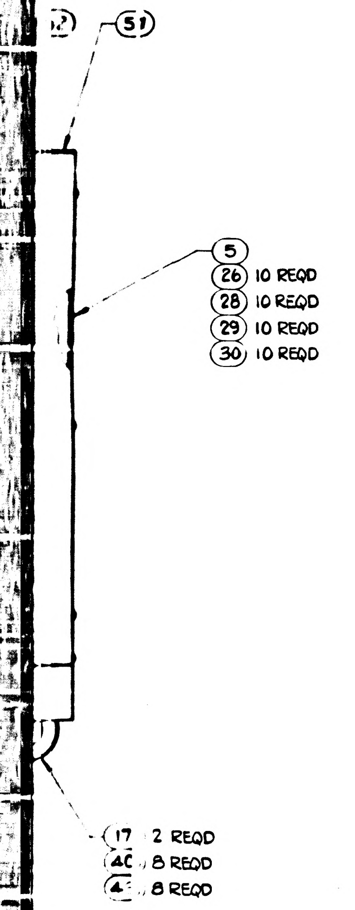
(36) SEE NOTE 4

2900070 REV V SH 1

1/2900070



PARTIAL SECTION A-A
SCALE 1:1



REVISIONS 23379

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
C	—	REPLACES REV B WITH CHANGE PER MXC-203746	—	11-AUG-65	B. RWH
D	—	REVISED PER MXC 204343	—	3 SEPT 65	
E	-	REVISED PER MXC-205057		22 SEP 65	RJJ
F	-	REVISED PER MXC 205610	—	11 OCT 65	LK
G		INITIAL RELEASE CLASS A PER TDRR 23379		8 OCT 65	JR
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J		REVISED PER TDRR 24126		1 DEC 65	
K		REVISED PER TDRR 24725		20 DEC 65	
L		REVISED PER TDRR 24705		DEC 65	CF
M		REVISED PER TDRR 25280		20 JAN 66	
N		REVISED PER TDRR 25391		25 JAN 66	

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
				6		68	2900958	WASHER, SPRING
				8		67	MS35338-82	WASHER, SPRING LOCK
				6		66	MS16996-24	SCREW, SOC. HD
				2		65	MS16996-23	SCREW, SOC. HD
				1		64	2900803	BAR, BJS
				AR		63	MIL-I-8660	SILICON GREASE (ES2311)
~~SEE NOTE 3~~				~~AR~~		~~62~~	~~1016201~~	~~CURING AGENT~~
~~SEE NOTE 3~~				~~AR~~		~~61~~	~~1016200~~	~~FILLER CALCIUM~~
~~SEE NOTE 3~~				AR		60	MIL-A-5092 TYPE II	ADHESIVE
				1		59	2900345-006	CUSHION
				1		58	2900345-005	CUSHION
				1		57	2900345-004	CUSHION
				1		56	2900345-003	CUSHION
				1		55	2900345-002	CUSHION
				1		54	2900345-001	CUSHION
				1		53	2900345-008	CUSHION
				1		52	2900345-007	CUSHION
						51		
						50		
				4		49	MS 21083-C6	NUT - SELF LOCKING
				16		48	MS 21083-C08	NUT - SELF LOCKING
				2		47	AN960-C10	(1897006-017) WASHER FLAT
				22		46	MS 35338-84	WASHER, LOCK
				2		45	MS 35338-83	WASHER, LOCK
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				6		42	MS 16995-81	SCREW, SOC HD

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
				011				
				4		41	MS 16996-40	SCREW, SOC HD
				16		40	MS 16995-79	SCREW, SOC HD
				2		39	MS 16996-34	SCREW, SOC HD
						38		
				8		37	MS 16995-26	SCREW, SOC HD
SEE NOTE 3				1		36	1897363-001	RUBBER CHANNEL, 8.00 FT LONG
				16		35	2900344	SHIM, SLIDE BRACKET
SEE NOTE 3				4		34	1000250-2	SCREW, BUTTON HD
				1		33	1004260-135	NAMEPLATE
				2		32	MS 35691-1230	NUT, PLAIN, HEX
				1		31	2900785	WASHER, THRUST
SEE NOTE 3				38		30	1015857-1	WASHER, RETAINER
				38		29	1016061-001	SPRING, EJECTOR
				38		28	1016062-001	WASHER, WEAR
				6		27	1015854-017	FASTENER, STUD
				32		26	1015854-014	FASTENER, STUD
SEE NOTE 3				4		25	1010400-15	CLAMP, LOOP
				4		24	1016105-010	CLAMP, STRAP
SEE NOTE 7				2		23	MS 17795-143	BEARING
						22		
				~~1~~		~~21~~	~~1900720~~	~~WASHER, SPRING~~
				3		20	1900641	WASHER, THRUST
SEE NOTE 3				1		19	1897297	SLIDE L.H.
				1		18	1897298	SLIDE R.H.
				2		17	1897272	CASTER, SWIVEL
SEE NOTE 3				2		16	1897271	CASTER, BRAKE
						15		
SEE NOTE 6						14		
				2		13	2900347	BEARING, FLANGE
				1		12	2900337	CLAMP, LOWER
				1		11	2900336	CLAMP, UPPER
				1		10	2900338	HUB, FULCRUM
				1		9	2900333	SUPPORT, ROTATING (INSEP ASSY)
				1		8	2900329	ARM, CONDUIT (INSEP ASSY)
				1		7	2900331	BRACKET, SLIDE SUPPORT L.H.
				1		6	2900332	BRACKET, SLIDE SUPPORT R.H.
				1		5	2900343	COVER, REAR (INSEP ASSY)
				1		4	2900342	COVER, RIGHT SIDE (INSEP ASSY)
				1		3	2900341	COVER, LEFT SIDE (INSEP ASSY)
				1		2	2900339	COVER, FRONT (INSEP ASSY)
				1		1	2900330	SUB SYSTEM MTG FIXT (INSEP ASSY)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900070-011	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN 30-MAR-65
DATE
CHECKED Ed Foster 2 AUG 65
APPROVAL 3 AUG 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SUB SYSTEM MOUNTING FIXTURE
CART ASSEMBLY

CODE IDENT NO. 99974
SIZE 2
2900070
SCALE 1:4
SHEET 1 OF 1

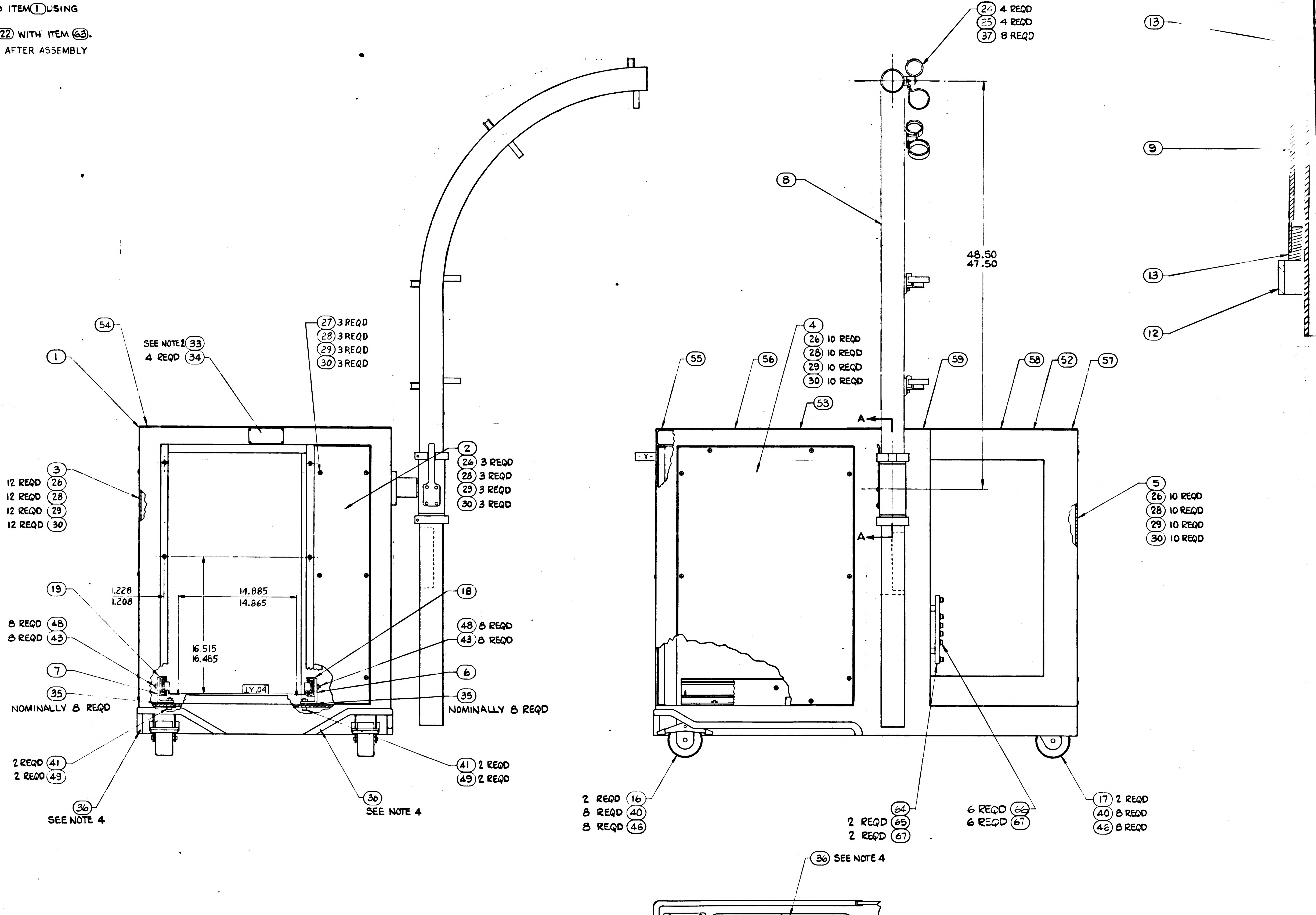
2900070 REV N SH 1

2900070

2/2900070

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MARK APPLICABLE CONTRACT NO. & SERIAL NO. TO ITEM ㉝ IN ACCORDANCE WITH ND 1002023. LETTERS & NUMERALS TO BE .100-.140 HIGH.
3. VENDOR ITEM- SEE SPECIFICATION CONTROL DRAWING.
4. BOND ITEM ㊱ & ITEMS (52) THRU (59) TO ITEM ① USING ITEM (60), ~~(61) & (62)~~.
5. COAT MATING SURFACE OF ITEMS ⑳, ㉑ & ㉒ WITH ITEM (63).
7. SIZE ITEMS ㉓ TO 1.002-1.010 INSIDE DIA AFTER ASSEMBLY TO ITEM ⑩, IF NECESSARY.



(54)
SEE NOTE 2 ㉝
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6 REQD (67)
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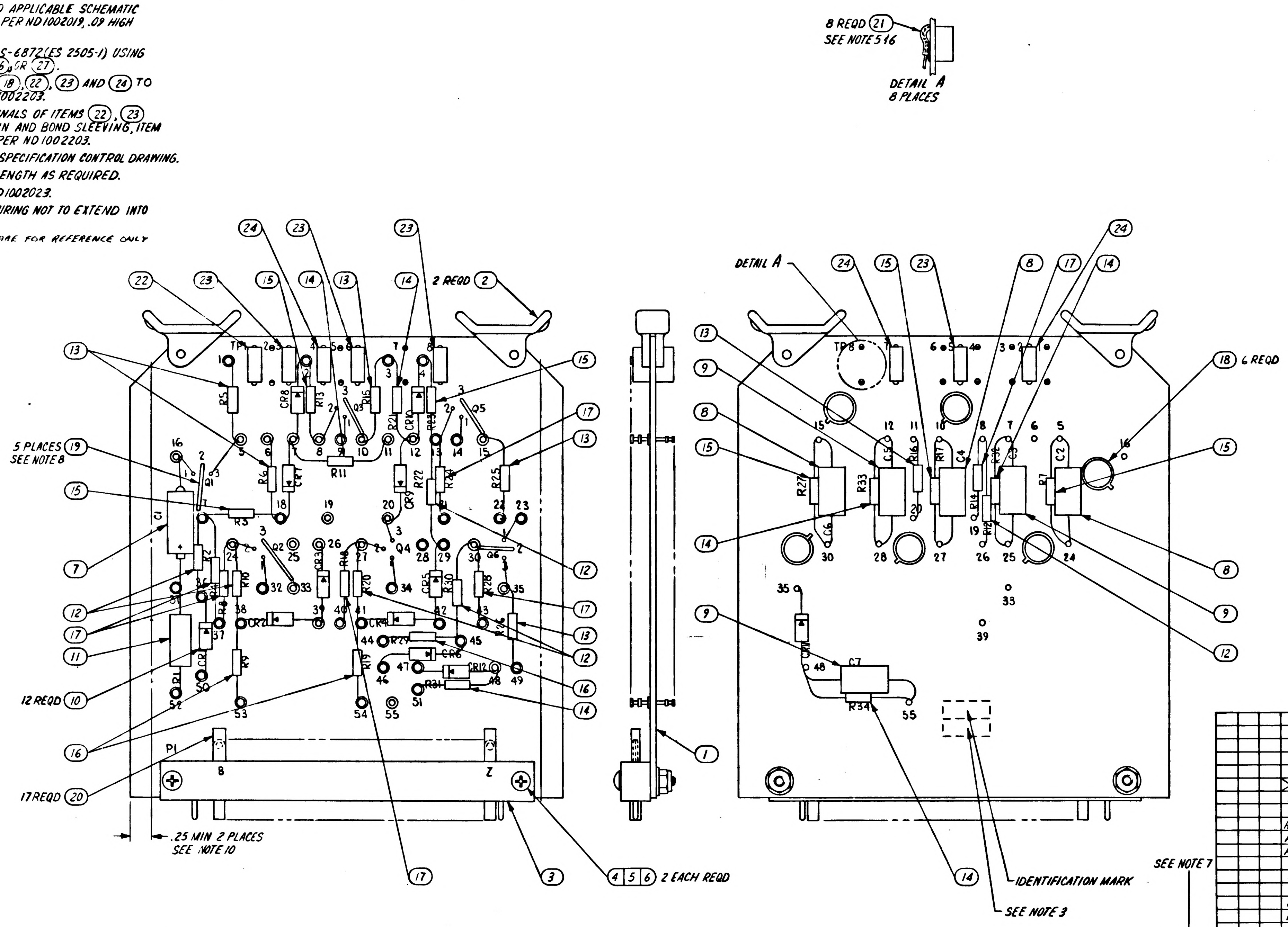
㊵ 8 REQD
㊻ 8 REQD
㊱ SEE NOTE 4

2900070 | REV | SH 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES 267).
3. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .09 HIGH COLOR BLACK.
4. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEMS (25) AND (26), OR (27).
5. BOND ITEMS (7), (18), (22), (23) AND (24) TO ITEM (1) PER ND1002203.
6. FORM OVER TERMINALS OF ITEMS (22), (23) AND (24) AS SHOWN AND BOND SLEEVING, ITEM (21) TO ITEM (1) PER ND1002203.
7. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.
8. CUT ITEM (19) TO LENGTH AS REQUIRED.
9. SERIALIZE PER ND1002023.
10. COMPONENTS AND WIRING NOT TO EXTEND INTO AREAS INDICATED.
11. DIODE SYMBOLS ARE FOR REFERENCE ONLY

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
A		REPLACES REV (-) WITH CHANGE PER MXC 309632		17 MAY 65	JRS
B		REVISED PER MXC 203409		30 JUL 65	RWH
C		INITIAL RELEASE CLASS A PER TDRR 23556		8 OCT 65	



						30	PS2900075	PROCUREMENT SPECIFICATION
				X		29	2900019	SCHEMATIC DIAGRAM, ELECTRICAL
				1		28	2900018	WIRE LIST AA
				AR		27	SN60WRAP	SOLDER QQ-S-571 (ES 2175-3)
				AR		26	MIL-F-14256 TYPE A OR W	FLUX (ES 2798)
				AR		25	SN60WS	SOLDER QQ-S-571 (ES 2175-1)
SEE NOTE 7				3		24	1016347-010	JACK, MINIATURE, CIRCUIT BOARD
				4		23	1016347-008	JACK, MINIATURE, CIRCUIT BOARD
				1		22	1016347-003	JACK, MINIATURE, CIRCUIT BOARD
				8		21	1010490-082	SLEEVING, ELECT, HEAT SHRINK
				17		20	1015864-109	INSULATION SLEEVING
				1		19	1006776-20	INSULATION SLEEVING 4 IN TOT LENGTH
SEE NOTE 7				6		18	1015928-001	TRANSISTOR
				6		17	RC07GF104J	(1896985-097) RESISTOR (MIL-R-11/8)
				3		16	RC07GF513J	(-090)
				6		15	RC07GF393J	(-087)
				6		14	RC07GF153J	(-077)
				6		13	RC07GF512J	(-066)
				6		12	RC07GF392J	(1896985-063) (MIL-R 11/8)
				1		11	RC32GF391J	(1896953-053) RESISTOR (MIL-R-11/6)
				12		10	1N914	(1896966-044) DIODE (MIL-S-19500/116)
				3		9	CM15C101J03	(1896969-053) CAPACITOR (MIL-C-5/1)
				3		8	CM15C200J03	(1896969-036) CAPACITOR (MIL-C-5/1)
				1		7	CS13AG100K	(1896954-176) CAPACITOR (MIL-C-26655/2)
				2		6	AN960-C4	(1897006-024) WASHER, FLAT
SEE NOTE 7				2		5	1016151-004	NUT, SELF LOCKING
				2		4	MS35216-17	SCREW, PAN HD
SEE NOTE 7				1		3	1015956-167	CONNECTOR, ADAPTER
SEE NOTE 7				2		2	1015999-002	EJECTOR, CIRCUIT BOARD
				1		1	2900020	TERMINAL BOARD (INSEP ASSY)
				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

REPLACES REV(-)WITH CHANGE

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900029-011	2900029-011	-011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Kbringer 29 MAR 65 DATE
CHECKED 31 MAR 65
APPROVAL 31 MAR 65
APPROVAL 10-20-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

FLIP FLOP ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900075
SCALE 2:1
SHEET 1 OF 1

20 APR 65

APOLLO G&C Specification
PS2900076 REV D
Original Issue Date: 10/29/65
Release Authority: TDRR 23556
Class A **Release**
CODE IDENT NO. 99974

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

INTERROGATOR ASSEMBLY

DRAWING NO. 2900076

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
	A		3, 5, 6, 7, 8		
10-17-65	B	MXC 206222	57, 8		
10-28-65	C	MXC 206482	8		
11/28/65	D		ALL (Unit Lot		

This specification consists of page 1 **to** 8 **inclusive.**

APPROVALS	NASA/MSC	10-27-65 J M Watson MIT/IL	R Hadley ACSP

1. SCOPE

1.1 PURPOSE. This specification establishes the detail requirements for complete identification and acceptance of all units of the Interrogator Assembly, Part No. 2900076-011.

2. APPLICABLE DOCUMENTS

2.1 EFFECTIVE ISSUES. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, Military Standards and Specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G&C

ND1002214	General Specification for Preservation, Packaging, Packing and Container Marking of APOLLO Guidance and Control Major Assemblies, Assemblies, Subassemblies, Parts and Associated Ground Support Equipment

DRAWINGS

APOLLO G&C

2900076	Interrogator Assembly
2900099	Schematic Diagram, Electrical

(Copies of specifications, standards, drawings, bulletins, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 CONFLICTING REQUIREMENTS. In event of a conflict between requirements, the following order of precedence shall apply. The contractor shall also notify MIT/IL APOLLO Management of the conflict.

a. The contract
b. This specification
c. Documents listed in this section

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 Inputs. The Interrogator Assembly, hereafter referred to as the interrogator, shall be capable of performing as specified herein when supplied with +30.0±0.3 vdc and -30.0±0.3 vdc power and the following input signals:

a. A negative-going pulse with the following characteristics:

   (1) Amplitude: 30±3V peak
   (2) Width: 10.0±2.0 μsec at 5.0±0.5V
   (3) Fall Time: <500 nsec
   (4) Rep Rate: 3200 pps ±1 percent

b. A pulse with the following characteristics:

   (1) Amplitude: 10.0±1.0V peak
   (2) Width: 5.0±1.0 μsec
   (3) Rise Time: <300 nsec
   (4) Droop: <50 percent
   (5) Delay: 3.0±1.0 μsec lagging the leading edge of pulse specified in 3.1.1.a.
   (6) Rep Rate: 3200 pps ±1 percent

c. A variable sine wave with the following characteristics:

   (1) Amplitude: 0.3 to 10V rms
   (2) Rep Rate: 3200 pps ±1 percent
   (3) Phase: 0 or π
   (4) Sync: 135° ±5° lead of pulse specified in 3.1.1.a.

d. A pulse with the following characteristics:

   (1) Amplitude: 5.0±0.5V peak
   (2) Width: 3.0±0.5 μsec
   (3) Rise Time: <300 nsec
   (4) Droop: <50 percent
   (5) Rep Rate: 3200 pps ±1 percent
   (6) Phase: In phase with leading edge of pulse specified in 3.1.1.a.

3.1.2 Characteristics

3.1.2.1 Outputs. The interrogator shall provide the following outputs:

a. >15 vdc
b. A negative-going pulse with the following characteristics:

   (1) Amplitude: >15V peak
   (2) Width: 10.0±2.0 μsec at 5.0±0.5V
   (3) Fall Time: <500 nsec
   (4) Rep Rate: 3200 pps ±1 percent

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the interrogator shall be in accordance with APOLLO G&C Drawing 2900076 and all drawings and engineering data referenced thereon.

4. QUALITY ASSURANCE PROVISIONS

4.1 GENERAL. The contractor responsible for the manufacture of the interrogator shall be responsible for the accomplishment of each test required herein.

4.1.1 Test Conditions

4.1.1.1 Environmental. Unless otherwise specified, the interrogator shall be tested under the following ambient conditions:

a. Temperature: 25° ±10°C
b. Relative Humidity: 90% max
c. Barometric Pressure: 28 to 32 inches of Hg

4.1.1.2 Test Inputs and Load. Unless otherwise specified, the interrogator shall be tested with the following applied inputs and load.

4.1.1.2.1 Inputs

a. A negative-going pulse with the following characteristics applied to pins L (Hi) and H (Lo);

    (1) Amplitude: 30±3V peak
    (2) Width: 10±2 μsec at 5.0±0.5V
    (3) Fall Time: <500 nsec
    (4) Rep Rate: 3200±1 percent

b. +30.0±0.3 vdc applied to pins F (Hi) and H (Lo)

c. -30.0±0.3 vdc applied to pins J (Hi) and H (Lo)

4.1.1.2.2 Load. A 20K ohm ±5 percent, 1/2 watt resistor shall be connected between pins F (Hi) and K (Lo).

4.1.1.3 Calibration. With the conditions specified in 4.1.1.2 established, the interrogator shall be calibrated as follows before performing the tests specified in 4.2:

a. Apply a sine wave with the following characteristics to pins S (Hi) and R (Lo):

    (1) Amplitude: 0.350V rms ±1.0 percent
    (2) Rep Rate: 3200 pps ±1 percent
    (3) Phase: Zero
    (4) Sync: 135° ±5° leading the pulse at pins L (Hi) and H (Lo).

b. Adjust R8 for an output of >15 vdc at pins M (Hi) and H (Lo).
c. Remove the input that was applied to pins S (Hi) and R (Lo).

d. Apply a pulse with the following characteristics to pins Z (Hi) and H (Lo);

    (1) Amplitude: 10±1V peak
    (2) Width: 5±1 μsec
    (3) Rise Time: <300 nsec
    (4) Droop: <50 percent
    (5) Delay: 3±1 μsec lagging the leading edge of pulse specified in 4.1.1.2.1.a.
    (6) Rep Rate: 3200 pps ±1 percent

e. The output at pins M (Hi) and H (Lo) shall be <0.6V.

f. Apply a sine wave with the following characteristics to pins S (Hi) and R (Lo):

    (1) Amplitude: 0.350V rms ±1.0 percent
    (2) Rep Rate: 3200 pps ±1 percent
    (3) Phase: π
    (4) Sync: 315° ±5° leading the pulse at pins L (Hi) and H (Lo)

g. Adjust R9 for an output of >15 vdc at pins N (Hi) and H (Lo).
h. Remove the input that was applied to pins S (Hi) and R (Lo).
i. Apply the pulse specified in 4.1.1.3.d to pins Z (Hi) and H (Lo).
j. The output at pins N (Hi) and H (Lo) shall be <0.6V.
k. Repeat the calibration procedure if requirements specified in 4.1.1.3.b, e, g, and j are not met.

4.1.2 Nonconforming Units. Failure of the unit to pass any examination or test of this specification shall automatically classify the unit as nonconforming. Each nonconforming unit corrected by the contractor shall be reinspected. Reinspection may be limited to the test or examination which defined the nonconformance, or, when directed by the cognizant inspector, a complete retest and reexamination may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the contractor to the cognizant NASA representative.

4.2 TESTS

4.2.1 Drawing Compliance. The interrogator shall be visually examined for compliance to the requirements of APOLLO G&C Drawing 2900076. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulant defects, contaminants, pin misalignment, and legibility and appearance of markings.

4.2.2 Continuity and DC Resistance. Without power applied, the continuity and dc resistance test shall be performed in accordance with Drawing 2900099. The continuity and dc resistance shall be in accordance with Drawing 2900099.

4.2.3 Outputs

4.2.3.1 Reset. With the pulse specified in 4.1.1.3.d applied to pins Z (Hi) and H (Lo), the output at pins M (Hi) and H (Lo) shall be <0.6V and the output at pins N (Hi) and H (Lo) shall be <0.6V.

4.2.3.2 Plus Select. With the input specified in 4.2.3.2.1 applied, the outputs shall be as specified in 4.2.3.2.2.

4.2.3.2.1 Test Input. The test input shall be a sine wave with the following characteristics applied to pins S (Hi) and R (Lo):

a. Amplitude: 7.0V rms ±1.0 percent
b. Rep Rate: 3200 pps ±1 percent
c. Phase: Zero
d. Sync: 135° ±5° lead of pulse at pins L (Hi) and H (Lo)

4.2.3.2.2 Outputs. The outputs shall be as follows:

a. >15 vdc at pins M (Hi) and H (Lo)
b. <0.6V at pins N (Hi) and H (Lo)
c. A negative-going pulse with the following characteristics at pins K (Hi) and H (Lo):
    (1) Amplitude: >15V peak
    (2) Width: 10±2 μsec at 5.0±0.5V
    (3) Fall Time: <500 nsec
    (4) Rep Rate: 3200 pps ±1 percent

4.2.3.3 Minus Select. With the input specified in 4.2.3.3.1 applied, the outputs shall be as specified in 4.2.3.3.2.

4.2.3.3.1 Test Input. The test input shall be a sine wave with the following characteristics applied to pins S (Hi) and R (Lo):

a. Amplitude: 7.0V rms ±1.0 percent
b. Rep Rate: 3200 pps ±1 percent
c. Phase: π
d. Sync: 315° ±5° lead of pulse at pins L (Hi) and H (Lo)

4.2.3.3.2 Outputs. The outputs shall be as follows:

a. >15 vdc at pins N (Hi) and H (Lo)
b. <0.6V at pins M (Hi) and H (Lo)
c. A negative-going pulse with the following characteristics at pins K (Hi) and H (Lo):
    (1) Amplitude: >15V peak
    (2) Width: 10±2 μsec at 5.0±0.5V
    (3) Fall Time: <500 nsec
    (4) Rep Rate: 3200 pps ±1 percent

4.2.3.4 Plus Select (C/S). With the input specified in 4.2.3.4.1 applied, the outputs shall be as specified in 4.2.3.4.2.

4.2.3.4.1 Test Input. Connect a 1K ohm resistor between the signal source (Hi) and pin Y (Hi). The voltage out of the signal source (Hi) and pin X (Lo) shall have the following characteristics:

a. Amplitude: 5.0±0.5V peak
b. Width: 3.0±0.5 μsec
c. Rise Time: <300 nsec
d. Droop: <50 percent
e. Rep Rate: 3200 pps ±1 percent
f. Phase: In phase with leading edge of pulse at pins L (Hi) and H (Lo)

4.2.3.4.2 Outputs. The outputs shall be as follows:

a. >15 vdc at pins M (Hi) and H (Lo)
b. <0.6V at pins N (Hi) and H (Lo)

4.2.3.5 Minus Select (C/S). Connect a 1K ohm resistor between signal source (Hi) and pin V (Hi). The pulse out of the signal source (Hi) and pin W (Lo) shall have the characteristics as specified in 4.2.3.4.1.

4.2.3.5.1 Outputs. The outputs shall be as follows:

a. >15 vdc at pins N (Hi) and H (Lo).
b. <0.6V at pins M (Hi) and H (Lo).

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES. None.

APOLLO G&N Specification
PS2900076 REV E
Original Issue Date: 10/24/65
Release Authority: TDRR 23556
Class A Release
CODE IDENT NO. 99974

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

INTERROGATOR ASSEMBLY

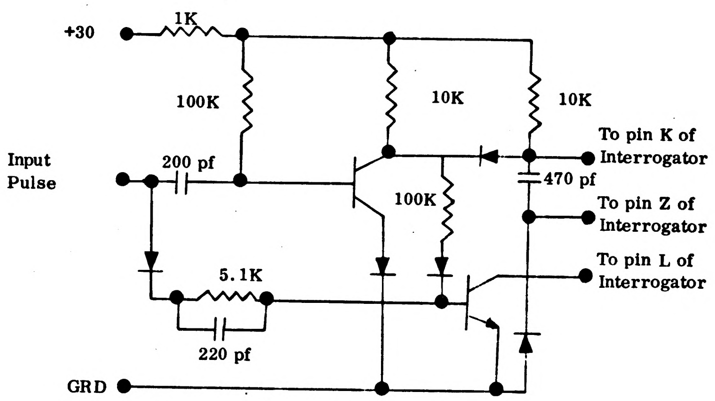
DRAWING NO. 2900076

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
	A		3, 5, 6, 7, 8		
10-19-65	B	MXC [illegible]	5, 7, 8		
[illegible]	C	MXC 206482	8		
Ⓜ [illegible]/28/65	D		ALL, Init Rel		
4/26/66	E	28355	2-8 RDC/AV	WK	--

This specification consists of page 1 **to** 8 **inclusive.**

APPROVALS	NASA/MSC	10-29-65 J M Watson MIT/IL	W K Hadley ACSP


+30
1K
100K
10K
10K
Input
Pulse
200 pf
470 pf
To pin K of
Interrogator
To pin Z of
Interrogator
100K
To pin L of
Interrogator
5.1K
220 pf
GRD

All Diodes are IN914
All Transistors are 2N2193

TEST CIRCUIT FOR

CALIBRATION AND TEST OF

INTERROGATOR

FIGURE 1

e. The output at pins M (Hi) and H (Lo) shall be <0.6V.

f. Apply the sine wave specified in 4.2.1.2.1.f to pins S (Hi) and R (Lo).

g. Adjust R9 for an output of >15 vdc at pins N (Hi) and H (Lo). The pulse at pin Z shall decrease to <1.5 Vp.

h. Remove the sine wave input from pins S (Hi) and R (Lo).

i. With the sine wave removed, the pulse specified in 4.2.1.2.1.d shall be present at pins Z (Hi) and H (Lo).

j. The output at pins N (Hi) and H (Lo) shall be <0.6V.

k. Repeat the calibration procedure if the requirements specified in 4.2.1.3.b, e, g, and j are not met.

4.2.2 Nonconforming Units. Failure of the unit to pass any examination or test of this specification shall automatically classify the unit as nonconforming. Each nonconforming unit corrected by the contractor shall be reinspected. Reinspection may be limited to the test or examination which defined the nonconformance, or, when directed by the cognizant inspector, a complete retest and reexamination may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the contractor to the cognizant NASA representative.

4.3 TESTS

4.3.1 Drawing Compliance. The interrogator shall be visually examined for compliance to the requirements of Drawing 2900076. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulant defects, contaminants, pin misalignment, and legibility and appearance of markings.

4.3.2 Reset. With the inputs specified in 4.2.1.2.1.a, b, and c applied and the pulse specified in 4.2.1.2.1.d applied to pins Z (Hi) and H (Lo), the outputs at pins M (Hi) and H (Lo) and at pins N (Hi) and H (Lo) shall be <0.6V.

4.3.3 Plus Select. With the conditions of 4.2.1.2.1.a, b, and c established and the sine wave specified in 4.2.1.2.1.g applied to pins S (Hi) and R (Lo), the outputs (unless otherwise specified all pulses shall be positive) shall be as follows:

a. >15 vdc at pins M (Hi) and H (Lo)
b. <0.6V at pins N (Hi) and H (Lo)
c. <1.0V at pins K (Hi) and H (Lo)

4.3.4 Minus Select. With the conditions of 4.2.1.2.1.a, b, and c established and the sine wave specified in 4.2.1.2.1.h applied to pins S (Hi) and R (Lo), the outputs shall be as follows:

a. >15 vdc at pins N (Hi) and H (Lo)
b. <0.6V at pins M (Hi) and H (Lo)
c. <1.0V at pins K (Hi) and H (Lo)

4.3.5 Plus Select (C/S). With the conditions of 4.2.1.2.1.a, b, and c established and the pulse of 4.2.1.2.1.i applied to pins Y (Hi) and X (Lo), the outputs shall be as follows:

a. >15 vdc at pins M (Hi) and H (Lo)
b. <0.6 vdc at pins N (Hi) and H (Lo)

4.3.6 Minus Select (C/S). With the conditions of 4.2.1.2.1.a, b, and c established and the pulse of 4.2.1.2.1.i shall be applied to pins Y (Hi) and X (Lo), the outputs shall be as follows:

a. >15 vdc at pins N (Hi) and H (Lo)
b. <0.6V at pins M (Hi) and H (Lo)

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES

6.1 Low Impedance Path. Low impedance path shall be defined as a resistance less than 1K ohms.

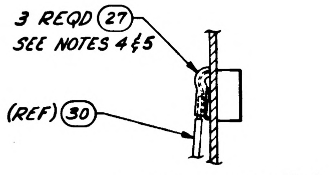
6.2 High Impedance. High impedance shall be defined as a resistance greater than 100K ohms.

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM (36), OR (37) AND (38).
3. USE ITEM (29) AS REQUIRED ON LEADS OF ITEM (26). CUT TO LENGTH REQUIRED.
4. BOND ITEMS (4), (5), (25) AND (26) TO ITEM (1) PER ND1002203.
5. FORM OVER TERMINALS OF ITEMS (4) AND (5) AS SHOWN AND BOND SLEEVING, ITEM (27), TO ITEM (1) PER ND1002203.
6. COMPONENTS AND WIRING NOT TO EXTEND INTO AREAS INDICATED.
7. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267).
8. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .09 HIGH.
9. SERIALIZE PER ND1002023.
10. VENDOR ITEM - SEE SPEC CONTROL DRAWING.
11. DIODE SYMBOLS FOR REFERENCE ONLY.

TABLE I

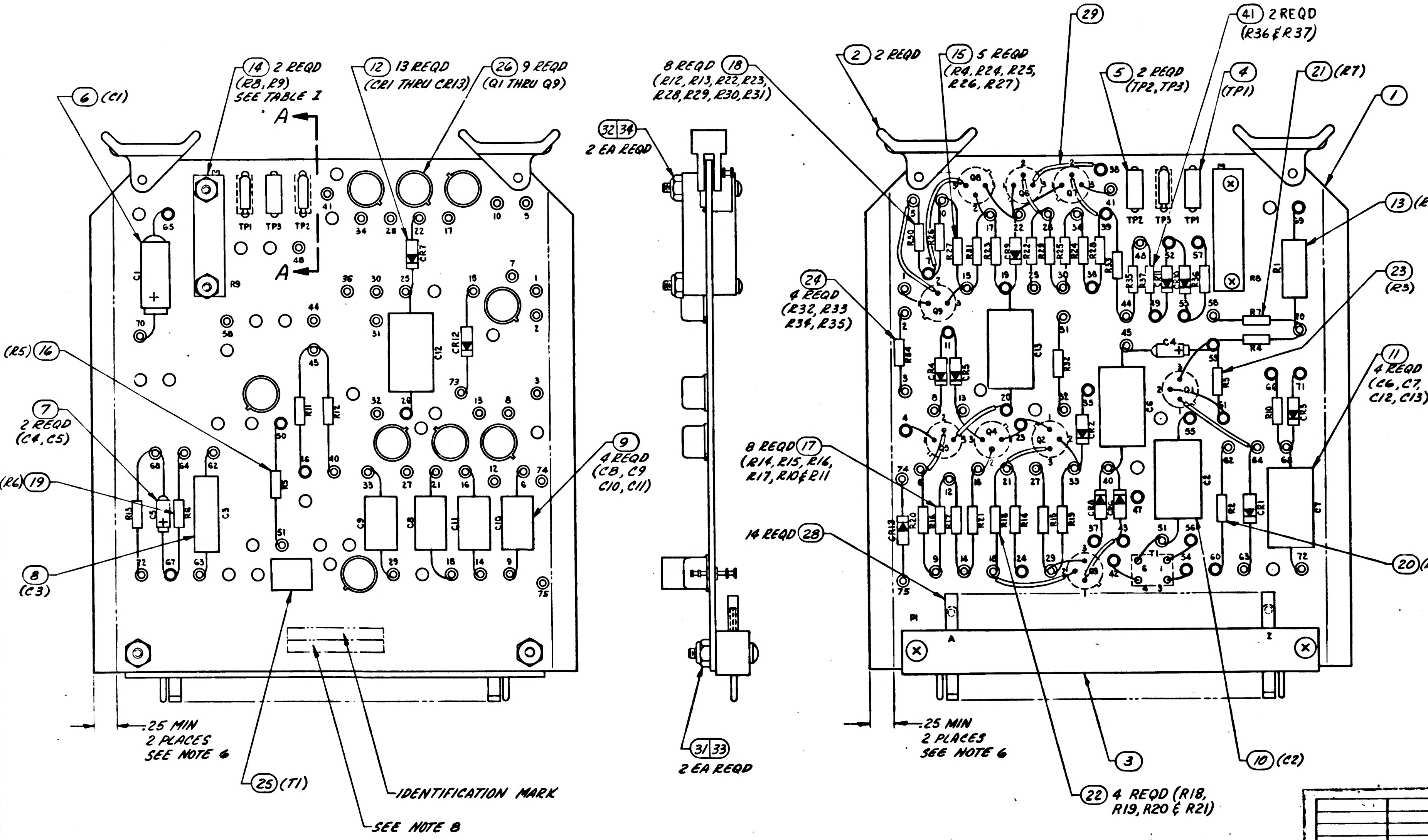
CONDUCTOR	TO	STRIP	TIN
R8-1 (YEL)	TERM. 47	.25	YES
R8-2 (RED)	66		
R8-3 (GRN)	58		
R9-1 (YEL)	65		
R9-2 (RED)	46		
R9-3 (GRN)	TERM. 58	.25	YES


3 REQD (27)
SEE NOTES 4 & 5
(REF) (30)

PARTIAL SECTION A-A
3 PLACES

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A	—	REVISED PER D.O.-60573		5-JUN-65	
B		REPLACES REV A WITH CHANGE PER MXC 202552		26 JUN 65	
C		REVISED PER MXC 203434		30 JUN 65	
D		REVISED PER MXC 204829		3 SEP 65	J.H.P.
E		REVISED PER MXC 205145		23 SEP 65	J.H.P.
F		INITIAL RELEASE CLASS A PER TDRR 23556		8 OCT 65	


(6) (C1)
(14) 2 REQD (R8, R9) SEE TABLE I
A
A
(12) 13 REQD (CR1 THRU CR13)
(26) 9 REQD (Q1 THRU Q9)
(R5) (16)
(7) 2 REQD (C4, C5)
(R6) (19)
(8) (C3)
(9) 4 REQD (C8, C9 C10, C11)
.25 MIN 2 PLACES SEE NOTE 6
(25) (T1)
IDENTIFICATION MARK
SEE NOTE 8
(32) (34) 2 EA REQD
(31) (33) 2 EA REQD
8 REQD (18) (R12, R13, R22, R23, R28, R29, R30, R31)
(2) 2 REQD
(15) 5 REQD (R4, R24, R25, R26, R27)
(29)
(5) 2 REQD (TP2, TP3)
(41) 2 REQD (R36 & R37)
(4) (TP1)
(21) (R7)
(1)
(13) (R1)
(23) (R3)
(11) 4 REQD (C6, C7, C12, C13)
(24) 4 REQD (R32, R33 R34, R35)
8 REQD (17) (R14, R15, R16, R17, R10 & R11)
14 REQD (28)
(20) (R2)
.25 MIN 2 PLACES SEE NOTE 6
(3)
(22) 4 REQD (R18, R19, R20 & R21)
(10) (C2)

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	2		41	RC07GF103J	(1896985-073) RESISTOR MIL-R-11/8
	☒		40	PS2900076	PROCUREMENT SPECIFICATION
	X		39	2900099	SCHEMATIC DIAGRAM, ELEC
	AR		38	SN60WS	SOLDER QQ-S-571 (ES2175-1)
	AR		37	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
	AR		36	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
SEE NOTE 10	2		34	1016151-002	NUT, SELF LOCKING
SEE NOTE 10	2		33	1016151-004	NUT, SELF LOCKING
	2		32	MS35216-9	SCREW, PAN HD
	2		31	MS35216-17	SCREW, PAN HD
	1		30	2900098	WIRE LIST AA
SEE NOTE 10	1		29	1006776-20	INSULATION SLEEVING, 12 IN. LG
	14		28	1015864-109	INSULATION SLEEVING, ELEC
	3		27	1010490-082	SLEEVING, ELEC, HEAT SHRINK
	9		26	1015928-001	TRANSISTOR
SEE NOTE 10	1		25	1015898-017	TRANSFORMER, AUDIO FREQ
	4		24	RC07GF394J	(1896985-111) RESISTOR MIL-R-11/8
	1		23	RC07GF204J	(1896985-104)
	4		22	RC07GF104J	(1896985-097)
	1		21	RC07GF823J	(1896985-095)
	1		20	RC07GF683J	(1896985-093)
	1		19	RC07GF473J	(1896985-089)
	8		18	RC07GF393J	(1896985-087)
	6		17	RC07GF203J	(1896985-080)
	1		16	RC07GF622J	(1896985-068)
	5		15	RC07GF512J	(1896985-066) MIL-R-11/8
	2		14	RT12C2L203	(1896967-011) MIL-R-27208/8
	1		13	RC32GF911J	(1896953-062) RESISTOR MIL-R-11/6
	13		12	IN914	(1896966-044) SEMICONDUCTOR MIL-S-19500/116
	4		11	CM20D102J03	(1896878-107) CAPACITOR MIL-C-5/2
	1		10	CM20D821J03	(1896878-105) MIL-C-5/2
	4		9	CM15C390J03	(1896969-043) MIL-C-5/1
	1		8	CP05A1KF103K3	(1896959-073) MIL-C-25/1
	2		7	CS13AFR47K	(1896954-120) MIL-C-26655/2
	1		6	CS13AG100K	(1896954-176) CAPACITOR MIL-C-26655/2
SEE NOTE 10	2		5	1016347-004	JACK, MINIATURE, CKT BOARD
	1		4	1016347-003	JACK, MINIATURE, CKT BOARD
	1		3	1015956-168	CONNECTOR, ADAPTER, ELEC
SEE NOTE 10	2		2	1015999-004	EJECTOR, CIRCUIT BOARD
	1		1	2900097	TERMINAL BOARD (INSEP ASSY)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900029-011	2900029-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — − | DECIMALS + — − | ANGLES + — −

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN

DRAWN C.M. Kulp 29 MAR 65
DATE
CHECKED J. Stelom 31 MAR 65
RE APPROVAL 31 MAR 65
APPROVAL 6-20-65
NASA APPROVAL
MIT APPROVAL
10 MAY 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

INTERROGATOR
ELECTRONIC COMPONENT
ASSEMBLY

CODE IDENT NO. 99974 | SIZE E | 2900076
SCALE 2/1 | SHEET 1 OF 1

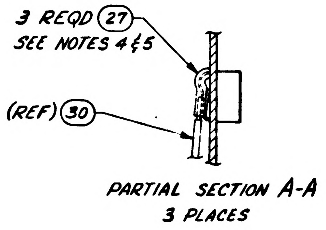
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM (36), OR (37) AND (38).
3. USE ITEM (29) AS REQUIRED ON LEADS OF ITEM (26). CUT TO LENGTH REQUIRED.
4. BOND ITEMS ④, ⑤, (25) AND (26) TO ITEM ① PER ND1002203.
5. FORM OVER TERMINALS OF ITEMS ④ AND ⑤ AS SHOWN AND BOND SLEEVING, ITEM (27), TO ITEM ① PER ND1002203.
6. COMPONENTS AND WIRING NOT TO EXTEND INTO AREAS INDICATED.
7. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267).
8. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .09 HIGH.
9. SERIALIZE PER ND1002023.
10. VENDOR ITEM - SEE SPEC CONTROL DRAWING.
11. DIODE SYMBOLS FOR REFERENCE ONLY.

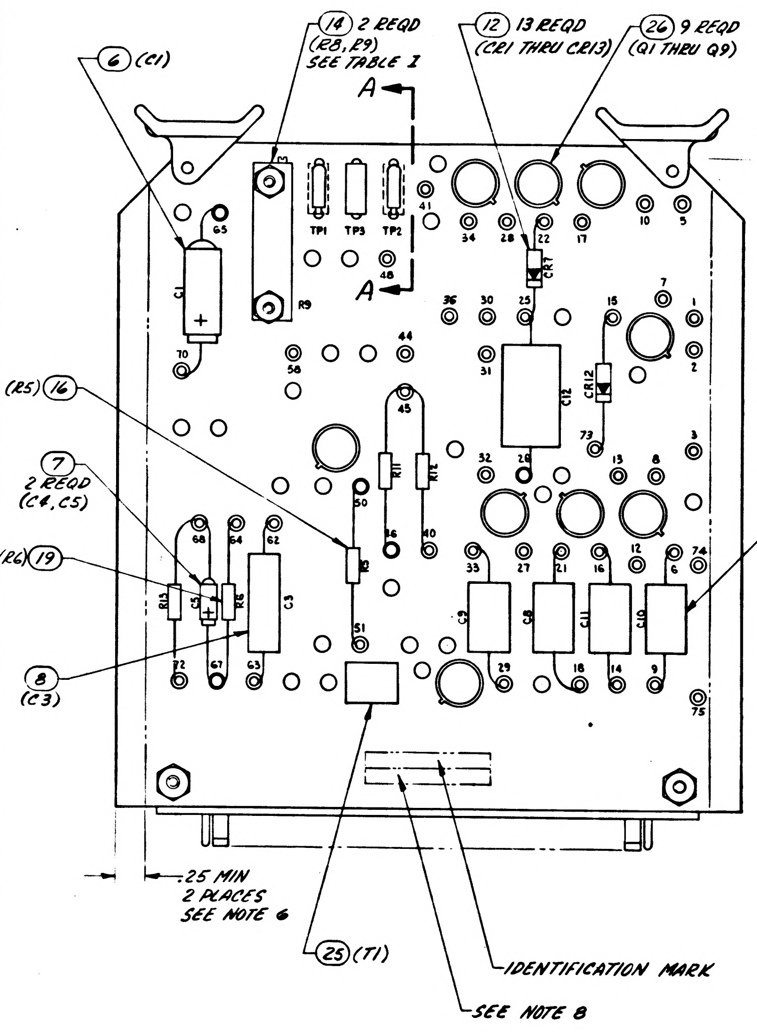
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A	—	REVISED PER D.O.-60573		5 JUN -65	B.
B		REPLACES REV A WITH CHANGE PER MXC 202582		26 JUN 65	
C		REVISED PER MXC 203434		30 JUL 65	
D		REVISED PER MXC 204829		3 SEP 65	J.H.P. AU
E		REVISED PER MXC 205145		23 SEP 65	J.H.P.
F		INITIAL RELEASE CLASS A PER TDRR 23556		8 OCT 65	
G		REVISED PER TDRR 24863		29 DEC 65	AU

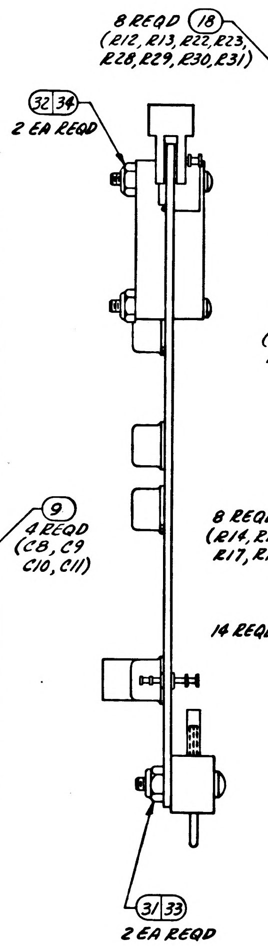
TABLE I

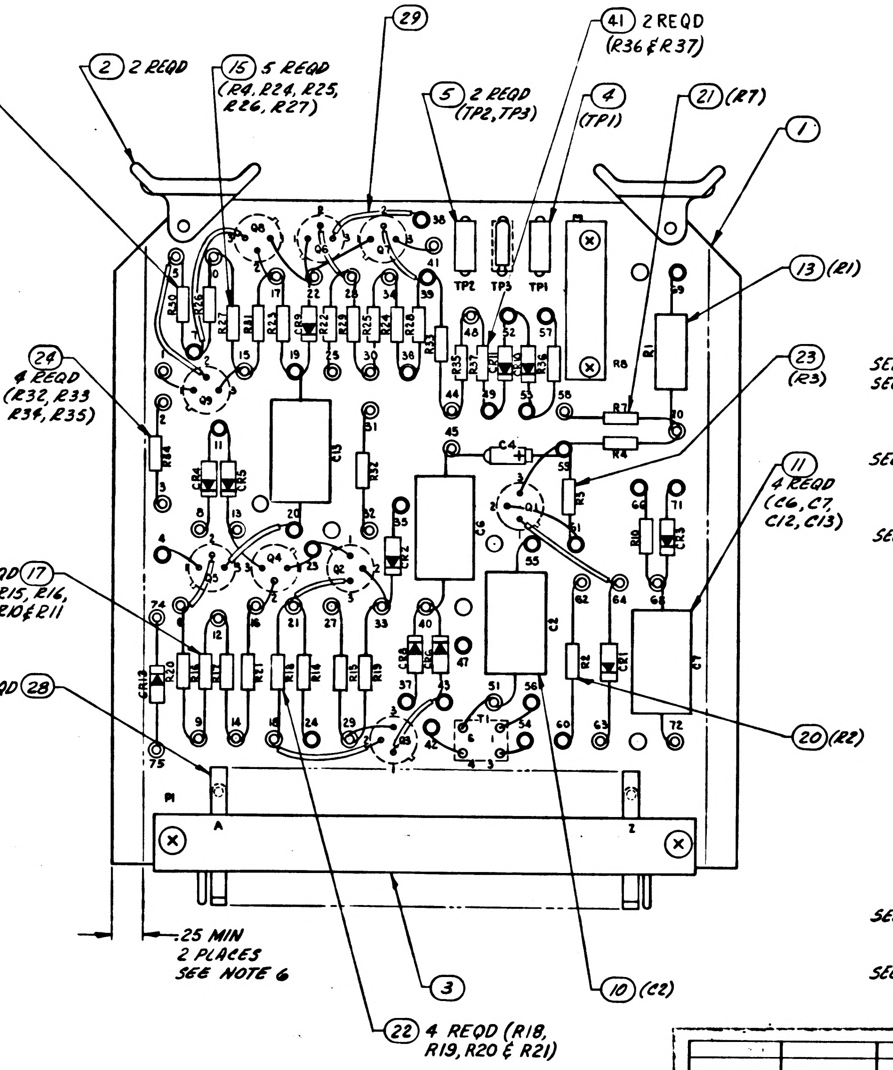
CONDUCTOR	TO	STRIP	TIN
R8-1 (YEL)	TERM. 47	.25	YES
R8-2 (RED)	66		
R8-3 (GRN)	58		
R9-1 (YEL)	65		
R9-2 (RED)	46		
R9-3 (GRN)	TERM. 58	.25	YES


3 REQD (27)
SEE NOTES 4 & 5
(REF) (30)

PARTIAL SECTION A-A
3 PLACES


(6) (C1)
(14) 2 REQD (R8, R9) SEE TABLE I
(12) 13 REQD (CR1 THRU CR13)
(26) 9 REQD (Q1 THRU Q9)
A
A
TP1
TP3
TP2
C1
R9
C12
CR12
CR7
C3
R13
C5
R6
R11
R12
C8
C9
C10
C11
(R5) (16)
(7) 2 REQD (C4, C5)
(R6) (19)
(8) (C3)
(9) 4 REQD (C8, C9 C10, C11)
.25 MIN
2 PLACES
SEE NOTE 6
(25) (T1)
IDENTIFICATION MARK
SEE NOTE 8


8 REQD (18) (R12, R13, R22, R23, R28, R29, R30, R31)
(32)(34) 2 EA REQD
(31)(33) 2 EA REQD


(2) 2 REQD
(15) 5 REQD (R4, R24, R25, R26, R27)
(29)
(5) 2 REQD (TP2, TP3)
(4) (TP1)
(41) 2 REQD (R36 & R37)
(21) (R7)
(1)
(13) (R1)
(23) (R3)
(11) 4 REQD (C6, C7, C12, C13)
(24) 4 REQD (R32, R33 R34, R35)
8 REQD (17) (R14, R15, R16, R17, R10 & R11)
14 REQD (28)
(20) (R2)
.25 MIN
2 PLACES
SEE NOTE 6
(3)
(22) 4 REQD (R18, R19, R20 & R21)
(10) (C2)
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Q9
TP2
TP3
TP1
R8
R1
R7
R4
R5
C4
C6
C2
C7
C13
P1
A
Z
T1

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	2		41	RC07GF122J	(1896985-051) RESISTOR MIL-R-11/8
			40	PS2900076	PROCUREMENT SPECIFICATION
	X		39	2900099	SCHEMATIC DIAGRAM, ELEC
	AR		38	SN60WS	SOLDER QQ-S-571 (ES2175-1)
	AR		37	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
	AR		36	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
SEE NOTE 10	2		34	1016151-002	NUT, SELF LOCKING
SEE NOTE 10	2		33	1016151-004	NUT, SELF LOCKING
	2		32	MS35216-9	SCREW, PAN HD
	2		31	MS35216-17	SCREW, PAN HD
	1		30	2900098	WIRE LIST AA
SEE NOTE 10	1		29	1006776-20	INSULATION SLEEVING, 12 IN. LG
	14		28	1015864-109	INSULATION SLEEVING, ELEC
	3		27	1010490-082	SLEEVING, ELEC, HEAT SHRINK
	9		26	1015928-001	TRANSISTOR
SEE NOTE 10	1		25	1015898-017	TRANSFORMER, AUDIO FREQ
	4		24	RC07GF394J	(1896985-111) RESISTOR MIL-R-11/8
	1		23	RC07GF204J	(1896985-104)
	4		22	RC07GF104J	(1896985-097)
	1		21	RC07GF823J	(1896985-095)
	1		20	RC07GF683J	(1896985-093)
	1		19	RC07GF473J	(1896985-089)
	8		18	RC07GF393J	(1896985-087)
	6		17	RC07GF203J	(1896985-080)
	1		16	RC07GF622J	(1896985-068)
	5		15	RC07GF512J	(1896985-066) MIL-R-11/8
	2		14	RT12C2L203	(1896967-011) MIL-R-27208/8
	1		13	RC32GF911J	(1896953-062) RESISTOR MIL-R-11/6
	13		12	1N914	(1896966-044) SEMICONDUCTOR MIL-S-19500/116
	4		11	CM20D102J03	(1896878-107) CAPACITOR MIL-C-5/2
	1		10	CM20D821J03	(1896878-105) MIL-C-5/2
	4		9	CM15C390J03	(1896969-043) MIL-C-5/
	1		8	CP05A1KF103K3	(1896959-073) MIL-C-25/1
	2		7	CS13AFR47K	(1896954-120) MIL-C-26655/2
	1		6	CS13AG100K	(1896954-176) CAPACITOR MIL-C-26655/2
SEE NOTE 10	2		5	1016347-004	JACK, MINIATURE, CKT BOARD
	1		4	1016347-003	JACK, MINIATURE, CKT BOARD
	1		3	1015956-168	CONNECTOR, ADAPTER, ELEC
SEE NOTE 10	2		2	1015999-004	EJECTOR, CIRCUIT BOARD
	1		1	2900097	TERMINAL BOARD (INSEP ASSY)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900029-011	2900029-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN C.M. Kulp DATE 29 MAR 65
CHECKED J. Stelona 31 MAR 65
APPROVAL 31 MAR 65
APPROVAL 10-20-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

INTERROGATOR
ELECTRONIC COMPONENT
ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900076
SCALE 2/1
SHEET 1 OF 1

10 MAY 65

2900076

NOTES:

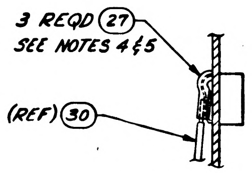
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM (36), OR (37) AND (38).
3. USE ITEM (29) AS REQUIRED ON LEADS OF ITEM (26). CUT TO LENGTH REQUIRED.
4. BOND ITEMS (4), (5), (25) AND (26) TO ITEM (1) PER ND1002203.
5. FORM OVER TERMINALS OF ITEMS (4) AND (5) AS SHOWN AND BOND SLEEVING, ITEM (27), TO ITEM (1) PER ND1002203.
6. COMPONENTS AND WIRING NOT TO EXTEND INTO AREAS INDICATED.
7. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267).
8. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .09 HIGH.
9. SERIALIZE PER ND1002023.
10. VENDOR ITEM - SEE SPEC CONTROL DRAWING.
11. DIODE SYMBOLS FOR REFERENCE ONLY.

REVISIONS

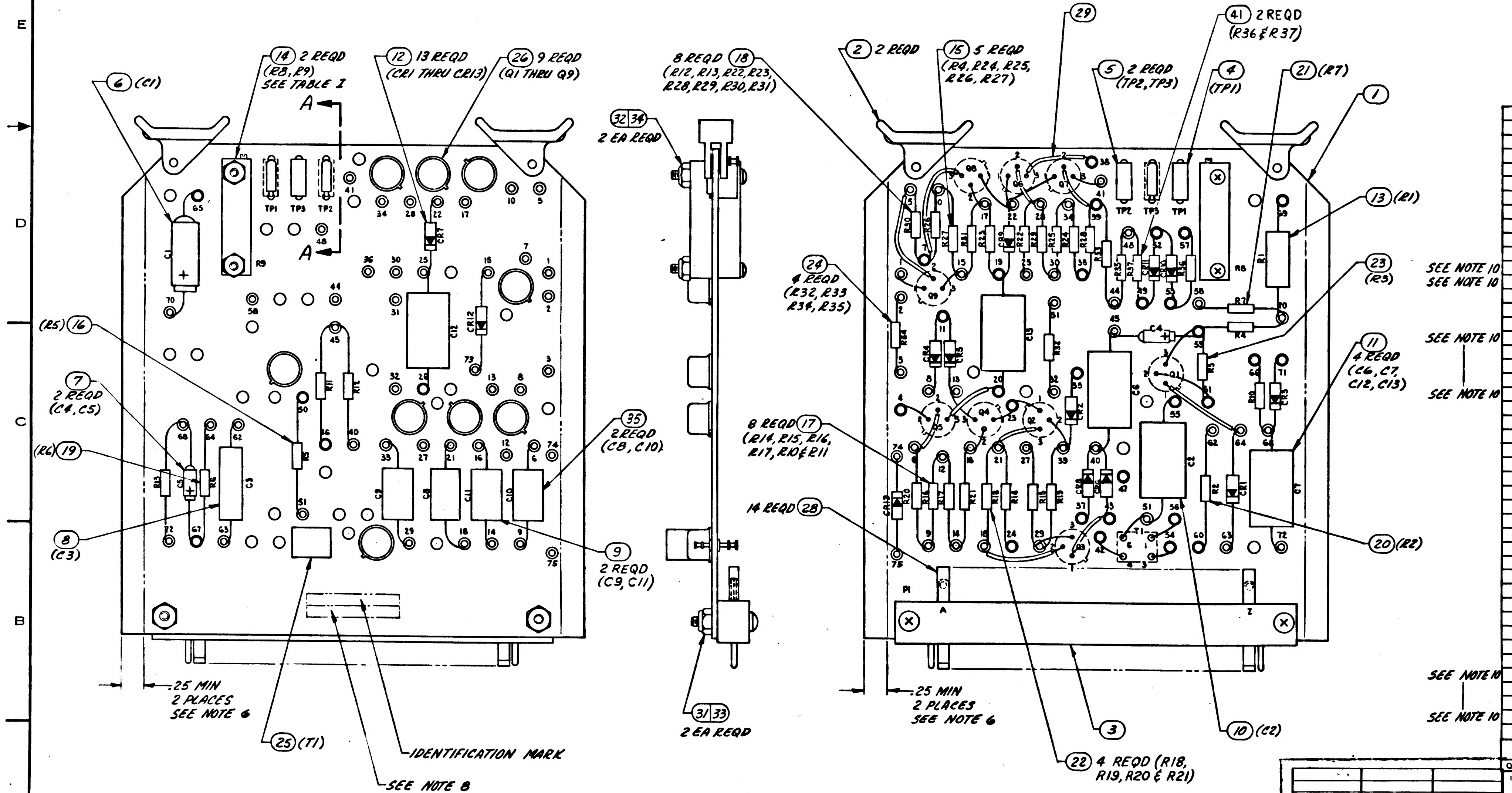
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A	—	REVISED PER D.O.-60573		5-JUN-65	
B		REPLACES REV A WITH CHANGE PER MXC 202552		26 JUN 65	
C		REVISED PER MXC 203434		30 JUL 65	
D		REVISED PER MXC 204829		13 SEP 65	J.H.P. AU
E		REVISED PER MXC 205145		23 SEP 65	J.H.P.
F		INITIAL RELEASE CLASS A PER TDRR 23556		18 OCT 65	
G		REVISED PER TDRR 24863		29 DEC 65	AU
H		REVISED PER TDRR 25291		20 JAN 66	

TABLE I

CONDUCTOR	TO	STRIP	TIN
R8-1 (YEL)	TERM. 47	.25	YES
R8-2 (RED)	66		
R8-3 (GRN)	58		
R9-1 (YEL)	65		
R9-2 (RED)	46		
R9-3 (GRN)	TERM. 58	.25	YES


3 REQD (27)
SEE NOTES 4 & 5
(REF) (30)

PARTIAL SECTION A-A
3 PLACES


(6) (C1)
(14) 2 REQD (R8, R9) SEE TABLE I
(12) 13 REQD (CR1 THRU CR13)
(26) 9 REQD (Q1 THRU Q9)
A
A
(R5) (16)
(7) 2 REQD (C4, C5)
(R6) (19)
(8) (C3)
(35) 2 REQD (C8, C10)
(9) 2 REQD (C9, C11)
.25 MIN 2 PLACES SEE NOTE 6
(25) (T1)
IDENTIFICATION MARK
SEE NOTE 8
8 REQD (18) (R12, R13, R22, R23, R28, R29, R30, R31)
(32) (34) 2 EA REQD
(31) (33) 2 EA REQD
(2) 2 REQD
(15) 5 REQD (R4, R24, R25, R26, R27)
(29)
(5) 2 REQD (TP2, TP3)
(41) 2 REQD (R36 & R37)
(4) (TP1)
(21) (R7)
(1)
(13) (R1)
(23) (R3)
(11) 4 REQD (C6, C7, C12, C13)
(24) 4 REQD (R32, R33, R34, R35)
8 REQD (17) (R14, R15, R16, R17, R10 & R11)
14 REQD (28)
(20) (R2)
.25 MIN 2 PLACES SEE NOTE 6
(3)
(10) (C2)
(22) 4 REQD (R18, R19, R20 & R21)
TP1
TP3
TP2
TP1
R9
R8
C1
C12
C3
C9
C8
C11
C10
C13
C6
C2
C7
Q1
Q2
Q4
Q5
Q6
Q7
Q8
Q9
T1
P1

LIST OF PARTS AND MATERIALS

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	2		41	RC07GF122J	(1896985-051) RESISTOR MIL-R-11/8
	☒		40	PS2900076	PROCUREMENT SPECIFICATION
	X		39	2900099	SCHEMATIC DIAGRAM, ELEC
	AR		38	SN60WS	SOLDER QQ-S-571 (ES2175-1)
	AR		37	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
	AR		36	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
	2		35	CM15D471J03	(1896969-104) CAPACITOR (MIL-C-5/1)
SEE NOTE 10	2		34	1016151-002	NUT, SELF LOCKING
SEE NOTE 10	2		33	1016151-004	NUT, SELF LOCKING
	2		32	MS35216-9	SCREW, PAN HD
	2		31	MS35216-17	SCREW, PAN HD
	1		30	2900098	WIRE LIST AA
SEE NOTE 10	1		29	1006776-20	INSULATION SLEEVING, 12 IN. LG
	14		28	1015864-109	INSULATION SLEEVING, ELEC
	3		27	1010490-082	SLEEVING, ELEC, HEAT SHRINK
	9		26	1015928-001	TRANSISTOR
SEE NOTE 10	1		25	1015898-017	TRANSFORMER, AUDIO FREQ
	4		24	RC07GF224J	(1896985-105) RESISTOR MIL-R-11/8
	1		23	RC07GF204J	(1896985-104)
	4		22	RC07GF104J	(1896985-097)
	1		21	RC07GF823J	(1896985-095)
	1		20	RC07GF683J	(1896985-093)
	1		19	RC07GF512J	(1896985-066)
	8		18	RC07GF393J	(1896985-087)
	6		17	RC07GF203J	(1896985-080)
	1		16	RC07GF622J	(1896985-068)
	5		15	RC07GF512J	(1896985-066) MIL-R-11/8
	2		14	RT12C2L203	(1896967-011) MIL-R-27208/8
	1		13	RC32GF911J	(1896953-062) RESISTOR MIL-R-11/6
	13		12	1N914	(1896966-044) SEMICONDUCTOR MIL-S-19500/116
	4		11	CM20D102J03	(1896878-107) CAPACITOR MIL-C-5/2
	1		10	CM20D821J03	(1896878-105) MIL-C-5/2
	2		9	CM15C390J03	(1896969-043) MIL-C-5/1
	1		8	CP05A1KF103K3	(1896959-073) MIL-C-25/1
	2		7	CS13AFR47K	(1896954-120) MIL-C-26655/2
	1		6	CS13AG100K	(1896954-176) CAPACITOR MIL-C-26655/2
SEE NOTE 10	2		5	1016347-004	JACK, MINIATURE, CKT BOARD
	1		4	1016347-003	JACK, MINIATURE, CKT BOARD
	1		3	1015956-168	CONNECTOR, ADAPTER, ELEC
SEE NOTE 10	2		2	1015999-004	EJECTOR, CIRCUIT BOARD
	1		1	2900097	TERMINAL BOARD (INSEP ASSY)

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900029-011	2900029-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN C.M. Kulp DATE 29 MAR 65
CHECKED J. Strauss 31 MAR 65
APPROVAL 31 MAR 65
APPROVAL 10-20-65
NASA APPROVAL
MIT APPROVAL
10 MAY 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

INTERROGATOR
ELECTRONIC COMPONENT
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900076
SCALE 2/1
SHEET 1 OF 1

2900076

NOTES:

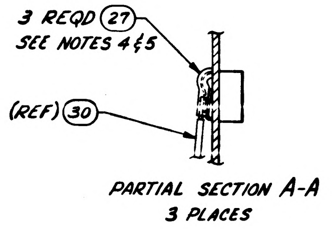
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM ㊱, OR ㊲ AND ㊳.
3. USE ITEM ㉙ AS REQUIRED ON LEADS OF ITEM ㉖. CUT TO LENGTH REQUIRED.
4. BOND ITEMS ④, ⑤, ㉕ AND ㉖ TO ITEM ① PER ND1002203.
5. FORM OVER TERMINALS OF ITEMS ④ AND ⑤ AS SHOWN AND BOND SLEEVING, ITEM ㉗, TO ITEM ① PER ND1002203.
6. COMPONENTS AND WIRING NOT TO EXTEND INTO AREAS INDICATED.
7. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267).
8. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .09 HIGH.
9. SERIALIZE PER ND1002023.
10. VENDOR ITEM - SEE SPEC CONTROL DRAWING.
11. DIODE SYMBOLS FOR REFERENCE ONLY.

TABLE I

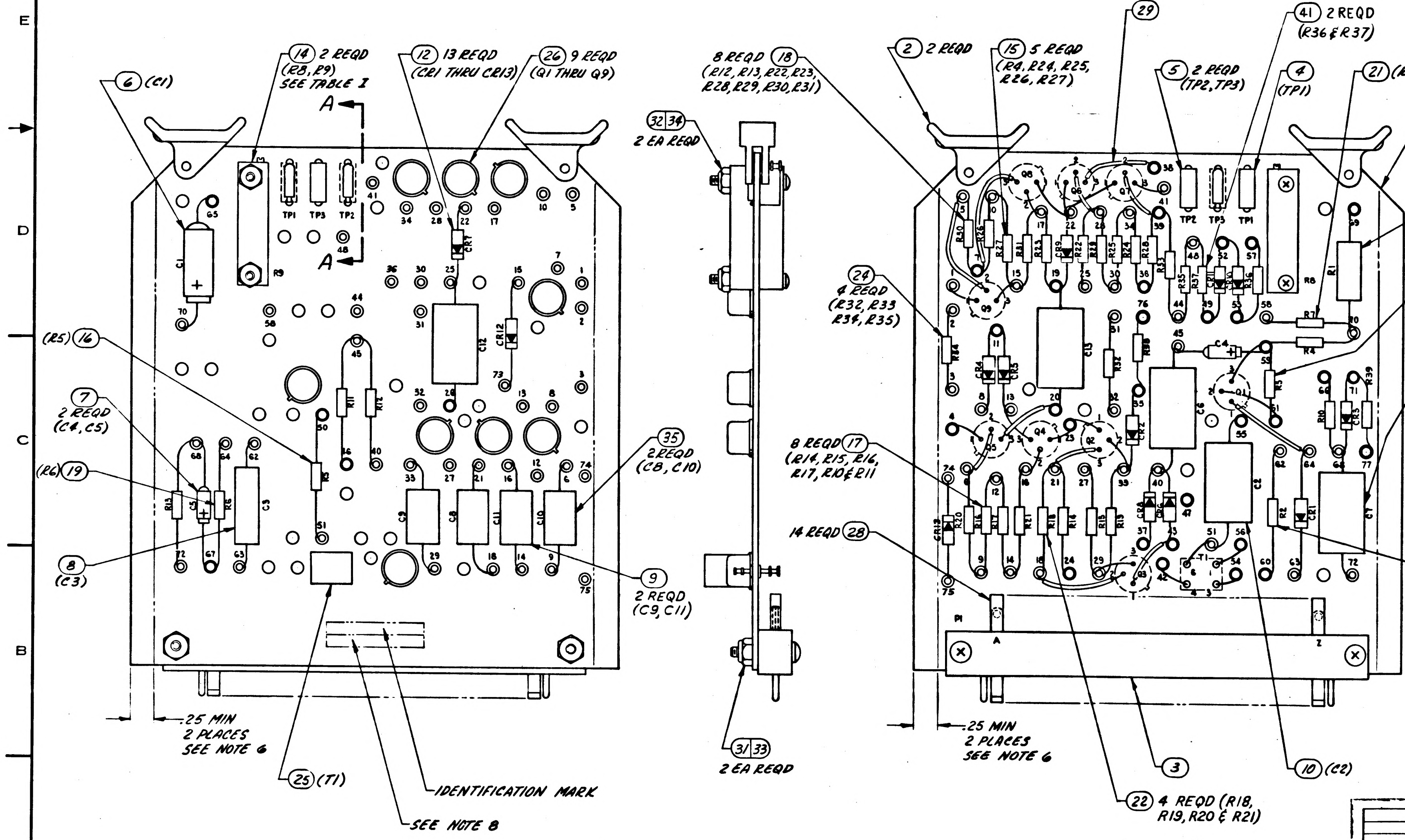
CONDUCTOR	TO	STRIP	TIN
R8-1 (YEL)	TERM. 47	.25	YES
R8-2 (RED)	66		
R8-3 (GRN)	58		
R9-1 (YEL)	65		
R9-2 (RED)	46		
R9-3 (GRN)	TERM. 58	.25	YES

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.
A	—	REVISED PER D.O.-60573		5-JUN-65	B.
B		REPLACES REV A WITH CHANGE PER MXC 202552		26 JUN 65	
C		REVISED PER MXC 203434		30 JUL 65	
D		REVISED PER MXC 204829		13 SEP 65	J.H.P. AU
E		REVISED PER MXC 205145		23 SEP 65	J.H.P.
F		INITIAL RELEASE CLASS A PER TDRR 23556		18 OCT 65	
G		REVISED PER TDRR 24863		29 DEC 65	AU
H		REVISED PER TDRR 25291		20 JAN 66	
J		REVISED PER TDRR 26114		7 FEB 66	DKB


3 REQD ㉗
SEE NOTES 4 & 5
(REF) ㉚

PARTIAL SECTION A-A
3 PLACES


⑥ (C1)
⑭ 2 REQD (R8, R9) SEE TABLE I
A
A
⑫ 13 REQD (CR1 THRU CR13)
㉖ 9 REQD (Q1 THRU Q9)
(R5) ⑯
⑦ 2 REQD (C4, C5)
(R6) ⑲
⑧ (C3)
㉟ 2 REQD (C8, C10)
⑨ 2 REQD (C9, C11)
.25 MIN 2 PLACES SEE NOTE 6
㉕ (T1)
IDENTIFICATION MARK
SEE NOTE 8
8 REQD ⑱ (R12, R13, R22, R23, R28, R29, R30, R31)
32 34 2 EA REQD
31 33 2 EA REQD
② 2 REQD
⑮ 5 REQD (R4, R24, R25, R26, R27)
㉙
㊶ 2 REQD (R36 & R37)
⑤ 2 REQD (TP2, TP3)
④ (TP1)
㉑ (R7)
①
⑬ (R1)
㉔ 4 REQD (R32, R33, R34, R35)
㉓ (R3)
⑪ 4 REQD (C6, C7, C12, C13)
8 REQD ⑰ (R14, R15, R16, R17, R10 & R11)
14 REQD ㉘
⑳ (R2)
.25 MIN 2 PLACES SEE NOTE 6
③
㉒ 4 REQD (R18, R19, R20 & R21)
⑩ (C2)

			021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			⊠			44	PS2016105	PROCUREMENT SPECIFICATION
			1			43	2901013	TERMINAL BD. (INSEP. ASS'Y)
			1			42	2901012	WIRE LIST AA
			4	2		41	RC07GF122J	(1896985-051) RESISTOR MIL-R-11/8
				⊠		40	PS2900076	PROCUREMENT SPECIFICATION
			X	X		39	2900099	SCHEMATIC DIAGRAM, ELEC
			AR	AR		38	SN60WS	SOLDER QQ-S-571 (ES2175-1)
			AR	AR		37	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
			AR	AR		36	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
			2	2		35	CM15D471J03	(1896969-104) CAPACITOR (MIL-C-5/1)
SEE NOTE 10			2	2		34	1016151-002	NUT, SELF LOCKING
SEE NOTE 10			2	2		33	1016151-004	NUT, SELF LOCKING
			2	2		32	MS35216-9	SCREW, PAN HD
			2	2		31	MS35216-17	SCREW, PAN HD
				1		30	2900098	WIRE LIST AA
SEE NOTE 10			1	1		29	1006776-20	INSULATION SLEEVING, 12 IN. LG
			14	14		28	1015864-109	INSULATION SLEEVING, ELEC
			3	3		27	1010490-082	SLEEVING, ELEC, HEAT SHRINK
			9	9		26	1015928-001	TRANSISTOR
SEE NOTE 10			1	1		25	1015898-017	TRANSFORMER, AUDIO FREQ
			4	4		24	RC07GF224J	(1896985-105) RESISTOR MIL-R-11/8
			1	1		23	RC07GF204J	(1896985-104)
			4	4		22	RC07GF104J	(1896985-097)
			1	1		21	RC07GF823J	(1896985-095)
			1	1		20	RC07GF683J	(1896985-093)
			1	1		19	RC07GF512J	(1896985-066)
			8	8		18	RC07GF393J	(1896985-087)
			6	6		17	RC07GF203J	(1896985-080)
			1	1		16	RC07GF622J	(1896985-068)
			5	5		15	RC07GF512J	(1896985-066) MIL-R-11/8
			2	2		14	RT12C2L203	(1896967-011) MIL-R-27208/8
			1	1		13	RC32GF911J	(1896953-062) RESISTOR MIL-R-11/6
			13	13		12	IN914	(1896966-044) SEMICONDUCTOR MIL-S-19500/116
			4	4		11	CM20D102J03	(1896878-107) CAPACITOR MIL-C-5/2
			1	1		10	CM20D821J03	(1896878-105) MIL-C-5/2
			2	2		9	CM15C390J03	(1896969-043) MIL-C-5/1
			1	1		8	CP05A1KF103K3	(1896959-073) MIL-C-25/1
			2	2		7	CS13AFR47K	(1896954-120) MIL-C-26655/2
			1	1		6	CS13AG100K	(1896954-176) CAPACITOR MIL-C-26655/2
SEE NOTE 10			2	2		5	1016347-004	JACK, MINIATURE, CKT BOARD
			1	1		4	1016347-003	JACK, MINIATURE, CKT BOARD
			1	1		3	1015956-168	CONNECTOR, ADAPTER, ELEC
SEE NOTE 10			2	2		2	1015999-004	EJECTOR, CIRCUIT BOARD
				1		1	2900097	TERMINAL BOARD (INSEP ASSY)
	QUANTITY REQUIRED						LIST OF PARTS AND MATERIALS	

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900029-011	2900029-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS
DRAWN C.M. Kulp 29 MAR 65
CHECKED J. Stevens 31 MAR 65
APPROVAL 31 MAR 65
APPROVAL 10-20-65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INTERROGATOR
ELECTRONIC COMPONENT
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900076
SCALE 2/1
SHEET 1 OF 1

2900076

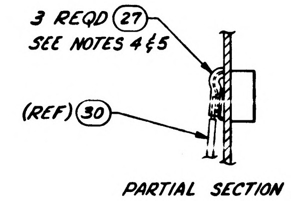
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A	—	REVISED PER D.O.-60573		5-JUN-65	
B		REPLACES REV A WITH CHANGE PER MXC 202582		26 JUN 65	
C		REVISED PER MXC 203434		30 JUL 65	
D		REVISED PER MXC 204829		13 SEP 65	J.H.P. AU
E		REVISED PER MXC 205145		23 SEP 65	J.H.P.
F		INITIAL RELEASE CLASS A PER TDRR 23556		18 OCT 65	
G		REVISED PER TDRR 24863		29 DEC 65	AU
H		REVISED PER TDRR 25291		20 JAN 66	
J		REVISED PER TDRR 26114		FEB 66	DKD
K		REVISED PER TDRR 276 3		4 APR 66	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM (36), OR (37) AND (38).
3. USE ITEM (29) AS REQUIRED ON LEADS OF ITEM (26). CUT TO LENGTH REQUIRED.
4. BOND ITEMS (4), (5), (25) AND (26) TO ITEM (1) PER ND1002203.
5. FORM OVER TERMINALS OF ITEMS (4) AND (5) AS SHOWN AND BOND SLEEVING, ITEM (27), TO ITEM (1) PER ND1002203.
6. COMPONENTS AND WIRING NOT TO EXTEND INTO AREAS INDICATED.
7. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267).
8. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .09 HIGH.
9. SERIALIZE PER ND1002023.
10. VENDOR ITEM - SEE SPEC CONTROL DRAWING.
11. DIODE SYMBOLS FOR REFERENCE ONLY.
12. IN 011 CONFIGURATION, R38 & R39 ARE NOT USED.

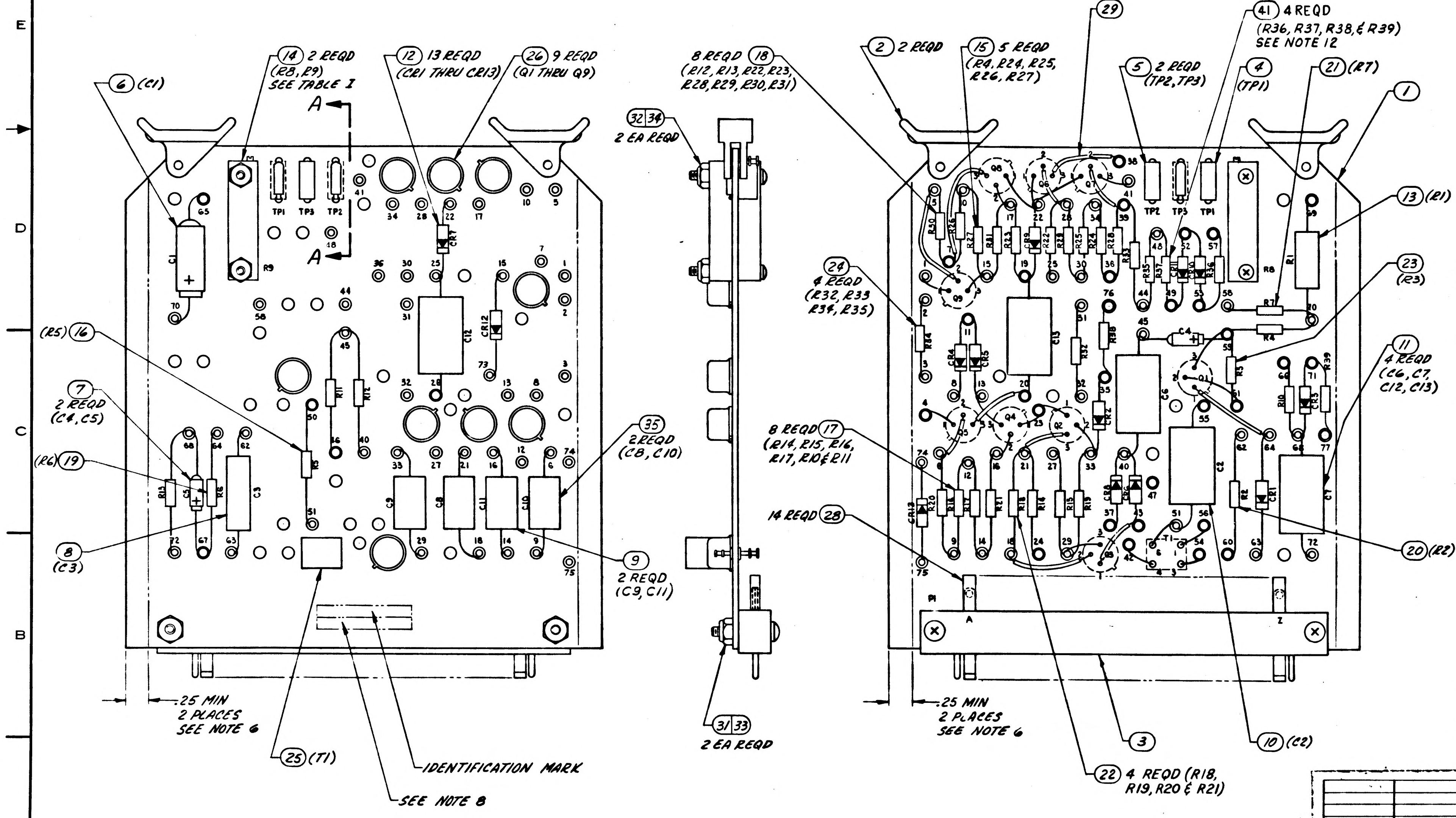
TABLE I

CONDUCTOR	TO	STRIP	TIN
R8-1 (YEL)	TERM. 47	.25	YES
R8-2 (RED)	66		
R8-3 (GRN)	58		
R9-1 (YEL)	65		
R9-2 (RED)	46		
R9-3 (GRN)	TERM. 58	.25	YES



3 REQD (27)
SEE NOTES 4 & 5
(REF) (30)

PARTIAL SECTION A-A
3 PLACES



(6) (C1)
(14) 2 REQD (R8, R9) SEE TABLE I
A
(12) 13 REQD (CR1 THRU CR13)
(26) 9 REQD (Q1 THRU Q9)
(R5) (16)
(7) 2 REQD (C4, C5)
(R6) (19)
(8) (C3)
(35) 2 REQD (C8, C10)
(9) 2 REQD (C9, C11)
.25 MIN 2 PLACES SEE NOTE 6
(25) (T1)
IDENTIFICATION MARK
SEE NOTE 8
8 REQD (18) (R12, R13, R22, R23, R28, R29, R30, R31)
(32) (34) 2 EA REQD
(31) (33) 2 EA REQD
(24) 4 REQD (R32, R33, R34, R35)
8 REQD (17) (R14, R15, R16, R17, R10 & R11)
14 REQD (28)
(2) 2 REQD
(15) 5 REQD (R4, R24, R25, R26, R27)
(29)
(5) 2 REQD (TP2, TP3)
(41) 4 REQD (R36, R37, R38, & R39) SEE NOTE 12
(4) (TP1)
(21) (R7)
(1)
(13) (R1)
(23) (R3)
(11) 4 REQD (C6, C7, C12, C13)
(20) (R2)
(3)
(22) 4 REQD (R18, R19, R20 & R21)
(10) (C2)
.25 MIN 2 PLACES SEE NOTE 6
TP1
TP2
TP3
P1

			021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			☒			44	PS2016105	PROCUREMENT SPECIFICATION
			1			43	2901013	TERMINAL BD. (INSEP. ASS'Y)
			1			42	2901012	WIRE LIST AA
			4	2		41	RC07GF122J	(1896985-051) RESISTOR MIL-R-11/8
				☒		40	PS2900076	PROCUREMENT SPECIFICATION
			X	X		39	2900099	SCHEMATIC DIAGRAM, ELEC
			AR	AR		38	SN60WS	SOLDER QQ-S-571 (ES2175-1)
			AR	AR		37	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
			AR	AR		36	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
			2	2		35	CM15D471J03	(1896969-104) CAPACITOR (MIL-C-5/1)
SEE NOTE 10			2	2		34	1016151-002	NUT, SELF LOCKING
SEE NOTE 10			2	2		33	1016151-004	NUT, SELF LOCKING
			2	2		32	MS35216-9	SCREW, PAN HD
			2	2		31	MS35216-17	SCREW, PAN HD
				1		30	2900098	WIRE LIST AA
SEE NOTE 10			1	1		29	1006776-20	INSULATION SLEEVING, 12 IN. LG
			14	14		28	1015864-109	INSULATION SLEEVING, ELEC
			3	3		27	1010490-082	SLEEVING, ELEC, HEAT SHRINK
			9	9		26	1015928-001	TRANSISTOR
SEE NOTE 10			1	1		25	1015898-017	TRANSFORMER, AUDIO FREQ
			4	4		24	RC07GF224J	(1896985-105) RESISTOR MIL-R-11/8
			1	1		23	RC07GF204J	(1896985-104)
			4	4		22	RC07GF104J	(1896985-097)
			1	1		21	RC07GF823J	(1896985-095)
			1	1		20	RC07GF683J	(1896985-093)
			1	1		19	RC07GF512J	(1896985-066)
			8	8		18	RC07GF393J	(1896985-087)
			6	6		17	RC07GF203J	(1896985-080)
			1	1		16	RC07GF622J	(1896985-068)
			5	5		15	RC07GF512J	(1896985-066) MIL-R-11/8
			2	2		14	RT12C2L203	(1896967-011) MIL-R-27208/8
			1	1		13	RC32GF911J	(1896953-062) RESISTOR MIL-R-11/6
			13	13		12	1N914	(1896966-044) SEMICONDUCTOR MIL-S-19500/116
			4	4		11	CM20D102J03	(1896878-107) CAPACITOR MIL-C-5/2
			1	1		10	CM20D821J03	(1896878-105) MIL-C-5/2
			2	2		9	CM15C390J03	(1896969-043) MIL-C-5/1
			1	1		8	CP05A1KF103K3	(1896959-073) MIL-C-25/1
			2	2		7	CS13AFR47K	(1896954-120) MIL-C-26655/2
			1	1		6	CS13AG100K	(1896954-176) CAPACITOR MIL-C-26655/2
SEE NOTE 10			2	2		5	1016347-004	JACK, MINIATURE, CKT BOARD
			1	1		4	1016347-003	JACK, MINIATURE, CKT BOARD
			1	1		3	1015956-168	CONNECTOR, ADAPTER, ELEC
SEE NOTE 10			2	2		2	1015999-004	EJECTOR, CIRCUIT BOARD
				1		1	2900097	TERMINAL BOARD (INSEP ASSY)
	QUANTITY REQUIRED						LIST OF PARTS AND MATERIALS	

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900029-011	2900029-011	-011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS
DRAWN C.M. Kulp DATE 29 MAR 65
CHECKED 31 MAR 65
APPROVAL 31 MAR 65
APPROVAL 10-20-65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INTERROGATOR
ELECTRONIC COMPONENT
ASSEMBLY

CODE IDENT NO. 99974 SIZE E 2900076
SCALE 2/1 SHEET 1 OF 1

10 MAY 65

NOTES:

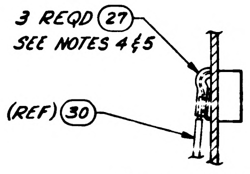
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM (36), OR (37) AND (38).
3. USE ITEM (29) AS REQUIRED ON LEADS OF ITEM (26). CUT TO LENGTH REQUIRED.
4. BOND ITEMS (4), (5), (25) AND (26) TO ITEM (1) PER ND1002203.
5. FORM OVER TERMINALS OF ITEMS (4) AND (5) AS SHOWN AND BOND SLEEVING, ITEM (27), TO ITEM (1) PER ND1002203.
6. COMPONENTS AND WIRING NOT TO EXTEND INTO AREAS INDICATED.
7. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267).
8. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .09 HIGH.
9. SERIALIZE PER ND1002023.
10. VENDOR ITEM - SEE SPEC CONTROL DRAWING.
11. DIODE SYMBOLS FOR REFERENCE ONLY.
12. IN 011 CONFIGURATION, R38 & R39 ARE NOT USED.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A	—	REVISED PER D.O.-60573		5-JUN-65	
B		REPLACES REV A WITH CHANGE PER MXC 202552		26 JUN 65	
C		REVISED PER MXC 203434		30 JUL 65	
D		REVISED PER MXC 204829		3 SEP 65	J.H.P. AU
E		REVISED PER MXC 205145		23 SEP 65	J.H.P.
F		INITIAL RELEASE CLASS A PER TDRR 23556		8 OCT 65	
G		REVISED PER TDRR 24863		29 DEC 65	AU
H		REVISED PER TDRR 25291		20 JAN 66	
J		REVISED PER TDRR 26114		FEB 66	DWD
K		REVISED PER TDRR 276 3		APR 66	
L		REVISED PER TDRR 28346		5 MAY 66	

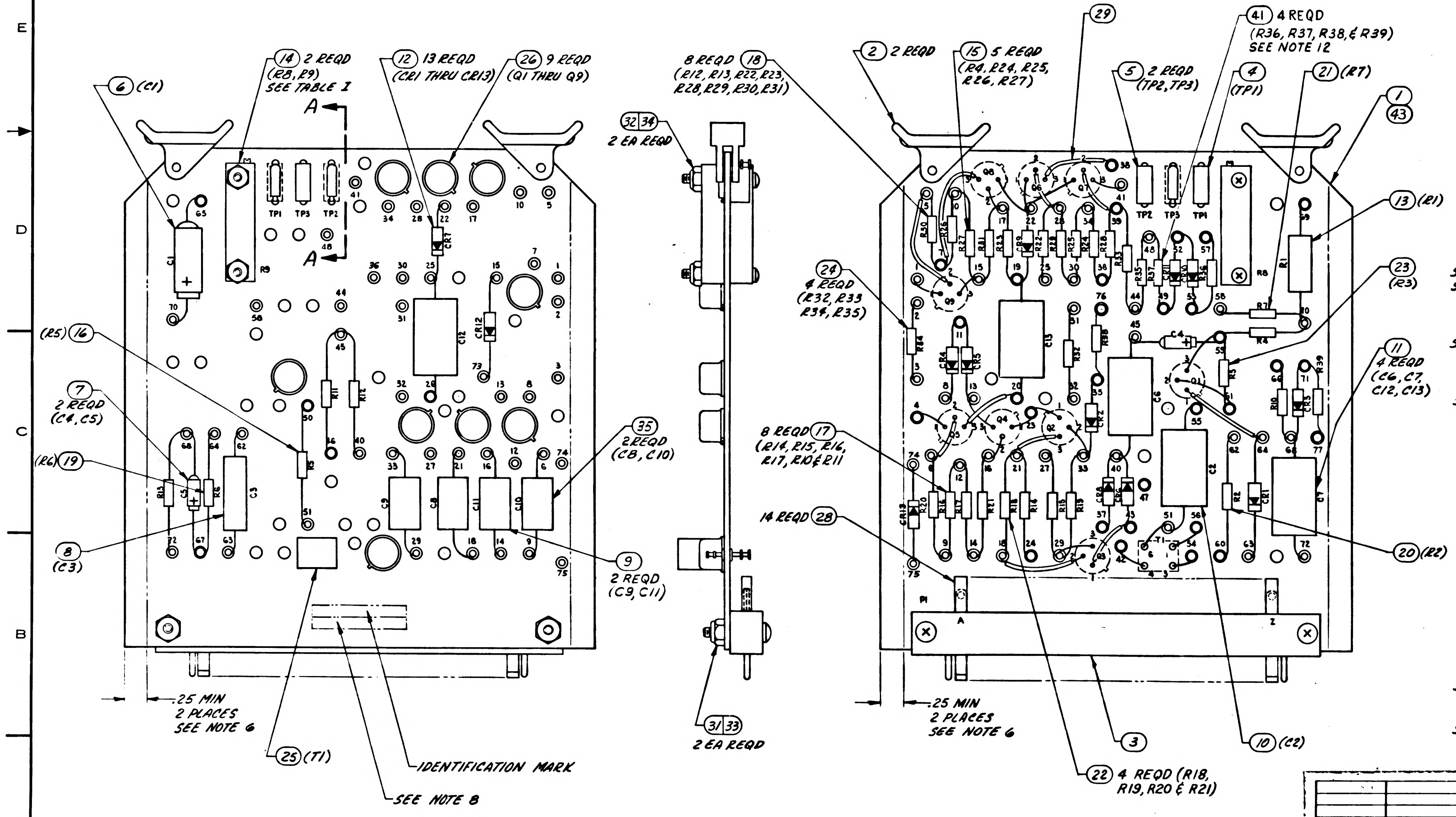
TABLE I

CONDUCTOR	TO	STRIP	TIN
R8-1 (YEL)	TERM. 47	.25	YES
R8-2 (RED)	66		
R8-3 (GRN)	58		
R9-1 (YEL)	65		
R9-2 (RED)	46		
R9-3 (GRN)	TERM. 58	.25	YES



3 REQD (27)
SEE NOTES 4 & 5
(REF) (30)

PARTIAL SECTION A-A
3 PLACES



(6) (C1)
(14) 2 REQD (R8, R9) SEE TABLE I
A
(12) 13 REQD (CR1 THRU CR13)
(26) 9 REQD (Q1 THRU Q9)
TP1
TP3
TP2
C1
R9
CR7
C12
CR12
R11
R12
C3
C2
C8
C11
C10
(R5) (16)
(7) 2 REQD (C4, C5)
(R6) (19)
(8) (C3)
(35) 2 REQD (C8, C10)
(9) 2 REQD (C9, C11)
.25 MIN
2 PLACES
SEE NOTE 6
(25) (T1)
IDENTIFICATION MARK
SEE NOTE 8
(32) (34) 2 EA REQD
(31) (33) 2 EA REQD
14 REQD (28)
8 REQD (18) (R12, R13, R22, R23, R28, R29, R30, R31)
(2) 2 REQD
(15) 5 REQD (R4, R24, R25, R26, R27)
(29)
(5) 2 REQD (TP2, TP3)
(4) (TP1)
(41) 4 REQD (R36, R37, R38, & R39) SEE NOTE 12
(21) (R7)
(1)
(43)
(13) (R1)
(23) (R3)
(11) 4 REQD (C6, C7, C12, C13)
(24) 4 REQD (R32, R33, R34, R35)
8 REQD (17) (R14, R15, R16, R17, R10 & R11)
(20) (R2)
(22) 4 REQD (R18, R19, R20 & R21)
(3)
(10) (C2)
.25 MIN
2 PLACES
SEE NOTE 6
P1
A
Z

			021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			☒			44	PS2016105	PROCUREMENT SPECIFICATION
			1			43	2901013	TERMINAL BD. (INSEP. ASS'Y)
			1			42	2901012	WIRE LIST AA
			4	2		41	RC07GF122J	(1896985-051) RESISTOR MIL-R-11/8
				☒		40	PS2900076	PROCUREMENT SPECIFICATION
			X	X		39	2900099	SCHEMATIC DIAGRAM, ELEC
			AR	AR		38	SN60WS	SOLDER QQ-S-571 (ES2175-1)
			AR	AR		37	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
			AR	AR		36	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
			2	2		35	CM15D471J03	(1896969-104) CAPACITOR (MIL-C-5/1)
SEE NOTE 10			2	2		34	1016151-002	NUT, SELF LOCKING
SEE NOTE 10			2	2		33	1016151-004	NUT, SELF LOCKING
			2	2		32	MS35216-9	SCREW, PAN HD
			2	2		31	MS35216-17	SCREW, PAN HD
				1		30	2900098	WIRE LIST AA
SEE NOTE 10			1	1		29	1006776-20	INSULATION SLEEVING, 12 IN. LG
			14	14		28	1015864-109	INSULATION SLEEVING, ELEC
			3	3		27	1010490-082	SLEEVING, ELEC, HEAT SHRINK
			9	9		26	1015928-001	TRANSISTOR
SEE NOTE 10			1	1		25	1015898-017	TRANSFORMER, AUDIO FREQ
			4	4		24	RC07GF224J	(1896985-105) RESISTOR MIL-R-11/8
			1	1		23	RC07GF204J	(1896985-104)
			4	4		22	RC07GF104J	(1896985-097)
			1	1		21	RC07GF823J	(1896985-095)
			1	1		20	RC07GF683J	(1896985-093)
			1	1		19	RC07GF512J	(1896985-066)
			8	8		18	RC07GF393J	(1896985-087)
			6	6		17	RC07GF203J	(1896985-080)
			1	1		16	RC07GF622J	(1896985-068)
			5	5		15	RC07GF512J	(1896985-066) MIL-R-11/8
			2	2		14	RT12C2L203	(1896967-011) MIL-R-27208/8
			1	1		13	RC32GF911J	(1896953-062) RESISTOR MIL-R-11/6
			13	13		12	1N914	(1896966-044) SEMICONDUCTOR MIL-S-19500/116
			4	4		11	CM20D102J03	(1896878-107) CAPACITOR MIL-C-5/2
			1	1		10	CM20D821J03	(1896878-105) MIL-C-5/2
			2	2		9	CM15C390J03	(1896969-043) MIL-C-5/1
			1	1		8	CP05A1KF103K3	(1896959-073) MIL-C-25/1
			2	2		7	CS13AFR47K	(1896954-120) MIL-C-26655/2
			1	1		6	CS13AG100K	(1896954-176) CAPACITOR MIL-C-26655/2
SEE NOTE 10			2	2		5	1016347-004	JACK, MINIATURE, CKT BOARD
			1	1		4	1016347-003	JACK, MINIATURE, CKT BOARD
			1	1		3	1015956-168	CONNECTOR, ADAPTER, ELEC
SEE NOTE 10			2	2		2	1015999-004	EJECTOR, CIRCUIT BOARD
				1		1	2900097	TERMINAL BOARD (INSEP ASSY)

QUANTITY REQUIRED — LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900029-011	2900029-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — − DECIMALS + — − ANGLES + — −
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS
DRAWN C. M. Kulp DATE 29 MAR 65
CHECKED 31 MAR 65
APPROVAL 31 MAR 65
APPROVAL 10-20-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

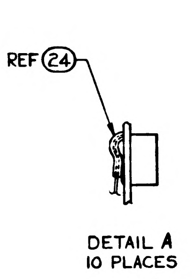
INTERROGATOR
ELECTRONIC COMPONENT
ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900076
SCALE 2/1
SHEET 1 OF 1

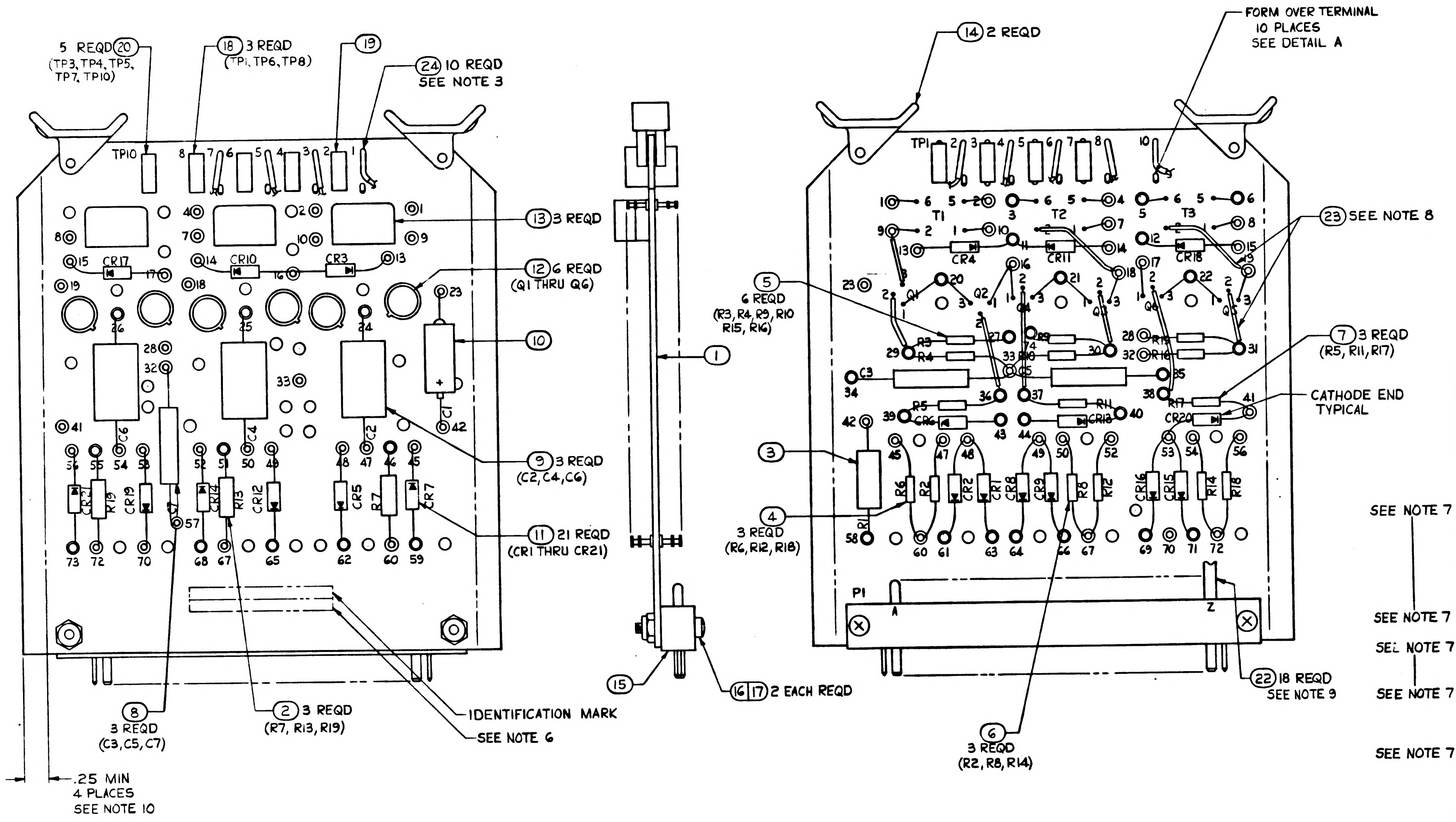
10 MAY 65

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEMS (27) AND (28), OR (29).
3. BOND ITEMS (8), (12), (13), (18), (19), (20), (21), (24) TO ITEM (1) PER ND1002203.
4. SERIALIZE PER ND1002023.
5. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267).
6. MARK SCHEM AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .09 HIGH, COLOR BLACK.
7. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING
8. CUT TO LENGTH AS REQUIRED.
9. ALL TERMINALS ON ITEM (15) THAT ARE WIRED REQUIRE SLEEVING ITEM (22).
10. COMPONENTS AND WIRING NOT TO EXTEND INTO AREAS INDICATED.
11. CODE SYMBOLS ARE FOR REFERENCE ONLY.

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REPLACES REVISION (-) WITH CHANGE PER MXC309633		7 MAY 65	
B		REVISED PER MXC 202281		10 JUN 65	
C		REVISED PER MXC 203435		JUL 65	
D		REVISED PER MXC 204043		9 AUG 65	
E		INITIAL RELEASE CLASS A PER TDRR 23556		8 OCT 65	



DETAIL A
10 PLACES


5 REQD (20)
(TP3, TP4, TP5, TP7, TP10)
(18) 3 REQD
(TP1, TP6, TP8)
(19)
(24) 10 REQD
SEE NOTE 3
(13) 3 REQD
(12) 6 REQD
(Q1 THRU Q6)
(10)
(9) 3 REQD
(C2, C4, C6)
(11) 21 REQD
(CR1 THRU CR21)
(8)
3 REQD
(C3, C5, C7)
(2) 3 REQD
(R7, R13, R19)
IDENTIFICATION MARK
SEE NOTE 6
.25 MIN
4 PLACES
SEE NOTE 10
(1)
(15)
(16) (17) 2 EACH REQD
(14) 2 REQD
FORM OVER TERMINAL
10 PLACES
SEE DETAIL A
(23) SEE NOTE 8
(5)
6 REQD
(R3, R4, R9, R10, R15, R16)
(7) 3 REQD
(R5, R11, R17)
CATHODE END
TYPICAL
(3)
(4)
3 REQD
(R6, R12, R18)
(6)
3 REQD
(R2, R8, R14)
(22) 18 REQD
SEE NOTE 9
T1
T2
T3
Q1
Q2
Q3
Q4
Q5
Q6
CR4
CR11
CR18
CR17
CR10
CR3
C1
C2
C3
C4
C5
C6
P1
A
Z
TP1
TP10

SEE NOTE 7
SEE NOTE 7
SEE NOTE 7
SEE NOTE 7
SEE NOTE 7

QUANTITY REQUIRED							
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			X		31	PS2900077	PROCUREMENT SPECIFICATION
			X		30	2900085	SCHEMATIC DIAGRAM
			AR		29	SN60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
			AR		28	MIL-F-14256 TYPE A OR W	FLUX (ES 2798)
			AR		27	SN60 WS	SOLDER QQ-S-571 (ES2175-1)
					26		
			1		25	2900084	WIRE LIST "AA"
			10		24	1010490-082	INSULATION-SLEEVING, ELECT
			1		23	1006776-20	INS-SLEEVING, ELECT-7 IN. TOT LG
			18		22	1015864-109	INSULATION-SLEEVING, ELECT
			~~1~~		~~21~~	~~1016347-010~~	~~JACK, MINIATURE~~
			5		20	1016347-008	JACK, MINIATURE
			1		19	1016347-003	JACK, MINIATURE
			3		18	1016347-001	JACK, MINIATURE
			2		17	1016151-004	NUT-SELF LOCKING
			2		16	MS35216-17	SCREW, MACHINE, PAN HD
			1		15	1015956-169	CONNECTOR, ADAPTER, ELECTRICAL
			2		14	1015999-005	EJECTOR, CIRCUIT BOARD
			3		13	1016355	TRANSFORMER, PULSE
			6		12	1015928-001	TRANSISTOR
			21		11	1N914	(1896966-044) DIODE, MIL-S-19500/116
			1		10	CS13AG100K	(1896954-176) CAPACITOR, MIL-C-26655/2
			3		9	CM20D102J03	(1896878-107) CAPACITOR, MIL-C-5/2
			3		8	CM20D821J03	(1896878-105) CAPACITOR, MIL-C-5/2
			3		7	RC07GF204J	(1896985-104) RESISTOR, MIL-R-11/8
			3		6	RC07GF153J	(1896985-077) RESISTOR, MIL-R-11/8
			6		5	RC076F332J	(1896985-061) RESISTOR, MIL-R-11/8
			3		4	RC07GF102J	(1896985-049) RESISTOR MIL-R-11/8
			1		3	RC32GF200J	(1896953-022) RESISTOR, MIL-R-11/6
			3		2	RC20GF201J	(1896952-032) RESISTOR, MIL-R-11/3
			1		1	2900083	TERMINAL BOARD (INSEP ASSY)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900029-011	2900029-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Schwabe DATE 8 APR 65
CHECKED J. GRIEB 23 APR 65
APPROVED Tuchschere 27 APR 65
APPROVAL Hermann 10-20-65
NASA APPROVAL
MIT APPROVAL 27 APR 65

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

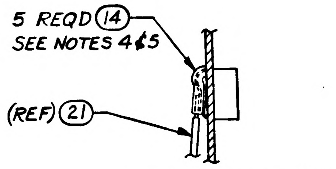
SELECTOR DRIVE ASSEMBLY

CODE IDENT NO 99974
SIZE E
2900077
SCALE 2/1
SHEET 1 OF 1

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
B		REPLACES REVISION A WITH CHANGE PER MXC 202554		1 JULY 65	D.C.M.
C		REVISED PER MXC 203681		6 AUG 65	RTP
D		REVISED PER MXC 205212		27 SEP 65	A.N
E		INITIAL RELEASE CLASS A PER TDRR 23556		8 OCT 65	

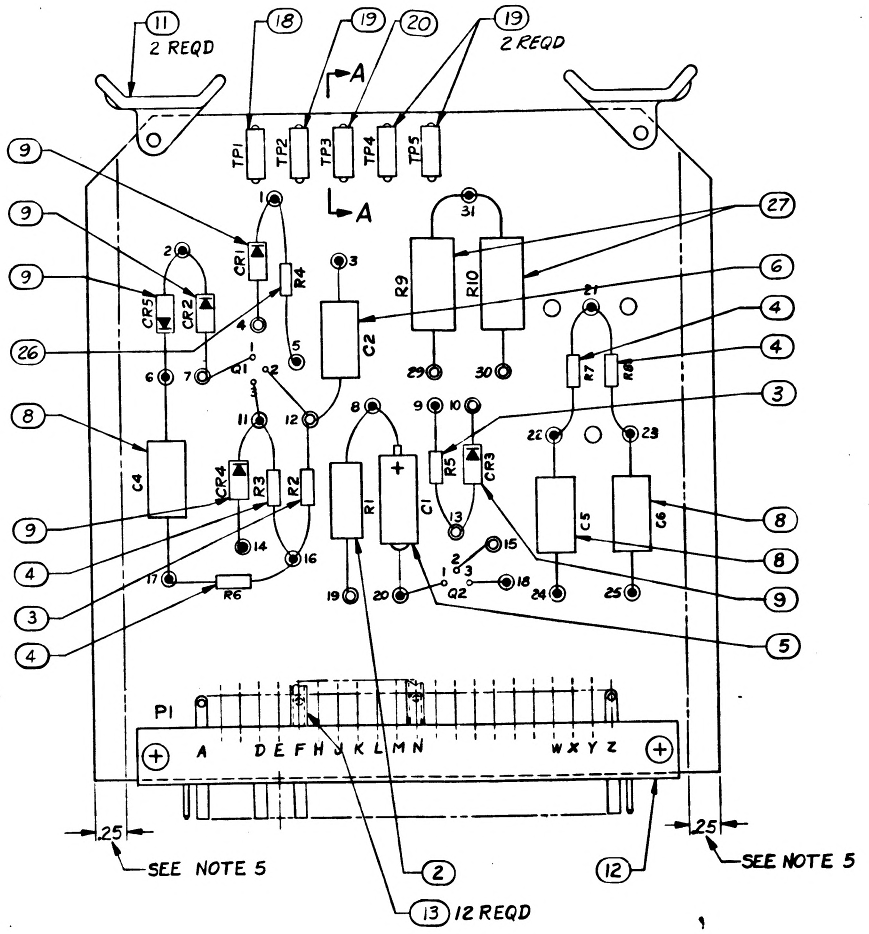
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM ㉔, OR ITEMS ㉓ AND ㉒.
3. BOND ITEMS ⑱, ⑲, ⑳ AND ⑩ TO ITEM ① PER ND1002203.
4. FORM OVER TERMINALS OF ITEMS ⑱, ⑲ AND ⑳ AS SHOWN AND BOND SLEEVING, ITEM ⑭, TO ITEM ① PER ND1002203.
5. COMPONENTS AND WIRING NOT TO EXTEND INTO AREAS INDICATED.
6. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267).
7. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .09 HIGH
8. SERIALIZE PER ND1002023.
9. VENDOR ITEM-SEE SPEC CONTROL DRAWING.
10. DIODE SYMBOLS ARE FOR REFERENCE ONLY.

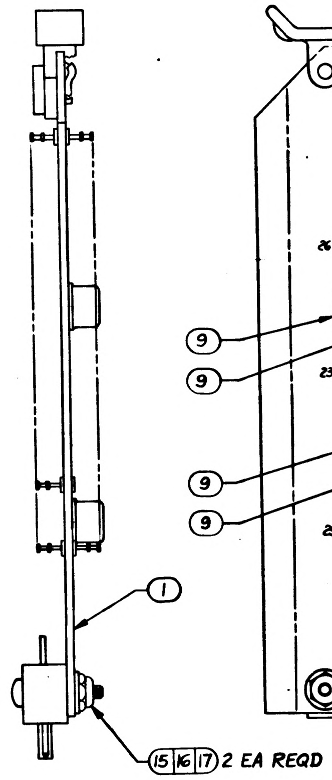


5 REQD ⑭
SEE NOTES 4 & 5
(REF) ㉑

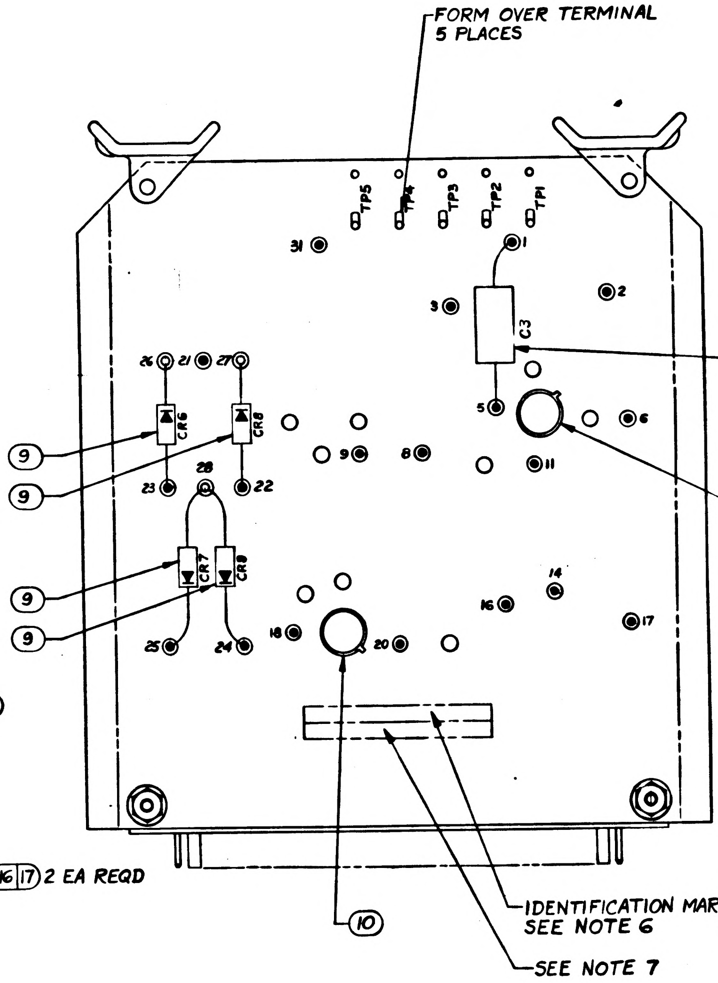
PARTIAL SECTION A-A
5 PLACES



⑪ 2 REQD
⑱
⑲
⑳
⑲ 2 REQD
A
A
TP1
TP2
TP3
TP4
TP5
⑨
⑨
⑨
㉖
⑧
⑨
④
③
④
㉗
⑥
④
④
③
⑧
⑧
⑨
⑤
CR1
CR2
CR3
CR4
CR5
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
C1
C2
C4
C5
C6
Q1
Q2
P1
A D E F H J K L M N W X Y Z
.25
SEE NOTE 5
②
⑬ 12 REQD
⑫
.25
SEE NOTE 5



①
⑮⑯⑰ 2 EA REQD



FORM OVER TERMINAL
5 PLACES
TP5
TP4
TP3
TP2
TP1
⑦
C3
⑩
⑨
⑨
⑨
⑨
CR6
CR7
CR8
CR9
⑩
IDENTIFICATION MARK
SEE NOTE 6
SEE NOTE 7

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	X		28	PS2900080	PROCUREMENT SPECIFICATION
	2		27	RC42GF621J	(1896951-044) RESISTOR MIL-R-11/7
	1		26	RC07GF363J	(1896985-086) RESISTOR MIL-R-11/8
	X		25	2900158	SCHEMATIC DIAGRAM, ELEC
	AR		24	SN60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
	AR		23	MIL-F-14256	FLUX TYPE A OR W (ES2798)
	AR		22	SN60WS	SOLDER QQ-S-571 (ES2175-1)
	1		21	2900159	WIRE LIST A-A
SEE NOTE 9	1		20	1016347-010	JACK, MINIATURE
SEE NOTE 9	3		19	1016347-008	JACK, MINIATURE
SEE NOTE 9	1		18	1016347-003	JACK, MINIATURE
	2		17	AN960C4	WASHER, PLAIN
SEE NOTE 9	2		16	1016151-004	NUT-SELF LOCKING
	2		15	MS35216-17	SCREW, PAN HD
SEE NOTE 9	5		14	1010490-082	INSULATION, SLEEVING
	12		13	1015864-109	INSULATION, SLEEVING
	1		12	1015956-171	CONNECTOR ADAPTER, ELEC
	2		11	1015999-003	EJECTOR, CIRCUIT BOARD
SEE NOTE 9	2		10	1015928-001	TRANSISTOR
	9		9	IN914	(1896966-044) DIODE MIL-S-19500/116
	3		8	CM15D471J03	(1896969-104) CAPACITOR MIL-C-5/1
	1		7	CM15C221J03	(1896969-096) CAPACITOR MIL-C-5/1
	1		6	CM15C201J03	(1896969-060) CAPACITOR MIL-C-5/1
	1		5	CS13AG100K	(1896954-176) CAPACITOR MIL-C-26655/2
	4		4	RC07GF103J	(1896985-073) RESISTOR MIL-R-11/8
	2		3	RC07GF104J	(1896985-097) RESISTOR MIL-R-11/8
	1		2	RC32GF102J	(1896953-063) RESISTOR MIL-R-11/6
	1		1	2900157	TERMINAL BOARD INSEP ASSY

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900029-011	2900029-011	011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — − — DECIMALS + — − — ANGLES + — − —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN WEISSERT DATE 29 MARCH 65
CHECKED Molge 18 MAY 65
APPROVAL R Pierini 20-May-65
APPROVAL 10-20-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BUFFER ASSEMBLY,
ELECTRONIC

CODE IDENT NO. 99974
SIZE E
2900080
SCALE 2:1
SHEET 1 OF 1

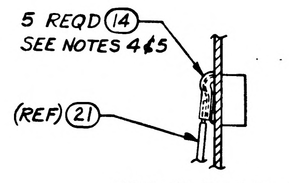
20 MAY 65

E 2900080

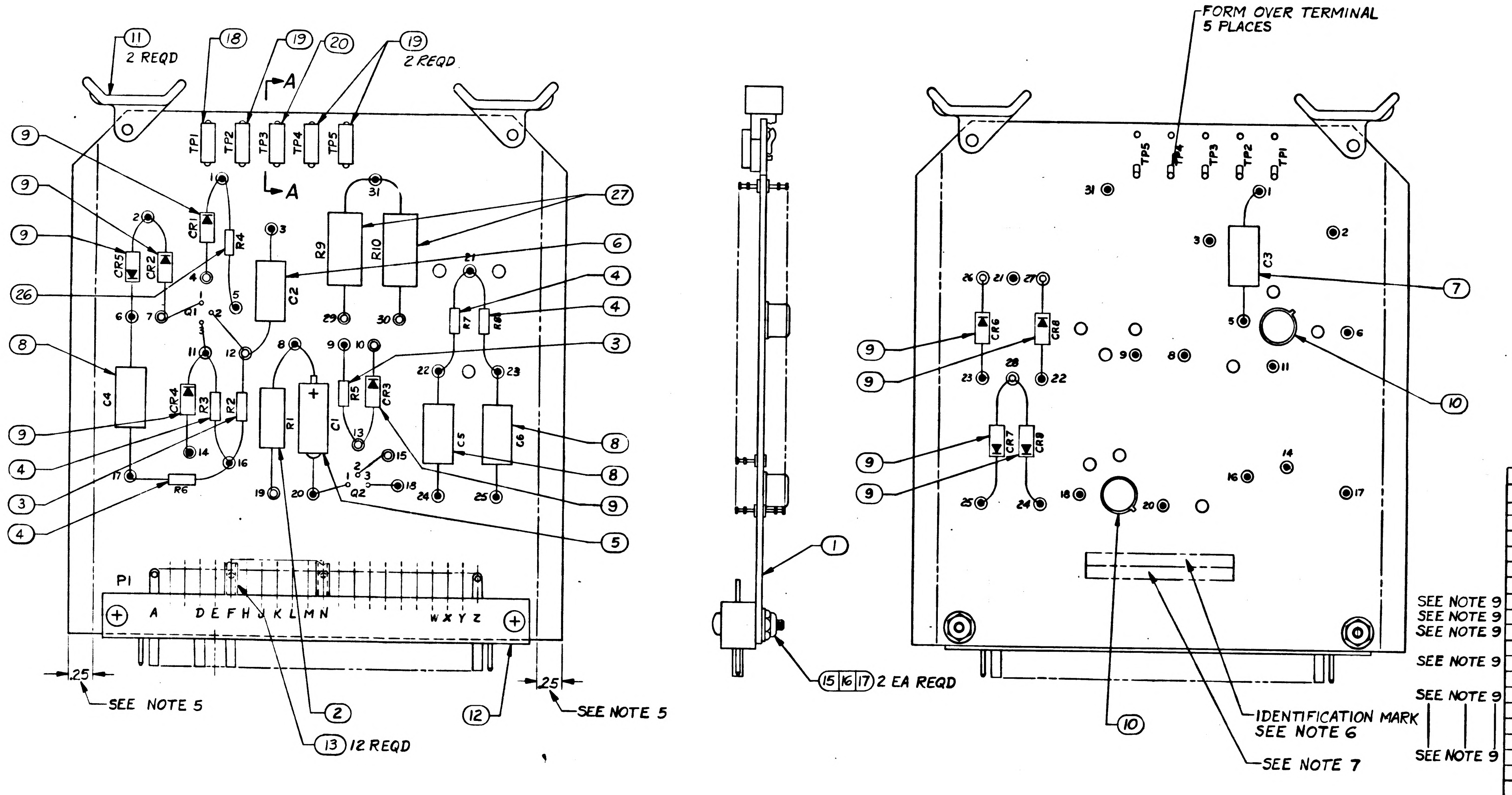
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM (24), OR ITEMS (23) AND (22).
3. BOND ITEMS (18), (19), (20) AND (10) TO ITEM (1) PER ND1002203.
4. FORM OVER TERMINALS OF ITEMS (18), (19) AND (20) AS SHOWN AND BOND SLEEVING, ITEM (14), TO ITEM (1) PER ND1002203.
5. COMPONENTS AND WIRING NOT TO EXTEND INTO AREAS INDICATED.
6. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267).
7. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .09 HIGH
8. SERIALIZE PER ND1002023.
9. VENDOR ITEM-SEE SPEC CONTROL DRAWING.
10. DIODE SYMBOLS ARE FOR REFERENCE ONLY.

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
B		REPLACES REVISION A WITH CHANGE PER MXC 202554		1 JULY 65	D.C.M.
C		REVISED PER MXC 203681		6 AUG 65	RTP
D		REVISED PER MXC 205212		27 SEP 65	A.N
Ⓜ E		INITIAL RELEASE CLASS A PER TDRR 23556			
F		REVISED PER TDRR 24869		29 DEC 65	JHP


5 REQD (14)
SEE NOTES 4 & 5
(REF) (21)

PARTIAL SECTION A-A
5 PLACES


(11) 2 REQD
(18)
(19)
(20)
(19) 2 REQD
A
TP1
TP2
TP3
TP4
TP5
(9)
(9)
(9)
(26)
(8)
(9)
(4)
(3)
(4)
(27)
(6)
(4)
(4)
(3)
(8)
(8)
(9)
(5)
CR1
CR2
CR3
CR4
CR5
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
C1
C2
C4
C5
C6
Q1
Q2
P1
A DEFHJKLMN WXYZ
.25
SEE NOTE 5
(2)
(13) 12 REQD
(12)
.25
SEE NOTE 5
(1)
(15)(16)(17) 2 EA REQD
FORM OVER TERMINAL
5 PLACES
(7)
(10)
C3
CR6
CR7
CR8
(9)
(9)
(9)
(9)
(10)
IDENTIFICATION MARK
SEE NOTE 6
SEE NOTE 7
SEE NOTE 9
SEE NOTE 9
SEE NOTE 9
SEE NOTE 9
SEE NOTE 9
SEE NOTE 9

			X		28	PS2900080	PROCUREMENT SPECIFICATION
			2		27	RC42GF621J	(1896951-044) RESISTOR MIL-R-11/7
			1		26	RC07GF512J	(1896985-066) RESISTOR MIL-R-11/8
			X		25	2900158	SCHEMATIC DIAGRAM, ELEC
			AR		24	SN60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
			AR		23	MIL-F-14256	FLUX TYPE A OR W (ES2798)
			AR		22	SN60 WS	SOLDER QQ-S-571 (ES2175-1)
			1		21	2900159	WIRE LIST A-A
			1		20	1016347-010	JACK, MINIATURE
			3		19	1016347-008	JACK, MINIATURE
			1		18	1016347-003	JACK, MINIATURE
			2		17	AN960 C4	WASHER, PLAIN
			2		16	1016151-004	NUT- SELF LOCKING
			2		15	MS35216-17	SCREW, PAN HD
			5		14	1010490-082	INSULATION, SLEEVING
			12		13	1015864-109	INSULATION, SLEEVING
			1		12	1015956-171	CONNECTOR ADAPTER, ELEC
			2		11	1015999-003	EJECTOR, CIRCUIT BOARD
			2		10	1015928-001	TRANSISTOR
			9		9	1N914	(1896966-044) DIODE MIL-S-19500/116
			3		8	CM15D471J03	(18969[illegible]-04) CAPACITOR MIL-C-5
			1		7	CM15C221J03	(1896969-096) CAPACITOR MIL-C-5/1
			1		6	CM15C201J03	(1896969-060) CAPACITOR MIL-C-5/1
			1		5	CS13AG100K	(1896956-176) CAPACITOR MIL-C-26655
			4		4	RC07GF103J	(1896985-073) RESISTOR MIL-R-11/8
			2		3	RC07GF104J	(1896985-097) RESISTOR MIL-R-11/8
			1		2	RC32GF102J	(1896953-063) RESISTOR MIL-R-11/6
			1		1	2900157	TERMINAL BOARD INSEP ASSY
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

2900029-011	2900029-011	011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN WEISSERT DATE 29 MARCH 65
CHECKED Molye 18 MAY 65
APPROVAL 20 May 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BUFFER ASSEMBLY, ELECTRONIC

CODE IDENT NO 99974
SIZE E
2900080
SCALE 2:1
SHEET 1 OF 1

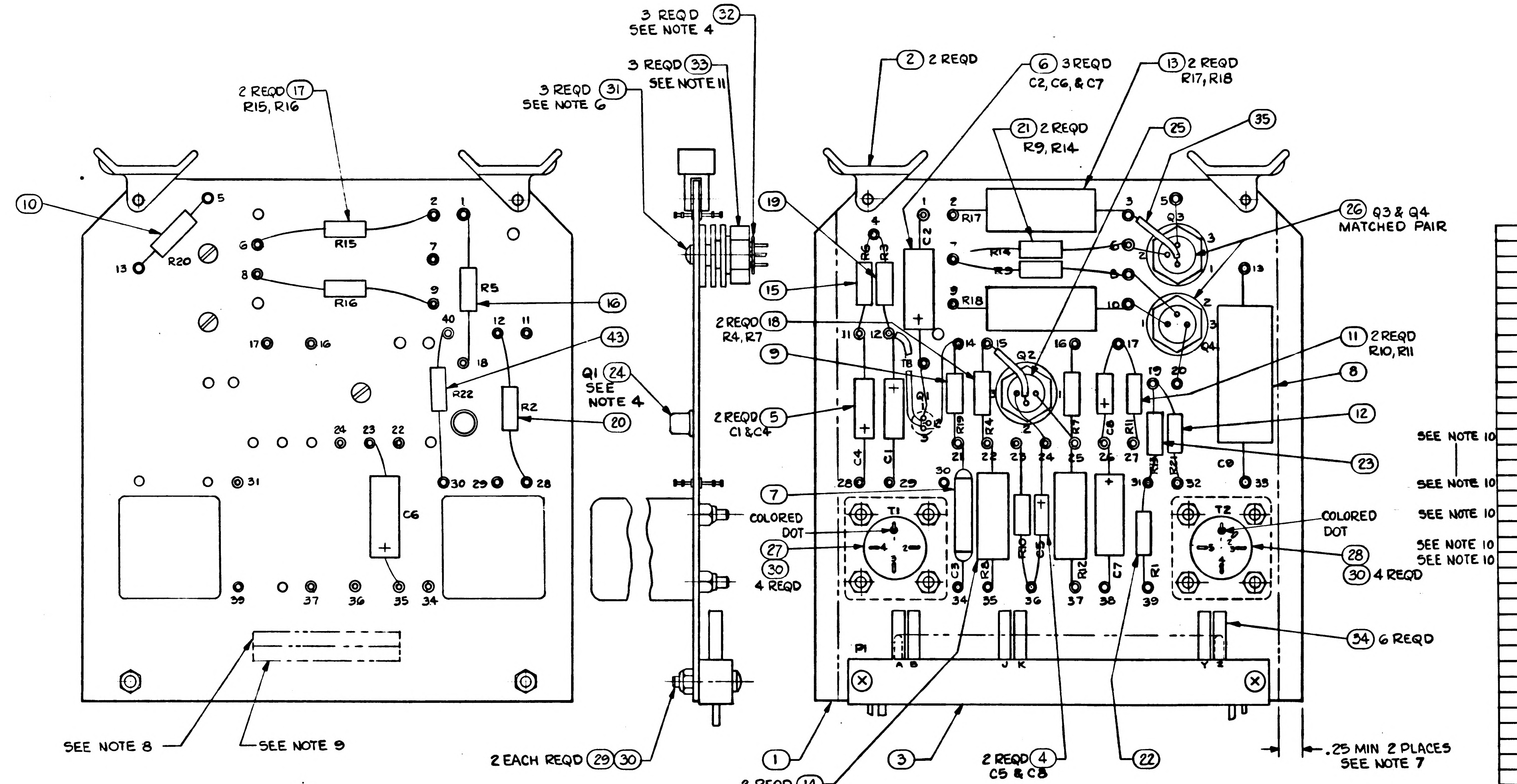
20 MAY 65

NOTES :

1- INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2- SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEM (39) OR (40) AND ITEM (38).
3- SERIALIZE PER ND 1002023.
4- BOND ITEM (32) TO ITEM (33) AND BOND ITEM (24) TO ITEM ① PER ND 1002203.
5- SPOT TIE WIRES AS REQUIRED USING ITEM (37).
6- SECURE ITEM (31) USING ITEM (42).
7- COMPONENTS AND WIRING NOT TO EXTEND INTO AREAS INDICATED.
8- IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES 267).
9- MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND 1002019, .09 HIGH, COLOR BLACK.
10- VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
11- HEAT SINK, NUT CAP ITEM (33) LOCKING TORQUE 25 - 30 IN.-OZ.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
B		REPLACES REVISION A WITH CHANGE PER MXC 202075		16 JUN 65	MW
C		REVISED PER MXC-203416		28 JUL 65	RWH
D		REVISED PER MXC-204209		2 AUG 65	JHF
E		REVISED PER MXC 204915		SEP 65	
F		INITIAL RELEASE CLASS A PER TDRR 23557		OCT 65	



3 REQD (32) SEE NOTE 4
3 REQD (33) SEE NOTE 11
3 REQD (31) SEE NOTE 6
2 REQD (17) R15, R16
(10)
R20
R15
R16
R5
R22
R2
C6
(16)
(43)
(20)
Q1 (24) SEE NOTE 4
SEE NOTE 8
SEE NOTE 9
2 EACH REQD (29) (30)
(2) 2 REQD
(6) 3 REQD C2, C6, & C7
(13) 2 REQD R17, R18
(21) 2 REQD R9, R14
(25)
(35)
(26) Q3 & Q4 MATCHED PAIR
(19)
(15)
2 REQD (18) R4, R7
(9)
2 REQD (5) C1 & C4
(7)
COLORED DOT
(27)
(30) 4 REQD
(11) 2 REQD R10, R11
(8)
(12)
(23)
COLORED DOT
(28)
(30) 4 REQD
(54) 6 REQD
T1
T2
Q2
Q3
Q4
P1
(1)
2 REQD (14) R8, R12
(3)
2 REQD (4) C5 & C8
(22)
.25 MIN 2 PLACES SEE NOTE 7

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION	
	X		44	PS2900086	PROCUREMENT SPEC.	
	1		43	RN60C4990F	(1896976-260) RESISTOR MIL-R-10509/1	
	AR		42	MIL-S-22473 GR'C'	SEALING & RET. COMPOUND (ES 2544-3)	
	X		41	2900167	SCHEMATIC DIAGRAM, ELEC.	
	AR		40	SN60WRAP	SOLDER QQ-S-571 (ES 2175-3)	
	AR		39	MIL-F-14256 TYPE A OR W	FLUX (ES 2798)	
	AR		38	SN60WS	SOLDER QQ-S-571 (ES 2173-1)	
	AR		37	MIL-T-713	LACING TAPE, TYPE P, WAXED, BLACK (ES 2732, SIZE 18)	
	1		36	2900168	WIRE LIST A-A	
SEE NOTE 10	AR		35	1006776-20	INSULATION, SLEEVING - 6 LG	
	6		34	1015864-109	INSULATION, SLEEVING-ELEC.	
	3		33	1015872-001	HEAT SINK	
SEE NOTE 10	3		32	1015870-001	INSULATOR, DISC	
	3		31	MS35216-11	SCREW-PAN HD	
SEE NOTE 10	10		30	1016151-004	NUT-SELF LOCKING	
	2		29	MS35216-17	SCREW-PAN HD.	
SEE NOTE 10	1		28	1015850	TRANSFORMER	
SEE NOTE 10	1		27	1015913	TRANSFORMER	
	1		26	1015928-004	TRANSISTOR-MATCHED PAIR-2N2243A	
	1		25	1015928-001	TRANSISTOR 2N2193	
	1		24	1015935-001	TRANSISTOR 2N930	
	1		23	RN60C2003C	(1896984-856) RESISTOR MIL-R-10509	
	1		22	RN60B3322F	(1896977-435)	
	2		21	RN60B4992F	(1896977-452)	
	1		20	RN60B9092F	(1896977-477)	
	1		19	RN60B3652F	(1896977-439)	
	2		18	RN60B1002F	(1896977-385)	
	2		17	RN60B1001F	(1896977-289)	
	1		16	RN60B7150F	(1896977-275)	
	1		15	RN60B2000F	(1896977-222)	
	2		14	RN70B3320F	(1896973-243)	
	2		13	RN75B23R7F	(1896971-133)	MIL-R-10509
	1		12	RC20GF103J	(1896952-073)	MIL-R-11
	2		11	RC20GF302J	(1896952-060)	
	1		10	RC20GF101J	(1896952-025)	
	1		9	RC20GF750J	(1896952-022, RESISTOR	MIL-R-11
SEE NOTE 10	1		8	1015927-25	CAPACITOR	
	1		7	CTM103VBK	(1896957-034)	MIL-C-27237
	3		6	CS13AF220K	(1896954-150)	MIL-C-26655
	2		5	CS13AF6R8K	(1896954-141)	
	2		4	CS13AFR47K	(1896954-120) CAPACITOR MIL-C-26655	
SEE NOTE 10	1		3	1015956-171	CONNECTOR, ADAPTER, ELEC.	
SEE NOTE 10	2		2	1015999-004	EJECTOR, CIRCUIT BOARD	
	1		1	2900166	TERMINAL BOARD (INSEP ASSY)	

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900024-011	2900024-011	011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Oezel 6 MAY 65 DATE
CHECKED C. Pioda 20 MAY 65
APPROVAL 20 MAY 65
APPROVAL 6-4-65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

RESOLVER AMPLIFIER ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900086
SCALE 2:1
SHEET 1 OF 1

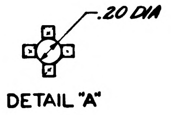
Charleston 20 MAY 65

F 2900086

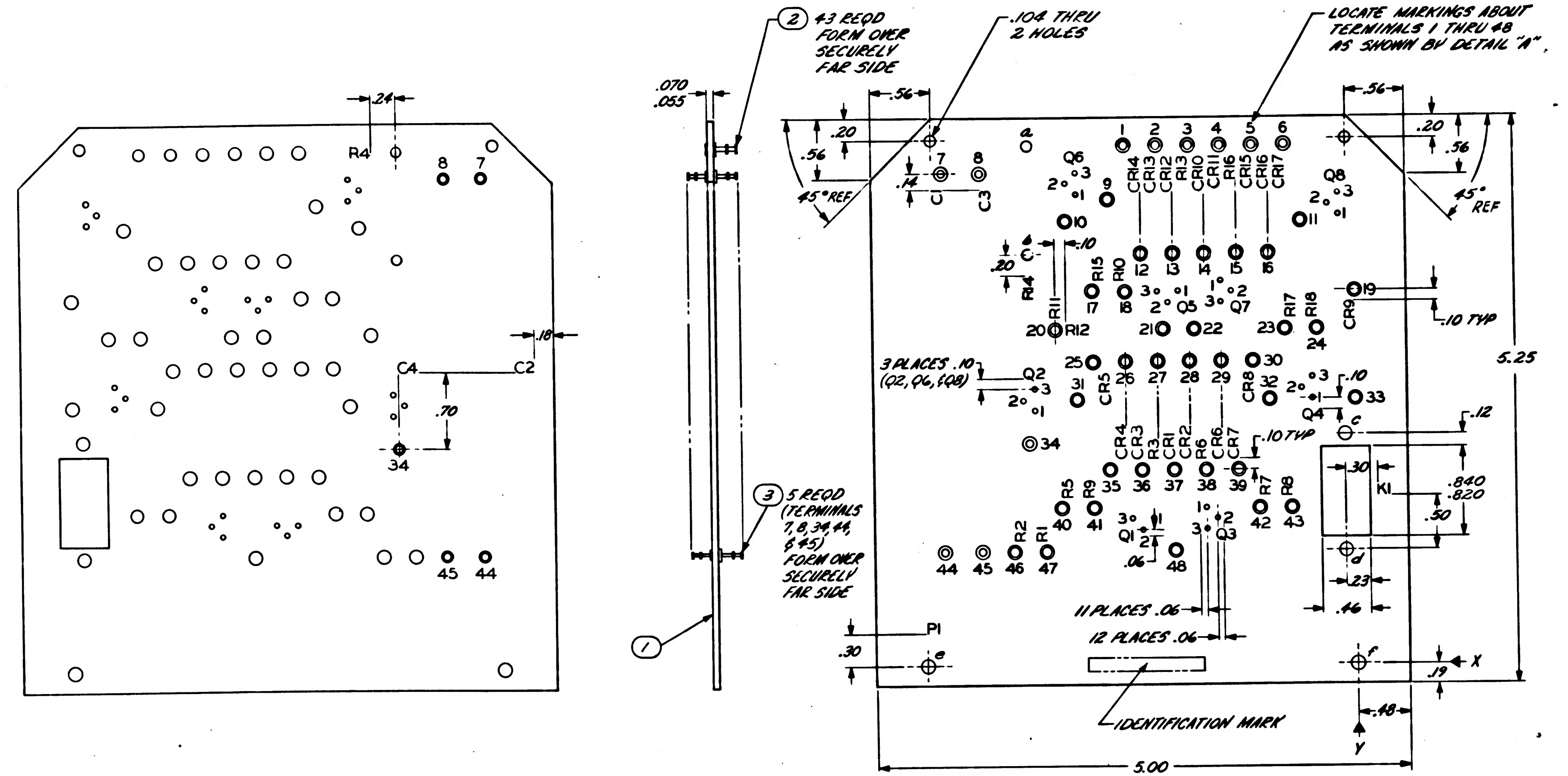
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: LAMINATED GLASS CLOTH EPOXY RESIN MIL-P-18177 TYPE GEE (ES 2744-1).
3. MUST BE FREE FROM BURRS & SHARP EDGES.
4. HOLE DESIGNATIONS a THRU f ARE FOR MANUFACTURING REFERENCE.
5. IDENTIFY USING DRAWING NUMBER PER MIL-STD-130 (ES 267).
6. MARK CHARACTERS PER ND1002019, .06 HIGH, COLOR BLACK. CENTRALIZE AS SHOWN.
7. ARROW INDICATES DIRECTION OF POSITIVE (+) DIMENSION.

REVISIONS					23917
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR 2307		19-OCT-65	



DETAIL "A"



② 43 REQD FORM OVER SECURELY FAR SIDE
③ 5 REQD (TERMINALS 7, 8, 34, 44, & 45) FORM OVER SECURELY FAR SIDE
①
.070
.055
.24
R4
C4
C2
.18
.70
34
8
7
45
44
.104 THRU 2 HOLES
LOCATE MARKINGS ABOUT TERMINALS 1 THRU 48 AS SHOWN BY DETAIL "A".
.56
.20
45° REF
.14
a
C1
C3
Q6
Q8
CR14
CR13
CR12
R13
CR10
CR11
R16
CR15
CR16
CR17
R15
R10
R14
R11
R12
Q5
Q7
R17
R18
CR9
.10 TYP
3 PLACES .10 (Q2, Q6, & Q8)
Q2
Q4
CR5
CR8
CR4
CR3
R3
CR1
CR2
R6
CR6
CR7
.10 TYP
R5
R9
R2
R1
Q1
Q3
R7
R8
.12
.30
K1
.840
.820
.50
.23
.46
c
d
e
f
.06
11 PLACES .06
12 PLACES .06
P1
.30
.19
X
Y
.48
5.25
5.00
IDENTIFICATION MARK

COORDINATE DIMENSIONS			
HOLE NO.	COORDINATE X (HORIZ)	COORDINATE Y (VERT)	HOLE DESCRIPTION
1	2.15	4.80	.092-.098 DIA THRU
2	1.85	4.80	
3	1.55	4.80	
4	1.25	4.80	
5	.95	4.80	
6	.65	4.80	
7	3.85	4.55	
8	3.50	4.55	
9	2.30	4.30	
10	2.70	4.10	
11	.50	4.10	
12	2.00	3.80	
13	1.70	3.80	
14	1.40	3.80	
15	1.10	3.80	
16	.80	3.80	
17	2.45	3.45	
18	2.15	3.45	
19	.00	3.45	
20	2.80	3.10	
21	1.80	3.10	
22	1.50	3.10	
23	.65	3.10	
24	.35	3.10	
25	2.45	2.80	
26	2.15	2.80	
27	1.85	2.80	
28	1.55	2.80	
29	1.25	2.80	
30	.95	2.80	
31	2.60	2.45	
32	.80	2.45	
33	.00	2.45	
34	3.05	2.05	
35	2.30	1.80	
36	2.00	1.80	
37	1.70	1.80	
38	1.40	1.80	
39	1.10	1.80	
40	2.75	1.45	
41	2.45	1.45	
42	.90	1.45	.092-.098 DIA THRU

COORDINATE DIMENSIONS			
HOLE NO.	COORDINATE X (HORIZ)	COORDINATE Y (VERT)	HOLE DESCRIPTION
43	.60	1.45	.092-.098 DIA THRU
44	3.85	1.05	
45	3.50	1.05	
46	3.20	1.05	
47	2.90	1.05	
48	1.70	1.05	.092-.098 DIA THRU
Q1-1	1.900	1.350	.043 THRU
Q1-2	2.000	1.250	
Q1-3	2.100	1.350	
Q2-1	3.000	2.350	
Q2-2	3.100	2.450	
Q2-3	3.000	2.550	
Q3-1	1.400	1.450	
Q3-2	1.300	1.350	
Q3-3	1.400	1.250	
Q4-1	.400	2.450	
Q4-2	.500	2.550	
Q4-3	.400	2.650	
Q5-1	1.650	3.450	
Q5-2	1.750	3.350	
Q5-3	1.850	3.450	
Q6-1	2.600	4.350	
Q6-2	2.700	4.450	
Q6-3	2.600	4.550	
Q7-1	1.250	3.550	
Q7-2	1.150	3.450	
Q7-3	1.250	3.350	
Q8-1	.150	4.150	
Q8-2	.250	4.250	
Q8-3	.150	4.350	.043 THRU
a	3.050	4.800	.092-.098 THRU
b	3.050	3.800	.092-.098 THRU
c	.100	2.120	.123-.130 THRU
d	.100	1.050	
e	4.031	.000	
f	.000	.000	.123-.130 THRU

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
3	5	MS17157-6	TERMINAL, STUD FEED THRU
2	43	MS17122-6	TERMINAL, STUD
1	1	2900087-001	TERMINAL BOARD SEE NOTE 2

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2900088-031	2900036-011
2900088-021	2900036-011
2900088-011	2900036-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS +— −—
DECIMALS ±.02 ±.005
ANGLES ±2°
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ~~SPARK PLUG DIVISION, GMC~~
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN S. Kaufman 6 APR 65 DATE
CHECKED Wilson 26 APR 65
APPROVAL 27 APR 65
APPROVAL Goldman 4/12/65
NASA APPROVAL
MIT APPROVAL 21 Oct 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL BOARD (INSEPARABLE ASSEMBLY)

CODE IDENT NO 99974
SIZE E
2900087
SCALE 2:1
SHEET 1 OF 1

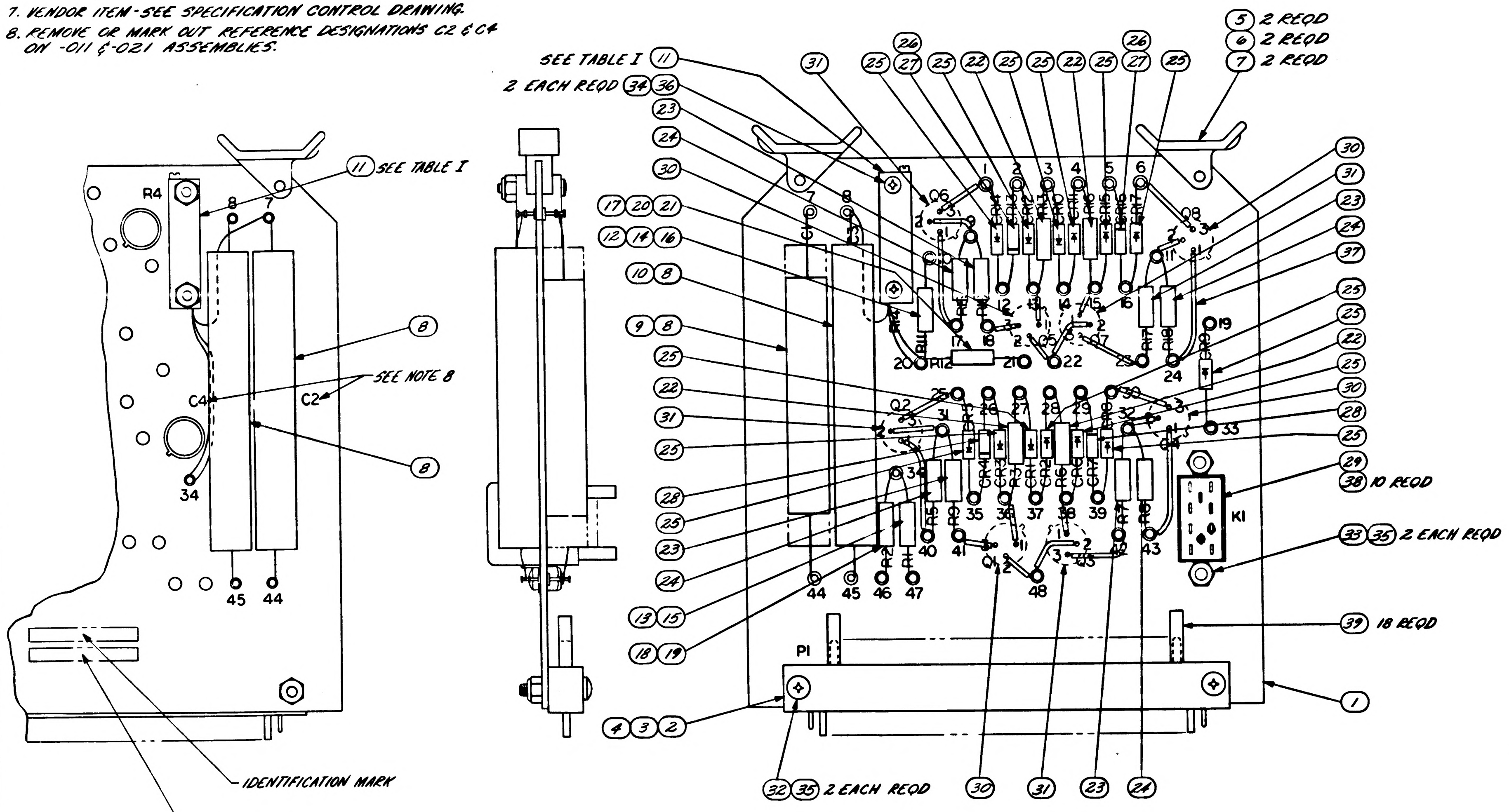
Charleston 26 APR. 65

2900087 A

MIL 1077E P

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES 267).
3. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEMS (42) OR (40) & (41)
4. BOND ITEMS (8), (9), (10), (30), & (31) TO ITEM (1) PER ND 1002203.
5. SERIALIZE PER ND 1002023.
6. MARK "SCHEM" & APPLICABLE SCHEMATIC DRAWING NUMBER PER ND 1002019, .09 HIGH, COLOR BLACK.
7. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
8. REMOVE OR MARK OUT REFERENCE DESIGNATIONS C2 & C4 ON -011 & -021 ASSEMBLIES.

REVISIONS 2341					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC 203028		9 JUL 65	
B		REVISED PER MXC 204739		3 SEPT 65	
C		INITIAL RELEASE CLASS A PER TDRR 23417		9 OCT 65	



SEE TABLE I (11)
2 EACH REQD (34)(36)
(11) SEE TABLE I
R4
8
7
(8)
SEE NOTE 8
C4
C2
(8)
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IDENTIFICATION MARK
SEE NOTE 6
(23)
(24)
(30)
(17)(20)(21)
(12)(14)(16)
(10)(8)
(9)(8)
(25)
(22)
(31)
(25)
(28)
(25)
(23)
(24)
(13)(15)
(18)(19)
(4)(3)(2)
(32)(35) 2 EACH REQD
(30)
(31)
(23)
(24)
(31)
(25)(27)(25)(22)(25)(22)(25)(27)(25)
(26)
(26)
(5) 2 REQD
(6) 2 REQD
(7) 2 REQD
(30)
(31)
(23)
(24)
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(22)
(25)
(30)
(28)
(25)
(29)
(38) 10 REQD
(33)(35) 2 EACH REQD
(39) 18 REQD
(1)
Q6
Q8
Q2
Q4
Q1
C1
C3
CR1
CR2
CR3
CR4
CR5
CR6
CR7
CR8
CR9
CR10
CR11
CR12
CR13
CR14
CR15
CR16
CR17
R1
R2
R3
R5
R6
R7
R8
R9
R10
R11
R12
R13
R15
R16
R17
R18
R19
K1
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TABLE I

FROM	TO	CUT	STRIP	TIN
R4-GRN	TERM. 34	2.00	.25	YES
R4-RED	TERM. 34	2.00	│	│
R4-YEL	TERM. 7	2.00	│	│
R14-GRN	TERM. 20	1.00	│	│
R14-RED	TERM. 20	1.00	│	│
R14-YEL	TERM. 8	1.80	.25	YES

SEE NOTE 7 (items 35–39)

SEE NOTE 7 (items 26–31)

SEE NOTE 7 (items 2–7)

	031	021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	☒				49	PS 2016103	PROCUREMENT SPECIFICATION
		☒			48	PS 2016102	PROCUREMENT SPECIFICATION
			☒		47	PS 2900088	PROCUREMENT SPECIFICATION
	1	1	1		46	2900090	WIRE LIST A-A
	X				45	2900089-003	SCHEMATIC DIAGRAM, ELEC
		X			44	2900089-002	│ │ │
			X		43	2900089-001	SCHEMATIC DIAGRAM, ELEC
	AR	AR	AR		42	SN60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
	AR	AR	AR		41	MIL-F-14256 TYPE A OR W	FLUX (ES 2798)
	AR	AR	AR		40	SN60WS	SOLDER QQ-S-571 (ES 2175-1)
	18	18	18		39	1015864-109	INSULATION-SLEEVING
	10	10	10		38	1015864-079	│ │
	AR	AR	AR		37	1006776-20	INSULATION-SLEEVING
	2	2	2		36	1016151-002	NUT-SELF LOCKING
	4	4	4		35	1016151-004	NUT-SELF LOCKING
	2	2	2		34	MS35216-8	SCREW-PAN HD
	2	2	2		33	MS35216-13	│ │ │
	2	2	2		32	MS35216-17	SCREW-PAN HD
	4	4	4		31	1015928-002	TRANSISTOR, 2N2243A
	4	4	4		30	1015934-001	TRANSISTOR, 2N1132
	1	1	1		29	1015845-412	RELAY
	2	2	2		28	1015941-10	SEMICONDUCTOR
		2	2		27	1015941-8	│
	2				26	1015941-6	SEMICONDUCTOR
	13	13	13		25	1N459	(1896966-291) SEMICONDUCTOR MIL-S-19500
	4	4	4		24	RC20GF393J	(1896952-087) RESISTOR MIL-R-11
	4	4	4		23	RC20GF103J	(│ -073) │ │
	4	4	4		22	RC20GF152J	(1896952-053) MIL-R-11
		1			21	RN60B6342F	(1896977-462) MIL-R-10509
			1		20	RN60B6042F	(│ -460) │ │
	1	1			19	RN60B5622F	(│ -457) │ │
			1		18	RN60B5362F	(│ -455) │ │
	1				17	RN60B3242F	(│ -434) │ │
		1			16	RN60B5761F	(│ -362) │ │
	1	1			15	RN60B4991F	(│ -356) │ │
			1		14	RN60B4421F	(│ -351) │ │
			1		13	RN60B4321F	(│ -350) │ │
	1				12	RN60B3401F	(1896977-340) RESISTOR MIL-R-10509
	2	2	2		11	RT12C2L103	(1896967-010) RESISTOR VAR MIL-R-27208
			1		10	CL33CE600MN3	(1896955-010) CAPACITOR MIL-C-3965
			1		9	CL33CE400MN3	(1896955-009) │ │
	4	2			8	CL33CD101MN3	(1896955-005) CAPACITOR MIL-C-3965
	2				7	1015999-011	EJECTOR
		2			6	1015999-007	│
			2		5	1015999-004	EJECTOR
	1				4	1015956-169	CONNECTOR-PLUG
		1			3	1015956-168	│
			1		2	1015956-167	CONNECTOR-PLUG
	1	1	1		1	2900087	TERMINAL BOARD (INSERT ASSY)

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900036-011	2900036-011	-031
2900036-011	2900036-011	-021
2900036-011	2900036-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS ±.02
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN 12 APR 65
CHECKED Wilson 26 APR 65
APPROVAL 27 APR 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

DUMP PROTECTION
ASSEMBLY, GIMBAL

CODE IDENT NO. 99974
SIZE E
2900088
SCALE 2:1
SHEET 1 OF 1

[illegible] 26 APR 65

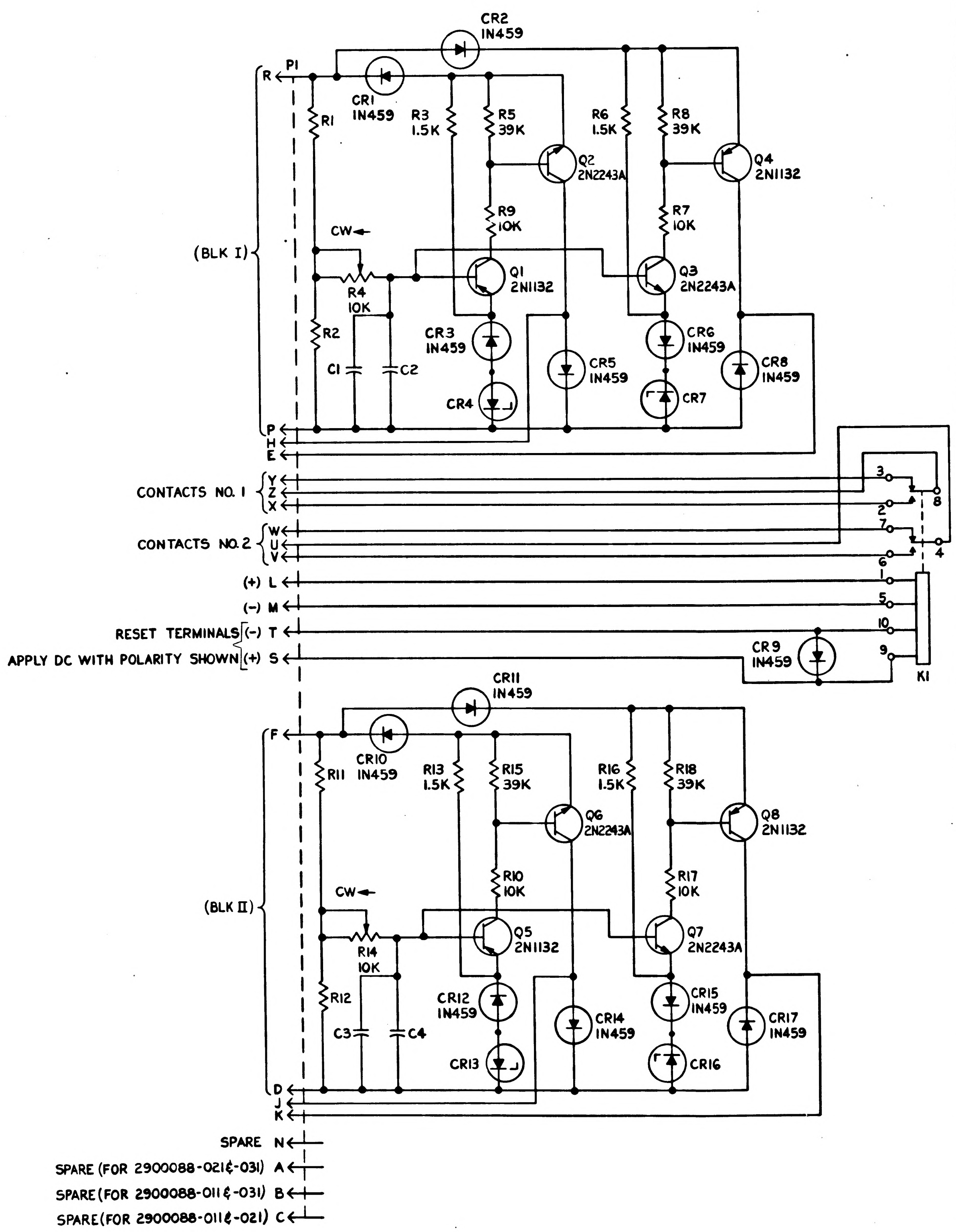
2900088 C

5300088

ET DRAWING IN ACCORDANCE WITH STANDARDS CRIBED BY MIL-D-70327.

UNLESS OTHERWISE SPECIFIED, VALUES ARE IN OHMS & MICROFARADS.

3. RELAYS ARE SHOWN IN THE RESET POSITION.
4. ALL PART NUMBERS ARE FOR REFERENCE ONLY.
5. SCHEMATIC DRAWING NO. IS THE DRAWING NO. PLUS APPLICABLE DASH NO.
6. POLARIZING POSITION OF P1 IS "A" FOR -001, "B" FOR 002, & "C" FOR -003.



CR2 1N459
P1
R
CR1 1N459
R1
R3 1.5K
R5 39K
R6 1.5K
R8 39K
Q2 2N2243A
Q4 2N1132
R9 10K
R7 10K
CW
(BLK I)
R4 10K
Q1 2N1132
Q3 2N2243A
R2
CR3 1N459
CR6 1N459
C1
C2
CR5 1N459
CR8 1N459
CR4
CR7
P
H
E
CONTACTS NO. 1
Y
Z
X
CONTACTS NO. 2
W
U
V
(+) L
(-) M
RESET TERMINALS (-) T
APPLY DC WITH POLARITY SHOWN (+) S
CR9 1N459
K1
3
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2
7
4
6
1
5
10
9
CR11 1N459
F
CR10 1N459
R11
R13 1.5K
R15 39K
R16 1.5K
R18 39K
Q6 2N2243A
Q8 2N1132
R10 10K
R17 10K
CW
(BLK II)
R14 10K
Q5 2N1132
Q7 2N2243A
R12
CR12 1N459
CR15 1N459
CR14 1N459
CR17 1N459
C3
C4
CR13
CR16
D
J
K
SPARE N
SPARE (FOR 2900088-021 & -031) A
SPARE (FOR 2900088-011 & -031) B
SPARE (FOR 2900088-011 & -021) C

SEE NOTE 5

DASH NO. -003	-002	-001	REF DES	PART NUMBER	DESCRIPTION	SCHEMATIC DIAGRAM OR VALUE, TOL & RATING
		X	C1	CL33CE400MN3	CAPACITOR, MIL-C-3965	40, ±20%, 15V
X	X		C1	CL33CD101MN3		100, ±20%, 10V
X			C2	CL33CD101MN3		100, ±20%, 10V
		X	C3	CL33CE600MN3		60, ±20%, 15V
X	X		C3	CL33CD101MN3		100, ±20%, 10V
X			C4	CL33CD101MN3	CAPACITOR, MIL-C-3965	100, ±20%, 10V
X	X	X	CR1	1N459	SEMICONDUCTOR, MIL-S-19500	
X	X	X	CR2	1N459		
X	X	X	CR3	1N459	, MIL-S-19500	
X	X	X	CR4	1015941-10		4.7V ±5%
X	X	X	CR5	1N459	, MIL-S-19500	
X	X	X	CR6	1N459	, MIL-S-19500	
X	X	X	CR7	1015941-10		4.7V ±5%
X	X	X	CR8	1N459	, MIL-S-19500	
X	X	X	CR9	1N459		
X	X	X	CR10	1N459		
X	X	X	CR11	1N459		
X	X	X	CR12	1N459	, MIL-S-19500	
	X	X	CR13	1015941-8		3.9V ±5%
X			CR13	1015941-6		3.3V ±5%
X	X	X	CR14	1N459	, MIL-S-19500	
X	X	X	CR15	1N459	, MIL-S-19500	
X			CR16	1015941-6		3.3V ±5
	X	X	CR16	1015941-8		3.9V ±5
X	X	X	CR17	1N459	SEMICONDUCTOR, MIL-S-19500	
X	X	X	K1	1015845-412	RELAY	
		X	P1	1015956-167	CONNECTOR-PLUG	
	X		P1	1015956-168		
X			P1	1015956-169	CONNECTOR-PLUG	
X	X	X	Q1	2N1132	TRANSISTOR, EIA	
X	X	X	Q2	2N2243A		
X	X	X	Q3	2N2243A		
X	X	X	Q4	2N1132		
X	X	X	Q5	2N1132		
X	X	X	Q6	2N2243A		
X	X	X	Q7	2N2243A		
X	X	X	Q8	2N1132	TRANSISTOR, EIA	
		X	R1	RN60B4321F	RESISTOR, MIL-R-10509	4.32K, ±1%, 1/8W
X	X		R1	RN60B4991F		4.99K,
		X	R2	RN60B5362F		53.6K,
X	X		R2	RN60B5622F	, MIL-R-10509	56.2K, ±1%, 1/8W
X	X	X	R3	RC20GF152J	, MIL-R-11	1.5K, ±5%, 1/2W
X	X	X	R4	RT12C2L103	-VAR, MIL-R-27208	10K, , 3/4W
X	X	X	R5	RC20GF393J	, MIL-R-11	39K, , 1/2W
X	X	X	R6	RC20GF152J		1.5K,
X	X	X	R7	RC20GF103J		10K,
X	X	X	R8	RC20GF393J		39K,
X	X	X	R9	RC20GF103J		10K,
X	X	X	R10	RC20GF103J	, MIL-R-11	10K, ±5%, 1/2W
		X	R11	RN60B4421F	, MIL-R-10509	4.42K, ±1%, 1/8W
	X		R11	RN60B5761F		5.76K,
X			R11	RN60B3401F		3.40K,
		X	R12	RN60B6042F		60.4K
	X		R12	RN60B6342F		63.4K
X			R12	RN60B3242F	, MIL-R-10509	32.4K, ±1%, 1/8W
X	X	X	R13	RC20GF152J	, MIL-R-11	1.5K, ±5%, 1/2W
X	X	X	R14	RT12C2L103	-VAR, MIL-R-27208	10K, , 3/4W
X	X	X	R15	RC20GF393J	, MIL-R-11	39K, , 1/2W
X	X	X	R16	RC20GF152J		1.5K,
X	X	X	R17	RC20GF103J		10K,
X	X	X	R18	RC20GF393J	RESISTOR, MIL-R-11	39K, ±5%, 1/2W

REVISIONS 23417

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR 23417		OCT 65	JM

NEXT ASSY	USED ON
2900088-031	2900036-011
2900088-021	2900036-011
2900088-011	2900036-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN 8 APR 65 DATE
CHECKED Wilson 26 APR 65
APPROVAL E. Nass 27 APR 65
APPROVAL J. M. Watson 10-19-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC DIAGRAM, ELECTRICAL-
DUMP PROTECTION
ASSEMBLY, GIMBAL

CODE IDENT NO. 99974
SIZE E
2900089
SCALE —
SHEET 1 OF 1

APPLICATION		REVISIONS 23417			
NEXT ASSY	USED ON	SYM	DESCRIPTION	DATE	APPROVAL
2900088-011	2900036-011	A	INITIAL RELEASE CLASS A PER TDRR 23417	19-OCT-65	JM
2900088-021	2900036-011				
2900088-031	2900036-011				

REV	A	A	A	A	A	A
SHEET	1	2	3	4	5	6

REV STATUS OF SHEETS

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN 13 APR 65 DATE
CHECKED Clare Wilson 27 APR 65
LGT APPROVAL E. Nass 27 APR 65
APPROVAL Yedinan 14/12/65

NASA APPROVAL
MIT APPROVAL 11 Oct 65

CONTRACT NAS 9-497

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WIRE LIST A-A

CODE IDENT NO. 99974
SIZE A
2900090
REV A

SCALE —

SHEET 1 OF 6

WIRE LIST AA 2900090

NOTE NUMBER	GENERAL NOTES DESCRIPTION
1	NOT APPLICABLE
2	INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
3	LENGTHS SPECIFIED ARE FOR CONDUCTORS BEFORE ATTACHING TO AN ACCESSORY.
4	SOLDER PER MIL-S-6872 (ES2505-1) USING ITEMS 4, OR 2 AND 3.
5	MARK LEAD IDENTIFICATION PER ND1002019.

TOLERANCE CHART, UNLESS OTHERWISE SPECIFIED ---

APPLICABLE LENGTH FOR WIRE OR CABLE, STRIP WIRE, STRIP JACKET, CUT WIRE OR CUT SHIELD.	TOLERANCE WIRE OR CABLE	STRIP WIRE	STRIP JACKET	CUT WIRE	CUT SHIELD
UNDER 1 INCH	+ .06-.00	+.03-.00	+.06-.06	+.06-.06	+.06-.06
1 INCH TO 6 INCHES	+ .50-.00	+.06-.00	+.25-.25	+.25-.25	+.25-.25
6 INCHES TO 6 FEET	+1.00-.00		+.50-.50	+.50-.50	+.50-.50
OVER 6 FEET	+2.00-.00				

MANNED SPACECRAFT CENTER HOUSTON, TEXAS
SIZE A
2900090
SCALE-NONE
REV LTR A
SHEET 2 OF 6

WIRE LIST AA 2900090

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2900090-001	WIRE, ND1002181 TYPE 1, CLASS 1, 24AWG, WHT 10 FEET TOTAL LENGTH
	2	AR	SN60WS	SOLDER QQ-S-571 (ES2175-1)
	3	AR	MIL-F-14256	TYPE A OR W FLUX (ES2798)
	4	AR	SN60WRAP	SOLDER QQ-S-571 (ES2175-3)

MANNED SPACECRAFT CENTER HOUSTON, TEXAS
SIZE A
2900090
SCALE-NONE
REV LTR A
SHEET 3 OF 6

MIL 2084 4-63

WIRE LIST AA 2900090

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 1	1	6.40	P1-D TERM.16					.25 .25	YES YES			
AA 2	1	1.20	P1-D TERM.45					.25 .25	YES YES			
AA 3	1	4.80	P1-E TERM.30					.25 .25	YES YES			
AA 4	1	4.20	P1-F TERM.10					.25 .25	YES YES			
AA 5	1	3.10	P1-H TERM.25					.25 .25	YES YES			
AA 6	1	5.00	P1-J TERM.1					.25 .25	YES YES			
AA 7	1	6.40	P1-K TERM.6					.25 .25	YES YES			
AA 8	1	4.00	P1-L K1-1					.25 .25	YES YES			
AA 9	1	4.00	P1-M K1-5					.25 .25	YES YES			
AA 10	1	3.00	P1-P TERM.44					.25 .25	YES YES			
AA 11	1	2.70	P1-P TERM.39					.25 .25	YES YES			
AA 12	1	2.30	P1-R TERM.47					.25 .25	YES YES			

MANNED SPACECRAFT CENTER HOUSTON, TEXAS
SIZE A
2900090
SCALE-NONE
REV LTR A
SHEET 4 OF 6

WIRE LIST AA 2900090

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 13	1	2.90	P1-S K1-9					.25 .25	YES YES			
AA 14	1	3.30	P1-T K1-10					.25 .25	YES YES			
AA 15	1	2.50	P1-U K1-4					.25 .25	YES YES			
AA 16	1	2.80	P1-V K1-6					.25 .25	YES YES			
AA 17	1	2.90	P1-W K1-7					.25 .25	YES YES			
AA 18	1	2.20	P1-X K1-2					.25 .25	YES YES			
AA 19	1	1.60	P1-Y K1-3					.25 .25	YES YES			
AA 20	1	2.30	P1-Z K1-8					.25 .25	YES YES			
AA 21	1	3.10	TERM.19 K1-9					.25 .25	YES YES			
AA 22	1	1.40	TERM.33 K1-10					.25 .25	YES YES			
AA 23	1	4.30	TERM.45 TERM.21					.25 .25	YES YES			
AA 24	1	2.50	TERM.47 TERM.37					.25 .25	YES YES			

MANNED SPACECRAFT CENTER HOUSTON, TEXAS
SIZE A
2900090
SCALE-NONE
REV LTR A
SHEET 5 OF 6

MIL 2084 4-63

WIRE LIST AA 2900090

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 25	1	2.50	TERM.35					.25	YES			
			TERM.46					.25	YES			
AA 26	1	1.50	TERM.46					.25	YES			
			TERM.44					.25	YES			
AA 27	1	6.50	TERM.7					.25	YES			
			TERM.48					.25	YES			
AA 28	1	4.30	TERM.8					.25	YES			
			TERM.22					.25	YES			
AA 29	1	1.40	TERM.12					.25	YES			
			TERM.21					.25	YES			
AA 30	1	2.00	TERM.14					.25	YES			
			TERM.10					.25	YES			
AA 31	1	3.00	TERM.40					.25	YES			
			TERM.27					.25	YES			
AA 32	1	3.00	TERM.43					.25	YES			
			TERM.28					.25	YES			
AA 33	1	3.00	TERM.17					.25	YES			
			TERM.3					.25	YES			
AA 34	1	3.30	TERM.24					.25	YES			
			TERM.4					.25	YES			

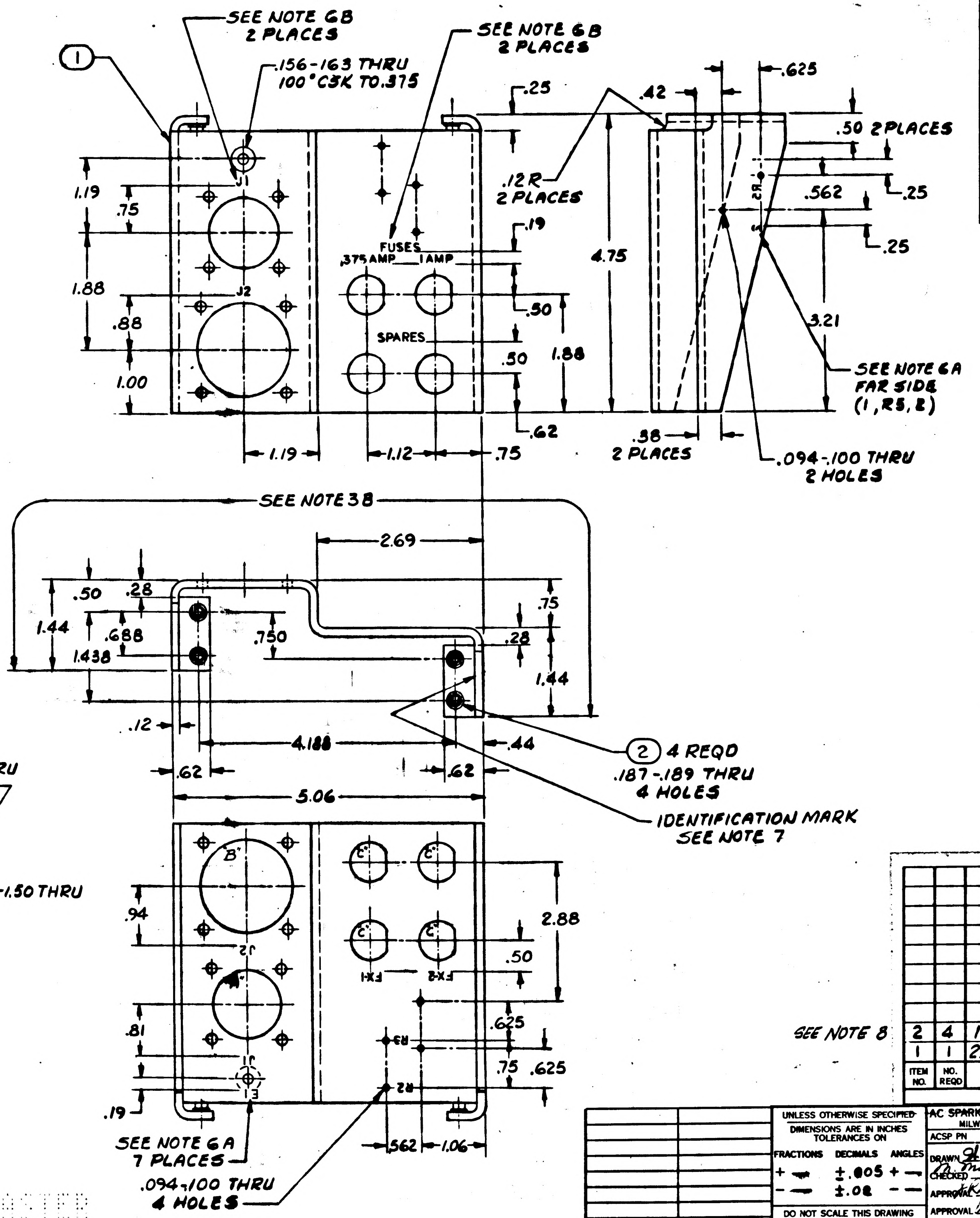
MANNED SPACECRAFT CENTER HOUSTON, TEXAS	SIZE A	2900090
SCALE - NONE	REV LTR A	SHEET 6 OF 6

NOTES:

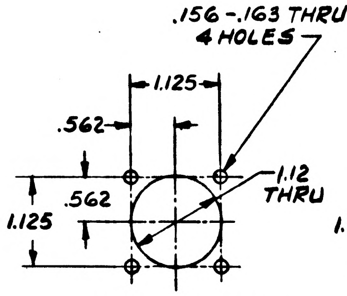
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY QQ-A-250/8 TEMPER H32 (5052 ES-2105).
3. FINISH:
   - A. CHEMICAL FILM IN ACCORDANCE WITH MIL-C-5541 (ES-591).
   - B. APPLY MIL-P-8585 PRIMER AND TWO COATS OF SCD 10/6194 CASHMERE BLUE TO SURFACE SHOWN.
4. MUST BE FREE FROM BURRS AND SHARP CORNERS.
5. UNLESS OTHERWISE SPECIFIED:
   - A. MINIMUM BEND RELIEF PERMISSIBLE.
   - B. ALL BEND RADII SHALL BE .12.
6. MARKING:
   - A. MARK CHARACTERS PER ND 1002019 .12 HIGH, COLOR BLACK.
   - B. SILK SCREEN CHARACTERS PER ND 1002112 .12 HIGH USING SEMI-GLOSS ENAMEL PER ND 1002111 (ES-2563), COLOR INSTRUMENT BLACK NO. 514 OF ANA 157, CHARACTER STYLE FUTURA DEMI-BOLD PER ND1002122.
7. IDENTIFY USING DRAWING NUMBER PER MIL-STD-130 (ES267).
8. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.

REVISIONS TDRR

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		REVISED PER D.O. 60978		2 SEP 65	FRW
B		REVISED PER MYC 205195		23 SEP 65	WP
C		INITIAL RELEASE CLASS A PER TDRR 24043		18 OCT 65	JR

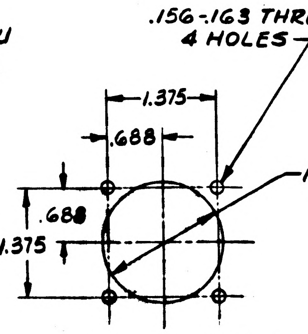


①
SEE NOTE 6B 2 PLACES
.156-.163 THRU 100° CSK TO .375
SEE NOTE 6B 2 PLACES
.25
.42
.625
.50 2 PLACES
.12 R 2 PLACES
.562
.25
.25
.19
4.75
3.21
FUSES
.375 AMP
1 AMP
SPARES
J1
J2
1.19
.75
1.88
.88
1.00
.50
.50
1.88
.62
1.19
1.12
.75
.38 2 PLACES
SEE NOTE 6A FAR SIDE (1, R3, 2)
.094-.100 THRU 2 HOLES
SEE NOTE 3B
2.69
.50
.28
1.44
.688
1.438
.750
.75
.28
1.44
.12
4.188
.44
.62
.62
② 4 REQD
.187-.189 THRU 4 HOLES
IDENTIFICATION MARK SEE NOTE 7
5.06
B
C
.94
2.88
.50
.81
.625
.75
.625
.19
.562
1.06
SEE NOTE 6A 7 PLACES
.094-.100 THRU 4 HOLES



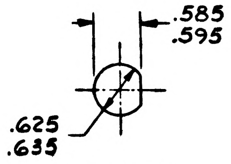
.156-.163 THRU 4 HOLES
1.125
.562
.562
1.125
1.12 THRU

HOLE CLUSTER A



.156-.163 THRU 4 HOLES
1.375
.688
.688
1.375
1.50 THRU

HOLE CLUSTER B



.585
.595
.625
.635

DETAIL C
4 PLACES

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	4	1015843-13	NUT, FLUSH MOUNTED, CLINCH
1	1	2900093-001	BRACKET (SEE NOTE 2)

SEE NOTE 8

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
1900299-021	1900299-021

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	±.005	+ —
— —	±.02	— —

DO NOT SCALE THIS DRAWING

MATERIAL SEE NOTE 2

CONTRACT NAS 9-497

~~AC SPARK PLUG DIVISION, GMC~~
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 17 Nov 64
CHECKED 7 DEC 64
APPROVAL 7 DEC 64
APPROVAL 7/15/65
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BRACKET, ELECTRICAL CONNECTOR AND RESISTOR (INSEPARABLE ASSEMBLY)

CODE IDENT NO. 99974
SIZE D
2900093
SCALE 1:1
SHEET 1 OF 1

REVISIONS TDRR

SYM	DESCRIPTION	DATE	APPROVAL
A1	REVISED PER MXC204640	9 SEP 65	J.E.L. EF
B	INITIAL RELEASE CLASS A PER TDRR 29043	18 OCT 65	JR

APPLICATION

NEXT ASSY	USED ON
1900299-021	1900299-021

REV		B	B	B	B	B	B
SHEET	1	2	3	4	5	6	7

REV STATUS OF SHEETS

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN 19 NOV 64 DATE
CHECKED 9 APR 65
APPROVAL 5 JAN 65
APPROVAL 7-12-65
NASA APPROVAL C. C. METZGER
MIT APPROVAL
CONTRACT NAS9-497

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE "C"
DEGAUSSER ASSEMBLY

CODE IDENT NO.	SIZE	2900095	REV
99974	A		B
SCALE —		SHEET 1 OF 7	

CABLE C 2900095 B

NOTE NUMBER	GENERAL NOTES DESCRIPTION
1	NOT APPLICABLE.
2	INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
3	MARK CONDUCTOR IDENTIFICATION ON SINGLE CONDUCTORS PER ND1002019 OMITTING ALL SUFFIX LETTERS EXCEPT A AND B.
4	SPACING OF CONDUCTOR IDENTIFICATION SHALL BE EVERY 1.2 INCHES.
5	SPIRALLING OF THE MARKING IS ALLOWED.
6	FASTEN MARKER SECURELY WITH ITEM 9. WRAP MARKER TO CONFORM TO CABLE CONFIGURATION.
7	SPOT TIE CABLE USING ITEM 9
8	VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
9	SPOT TIE ENDS OF ALL ZIPPER TUBING USING ITEM 9
10	ASSEMBLE ITEM 11 INTO ALL UNUSED GROMMET HOLES.

MANNED SPACECRAFT CENTER HOUSTON, TEXAS	SIZE A	2900095	
SCALE-NONE	REV LTR	B	SHEET 2 OF 7

MIL 2084 4-63

CABLE C 2900095 B

NOTE NUMBER GENERAL NOTES DESCRIPTION

TOLERANCE CHART, UNLESS OTHERWISE SPECIFIED ---

APPLICABLE LENGTH FOR WIRE OR CABLE, STRIP WIRE, STRIP JACKET, CUT WIRE OR CUT SHIELD.	TOLERANCE				
	WIRE OR CABLE	STRIP WIRE	STRIP JACKET	CUT WIRE	CUT SHIELD
UNDER 1 INCH	+ .06-.00	+.03-.00	+.06-.06	+.06-.06	+.06-.06
1 INCH TO 6 INCHES	+ .50-.00	+.06-.00	+.25-.25	+.25-.25	+.25-.25
6 INCHES TO 6 FEET	+1.00-.00		+.50-.50	+.50-.50	+.50-.50
OVER 6 FEET	+2.00-.00				

MANNED SPACECRAFT CENTER HOUSTON, TEXAS	SIZE A	2900095	
SCALE-NONE	REV LTR	B	SHEET 3 OF 7

MIL 2084 4-63

CABLE C 2900095 B

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2900095-001	WIRE, ND1002181, TYPE 1, CLASS 1, WHT. 22AWG 16 FEET 8 INCHES TOTAL LENGTH
8	2	1	1016161-324	CONNECTOR (P6)
8	3	1	1897180- 2	CONNECTOR (P5)
	4	1	1900667-025	SLEEVE MARKER (P6)
	5	1	1900667-026	SLEEVE MARKER (P5)
	6	1	1900668-006	SLEEVE IDENTIFICATION
	7	1	AN3420-8	BUSHING
	8	1	2900095-002	ZIPPER TUBING ND1002155 TYPE 1, PLASTIC FLEXIBLE 3/8 I.D. 12.5 IN. TOTAL LENGTH
	9	AR	MIL-T-713	LACING TAPE TYPE P, CLASS 2, BLACK (ES-2732 NO. 18)
	10	16	1897213-1	CONTACT, SOCKET
8	11	45	1897192	PLUG

MANNED SPACECRAFT CENTER HOUSTON, TEXAS	SIZE A	2900095	
SCALE-NONE	REV LTR	B	SHEET 4 OF 7

MIL 2084 4-63

CABLE C

2900095 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 1	1		P6-U	1				.30	NO			
			P5-1	2				.16	NO		10	
C 2	1		P6-V	1				.30	NO			
			P5-2	2				.16	NO		10	
C 3	1		P6-W	1				.30	NO			
			P5-3	2				.16	NO		10	
C 4	1		P6-N	1				.30	NO			
			P5-12	2				.16	NO		10	
C 5	1		P6-P	1				.30	NO			
			P5-13	2				.16	NO		10	
C 6	1		P6-R	1				.30	NO			
			P5-14	2				.16	NO		10	
C 7	1		P6-K	1				.30	NO			
			P5-59	2				.16	NO		10	
C 8	1		P6-L	1				.30	NO			
			P5-60	2				.16	NO		10	
C 9	1		P6-M	1				.30	NO			
			P5-61	2				.16	NO		10	
C 10	1		P6-D	1				.30	NO			
			P5-4	2				.16	NO		10	
C 11	1		P6-F	1				.30	NO			
			P5-5	2				.16	NO		10	
C 12	1		P6-G	1				.30	NO			
			P5-15	2				.16	NO		10	

MANNED
SPACECRAFT
CENTER
HOUSTON, TEXAS

SIZE A

2900095

SCALE-NONE | REV LTR B | SHEET 5 OF 7

MIL 2084 4-63

CABLE C

2900095 B

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
C 13	1		P6-J	1				.30	NO			
			P5-16	2				.16	NO		10	
C 14	1		P6-A	1				.30	NO			
			P5-32	2				.16	NO		10	
C 15	1		P6-B	1				.30	NO			
			P5-34	2				.16	NO		10	
C 16	1		P6-C	1				.30	NO			
			P5-33	2				.16	NO		10	

MANNED
SPACECRAFT
CENTER
HOUSTON, TEXAS

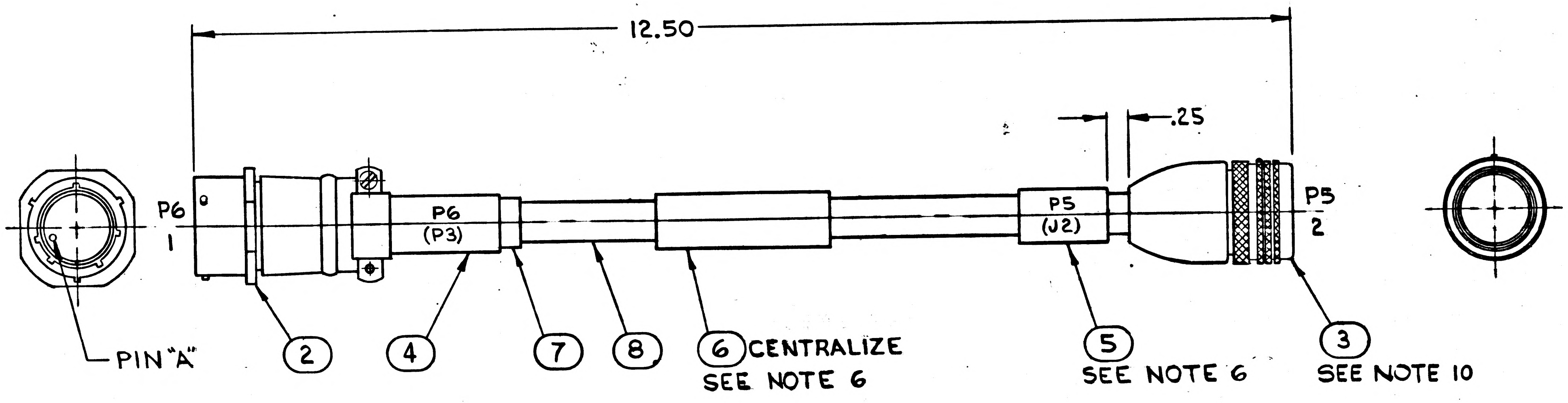
SIZE A

2900095

SCALE-NONE | REV LTR B | SHEET 6 OF 7

MIL 2084 4-63

REVISIONS TDRR 24043					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
		SEE SHEET 1 FOR REV.			



12.50
.25
P6
1
P6
(P3)
P5
(J2)
P5
2
PIN "A"
②
④
⑦
⑧
⑥ CENTRALIZE
SEE NOTE 6
⑤
SEE NOTE 6
③
SEE NOTE 10

1900299-021	1900299-021
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN RW Kaisal DATE 19 NOV 64
CHECKED W. DIEHL 6 APR. '65
APPROVAL J.R. Whiteman 5 JAN 65
APPROVAL J. M. Watson 1-12-65
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

CABLE "C"
DEGAUSSER ASSEMBLY

CODE IDENT NO. 99974
SIZE C
2900095
SCALE —
SHEET 7 OF 7

MIL 1077C—P

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ALL PART NUMBERS ARE FOR REFERENCE ONLY.
3. DRAWINGS FOR REFERENCE:
   2900076-011 INTERROGATOR, ELEC COMPONENT ASSY
4. UNLESS OTHERWISE SPECIFIED:
   A. VALUES ARE IN OHMS AND MICROFARADS.

UNUSED TERMINALS

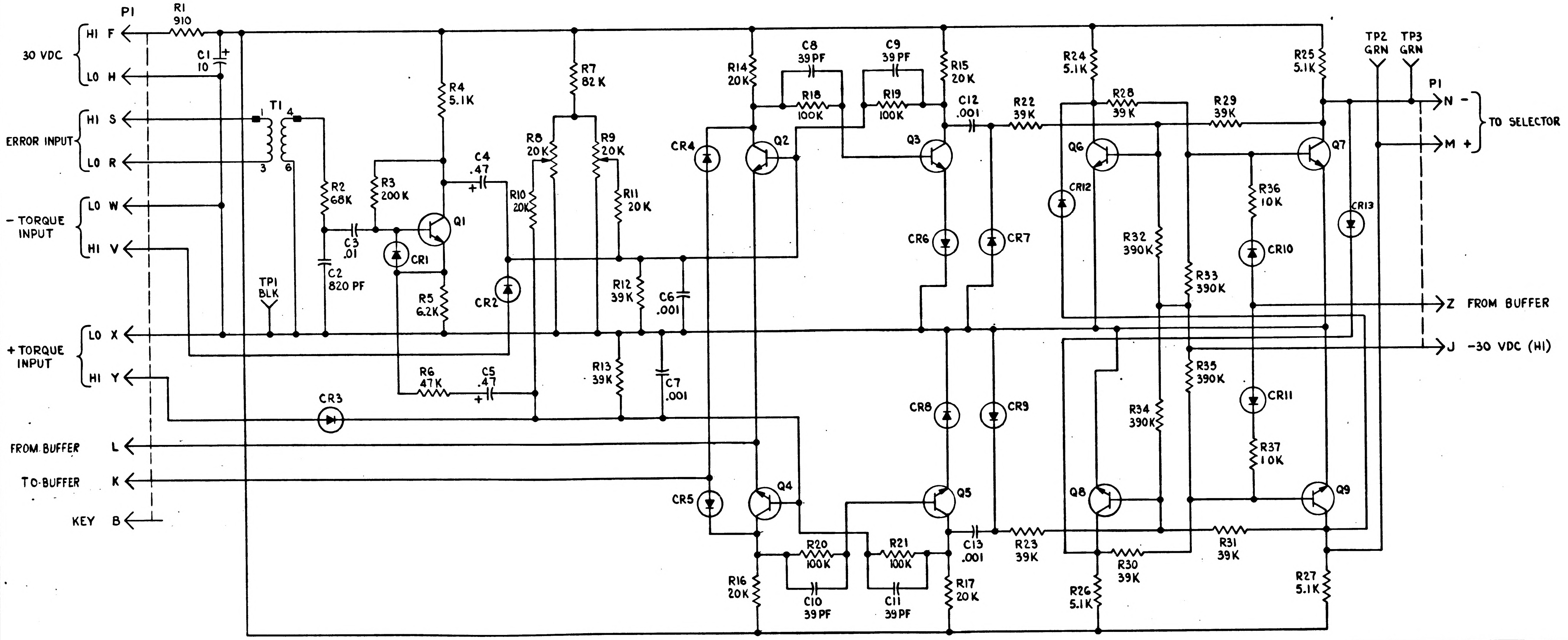
REF DES	TERMINAL NO.
P1	A,C,D,E,P,T,U

REF DES	PART NUMBER	DESCRIPTION	SCHEMATIC DIAGRAM OR VALUE, TOL & RATING
C1	CS13AG100K	CAPACITOR MIL-C-26655/2	
C2	CM20D821J03	MIL-C-5/2	
C3	CP05A1KF103K3	MIL-C-25/1	
C4	CS13AFR47K	MIL-C-26655/2	
C5	CS13AFR47K	MIL-C-26655/2	
C6	CM20D102J03	MIL-C-5/2	
C7	CM20D102J03	MIL-C-5/2	
C8	CM15C390J03	MIL-C-5/1	
C9	↓	↓	
C10	↓	↓	
C11	↓	↓	
C12	CM20D102J03	MIL-C-5/2	
C13	CM20D102J03	MIL-C-5/2	
CR1	IN914	SEMICONDUCTOR, MIL-S-19500/116	
CR2	↓	↓	
CR3	↓	↓	
CR4	↓	↓	
CR5	↓	↓	
CR6	↓	↓	
CR7	↓	↓	
CR8	↓	↓	
CR9	↓	↓	
CR10	↓	↓	
CR11	↓	↓	
CR12	↓	↓	
CR13	↓	↓	
P1	1015956-168	CONNECTOR, ADAPTER	
Q1	1015928-001	TRANSISTOR SPL	2N2193
Q2	↓	↓	↓
Q3	↓	↓	↓
Q4	↓	↓	↓
Q5	↓	↓	↓
Q6	↓	↓	↓
Q7	↓	↓	↓
Q8	↓	↓	↓
Q9	↓	↓	↓
R1	RC32GF911J	RESISTOR MIL-R-11/6	
R2	RC07GF683J	RESISTOR MIL-R-11/8	
R3	RC07GF204J	RESISTOR MIL-R-11/8	

REF DES	PART NUMBER	DESCRIPTION	SCHEMATIC DIAGRAM OR VALUE, TOL & RATING
R4	RC07GF512J	RESISTOR MIL-R-11/8	
R5	RC07GF622J	↓	
R6	RC07GF473J	↓	
R7	RC07GF823J	↓	
R8	RT12C2L203	MIL-R-27208/8	
R9	RT12C2L203	MIL-R-27208/8	
R10	RC07GF203J	MIL-R-11/8	
R11	RC07GF203J	↓	
R12	RC07GF393J	↓	
R13	RC07GF393J	↓	
R14	RC07GF203J	↓	
R15	↓	↓	
R16	↓	↓	
R17	↓	↓	
R18	RC07GF104J	↓	
R19	↓	↓	
R20	↓	↓	
R21	↓	↓	
R22	RC07GF393J	↓	
R23	RC07GF393J	↓	
R24	RC07GF512J	↓	
R25	↓	↓	
R26	↓	↓	
R27	↓	↓	
R28	RC07GF393J	↓	
R29	↓	↓	
R30	↓	↓	
R31	↓	↓	
R32	RC07GF394J	↓	
R33	↓	↓	
R34	↓	↓	
R35	↓	↓	
R36	RC07GF103J	↓	
R37	RC07GF103J	↓	
T1	1015898-017	TRANSFORMER, AUDIO FREQ	
TP1	1016347-003	JACK, MINIATURE	
TP2	1016347-004	JACK, MINIATURE	
TP3	1016347-004	JACK, MINIATURE	

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A	—	REVISED PER D.O.-60573		7-JUN-65	B. EF
B		REVISED PER MXC 205146		24 SEP 65	
C		INITIAL RELEASE CLASS A PER TDRR 23556		OCT 65	



P1
R1 910
30 VDC
HI F
LO H
C1 10
ERROR INPUT
HI S
LO R
T1
1 4 3 6
- TORQUE INPUT
LO W
HI V
TP1 BLK
+ TORQUE INPUT
LO X
HI Y
FROM BUFFER L
TO-BUFFER K
KEY B
R2 68K
C2 820 PF
C3 .01
R3 200K
CR1
Q1
R4 5.1K
R5 6.2K
C4 .47
CR2
R6 47K
C5 .47
CR3
R7 82K
R8 20K
R9 20K
R10 20K
R11 20K
R12 39K
R13 39K
C6 .001
C7 .001
CR4
CR5
R14 20K
R16 20K
Q2
Q4
C8 39PF
C9 39PF
R18 100K
R19 100K
R20 100K
R21 100K
C10 39PF
C11 39PF
R15 20K
R17 20K
Q3
Q5
CR6
CR7
CR8
CR9
C12 .001
C13 .001
R22 39K
R23 39K
R24 5.1K
R26 5.1K
R28 39K
R30 39K
Q6
Q8
CR12
R32 390K
R33 390K
R34 390K
R35 390K
R29 39K
R31 39K
R36 10K
R37 10K
CR10
CR11
Q7
Q9
CR13
R25 5.1K
R27 5.1K
TP2 GRN
TP3 GRN
P1
N -
M +
TO SELECTOR
Z FROM BUFFER
J -30 VDC (HI)

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 4 MAY 65
CHECKED J. Stelma 7 MAY 65
APPROVAL R.F. Schmus 10 MAY 65
APPROVAL J. M. Watson 10-22-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC DIAGRAM,
ELECTRICAL
INTERROGATOR

CODE IDENT NO. 99974
SIZE E
2900099
SCALE —
SHEET 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ALL PART NUMBERS ARE FOR REFERENCE ONLY.
3. DRAWINGS FOR REFERENCE:
   2900076-011 INTERROGATOR, ELEC COMPONENT ASSY
4. UNLESS OTHERWISE SPECIFIED:
   A. VALUES ARE IN OHMS AND MICROFARADS.

UNUSED TERMINALS

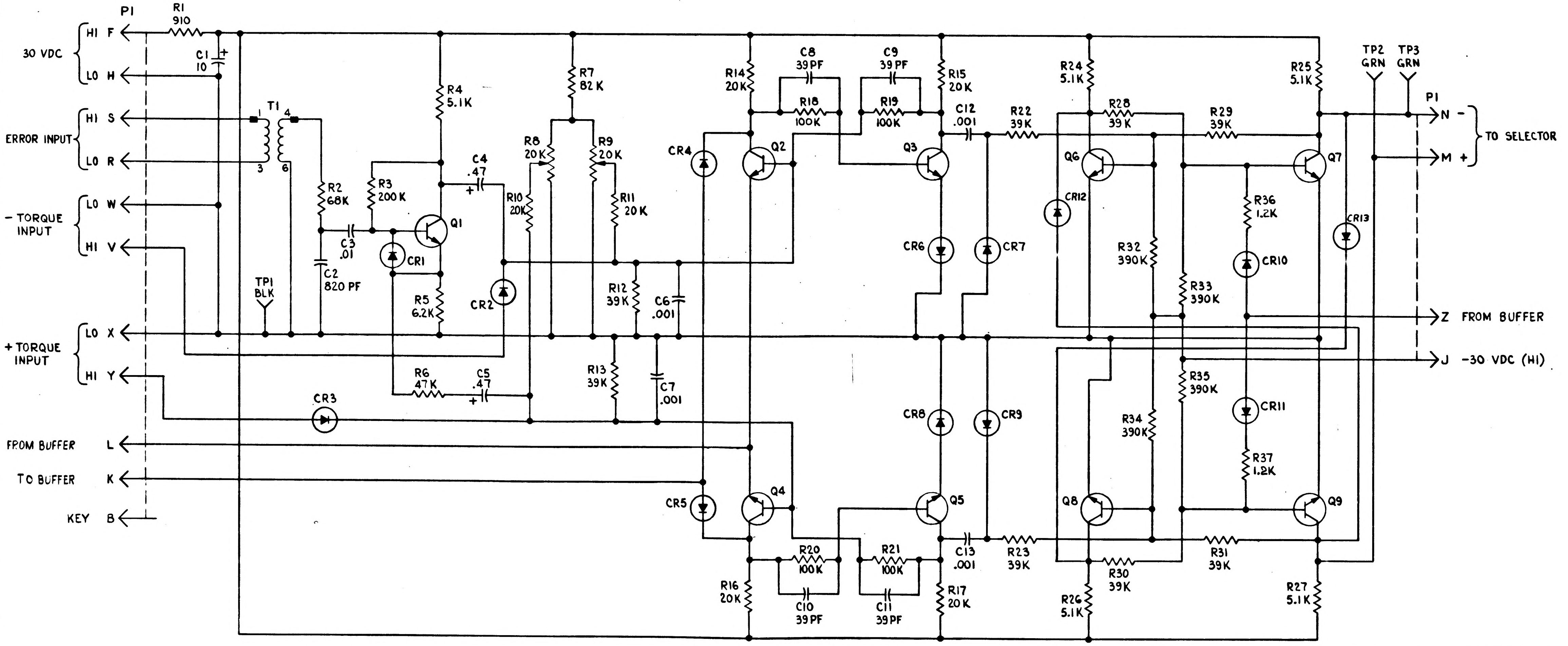
REF DES	TERMINAL NO.
P1	A,C,D,E,P,T,U

REF DES	PART NUMBER	DESCRIPTION	SCHEMATIC DIAGRAM OR VALUE, TOL & RATING
C1	CS13AG100K	CAPACITOR MIL-C-26655/2	
C2	CM20D821J03	MIL-C-5/2	
C3	CP05A1KF103K3	MIL-C-25/1	
C4	CS13AFR47K	MIL-C-26655/2	
C5	CS13AFR47K	MIL-C-26655/2	
C6	CM20D102J03	MIL-C-5/2	
C7	CM20D102J03	MIL-C-5/2	
C8	CM15C390J03	MIL-C-5/1	
C9	↓	↓	
C10	↓	↓	
C11	↓	↓	
C12	CM20D102J03	MIL-C-5/2	
C13	CM20D102J03	MIL-C-5/2	
CR1	1N914	SEMICONDUCTOR, MIL-S-19500/116	
CR2	↓	↓	
CR3	↓	↓	
CR4	↓	↓	
CR5	↓	↓	
CR6	↓	↓	
CR7	↓	↓	
CR8	↓	↓	
CR9	↓	↓	
CR10	↓	↓	
CR11	↓	↓	
CR12	↓	↓	
CR13	↓	↓	
P1	1015956-168	CONNECTOR, ADAPTER	
Q1	1015928-001	TRANSISTOR SPL	2N2193
Q2	↓	↓	↓
Q3	↓	↓	↓
Q4	↓	↓	↓
Q5	↓	↓	↓
Q6	↓	↓	↓
Q7	↓	↓	↓
Q8	↓	↓	↓
Q9	↓	↓	↓
R1	RC32GF911J	RESISTOR MIL-R-11/6	
R2	RC07GF683J	RESISTOR MIL-R-11/8	
R3	RC07GF204J	RESISTOR MIL-R-11/8	

REF DES	PART NUMBER	DESCRIPTION	SCHEMATIC DIAGRAM OR VALUE, TOL & RATING
R4	RC07GF512J	RESISTOR MIL-R-11/8	
R5	RC07GF622J	↓	
R6	RC07GF473J	↓	
R7	RC07GF823J	↓	
R8	RT12C2L203	MIL-R-27208/8	
R9	RT12C2L203	MIL-R-27208/8	
R10	RC07GF203J	MIL-R-11/8	
R11	RC07GF203J	↓	
R12	RC07GF393J	↓	
R13	RC07GF393J	↓	
R14	RC07GF203J	↓	
R15	↓	↓	
R16	↓	↓	
R17	↓	↓	
R18	RC07GF104J	↓	
R19	↓	↓	
R20	↓	↓	
R21	↓	↓	
R22	RC07GF393J	↓	
R23	RC07GF393J	↓	
R24	RC07GF512J	↓	
R25	↓	↓	
R26	↓	↓	
R27	↓	↓	
R28	RC07GF393J	↓	
R29	↓	↓	
R30	↓	↓	
R31	↓	↓	
R32	RC07GF394J	↓	
R33	↓	↓	
R34	↓	↓	
R35	↓	↓	
R36	RC07GF122J	↓	
R37	RC07GF122J	↓	
T1	1015898-017	TRANSFORMER, AUDIO FREQ	
TP1	1016347-003	JACK, MINIATURE	
TP2	1016347-004	JACK, MINIATURE	
TP3	1016347-004	JACK, MINIATURE	

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A	—	REVISED PER D.O.-60573		65	3. EF
B		REVISED PER MXC 205146		24 SEP 65	
C		INITIAL RELEASE CLASS A PER TDRR 23556		65	
D		REVISED PER TDRR 24862		29 DEC 65	JHF


P1
R1 910
HI F
30 VDC
LO H
C1 10
HI S
ERROR INPUT
LO R
T1
1 4 3 6
- TORQUE INPUT
LO W
HI V
TP1 BLK
+ TORQUE INPUT
LO X
HI Y
FROM BUFFER L
TO BUFFER K
KEY B
R2 68K
R3 200K
C3 .01
C2 820 PF
CR1
Q1
R4 5.1K
C4 .47
R5 6.2K
CR2
R6 47K
C5 .47
CR3
R7 82K
R8 20K
R9 20K
R10 20K
R11 20K
R12 39K
R13 39K
C6 .001
C7 .001
CR4
CR5
R14 20K
Q2
C8 39PF
R18 100K
C9 39PF
R19 100K
R15 20K
Q3
CR6
CR7
CR8
CR9
Q4
Q5
R20 100K
C10 39PF
R21 100K
C11 39PF
R16 20K
R17 20K
C12 .001
C13 .001
R22 39K
R23 39K
R24 5.1K
R28 39K
R29 39K
Q6
CR12
R32 390K
R33 390K
R36 1.2K
CR10
R35 390K
R34 390K
CR11
R37 1.2K
Q8
R30 39K
R31 39K
R26 5.1K
Q7
R25 5.1K
CR13
Q9
R27 5.1K
TP2 GRN
TP3 GRN
P1
N -
M +
TO SELECTOR
Z FROM BUFFER
J -30 VDC (HI)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS		
FRACTIONS ± — DECIMALS ± — ANGLES ± —	ACSP PN	SCHEMATIC DIAGRAM, ELECTRICAL INTERROGATOR		
DO NOT SCALE THIS DRAWING	DRAWN C.M. Kulp DATE 4 MAY 65 CHECKED J. Stevens 7 MAY 65 APPROVAL R.F. 10 MAY 65 APPROVAL J. M. Watson 10-22-65			
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974	SIZE E	2900099
CONTRACT NAS 9-497	MIT APPROVAL	SCALE —		SHEET 1 OF 1

2900099 D

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ALL PART NUMBERS ARE FOR REFERENCE ONLY.
3. DRAWINGS FOR REFERENCE:
   2900076-011 INTERROGATOR, ELEC COMPONENT ASSY
4. UNLESS OTHERWISE SPECIFIED:
   A. VALUES ARE IN OHMS AND MICROFARADS.

UNUSED TERMINALS

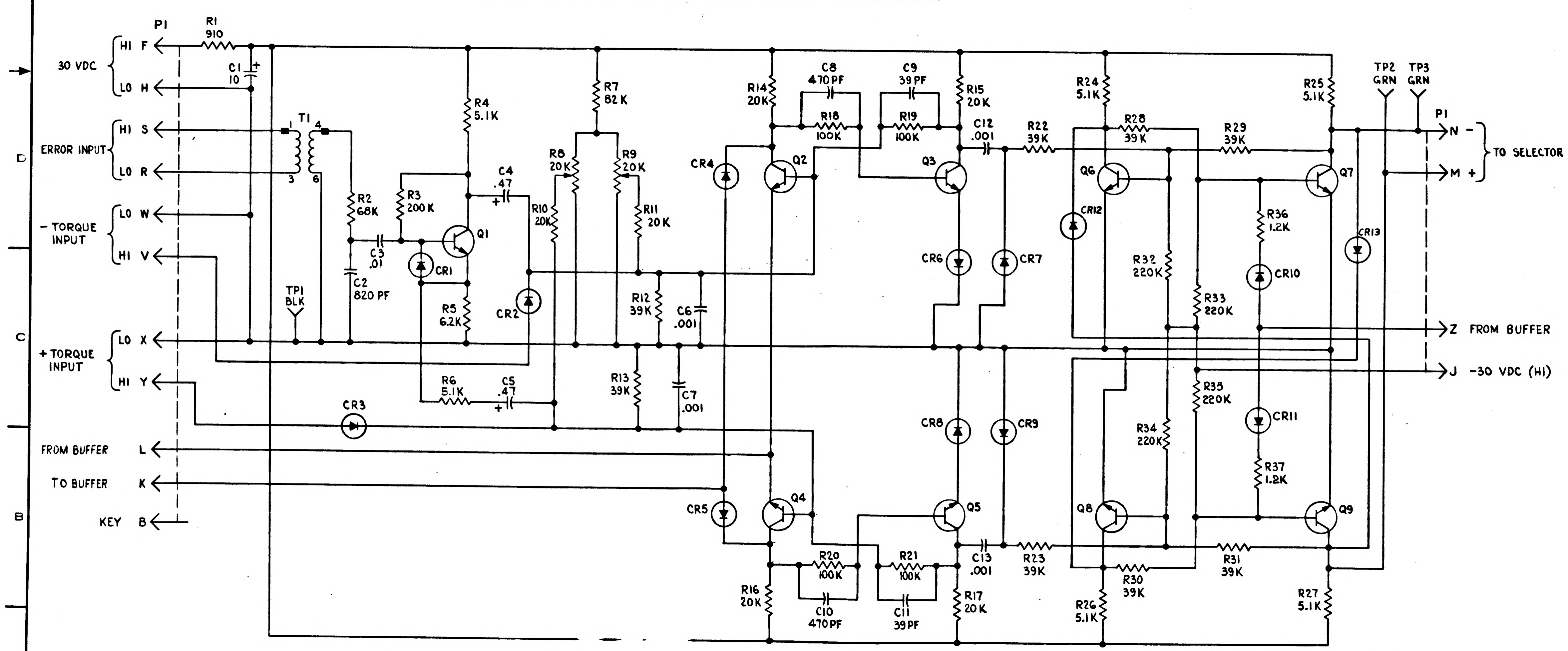
REF DES	TERMINAL NO.
P1	A,C,D,E,P,T,U

REF DES	PART NUMBER	DESCRIPTION	SCHEMATIC DIAGRAM OR VALUE, TOL & RATING
C1	CS13AG100K	CAPACITOR MIL-C-26655/2	
C2	CM20D821J03	MIL-C-5/2	
C3	CP05A1KF103K3	MIL-C-25/1	
C4	CS13AFR47K	MIL-C-26655/2	
C5	CS13AFR47K	MIL-C-26655/2	
C6	CM20D102J03	MIL-C-5/2	
C7	CM20D102J03	MIL-C-5/2	
C8	CM15D471J03	MIL-C-5/1	
C9	CM15C390J03		
C10	CM15D471J03		
C11	CM15C390J03		
C12	CM20D102J03	MIL-C-5/2	
C13	CM20D102J03	MIL-C-5/2	
CR1	1N914	SEMICONDUCTOR, MIL-S-19500/116	
CR2			
CR3			
CR4			
CR5			
CR6			
CR7			
CR8			
CR9			
CR10			
CR11			
CR12			
CR13			
P1	1015956-168	CONNECTOR, ADAPTER	
Q1	1015928-001	TRANSISTOR SPL	2N2193
Q2			
Q3			
Q4			
Q5			
Q6			
Q7			
Q8			
Q9			
R1	RC32GF911J	RESISTOR MIL-R-11/6	
R2	RC07GF683J	RESISTOR MIL-R-11/8	
R3	RC07GF204J	RESISTOR MIL-R-11/8	

REF DES	PART NUMBER	DESCRIPTION	SCHEMATIC DIAGRAM OR VALUE, TOL & RATING
R4	RC07GF512J	RESISTOR MIL-R-11/8	
R5	RC07GF622J		
R6	RC07GF512J		
R7	RC07GF823J		
R8	RT12C2L203	MIL-R-27208/8	
R9	RT12C2L203	MIL-R-27208/8	
R10	RC07GF203J	MIL-R-11/8	
R11	RC07GF203J		
R12	RC07GF393J		
R13	RC07GF393J		
R14	RC07GF203J		
R15			
R16			
R17			
R18	RC07GF104J		
R19			
R20			
R21			
R22	RC07GF393J		
R23	RC07GF393J		
R24	RC07GF512J		
R25			
R26			
R27			
R28	RC07GF393J		
R29			
R30			
R31			
R32	RC07GF224J		
R33			
R34			
R35			
R36	RC07GF122J		
R37	RC07GF122J		
T1	1015898-017	TRANSFORMER, AUDIO FREQ	
TP1	1016347-003	JACK, MINIATURE	
TP2	1016347-004	JACK, MINIATURE	
TP3	1016347-004	JACK, MINIATURE	

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A	—	REVISED PER D.O.-60573		7-JUN-65	B. EF
B		REVISED PER MXC 205146		24 SEP 65	JHP
C		INITIAL RELEASE CLASS A PER TDRR 23556		8 OCT 65	
D		REVISED PER TDRR 24862		29 DEC 65	JHP JS
E		REVISED PER TDRR 25292		19 JAN 66	JJ JAC


P1
R1 910
30 VDC
HI F
LO H
C1 10
+
ERROR INPUT
HI S
LO R
T1
1
3
4
6
- TORQUE INPUT
LO W
HI V
+ TORQUE INPUT
LO X
HI Y
TP1 BLK
R2 68K
C3 .01
C2 820 PF
R3 200K
Q1
CR1
R4 5.1K
R5 6.2K
C4 .47
CR2
R6 5.1K
C5 .47
CR3
FROM BUFFER L
TO BUFFER K
KEY B
R7 82K
R8 20K
R9 20K
R10 20K
R11 20K
R12 39K
C6 .001
R13 39K
C7 .001
CR4
CR5
R14 20K
C8 470PF
R18 100K
Q2
C9 39PF
R19 100K
R15 20K
Q3
C12 .001
CR6
CR7
CR8
CR9
Q4
Q5
R16 20K
R20 100K
C10 470PF
R21 100K
C11 39PF
R17 20K
C13 .001
R22 39K
R23 39K
R24 5.1K
R28 39K
R29 39K
Q6
CR12
R32 220K
R33 220K
R36 1.2K
CR10
Q7
R25 5.1K
CR13
R35 220K
R34 220K
CR11
R37 1.2K
Q8
Q9
R30 39K
R31 39K
R26 5.1K
R27 5.1K
TP2 GRN
TP3 GRN
P1
N -
M +
TO SELECTOR
Z FROM BUFFER
J -30 VDC (HI)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± —	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
DO NOT SCALE THIS DRAWING	DRAWN C. M. Kafe DATE 4 MAY 65 CHECKED J. Stevens 7 MAY 65 APPROVAL 10 MAY 65 APPROVAL J. M. Watson 10-22-65	SCHEMATIC DIAGRAM, ELECTRICAL INTERROGATOR	
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974	SIZE E 2900099
CONTRACT NAS9-497	MIT APPROVAL	SCALE —	SHEET 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ALL PART NUMBERS ARE FOR REFERENCE ONLY.
3. DRAWINGS FOR REFERENCE:
   2900076-011 INTERROGATOR, ELEC COMPONENT ASSY
4. UNLESS OTHERWISE SPECIFIED:
   A. VALUES ARE IN OHMS AND MICROFARADS.
5. R38 AND R39 NOT USED ON 2900076-011.

UNUSED TERMINALS

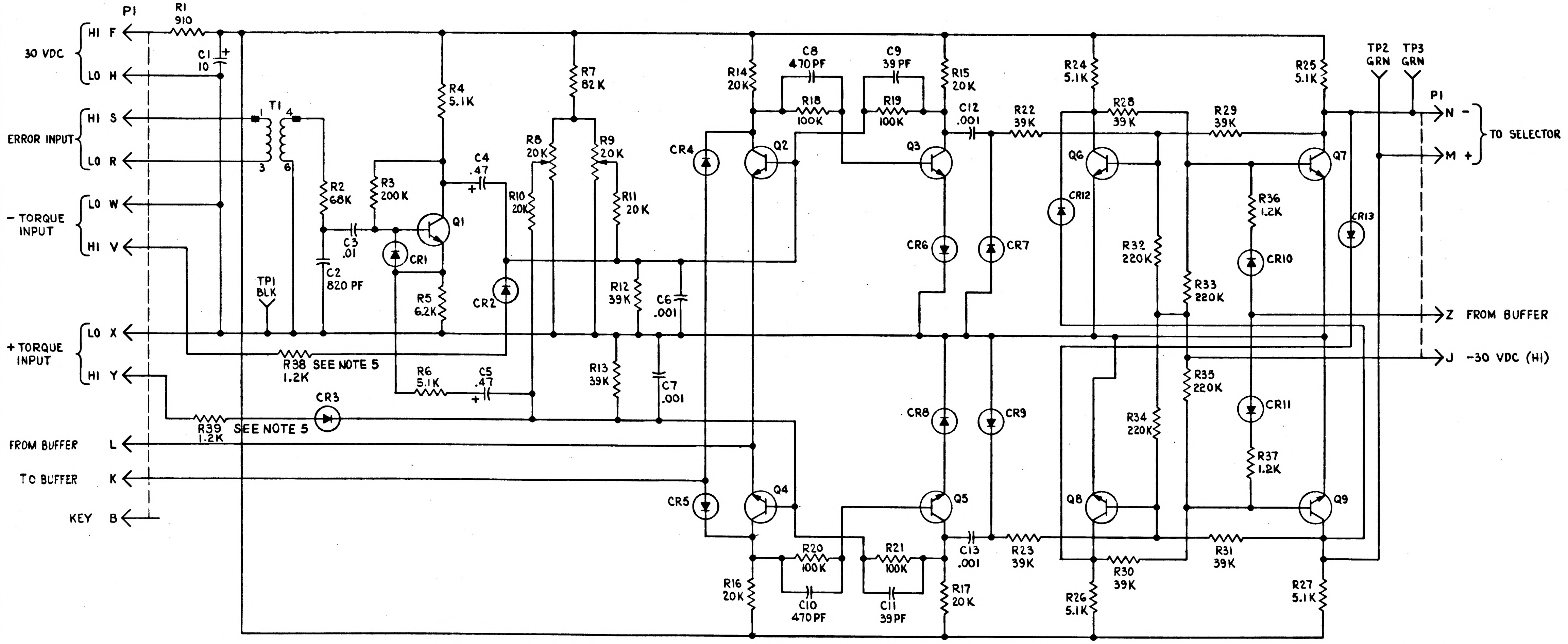
REF DES	TERMINAL NO.
P1	A,C,D,E,P,T,U

REF DES	PART NUMBER	DESCRIPTION	SCHEMATIC DIAGRAM OR VALUE, TOL & RATING
C1	CS13AG100K	CAPACITOR MIL-C-26655/2	
C2	CM20D821J03	MIL-C-5/2	
C3	CP05A1KF103K3	MIL-C-25/1	
C4	CS13AFR47K	MIL-C-26655/2	
C5	CS13AFR47K	MIL-C-26655/2	
C6	CM20D102J03	MIL-C-5/2	
C7	CM20D102J03	MIL-C-5/2	
C8	CM15D471J03	MIL-C-5/1	
C9	CM15C390J03		
C10	CM15D471J03		
C11	CM15C390J03		
C12	CM20D102J03	MIL-C-5/2	
C13	CM20D102J03	MIL-C-5/2	
CR1	1N914	SEMICONDUCTOR, MIL-S-19500/116	
CR2			
CR3			
CR4			
CR5			
CR6			
CR7			
CR8			
CR9			
CR10			
CR11			
CR12			
CR13			
P1	1015956-168	CONNECTOR, ADAPTER	
Q1	1015928-001	TRANSISTOR SPL	2N2193
Q2			
Q3			
Q4			
Q5			
Q6			
Q7			
Q8			
Q9			
R1	RC32GF911J	RESISTOR MIL-R-11/6	
R2	RC07GF683J	RESISTOR MIL-R-11/8	
R3	RC07GF204J	RESISTOR MIL-R-11/8	

REF DES	PART NUMBER	DESCRIPTION	SCHEMATIC DIAGRAM OR VALUE, TOL & RATING
R4	RC07GF512J	RESISTOR MIL-R-11/8	
R5	RC07GF622J		
R6	RC07GF512J		
R7	RC07GF823J		
R8	RT12C2L203	MIL-R-27208/8	
R9	RT12C2L203	MIL-R-27208/8	
R10	RC07GF203J	MIL-R-11/8	
R11	RC07GF203J		
R12	RC07GF393J		
R13	RC07GF393J		
R14	RC07GF203J		
R15			
R16			
R17			
R18	RC07GF104J		
R19			
R20			
R21			
R22	RC07GF393J		
R23	RC07GF393J		
R24	RC07GF512J		
R25			
R26			
R27			
R28	RC07GF393J		
R29			
R30			
R31			
R32	RC07GF224J		
R33			
R34			
R35			
R36	RC07GF122J		
R37	RC07GF122J		
R38	RC07GF122J		
R39	RC07GF122J		
T1	1015898-017	TRANSFORMER, AUDIO FREQ	
TP1	1016347-003	JACK, MINIATURE	
TP2	1016347-004	JACK, MINIATURE	
TP3	1016347-004	JACK, MINIATURE	

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A	—	REVISED PER D.O.-60573		7-JUN-65	EF
B		REVISED PER MXC 205146		24 SEP 65	JHP
C		INITIAL RELEASE CLASS A PER TDRR 23556		8 OCT 65	
D		REVISED PER TDRR 24862		29 DEC 65	JHP
E		REVISED PER TDRR 25292		19 JAN 66	JJ JRC
F		REVISED PER TDRR 26113		19 FEB 66	JHP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R1
910
HI F
30 VDC
LO H
C1
10
T1
1
4
3
6
HI S
ERROR INPUT
LO R
LO W
- TORQUE INPUT
HI V
LO X
+ TORQUE INPUT
HI Y
FROM BUFFER L
TO BUFFER K
KEY B
R2
68K
R3
200K
C3
.01
C2
820 PF
TP1
BLK
R4
5.1K
Q1
CR1
R5
6.2K
C4
.47
CR2
R38
1.2K
SEE NOTE 5
R6
5.1K
C5
.47
R39
1.2K
SEE NOTE 5
CR3
R7
82K
R8
20K
R9
20K
R10
20K
R11
20K
R12
39K
C6
.001
R13
39K
C7
.001
CR4
Q2
R14
20K
C8
470 PF
R18
100K
C9
39 PF
R19
100K
Q3
R15
20K
C12
.001
CR6
CR7
CR8
CR9
CR5
Q4
R16
20K
R20
100K
C10
470 PF
R21
100K
C11
39 PF
Q5
R17
20K
C13
.001
R22
39K
R23
39K
R24
5.1K
R28
39K
Q6
CR12
R32
220K
R33
220K
R35
220K
R34
220K
Q8
R26
5.1K
R30
39K
R29
39K
R31
39K
R25
5.1K
Q7
R36
1.2K
CR10
CR11
R37
1.2K
Q9
R27
5.1K
CR13
TP2
GRN
TP3
GRN
P1
N -
M +
TO SELECTOR
Z FROM BUFFER
J -30 VDC (HI)

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN C.M. Kulp DATE 4 MAY 65
CHECKED J. Stevens 7 MAY 65
APPROVAL 10 MAY 65
APPROVAL J. M. Watson 10-22-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC DIAGRAM,
ELECTRICAL
INTERROGATOR

CODE IDENT NO. 99974
SIZE E
2900099
SCALE —
SHEET 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

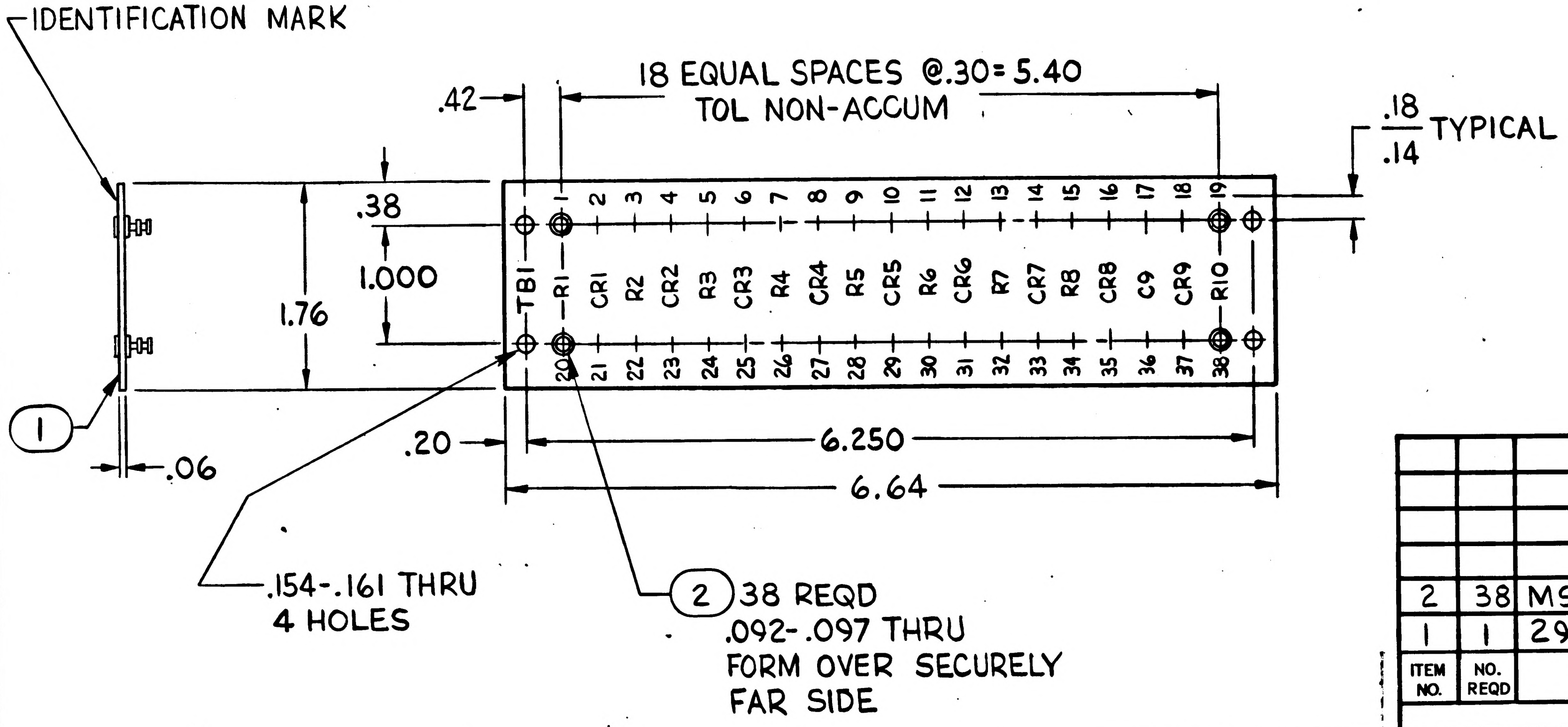
2. LAMINATED GLASS CLOTH EPOXY RESIN, MIL-P-18177, TYPE GEE (ES-2744-1).

3. MARK CHARACTERS .12 HIGH PER ND1002019, COLOR BLACK, CENTRALIZE AS SHOWN.

4. UNLESS OTHERWISE SPECIFIED:
   A. MUST BE FREE FROM BURRS AND SHARP EDGES.

5. IDENTIFY USING DRAWING NUMBER PER MIL-STD-130 (ES-267).

REVISIONS 23416					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 23416		19 OCT 65	7E / CW


IDENTIFICATION MARK
18 EQUAL SPACES @ .30 = 5.40
TOL NON-ACCUM
.42
.18
.14
TYPICAL
.38
1.000
1.76
TB1
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
R1 CR1 R2 CR2 R3 CR3 R4 CR4 R5 CR5 R6 CR6 R7 CR7 R8 CR8 C9 CR9 R10
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38
①
.06
.20
6.250
6.64
.154-.161 THRU
4 HOLES
② 38 REQD
.092-.097 THRU
FORM OVER SECURELY
FAR SIDE

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
2	38	MS17122-6	TERMINAL, STUD
1	1	2900106-001	TERMINAL BOARD

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2900105-011	2900027-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	±.02	+ —
− —	±.005	− —

DO NOT SCALE THIS DRAWING

MATERIAL
SEE NOTE 2

CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN E. Miller DATE 27 APR 65
CHECKED M. Manning 11 MAY 65
APPROVAL D. Foss 27 MAY 65
APPROVAL C. Gelman 9/9/65
NASA APPROVAL
MIT APPROVAL 21 Oct 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL BOARD
(INSEPARABLE ASSEMBLY)

CODE IDENT NO. 99974
SIZE C
2900106
SCALE FULL
SHEET 1 OF 1

Charleston 17 MAY 65

MIL 1077C—P

2900106 A

PARTS TABLE

SHEET, ZONE	REF DESIG	PART NUMBER	DESCRIPTION	SCHEMATIC DIAGRAM OR VALUE, TOL, RATING
4,D16	K53	1015837-001	RELAY	
5,E5	K54			
5,D7	K55			
4,F14	K56			
TABLE I	K57	1015837-001		
2,C2	K60	1015832-318		
3,D3	K61	1015802-004		
3,F6	K62			
3,F5	K63			
3,E6	K64			
3,D5	K65			
2,C5	K67			
2,C8	K68			
2,D6	K69			
[illegible]	K71			
[illegible]	K72			
[illegible]	K73			
[illegible]	K74	1015802-004		
[illegible]	K75	1015832-318		
3,F3	K76	1015802-004		
4,E8	K78	1015837-001		
4,C8	K79			
2,C2	K81			
4,E7	K82			
2,F7	K83			
4,F10	K84	1015837-001	RELAY	
	P12	1015868-500	CONNECTOR	
	P13			
	P14			
	P15	1015868-500	CONNECTOR	
5,G14	R1	1901321	RESISTOR, VARIABLE	750Ω,10%,4W
2,C3	R1(TB1)	RC32GF122J	, FIXED	1.2K,5%,1W
5,E11	R2			
5,E9	R3			
4,E16	R4			
4,E6	R5			
4,E3	R6			
2,C13	R7			
2,C11	R8			
2,C15	R9	RC32GF122J		1.2K,5%,1W
3,G6	R10	RC20GF202J		2K,5%,1/2W
3,C8	R11	RC32GF122J		1.2K,5%,1W
2,E3	R12			
4,D12	R13			
4,C9	R14			
4,C4	R15	RC32GF122J		1.2K,5%,1W
2,C7	R16	RC20GF202J	RESISTOR, FIXED	2K,5%,1/2W
5,E6	S1	1015869-544	SWITCH	
5,B15	S2	-546		
5,E12	S3	-730		
5,F9	S4	-711		
5,F4	S6	-304		
5,C12	S7	-722		
5,B13	S8	1015869-721		
5,C13	S9	1015994-001		
2,F14	S10	1015869-370		
5,C4	S11	1897337-501		
3,C5	S16	1015869-826		
5,C6	S17	-526		
4,F15	S18	-719		
3,F14	S20	-731		
2,D3	S21	-732		
2,F3	S22	-733		
3,D8	S23	-734		
3,F4	S24	-372		
3,F5	S25	-373		
3,F2	S26	-736		
3,E	S27	-375		
3,F10	S28	-318		
3,F	S29	1015869-376	SWITCH	

PARTS TABLE

SHEET, ZONE	REF DESIG	PART NUMBER	DESCRIPTION	SCHEMATIC DIAGRAM OR VALUE, TOL, RATING
	E9			
	E10			
	E12			
	E13			
	E14			
	E15			
	E16			
	E17			
	E18			
	E19			
	E20			
	E21			
	E22			
	E23			
	E24			
	E25			
	E26			
	E27			
	E28			
	E29			
5,C15	F1	MS90078-7-1	FUSE	
5,D15	F2	MS90078-15-1	FUSE	
	J1	MS3127E24-61P	CONNECTOR	
	J2	-61PW		
	J3	-61PX		
	J4	MS3127E24-61PY		
	J5	1015957-184		
	J6	-184		
	J7	-171		
	J8	-183		
	J9	-166		
	J10	185		
	J11	166		
	J12	1015867-500		
	J13			
	J14			
	J15	1015867-500	CONNECTOR	
2,C14	K1	1015832-318	RELAY	
2,C10	K2			
2,C12	K3			
4,E3	K4			
4,E5	K5			
5,E8	K6			
5,D10	K7	1015832-318		
2,F15	K9	1015802-004		
2,D8	K10	1015802-004		
3,C7	K11	1015832-318		
2,F12	K12	1015802-004		
2,F10	K13	1015802-004		
2,E2	K14	1015832-318		
5,F14	K16	1015837-001		
5,E14	K17			
5,F8	K18			
TABLE I	K19	1015837-001		
4,D11	K20	1015802-004		
4,E12	K21	1015832-318		
4,C8	K22	1015832-318		
TABLE I	K23	1015802-004		
4,C3	K24	1015832-318		
2,F2	K25	1015837-001		
2,D10	K26			
2,D12	K27			
2,D14	K28			
3,E4	K29			
3,E5	K30			
3,E7	K31			
3,D11	K32			
4,E3	K33			
4,F7	K34	1015837-001		
5,D14	K35	1016024-001		
5,C10	K36	1015837-001		
3,E3	K37			
TABLE I	K38			
TABLE I	K39			
TABLE I	K40	1015837-001		
5,C5	K41	1016096-006	, TIME DELAY	10 ±1 SECOND
3,C3	K42	1016096-007		1 ±.1 SECOND
3,C9	K43	1016096-010		.06 ±.006 SECOND
3,C16	K46	1016096-003		5 ±.5 SECOND
5,C3	K47	-011		180 ±18 SECOND
4,F13	K48	-008		90 ±9 SECOND
2,G10	K49	1016096-010	, TIME DELAY	.06 ±.006 SECOND
5,C8	K50	1015837-001		
3,C4	K51	1015837-001		
3,D13	K52	1015837-001	RELAY	

PARTS TABLE

SHEET, ZONE	REF DESIG	PART NUMBER	DESCRIPTION	SCHEMATIC DIAGRAM OR VALUE, TOL, RATING
TABLE I	A1	2900044-011	DETECTOR ASSEMBLY	2900046
TABLE I	A2	2900044-011	DETECTOR ASSEMBLY	2900046
TABLE I	A4	2900053-011	DIODE AND RESISTOR BD ASS'Y	2900054
TABLE I	A5	2900050-011	DIODE BOARD ASSEMBLY	2900049
TABLE I	A3	2900750-011	DIODE BOARD ASSEMBLY	
2,C3	CR1	1N645	SEMICONDUCTOR (MIL-S-19500)	
5,E11	CR2			
5,E9	CR3			
4,E15	CR4			
4,E6	CR5			
4,E3	CR6			
2,C12	CR7			
2,C10	CR8			
2,C15	CR9			
3,C8	CR10			
2,E3	CR11			
4,D13	CR12			
4,D13	CR13			
4,C9	CR14			
4,C10	CR15			
4,C5	CR16			
4,C5	CR17			
4,D5	CR18			
4,D9	CR19			
4,E12	CR20			
4,C2	CR21			
5,E6	CR22	1N645	SEMICONDUCTOR (MIL-S-19500)	
5,F6	DS1	MS25237-327	LAMP-INCANDESCENT	
5,B15	DS2			
5,F12	DS3			
5,F9	DS4			
5,F3	DS6			
5,C12	DS7			
5,C13	DS8			
5,D15	DS9			
2,G14	DS10			
5,C4	DS11			
3,D5	DS16			
5,C6	DS17			
4,G15	DS18			
3,F14	DS20			
2,D3	DS21			
2,G3	DS22			
3,E8	DS23			
3,G4	DS24			
3,G5	DS25			
3,G2	DS26			
3,E11	DS27			
3,G10	DS28			
3,G11	DS29			
4,G7	DS30			
4,F3	DS32			
4,F6	DS33			
2,E11	DS34			
2,E12	DS35			
2,E15	DS36			
4,D6	DS37			
4,D10	DS38			
4,E13	DS39			
2,E5	DS41			
2,E6	DS42			
2,E7	DS43			
2,F8	DS45			
2,G12	DS46			
2,G11	DS47			
2,G12	DS48	MS25237-327	LAMP-INCANDESCENT	
	E1			
	E2			
	E3			
	E4			
	E5			
	E6			
	E8			

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC 206113		19-OCT-65	MTC
3		INITIAL RELEASE CLASS - PER TDRR 23416		21-OCT-65	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ___ ± ___ ± ___	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN Bender 13-AUG-65 DATE CHECKED 14 OCT 65 APPROVAL 15 OCT 65 APPROVAL	MANNED SPACECRAFT CENTER HOUSTON, TEXAS SCHEMATIC DIAGRAM, ELECTRICAL TEST CONTROL ASSY
DO NOT SCALE THIS DRAWING MATERIAL ___	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J_2 · 2900109
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — · SHEET 1 OF 5

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ALL PART NUMBERS ARE FOR REFERENCE ONLY.
3. ALL RELAYS ARE SHOWN IN THE UNENERGIZED POSITION.
4. DRAWINGS FOR REFERENCE:
   2900109 TEST CONTROL ASSEMBLY
5. LAST NUMBER USED: ▽ = 14 ; ( ) = 43
6. SIGNAL DESCRIPTION:
   - ▽1 27 VDC HI ISS LEVEL STANDBY
   - ▽2 27 VDC O/A ON
   - ▽3 G & N POWER MODES ENABLE
   - ▽4 G & N +28VDC LO
   - ▽5 27 VDC RLP HI
   - ▽6 COMMAND ALL LOOPS OPEN
   - ▽7 STAB LOOPS DISABLED
   - ▽8 MASTER RESET LOGIC
   - ▽9 ENABLE GYRO TORQUING
   - ▽10 G & N +28VDC HI
   - ▽11 27 VDC RLP LO
   - ▽12 SHIELD GROUND
   - ▽13 27 VDC ISS LEVEL OPERATE
   - ▽14 ENABLE & LATCH FOR IRIG CAGING
7. VALUES ARE IN (OHMS).

TABLE I
SEPARATED SYMBOLS

REF DESIG	SHEET AND ZONE LOCATIONS
A1A, B, C, D	3,F8; 2,G15; 2,E8; 2,G5
A2A, B	4,E10; 4,C3
A3A	4,E8
A4A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, V, W	5,G15; 5,C5; 4,F12; 4,E11; 4,F10; 4,D7; 3,D15; 3,E12; 3,B10; 3,E3; 3,B3; 3,E2; 2,F9; 2,G9; 2,F6; 2,G6; 2,C5; 2,D2; 5,D6; 2,F6
A5A, B, C, D, E, F, G, H, J, K	5,B10; 5,B9; 5,E7; 5,C6; 5,E4; 4,C12; 3,F16; 3,B15; 3,C10; 3,E9
K19A, B	5,E10; 5,C11
K23A, B	2,F13; 2,D9
K38A, B, C, D	5,F15; 4,F9; 3,F9; 2,G4
K39A, B, C	5,F13; 5,C11; 3,F8
K40A, B, C	5,F15; 5,E7; 2,F9
K57A, B, C, D	5,E13; 5,D4; 4,F11; 2,F16
TB1A, B, C, D, E, F, G, H, J, K	5,D11; 5,E9; 4,E15; 4,E6; 4,E3; 3,G6; 2,C15; 2,C13; 2,C11; 2,C3
TB2A, B, C, D, E, F, G, H	4,D12; 4,C9; 4,D4; 4,C2; 3,C8; 2,C7; 2,E3; 5,E6

UNUSED TERMINALS

REF DESIG	TERMINALS
J1	H,J,L,R,S,T,h,i,j,k,m,n,q,s,v, CC, DD, EE, FF, GG, HH, JJ
J2	B, C, D, L, P, W, k, q, t, u, v, y, z, AA, JJ, KK, LL, MM, NN
J3	E, L, N, T. V, X, Y, b, s, t, u, v, z, AA, BB, CC, EE, JJ, KK, LL, MM, NN, PP
J4	A, B, C, D, E, F, G, H, J, K, L, M, N, P, R, S, T, U, V, W, X, Y, a, b, c, d, e, f, g x, y, z, AA, BB, CC, DD, EE
J5	H, R, T
J6	A, B, C, H, K, N, R, T, W, X, Y, Z
J8	T, V, Y
J9	K, M, P
J10	N
J11	L, M, N
J12	S, T, U, z, BB, FF, HH
J13	HH
J14	B, j, k, x, y, z, AA, CC, DD
K1	4, 6, 7
K2	4, 6, 7
K3	4, 6, 7
K4	4, 6, 7
K5	4, 6, 7
K6	4, 6, 7
K7	4, 6, 7
K10	1, 5, 6, 8
K14	4, 6, 7
K16	15 THRU 20
K17	3, 4. 5, 12 THRU 17
K23	1, 5, 6, 8
K25	15, 16, 17
K26	12, 13, 14
K27	12, 13, 14
K28	12, 13, 14
K32	15, 16, 17
K33	9 THRU 20
K34	18, 19, 20
K35	12 THRU 20
K39	9 THRU 14
K40	9 THRU 17
K50	9 THRU 20
K51	12, 13, 14
K52	15, 16, 17
K53	12, 13, 14, 18, 19, 20
K55	12 THRU 20
K56	12, 13, 14, 18, 19, 20
K60	4, 6, 7
K61	2, 4, 5
K63	2, 4, 5
K64	2, 4, 5
K71	2, 4, 5
K75	4, 6, 7
K76	2, 4, 5
K81	18, 19, 20
K82	6 THRU 14
K83	18, 19, 20
K84	6 THRU 20
P12	S, T, U, z, BB, FF, HH
P13	HH
P14	B, j, K, x, y, z, AA, CC, DD
S1	SW3:C,NC,NO; SW4:C,NC,NO
S2	SW2:C,NC,NO; SW3:C,NC,NO; SW4:C,NC,NO
S3	SW2:C,NC,NO; SW3:C,NC,NO
S4	SW2:C,NC,NO; SW3:C,NC,NO
S6	SW2:C,NC,NO; SW3:C,NC,NO; SW4:C,NC,NO
S7	SW3:C,NC,NO
S8	SW4:C,NC,NO
S10	SW3:C,NC,NO; SW4:C,NC,NO
S11	SW2:C,NC,NO; SW3:C,NC,NO
S16	SW4:C,NC,NO
S17	SW3:C,NC,NO; SW4:C,NC,NO
S18	SW2:C,NC,NO; SW3:C,NC,NO
S21	SW2:C,NC,NO; SW3:C,NC,NO
S22	SW2:C,NC,NO; SW3:C,NC,NO
S23	SW3:C,NC,NO
S24	SW2:C,NC,NO; SW3:C,NC,NO; SW4:C,NC,NO
S25	
S26	
S27	
S28	
S29	SW2:C,NC,NO; SW3:C,NC,NO; SW4:C,NC,NO
S33	SW3:C,NC,NO; SW4:C,NC,NO
S34	SW2:C,NC,NO; SW3:C,NC,NO
S35	SW2:C,NC,NO; SW3:C,NC,NO
S36	SW2:C,NC,NO; SW3:C,NC,NO
S41	SW3:C,NC,NO; SW4:C,NC,NO
S42	SW3:C,NC,NO; SW4:C,NC,NO
S43	SW2:C,NC,NO; SW3:C,NC,NO; SW4:C,NC,NO
S45	
S46	
S47	
S48	SW2:C,NC,NO; SW3:C,NC,NO; SW4:C,NC,NO
J7	D,E,F,H,J,K,L,M,N,P,R,S,T,U,V,W,X,Y,Z

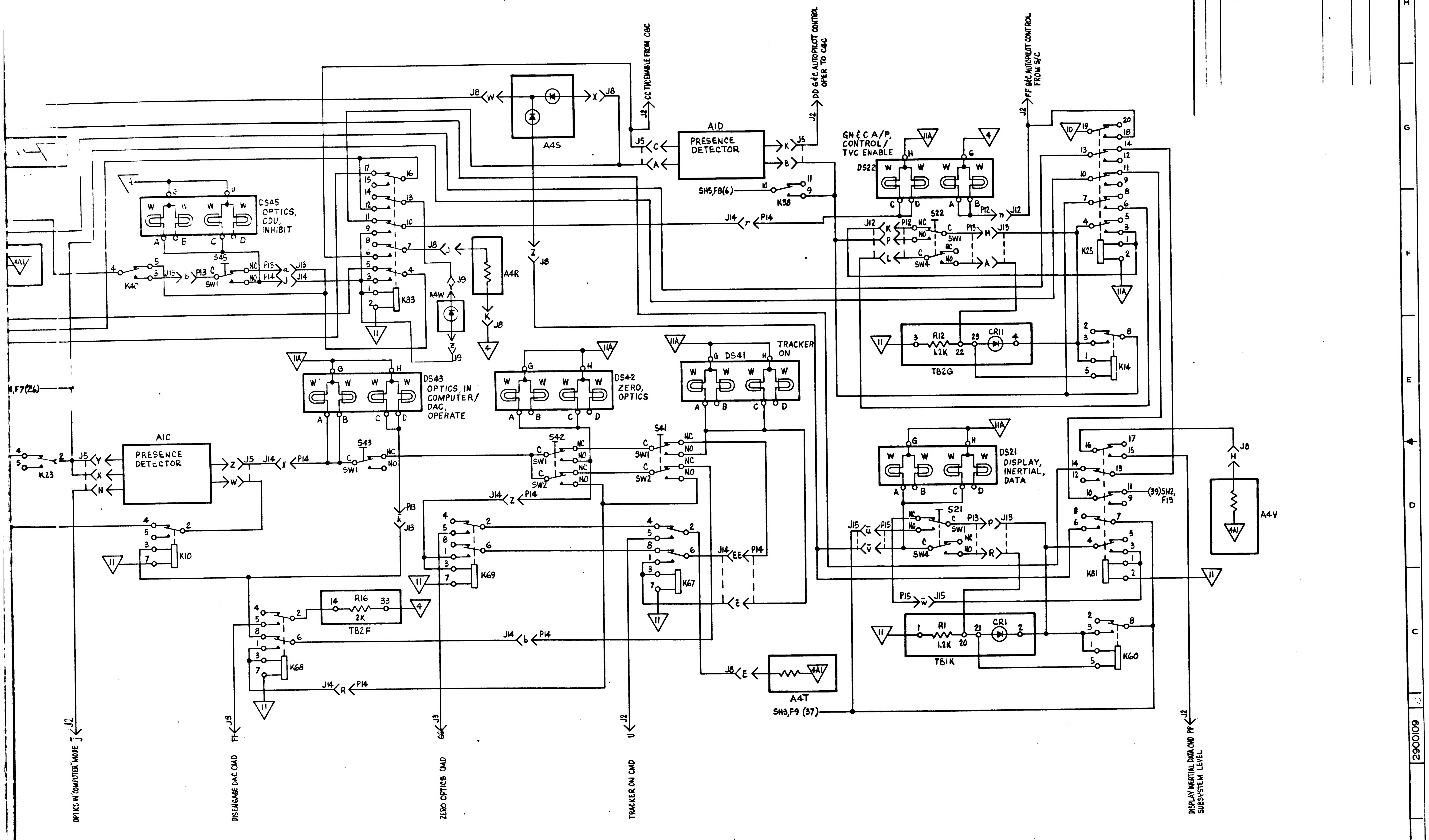
PARTS TABLE

SHEET, ZONE	REF DESIG	PART NUMBER	DESCRIPTION	SCHEMATIC DIAGRAM OR VALUE, TOL, RATING
4,F3	S32	1015869-735	SWITCH	
4,F6	S33	-710		
2,D11	S34	-729		
2,D13	S35	-728		
2,D15	S36	-727		
4,C6	S37	-706		
4,C10	S38	-705		
4,D14	S39	-704		
2,E5	S41	-378		
2,E6	S42	-379		
2,D7	S43	-744		
2,F8	S45	-746		
2,F13	S46	-381		
2,F11	S47	-382		
2,F12	S48	1015869-747	SWITCH	
TABLE I	TB1	2900105-011	DIODE AND RESISTOR BOARD ASSY	
TABLE I	TB2	2900107-011	DIODE AND RESISTOR BOARD ASSY	
	XDS1	SEE S1	INDICATOR-SWITCH ASSY	
	XDS2	SEE S2		
	XDS3	SEE S3		
	XDS4	SEE S4		
	XDS5	1015869-159		
	XDS6	SEE S6		
	XDS7	SEE S7		
	XDS8	SEE S8		
	XDS9	1015869-103		
	XDS10	SEE S10		
	XDS11	SEE S11		
	XDS12	1015869-159		
	XDS13			
	XDS14			
	XDS15	1015869-159		
	XDS16	SEE S16		
	XDS17	SEE S17		
	XDS18	SEE S18		
	XDS19	1015869-159		
	XDS20	SEE S20		
	XDS21	SEE S21		
	XDS22	SEE S22		
	XDS23	SEE S23		
	XDS24	SEE S24		
	XDS25	SEE S25		
	XDS26	SEE S26		
	XDS27	SEE S27		
	XDS28	SEE S28		
	XDS29	SEE S29		
	XDS30	1015869-192		
	XDS31	1015869-159		
	XDS32	SEE S32		
	XDS33	SEE S33		
	XDS34	SEE S34		
	XDS35	SEE S35		
	XDS36	SEE S36		
	XDS37	SEE S37		
	XDS38	SEE S38		
	XDS39	SEE S39		
	XDS40	1015869-159		
	XDS41	SEE S41		
	XDS42	SEE S42		
	XDS43	SEE S43		
	XDS44	1015869-159		
	XDS45	SEE S45		
	XDS46	SEE S46		
	XDS47	SEE S47		
	XDS48	SEE S48	INDICATOR-SWITCH ASSY	
	XF1	1015873-001	FUSEHOLDER	
	XF2	1015873-008	FUSEHOLDER	

SHEET, ZONE	REF DESIG	PART NUMBER	
4,D8	K53	1015837-00	RELAY
5,E5	K54		
5,D7	K55		
4,F14	K56		
TABLE I	K57	1015837-00	
2,C2	K60	1015832-3 9	
3,D3	K61	1015832-00	
3,F6	K62		
3,F5	K63		
3,E5	K64		
3,D5	K65		
2,C5	K67		
2,C8	K68		
2,D8	K69		
4,B15	K71		
4,B16	K72		
4,F11	K73		
4,F14	K74	1015832-004	
4,E14	K75	1015832-318	
3,F13	K76	1015832-004	
4,E8	K78	1015837-001	
4,C8	K79		
2,C2	K81		
4,E7	K82		
2,F7	K83		
4,F10	K84	1015837-001	RELAY
	P12	1015868-500	CONNECTO
	P13		
	P14		
	P15	1015868-500	CONNECTO
5,G14	R1	1901321	RESISTOR,
2,C3	R1(TB1)	RC32GF122J	
5,E11	R2		
5,E9	R3		
4,E16	R4		
4,E6	R5		
4,E3	R6		
2,C13	R7		
2,C11	R8		
2,C15	R9	RC32GF122J	
3,G6	R10	RC20GF202J	
3,C8	R11	RC32GF122J	
2,E3	R12		
4,D12	R13		
4,C9	R14		
4,C4	R15	RC32GF122J	
2,C7	R16	RC20GF202J	RESISTOR,
5,E6	S1	1015869-544	SWITCH
5,B15	S2	-546	
5,E12	S3	-730	
5,F9	S4	-711	
5,F4	S6	-304	
5,C12	S7	-722	
5,B13	S8	1015869-721	
5,C13	S9	1015994-001	
2,F14	S10	1015869-370	
5,C4	S11	1897337-501	
3,C5	S16	1015869-826	
5,C6	S17	-526	
4,F15	S18	-719	
3,F14	S20	-731	
2,D3	S21	-732	
2,F3	S22	-733	
3,D8	S23	-734	
3,F4	S24	-372	
3,F5	S25	-373	
3,F2	S26	-736	
3,E11	S27	-375	
3,F10	S28	-3 9	
3,F11	S29	1015869-376	SWITCH

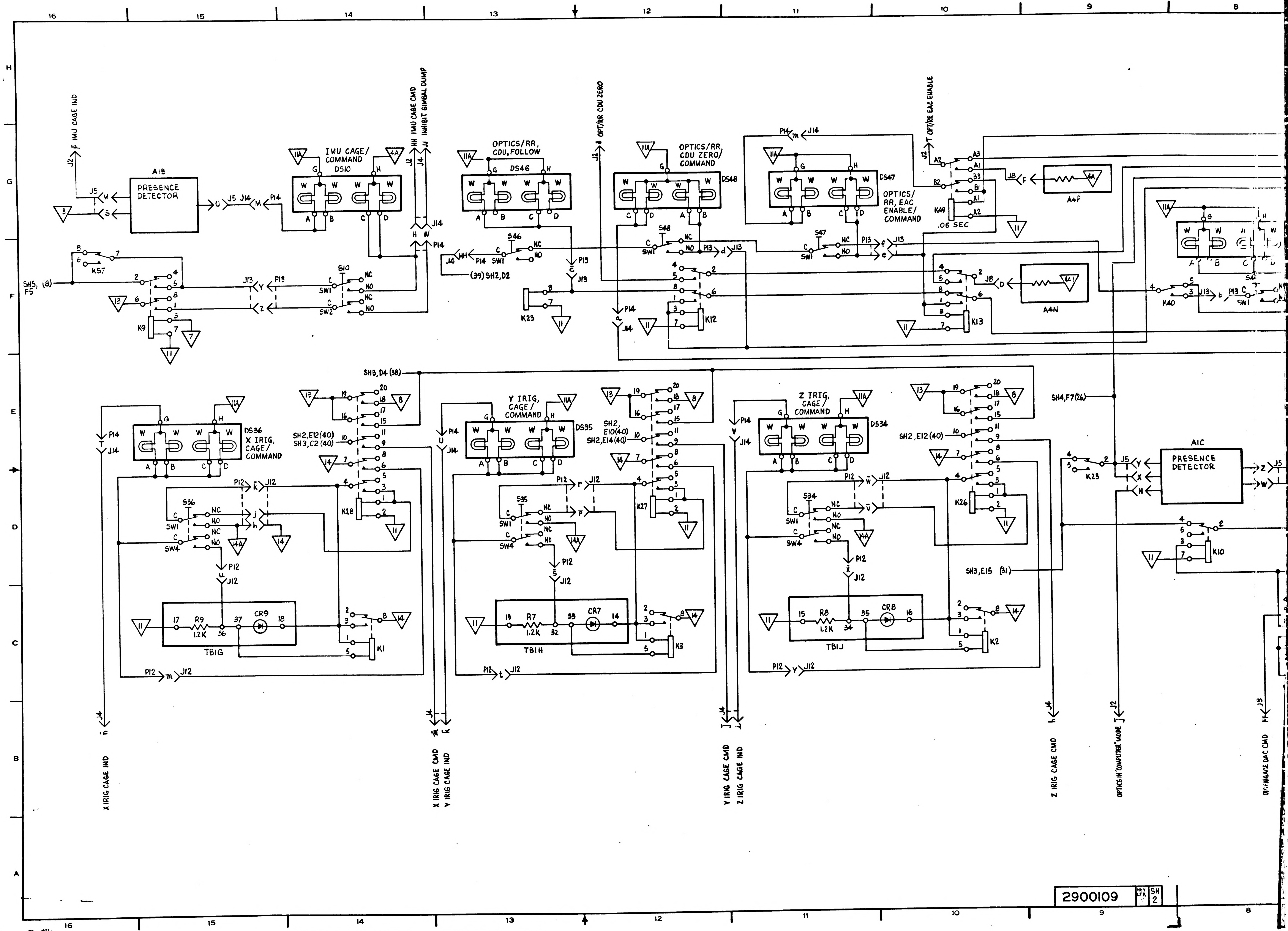
2900109	REV LTR	SH
		1

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
		REVISIONS 23416			
A		REVISED PER MXC 206113		3 OCT 65	MTC
3		INITIAL RELEASE CLASS A PER TDRR 23416		OCT 65	



A4S
J8 W
X J8
J2 CC TVC ENABLE FROM C&C
A1D
PRESENCE DETECTOR
J5 C
A
K J5
B
J2 DD G&C AUTOPILOT CONTROL OPER TO C&C
J2 FF G&C AUTOPILOT CONTROL FROM S/C
GN & C A/P, CONTROL/ TVC ENABLE
DS22
11A
4
SH5,F8(6)
K38
J14 r P14
P12 n J12
S22
SW1
SW4
J12 K P L
P13 H J13
A
K25
10
11A
DS45 OPTICS, CDU, INHIBIT
S45
K40
J13 b P13
P15 a J13
F14 J J14
K83
J8 J
A4R
J9
A4W
K J8
Z J8
TB2G
R12 1.2K
CR11
K14
11A
DS43 OPTICS IN COMPUTER/ DAC, OPERATE
S43
DS42 ZERO, OPTICS
S42
DS41 TRACKER ON
S41
A1C PRESENCE DETECTOR
J5 Y X N
Z J5 J14 X P14
W
K23
F7(26)
K10
P13 K J13
J14 Z P14
K69
K67
J14 EE P14
TB2F
R16 2K
K68
J14 b P14
J14 R P14
J8 E
A4T
SH3,F9 (37)
DS21 DISPLAY, INERTIAL, DATA
S21
J15
P15 W J15
P13 P J13
R
K81
(39)SH2, F19
J8 H
A4V
4A1
TB1K
R1 1.2K
CR1
K60
J2 J OPTICS IN 'COMPUTER' MODE
J3 FF DISENGAGE DAC CMD
J3 GG ZERO OPTICS CMD
J2 U TRACKER ON CMD
J2 PP DISPLAY INERTIAL DATA CMD SUBSYSTEM LEVEL

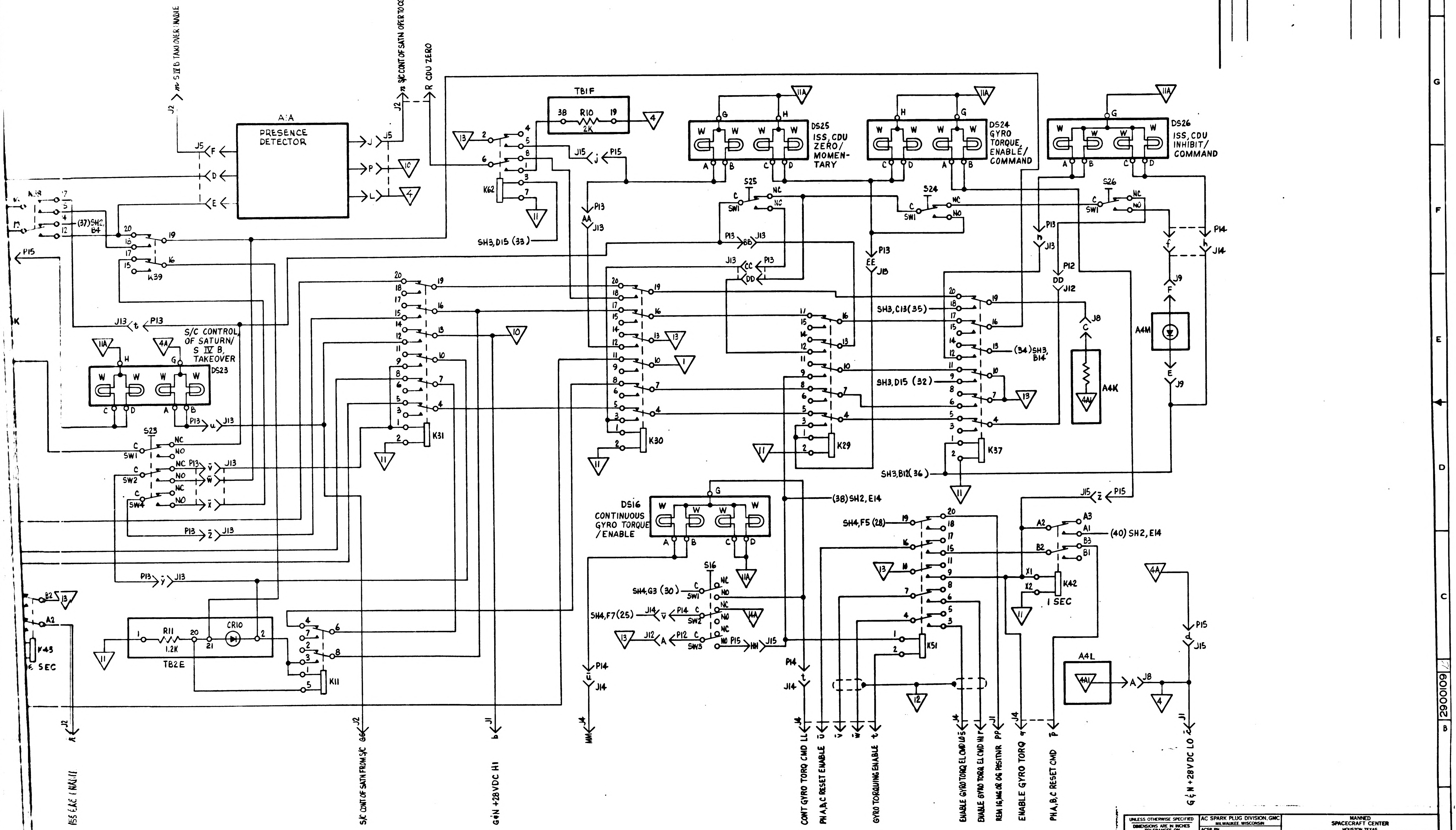
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN Bender DATE 13-AUG-65	SCHEMATIC DIAGRAM, ELECTRICAL TEST CONTROL ASSY
	CHECKED 15-OCT-65	
	APPROVAL 15 OCT 65	
DO NOT SCALE THIS DRAWING	APPROVAL J M Watson	
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 SIZE 2900109
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — SHEET 2 OF 5


IMU CAGE IND
A1B
PRESENCE DETECTOR
IMU CAGE/ COMMAND
DS10
IMU CAGE CMD
INHIBIT GIMBAL DUMP
OPTICS/RR, CDU, FOLLOW
DS46
OPT/RR CDU ZERO
OPTICS/RR, CDU ZERO/ COMMAND
DS48
DS47
OPTICS/ RR, EAC ENABLE/ COMMAND
OPT/RR EAC ENABLE
K49
.06 SEC
A4P
A4N
K57
K9
SW1
SW2
S10
S46
S48
S47
K23
K12
K13
K40
SH5, (8) F5
(39) SH2, D2
SH3, D4 (38)
SH4, F7 (26)
X IRIG, CAGE/ COMMAND
DS36
Y IRIG, CAGE/ COMMAND
DS35
Z IRIG, CAGE/ COMMAND
DS34
SH2, E12 (40)
SH3, C2 (40)
SH2, E10 (40)
SH2, E14 (40)
SH3, E15 (31)
K28
K27
K26
S36
S35
S34
SW4
TB1G
TB1H
TB1J
R9 1.2K
R7 1.2K
R8 1.2K
CR9
CR7
CR8
K1
K3
K2
A1C
PRESENCE DETECTOR
K10
X IRIG CAGE IND
X IRIG CAGE CMD
Y IRIG CAGE IND
Y IRIG CAGE CMD
Z IRIG CAGE IND
Z IRIG CAGE CMD
OPTICS IN "COMPUTER" MODE
DISENGAGE DAC CMD
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

2900109 REV LTR SH 2

1/2900109

REVISIONS					23416
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC 206113		19-OCT 65	HTO
B		INITIAL ~~RELEASE-CLASSN~~; PER TDRR 23416		20 OCT 65	



J2 m S IV B TAKEOVER INDIC
J2 n S/C CONT OF SATN OPER TO GSC
R CDU ZERO
A1A PRESENCE DETECTOR
J5
TB1F
R10 2K
38
19
K62
SH3, D15 (33)
J15 j P15
P13 AA J13
P13 BB J13
J13 CC P13
DD
DS25 ISS, CDU ZERO/ MOMENTARY
S25
DS24 GYRO TORQUE, ENABLE/ COMMAND
S24
DS26 ISS, CDU INHIBIT/ COMMAND
S26
P13 EE J13
P13 h J13
P12 DD J12
P14 h J14
J9
A4M
J8
A4K
4A1
K38
(37) SH2, B4
K39
P15
J13 t P13
S/C CONTROL OF SATURN/ S IV B, TAKEOVER
DS23
S23
SW1
SW2
SW4
P13 u J13
P13 v J13
P13 w J13
P13 z J13
P13 y J13
K31
K30
K29
K37
SH3, C13 (35)
(34) SH3, B14
SH3, D15 (32)
SH3, B12 (36)
(38) SH2, E14
DS16 CONTINUOUS GYRO TORQUE /ENABLE
SH4, F5 (28)
J15 z P15
(40) SH2, E14
K42 1 SEC
K51
S16
SH4, G3 (30)
SH4, F7 (25) J14 v P14
J12 A P12
P15 HH J15
P14 t J14
A4L
J8
P15 J15
R11 1.2K
CR10
TB2E
K11
K43 5 SEC
P14 J14
ISS E,K,C INHIBIT
S/C CONT OF SATN FROM S/C GG
G&N +28VDC HI
CONT GYRO TORQ CMD LL
PH A,B,C RESET ENABLE
GYRO TORQUING ENABLE
ENABLE GYRO TORQ EL CMD LO
ENABLE GYRO TORQ EL CMD HI
REM IG, MG OR OG POSITNR PP
ENABLE GYRO TORQ
PH A,B,C RESET CMD
G&N +28VDC LO

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DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
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MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 13-AUG-65
CHECKED Hogue 15 OCT 65
APPROVAL 15 OCT 65
APPROVAL 10-20-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

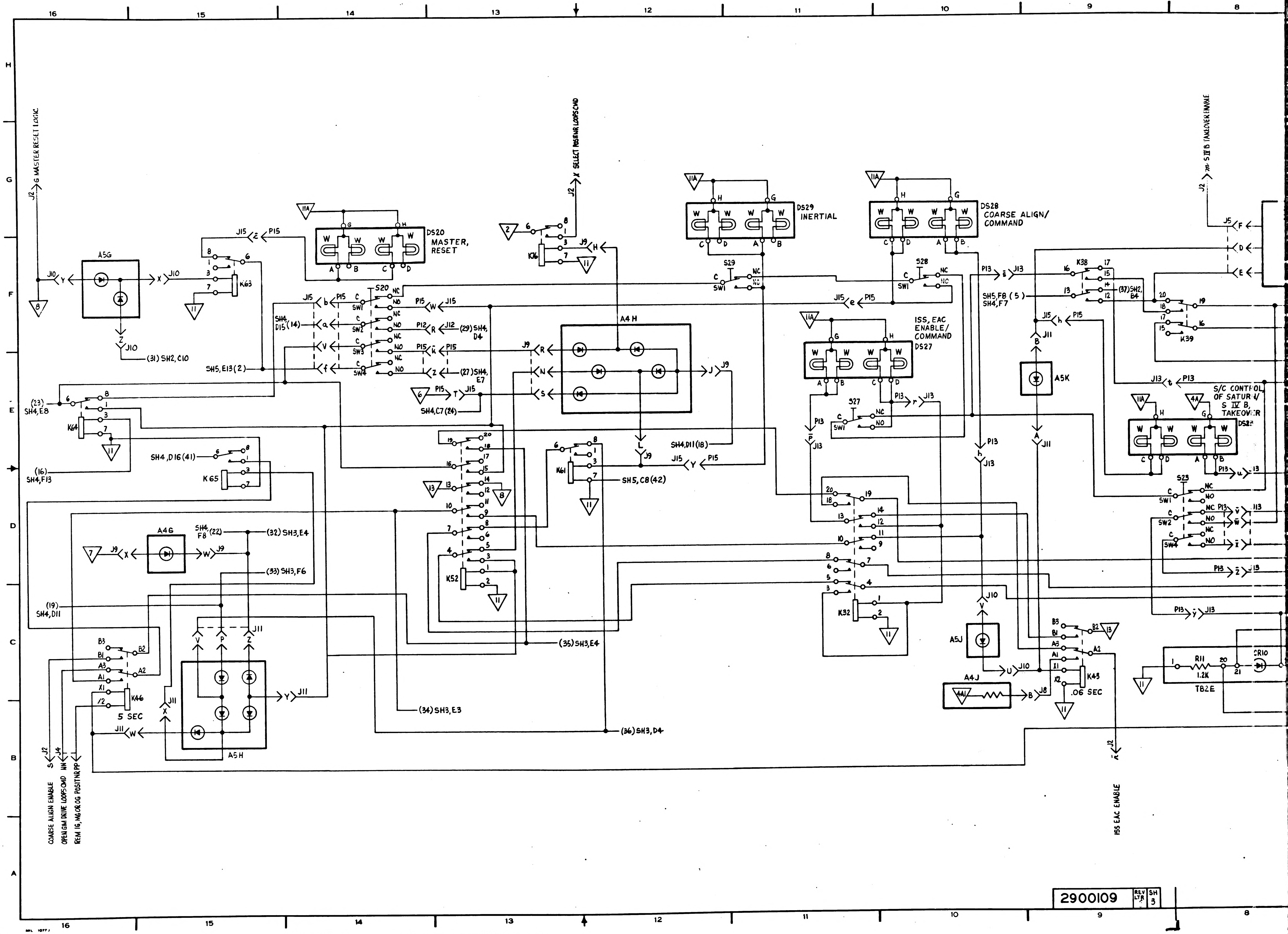
SCHEMATIC DIAGRAM, ELECTRICAL
TEST CONTROL ASSY

CODE IDENT NO. 99974
SIZE J2
2900109
SCALE —
SHEET 3 OF 5

2900109

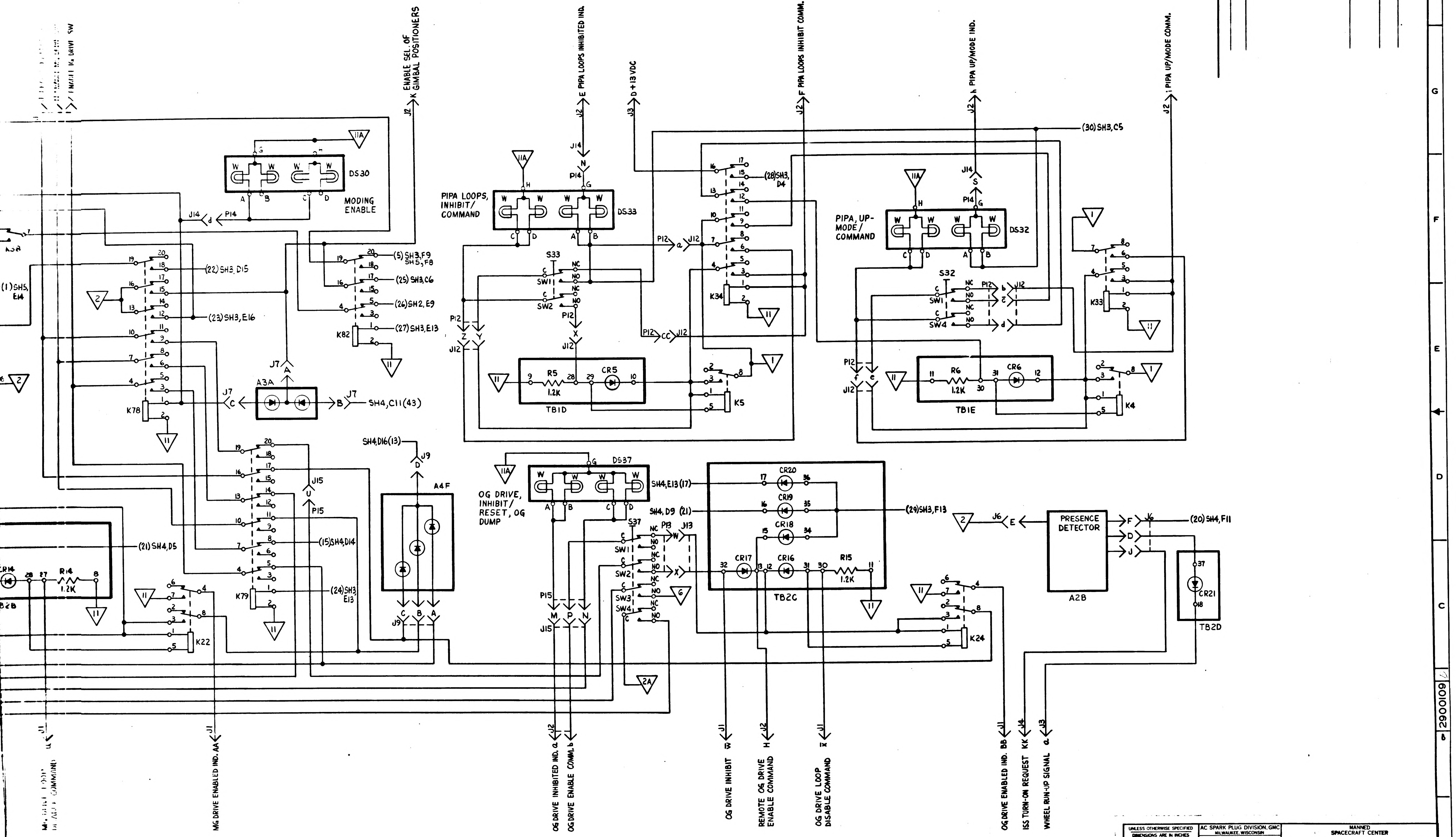
00109 REV LTR SH 3

2-2900109


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
J2 G MASTER RESET LOGIC
J2 X SELECT POSITNR LOOPSCMD
J2 m S IVB TAKEOVER ENABLE
A5G
J10 Y
X J10
Z J10
(31) SH2, C10
K63
J15 c P15
DS20 MASTER, RESET
11A
S20
SW1
SW2
SW3
SW4
NC
NO
J15 b
SH4, D15 (14) a
J15 V
SH5, E13 (2) f
P15 W J15
P12 R J12 (29) SH4, D4
P15 k P15
Z (27) SH4, E7
P15 T J15
SH4, C7 (24)
K76
J9 H
A4H
J9 R
N
S
J9
L J9
SH4, D11 (18)
K61
J15 Y P15
SH5, C8 (42)
(23) SH4, E8
K64
SH4, D16 (41)
K 65
(16) SH4, F13
K52
A4G
J9 X
W J9
SH4, F8 (22)
(32) SH3, E4
(33) SH3, F6
(19) SH4, D11
J11
V
P
Z
A5H
Y J11
J11 X
J11 W
K46
5 SEC
B3
B1
A3
A1
X1
X2
B2
A2
(35) SH3, E4
(34) SH3, E3
(36) SH3, D4
J2 S
J4 MM
PP
COARSE ALIGN ENABLE
OPEN GIM DRIVE LOOPS CMD
REM IG, MG OR OG POSITNR PP
DS29 INERTIAL
S29
J15 e P15
DS28 COARSE ALIGN/ COMMAND
S28
DS27 ISS, EAC ENABLE/ COMMAND
S27
P13 r J13
P13 J13
K32
P13 s J13
SH5, F8 (5) SH4, F7
K38
K39
(37) SH2, B4
J15 h P15
B J11
A5K
A J11
P13 J13
J5
F
D
E
J13 t P13
S/C CONTROL OF SATURN/ S IVB TAKEOVER
4A
DS2
P13 u J13
S23
P13 J13
P13 z J13
P13 y J13
J10
V
A5J
U J10
A4J
44
B J8
K45
.06 SEC
TB2E
R11 1.2K
CR10
J2 ISS EAC ENABLE
2900109
REV LTR C
SH 3

1/2900109

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC 206113		9-OCT-65	HTC
3		INITIAL RELEASE CLASS A PER TDRR 23416		25 OCT 65	



J2 K ENABLE SEL OF GIMBAL POSITIONERS
J2 E PIPA LOOPS INHIBITED IND.
J3 D +13 VDC
J2 F PIPA LOOPS INHIBIT COMM.
J2 h PIPA UP/MODE IND.
J2 j PIPA UP/MODE COMM.
DS30
MODING ENABLE
PIPA LOOPS, INHIBIT/ COMMAND
DS33
PIPA, UP-MODE/ COMMAND
DS32
(30) SH3, C5
(28) SH3, D4
(5) SH3, F9 SH5, F8
(22) SH3, D15
(25) SH3, C6
(24) SH2, E9
(23) SH3, E16
(27) SH3, E13
(1) SH5, E14
K78
K82
K34
K33
K5
K4
S33
S32
SW1
SW2
SW4
R5 1.2K
CR5
TB1D
R6 1.2K
CR6
TB1E
A3A
J7
SH4, C11 (43)
SH4, D16 (13)
J9
A4F
J15
P15
(15) SH4, D14
(24) SH3 E13
K79
(21) SH4, D5
CR14
R14 1.2K
B2B
K22
OG DRIVE, INHIBIT/ RESET, OG DUMP
DS37
S37
SW3
P13
J13
SH4, E13 (17)
SH4, D9 (21)
CR20
CR19
CR18
CR17
CR16
R15 1.2K
TB2C
(29) SH3, F13
K24
PRESENCE DETECTOR
A2B
J6
(20) SH4, F11
CR21
TB2D
11A
2A
J1 AA MG DRIVE ENABLED IND.
J2 a OG DRIVE INHIBITED IND.
J2 b OG DRIVE ENABLE COMM.
J1 W OG DRIVE INHIBIT
J2 H REMOTE OG DRIVE ENABLE COMMAND
J1 X OG DRIVE LOOP DISABLE COMMAND
J1 BB OG DRIVE ENABLED IND.
J4 KK ISS TURN-ON REQUEST
J3 a WHEEL RUN-UP SIGNAL
2900109

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ ___	+ ___	+ ___
−	−	−

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MATERIAL ——

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN Bender DATE 13-AUG-65
CHECKED Hogue 15 OCT 65
APPROVAL 15 OCT 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

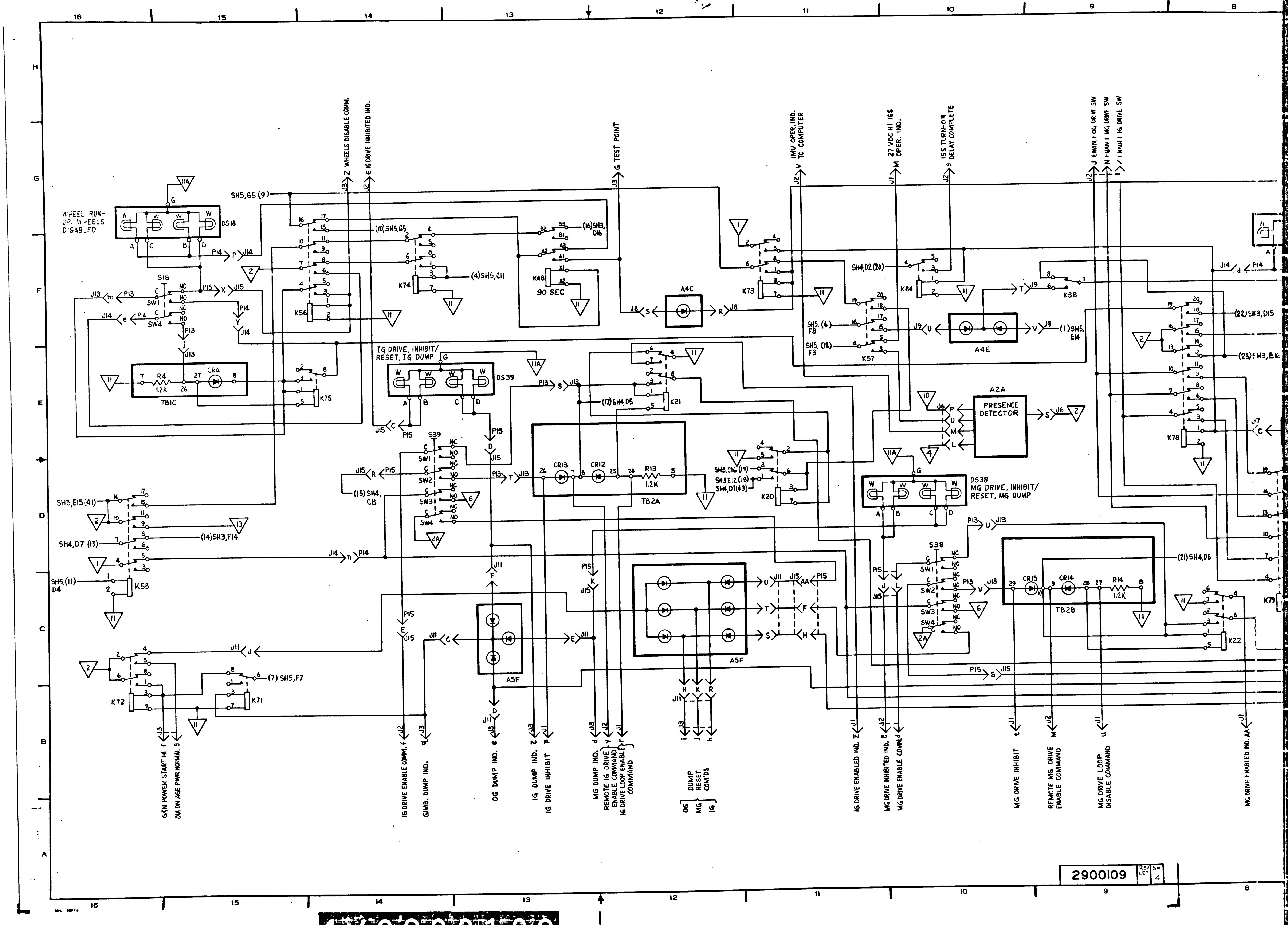
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC DIAGRAM, ELECTRICAL
TEST CONTROL ASSEMBLY

CODE IDENT NO. 99974
SIZE J2
2900109
SCALE ——
SHEET 4 OF 5

2900109

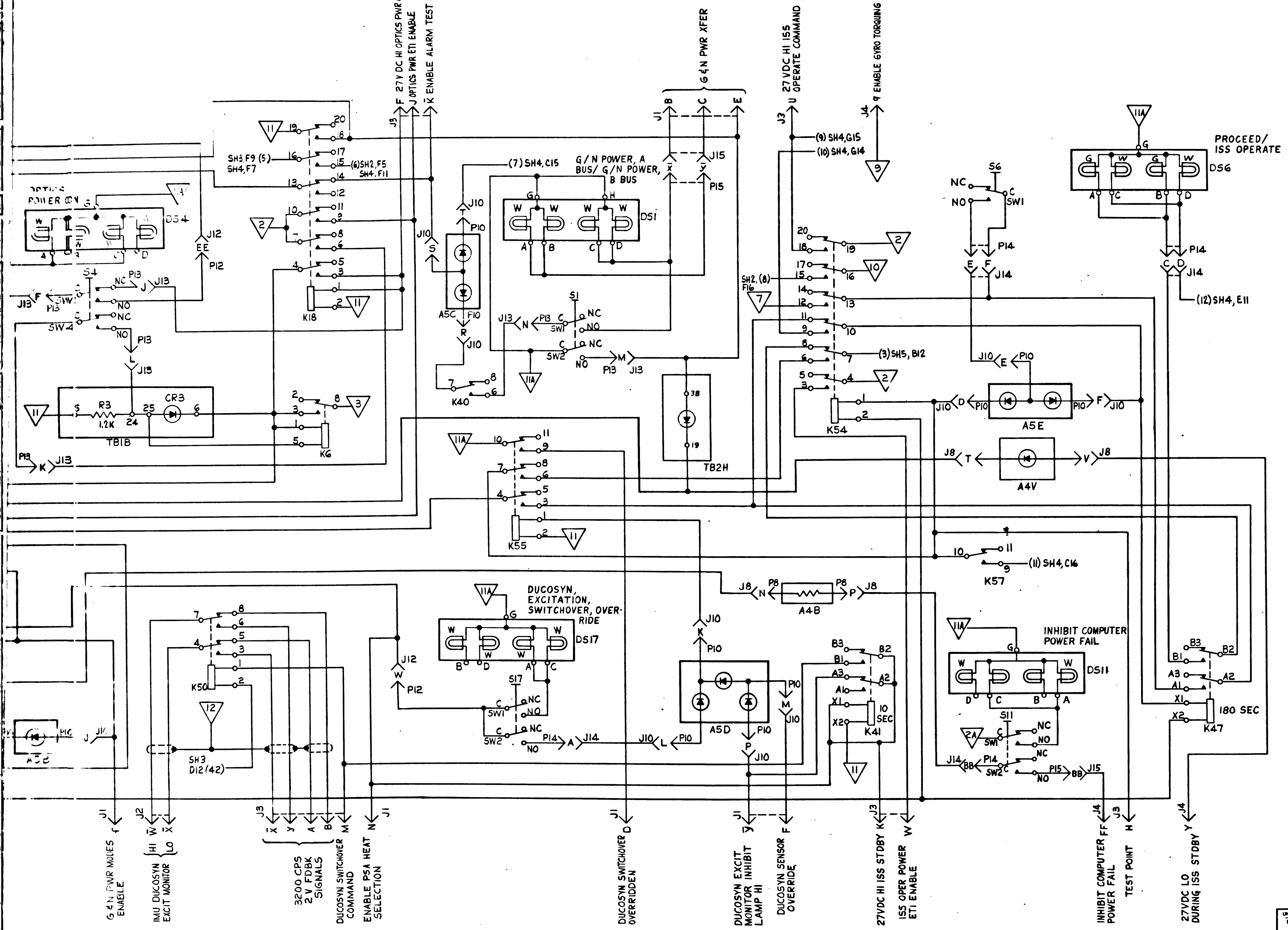
2K2900109


WHEEL RUN-UP, WHEELS DISABLED
DS18
S18
SW1
SW4
TBIC
R4 1.2K
CR4
K75
K56
K74
K48
90 SEC
(10) SH5,G5
(16) SH3, D16
(4) SH5, C11
SH5,G5 (9)
J3 Z WHEELS DISABLE COMM.
J2 e IG DRIVE INHIBITED IND.
J3 G TEST POINT
J2 V IMU OPER. IND. TO COMPUTER
J1 M 27 VDC HI ISS OPER. IND.
J2 g ISS TURN-ON DELAY COMPLETE
J2 J ENABLE OG DRIVE SW
N ENABLE MG DRIVE SW
Z ENABLE IG DRIVE SW
A4C
K73
K84
SH4,D2 (20)
K38
A4E
(1) SH5, E14
K57
SH5, (6) F8
SH5, (12) F3
(22) SH3, D15
(23) SH3, E16
IG DRIVE, INHIBIT/ RESET, IG DUMP
DS39
S39
(15) SH4, C8
(17) SH4, D5
K21
TB2A
CR13
CR12
R13 1.2K
SH3,C16 (19)
SH3,E12 (18)
SH4,D7 (43)
K20
A2A
PRESENCE DETECTOR
K78
DS38
MG DRIVE, INHIBIT/ RESET, MG DUMP
SH3,E15 (41)
SH4, D7 (13)
(14) SH3, F14
SH5, (11) D4
K53
S38
TB2B
CR15
CR14
R14 1.2K
(21) SH4, D5
K79
K22
A5F
K72
K71
(7) SH5, F7
G&N POWER START HI f
OIA ON AGE PWR NORMAL g
IG DRIVE ENABLE COMM. f
GIMB. DUMP IND. q
OG DUMP IND. e
IG DUMP IND. Z
IG DRIVE INHIBIT P
MG DUMP IND. d
REMOTE IG DRIVE ENABLE COMMAND Y
IG DRIVE LOOP ENABLE COMMAND r
DUMP RESET COM'DS OG MG IG
IG DRIVE ENABLED IND. Z
MG DRIVE INHIBITED IND. Z
MG DRIVE ENABLE COMM. d
MG DRIVE INHIBIT t
REMOTE MG DRIVE ENABLE COMMAND M
MG DRIVE LOOP DISABLE COMMAND u
MG DRIVE ENABLED IND. AA
16 15 14 13 12 11 10 9 8
H G F E D C B A

2900109 REV LTR SH 4

4/2900109

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC 206113		5-OCT-66	HTO
3		INITIAL RELEASE CLASS A PER TDRR 23416		23 OCT 65	



27V DC HI OPTICS PWR ON
J OPTICS PWR ETI ENABLE
K ENABLE ALARM TEST
G&N PWR XFER
27VDC HI ISS OPERATE COMMAND
9 ENABLE GYRO TORQUING
OPTICS POWER ON
DS4
K18
S4
SW1
SW4
TB1B
R3 1.2K
CR3
K6
A5C
G/N POWER, A BUS/ G/N POWER, B BUS
DS1
S1
K40
TB2H
SH4, G15
SH4, G14
K54
A5E
A4V
S6
PROCEED/ ISS OPERATE
DS6
(12) SH4, E11
(3) SH5, B12
K55
K57
(11) SH4, C16
A4B
DUCOSYN, EXCITATION, SWITCHOVER, OVERRIDE
DS17
S17
K50
SH3 D12(42)
A5D
K41
10 SEC
INHIBIT COMPUTER POWER FAIL
DS11
S11
K47
180 SEC
G&N PWR MODES ENABLE
IMU DUCOSYN EXCIT MONITOR
3200 CPS 2 V FDBK SIGNALS
DUCOSYN SWITCHOVER COMMAND
ENABLE PSA HEAT SELECTION
DUCOSYN SWITCHOVER OVERRIDDEN
DUCOSYN EXCIT MONITOR INHIBIT LAMP HI
DUCOSYN SENSOR OVERRIDE
27VDC HI ISS STDBY
ISS OPER POWER ETI ENABLE
INHIBIT COMPUTER POWER FAIL
TEST POINT
27VDC LO DURING ISS STDBY

UNLESS OTHERWISE SPECIFIED	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + — / DECIMALS + — / ANGLES + —	ACSP PN DRAWN Bender DATE 13-AUG-65 CHECKED 15 OCT 65 APPROVAL 15 OCT 65 APPROVAL	SCHEMATIC DIAGRAM, ELECTRICAL TEST CONTROL ASSEMBLY
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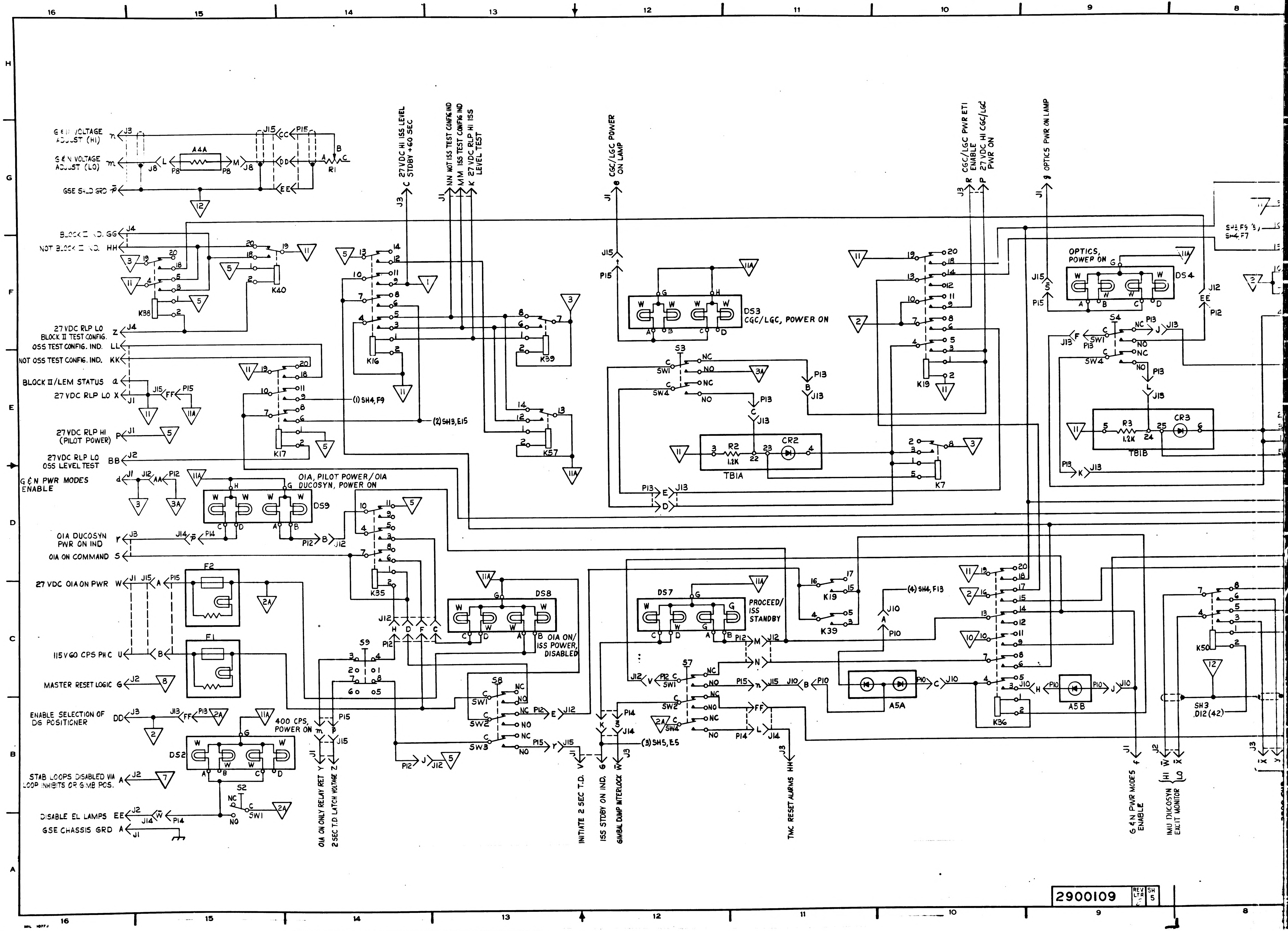
MATERIAL	NASA APPROVAL MIT APPROVAL	CODE IDENT NO. 99974 / SIZE J2 / 2900109
CONTRACT NAS 9-497		SCALE NONE / SHEET 5 OF 5

2900109 REV SH 5

2/2900109


G&N VOLTAGE ADJUST (HI)
G&N VOLTAGE ADJUST (LO)
GSE SHLD GRD
A4A
R1
BLOCK II IND. GG
NOT BLOCK II IND. HH
K38
K40
27 VDC RLP LO BLOCK II TEST CONFIG.
OSS TEST CONFIG. IND. LL
NOT OSS TEST CONFIG. IND. KK
BLOCK II/LEM STATUS
27 VDC RLP LO X
K17
(1) SH4, F9
(2) SH3, E15
27 VDC RLP HI (PILOT POWER)
27 VDC RLP LO OSS LEVEL TEST BB
G&N PWR MODES ENABLE
01A, PILOT POWER/01A DUCOSYN, POWER ON
DS9
01A DUCOSYN PWR ON IND
01A ON COMMAND S
27 VDC 01A ON PWR W
F2
F1
115V 60 CPS PH C U
MASTER RESET LOGIC G
ENABLE SELECTION OF DG POSITIONER DD
400 CPS, POWER ON
DS2
STAB LOOPS DISABLED VIA LOOP INHIBITS OR GIMB POS.
S2
DISABLE EL LAMPS EE
GSE CHASSIS GRD A
K35
S9
01A ON ONLY RELAY RET
2 SEC T.D LATCH VOLTAGE
27 VDC HI ISS LEVEL STDBY +60 SEC
NN NOT ISS TEST CONFIG IND
MM ISS TEST CONFIG IND
K 27 VDC RLP HI ISS LEVEL TEST
K16
K39
K57
DS8
01A ON/ ISS POWER, DISABLED
S8
SW1
SW2
SW3
INITIATE 2 SEC T.D.
CGC/LGC POWER ON LAMP
DS3
CGC/LGC, POWER ON
S3
SW4
TB1A
R2 1.2K
CR2
DS7
PROCEED/ ISS STANDBY
S7
ISS STDBY ON IND.
GIMBAL DUMP INTERLOCK
(3) SH5, E5
TMC RESET ALARMS HH
K19
(4) SH4, F13
A5A
K7
CGC/LGC PWR RET ENABLE
27 VDC HI CGC/LGC PWR ON
OPTICS PWR ON LAMP
OPTICS, POWER ON
DS4
S4
TB1B
R3 1.2K
CR3
K36
A5B
K50
SH3 D12 (42)
G&N PWR MODES ENABLE
IMU DUCOSYN EXCIT MONITOR (HI) (LO)
SH3 F9
SH4 F7
2900109
REV LTR
SH 5
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

1/2900109

2900112

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES-267).
3. SOLDER PER MIL-S-6872 (ES 2505-1) USING ITEMS (34) AND (35) OR (36).
4. BOND ITEMS (12|16|17) AND (18) TO ITEM (1) PER ND 1002203.
5. SERIALIZE PER ND1002023.
6. MARK SCHEM AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .09 HIGH, COLOR BLACK.
7. COMPONENTS AND WIRING SHALL NOT EXTEND INTO AREAS INDICATED.
8. CUT ITEM (23) TO LENGTH AS REQUIRED.
9. STRIP LEADS .25 AND TIN.
10. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING.
11. SPOT TIE WIRES AS REQUIRED USING ITEM (33).
12. SEMICONDUCTOR POLARIZING MARKING IS FOR REFERENCE ONLY.

REVISIONS 23420					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REPLACES REV (-) WITH CHANGES RER MXC 201539		24 MAY 65	
B		REVISED PER MXC 201872 ITEM 13 QTY WAS 2		9 JUN 65	
C		REVISED PER MXC 202264		16 JUN 65	
D		REVISED PER MXC-202972		13 JUL 65	
E		REVISED PER MXC 203006		19 JUL 65	
F		REVISED PER MXC 203436		2 AUG 65	
G		REVISED PER MXC 203751		11 AUG 65	
H		REVISED PER MXC 204283		9 SEP 65	
J		INITIAL RELEASE CLASS A PER TDRR 23420		8 OCT 65	

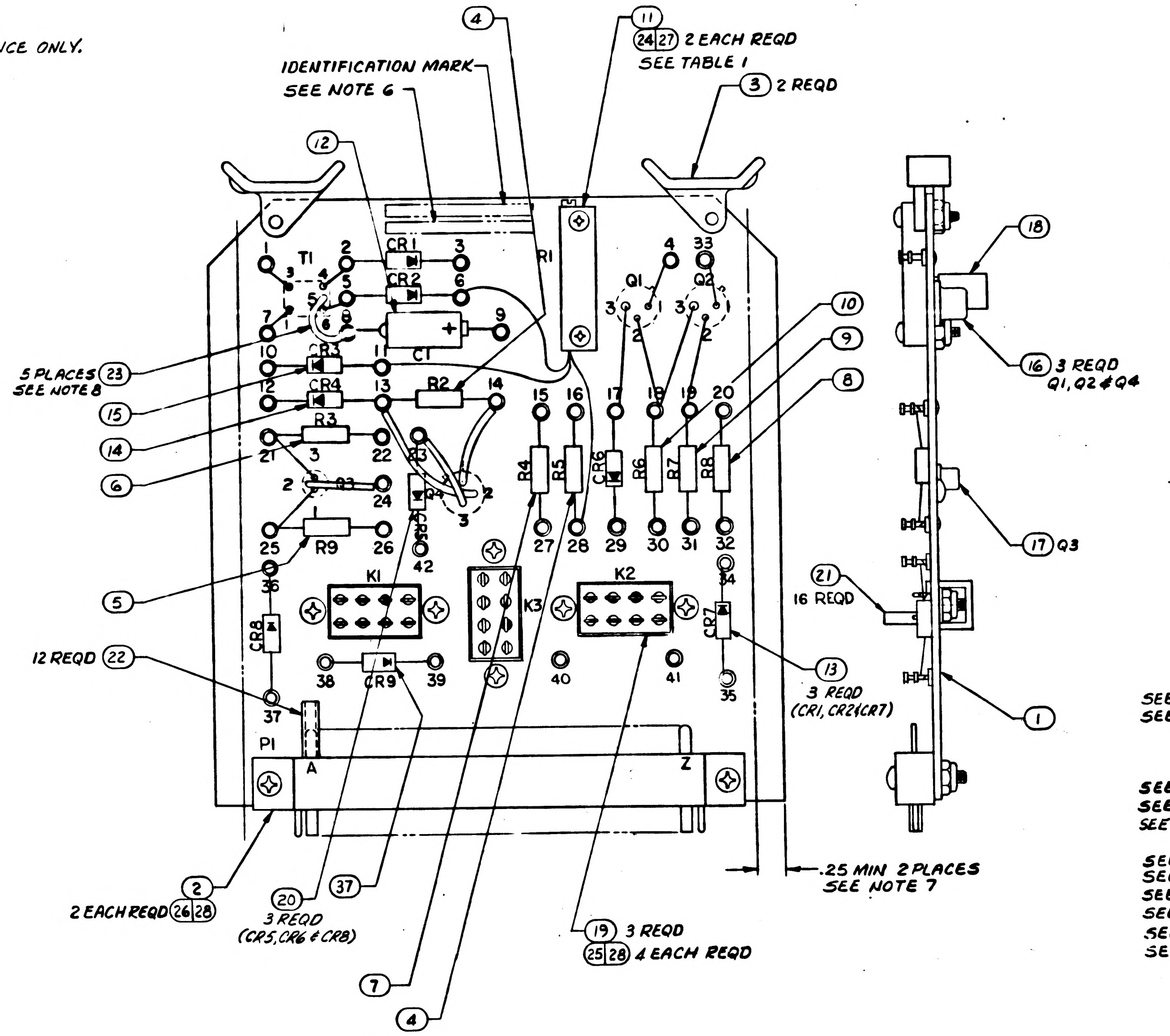


TABLE 1

FROM	TO
R1-RED	TERM. 28 (SEE NOTE 9)
R1-YEL	TERM. 11 (SEE NOTE 9)
R1-GRN	TERM. 6 (SEE NOTE 9)

	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	1		37	IN645	(1896966-004) DIODE MIL-S-19500
	AR		36	SN60 WRAP	SOLDER QQ-S-571 (ES 2175-3)
	AR		35	MIL-F-14256 TYPE A OR W	FLUX (ES 279A)
	AR		34	SN60 WS	SOLDER QQ-S-571 (ES 2175-1)
	AR		33	MIL-T-713	LACING TAPE TYPE P, WAXED CLASS 2, BLACK
	☒		32	PS2900115	PROCUREMENT SPECIFICATION
	☒		31	2900117	SCHEMATIC DIAGRAM, ELEC
	1		30	2900118	WIRE LIST AA
			29		
SEE NOTE 10	8		28	1016151-004	NUT, SELF LOCKING
SEE NOTE 10	2		27	1016151-002	NUT, SELF LOCKING
	2		26	MS35216-17	SCREW, PAN HD
	6		25	MS35216-13	SCREW, PAN HD
	2		24	MS35216-7	SCREW, PAN HD
SEE NOTE 8 & 10	1		23	1006776-20	INSULATION, SLEEVING 6IN. TOTAL LG
SEE NOTE 10	12		22	1015864-109	INSULATION, SLEEVING
SEE NOTE 10	16		21	1015864-079	INSULATION, SLEEVING
	3		20	IN649	(1896966-006) DIODE MIL-S-19500
SEE NOTE 10	3		19	1897222-9	RELAY, ARMATURE
SEE NOTE 10	1		18	1015898-17	TRANSFORMER, AUDIO
SEE NOTE 10	1		17	1015935-001	TRANSISTOR, SILICON
SEE NOTE 10	3		16	1015928-002	TRANSISTOR, NPN
SEE NOTE 10	1		15	1015941-12	SEMI COND DEVICE, DIODE
SEE NOTE 10	1		14	1015941-17	SEMI COND DEVICE, DIODE
	3		13	IN459	(1896966-291) DIODE MIL-S-19500
	1		12	CS13AF6R8K	(1896954-141) CAPACITOR MIL-C-26655
	1		11	RT12C2L203	(1896967-011) RESISTOR MIL-R-27208/8
	1		10	RC20GF303J	(1896952-084) RESISTOR MIL-R-11/3
	1		9	RC20GF514J	(1896952-114) RESISTOR MIL-R-11/3
	1		8	RC20GF204J	(1896952-104) RESISTOR MIL-R-11/3
	1		7	RC20GF334J	(1896952-109) RESISTOR MIL-R-11/3
	1		6	RC20GF272J	(1896952-059) RESISTOR MIL-R-11/3
	1		5	RC20GF332J	(1896952-061) RESISTOR MIL-R-11/3
	2		4	RC20GF102J	(1896952-049) RESISTOR MIL-R-11/3
SEE NOTE 10	2		3	1015999-011	EJECTOR, CIRCUIT BOARD
SEE NOTE 10	1		2	1015956-176	CONNECTOR, ADAPTER, ELEC
	1		1	2900116	TERMINAL BOARD (INSEP ASSY)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900031-011	2900031-011	011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN 19 APR 65
CHECKED 21 APR 65
APPROVAL D'Hore 21 APR 65
APPROVAL Jokeman 7/8/65
NASA APPROVAL
MIT APPROVAL
Charleston 27 APR 65

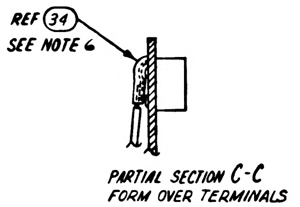
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SENSOR ASSEMBLY,
WHEEL POWER AND -28VDC

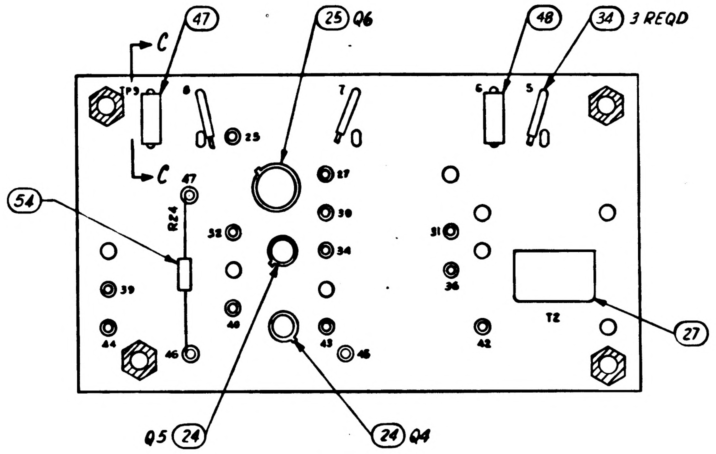
CODE IDENT NO. 99974
SIZE E
2900115
SCALE 2:1
SHEET 1 OF 1

NOTES:

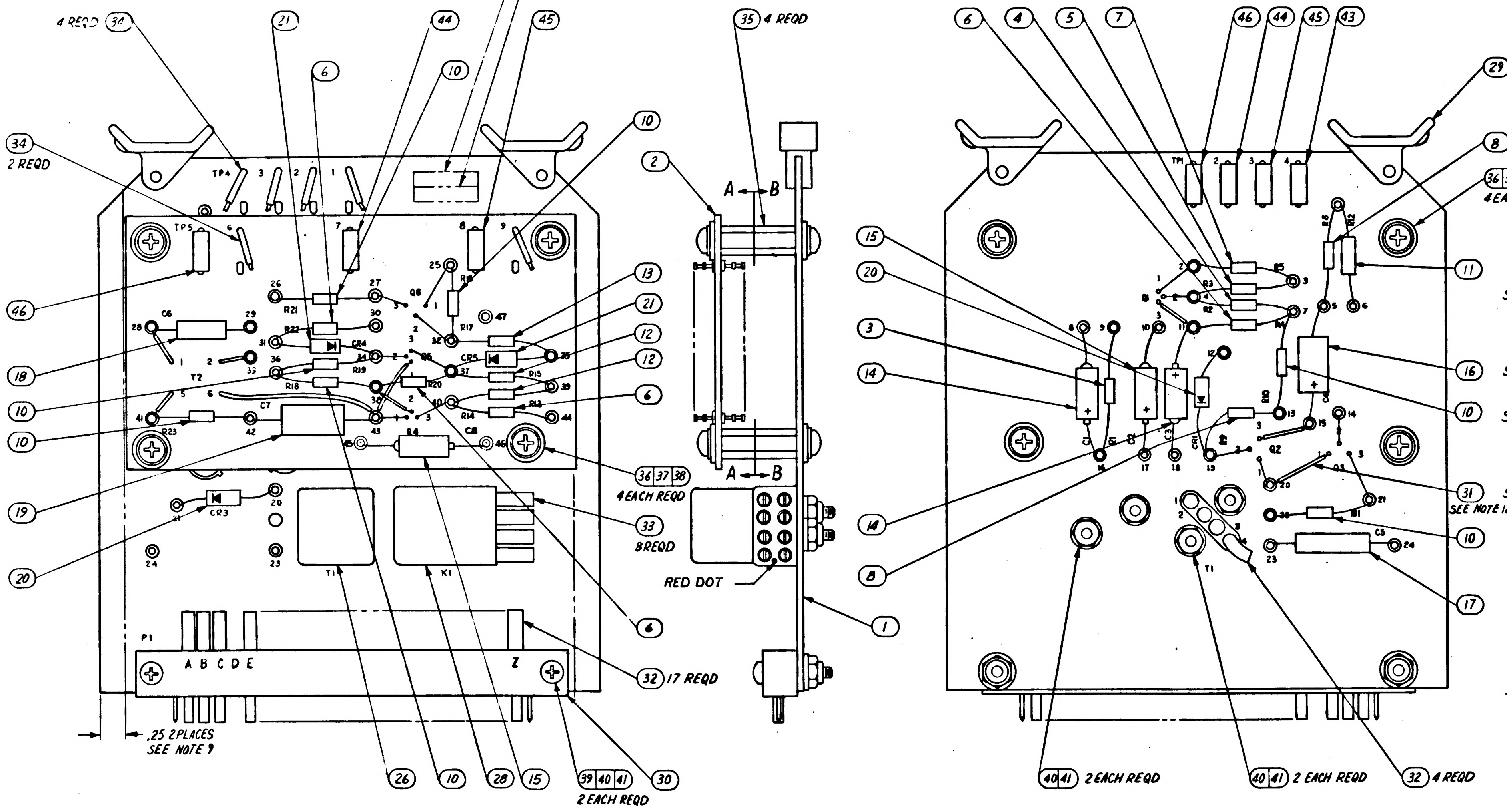
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEMS (49) AND (50) OR (51).
3. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267).
4. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .09 HIGH, COLOR BLACK.
5. SERIALIZE PER ND1002023.
6. BOND ITEMS (43), (44), (45), (46), (47), (48), AND (34) TO ITEMS (1) OR (2) PER ND 1002203.
7. BOND ITEMS (22), (23), (24), (25) AND (27) TO ITEMS (1) OR (2) PER ND1002203.
8. SPOT TIE WIRES AS REQUIRED USING ITEM (52).
9. THIS AREA TO BE CLEAR OF ALL LEADS AND COMPONENTS, BOTH SIDES.
10. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
11. STRIP LEADS .25 AND TIN.
12. CUT TO LENTH AS REQUIRED.

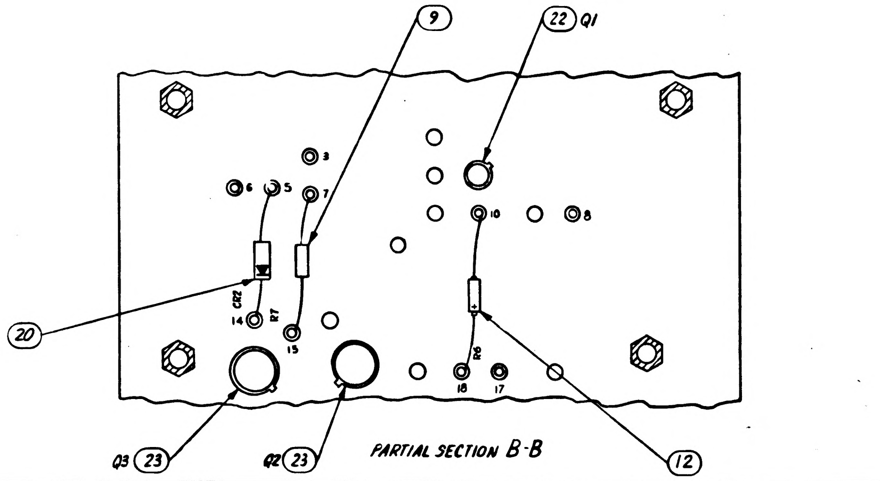

REF (34)
SEE NOTE 6

PARTIAL SECTION C-C
FORM OVER TERMINALS
9 PLACES


C
(47)
(25) Q6
(48)
(34) 3 REQD
(54)
R24
T2
(27)
Q5 (24)
(24) Q4

SECTION A-A


IDENTIFICATION MARK
SEE NOTES 3 AND 4
SEE NOTE 4
4 REQD (34)
(21)
(44)
(45)
(6)
(10)
(10)
(34) 2 REQD
(46)
(18)
(10)
(10)
(19)
(20)
(13)
(21)
(12)
(12)
(6)
(36)(37)(38) 4 EACH REQD
(33) 8 REQD
(6)
(32) 17 REQD
(26)
(10)
(28)
(15)
(39)(40)(41) 2 EACH REQD
(30)
.25 2 PLACES
SEE NOTE 9
(35) 4 REQD
(2)
A
B
RED DOT
(1)
P1
A B C D E
Z
T1
K1
(6)
(4)
(5)
(7)
(46)
(44)
(45)
(43)
(29) 2 REQD
(8)
(36)(37)(38) 4 EACH REQD
(11)
(15)
(20)
(3)
(14)
(16)
(10)
(31)
SEE NOTE 12
(10)
(17)
(14)
(8)
(40)(41) 2 EACH REQD
(40)(41) 2 EACH REQD
(32) 4 REQD
SEE NOTE 10
SEE NOTE 10
SEE NOTE 10
SEE NOTE 10
SEE NOTE 10


(9)
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(20)
Q3 (23)
Q2 (23)
(12)

PARTIAL SECTION B-B

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
B		REPLACES REV A WITH CHANGE PER MXC 202555	——	26 JUN 65	FE JRC
C		REVISED PER MXC 203016		5 [illegible] 65	
D		REVISED PER MXC 204662		[illegible]	
E		REVISED PER MXC 204927		23 SEP 65	
F		REVISED PER MXC 205793		[illegible] OCT 65	
G		REVISED PER MXC 309807		19 OCT 65	RGB
H		INITIAL RELEASE CLASS A PER TDRR 23404		20 OCT 65	

			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			X		55	PS 2900119	PROCUREMENT SPECIFICATION
			1		54	RC07GF510J	(1896985-018) RESISTOR MIL-R-11/8
			X		53	2900234	SCHEMATIC DIAGRAM
			AR		52	MIL-T-713	LACING TAPE TYPE P, WAXED CLASS 2, BLACK (ES2732 NO.18)
			AR		51	SN60WRAP	SOLDER QQ-S-571 (ES2175-3)
			AR		50	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
			AR		49	SN60WS	SOLDER QQ-S-571 (ES2175-1)
			1		48	1016347-009	JACK, MINIATURE
			1		47	-004	
			2		46	-010	
			2		45	-008	
			2		44	-003	
			1		43	1016347-001	JACK, MINIATURE
			1		42	2900235	WIRE LIST AA
			6		41	AN960C4	WASHER PLAIN
			6		40	1016151-004	NUT SELF LOCKING
			2		39	MS35216-017	SCREW, PAN HD
			8		38	AN960C6	WASHER, PLAIN
			8		37	MS35333-71	WASHER, LOCK
			8		36	MS35216-25	SCREW - PAN HD
			4		35	1016000-007	STAND OFF, THREADED, HEX
			9		34	1010490-082	INSULATION - SLEEVING, ELECT
			8		33	1015864-079	
			21		32	1015864-109	
			1		31	1006776-22	INSULATION-SLEEVING-5 IN TOTAL LG
			1		30	1015956-170	CONNECTOR, ADAPTER
			2		29	1015999-006	EJECTOR, CIRCUIT BOARD
			1		28	1015802-006	RELAY-ARMATURE
			1		27	1016010	TRANSFORMER, PULSE
			1		26	1016049	TRANSFORMER, POWER
			1		25	1015934-001	TRANSISTOR
			2		24	1016182	TRANSISTOR
			2		23	1015928-001	TRANSISTOR
			1		22	1015935-001	TRANSISTOR
			2		21	IN914	(1896966-044) DIODE, MIL-S-19500/116
			3		20	IN459	(1896966-291) DIODE, MIL-S-19500/193
			1		19	CM15F471J03	(1896969-139) CAPACITOR, MIL-C-5/1E
			1		18	CTM332VBK	(1896957-028) MIL-C-27287/1
			1		17	CTM152VDJ	(1896957-279) MIL-C-27287/1
			1		16	CM15F391J03	(1896969-137) MIL-C-5/1E
			2		15	CS13AF6R8K	(1896954-141) MIL-C-26655/2D
			2		14	CS13AF4R7K	(1896954-138) CAPACITOR, MIL-C-26655/2D
			1		13	RC07GF623J	(1896985-092) RESISTOR, MIL-R-11/8
			3		12	RC07GF202J	(1896985-056) 11/8
			1		11	RC07GF121J	(1896952-027) 11/3
			7		10	RC07GF103J	(1896985-073) 11/8
			1		9	RC07GF513J	(-090)
			2		8	RC07GF104J	(-097)
			1		7	RC07GF750J	(-022)
			4		6	RC07GF203J	(-080)
			1		5	RC07GF333J	(-085)
			1		4	RC07GF125J	(-123)
			1		3	RC07GF683J	(1896985-093) RESISTOR, MIL-R-11/8
			1		2	2900233	TERMINAL BOARD, UPPER (INSEP ASSY)
			1		1	2900232	TERMINAL BOARD, LOWER (INSEP ASSY)

QUANTITY REQUIRED

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900035-011	2900035-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ± .02 ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Klovinger DATE 13 APR 65
CHECKED Udovich 13 APR 65
APPROVAL R. Pierini 13 APR 65
APPROVAL M. Nelson 6-15-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SIGNAL SHAPING AND
INHIBIT ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900119
SCALE 2:1
SHEET 1 OF 1

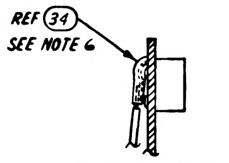
H Erickson 14 JUN 65

2900119

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872(ES2505-1) USING ITEMS (49) AND (50) OR (51).
3. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130(ES267).
4. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .09 HIGH, COLOR BLACK.
5. SERIALIZE PER ND1002023.
6. BOND ITEMS (43), (44), (45), (46), (47), (48), AND (34) TO ITEMS (1) OR (2) PER ND 1002203.
7. BOND ITEMS (22), (23), (24), (25) AND (27) TO ITEMS (1) OR (2) PER ND1002203.
8. SPOT TIE WIRES AS REQUIRED USING ITEM (52).
9. THIS AREA TO BE CLEAR OF ALL LEADS AND COMPONENTS, BOTH SIDES.
10. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
11. STRIP LEADS .25 AND TIN.
12. CUT TO LENTH AS REQUIRED.

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
B		REPLACES REV A WITH CHANGE PER MXC 202555	—	26 JUN 65	FE JAC
C		REVISED PER MXC 203016		[illegible] 65	
D		REVISED PER MXC 204662		10 SEP [illegible]	
E		REVISED PER MXC 204927		23 SEP 65	
F		REVISED PER MXC 205793		[illegible] OCT 65	JHP
G		REVISED PER MXC 309807		14 OCT 65	RGB
H		INITIAL RELEASE CLASS A PER TDRR 23444		20 OCT 65	
J		REVISED PER TDRR 24859		29 DEC 65	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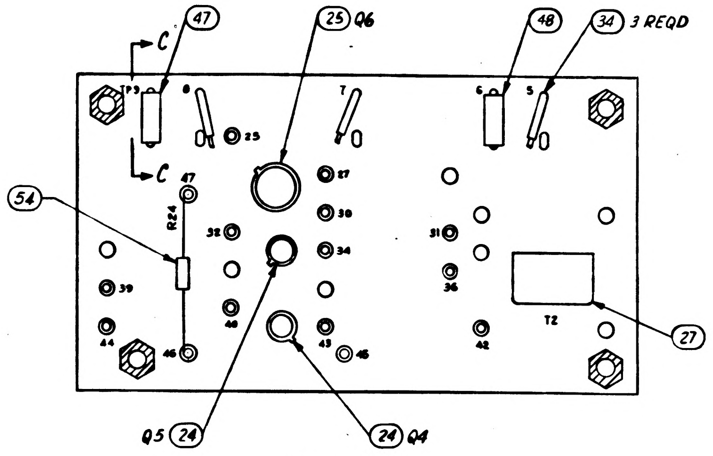
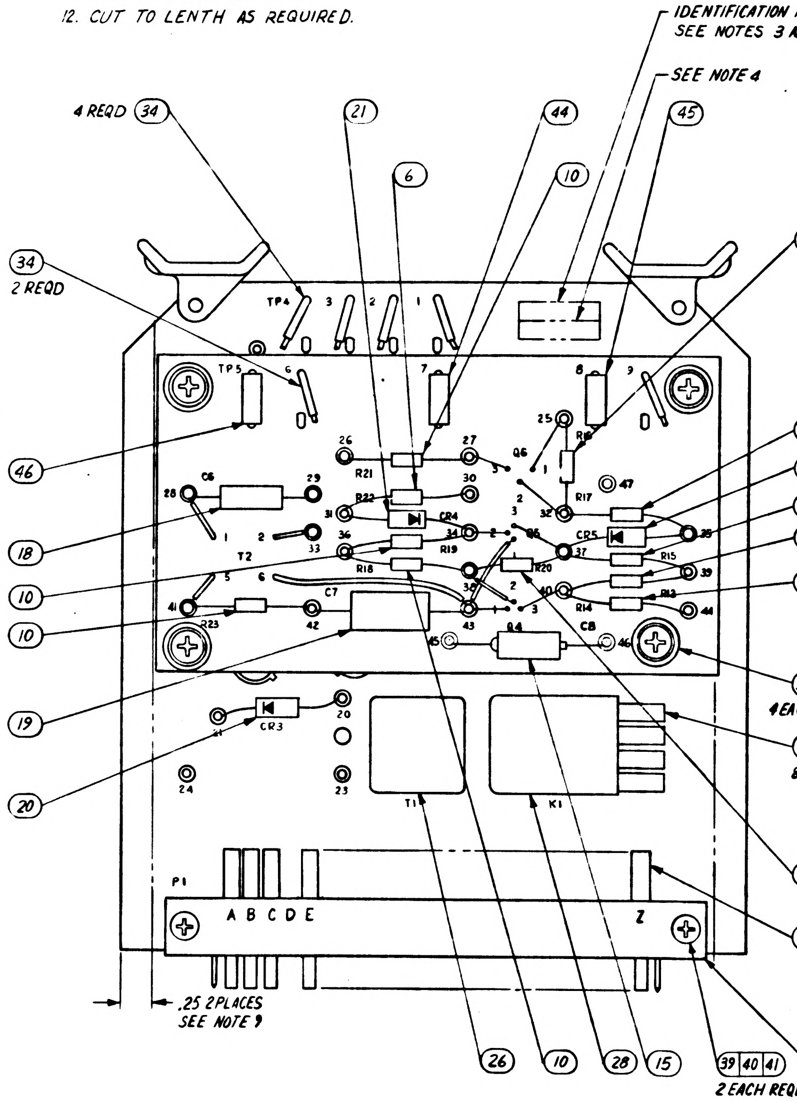
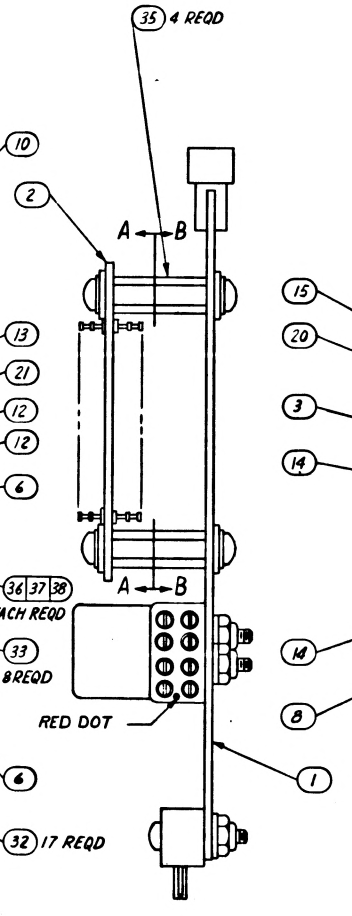
SEE NOTE 6

PARTIAL SECTION C-C
FORM OVER TERMINALS
9 PLACES


(47)
C
(25) Q6
(48)
(34) 3 REQD
(54)
R24
TP5
T2
(27)
Q5 (24)
(24) Q4

SECTION A-A


IDENTIFICATION MARK SEE NOTES 3 AND 4
SEE NOTE 4
4 REQD (34)
(21)
(44)
(45)
(6)
(10)
(34) 2 REQD
TP4
TP5
(46)
(18)
(10)
(10)
(19)
(20)
(13)
(21)
(12)
(12)
(6)
(36)(37)(38) 4 EACH REQD
(33) 8 REQD
(6)
(32) 17 REQD
P1
A B C D E
Z
T1
K1
CR3
C6
C7
C8
T2
.25 2 PLACES SEE NOTE 9
(26)
(10)
(28)
(15)
(39)(40)(41) 2 EACH REQD
(30)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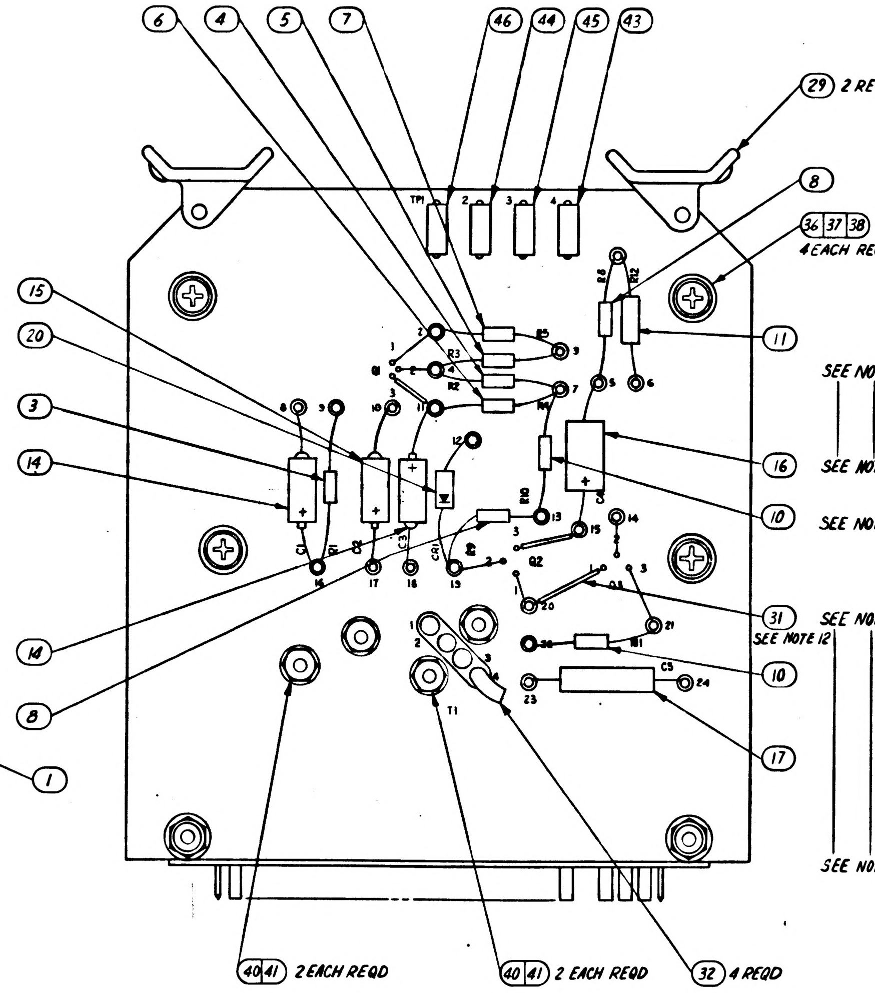
(2)
A
B
A
B
RED DOT
(1)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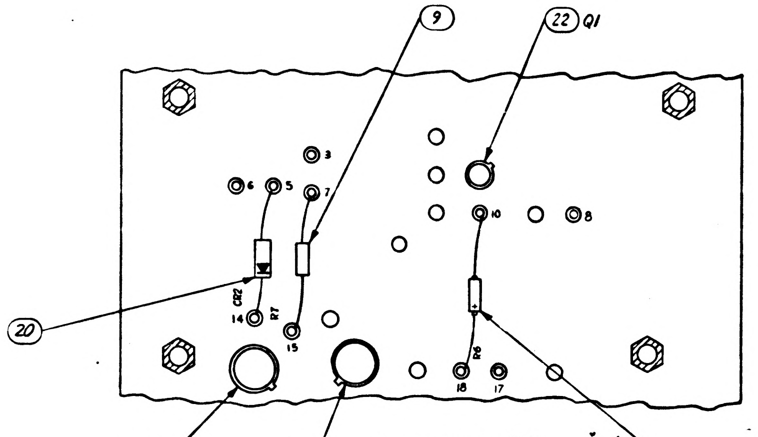
(29) 2 REQD
(8)
(36)(37)(38) 4 EACH REQD
TP1
(15)
(20)
(3)
(14)
(11)
(16)
(10)
(31)
(10)
(17)
(14)
(8)
Q2
Q3
T1
(40)(41) 2 EACH REQD
(40)(41) 2 EACH REQD
(32) 4 REQD


(9)
(22) Q1
(20)
CR2
R7
R6
(56)
Q3 (23)
Q2 (23)

PARTIAL SECTION B-B

				1		56	RC20GF392J	(1896952-063) RESISTOR MIL-R-11/3
				X		55	PS 2900119	PROCUREMENT SPECIFICATION
				1		54	RC07GF510J	(1896985-018) RESISTOR MIL-R-11/8
				X		53	2900234	SCHEMATIC DIAGRAM
				AR		52	MIL-T-713	LACING TAPE TYPE P, WAXED CLASS 2, BLACK (ES2732 NO.18)
				AR		51	SN60WRAP	SOLDER QQ-S-571 (ES2175-3)
				AR		50	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
				AR		49	SN60WS	SOLDER QQ-S-571 (ES2175-1)
SEE NOTE 10				1		48	1016347-009	JACK, MINIATURE
				1		47	-004	
				2		46	-010	
				2		45	-008	
				2		44	-003	
SEE NOTE 10				1		43	1016347-001	JACK, MINIATURE
				1		42	2900235	WIRE LIST AA
				6		41	AN960C4	WASHER PLAIN
SEE NOTE 10				6		40	1016151-004	NUT, SELF LOCKING
				2		39	MS35216-017	SCREW, PAN HD
				8		38	AN960C6	WASHER, PLAIN
				8		37	MS35333-71	WASHER, LOCK
				8		36	MS35216-25	SCREW - PAN HD
SEE NOTE 10				4		35	1016000-007	STAND OFF, THREADED, HEX
SEE NOTE 12				9		34	1010490-082	INSULATION - SLEEVING, ELECT
				8		33	1015864-079	
				21		32	1015864-109	
				1		31	1006776-22	INSULATION-SLEEVING-5 IN TOTAL LG
				1		30	1015956-170	CONNECTOR, ADAPTER
				2		29	1015999-006	EJECTOR, CIRCUIT BOARD
				1		28	1015802-006	RELAY-ARMATURE
				1		27	1016010	TRANSFORMER, PULSE
				1		26	1016049	TRANSFORMER, POWER
				1		25	1015934-001	TRANSISTOR
				2		24	1016182	TRANSISTOR
				2		23	1015928-001	TRANSISTOR
SEE NOTE 10				1		22	1015935-001	TRANSISTOR
				2		21	1N914	(1896966-044) DIODE, MIL-S-19500/116
				3		20	1N459	(1896966-291) DIODE, MIL-S-19500/193
				1		19	CM15F471J03	(1896969-139) CAPACITOR, MIL-C-5/1E
				1		18	CTM332VBK	(1896957-028) MIL-C-27287/1
				1		17	CTM152VDJ	(1896957-279) MIL-C-27287/1
				1		16	CM15F391J03	(1896969-137) MIL-C-5/1E
				2		15	CS13AF6R8K	(1896954-141) MIL-C-26655/2D
				2		14	CS13AF4R7K	(1896954-138) CAPACITOR, MIL-C-26655/2D
				1		13	RC07GF623J	(1896985-092) RESISTOR, MIL-R-11/8
				2		12	RC07GF202J	(1896985-056) 11/8
				1		11	RC07GF121J	(1896952-027) 11/3
				7		10	RC07GF103J	(1896985-073) 11/8
				1		9	RC07GF513J	(-090)
				2		8	RC07GF104J	(-097)
				1		7	RC07GF750J	(-022)
				4		6	RC07GF203J	(-080)
				1		5	RC07GF333J	(-085)
				1		4	RC07GF125J	(-123)
				1		3	RC07GF274J	(1896985-107) RESISTOR, MIL-R-11/3
				1		2	2900233	TERMINAL BOARD, UPPER (INSEP ASSY)
				1		1	2900232	TERMINAL BOARD, LOWER (INSEP ASSY)
				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900035-011	2900035-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± .02 ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Klavinger DATE 13 APR 65
CHECKED Idovich 13 APR 65
APPROVAL R. Pierini 13 APR 65
APPROVAL M. [illegible] 5-15-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SIGNAL SHAPING AND
INHIBIT ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900119
SCALE 2:1
SHEET [illegible]

R. Erickson 14 JUN 65

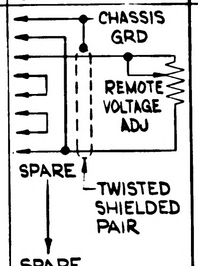
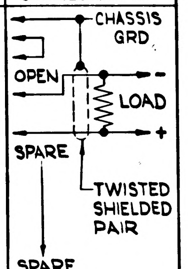
J

2900119

REVISIONS			23389		
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR 23389		5-05	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
3. MARK CHARACTERS .12 HIGH PER ND1002019. POSITION AS SHOWN.
4. THE 8.5 AMP POWER SUPPLY (2900121-011) SHALL COMPLY WITH SECTIONS 3 AND 4 OF PS 2900012, EXCEPT THAT WHEREVER PART NUMBER 2900012 APPEARS IN THE TEXT OF THESE SECTIONS PART NUMBER 2900121 SHALL BE SUBSTITUTED. THOSE PORTIONS OF PS2900012 WHICH RELATE TO THE 5 AMP POWER SUPPLY SHALL NOT APPLY.
5. SECTION 5 OF PS2900012 IS A REQUIREMENT WHENEVER THE POWER SUPPLY (2900121-011) IS SOLD INDEPENDENTLY OF A HIGHER ASSEMBLY.
6. THE SUPPLIER'S NAME AND ADDRESS, NASA PART NUMBER OF THE POWER SUPPLY AND THE POWER SUPPLY CURRENT AND VOLTAGE RATING SHALL BE PLACED ON THE OUTSIDE SURFACE OF THE REAR OF THE POWER SUPPLY.

PIN LIST FOR CONNECTOR PART NO. MS3112E-16-8P		PIN LIST FOR CONNECTOR PART NO. MS3112E-20-16SW					
		FOR LOCAL VOLTAGE ADJUSTING & SENSING		FOR REMOTE VOLTAGE ADJUSTMENT		FOR REMOTE VOLTAGE SENSING	
PIN LTR	PIN CONNECTIONS	PIN LTR	PIN CONNECTIONS	PIN LTR	PIN CONNECTIONS	PIN LTR	PIN CONNECTIONS
A	CHASSIS GRD	A	CHASSIS GRD	A	 CHASSIS GRD	A	 CHASSIS GRD
B	OPEN	B		B		B	
C	OPEN	C		C		C	
D	115 VAC INPUT hi	D		D	REMOTE VOLTAGE ADJ	D	OPEN - LOAD
E	115 VAC Lo	E		E		E	
F	OPEN	F		F		F	+
G	OPEN	G		G		G	
H	OPEN	H	SPARE	H		H	SPARE
		J		J	SPARE	J	
		K		K	TWISTED SHIELDED PAIR	K	TWISTED SHIELDED PAIR
		L		L		L	
		M		M		M	
		N		N		N	
		P	SPARE	P	SPARE	P	SPARE
		R	30V Hi	R	30V Hi	R	30V Hi
		S	30V Lo	S	30V Lo	S	30V Lo

REF DES OR PART NO.	PARTS EXCHANGED	
	EXISTING PART:	REPLACED BY:

REF DES OR PART NO.	PARTS REMOVED

SEE NOTES 4 & 5

SEE NOTE 2

QUANTITY REQUIRED								
				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
						46		
						45		
						44		
						43		
						42		
				X		41	PS2900012	PROCUREMENT SPECIFICATION
						40		
						39		
						38		
						37		
						36		
						35		
						34		
						33		
						32		
						31		
						30		
						29		
						28		
						27		
						26		
						25		
						24		
						23		
						22		
						21		
						20		
						19		
						18		
						17		
						16		
				1		15	1901701 -092	RESISTOR -VARIABLE
				2		14	-091	RESISTOR -VARIABLE
				2		13	-128	NUT
				3		12	-122	NUT
				8		11	-121	NUT
				3		10	-112	LOCKWASHER
				8		9	1901701-111	LOCKWASHER
						8		
				3		7	1901701-143	SCREW-MACH,
				8		6	1901701-141	SCREW-MACH,
				1		5	1901701-031	PILOT LIGHT
				1		4	MS3112E-20-16SW	(1901701-TBA) CONNECTOR
				1		3	MS3112E-16-8P	(1901701-044) CONNECTOR
				1		2	1901714	BRACKET, ANGLE-POT
				1		1	2900123-002	POWER SUPPLY

LIST OF PARTS AND MATERIALS

2900013-011	2900012-011	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — DECIMALS + — ANGLES + —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN S. Agne DATE 29APR65
CHECKED 12 MAY 65
APPROVAL 5-13-65
APPROVAL Gedeman
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

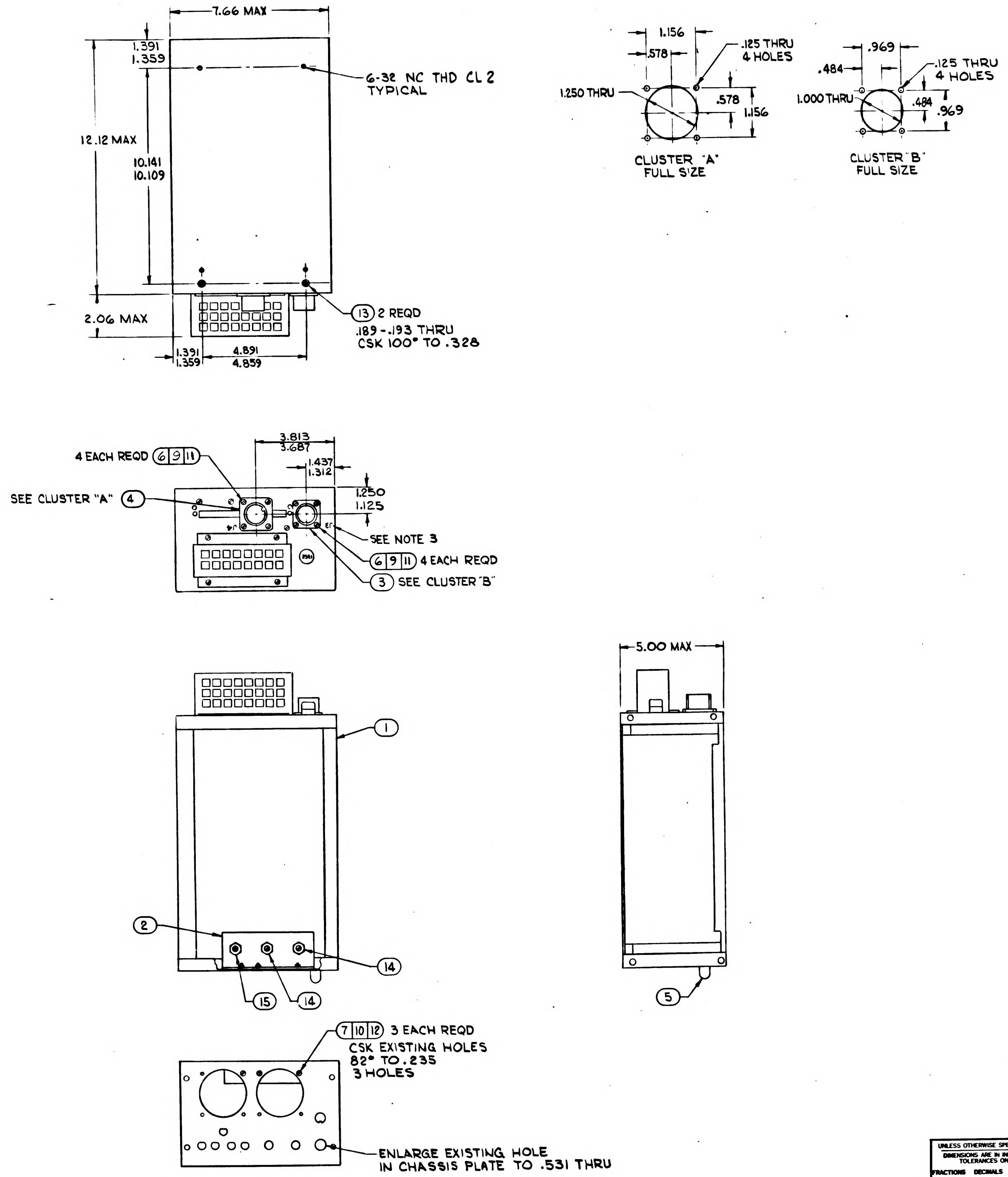
POWER SUPPLY, HALF RACK-
8.5 AMP

ALTERED COMMERCIAL ITEM

CODE IDENT NO. 99974
SIZE E
2900121
SCALE
SHEET 1 OF 2

REVISIONS 23399

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 23399			



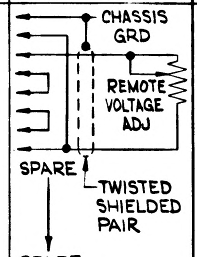
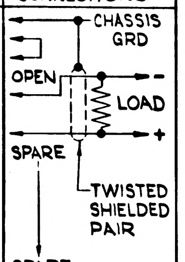
7.66 MAX
1.391
1.359
6-32 NC THD CL 2
TYPICAL
12.12 MAX
10.141
10.109
2.06 MAX
13 2 REQD
.189 - .193 THRU
CSK 100° TO .328
1.391
1.359
4.891
4.859
1.156
.578
.125 THRU
4 HOLES
1.250 THRU
.578
1.156
CLUSTER "A"
FULL SIZE
.969
.484
.125 THRU
4 HOLES
1.000 THRU
.484
.969
CLUSTER "B"
FULL SIZE
3.813
3.687
1.437
1.312
4 EACH REQD 6 9 11
1.250
1.125
SEE CLUSTER "A" 4
SEE NOTE 3
6 9 11 4 EACH REQD
3 SEE CLUSTER "B"
5.00 MAX
1
2
14
15
14
5
7 10 12 3 EACH REQD
CSK EXISTING HOLES
82° TO .235
3 HOLES
ENLARGE EXISTING HOLE
IN CHASSIS PLATE TO .531 THRU

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ±.010 ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
	ACSP PN		
	DRAWN S Agne DATE 3 MAY 65 CHECKED 2 MAY 65 APPROVAL 5-13-65 APPROVAL	POWER SUPPLY, HALF RACK- 8.5 AMP ALTERED COMMERCIAL ITEM	
DO NOT SCALE THIS DRAWING			
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974	SIZE E 2900121
CONTRACT NAS 9-497	MIT APPROVAL	SCALE 1/2	SHEET 2 OF 2

REVISIONS 23389					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.
(M) A		INITIAL RELEASE CLASS A PER TDRR 23389		8 OCT 65	
B		REVISED PER TDRR 27539		5 APR 66	AJ

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
3. MARK CHARACTERS .12 HIGH PER ND1002019. POSITION AS SHOWN.
4. THE 8.5 AMP POWER SUPPLY (2900121-011) SHALL COMPLY WITH SECTIONS 3 AND 4 OF PS 2900012, EXCEPT THAT WHEREVER PART NUMBER 2900012 APPEARS IN THE TEXT OF THESE SECTIONS PART NUMBER 2900121 SHALL BE SUBSTITUTED. THOSE PORTIONS OF PS2900012 WHICH RELATE TO THE 5 AMP POWER SUPPLY SHALL NOT APPLY.
5. SECTION 5 OF PS 2900012 IS A REQUIREMENT WHENEVER THE POWER SUPPLY (2900121-011) IS SOLD INDEPENDENTLY OF A HIGHER ASSEMBLY.
6. THE SUPPLIER'S NAME AND ADDRESS, NASA PART NUMBER OF THE POWER SUPPLY AND THE POWER SUPPLY CURRENT AND VOLTAGE RATING SHALL BE PLACED ON THE OUTSIDE SURFACE OF THE REAR OF THE POWER SUPPLY.

PIN LIST FOR CONNECTOR PART NO. MS3112E-16-8P		PIN LIST FOR CONNECTOR PART NO. MS3112E-20-16SW					
		FOR LOCAL VOLTAGE ADJUSTING & SENSING		FOR REMOTE VOLTAGE ADJUSTMENT		FOR REMOTE VOLTAGE SENSING	
PIN LTR	PIN CONNECTIONS	PIN LTR	PIN CONNECTIONS	PIN LTR	PIN CONNECTIONS	PIN LTR	PIN CONNECTIONS
A	CHASSIS GRD	A	CHASSIS GRD	A	 CHASSIS GRD	A	 CHASSIS GRD
B	OPEN	B		B		B	
C	OPEN	C		C		C	
D	115 VAC INPUT hi	D		D	REMOTE VOLTAGE ADJ	D	OPEN
E	115 VAC Lo	E		E		E	LOAD
F	OPEN	F		F		F	
G	OPEN	G		G		G	
H	OPEN	H	SPARE	H		H	SPARE
		J		J	SPARE	J	
		K		K	TWISTED SHIELDED PAIR	K	TWISTED SHIELDED PAIR
		L		L		L	
		M		M		M	
		N		N		N	
		P	SPARE	P	SPARE	P	SPARE
		R	30V Hi	R	30V Hi	R	30V Hi
		S	30V Lo	S	30V Lo	S	30V Lo

DESIGN REQUIREMENTS:

1. INPUT VOLTAGE. THE POWER SUPPLY SHALL BE CAPABLE OF PERFORMING AS SPECIFIED HEREIN WHEN SUPPLIED WITH 105 TO 125 VOLTS, 55 TO 65 CPS.
2. OUTPUT CURRENT: THE CONTINUOUS FULL LOAD OUTPUT CURRENT RATINGS OF THE POWER SUPPLY SHALL BE 8.5 AMPERES AT 30 VDC.
3. STABILITY: THE OUTPUT VOLTAGE OF THE POWER SUPPLY SHALL VARY LESS THAN 0.1 PERCENT DURING EIGHT HOURS OF OPERATION AT A FIXED LOAD AND STABILIZED AMBIENT TEMPERATURE.
4. TEMPERATURE COEFFICIENT: THE TEMPERATURE COEFFICIENT OF THE OUTPUT VOLTAGE SHALL BE LESS THAN 0.05 PERCENT PER DEGREE CENTIGRADE.
5. OUTPUT IMPEDANCE: THE OUTPUT IMPEDANCE OF THE POWER SUPPLY SHALL BE 0.003 OHMS MAX DC THRU 1 KC, 0.03 OHMS MAX 1 KC THROUGH 10 KC, AND 0.8 OHMS MAX 10 KC THRU 100 KC.
6. RECOVERY: AFTER A LOAD CHANGE FROM NO LOAD TO FULL LOAD OR FULL LOAD TO NO LOAD, THE OUTPUT VOLTAGE SHALL RETURN TO WITHIN 0.25 VDC OF THE INITIAL VOLTAGE WITHIN 250 MICROSECONDS AND THE VOLTAGE EXCURSION SHALL BE LESS THAN 0.5 VDC PEAK.
7. SWITCHING TRANSIENT: THE TURN-ON AND TURN-OFF TRANSIENTS SHALL NOT CAUSE THE OUTPUT VOLTAGE TO BE MORE THAN ONE VOLT GREATER THAN THE REGULATED VALUE.

REF DES OR PART NO.	PARTS EXCHANGED	
	EXISTING PART:	REPLACED BY:

REF DES OR PART NO.	PARTS REMOVED

SEE NOTES 4 & 5

SEE NOTE 2

					46		
					45		
					44		
					43		
					42		
			X		41	PS2900012	PROCUREMENT SPECIFICATION
					40		
					39		
					38		
					37		
					36		
					35		
					34		
					33		
					32		
					31		
					30		
					29		
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					26		
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					24		
					23		
					22		
					21		
					20		
					19		
					18		
					17		
					16		
			1		15	1901701-092	RESISTOR-VARIABLE
			2		14	-091	RESISTOR-VARIABLE
			2		13	-128	NUT
			3		12	-122	NUT
			8		11	-121	NUT
			3		10	-112	LOCKWASHER
			8		9	1901701-111	LOCKWASHER
					8		
			3		7	1901701-143	SCREW-MACH,
			8		6	1901701-141	SCREW-MACH,
			1		5	1901701-031	PILOT LIGHT
			1		4	MS3112E-20-16SW	(1901701-064) CONNECTOR
			1		3	MS3112E-16-8P	(1901701-044) CONNECTOR
			1		2	1901714	BRACKET, ANGLE-POT
			1		1	2900123-002	POWER SUPPLY
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

2900121 B

2900013-011	2900012-011	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN S. Agne DATE 29 APR 65
CHECKED 12 MAY 65
APPROVAL 5-13-65
APPROVAL Geldman 10/4/65
NASA APPROVAL
MIT APPROVAL

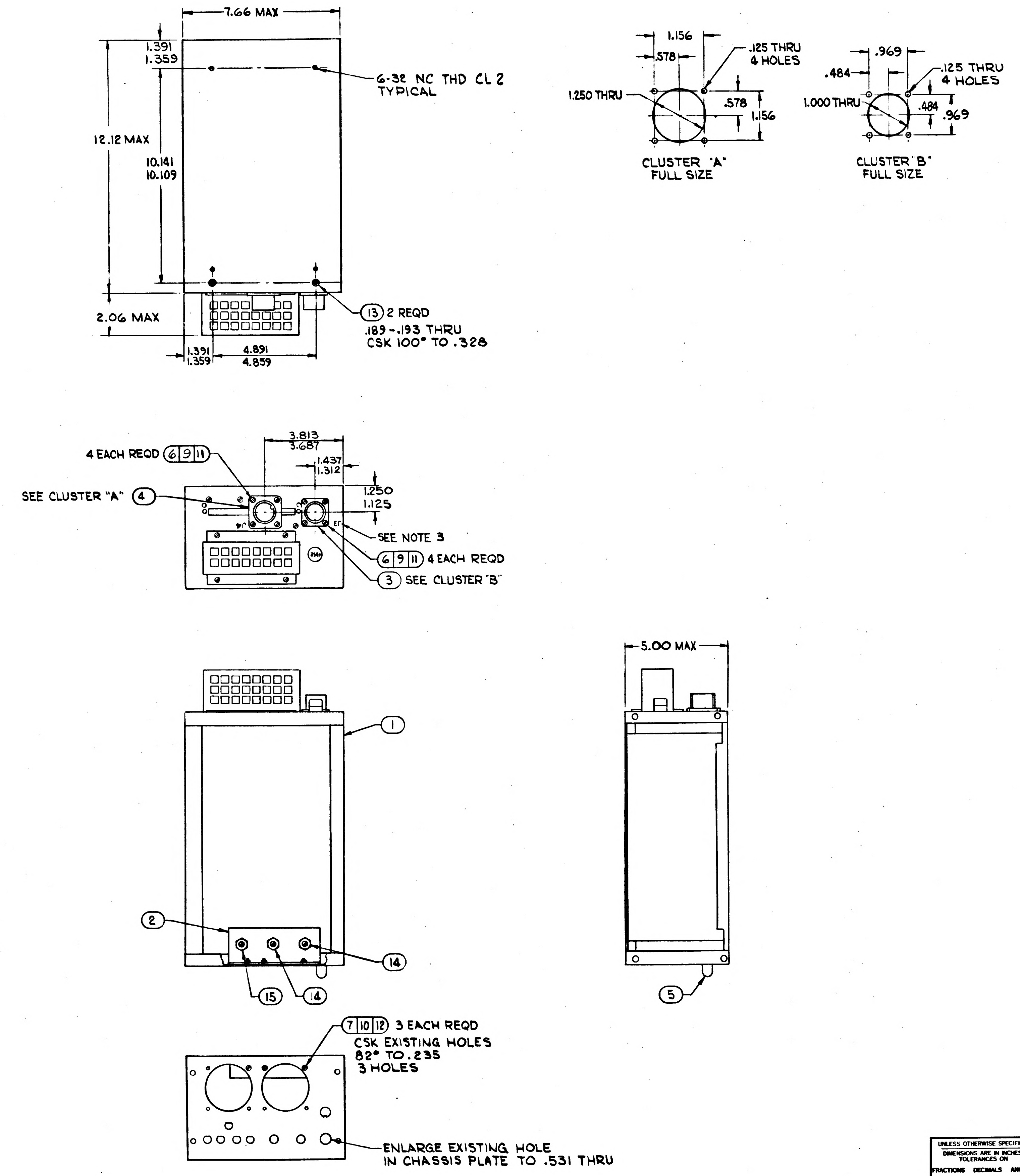
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

POWER SUPPLY, HALF RACK-
8.5 AMP

ALTERED COMMERCIAL ITEM

CODE IDENT NO 99974
SIZE E
2900121
SCALE
SHEET 1 OF 2

REVISIONS 23389					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		INITIAL RELEASE CLASS A PER TDRR 23399			
3		REVISION STATUS CHANGED		5 APR 66	AU


7.66 MAX
1.391
1.359
6-32 NC THD CL 2
TYPICAL
12.12 MAX
10.141
10.109
2.06 MAX
13 2 REQD
.189 - .193 THRU
CSK 100° TO .328
1.391
1.359
4.891
4.859
1.156
.578
.125 THRU
4 HOLES
1.250 THRU
.578
1.156
CLUSTER "A"
FULL SIZE
.969
.484
.125 THRU
4 HOLES
1.000 THRU
.484
.969
CLUSTER "B"
FULL SIZE
3.813
3.687
1.437
1.312
4 EACH REQD 6 9 11
1.250
1.125
SEE CLUSTER "A" 4
SEE NOTE 3
6 9 11 4 EACH REQD
3 SEE CLUSTER "B"
5.00 MAX
1
2
14
15
14
5
7 10 12 3 EACH REQD
CSK EXISTING HOLES
82° TO .235
3 HOLES
ENLARGE EXISTING HOLE
IN CHASSIS PLATE TO .531 THRU

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ±.010 ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN S Agne DATE 3 MAY 65 CHECKED 3 MAY 65 APPROVAL 5-13 65 APPROVAL	POWER SUPPLY, HALF RACK - 8.5 AMP ALTERED COMMERCIAL ITEM
DO NOT SCALE THIS DRAWING		
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 SIZE E 2900121
CONTRACT NAS 9-497	MIT APPROVAL 20 Oct 65	SCALE 1/2 SHEET 2 OF 2

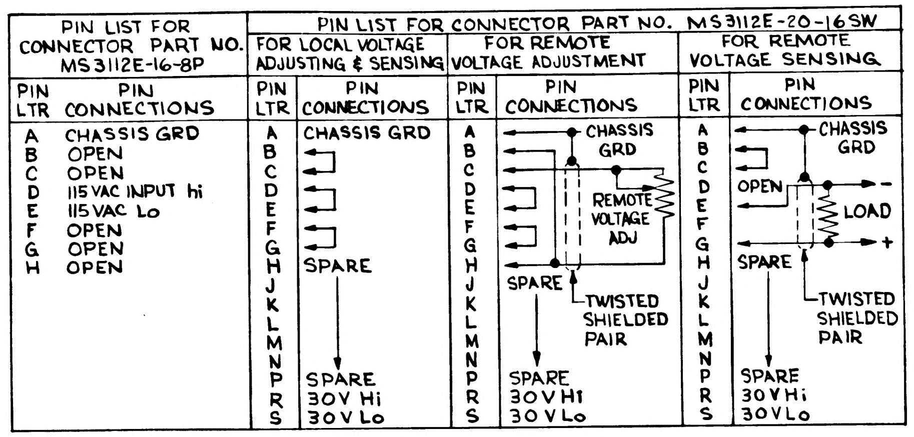
2900121

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC 204708		10 SEP 65	
B		INITIAL RELEASE CLASS A PER TDRR 23389			

REVISIONS 23389

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.
3. MARK CHARACTERS .12 HIGH PER ND1002019. POSITION AS SHOWN.
4. THE 5 AMP POWER SUPPLY, (2900122-011) SHALL COMPLY WITH SECTIONS 3 AND 4 OF PS2900012, EXCEPT THAT WHEREVER PART NUMBER 2900012 APPEARS IN THE TEXT OF THESE SECTIONS PART NUMBER 2900122 SHALL BE SUBSTITUTED. THOSE PORTIONS OF PS2900012 WHICH RELATE ONLY TO TO THE 8.5AMP POWER SUPPLY SHALL NOT APPLY.
5. SECTION 5 OF PS2900012 IS A REQUIREMENT WHENEVER THE POWER SUPPLY (2900122-011) IS SOLD INDEPENDENTLY OF A HIGHER ASSEMBLY.
6. THE SUPPLIER'S NAME AND ADDRESS, NASA PART NUMBER OF THE POWER SUPPLY AND THE POWER SUPPLY CURRENT AND VOLTAGE RATING SHALL BE PLACED ON THE OUTSIDE SURFACE OF THE REAR OF THE POWER SUPPLY.



PIN LIST FOR CONNECTOR PART NO. MS3112E-16-8P		PIN LIST FOR CONNECTOR PART NO. MS3112E-20-16SW					
		FOR LOCAL VOLTAGE ADJUSTING & SENSING		FOR REMOTE VOLTAGE ADJUSTMENT		FOR REMOTE VOLTAGE SENSING	
PIN LTR	PIN CONNECTIONS	PIN LTR	PIN CONNECTIONS	PIN LTR	PIN CONNECTIONS	PIN LTR	PIN CONNECTIONS
A	CHASSIS GRD	A	CHASSIS GRD	A	CHASSIS GRD	A	CHASSIS GRD
B	OPEN	B		B		B	
C	OPEN	C		C		C	
D	115 VAC INPUT hi	D		D	REMOTE VOLTAGE ADJ	D	OPEN
E	115 VAC Lo	E		E		E	LOAD
F	OPEN	F		F		F	
G	OPEN	G		G		G	
H	OPEN	H	SPARE	H		H	SPARE
		J		J	SPARE	J	
		K		K	TWISTED SHIELDED PAIR	K	TWISTED SHIELDED PAIR
		L		L		L	
		M		M		M	
		N		N		N	
		P	SPARE	P	SPARE	P	SPARE
		R	30V Hi	R	30 V H1	R	30 V Hi
		S	30 V Lo	S	30 V Lo	S	30 V Lo

REF DES OR PART NO.	PARTS EXCHANGED	
	EXISTING PART:	REPLACED BY:
C3	0.1 uf, 200V, 20%	0.1 uf, 400V, 10%
C5	0.047 uf, 200V, 10%	0.047 uf, 400V, 10%
C6	0.0047 uf, 200V, 20%	0.0047 uf, 200V, 10%
C7	0.22 uf, 200V, 20%	0.22 uf, 200V, 10%
C8	5,000 uf, 50V	4,000 uf, 50V
C9	10,000 uf, 60V	12,400 uf, 60V
C12	1.0 uf, 200V, 20%	1.0 uf, 200V, 10%
C15	0.0047 uf, 200V, 20%	0.0047 uf, 200V, 10%
CR35	SCR 93-3	2N2575
DS1	LEECRAFT, 32R2111T	DIALCO 101-5030-932
Q20	2N2140	2N2138
R1	270 Ω, 2.0W, 10%	270 Ω, 1.0W, 10%
R2	1K, 1/2W	2.2K, 1/2W
R10	432 Ω, 1/2W, 1%	681 Ω, 1/2W, 1%
R17	330 Ω, 2.0W, 10%	330 Ω, 1.0W, 10%
R20	249 Ω, 1/2W, 1%	402 Ω, 1/2W, 1%
R37	4K, 2W	1,250 Ω, 2W
R38	100 Ω, 2W	125 Ω, 2W
R57	4 Ω, 25W	1.4 Ω, 50W
R60	511 Ω, 1/2W, 1%	750 Ω, 1/2W, 1%
R62	10 Ω, 2.0W, 10%	125 Ω, 2.0W, 10%
R63	340 Ω, 1/2W, 1%	475 Ω, 1/2W, 1%
T1	HT40-5	HT40-5L

REF DES OR PART NO.	PARTS REMOVED
M1	VOLTMETER, 40 VOLTS
M2	AMMETER, 5 AMPS
Q18	TRANSISTOR 2N1554
R45	RESISTOR 0.2 Ω, 10W, 10%
R48	39,950 Ω, 1/2W, 1/2%
R49	(POT.) 500 Ω, 1-1/2W, 20%
R52	4 Ω, 25W
R59	(METER SHUNT) C3345
R61	RESISTOR (POT.) 10 Ω, 2W
S1	DPST, NST 52K
	BARRIER STRIP 440Y-11 (GEN PRO)
	BINDING POST (5) SUP. ELECT., DF21
	BINDING POST JUMPERS, TRYGON 1244-B
	CENTERING WASHERS, OHMITE 6000
	COVER, TOP
	HANDLE
	KNOBS (2), ROGAN, RB 999-700
	LINE CORD, 18/3 WIRE
	RUBBER FEET, BH 2096-W (MILLER)
	SHORTING LINKS, H.H. SMITH 601-J
	SHUNT BD, B3201
	SOLDER LUGS (.220 HOLE) ZIERICK 107
	SOLDER LUGS (.144 HOLE) ZIERICK 649
	STRAIN RELIEF, LINE CORD, HEYCO, 6P-1

SEE NOTES 4 & 5

SEE NOTE 2

			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
					46		
					45		
					44		
					43		
					42		
			X		41	PS2900012	PROCUREMENT SPECIFICATION
			X		40	1901715	SCHEMATIC DIAGRAM
			1		39	1901701-027	SEMICONDUCTOR
			3		38	-023	SEMICONDUCTOR
			1		37	-011	CAPACITOR
			1		36	-009	
			1		35	-008	
			1		34	-006	
			2		33	-004	
			1		32	-002	
			1		31	-001	CAPACITOR
			1		30	-099	TRANSFORMER
			1		29	-053	TRANSISTOR
			1		28	-090	RESISTOR-FIXED
			1		27	-089	
			2		26	-088	
			1		25	-085	
			1		24	-082	
			2		23	-080	
			1		22	-077	
			1		21	-076	
			1		20	-075	
			1		19	-074	
			1		18	-071	
			1		17	-070	
			1		16	-068	-FIXED
			1		15	-092	-VARIABLE
			2		14	-091	RESISTOR-VARIABLE
			2		13	-128	NUT
			3		12	-122	NUT
			8		11	-121	NUT
			3		10	-112	LOCKWASHER
			8		9	1901701-111	LOCKWASHER
					8		
			3		7	1901701-143	SCREW-MACH,
			8		6	-141	SCREW-MACH,
			1		5	1901701-031	PILOT LIGHT
			1		4	MS3112E-20-16S	(1901701-045) CONNECTOR
			1		3	MS3112E-16-8P	(1901701-044) CONNECTOR
			1		2	1901714	BRACKET, ANGLE-POT
			1			2900123-00	POWER SUPPLY
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

2900122 A

2900013-011	2900023-011	-011
NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN S. Agne DATE 29 APR 65
CHECKED 12 MAY 65
APPROVAL 5-13-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

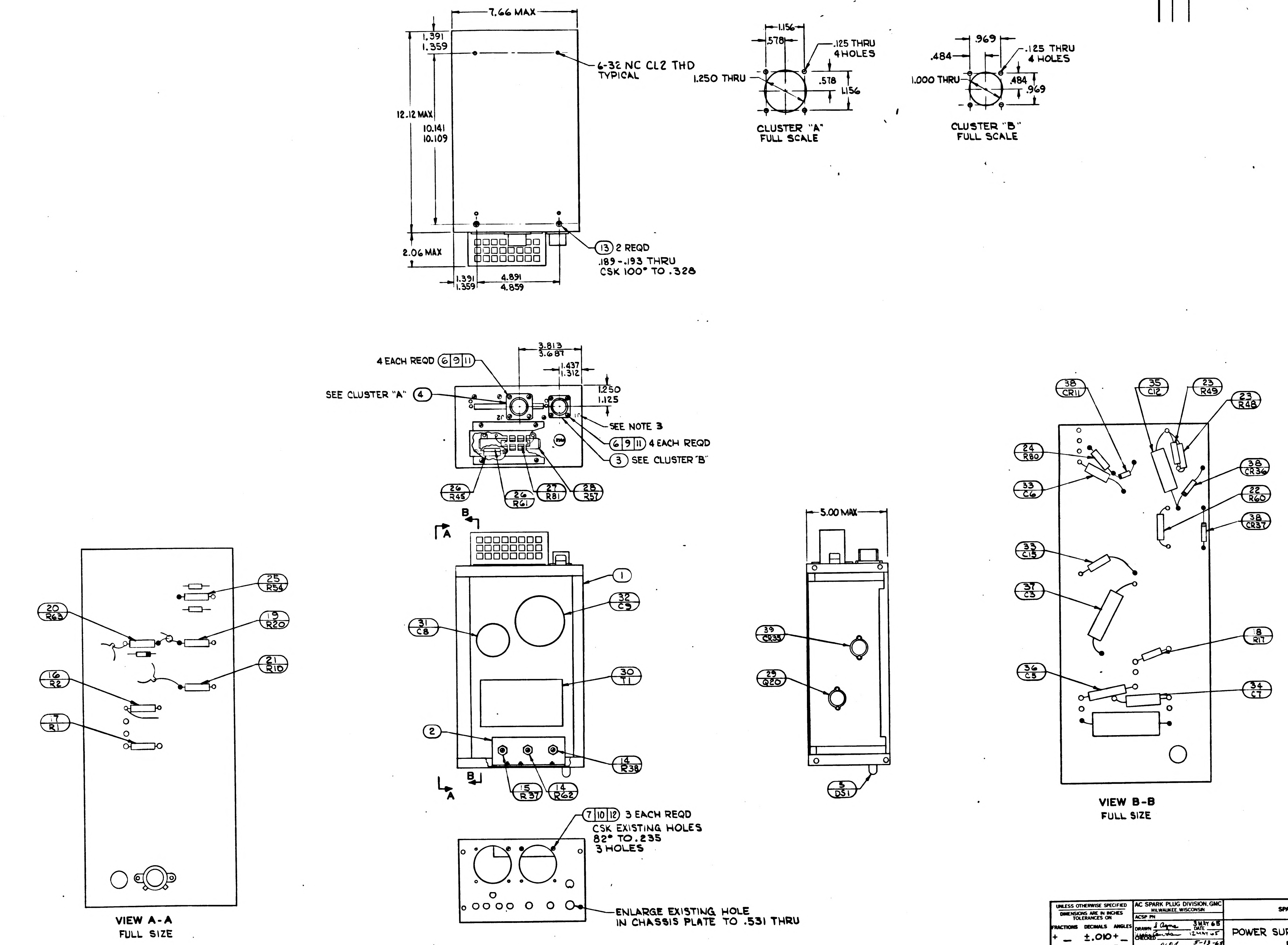
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

POWER SUPPLY, HALF RACK -
5 AMP
ALTERED COMMERCIAL ITEM

CODE IDENT NO 99974
SIZE E
2900122
SCALE
SHEET 1 OF 2

REVISIONS 23329

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER MXC 204748		10 SEP 65	
B		INITIAL RELEASE CLASS A PER TDRR 23399			


7.66 MAX
1.391
1.359
6-32 NC CL2 THD
TYPICAL
12.12 MAX
10.141
10.109
13 2 REQD
.189-.193 THRU
CSK 100° TO .328
2.06 MAX
1.391
1.359
4.891
4.859
1.156
.578
.125 THRU
4 HOLES
1.250 THRU
.578
1.156
CLUSTER "A"
FULL SCALE
.969
.484
.125 THRU
4 HOLES
1.000 THRU
.484
.969
CLUSTER "B"
FULL SCALE
3.813
3.687
1.437
1.312
1.250
1.125
4 EACH REQD 6 9 11
SEE CLUSTER "A" 4
J2
J1
SEE NOTE 3
6 9 11 4 EACH REQD
3 SEE CLUSTER "B"
26 R45
26 R61
27 R81
28 R57
B
A
1
32 C9
31 C8
30 T1
2
14 R38
15 R37
14 R62
B
A
7 10 12 3 EACH REQD
CSK EXISTING HOLES
82° TO .235
3 HOLES
ENLARGE EXISTING HOLE
IN CHASSIS PLATE TO .531 THRU
5.00 MAX
39 CR35
29 Q20
5 DS1
25 R54
20 R63
19 R20
21 R10
16 R2
17 R1
VIEW A-A
FULL SIZE
38 CR11
35 C12
23 R49
23 R48
24 R80
33 C6
38 CR36
22 R60
38 CR37
33 C15
37 C3
18 R17
36 C5
34 C7
VIEW B-B
FULL SIZE

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± .010 ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN S Agne DATE 3 MAY 65
CHECKED 12 MAY 65
APPROVAL 5-13-65
APPROVAL 10
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

POWER SUPPLY, HALF RACK-
5 AMP
ALTERED COMMERCIAL ITEM

CODE IDENT NO. 99974
SIZE E
2900122
SCALE 1/2
SHEET 2 OF 2

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		REVISED PER DO 60464		15 MAY 65	E / MEM
B		REVISED PER DO 60822		5 AUG 65	DRD / RWH
C		REVISED PER DO60903		16 AUG 65	FRW / WT
D		REVISED PER MXC 206118		19 OCT 65	LK / WT.
E		INITIAL RELEASE CLASS A PER TDRR 23380		19 OCT 65	FE / JCW

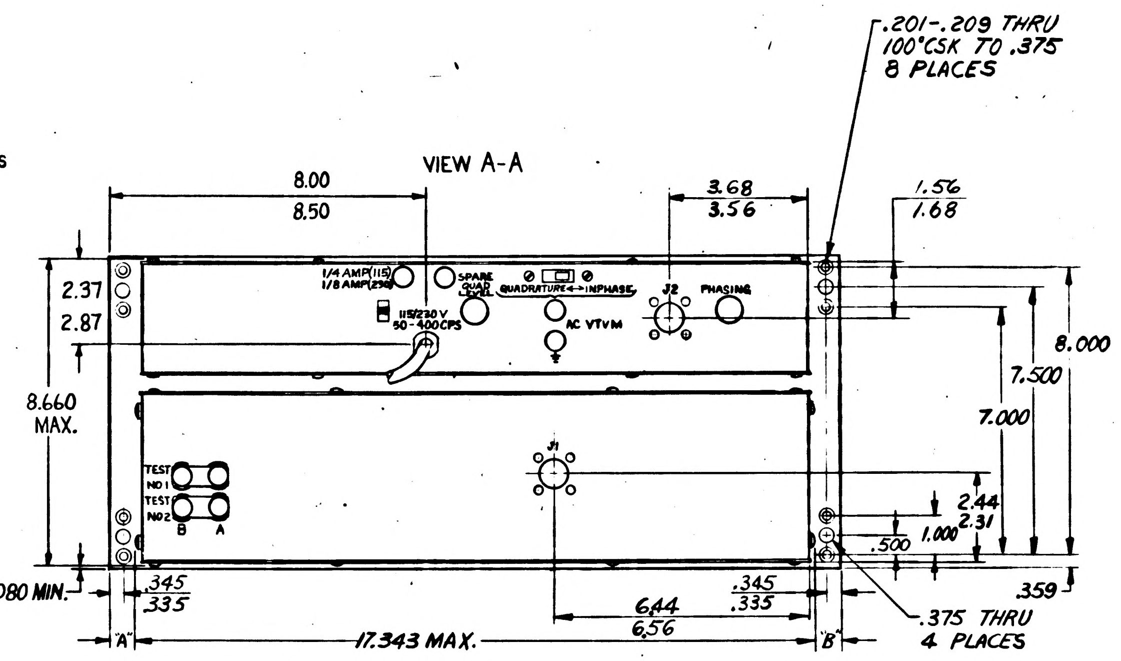
REVISIONS 23380

NOTES:

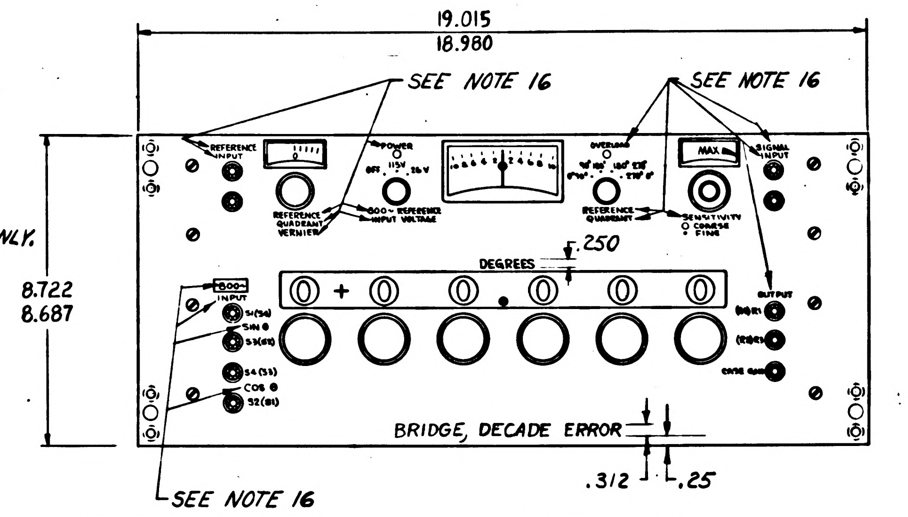
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. EXCEPT THAT 2900127 SHALL BE SUBSTITUTED FOR 2900128 THE EQUIPMENT SHALL COMPLY WITH ALL "REQUIREMENTS" AND SHALL PASS ALL "TESTS" IN PS 2900128 UNDER THE "TEST CONDITIONS" SPECIFIED IN PS 2900128 NO PART OF PS 2900128 IS APPLICABLE OTHER THAN THOSE SECTIONS SPECIFIED IN THIS NOTE.
3. TWO COPIES OF THE SERVICE MANUAL CONTAINING A PARTS LIST, SCHEMATIC DIAGRAM OPERATING INSTRUCTION, MAINTENANCE INSTRUCTIONS, AND CALIBRATION INSTRUCTIONS WHICH ARE ADEQUATE FOR COMPLETE MAINTENANCE AND OPERATION OF THIS INSTRUMENT SHALL BE SUPPLIED WITH EACH UNIT. ONE COPY OF INSPECTION TEST DATA SHALL BE SUPPLIED WITH EACH UNIT.
4. ALLOW .25 CLEARANCE BEHIND HOLES.
5. POWER CORD SHALL BE A 3 WIRE CORD 6 FEET LONG WITH A STANDARD 3 PRONG 115V PLUG ATTACHED TO ONE END. THE OTHER END SHALL BE TERMINATED WITHIN THE INSTRUMENT.
6. THIS INSTRUMENT SHALL HAVE 5 WAY BINDING POSTS FOR ALL FRONT CONNECTIONS. THESE BINDING POSTS SHALL HAVE A HOLE DIAMETER OF .163 ± .005 AND DEPTH OF HOLE OF .50 MINIMUM TO MATE WITH STANDARD SINGLE BANANA PLUGS.
7. A CABLE SHALL BE PROVIDED TO CONNECT THE BRIDGE OUTPUT TO SIGNAL INPUT. THIS CABLE SHALL HAVE MOLDED TYPE DOUBLE BANANA PLUGS ON EACH END TO MATE WITH THE APPROPRIATE BINDING POSTS OF THE DECADE ERROR BRIDGE.
8. THE SUPPLIERS NAME, ADDRESS, AND NASA PART NUMBER SHALL BE PLACED ON THE OUTSIDE SURFACE OF THE REAR PLATE PER ND1002019. THIS INFORMATION SHALL NOT APPEAR ON THE FRONT PANEL.
9. APPLY FINISH P513 OF MIL-F-14072 TO ENTIRE PANEL. APPLY MIL-P-8585 PRIMER AND 2 COATS OF TTE-529 CLASS B SEMI GLOSS ENAMEL, LIGHT GRAY, COLOR 26440 OF FED-STD-595 TO FRONT AND EDGES OF PANEL ONLY.
10. FRONT PANEL ALUMINUM ALLOY, QQ-A-250, TEMPER H-32.
11. ALL KNOBS SHALL BE PER MS91528 TYPE F AND K WHERE PRACTICAL. ALL KNOBS SHALL BE FLAT BLACK EXCEPT WHERE THE KNOB IS PART OF A COLOR CODE.
12. SILK SCREEN CHARACTERS PER ND1002112, .125 HIGH UNLESS OTHERWISE SPECIFIED, USING SEMI-GLOSS ENAMEL PER ND1002111, COLOR INSTRUMENT BLACK NO 514 OF ANA-157. CHARACTER STYLE FUTURA DEMI-BOLD PER ND1002122, TYPE I. CENTRALIZE AS SHOWN. SILK SCREEN FRONT PANEL ONLY.
13. DIMENSION "A" SHALL BE EQUAL TO DIMENSION "B" WITHIN .040.
14. POWER INDICATOR SHALL BE GREEN.
15. OVERLOAD INDICATOR SHALL BE AMBER.
16. DESIGNATED CHARACTERS ARE .187 HIGH.
17. ALL CHARACTERS OTHER THAN ON THE FRONT PANEL TO BE MARKED PER ND 1002019.

THE SINGER CO. (88867)
METRICS DIV GERTSCH DEPT
LOS ANGELES, CALIF.
BULLETIN DEB-2C-8R

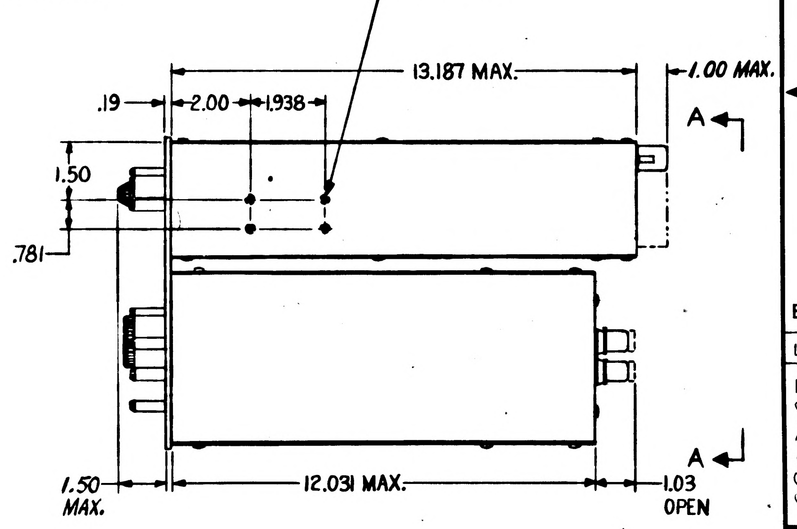
VIEW A-A



.201-.209 THRU
100°CSK TO .375
8 PLACES
8.00
8.50
3.68
3.56
1.56
1.68
2.37
2.87
8.660
MAX.
1/4 AMP(115)
1/8 AMP(230)
SPARE QUAD LEVEL
115/230 V
50-400CPS
QUADRATURE ↔ INPHASE
AC VTVM
J2
PHASING
J1
TEST NO 1
TEST NO 2
B
A
8.000
7.500
7.000
2.44
2.31
1.000
.500
.359
.080 MIN.
.345
.335
6.44
6.56
.345
.335
"A"
17.343 MAX.
"B"
.375 THRU
4 PLACES



19.015
18.980
SEE NOTE 16
SEE NOTE 16
REFERENCE INPUT
POWER
OFF 115V 26V
REFERENCE QUADRANT VERNIER
800~ REFERENCE INPUT VOLTAGE
OVERLOAD
REFERENCE QUADRANT
SENSITIVITY
COARSE
FINE
MAX
SIGNAL INPUT
8.722
8.687
.250
DEGREES
0 + 0 0 . 0 0 0
800~ INPUT
S1(S4)
SIN θ
S3(S2)
S4(S3)
COS θ
S2(S1)
OUTPUT
(R4)R1
(R2)R3
CASE GND
BRIDGE, DECADE ERROR
.312
.25
SEE NOTE 16



.069-.073 THRU
2-56 NC-2B
SEE NOTE 4
13.187 MAX.
1.00 MAX.
.19
2.00
1.938
A
1.50
.781
A
1.50
MAX.
12.031 MAX.
1.03
OPEN

CONNECTOR IDENTIFICATION	PIN	PIN USAGE	REMARKS
J1 MS 3112 E-12-10P	C	INPUT SIN θ S1 (S4)	
	D	INPUT SIN θ S3 (S2)	
	E	INPUT COS θ S4 (S3)	
	F	INPUT COS θ S2 (S1)	
	G	OUTPUT (R4) R1 HI	
	H	OUTPUT (R2) R3 LO	
	A	CASE GROUND	
	B,J,K	SPARE	
J2 MS 3112 E-12-10 PW	C	SIGNAL INPUT HI	
	D	SIGNAL INPUT LO	
	F	REFERENCE INPUT HI	
	G	REFERENCE INPUT LO	
	A	CASE GROUND	
	B,E,H	SPARE	
	J K	SPARE	

NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+	±.005	+
−	±.03	−

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN

DRAWN DATE 19 APR 65
CHECKED 22 APR 65
APPROVAL E. Engelhardt 29 APR 65
APPROVAL L. Gilman 10/19/65
NASA APPROVAL
MIT APPROVAL 20 Oct 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BRIDGE, DECADE ERROR

SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 99974
SIZE D
2900127
SCALE —
SHEET 1 of 1

2900127 E

MIL 10770-A

F 2900127

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
REVISIONS 2-380					
A		REVISED PER DO 60464		5 MAY 65	MEM
B		REVISED PER DO 60822		5 AUG 65	OKD RWH
C		REVISED PER DO60903		16 AUG 65	FRW
D		REVISED PER MXC 206118		19 OCT 65	LK
E		INITIAL RELEASE CLASS A PER TDRR 23380		19 OCT 65	JCW
F		REVISED PER TDRR 27536		7 APR 66	RWH

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. EXCEPT THAT 2900127 SHALL BE SUBSTITUTED FOR 2900128 THE EQUIPMENT SHALL COMPLY WITH ALL "REQUIREMENTS" AND SHALL PASS ALL "TESTS" IN PS 2900128 UNDER THE "TEST CONDITIONS" SPECIFIED IN PS 2900128 NO PART OF PS 2900128 IS APPLICABLE OTHER THAN THOSE SECTIONS SPECIFIED IN THIS NOTE.
3. TWO COPIES OF THE SERVICE MANUAL CONTAINING A PARTS LIST, SCHEMATIC DIAGRAM OPERATING INSTRUCTION, MAINTENANCE INSTRUCTIONS, AND CALIBRATION INSTRUCTIONS WHICH ARE ADEQUATE FOR COMPLETE MAINTENANCE AND OPERATION OF THIS INSTRUMENT SHALL BE SUPPLIED WITH EACH UNIT. ONE COPY OF INSPECTION TEST DATA SHALL BE SUPPLIED WITH EACH UNIT.
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11. ALL KNOBS SHALL BE PER MS91528 TYPE F AND K WHERE PRACTICAL. ALL KNOBS SHALL BE FLAT BLACK EXCEPT WHERE THE KNOB IS PART OF A COLOR CODE.
12. SILK SCREEN CHARACTERS PER ND1002112, .125 HIGH UNLESS OTHERWISE SPECIFIED, USING SEMI-GLOSS ENAMEL PER ND1002111, COLOR INSTRUMENT BLACK NO 514 OF ANA-157. CHARACTER STYLE FUTURA DEMI-BOLD PER ND1002122, TYPE I. CENTRALIZE AS SHOWN. SILK SCREEN FRONT PANEL ONLY.
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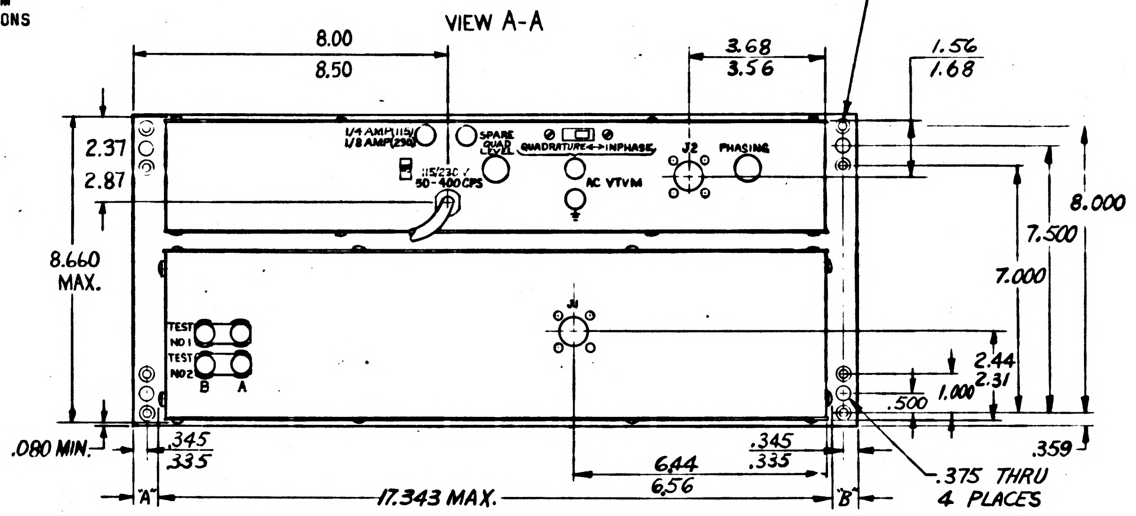
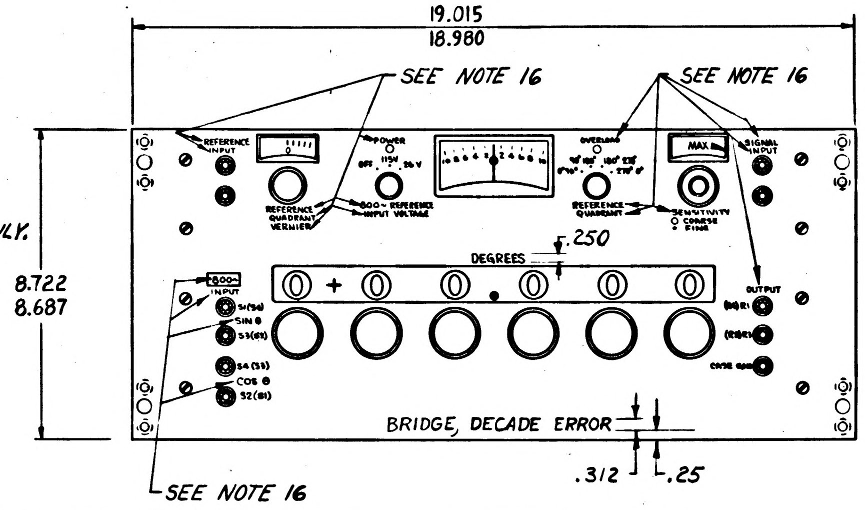
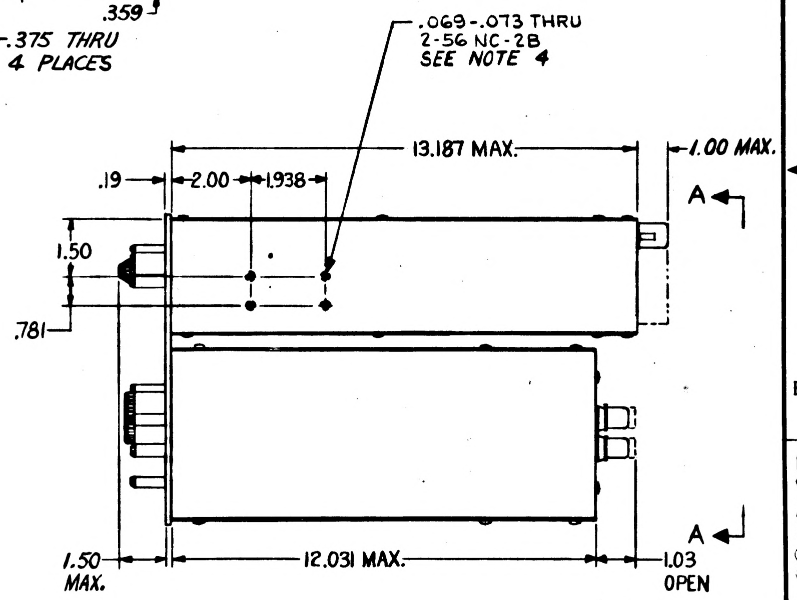
14. POWER INDICATOR SHALL BE GREEN.
15. OVERLOAD INDICATOR SHALL BE AMBER.
16. DESIGNATED CHARACTERS ARE .187 HIGH.
17. ALL CHARACTERS OTHER THAN ON THE FRONT PANEL TO BE MARKED PER ND 1002019.

THE SINGER CO. (88867)
METRICS DIV GERTSCH DEPT
LOS ANGELES, CALIF.
BULLETIN DEB-2C-8R

VIEW A-A


8.00
8.50
3.68
3.56
1.56
1.68
.201-.209 THRU 100°CSK TO .375 8 PLACES
2.37
2.87
8.660 MAX.
1/4 AMP 115V
1/8 AMP 230V
SPARE QUAD
QUADRATURE ↔ INPHASE
J2
PHASING
115/230 V 50-400 CPS
AC VTVM
8.000
7.500
7.000
TEST NO 1
TEST NO 2
B A
J1
2.44
2.31
1.000
.500
.080 MIN.
.345
.335
6.44
6.56
.345
.335
.359
.375 THRU 4 PLACES
A
17.343 MAX.
B


19.015
18.980
SEE NOTE 16
SEE NOTE 16
REFERENCE INPUT
POWER
OFF 115V 230V
REFERENCE QUADRANT VERNIER
400 ~ REFERENCE INPUT VOLTAGE
OVERLOAD
REFERENCE QUADRANT
MAX
SIGNAL INPUT
SENSITIVITY
.250
DEGREES
400~ INPUT
S1 (S4)
SIN θ
S3 (S2)
S4 (S3)
COS θ
S2 (S1)
OUTPUT
8.722
8.687
BRIDGE, DECADE ERROR
.312
.25
SEE NOTE 16


.069-.073 THRU 2-56 NC-2B SEE NOTE 4
13.187 MAX.
1.00 MAX.
.19
2.00
1.938
A
1.50
.781
A
1.50 MAX.
12.031 MAX.
1.03 OPEN

CONNECTOR IDENTIFICATION	PIN	PIN USAGE	REMARKS
J1 MS 3112 E-12-10P	C	INPUT SIN θ S1 (S4)	
	D	INPUT SIN θ S3 (S2)	
	E	INPUT COS θ S4 (S3)	
	F	INPUT COS θ S2 (S1)	
	G	OUTPUT (R4) R1 HI	
	H	OUTPUT (R2) R3 LO	
	A	CASE GROUND	
	B, J, K	SPARE	
J2 MS 3112 E-12-10 PW	C	SIGNAL INPUT HI	
	D	SIGNAL INPUT LO	
	F	REFERENCE INPUT HI	
	G	REFERENCE INPUT LO	
	A	CASE GROUND	
	B, E, N	SPARE	
	J K	SPARE	

NEXT ASSY	USED ON	APPLICABLE DASH NO.
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+	±.005	+
−	±.03	−

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN DATE 19 APR 65
CHECKED 22 APR 65
APPROVAL E. Engelhardt 28 APR 65
APPROVAL 10/14/65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

BRIDGE, DECADE ERROR
SPECIFICATION CONTROL DRAWING

CODE IDENT NO. 99974
SIZE D
2900127
SCALE —
SHEET 1 of 2

2900127

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG. NO.	DATE	APPD
F		THIS SHEET ADDED PER TDRR 27536		7-APR-66	J. RWH

DESIGN REQUIREMENTS:

1. VOLT-AMPERES. THE DEB SHALL DRAW A MAXIMUM OF 20 VOLT-AMPERES.
2. RANGE. THE DEB SHALL BE CAPABLE OF MEASURING RESOLVER ANGLES FROM 0° TO 360° WITHOUT EXTERNALLY REVERSING CONNECTIONS TO THE RESOLVER.
3. RESOLUTION. THE RESOLUTION OF THE DIGITAL READOUT OF THE DEV SHALL BE 0.001 DEGREES-OF-ARC.
4. RESOLVER VOLTAGE. THE DEB SHALL BE CAPABLE OF ACCEPTING VOLTAGES OF 170 V RMS MAXIMUM AT 800 CPS ACROSS THE SIN θ AND COS θ INPUTS.
5. OUTPUT IMPEDANCE. THE OUTPUT IMPEDANCE AT THE ISOLATED OUTPUT SHALL BE 420 OHMS MAXIMUM AT 800 CPS WITH A ZERO IMPEDANCE INPUT APPLIED TO THE SIN θ AND COS θ INPUTS.
6. FREQUENCY. THE DEB REQUIREMENTS SHALL BE EFFECTIVE FOR A FREQUENCY OF 800 ± 20 CPS.
7. REFERENCE VOLTAGE. THE DEB SHALL OPERATE WITH A REFERENCE INPUT VOLTAGE OF 28 ± 2 VOLTS AND 115 ± 10 VOLTS.
8. REFERENCE PHASE SHIFT READOUT. THE REFERENCE PHASE SHIFTER SHALL HAVE A READOUT CAPABLE OF DISPLAYING THE ANGLE OF PHASE SHIFT OF THE REFERENCE INPUT WITH AN ERROR OF LESS THAN ± 2 DEGREES.
9. HARMONIC REJECTION. THE DEB NULL INDICATOR SHALL HAVE A MINIMUM OF 25 DB OF REJECTION BELOW 400 CPS AND 40 DB OF REJECTION FROM 1600 CPS TO 1 MEGACYCLE.
10. RATED OPERATING CONDITIONS. THE DECADE ERROR BRIDGE ASSEMBLY (DEB) SHALL BE CAPABLE OF PERFORMING AS SPECIFIED HEREIN, UNDER ALL COMBINATIONS OF THE FOLLOWING CONDITIONS:
    - a. AMBIENT TEMPERATURE 15° TO 35°C
    - b. AMBIENT RELATIVE HUMIDITY 10 TO 90 PERCENT
    - c. OPERATING POWER
        - (1) VOLTAGE: 105V TO 125V, SINGLE PHASE
        - (2) FREQUENCY: 55 TO 65 CPS
    - d. WARM-UP TIME: NO WARM-UP REQUIRED.

THIS SHEET ADDED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE DECIMALS + − 3 PLACE DECIMALS + − ANGLES + −	AC ELECTRONICS DIVISION GENERAL MOTORS CORP. MILWAUKEE WIS.	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	DRAWN Bender DATE 7-APR-66 CHECKED 12 APR 66 APPROVAL 12 APR 66	BRIDGE, DECADE ERROR SPECIFICATION CONTROL DRAWING
DO NOT SCALE THIS DRAWING	CONTRACT NAS 9-497	
MATERIAL	NASA APPROVAL	SIZE D CODE IDENT NO. 99974 2900127
APPROVAL	MIT APPROVAL	SCALE SHEET 2 OF 2

APOLLO G&C Specification
PS2900128 Rev. ~~A~~ B
Original Issue Date:
Release Authority: TDRR
Class A Release 23380
Code Ident No. 99974

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

BRIDGE, DECADE ERROR, ASSEMBLY

DRAWING NO. 2900128

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
9/28/65	A	MXC 205509	6&9		
10/18/65	B	23380	ALL, INT. REL.	10-20-65	

This specification consists of page 1 to 16 inclusive.

APPROVALS	NASA/MSC	10-19-65 20 Oct 65 MIT/IL	ACSP

1. SCOPE

1.1 PURPOSE. This specification establishes the detail requirements for complete identification and acceptance of the Decade Error Bridge Assembly Part No. 2900128-011.

2. APPLICABLE DOCUMENTS

2.1 EFFECTIVE ISSUES. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, Military Standards and Specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G&C

ND1002214	General Specification for Preservation, Packaging, Packing and Container Marking of APOLLO Guidance and Navigation Major Assemblies, Assemblies, Subassemblies, Parts and Associated Ground Support Equipment

DRAWINGS

APOLLO G&C

2900128	Bridge, Decade Error, Assembly

(Copies of specifications, standards, drawings, bulletins, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 CONFLICTING REQUIREMENTS. In event of a conflict between requirements, the following order of precedence shall apply. The contractor shall also notify MIT/IL APOLLO Management of the conflict.

a. The contract
b. This specification
c. Documents listed in this section

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 Rated Operating Conditions. The Decade Error Bridge Assembly (DEB) shall be capable of performing as specified herein, under all combinations of the following conditions:

a. Ambient temperature	15° to 35°C
b. Ambient relative humidity	10 to 90 percent
c. Operating power	
(1) Voltage:	105V to 125V, single phase
(2) Frequency:	55 to 65 cps
d. Warm-up time	No warm-up required

3.1.2 Characteristics

3.1.2.1 Volt-Amperes. The DEB shall draw a maximum of 20 volt-amperes.

3.1.2.2 Range. The DEB shall be capable of measuring resolver angles from 0° to 360° without externally reversing connections to the resolver.

3.1.2.3 Accuracy. The maximum error of the DEB shall be 2 seconds-of-arc.

3.1.2.4 Resolution. The resolution of the digital readout of the DEB shall be 0.001 degrees-of-arc.

3.1.2.5 Resolver Voltage. The DEB shall be capable of accepting voltages of 170V rms maximum at 800 cps across the Sin θ and Cos θ inputs.

3.1.2.6 Output Impedance. The output impedance at the isolated output shall be 420 ohms maximum at 800 cps with a zero impedance input applied to the Sin θ and Cos θ inputs.

3.1.2.7 Transformation Ratio. The transformation ratio from Sin θ and Cos θ inputs to the isolated output shall be 1.00 ± 0.01.

3.1.2.8 Input Impedance. The input impedances shall be as follows:

a. Sin θ input: 400K ohms minimum at 800 cps
b. Cos θ input: 400K ohms minimum at 800 cps
c. Signal input: 100K ohms minimum
d. Reference input: 100K ohms minimum

3.1.2.9 Input Isolation. The Sin θ, Cos θ, bridge output, and reference inputs shall be isolated from each other and from case ground. The case ground and power ground shall be isolated.

3.1.2.10 Frequency. The DEB requirements shall be effective for a frequency of 800±20 cps.

3.1.2.11 Reference Voltage. The DEB shall operate with a reference input voltage of 28±2 volts and 115±10 volts.

3.1.2.12 Sensitivity. The DEB null indicator shall have a continuously adjustable sensitivity from 10 millivolts full scale to 100 volts full scale.

3.1.2.13 Reference Phase Shifter. The DEB null indicator shall have a phase shifter capable of shifting the phase of the reference input through an angle of 360 degrees.

3.1.2.14 Reference Phase Shift Readout. The reference phase shifter shall have a readout capable of displaying the angle of phase shift of the reference input with an error of less than ±2 degrees.

3.1.2.15 Harmonic Rejection. The DEB null indicator shall have a minimum of 40 DB of rejection below 400 cps and from 1600 cps to 1 megacycle.

3.1.2.16 Overload Indicator. An overload indicator shall be provided to indicate when the quadrature component of the input signal to the null indicator is about to exceed the limit of the rejection capability of the null indicator.

3.1.2.17 Voltage Gradient. The error voltage gradient shall be constant over the entire range of resolver angles.

3.1.2.18 Calibration. Pre-use calibration shall not be required.

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with APOLLO G&C Drawing 2900128 and all drawings and engineering data referenced thereon.

4. QUALITY ASSURANCE PROVISIONS

4.1 GENERAL. The contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein.

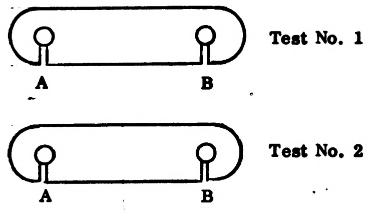
4.1.1 Test Conditions

4.1.1.1 Environmental. Unless otherwise specified the DEB shall be tested under the following conditions.

- a. Temperature: 25° ±10°C
- b. Relative Humidity: 90% max
- c. Barometric Pressure: 28 to 32 inches of Hg

4.1.1.2 Operating Power. The DEB shall perform the tests specified in 4.2.2 through 4.2.9 with an input of 115±10 volts, 60±5 cps applied.

4.1.1.3 Shorting Links. Shorting links for tests specified in 4.2.2 through 4.2.9 shall be applied to (Test No. 1) and (Test No. 2) binding posts A and B as shown in Figure 1.



POSITION OF SHORTING LINKS ON REAR OF EQUIPMENT

FIGURE 1

4.1.2 Nonconforming Units. Failure of the unit to pass any examination or test of this specification shall automatically classify the unit as nonconforming. Each nonconforming unit corrected by the contractor shall be reinspected. Reinspection may be limited to the test or examination which defined the nonconformance, or, when so directed by the cognizant inspector, a complete retest or reexamination may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the contractor to the cognizant NASA representative.

4.2 TESTS

4.2.1 Drawing Compliance. The assembly shall be visually examined for compliance to the requirements of APOLLO G&C Drawing 2900128. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulant defects, contaminants, pin misalignment, and legibility and appearance of markings.

4.2.2 Ground Isolation. With no operating power applied and the REFERENCE VOLTAGE INPUT switch set to the "115V" position, the resistance between the following points shall be greater than 100 megohms. The measuring voltage shall not exceed 50 volts.

FROM	TO
S3 Sin θ	S2 Cos θ
S3 Sin θ	R3 Output
S3 Sin θ	Reference Input (Bottom Jack)
S3 Sin θ	Case Ground
S3 Sin θ	Either flat prong of power plug
S2 Cos θ	R3 Output
S2 Cos θ	Reference Input (Bottom Jack)
S2 Cos θ	Case Ground
S2 Cos θ	Either flat prong of power plug
R3 Output	Reference Input (Bottom Jack)
R3 Output	Case Ground
R3 Output	Either flat prong of power plug
Reference Input (Bottom Jack)	Case Ground
Reference Input (Bottom Jack)	Either flat prong of power plug
Case Ground	Either flat prong of power plug

4.2.2.1 Continuity. With no operating power applied the resistance between the following points shall be less than 0.5 ohms.

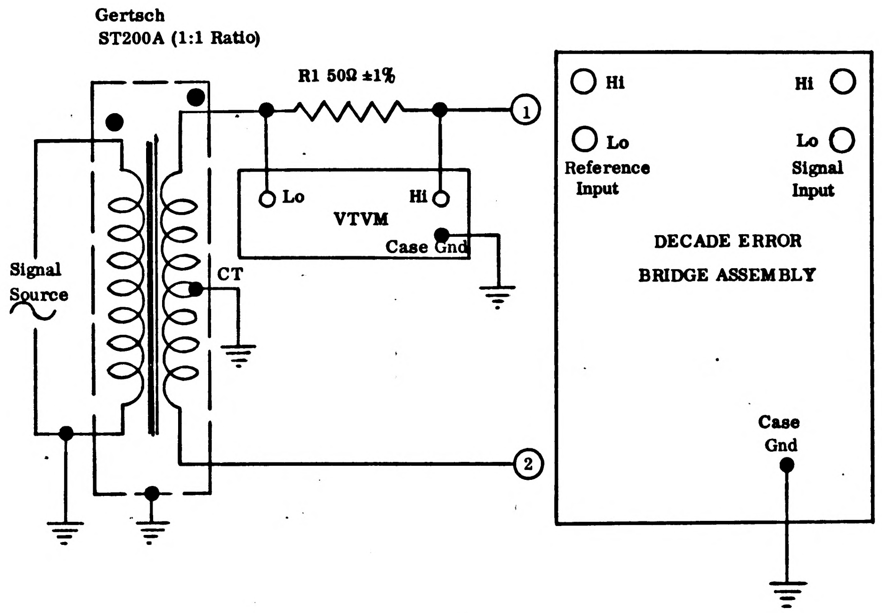
FROM	TO
Reference Input (Top Jack)	J2-F
Reference Input (Bottom Jack)	J2-G
Signal Input (Top Jack)	J2-C
Signal Input (Bottom Jack)	J2-D
S_1 Sin θ	J1-C
S_3 Sin θ	J1-D
S_4 Cos θ	J1-E
S_2 Cos θ	J1-F
R_1 Output	J1-G
R_3 Output	J1-H
Case Ground Binding Post	J1-A
Case Ground Binding Post	J2-A
Case Ground Binding Post	Case (Chassis)
Case Ground Binding Post	Round prong of power plug

4.2.3 Input Impedance Tests

4.2.3.1 Reference Input. With the test setup as recommended in Figure 2 and points 1 and 2 connected to the DEB reference input Hi and Lo respectively and the signal source set to 80±1V rms at 800±20 cps, the voltage measured across R1 shall not be greater than 0.04V rms.

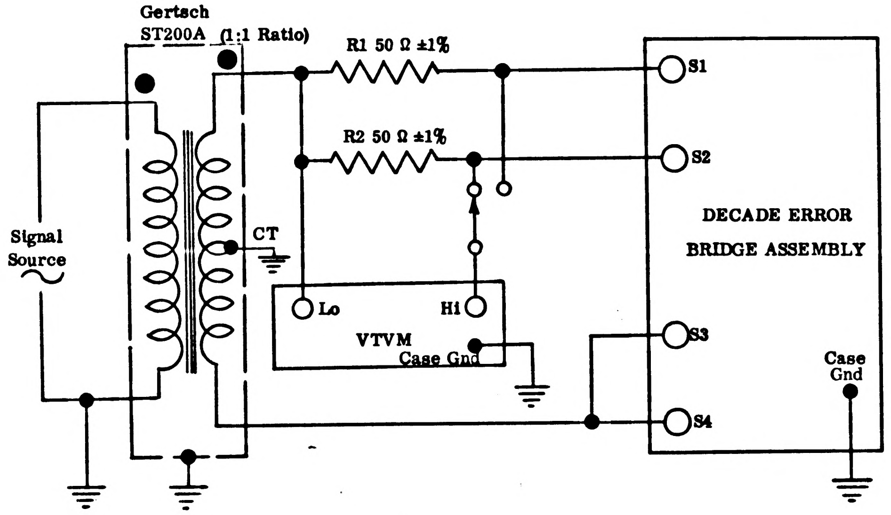
4.2.3.2 Signal Input. With the test setup as recommended in Figure 2, the transformer ST200A center tap removed from ground, points 1 and 2 connected to the DEB signal input Hi and Lo respectively and the signal source set to 80±1V rms at 800±20 cps, the voltage measured across R1 shall not be greater than 0.04V rms.

4.2.3.3 Sin θ, Cos θ Inputs. With the test setup as recommended in Figure 3, the signal source set to 80±1V rms at 800±20 cps, and the DEB dials set to 45.000 degrees, the voltage measured across R1 and R2 shall be less than 0.01V rms.


Gertsch
ST200A (1:1 Ratio)
R1 50Ω ±1%
①
Lo
Hi
VTVM
Case Gnd
Signal
Source
CT
②
Hi
Lo
Reference
Input
Hi
Lo
Signal
Input
DECADE ERROR
BRIDGE ASSEMBLY
Case
Gnd

RECOMMENDED INPUT IMPEDANCE TEST SETUP

FIGURE 2


Gertsch
ST200A (1:1 Ratio)
R1 50 Ω ±1%
R2 50 Ω ±1%
Signal
Source
CT
Lo
Hi
VTVM
Case Gnd
S1
S2
S3
S4
DECADE ERROR
BRIDGE ASSEMBLY
Case
Gnd

RECOMMENDED INPUT IMPEDANCE TEST SETUP

FIGURE 3

4.2.4 Null Indicator Sensitivity

4.2.4.1 Maximum Sensitivity. With the recommended test setup as shown in Figure 4, a 28V ±2V, 800±20 cps input applied to the Reference Input of the DEB, the following set to the indicated positions and then with R1 adjusted until the DEB null indicator indicates full scale, the voltage as read on the VTVM shall be less than 10 millivolts.

CONTROL OR SWITCH	POSITION
REFERENCE INPUT VOLTAGE	"26V"
REFERENCE QUADRANT	"0° -90°"
REFERENCE QUADRANT VERNIER	"0°"
S1	"1"
R1	0 Volt Output
SENSITIVITY (Both Coarse and Fine)	"MAX"

4.2.4.2 Minimum Sensitivity. With the recommended test setup as shown in Figure 4, 115±5V applied to the Reference Input of the DEB, the following set to the indicated positions and then with R2 adjusted for a full scale indication on the DEB null indicator, the voltage as read on the VTVM shall be 100±volts rms maximum.

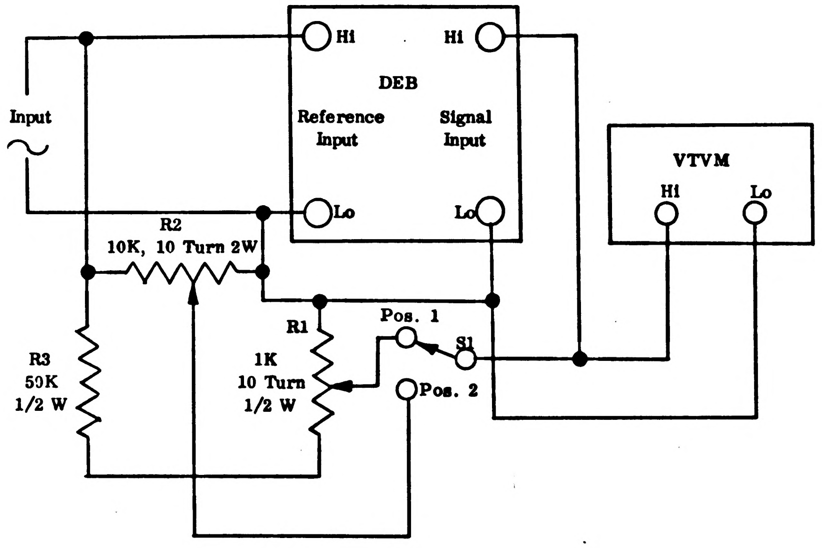
CONTROL OR SWITCH	POSITION
REFERENCE INPUT VOLTAGE	"115V"
SENSITIVITY (Both Coarse and Fine)	"MIN"
S1	"2"
REFERENCE QUADRANT	"0° -90°"
REFERENCE QUADRANT VERNIER	"0°"

4.2.5 Reference Phase Shifter. With the recommended test setup as shown in Figure 4, a 115±10V rms, 800±20 cps input applied to the Reference Input, S1 set to the "2" position, the REFERENCE INPUT VOLTAGE switch set to the "115V" position, the REFERENCE QUADRANT switch set to the "0° -90°" position, the REFERENCE QUADRANT VERNIER set to the "0°" position, R2 adjusted for an output voltage of 25.0±0.2V rms, and the SENSITIVITY controls adjusted for 90 percent of full scale null indicator deflection, the following shall be performed.

a. With the REFERENCE QUADRANT switch set to the "90° -180°" position, the null meter shall indicate 0±5 percent of full scale.

b. With the REFERENCE QUADRANT switch set to the "180° -270°" position, the null indicator shall indicate 85 to 95 percent of full scale to the left.

c. With the REFERENCE QUADRANT switch set to the "270° -0°" position, the null indicator shall indicate 0±5 percent of full scale.


Input
DEB
Hi
Reference Input
Lo
Hi
Signal Input
Lo
VTVM
Hi
Lo
R2
10K, 10 Turn 2W
R3
50K
1/2 W
R1
1K
10 Turn
1/2 W
Pos. 1
S1
Pos. 2

RECOMMENDED SENSITIVITY AND PHASE SHIFTER TEST SETUP

FIGURE 4

d. With the REFERENCE QUADRANT switch set to the "0° -90°" position, the REFERENCE QUADRANT VERNIER set to the "15" position, R2 adjusted for 90 percent of full scale null indicator deflection, the VTVM shall indicate 25.1 to 26.7V rms. Repeat this test except under the following conditions.

  (1) With the REFERENCE QUADRANT VERNIER set to the "30" position, the VTVM shall indicate 28.0 to 29.8V rms.

  (2) With the REFERENCE QUADRANT VERNIER set to the "45" position, the VTVM shall indicate 34.2 to 36.7V rms.

  (3) With the REFERENCE QUADRANT VERNIER set to the "60" position, the VTVM shall indicate 47.1 to 53.2V rms.

  (4) With the REFERENCE QUADRANT VERNIER set to the "75" position, the VTVM shall indicate 85.5 to 111.0V rms.

  (5) With the REFERENCE QUADRANT VERNIER set to the "90" position, and the R2 adjustment unchanged from 4.2.5.d.4, the null indicator shall indicate ±15 percent of full scale.

4.2.6 Overload Indicator. With the REFERENCE QUADRANT switch set to the "0° -90°" position, the REFERENCE QUADRANT VERNIER set to the "0" position, a 28±2V rms, 800±20 cps applied to both Reference Input and Signal Input, the REFERENCE INPUT VOLTAGE switch set to the "26V" position, the SENSITIVITY controls adjusted for full scale, then with the REFERENCE QUADRANT switch set to the "90° -180° " position, the REFERENCE QUADRANT VERNIER set for 0 deflection of the null indicator, adjust the SENSITIVITY controls until the OVERLOAD INDICATOR just comes on, the null indicator shall indicate less than 5 percent of full scale deflection.

4.2.7 Transformation Ratio

a. With the DEB Decade dials set to an angle of "0 + 00.000" degrees, an input of 28±2V rms, 800±20 cps applied to the Sin θ input (terminals S1 and S3), and a jumper between terminals S3 and R3, the voltage as measured with a VTVM connected to S1 (Lo) and R1 (Hi) shall be less than 0.28V rms.

b. With the DEB Decade dials set to an angle of "90 + 00.000", an input of 28±2V rms, 800±20 cps applied to the Cos θ input (terminals S4 and S2), and a jumper between terminals S4 and R3, the voltage as measured with a VTVM connected to S2 (Lo) and R1 (Hi) shall be less than 0.28V rms.

4.2.8 Accuracy. With the recommended test setup as shown in Figure 5, DEB switches and controls set as specified in Table I, the following conditions established and the DEB decade dials set to the angle to be tested, the ratio as read on transformer T3 shall be at the theoretical ratio listed in Table III for the angle being tested ± the maximum deviation listed in Table III for the same angle. This test shall be conducted for each angle listed in Table III.

a. The phase angle voltmeter, V1, shall be set to measure the in-phase component.

b. Switches S1, S2 and S3 shall be set to the positions as required in accordance with Table II.

c. Transformer T1 shall be set to the ratio as required in accordance with Table III.

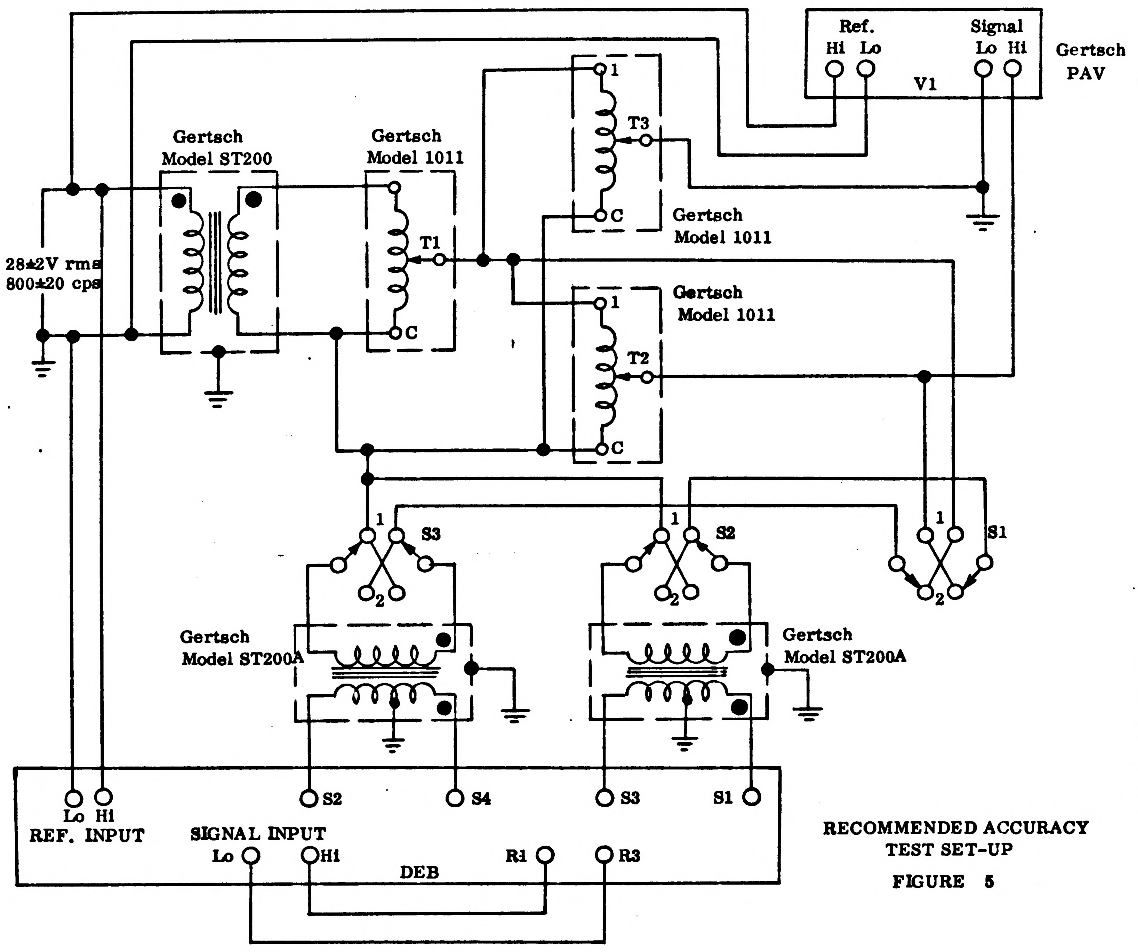
d. Transformer T2 shall be adjusted for a null as read on the DEB null indicator with the SENSITIVITY control at MAX.

e. Transformer T3 shall be adjusted for a null as read on the most sensitive range of the phase angle voltmeter, V1.

TABLE I

SWITCH AND CONTROL SETTINGS

SWITCH/CONTROL	SETTING
REFERENCE QUADRANT	0° -90°
REFERENCE QUADRANT VERNIER	0°
REFERENCE INPUT VOLTAGE	26V


Ref.
Hi Lo
Signal
Lo Hi
V1
Gertsch
PAV
Gertsch
Model ST200
Gertsch
Model 1011
T1
C
1
T3
Gertsch
Model 1011
T2
Gertsch
Model 1011
28±2V rms
800±20 cps
S3
S2
S1
1
2
Gertsch
Model ST200A
Gertsch
Model ST200A
S2
S4
S3
S1
Lo Hi
REF. INPUT
SIGNAL INPUT
Lo
Hi
R1
R3
DEB

RECOMMENDED ACCURACY
TEST SET-UP

FIGURE 5

TABLE II

SWITCH POSITIONS

ANGLE	S1	S2	S3
0 - 40°	2	1	1
45 - 85°	1	1	1
90 - 130°	1	1	2
135 - 175°	2	1	2
180 - 220°	2	2	2
225 - 265°	1	2	2
270 - 310°	1	2	1
315 - 360°	2	2	1

TABLE III

TRANSFORMER RATIOS, ANGULAR ACCURACY

RESOLVER BRIDGE ANGULAR SETTING				T1	THEORETICAL RATIO	MAX DEVIATIONS
0	90	180	270	1.00	0.0000000	0.0000097
5				1.00	0.0874887	0.0000098
10				0.98	0.1763270	0.0000100
15				0.97	0.2679492	0.0000104
20				0.94	0.3639702	0.0000110
25				0.91	0.4663077	0.0000118
30				0.87	0.5773503	0.0000130
35				0.82	0.7002075	0.0000145
40				0.77	0.8390996	0.0000165
45	135	225	315	0.71	1.0000000	0.0000194
50				0.77	0.8390996	0.0000165
55				0.82	0.7002075	0.0000145
60				0.87	0.5773503	0.0000130
65				0.91	0.4663077	0.0000118
70				0.84	0.3639702	0.0000110
75				0.97	0.2679492	0.0000104
80				0.98	0.1763270	0.0000100
85				1.00	0.0874887	0.0000098
			0.001	↑	0.0000175	0.0000097
			0.002		0.0000349	↑
			0.003		0.0000524	
			0.004		0.0000698	
			0.005		0.0000873	
			0.006	↓	0.0001047	↓
			0.007	1.00	0.0001222	0.0000097

TABLE III(Continued)

RESOLVER BRIDGE ANGULAR SETTING				T1	THEORETICAL RATIO	MAX DEVIATIONS
			0.008	1.00	0.0001396	0.0000097
			0.009	↑	0.0001571	↑
			0.010		0.0001745	
			0.020		0.0003491	
			0.030		0.0005236	
			0.040		0.0006981	
			0.050		0.0008727	
			0.060		0.0010472	
			0.070		0.0012217	
			0.080		0.0013963	
			0.090		0.0015708	
			0.100		0.0017453	
			0.200		0.0034907	
			0.300		0.0052360	
			0.400		0.0069814	
			0.500		0.0087269	
			0.600		0.0104724	
			0.700		0.0122179	
			0.800		0.0139635	
			0.900		0.0157093	
			1.000		0.0174551	
			2.000		0.0349208	↓
			3.000		0.0524078	0.0000097
			4.000		0.0699268	0.0000098
			5.000	↓	0.0874887	↑
			6.000	1.00	0.1051042	↓
			7.000	0.99	0.1227846	0.0000098
			8.000	0.99	0.1405408	0.0000100
			9.000	0.98	0.1583844	0.0000100

4.2.9 Voltage Gradient. With the recommended test setup as shown in Figure 5, the REFERENCE INPUT VOLTAGE switch set to the "26V" position, the REFERENCE QUADRANT switch set to the "0° -90°" position, the REFERENCE QUADRANT VERNIER set to the "0° " position, the DEB Decade dials set to "0+00.000" transformer T1 adjusted to the ratio indicated in Table III for the 0° , and transformer T2 adjusted for a null as indicated on the DEB null indicator, and with the DEB Decade dials advanced 5° adjust the SENSITIVITY controls of the DEB null indicator for 90 percent of full scale deflection. Using the same procedure for angles at 5° increments from 0° to 90° in place of 0+00.000 the deflection of the DEB null indicator shall be between 85 and 95 percent of full scale without any sensitivity change.

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES. None.

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PS2900128 Rev. C
Original Issue Date:
Release Authority: TDRR
Class A Release 23380
Code Ident No. 99974

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3/16/66	C	27242	3, 7, 14	WK	ACM

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3.1 PERFORMANCE

3.1.1 Rated Operating Conditions. The Decade Error Bridge Assembly (DEB) shall be capable of performing as specified herein, under all combinations of the following conditions:

a. Ambient temperature	15° to 35°C
b. Ambient relative humidity	10 to 90 percent
c. Operating power	
(1) Voltage:	105V to 125V, single phase
(2) Frequency:	55 to 65 cps
d. Warm-up time	No warm-up required

3.1.2 Characteristics

3.1.2.1 Volt-Amperes. The DEB shall draw a maximum of 20 volt-amperes.

3.1.2.2 Range. The DEB shall be capable of measuring resolver angles from 0° to 360° without externally reversing connections to the resolver.

3.1.2.3 Accuracy. The maximum error of the DEB shall be 2 seconds-of-arc.

3.1.2.4 Resolution. The resolution of the digital readout of the DEB shall be 0.001 degrees-of-arc.

3.1.2.5 Resolver Voltage. The DEB shall be capable of accepting voltages of 170V rms maximum at 800 cps across the Sin θ and Cos θ inputs.

3.1.2.6 Output Impedance. The output impedance at the isolated output shall be 420 ohms maximum at 800 cps with a zero impedance input applied to the Sin θ and Cos θ inputs.

3.1.2.7 Transformation Ratio. The transformation ratio from Sin θ and Cos θ inputs to the isolated output shall be 1.00 ± 0.01.

3.1.2.8 Input Impedance. The input impedances shall be as follows:

a. Sin θ input: 400K ohms minimum at 800 cps
b. Cos θ input: 400K ohms minimum at 800 cps
c. Signal input: 85K ohms minimum
d. Reference input: 85K ohms minimum

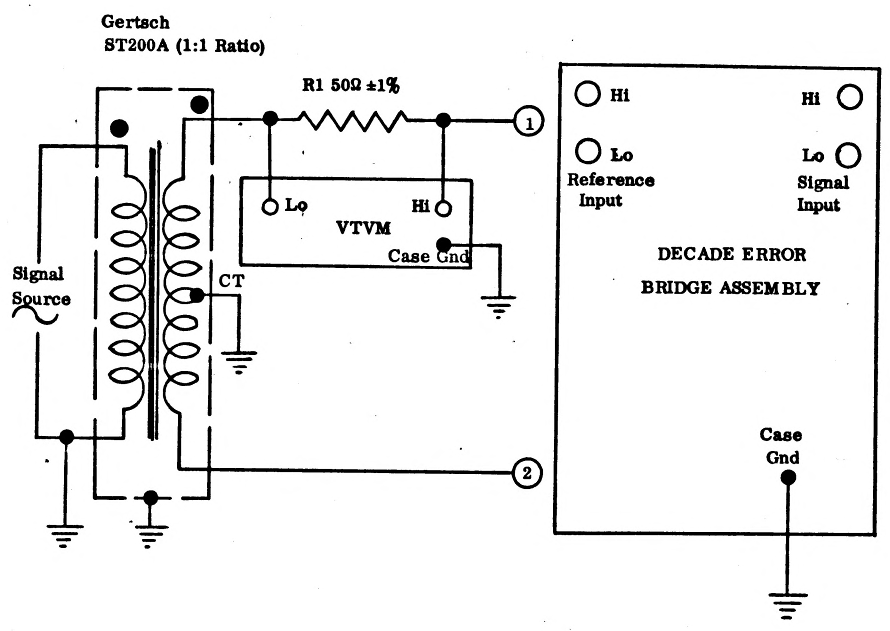
3.1.2.9 Input Isolation. The Sin θ, Cos θ, bridge output, and reference inputs shall be isolated from each other and from case ground. The case ground and power ground shall be isolated.

4.2.3 Input Impedance Tests

4.2.3.1 Reference Input. With the test setup as recommended in Figure 2 and points 1 and 2 connected to the DEB reference input Hi and Lo respectively and the signal source set to 80±1V rms at 800±20 cps, the voltage measured across R1 shall not be greater than 0.047V rms.

4.2.3.2 Signal Input. With the test setup as recommended in Figure 2, the transformer ST200A center tap removed from ground, points 1 and 2 connected to the DEB signal input Hi and Lo respectively and the signal source set to 80±1V rms at 800±20 cps, the voltage measured across R1 shall not be greater than 0.047V rms.

4.2.3.3 Sin θ, Cos θ Inputs. With the test setup as recommended in Figure 3, the signal source set to 80±1V rms at 800±20 cps, and the DEB dials set to 45.000 degrees, the voltage measured across R1 and R2 shall be less than 0.01V rms.


Gertsch
ST200A (1:1 Ratio)
R1 50Ω ±1%
①
②
Lo
Hi
VTVM
Case Gnd
CT
Signal
Source
Hi
Lo
Reference
Input
Hi
Lo
Signal
Input
DECADE ERROR
BRIDGE ASSEMBLY
Case
Gnd

RECOMMENDED INPUT IMPEDANCE TEST SETUP

FIGURE 2

TABLE II

SWITCH POSITIONS

ANGLE	S1	S2	S3
0 - 40°	2	1	1
45 - 85°	1	1	1
90 - 130°	1	1	2
135 - 175°	2	1	2
180 - 220°	2	2	2
225 - 265°	1	2	2
270 - 310°	1	2	1
315 - 360°	2	2	1

TABLE III

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RESOLVER BRIDGE ANGULAR SETTING				T1	THEORETICAL RATIO	MAX DEVIATIONS
0	90	180	270	1.00	0.0000000	0.0000097
5				1.00	0.0874887	0.0000098
10				0.98	0.1763270	0.0000100
15				0.97	0.2679492	0.0000104
20				0.94	0.3639702	0.0000110
25				0.91	0.4663077	0.0000118
30				0.87	0.5773503	0.0000130
35				0.82	0.7002075	0.0000145
40				0.77	0.8390996	0.0000165
45	135	225	315	0.71	1.0000000	0.0000194
50				0.77	0.8390996	0.0000165
55				0.82	0.7002075	0.0000145
60				0.87	0.5773503	0.0000130
65				0.91	0.4663077	0.0000118
70				0.94	0.3639702	0.0000110
75				0.97	0.2679492	0.0000104
80				0.98	0.1763270	0.0000100
85				1.00	0.0874887	0.0000098
			0.001	↑	0.0000175	0.0000097
			0.002		0.0000349	↑
			0.003		0.0000524	
			0.004		0.0000698	
			0.005		0.0000873	
			0.006	↓	0.0001047	↓
			0.007	1.00	0.0001222	0.0000097

APOLLO G&N Specification
PS2900128 Rev. D
Original Issue Date:
Release Authority: TDRR
Class A Release 23380
Code Ident No. 99974

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

BRIDGE, DECADE ERROR, ASSEMBLY

DRAWING NO. 2900128

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
9/28/65	A	MYC 205509	6&9		
Ⓜ 10/18/65	B	23380	ALL, INIT. REL.	WK 10-20-65	
Ⓜ 3/16/66	C	27242	3, 7, 14	WK	ACM
3/29/66	D	27537	1-16, Now 12 pages, was 16 pages	WK	----

This specification consists of page 1 to 12 inclusive.

APPROVALS	NASA/MSC	10-19-65 20 Oct 65 MIT/IL	ACSP

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 Accuracy. The maximum error of the DEB shall be 2 seconds-or-arc at the points specified in Table I.

3.1.2 Transformation Ratio. The transformation ratio from Sin θ and Cos θ inputs to the isolated output shall be 1.00±0.01.

3.1.3 Input Impedance. The input impedances shall be as follows:

a. Sin θ input: 400K ohms minimum at 800 cps
b. Cos θ input: 400K ohms minimum at 800 cps
c. Signal input: 85K ohms minimum
d. Reference input: 85K ohms minimum

3.1.4 Sensitivity. Full scale sensitivity of the DEB null indicator shall be in the range of 10 millivolts to 100 volts.

3.1.5 Reference Phase Shift. The DEB reference input shifting range shall be through an angle of 360 degrees.

3.1.6 Overload Indicator. The OVERLOAD INDICATOR shall illuminate when the limit of the quadrature rejection capability is about to be exceeded.

3.1.7 Voltage Gradient. The error voltage gradient shall be constant.

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with Drawing 2900128 and all drawings and engineering data referenced thereon.

3.2.2 Isolation. The Sin θ, Cos θ, bridge output, and reference inputs shall be isolated from each other and from case ground. The case ground and power ground shall be isolated.

3.2.3 Continuity. There shall be continuity between the points shown in Table II.

TABLE I.

TRANSFORMER RATIOS, ANGULAR ACCURACY

RESOLVER BRIDGE ANGULAR SETTING				T1	THEORETICAL RATIO	MAX DEVIATIONS
0	90	180	270	1.00	0.0000000	0.0000097
5				1.00	0.0874887	0.0000098
10				0.98	0.1763270	0.0000100
15				0.97	0.2679492	0.0000104
20				0.94	0.3639702	0.0000110
25				0.91	0.4663077	0.0000118
30				0.87	0.5773503	0.0000130
35				0.82	0.7002075	0.0000145
40				0.77	0.8390996	0.0000165
45	135	225	315	0.71	1.0000000	0.0000194
50				0.77	0.8390996	0.0000165
55				0.82	0.7002075	0.0000145
60				0.87	0.5773503	0.0000130
65				0.91	0.4663077	0.0000118
70				0.94	0.3639702	0.0000110
75				0.97	0.2679492	0.0000104
80				0.98	0.1763270	0.0000100
85				1.00	0.0874887	0.0000098
			0.001	↕	0.0000175	0.0000097
			0.002		0.0000349	↕
			0.003		0.0000524	
			0.004		0.0000698	
			0.005		0.0000873	
			0.006		0.0001047	
			0.007		0.0001222	
			0.008		0.0001396	
			0.009		0.0001571	
			0.010		0.0001745	
			0.020		0.0003491	
			0.030		0.0005236	
			0.040		0.0006981	
			0.050		0.0008727	
			0.060		0.0010472	
			0.070		0.0012217	
			0.080		0.0013963	
			0.090		0.0015708	
			0.100		0.0017453	
			0.200		0.0034907	

TABLE I (Continued)

RESOLVER BRIDGE ANGULAR SETTING	T_1	THEORETICAL RATIO	MAX DEVIATIONS
0.300	1.00	0.0052360	0.0000097
0.400	↑	0.0069814	↑
0.500		0.0087269	
0.600		0.0104724	
0.700		0.0122179	
0.800		0.0139635	
0.900		0.0157093	
1.000		0.0174551	
2.000		0.0349208	↓
3.000		0.0524078	0.0000097
4.000		0.0699268	0.0000098
5.000	↓	0.0874887	↑
6.000	1.00	0.1051042	↓
7.000	0.99	0.1227846	0.0000098
8.000	0.99	0.1405408	0.0000100
9.000	0.98	0.1583844	0.0000100

TABLE II

CONTINUITY

FROM	TO
Reference Input (Top Jack)	J2-F
Reference Input (Bottom Jack)	J2-G
Signal Input (Top Jack)	J2-C
Signal Input (Bottom Jack)	J2-D
S_1 Sin θ	J1-C
S_3 Sin θ	J1-D
S_4 Cos θ	J1-E
S_2 Cos θ	J1-F
R_1 Output	J1-G
R_3 Output	J1-H
Case Ground Binding Post	J1-A
Case Ground Binding Post	J2-A
Case Ground Binding Post	Case (Chassis)
Case Ground Binding Post	Round prong of power plug

4. QUALITY ASSURANCE PROVISIONS

4.1 PRODUCT PERFORMANCE AND CONFIGURATION REQUIREMENTS/QUALITY VERIFICATION CROSS REFERENCE INDEX

Test/Examination	Requirement	Method
Accuracy	3.1.1	4.3.9
Transformation Ratio	3.1.2	4.3.8
Input Impedance	3.1.3	4.3.4
Sensitivity	3.1.4	4.3.5
Reference Phase Shift	3.1.5	4.3.6
Overload Indicator	3.1.6	4.3.7
Voltage Gradient	3.1.7	4.3.10
Drawing Compliance	3.2.1	4.3.1
Isolation	3.2.2	4.3.2
Continuity	3.2.3	4.3.3

4.2 GENERAL. The contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein.

4.2.1 Test Conditions

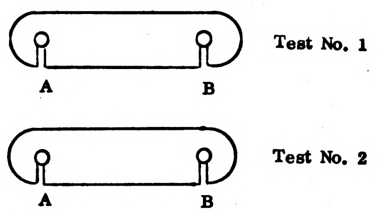
4.2.1.1 Environmental. Unless otherwise specified the DEB shall be tested under the following conditions.

a. Temperature: 25° ±10°C
b. Relative Humidity: 90% max
c. Barometric Pressure: 28 to 32 inches of Hg.

4.2.1.2 Input. The operating power necessary for DEB testing shall be 115±10 volts, 60±5 cps.

4.2.1.3 Shorting Links. Shorting links for the tests specified in 4.3.2 through 4.3.9 shall be applied to Test No. 1 and Test No. 2 binding posts A and B as shown in Figure 1.

4.2.2 Nonconforming Units. Failure of the unit to pass any examination or test of this specification shall automatically classify the unit as nonconforming. Each nonconforming unit corrected by the contractor shall be reinspected. Reinspection may be limited to the test or examination which defined the nonconformance, or, when so directed by the cognizant inspector, a complete retest or reexamination may be required. Nonconforming units which have not been corrected will be considered for acceptance only upon formal application by the contractor to the cognizant NASA representative.



POSITION OF SHORTING LINKS ON REAR OF EQUIPMENT

FIGURE 1

4.3 TESTS

4.3.1 Drawing Compliance. The assembly shall be visually examined for compliance to the requirements of Drawing 2900128. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulant defects, contaminants, pin misalignment, and legibility and appearance of markings.

4.3.2 Isolation. With no operating power applied and the REFERENCE VOLTAGE INPUT switch set to the "115V" position, the resistance between the following points shall be greater than 100 megohms. The measuring voltage shall not exceed 50 volts.

FROM	TO
S3 Sin θ	S2 Cos θ
S3 Sin θ	R3 Output
S3 Sin θ	Reference Input (Bottom Jack)
S3 Sin θ	Case Ground
S3 Sin θ	Either flat prong of power plug
S2 Cos θ	R3 Output
S2 Cos θ	Reference Input (Bottom Jack)
S2 Cos θ	Case Ground
S2 Cos θ	Either flat prong of power plug
R3 Output	Reference Input (Bottom Jack)
R3 Output	Case Ground
R3 Output	Either flat prong of power plug
Reference Input (Bottom Jack)	Case Ground
Reference Input (Bottom Jack)	Either flat prong of power plug
Case Ground	Either flat prong of power plug

4.3.3 Continuity. With no operating power applied the resistance between the points shown in Table II shall be less than 0.5 ohms.

4.3.4 Input Impedance

4.3.4.1 Reference Input. With the test setup as recommended in Figure 2 and points 1 and 2 connected to the DEB reference input Hi and Lo respectively, and the signal source set to 80±1V rms at 800±20 cps, the voltage measured across R1 shall not be greater than 0.047V rms.

4.3.4.2 Signal Input. With the test setup as recommended in Figure 2, the transformer ST200A center tap removed from ground, points 1 and 2 connected to the DEB signal input Hi and Lo respectively and the signal source set to 80±1V rms at 800±20 cps, the voltage measured across R1 shall not be greater than 0.047V rms.

4.3.4.3 Sin θ, Cos θ Inputs. With the test setup as recommended in Figure 3, the signal source set to 80±1V rms at 800±20 cps, and the DEB dials set to 45.000 degrees, the voltage measured across R1 and R2 shall be less than 0.01V rms.

4.3.5 Sensitivity

4.3.5.1 Maximum Sensitivity. With the recommended test setup as shown in Figure 4, a 28V ±2V, 800±20 cps input present at the Reference Input of the DEB, the following controls or switches set to the indicated position, and with R1 then adjusted until the DEB null indicator indicates full scale, the voltage as read on the VTVM shall be less than 10 millivolts.

CONTROL OR SWITCH	POSITION
REFERENCE INPUT VOLTAGE	"26V"
REFERENCE QUADRANT	"0° -90° "
REFERENCE QUADRANT VERNIER	"0° "
S1	"1"
R1	0 Volt Output
SENSITIVITY (Both Coarse and Fine)	"MAX"

4.3.5.2 Minimum Sensitivity. With the recommended test setup as shown in Figure 4, 115±5V present at the Reference Input of the DEB, the following controls or switches set to the indicated positions and with R2 then adjusted for a full scale indication on the DEB null indicator, the voltage as read on the VTVM shall be 100 volts rms maximum.

CONTROL OR SWITCH	POSITION
REFERENCE INPUT VOLTAGE	"115V"
SENSITIVITY (Both Coarse and Fine)	"MIN"
S1	"2"
REFERENCE QUADRANT	"0° -90° "
REFERENCE QUADRANT VERNIER	"0° "

4.3.6 Reference Phase Shift. With the recommended test setup as shown in Figure 4, a 115±10V rms, 800±20 cps input present at the Reference Input, S1 set to the "2" position, the REFERENCE INPUT VOLTAGE switch set to the "115V" position, the REFERENCE QUADRANT switch set to the "0° -90° " position, the REFERENCE QUADRANT VERNIER set to the "0° " position, R2 adjusted for an output voltage of 2.5±0.02V rms, and the SENSITIVITY controls adjusted for 90 percent of full scale null indicator deflection, the following shall be performed.

a. With the REFERENCE QUADRANT switch set to the "90° -180° " position, the null meter shall indicate 0±5 percent of full scale.

b. With the REFERENCE QUADRANT switch set to the "180° -270° " position, the null indicator shall indicate 85 to 95 percent of full scale to the left.

c. With the REFERENCE QUADRANT switch set to the "270° -0° " position, the null indicator shall indicate 0±5 percent of full scale.

d. With the REFERENCE QUADRANT switch set to the "0° -90° " position, the REFERENCE QUADRANT VERNIER set to the "15" position, R2 adjusted for 90 percent of full scale null indicator deflection, the voltage at the VTVM (Figure 4) shall be 25.1 to 26.7V rms. Repeat this test except under the following conditions.

(1) With the REFERENCE QUADRANT VERNIER set to the "30" position, the voltage at the VTVM (Figure 4) shall be 28.0 to 29.8V rms.

(2) With the REFERENCE QUADRANT VERNIER set to the "45" position, the voltage at the VTVM (Figure 4) shall be 34.2 to 36.7V rms.

(3) With the REFERENCE QUADRANT VERNIER set to the "60" position, the voltage at the VTVM (Figure 4) shall be 47.1 to 53.2V rms.

(4) With the REFERENCE QUADRANT VERNIER set to the "75" position, the voltage at the VTVM (Figure 4) shall be 85.5 to 111.0V rms.

(5) With the REFERENCE QUADRANT VERNIER set to the "90" position, and the R2 adjustment unchanged from 4.2.5.d.(4), the null indicator shall indicate ±15 percent of full scale.

4.3.7 Overload Indicator. With the REFERENCE QUADRANT switch set to the "0° -90° " position, the REFERENCE QUADRANT VERNIER set to the "0° " position, a 28±2V rms, 800±20 cps present at Reference Input and 2.5±0.02V rms obtained from the reference input by a resistive divider present at the Signal Input, the REFERENCE INPUT VOLTAGE switch set to the "26V" position, the SENSITIVITY controls adjusted for full scale, with the REFERENCE QUADRANT switch then set to the "90° -180° "position, the REFERENCE QUADRANT VERNIER set for 0 deflection of the null indicator, adjust the SENSITIVITY controls until the OVERLOAD INDICATOR just comes on, the null indicator shall indicate less than 5 percent of full scale deflection.

4.3.8 Transformation Ratio

a. With the DEB Decade dials set to an angle of "0 + 00.000" degrees, an input of 28±2V rms, 800±20 cps present at the Sin θ input (S1 and S3), and a jumper between S3 and R3, the voltage between S1 (Lo) and R1 (Hi) shall be less than 0.28V rms.

b. With the DEB Decade dials set to an angle of "90 + 00.000", an input of 28±2V rms, 800±20 cps present at the Cos θ input (S4 and S2), and a jumper between S4 and R3, the voltage between S2 (Lo) and R1 (Hi) shall be less than 0.28V rms.

4.3.9 Accuracy. With the recommenced test setup as shown in Figure 5, DEB switches and controls set as specified in Table I, the following conditions established, and the DEB decade dials set to the angle to be tested, the ratio (as read on transformer T3) shall be at the theoretical ratio listed in Table III for the angle being tested ± the maximum deviation listed in Table III for the same angle. This test shall be conducted for each angle listed in Table III.

a. The phase angle voltmeter, V1, set to measure the in-phase component.

b. Switches S1, S2 and S3 set to the positions specified in Table II.

c. Transformer T1 set to the ratio specified in Table III.

d. Transformer T2 adjusted for a null as read on the DEB null indicator with the SENSITIVITY control at MAX.

e. Transformer T3 adjusted for a null as read on the most sensitive range of the phase angle voltmeter, V_1.

TABLE III

SWITCH AND CONTROL SETTINGS

SWITCH/CONTROL	SETTING
REFERENCE QUADRANT	0° -90°
REFERENCE QUADRANT VERNIER	0°
REFERENCE INPUT VOLTAGE	26V

TABLE IV

SWITCH POSITIONS

ANGLE	S1	S2	S3
0 - 40°	2	1	1
45 - 85°	1	1	1
90 - 130°	1	1	2
135 - 175°	2	1	2
180 - 220°	2	2	2
225 - 265°	1	2	2
270 - 310°	1	2	1
315 - 360°	2	2	1

4.3.10 Voltage Gradient. With the recommended test setup as shown in Figure 5, the REFERENCE INPUT VOLTAGE switch set to the "26V" position, the REFERENCE QUADRANT switch set to the "0° -90° " position, the REFERENCE QUADRANT VERNIER set to the "0°" position, the DEB Decade dials set to "0+00.000", transformer T1 adjusted to the ratio indicated in Table III for the 0°, and transformer T_2 adjusted for a null on the DEB null indicator, and with the DEB Decade dials advanced 5° adjust the SENSITIVITY controls of the DEB null indicator for 90 percent of full scale deflection. Using the same procedure for angles at 5° increments from 0° to 90° in place of "0+00.000", the deflection of the DEB null indicator shall be between 85 and 95 percent of full scale without sensitivity change.

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

6. NOTES. None.

APOLLO G&N Specification
PS2900128 Rev. E
Original Issue Date:
Release Authority: TDRR
Class A Release 23380
Code Ident No. 99974

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

BRIDGE, DECADE ERROR, ASSEMBLY

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3/29/66	D	27537	1-16, Now 12 pages, was 16 pages	WK	----
5/24/66	E	29165	3	MGM	---

This specification consists of page 1 to 12 inclusive.

APPROVALS	NASA/MSC	10-19-65 MIT/IL	20 Oct 65	ACSP

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 Accuracy. The maximum error of the DEB shall be 2 seconds of arc [illegible]

3.1.2 Transformation Ratio. The transformation ratio from Sin θ and Cos θ inputs to the isolated output shall be 1.00±0.01.

3.1.3 Input Impedance. The input impedances shall be as follows:

a. Sin θ input: 400K ohms minimum at 800 cps
b. Cos θ input: 400K ohms minimum at 800 cps
c. Signal input: 85K ohms minimum
d. Reference input: 85K ohms minimum

3.1.4 Sensitivity. Full scale sensitivity of the DEB null indicator shall be in the range of 10 millivolts to 100 volts.

3.1.5 Reference Phase Shift. The DEB reference input shifting range shall be through an angle of 360 degrees.

3.1.6 Overload Indicator. The OVERLOAD INDICATOR shall illuminate when the limit of the quadrature rejection capability is about to be exceeded.

3.1.7 Voltage Gradient. The error voltage gradient shall be constant.

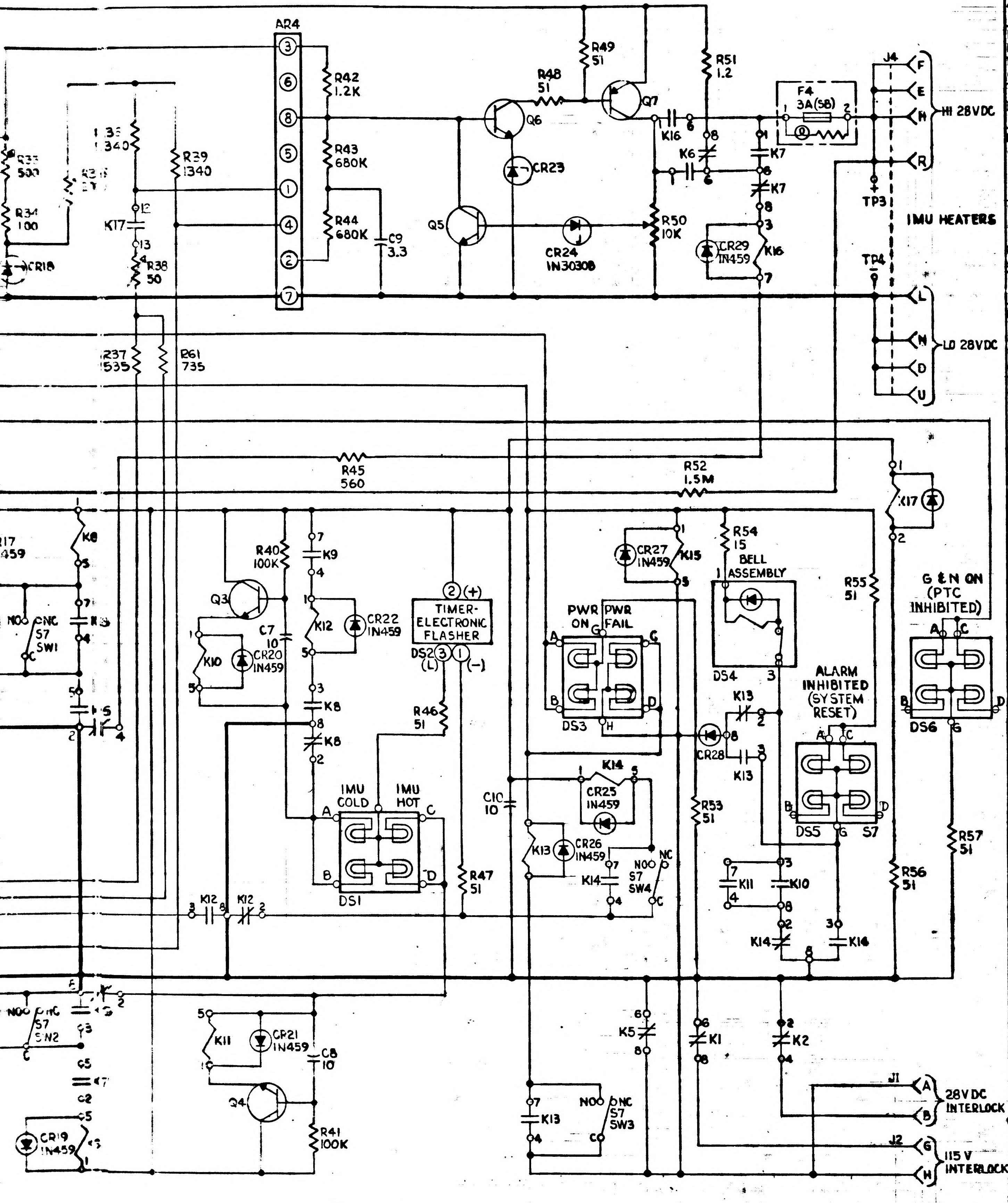
3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with Drawing 2900128 and all drawings and engineering data referenced thereon.

3.2.2 Isolation. The Sin θ, Cos θ, bridge output, and reference inputs shall be isolated from each other and from case ground. The case ground and power ground shall be isolated.

3.2.3 Continuity. There shall be continuity between the points shown in Table II.

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR TDRR 24042		3 NOV 65	



AR4
R42 1.2K
R43 680K
R44 680K
C9 3.3
R48 51
R49 51
R51 1.2
Q5
Q6
Q7
CR23
CR24 IN3030B
R50 10K
K16
K6
K7
F4 3A(SB)
J4
HI 28VDC
LO 28VDC
TP3
TP4
IMU HEATERS
CR29 IN459
R33 500
R34 100
R35 1340
R36
R38 50
R39 1340
R37 1535
R61 735
K17
CR18
R45 560
R52 1.5M
K17
K8
K9
R40 100K
Q3
C7 10
K12
CR22 IN459
K10
CR20 IN459
S7 SW1
TIMER-ELECTRONIC FLASHER
DS2
R46 51
R47 51
IMU COLD
IMU HOT
DS1
CR27 IN459
K15
R54 15
BELL ASSEMBLY
DS4
PWR ON
PWR FAIL
DS3
R55 51
K13
CR28
ALARM INHIBITED (SYSTEM RESET)
DS5
S7
G & N ON (PTC INHIBITED)
DS6
R57 51
R56 51
C10 10
K14
CR25 IN459
CR26 IN459
S7 SW4
R53 51
K11
K10
K14
K16
K12
S7 SW2
K11
CR21 IN459
C8 10
Q4
R41 100K
CR19 IN459
K5
K1
K2
K13
S7 SW3
J1
28V DC INTERLOCK
J2
115 V INTERLOCK

PARTS TABLE

ZONE	REF. DES.	PART NUMBER	DESCRIPTION	SCHEM DIAG OR VALUE, TOL & RATING
E-11	AR 1	1897261	COMPARATOR	28 VDC, 50MA
B-10	2			
D-10	3			
G-8	4			
F-11	BT 1 THRU BT 8	1897268-001	BATTERY	4.0 VOLTS
F-12	C 1	CTM104VBK(1896957-046)	CAP. MIL-C-27287/1	0.1 UF ±10% 200VDC
C-12	2	CS13BE156K(1896954-103)	MIL-C-26655/2	15 ±10% 20
F-11	3	CE71C5626(1896872-119)	MIL-C-62/12	5600 ±75% 50
E-11	4	CS13BC276K(1896954-070)	MIL-C-26655/2	27 ±10% 10
C-10	5	CS13BB157K(-060)		150 6
B-10	6	CS13BB157K(-060)		150 6
D-8	7	CS13BF106K(-144)		10 35
B-8	8	CS13BF106K(-144)		10 35
F-8	9	CS13BD335K(-082)		3.3 15
D-7	10	CS13BG106K(-176)		10 30
D-10	C 11	CS13BF476K(-156)		47 35
B-10	C 12			
C-11	C 13			
H-12	CR 1	1015967-001	SEMI-CONDUCTOR (DIODE)	
G-12	2	1015937-001		
G-12	3	1897277-001		
F-12	4	1897277-001		
C-12	5	IN459 (1896966-291)	MIL-S-19500/193A	
G-11	6	1015937-001		
G-11	7	1015939-008		
G-11	8	1015937-001		
F-11	9	IN3025B(1896966-187)	MIL-S-19500/115D	
F-11	10	IN3025B(1896966-187)	MIL-S-19500/115D	
E-11	11	IN459 (1896966-291)	MIL-S-19500/193A	
D-11	12	1897251-004		
D-11	13	IN3030B(1896966-070)	MIL-S-19500/115D	
F-10	14	IN3030B(-070)	/115D	
D-10	15	IN459 (-291)	/193A	
A-10	16			
E-9	17			
F-9	18	1897251-004		
A-9	19	IN459 (1896966-291)	MIL-S-19500/193A	
D-8	20			
B-8	21			
D-8	22			
G-7	23	1015939-008		
F-7	24	IN3030B(1896966-070)	MIL-S-19500/115D	
D-7	25	IN459 (-291)	/193A	
C-7	26			
E-7	27			
D-6	28	1015937-001		
F-6	29	IN459 (1896966-291)	MIL-S-19500/193A	
C-8	DS 1	(4) MS25237-327	LAMP INCANDESCENT	
D-8	2	1015925-002	TIMER-ELEC FLASHER	
D-7	3	(4) MS25237-327	LAMP INCANDESCENT	
D-6	4	2900528	BELL ASSEMBLY	
C-6	5	(4) MS25237-327	LAMP INCANDESCENT	
D-5	6	(4) MS25237-327	LAMP INCANDESCENT	
H-12	F 1	F02A250V4AS(1897099-113)	FUSE-MIL-F-15160/02	4A, 250V
G-12	2	F02B125V3AS(-130)		3A, 125V
G-12	3			
G-6	4			
H-13	J 1	MS3127E-14-12P(1897115-120)	CONNECTOR	
F-13	2	-14-12PW(1897115-121)		
F-13	3	-12-10P(1897119-100)		
E-13	4	-18-32S(1897122-320)		
G-12	K 1	1015982-003	RELAY	115V, 2PDT
G-12	2	1015802-004		28V,
C-11	3	1015982-004		28V,
E-11	4	1015832-312		22MA,
G-10	5	1015802-004		28V,
D-10	6	1015982-007		28V,
B-10	7	1015982-007		28V,
E-9	8	1015832-318		5.6MA,
A-9	9			
D-9	10			
B-9	11			
D-8	12			
C-7	13			
D-7	14			
E-7	15			5.6MA,
F-6	16	1015982-007		28V, 2PDT
E-6	17	1015837-001	RELAY	28V, 6PDT
	XDS1	1015869-783	LIGHT INDICATOR	
	XDS3	-785	LIGHT INDICATOR	
	XDS5	-748	IND. LT SW ASSY	
	XDS6	1897337-101	LIGHT INDICATOR	
	XF1	1015873-008	FUSEHOLDER	
	XF2	-001		
	XF3	-001		
	XF4	1015873-008	FUSEHOLDER	
C-12	M 1	1016080-514	METER	10-0-10 μa
D-11	Q 1	1015928-001	TRANSISTOR	
G-10	2			
D-8	3			
B-8	4			
F-7	5	1015935-		
G-7	6	1015928-		
G-7	7	1897309-		
B-13	R 1	1016053-023	RESISTOR	2964 ±.01%
C-13	2	1897260-007	-VAR	1K ± 5%
B-13	3	1016053-020		2722.4 ±.01%
D-12	4	RC20GF474J(1896952-121)		470K ±5%
D-12	5	RC20GF332J(1896952-061)		3.3K ±5%
C-12	6	RN60C2491F(1896976-327)		2.49K ±1%
C-12	7	RN60C1002F(1896976-385)		10K ±1%
B-12	8	1016053-005		2504.5 ±.01%
C-12	9	RC20GF155J(1896952-125)		1.5M ±5%
B-12	10	1016053-003		2308.8 ±.01%
B-12	11	RC32GF101J(1896953-039)		100 ±5%
G-12	12	1016053-004		2133.5 ±.01%
D-11	13	RN60C1503F(1896976-498)		150K ±1%
F-11	14	RC42GF101J(1896951-025)		100 ±5%
B-11	15	1016053-021		6295.5 ±.01%
E-11	16	1897260-005	-VAR	200 ±5%
D-11	17	RN60C1400C(1896984-250)		140 ±.25%
D-11	18	1897260-006	-VAR	500 ±5%
C-11	19	1897260-006	-VAR	500 ±5%
C-11	20	RC20GF301J(1896952-036)		300 ±5%
B-11	21	1016053-021		6295.5 ±.01%
B-11	22	1016053-005		2504.5 ±.01%
E-11	23	RC20GF102J(1896952-049)		1K ±5%
C-13	24	RC32GF151J(1896953-043)		150 ±5%
E-10	25	RC32GF101J(1896953-039)		100 ±5%
B-10	26	RN60C1502F(1896984-402)		15K ±1%
B-10	27	1897260-013	-VAR	50K ±5%
D-10	28	1897260-013	-VAR	50K ±5%
D-10	29	RN60C1502F(1896984-402)		15K ±1%
C-10	30	RC20GF102J(1896952-049)		1K ±5%
D-10	31	RC20GF301J(1896952-025)		300 ±5%
B-10	32	RC20GF301J(1896952-025)		300 ±5%
G-9	33	1897260-006	-VAR	500 ±5%
F-9	34	RN60C1000C(1896984-222)		100 ±.25%
F-9	35	1897260-005	-VAR	200 ±5%
G-9	36	1016053-019		1340 ±.01%
F-9	37	1016053-012		1535 ±.01%
F-9	38	1897260-003	-VAR	50 ±5%
G-9	39	1016053-019		1340 ±.01%
E-8	40	RC20GF104J(1896952-097)		100K ±5%
B-8	41	RC20GF104J(1896952-097)		100K
G-8	42	RC20GF122J(1896952-051)		1.2K
G-8	43	RC20GF684J(1896952-117)		680K
F-8	44	RC20GF684J(1896952-117)		680K
E-8	45	RC32GF561J(1896953-057)		560
D-8	46	RC42GF510J(1896951-018)		51
C-7	47	RC32GF510J(1896953-032)		51
G-7	48	RC32GF510J(1896953-032)		51
G-7	49	RC20GF510J(1896952-018)		51
F-7	50	1897260-010	-VAR	10K ±5%
G-6	51	RE70G1R21 (1897094-105)		1.2 ±1%
E-6	52	RC20GF155J (1896952-125)		1.5M ±5%
D-6	53	RC32GF510J (1896953-032)		51
E-6	54	RC42GF150J (1896951-005)		15
E-6	55	RC32GF510J (1896953-032)		51
C-6	56	RC42GF510J (1896951-018)		51
C-5	57	RC32GF510J (1896953-032)		51
D-12	58	RC20GF474J (1896952-113)		470K
D-10	59	RC20GF205J (1896952-128)		2M
B-10	60	RC20GF205J (1896952-128)		2M ±5%
F-9	61	1016053-001		735 ±.01%
B-11	R62	RN60C4992F (1898976-452)	RESISTOR	49.9K ± 1%
H-13	S1	1015825-036	SWITCH	
B-13	S2	1021575		
B-13	S3			
B-12	S4			
B-12	S5			
B-11	S6	1021575		
D-9	S7	SEE DS5	SWITCH	
G-12	T1	1897291	TRANSFORMER	
F-10	TP1	1016166-004	TEST JACK	
G-10	TP2	-006		
G-6	TP3	-004		
F-6	TP4	1016166-006	TEST JACK	

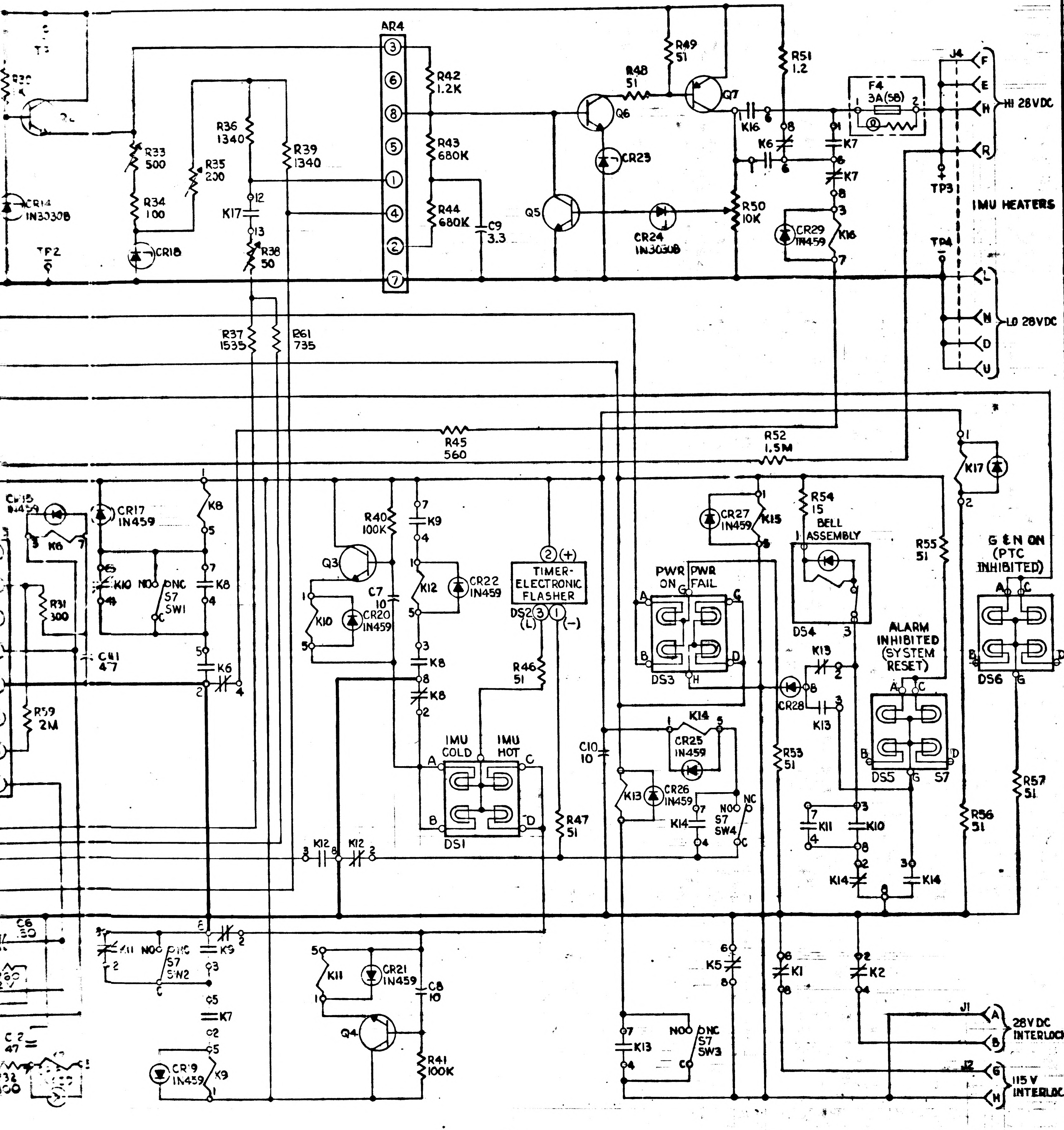
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Parks 26 OCT 65 DATE
CHECKED 26 OCT 65
APPROVAL 26 OCT 65
APPROVAL 11-16-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC DIAGRAM
BLOCK II PTC
(PORTABLE TEMPERATURE CONTROLLER)

CODE IDENT NO. 99974
SIZE J2
2900133
SCALE NONE
SHEET 1 OF


AR4
R42 1.2K
R43 680K
R44 680K
C9 3.3
R49 51
R48 51
R51 1.2
Q6
Q7
Q5
CR23
CR24 IN3030B
R50 10K
K16
K6
K7
F4 3A(5B)
CR29 IN459
J4
HI 28VDC
TP3
TP4
IMU HEATERS
LO 28VDC
R33 500
R35 200
R34 100
CR18
CR14 IN3030B
TP2
R36 1340
R39 1340
K17
R38 50
R37 1535
R61 735
R45 560
R52 1.5M
K17
CR15 IN459
CR17 IN459
K8
K6
K10
S7 SW1
R31 300
C11 47
R59 2M
R40 100K
Q3
K9
K12
CR22 IN459
C7 10
K10
CR20 IN459
K8
TIMER-ELECTRONIC FLASHER
DS2 (L) (+) (-)
R46 51
IMU COLD
IMU HOT
DS1
R47 51
K12
C10 10
PWR ON
PWR FAIL
DS3
CR27 IN459
K15
R54 15
BELL ASSEMBLY
DS4
R55 51
G & N ON (PTC INHIBITED)
DS6
ALARM INHIBITED (SYSTEM RESET)
DS5
S7
K13
CR28
K14
CR25 IN459
CR26 IN459
K13
K14
S7 SW4
R53 51
K11
K10
K14
R57 51
R56 51
C6 .30
K11
S7 SW2
K9
K11
CR21 IN459
C8 10
K7
Q4
R41 100K
C2 47
CR19 IN459
K9
K5
K1
K2
S7 SW3
K13
J1
28VDC INTERLOCK
J2
115 V INTERLOCK

PARTS TABLE

ZONE	REF. DES.	PART NUMBER	DESCRIPTION	SCHEM DIAG OR VALUE, TOL & RATING
E-11	AR1	1897261	COMPARATOR	28VDC, 50MA
B-10	2			
D-10	3			
G-8	4			
F-11	BT1 THRU BT8	1897268-001	BATTERY	4.0 VOLTS
F-12	C 1	CTM104VBK(1896957-046)	CAP. MIL-C-27287/1	0.1 UF, ±10% 200VDC
C-12	2	CS13BE156K(1896954-103)	MIL-C-26655/2	15 ±10% 20
F-11	3	CE71C5626(1896872-119)	MIL-C-62/12	5600 ±75% 50
E-11	4	CS13BC276K(1896954-070)	MIL-C-26655/2	27 ±10% 10
C-10	5	CS13BB157K(-060)		150 6
B-10	6	CS13BB157K(-060)		150 6
D-8	7	CS13BF106K(-144)		10 35
B-8	8	CS13BF106K(-144)		10 35
F-8	9	CS13BD335K(-082)		3.3 15
D-7	10	CS13BB106K(-176)		10
D-10	C 11	CS13BF476K(-156)		47 35
B-10	C 12			
C-11	C 13			
H-12	CR 1	1015967-001	SEMI-CONDUCTOR (DIODE)	
G-12	2	1015937-001		
G-12	3	1897277-001		
F-12	4	1897277-001		
C-12	5	IN459(1896966-291)	MIL-S-19500/193A	
G-11	6	1015937-001		
G-11	7	1015939-008		
G-11	8	1015937-001		
F-11	9	IN3025B(1896966-187)	MIL-S-19500/115D	
F-11	10	IN3025B(1896966-187)	MIL-S-19500/115D	
E-11	11	IN459 (1896966-291)	MIL-S-19500/193A	
D-11	12	1897251-004		
D-11	13	IN3030B(1896966-070)	MIL-S-19500/115D	
F-10	14	IN3030B(-070)	/115D	
D-10	15	IN459 (-291)	/193A	
A-10	16			
E-9	17			
F-9	18	1897251-004		
A-9	19	IN459 (1896966-291)	MIL-S-19500/193A	
D-8	20			
B-8	21			
D-8	22			
G-7	23	1015939-008		
F-7	24	IN3030B(1896966-070)	MIL-S-19500/115D	
D-7	25	IN459 (-291)	/193A	
C-7	26			
E-7	27			
D-6	28	1015937-001		
F-6	29	IN459 (1896966-291)	MIL-S-19500/193A	
C-8	DS1	(4) MS25237-327	LAMP INCANDESCENT	
D-8	2	1015925-002	TIMER-ELEC FLASHER	
D-7	3	(4) MS25237-327	LAMP INCANDESCENT	
D-6	4	2900528	BELL ASSEMBLY	
C-6	5	(4) MS25237-327	LAMP INCANDESCENT	
D-5	6	(4) MS25237-327	LAMP INCANDESCENT	
H-12	F 1	F02A250V4AS(1897099-113)	FUSE-MIL-F-15160/02	4A, 250V
G-12	2	F02B125V3AS(-130)		3A, 125V
G-12	3			
G-6	4			
H-13	J 1	MS3127E14-12P(1897115-120)	CONNECTOR	
F-13	2	-14-12PW(1897115-121)		
F-13	3	-12-10P(1897119-100)		
E-13	4	-18-32S(1897122-320)		
G-12	K 1	1015982-003	RELAY	115V, 2PDT
G-12	2	1015802-004		28V,
C-11	3	1015982-004		28V.
E-11	4	1015832-312		22MA,
G-10	5	1015802-004		28V,
D-10	6	1015982-007		28V,
B-10	7	1015982-007		28V,
E-9	8	1015832-318		5.6MA,
A-9	9			
D-9	10			
B-9	11			
D-8	12			
C-7	13			
D-7	14			
E-7	15			5.6MA,
F-6	16	1015982-007		28V, 2PDT
E-6	17	1015837-001	RELAY	28V, 6PDT
	XDS1	1015869-783	LIGHT INDICATOR	
	XDS3	-785	LIGHT INDICATOR	
	XDS5	-748	IND. LT SW ASSY	
	XDS6	1897337-101	LIGHT INDICATOR	
	XF1	1015873-008	FUSEHOLDER	
	XF2	-001		
	XF3	-001		
	XF4	1015873-008	FUSEHOLDER	

ZONE	REF. DES.	PART NUMBER	DESCRIPTION	SCHEM DIAG OR VALUE, TOL & RATING
C-12	M 1	1016080-514	METER	10-0-10 ua
D-11	Q 1	1015928-001	TRANSISTOR	
G-10	2			
D-8	3			
B-8	4			
F-7	5	1015935-		
G-7	6	1015928-		
G-7	7	1897309-		
B-13	R 1	1016053-023	RESISTOR	2964 ±.01%
C-13	2	1897260-007	-VAR	1K ±5%
B-13	3	1016053-020		2722.4 ±.01%
D-12	4	RC20GF474J(1896952-121)		470K ±5%
D-12	5	RC20GF332J(1896952-061)		3.3K ±5%
C-12	6	RN60C2491F(1896976-327)		2.49K ±1%
C-12	7	RN60C1002F(1896976-385)		10K ±1%
B-12	8	1016053-005		2504.5 ±.01%
C-12	9	RC20GF155J(1896952-125)		1.5M ±5%
B-12	10	1016053-003		2308.8 ±.01%
B-12	11	RC32GF101J(1896953-039)		100 ±5%
G-12	12	1016053-004		2153.5 ±.01%
D-11	13	RN60C1503F(1896976-498)		150K ±1%
F-11	14	RC42GF101J(1896951-025)		100 ±5%
B-11	15	1016053-021		6295.5 ±.01%
E-11	16	1897260-005	-VAR	200 ±5%
D-11	17	RN60C1400C(1896984-250)		140 ±.25%
D-11	18	1897260-006	-VAR	500 ±5%
C-11	19	1897260-006	-VAR	500 ±5%
C-11	20	RC20GF301J(1896952-036)		300 ±5%
B-11	21	1016053-021		6295.5 ±.01%
B-11	22	1016053-005		2504.5 ±.01%
E-11	23	RC20GF102J(1896952-049)		1K ±5%
C-10	24	RC32GF151J(1896953-043)		150 ±5%
E-10	25	RC32GF101J(1896953-039)		100 ±5%
B-10	26	RN60C1502F(1896984-402)		15K ±1%
B-10	27	1897260-013	-VAR	50K ±5%
D-10	28	1897260-013	-VAR	50K ±5%
D-10	29	RN60C1502F(1896984-402)		15K ±1%
C-10	30	RC20GF102J(1896952-049)		1K ±5%
D-10	31	RC20GF301J(1896952-025)		300 ±5%
B-10	32	RC20GF301J(1896952-025)		300 ±5%
G-9	33	1897260-006	-VAR	500 ±5%
F-9	34	RN60C1000C(1896984-222)		100 ±.25%
F-9	35	1897260-005	-VAR	200 ±5%
G-9	36	1016053-019		1340 ±.01%
F-9	37	1016053-012		1535 ±.01%
F-9	38	1897260-003	-VAR	50 ±5%
G-9	39	1016053-019		1340 ±.01%
E-8	40	RC20GF104J(1896952-097)		100K ±5%
B-8	41	RC20GF104J(1896952-097)		100K
G-8	42	RC20GF122J(1896952-051)		1.2K
G-8	43	RC20GF684J(1896952-117)		680K
F-8	44	RC20GF684J(1896952-117)		680K
E-8	45	RC32GF561J(1896953-057)		560
D-8	46	RC42GF510J(1896951-018)		51
C-7	47	RC32GF510J(1896953-032)		51
G-7	48	RC32GF510J(1896953-032)		51
G-7	49	RC20GF510J(1896952-018)		51
F-7	50	1897260-010	-VAR	10K ±5%
G-6	51	RE70G1R21 (1897094-105)		1.2 ±1%
E-6	52	RC20GF155J (1896952-125)		1.5M ±5%
D-6	53	RC32GF510J (1896953-032)		51
E-6	54	RC42GF150J (1896951-005)		15
E-6	55	RC32GF510J (1896953-032)		51
C-6	56	RC42GF510J (1896951-018)		51
C-5	57	RC32GF510J (1896953-032)		51
D-12	58	RC20GF474J (1896952-113)		470K
D-10	59	RC20GF205J (1896952-128)		2M
B-10	60	RC20GF205J (1896952-128)		2M ±5%
F-9	61	1016053-001		735 ±.01%
B-11	R62	RN60C4992F(1896976-452)	RESISTOR	49.9K ±1%
H-13	S1	1015825-036	SWITCH	
B-13	S2	1021575		
B-13	S3			
B-12	S4			
B-12	S5			
B-11	S6	1021575		
D-9	S7	SEE DS5	SWITCH	
G-12	T1	1897291	TRANSFORMER	
F-10	TP1	1016166-004	TEST JACK	
G-10	TP2	-006		
G-6	TP3	-004		
F-6	TP4	1016166-006	TEST JACK	

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR TDRR 24062		3 NOV 65	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Parker 26 OCT 65 DATE
CHECKED 26 OCT 65
APPROVAL 26 OCT 65
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC DIAGRAM
BLOCK II PTC
(PORTABLE TEMPERATURE CONTROLLER)

CODE IDENT NO. 99974
SIZE J2
2900133
SCALE NONE
SHEET

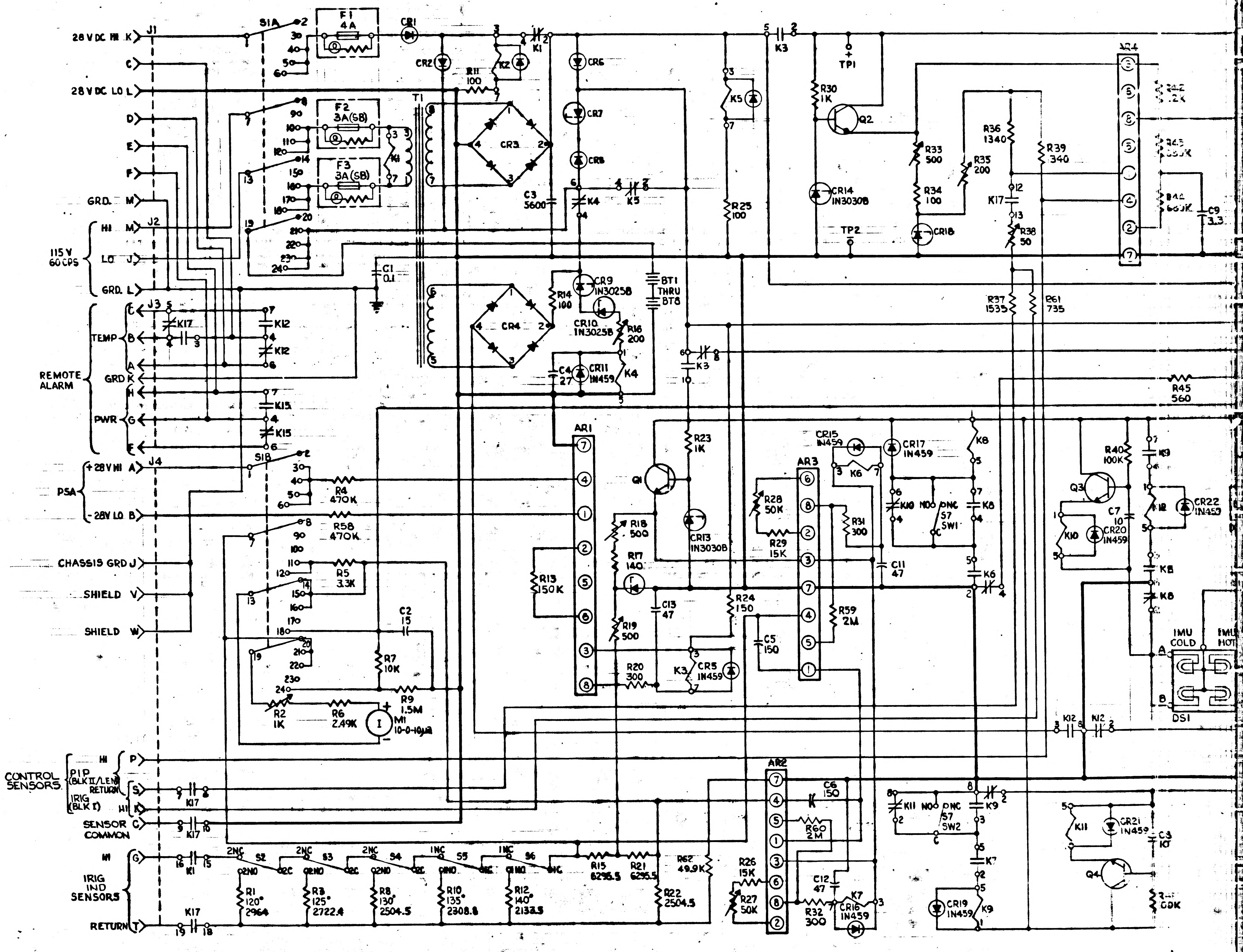
2900133 A

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ALL PART NUMBERS ARE FOR REFERENCE ONLY.
3. DRAWINGS FOR REFERENCE:

2900060	PORTABLE TEMPERATURE CONTROLLER ASSEMBLY

4. UNLESS OTHERWISE SPECIFIED:
   - A. RELAYS AND SWITCHES ARE SHOWN IN THE UNENERGIZED OR "OFF" POSITION.
   - B. VALUES ARE IN OHMS AND MICROFARADS.

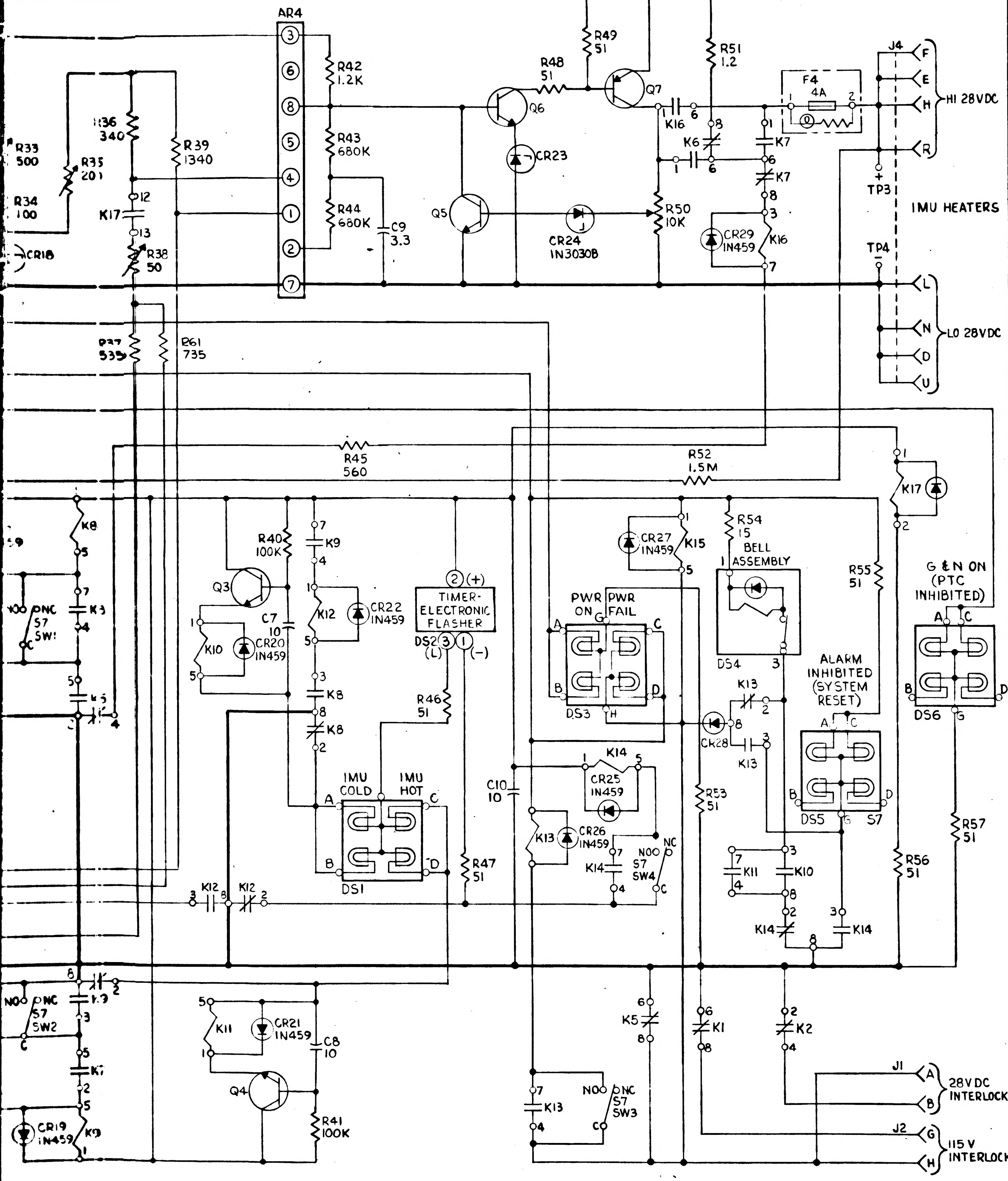


28 V DC HI K
28 V DC LO L
J1
J2
J3
J4
S1A
S1B
F1 4A
F2 3A(SB)
F3 3A(SB)
CR1
CR2
K1
K2
R11 100
T1
CR3
CR4
C3 5600
C1 0.1
CR6
CR7
CR8
K4
K5
K3
TP1
TP2
R30 1K
Q2
CR14 1N3030B
R25 100
R33 500
R34 100
CR18
R36 1340
R35 200
R39 340
K17
R38 50
R37 1535
R61 735
AR4
R42 1.2K
R43 383K
R44 665K
C9 3.3
R45 560
115 V 60 CPS
HI M
LO J
GRD. L
GRD. M
REMOTE ALARM
TEMP
GRD K
PWR
K12
K15
CR9 1N3025B
R14 100
CR10 1N3025B
R16 200
CR11 1N459
C4 27
BT1 THRU BT8
PSA
+28 V HI A
-28V LO B
R4 470K
R58 470K
R5 3.3K
C2 15
R7 10K
R9 1.5M
R2 1K
R6 2.49K
M1 10-0-10μA
CHASSIS GRD J
SHIELD V
SHIELD W
AR1
R13 150K
R18 500
R17 140
R19 500
R20 300
Q1
R23 1K
CR13 1N3030B
C13 47
R24 150
K3
CR5 1N459
C5 150
AR3
R28 50K
R29 15K
R31 300
R59 2M
C11 47
CR15 1N459
CR17 1N459
K6
K10
S7 SW1
K8
Q3
R40 100K
C7 10
CR20 1N459
CR22 1N459
K9
IMU COLD
IMU HOT
DS1
CONTROL SENSORS
PIP (BLK II/LEM)
IRIG (BLK I)
HI P
RETURN S
HI R
SENSOR COMMON C
IRIG IND SENSORS
HI G
RETURN T
S2 S3 S4 S5 S6
R1 120° 2964
R3 125° 2722.4
R8 130° 2504.5
R10 135° 2308.8
R12 140° 2133.5
R15 6295.5
R21 6295.5
R22 2504.5
R62 49.9K
AR2
C6 150
R60 2M
R26 15K
R27 50K
R32 300
C12 47
K7
CR16 1N459
K11
S7 SW2
CR19 1N459
CR21 1N459
Q4
C8 10

2900133 A

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR TDRR 24042		3 NOV 65	RP
B		REVISED PER TDRR 25405		31 JAN 66	RP



AR4
R42 1.2K
R43 680K
R44 680K
C9 3.3
R49 51
R48 51
R51 1.2
Q6
Q7
Q5
CR23
CR24 IN3030B
R50 10K
K16
K6
K7
CR29 IN459
F4 4A
J4
HI 28VDC
TP3
TP4
IMU HEATERS
LO 28VDC
R33 500
R34 100
R35 201
R36 340
R39 1340
K17
R38 50
CR18
R37 535
R61 735
R45 560
R52 1.5M
K17
K8
K3
S7 SW1
R40 100K
Q3
C7 10
K9
K12
CR22 IN459
K10
CR20 IN459
TIMER-ELECTRONIC FLASHER
DS2
R46 51
IMU COLD
IMU HOT
DS1
R47 51
CR27 IN459
K15
R54 15
BELL ASSEMBLY
DS4
PWR ON
PWR FAIL
DS3
K13
CK28
ALARM INHIBITED (SYSTEM RESET)
DS5
S7
R55 51
G & N ON (PTC INHIBITED)
DS6
R57 51
R56 51
C10 10
CR25 IN459
CR26 IN459
K14
S7 SW4
R53 51
K11
K10
K12
K5
K1
K2
S7 SW2
K11
CR21 IN459
C8 10
Q4
R41 100K
CR19 IN459
K9
S7 SW3
J1
28VDC INTERLOCK
J2
115 V INTERLOCK

PARTS TABLE

ZONE	REF. DES.	PART NUMBER	DESCRIPTION	SCHEM DIAG OR VALUE, TOL & RATING
E-11	AR 1	1897261	COMPARATOR	28 VDC, 50MA
B-10	2			
D-10	3			
G-8	4	↓	↓	↓
F-11	BT 1 THRU BT 8	1897268-001	BATTERY	4.0 VOLTS
F-12	C 1	CTM104VBK(1896957-046)	CAP. MIL-C-27287/1	0.1 UF ±10% 200VDC
C-12	2	CS13BE156K(1896954-103)	MIL-C-26655/2	15 ±10% 20
F-11	3	CE71C562G(1896872-119)	MIL-C-62/12	5600 ±75% 50
E-11	4	CS13BC276K(1896954-070)	MIL-C-26655/2	27 ±10% 10
C-10	5	CS13BB157K(-060)		150 6
B-10	6	CS13BB157K(-060)		150 6
D-8	7	CS13BF106K(-144)		10 35
B-8	8	CS13BF106K(-144)		10 35
F-8	9	CS13BD335K(-082)		3.3 15
D-7	10	CS13BG106K(-176)		10 50
D-10	C 11	CS13BF476K(-156)		47 35
B-10	C 12			
C-11	C 13	↓	↓	↓
H-12	CR 1	1015967-001	SEMI-CONDUCTOR (DIODE)	
G-12	2	1015937-001		
G-12	3	1897277-001		
F-12	4	1897277-001		
C-12	5	IN459(1896966-291)	MIL-S-19500/193A	
G-11	6	1015937-001		
G-11	7	1015939-008		
G-11	8	1015937-001		
F-11	9	IN3025B(1896966-187)	MIL-S-19500/115D	
F-11	10	IN3025B(1896966-187)	MIL-S-19500/115D	
E-11	11	IN459 (1896966-291)	MIL-S-19500/193A	
D-11	12	1897251-004		
D-11	13	IN3030B(1896966-070)	MIL-S-19500/115D	
F-10	14	IN3030B(-070)	/115D	
D-10	15	IN459 (-291)	/193A	
A-10	16			
E-9	17	↓	↓	
F-9	18	1897251-004		
A-9	19	IN459 (1896966-291)	MIL-S-19500/193A	
D-8	20			
B-8	21			
D-8	22	↓	↓	
G-7	23	1015939-008		
F-7	24	IN3030B(1896966-070)	MIL-S-19500/115D	
D-7	25	IN459 (-291)	/193A	
C-7	26			
E-7	27	↓	↓	
D-6	28	1015937-001		
F-6	29	IN459 (1896966-291)	MIL-S-19500/193A	
C-8	DS1	(4) MS25237-327	LAMP INCANDESCENT	
D-8	2	1015925-002	TIMER-ELEC FLASHER	
D-7	3	(4) MS25237-327	LAMP INCANDESCENT	
D-6	4	2900528	BELL ASSEMBLY	
C-6	5	(4) MS25237-327	LAMP INCANDESCENT	
D-5	6	(4) MS25237-327	LAMP INCANDESCENT	
H-12	F 1	F02A250V4AS(1897099-113)	FUSE-MIL-F-15160/02	4A, 250V
G-12	2	F02B125V3AS(-130)		3A, 125V
G-12	3	↓ (-130)		↓
G-6	4	F02A250V4AS(-113)	↓	4A, 250V
H-13	J 1	MS3127E-14-12P(1897115-120)	CONNECTOR	
F-13	2	-14-12PW(1897115-121)		
F-13	3	-12-10P(1897119-100)		
F-13	4	-18-32S(1897122-320)	↓	
G-12	K 1	1015982-003	RELAY	115V, 2PDT
G-12	2	1015802-004		28V,
C-11	3	1015982-004		28V.
E-11	4	1015832-312		22MA,
G-10	5	1015802-004		28V,
D-10	6	1015982-007		28V,
B-10	7	1015982-007		28V,
E-9	8	1015832-318		5.6MA,
A-9	9	-		
D-9	10	-		
B-9	11	-		
D-8	12	-		
C-7	13	-		
D-7	14	-		
E-7	15	-		5.6MA,
F-6	16	1015982-007		28V, 2PDT
E-6	17	1015837-001	RELAY	28V, 6PDT
	XDS1	1015869-783	LIGHT INDICATOR	
	XDS3	-785	LIGHT INDICATOR	
	XDS5	-748	IND. LT SW ASSY	
	XDS6	1897337-101	LIGHT INDICATOR	
	XF1	1015873-008	FUSEHOLDER	
	XF2	-001		
	XF3	-001		
	XF4	1015873-008	FUSEHOLDER	

ZONE	REF. DES.	PART NUMBER	DESCRIPTION	SCHEM DIAG OR VALUE, TOL & RATING
C-12	M 1	1016080-514	METER	10-0-10 ua
D-11	Q 1	1015928-001	TRANSISTOR	
G-10	2			
D-8	3			
B-8	4	↓		
F-7	5	1015935-		
G-7	6	1015928-		
G-7	7	1897309-	↓	
B-13	R 1	1016053-023	RESISTOR	2964 ±.01%
C-13	2	1897260-007	-VAR	1K ±5%
B-13	3	1016053-020		2722.4 ±.01%
D-12	4	RC20GF474J(1896952-121)		470K ±5%
D-12	5	RC20GF332J(1896952-061)		3.3K ±5%
C-12	6	RN60C1541F(1896976-307)		1.54K ±1%
C-12	7	RN60C1002F(1896976-385)		10K ±1%
B-12	8	1016053-005		2504.5 ±.01%
C-12	9	RC20GF155J(1896952-125)		1.5M ±5%
B-12	10	1016053-003		2308.8 ±.01%
B-12	11	RC32GF101J(1896953-039)		100 ±5%
G-12	12	1016053-004		2133.5 ±.01%
D-11	13	RN60C1503F(1896976-498)		150K ±1%
F-11	14	RC42GF101J(1896951-025)		100 ±5%
B-11	15	1016053-021		6295.5 ±.01%
E-11	16	1897260-005	-VAR	200 ±5%
D-11	17	RN60C1400C(1896984-250)		140 ±.25%
D-11	18	1897260-006	-VAR	500 ±5%
C-11	19	1897260-006	-VAR	500 ±5%
C-11	20	RC20GF301J(1896952-036)		300 ±5%
B-11	21	1016053-021		6295.5 ±.01%
B-11	22	1016053-005		2504.5 ±.01%
E-11	23	RC20GF102J(1896952-049)		1K ±5%
C-10	24	RC32GF151J(1896953-043)		150 ±5%
E-10	25	RC32GF101J(1896953-039)		100 ±5%
B-10	26	RN60C1502F(1896984-402)		15K ±1%
B-10	27	1897260-013	-VAR	50K ±5%
D-10	28	1897260-013	-VAR	50K ±5%
D-10	29	RN60C1502F(1896984-402)		15K ±1%
C-10	30	RC20GF102J(1896952-049)		1K ±5%
D-10	31	RC20GF301J (1896952-025)		300 ±5%
B-10	32	RC20GF301J (1896952-025)		300 ±5%
G-9	33	1897260-006	-VAR	500 ±5%
F-9	34	RN60C1000C(1896984-222)		100 ±.25%
F-9	35	1897260-005	-VAR	200 ±5%
G-9	36	1016053-019		1340 ±.01%
F-9	37	1016053-012		1535 ±.01%
F-9	38	1897260-003	-VAR	50 ±5%
G-9	39	1016053-019		1340 ±.01%
E-8	40	RC20GF104J(1896952-097)		100K ±5%
B-8	41	RC20GF104J (1896952-097)		100K
G-8	42	RC20GF122J(1896952-051)		1.2K
G-8	43	RC20GF684J (1896952-117)		680K
F-8	44	RC20GF684J (1896952-117)		680K
E-8	45	RC32GF561J(1896953-057)		560
D-8	46	RC42GF510J (1896951-018)		51
C-7	47	RC32GF510J (1896953-032)		51
G-7	48	RC32GF510J (1896953-032)		51
G-7	49	RC20GF510J (1896952-018)		51
F-7	50	1897260-010	-VAR	10K ±5%
G-6	51	RE70G1R21 (1897094-105)		1.2 ±1%
E-6	52	RC20GF155J (1896952-125)		1.5M ±5%
D-6	53	RC32GF510J (1896953-032)		51
E-6	54	RC42GF150J (1896951-005)		15
E-6	55	RC32GF510J (1896953-032)		51
C-6	56	RC42GF510J (1896951-018)		51
C-5	57	RC32GF510J (1896953-032)		51
D-12	58	RC20GF474J (1896952-113)		470K
D-10	59	RC20GF205J (1896952-128)		2M
B-10	60	RC20GF205J (1896952-128)		2M ±5%
F-9	61	1016053-001		735 ±.01%
B-11	R62	RN60C4992F (1896976-452)	RESISTOR	49.9K ±1%
H-13	S1	1015825-036	SWITCH	
B-13	S2	1021575		
B-13	S3			
B-12	S4			
B-12	S5			
B-11	S6	1021575		
D-9	S7	SEE DS5	SWITCH	
G-12	T1	1897291	TRANSFORMER	
F-10	TP1	1016166-004	TEST JACK	
G-10	TP2	-006		
G-6	TP3	-004		
F-6	TP4	1016166-006	TEST JACK	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS.
DRAWN J. Parker DATE 26 OCT 65
CHECKED
APPROVAL 26 OCT 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC DIAGRAM
BLOCK II PTC
(PORTABLE TEMPERATURE CONTROLLER)

CODE IDENT NO.	SIZE	
99974	J2	2900133

SCALE NONE
SHEET 1 OF 1

2900133 B

2900133 B

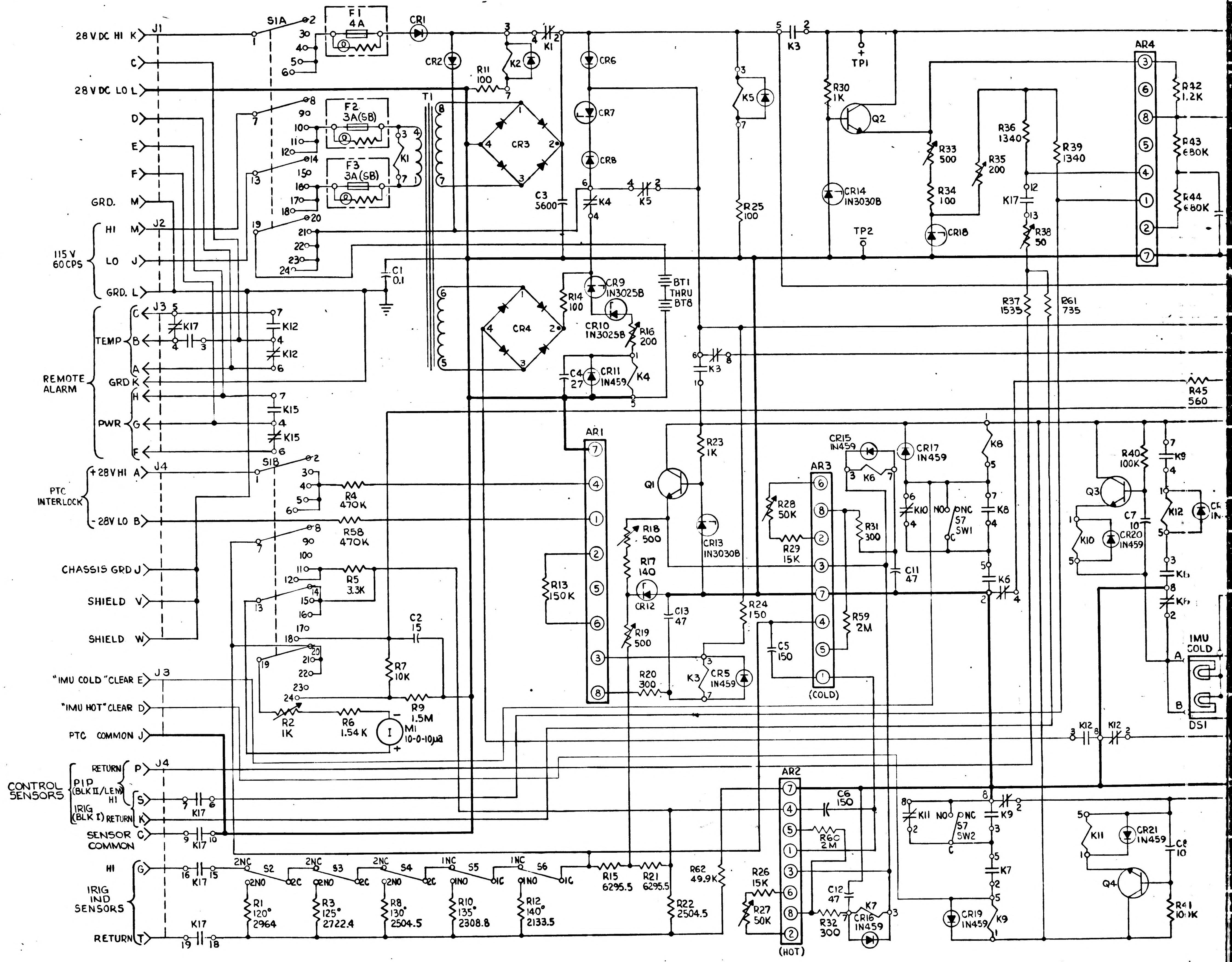
272900133

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ALL PART NUMBERS ARE FOR REFERENCE ONLY.
3. DRAWINGS FOR REFERENCE:

2900060	PORTABLE TEMPERATURE CONTROLLER ASSEMBLY

4. UNLESS OTHERWISE SPECIFIED:
   - A. RELAYS AND SWITCHES ARE SHOWN IN THE UNENERGIZED OR "OFF" POSITION.
   - B. VALUES ARE IN OHMS AND MICROFARADS.

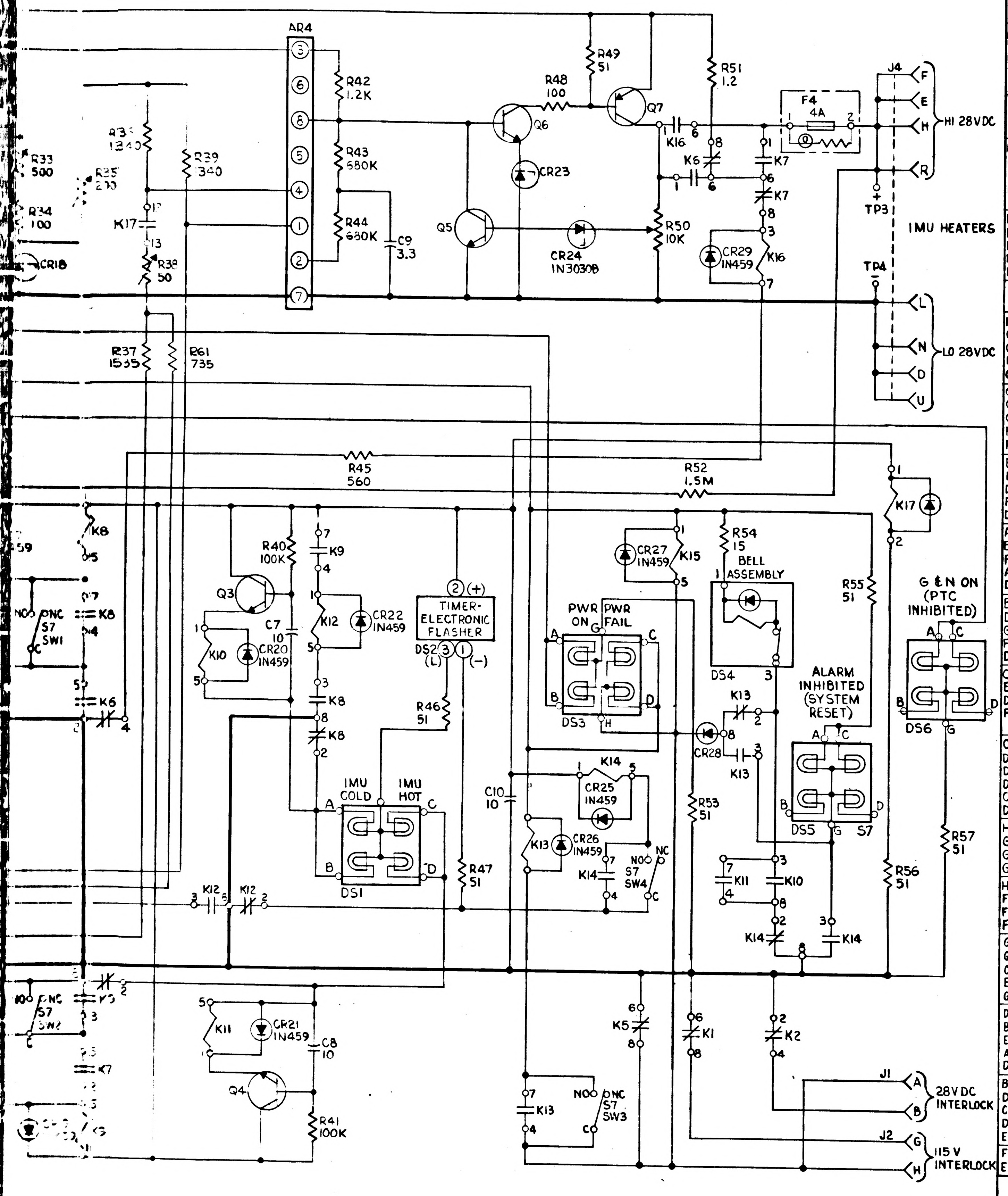


28 VDC HI K
J1
C
28 VDC LO L
D
E
F
GRD. M
HI M
J2
LO J
GRD. L
115 V 60 CPS
J3
TEMP
REMOTE ALARM
GRD K
PWR
J4
+28V HI A
PTC INTERLOCK
-28V LO B
CHASSIS GRD J
SHIELD V
SHIELD W
"IMU COLD" CLEAR E
"IMU HOT" CLEAR D
PTC COMMON J
CONTROL SENSORS
RETURN P
PIP (BLK II/LEM) HI S
IRIG (BLK I) RETURN K
SENSOR COMMON C
IRIG IND SENSORS
HI G
RETURN T
S1A
S1B
F1 4A
F2 3A(SB)
F3 3A(SB)
CR1
CR2
K1
K2
R11 100
T1
CR3
CR4
C1 0.1
C3 5600
CR6
CR7
CR8
K4
K5
CR9 1N3025B
CR10 1N3025B
R14 100
R16 200
C4 27
CR11 1N459
BT1 THRU BT8
K3
TP1
R30 1K
Q2
R25 100
CR14 1N3030B
TP2
R33 500
R34 100
CR18
R35 200
R36 1340
R39 1340
K17
R38 50
R37 1535
R61 735
AR4
R42 1.2K
R43 680K
R44 680K
R45 560
K12
K15
R4 470K
R58 470K
R5 3.3K
C2 15
R7 10K
R9 1.5M
R2 1K
R6 1.54K
M1 10-0-10µa
AR1
Q1
R23 1K
R18 500
R17 140
CR12
R19 500
R13 150K
CR13 1N3030B
C13 47
R20 300
CR5 1N459
R24 150
C5 150
AR3 (COLD)
R28 50K
R29 15K
R31 300
R59 2M
CR15 1N459
K6
CR17 1N459
K10
S7 SW1
C11 47
K8
R40 100K
Q3
C7 10
CR20 1N459
K9
IMU COLD
DS1
AR2 (HOT)
C6 150
R60 2M
R62 49.9K
R26 15K
R27 50K
C12 47
R32 300
CR16 1N459
K7
K11
S7 SW2
CR19 1N459
CR21 1N459
Q4
R41 10.0K
S2
S3
S4
S5
S6
R1 120° 2964
R3 125° 2722.4
R8 130° 2504.5
R10 135° 2308.8
R12 140° 2133.5
R15 6295.5
R21 6295.5
R22 2504.5

2900133 B

1/2900133

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR TDRR 24042		3 NOV 65	
B		REVISED PER TDRR 25405		31 JAN 66	
C		REVISED PER TDRR 25596		1 FEB 66	



AR4
R33 500
R34 100
R35 200
R36 1340
R37 1535
R38 50
R39 1340
R42 1.2K
R43 680K
R44 680K
C9 3.3
K17
CR18
R61 735
Q5
Q6
Q7
R48 100
R49 51
R51 1.2
CR23
CR24 IN3030B
R50 10K
K16
K6
K7
F4 4A
CR29 IN459
TP3
TP4
J4
HI 28VDC
IMU HEATERS
LO 28VDC
R45 560
R52 1.5M
K8
S7 SW1
NO NC
R40 100K
K9
Q3
C7 10
K10
CR20 IN459
K12
CR22 IN459
TIMER-ELECTRONIC FLASHER
DS2 (L)
R46 51
IMU COLD
IMU HOT
DS1
R47 51
CR27 IN459
K15
R54 15
BELL ASSEMBLY
DS4
PWR ON
PWR FAIL
DS3
K13
CR28
ALARM INHIBITED (SYSTEM RESET)
DS5
S7
R55 51
K17
G & N ON (PTC INHIBITED)
DS6
C10 10
K14
CR25 IN459
CR26 IN459
S7 SW4
R53 51
R56 51
R57 51
K11
K10
K14
S7 SW2
K5
CR21 IN459
C8 10
Q4
R41 100K
K5
K1
K2
S7 SW3
J1 28V DC INTERLOCK
J2 115 V INTERLOCK

PARTS TABLE

ZONE	REF. DES.	PART NUMBER	DESCRIPTION	SCHEM DIAG OR VALUE, TOL & RATING
E-11	AR1	1897261	COMPARATOR	28VDC, 50MA
B-10	2	↓	↓	↓
D-10	3			
G-8	4			
F-11	BT1 THRU BT8	1897268-001	BATTERY	4.0 VOLTS
F-12	C 1	CTM104VBK(1896957-046)	CAP. MIL-C-27287/1	0.1 UF ±10% 200VDC
C-12	2	CS13BE156K(1896954-103)	MIL-C-26655/2	15 ±10% 20
F-11	3	CE71C562G(1896872-119)	MIL-C-62/12	5600 +75% -10% 50
E-11	4	CS13BC276K(1896954-070)	MIL-C-26655/2	27 ±10% 10
C-10	5	CS13BB157K(-060)		150 6
B-10	6	CS13BB157K(-060)		150 6
D-8	7	CS13BF106K(-144)		10 35
B-8	8	CS13BF106K(-144)		10 35
F-8	9	CS13BD335K(-082)		3.3 15
D-7	10	CS13BG106K(-176)		10 50
D-10	C11	CS13BF476K(-156)		47 35
B-10	C12	↓		↓
C-11	C13			
H-12	CR1	1015967-001	SEMI-CONDUCTOR (DIODE)	
G-12	2	1015937-001		
G-12	3	1897277-001		
F-12	4	1897277-001		
C-12	5	IN459(1896966-291)	MIL-S-19500/193A	
G-11	6	1015937-001		
G-11	7	1015939-008		
G-11	8	1015937-001		
F-11	9	IN3025B(1896966-187)	MIL-S-19500/115D	
F-11	10	IN3025B(1896966-187)	MIL-S-19500/115D	
E-11	11	IN459 (1896966-291)	MIL-S-19500/193A	
D-11	12	1897251-004		
D-11	13	IN3030B(1896966-070)	MIL-S-19500/115D	
F-10	14	IN3030B(-070)	/115D	
D-10	15	IN459 (-291)	/193A	
A-10	16	↓	↓	
E-9	17			
F-9	18	1897251-004		
A-9	19	IN459 (1896966-291)	MIL-S-19500/193A	
D-8	20	↓	↓	
B-8	21			
D-8	22			
G-7	23	1015939-008		
F-7	24	IN3030B(1896966-070)	MIL-S-19500/115D	
D-7	25	IN459 (-291)	/193A	
C-7	26	↓	↓	
E-7	27			
D-6	28	1015937-001		
F-6	29	IN459 (1896966-291)	MIL-S-19500/193A	
C-8	DS1	(4) MS25237-327	LAMP INCANDESCENT	
D-8	2	1015925-002	TIMER-ELEC FLASHER	
D-7	3	(4) MS25237-327	LAMP INCANDESCENT	
D-6	4	2900528	BELL ASSEMBLY	
C-6	5	(4) MS25237-327	LAMP INCANDESCENT	
D-5	6	(4) MS25237-327	LAMP INCANDESCENT	
H-12	F 1	F02A250V4AS(1897099-113)	FUSE-MIL-F-15160/02	4A, 250V
G-12	2	F02B125V2AS(-129)	↓	2A, 125V
G-12	3	↓ (-129)		↓
G-6	4	F02A250V4AS(-113)		4A, 250V
H-13	J 1	MS3127E-14-12P(1897115-120)	CONNECTOR	
F-13	2	-14-12PW(1897115-121)	↓	
F-13	3	-1210P(1897119-100)		
F-13	4	-18-32S(1897122-320)		
G-12	K 1	1015982-003	RELAY	115V, 2PDT
G-12	2	1015802-004	↓	28V,
C-11	3	1015982-004		28V.
E-11	4	1015832-312		22MA,
G-10	5	1015802-004		28V,
D-10	6	1015982-007		28V,
B-10	7	1015982-007		28V,
E-9	8	1015832-318		5.6MA,
A-9	9	-		
D-9	10	-		
B-9	11	-		
D-8	12	-		
C-7	13	-		
D-7	14	-		
E-7	15	-		5.6MA,
F-6	16	1015982-007		28V, 2PDT
E-6	17	1015837-001	RELAY	28V, 6PDT
	XDS1	1015869-783	LIGHT INDICATOR	
	XDS3	-785	LIGHT INDICATOR	
	XDS5	-748	IND. LT SW ASSY	
	XDS6	1897337-101	LIGHT INDICATOR	
	XF1	1015873-008	FUSEHOLDER	
	XF2	-001		
	XF3	-001		
	XF4	1015873-008	FUSEHOLDER	

ZONE	REF. DES.	PART NUMBER	DESCRIPTION	SCHEM DIAG OR VALUE, TOL & RATING
C-12	M 1	1016080-514	METER	10-0-10 μa
D-11	Q 1	1015928-001	TRANSISTOR	
G-10	2	↓	↓	
D-8	3			
B-8	4			
F-7	5	1015935-		
G-7	6	1015928-		
G-7	7	1897309-		
B-13	R 1	1016053-023	RESISTOR	2964 ±.01%
C-13	2	1897260-007	-VAR	1K ±5%
B-13	3	1016053-020		2722.4 ±.01%
D-12	4	RC20GF474J(1896952-121)		470K ±5%
D-12	5	RC20GF332J(1896952-061)		3.3K ±5%
C-12	6	RN60C1541F(1896976-307)		1.54K ±1%
C-12	7	RN60C1002F(1896976-385)		10K ±1%
B-12	8	1016053-005		2504.5 ±.01%
C-12	9	RC20GF155J(1896952-125)		1.5M ±5%
B-12	10	1016053-003		2308.8 ±.01%
B-12	11	RC32GF101J(1896953-039)		100 ±5%
G-12	12	1016053-004		2133.5 ±.01%
D-11	13	RN60C1503F(1896976-498)		150K ±1%
F-11	14	RC42GF101J(1896951-025)		100 ±5%
B-11	15	1016053-021		6295.5 ±.01%
E-11	16	1897260-005	-VAR	200 ±5%
D-11	17	RN60C1400C(1896984-250)		140 ±.25%
D-11	18	1897260-006	-VAR	500 ±5%
C-11	19	1897260-006	-VAR	500 ±5%
C-11	20	RC20GF301J(1896952-036)		300 ±5%
B-11	21	1016053-021		6295.5 ±.01%
B-11	22	1016053-005		2504.5 ±.01%
E-11	23	RC20GF102J(1896952-049)		1K ±5%
C-10	24	RC32GF151J(1896953-043)		150 ±5%
E-10	25	RC32GF101J(1896953-039)		100 ±5%
B-10	26	RN60C1502F(1896984-402)		15K ±1%
B-10	27	1897260-013	-VAR	50K ±5%
D-10	28	1897260-013	-VAR	50K ±5%
D-10	29	RN60C1502F(1896984-402)		15 K ±1%
C-10	30	RC20GF102J(1896952-049)		1 K ±5%
D-10	31	RC20GF301J (1896952-025)		300 ±5%
B-10	32	RC20GF301J (1896952-025)		300 ±5%
G-9	33	1897260-006	-VAR	500 ±5%
F-9	34	RN60C1000C(1896984-222)		100 ±.25%
F-9	35	1897260-005	-VAR	200 ±5%
G-9	36	1016053-019		1340 ±.01%
F-9	37	1016053-012		1535 ±.01%
F-9	38	1897260-003	-VAR	50 ±5%
G-9	39	1016053-019		1340 ±.01%
E-8	40	RC20GF104J(1896952-097)		100K ±5%
B-8	41	RC20GF104J(1896952-097)		100K
G-8	42	RC20GF122J(1896952-051)		1.2K
G-8	43	RC20GF684J(1896952-117)		680K
F-8	44	RC20GF684J(1896952-117)		680K
E-8	45	RC32GF561J(1896953-057)		560
D-8	46	RC42GF510J (1896951-018)		51
C-7	47	RC32GF510J (1896953-032)		51
G-7	48	RC42GF101J (1896951-025)		100
G-7	49	RC20GF510J (1896952-018)		51
F-7	50	1897260-010	-VAR	10K ±5%
G-6	51	RE70G1R21 (1897094-105)		1.2 ±1%
E-6	52	RC20GF155J (1896952-125)		1.5M ±5%
D-6	53	RC32GF510J (1896953-032)		51
E-6	54	RC42GF150J (1896951-005)		15
E-6	55	RC32GF510J (1896953-032)		51
C-6	56	RC42GF510J (1896951-018)		51
C-5	57	RC32GF510J (1896953-032)		51
D-12	58	RC20GF474J (1896952-113)		470K
D-10	59	RC20GF205J (1896952-128)		2M
B-10	60	RC20GF205J (1896952-128)		2M ±5%
F-9	61	1016053-001		735 ±.01%
B-11	R62	RN60C4992F (1896976-452)	RESISTOR	49.9K ±1%
H-13	S1	1015825-036	SWITCH	
B-13	S2	1021575	↓	
B-13	S3	↓		
B-12	S4			
B-12	S5			
B-11	S6	1021575		
D-9	S7	SEE DS5	SWITCH	
G-12	T1	1897291	TRANSFORMER	
F-10	TP1	1016166-004	TEST JACK	
G-10	TP2	-006	↓	
G-6	TP3	-004		
F-6	TP4	1016166-006	TEST JACK	

2900133
C

3H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS.
DRAWN Parks 26 OCT 65 DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC DIAGRAM
BLOCK II PTC
(PORTABLE TEMPERATURE CONTROLLER)

CODE IDENT NO. 99974 SIZE J2 2900133
SCALE NONE SHEET

2900133 C

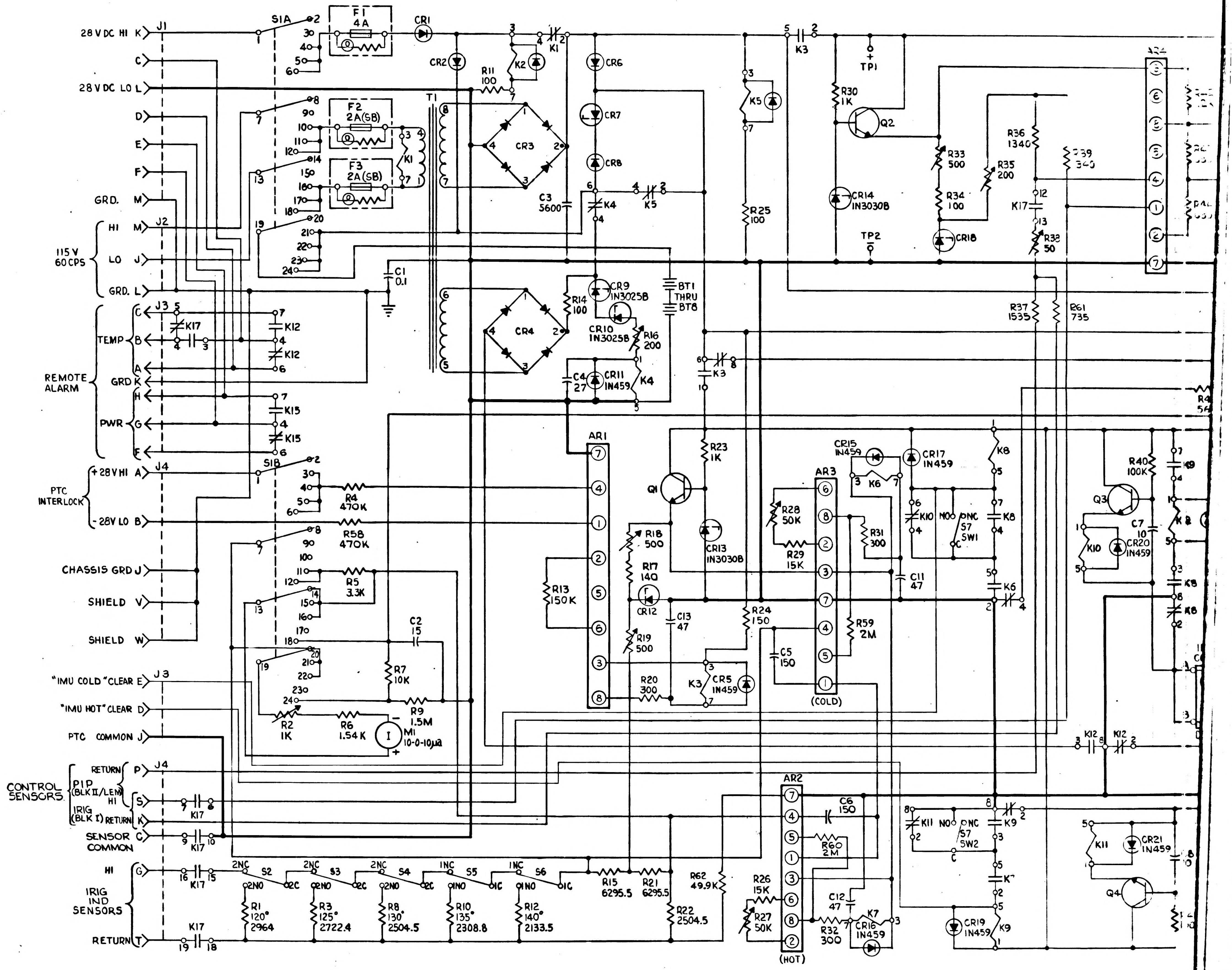
27 2900133

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ALL PART NUMBERS ARE FOR REFERENCE ONLY.
3. DRAWINGS FOR REFERENCE:

2900060	PORTABLE TEMPERATURE CONTROLLER ASSEMBLY

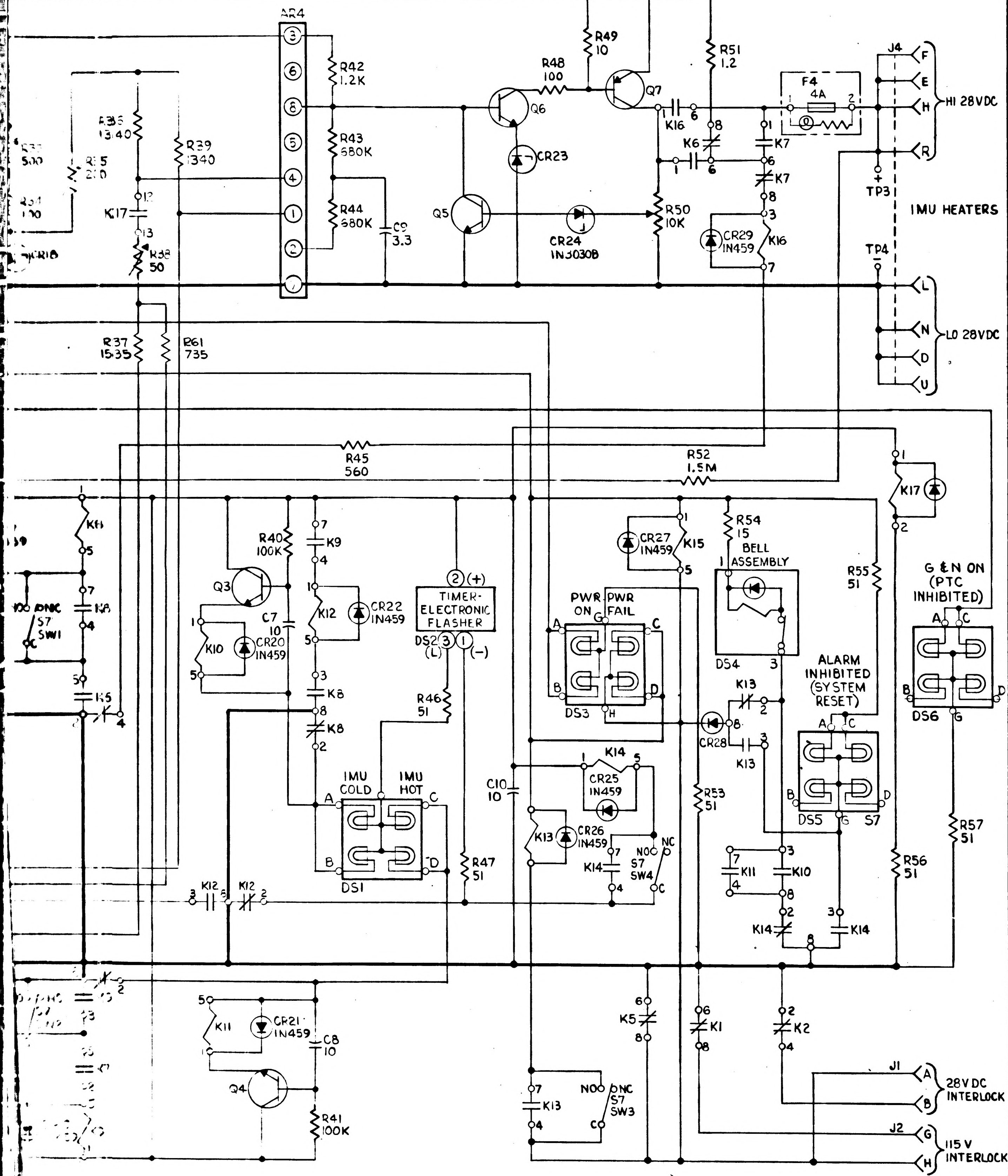
4. UNLESS OTHERWISE SPECIFIED:
   - A. RELAYS AND SWITCHES ARE SHOWN IN THE UNENERGIZED OR "OFF" POSITION.
   - B. VALUES ARE IN OHMS AND MICROFARADS.



28 V DC HI K
28 V DC LO L
GRD. M
115 V 60 CPS
HI M
LO J
GRD. L
REMOTE ALARM
TEMP
GRD K
PWR
PTC INTERLOCK
+28V HI A
-28V LO B
CHASSIS GRD J
SHIELD V
SHIELD W
"IMU COLD" CLEAR E
"IMU HOT" CLEAR D
PTC COMMON J
CONTROL SENSORS
RETURN P
PIP (BLK II/LEM)
IRIG (BLK I)
HI S
RETURN K
SENSOR COMMON C
IRIG IND SENSORS
HI G
RETURN T
J1
J2
J3
J4
S1A
S1B
F1 4A
F2 2A(SB)
F3 2A(SB)
CR1
CR2
CR3
CR4
CR6
CR7
CR8
CR9 1N3025B
CR10 1N3025B
CR11 1N459
CR12
CR13 1N3030B
CR14 1N3030B
CR15 1N459
CR16 1N459
CR17 1N459
CR18
CR19 1N459
CR20 1N459
CR21 1N459
T1
K1
K2
K3
K4
K5
K6
K7
K8
K9
K10
K11
K12
K15
K17
R11 100
R14 100
R16 200
R25 100
R30 1K
R33 500
R34 100
R35 200
R36 1340
R37 1535
R38 50
R39 340
R61 735
R4 470K
R58 470K
R5 3.3K
R7 10K
R9 1.5M
R2 1K
R6 1.54K
M1 10-0-10μa
R13 150K
R17 140
R18 500
R19 500
R20 300
R23 1K
R24 150
R28 50K
R29 15K
R31 300
R59 2M
R60 2M
R62 49.9K
R26 15K
R27 50K
R32 300
R40 100K
R1 120° 2964
R3 125° 2722.4
R8 130° 2504.5
R10 135° 2308.8
R12 140° 2133.5
R15 6295.5
R21 6295.5
R22 2504.5
C1 0.1
C2 15
C3 5600
C4 27
C5 150
C6 150
C7 10
C11 47
C12 47
C13 47
BT1 THRU BT8
TP1
TP2
Q1
Q2
Q3
Q4
AR1
AR2 (HOT)
AR3 (COLD)
AR4
S2
S3
S4
S5
S6
S7 SW1
S7 SW2

2900133

172900133


AR4
R42 1.2K
R43 680K
R44 680K
C9 3.3
R49 10
R48 100
R51 1.2
Q6
Q7
Q5
CR23
CR24 1N3030B
R50 10K
K16
K6
K7
F4 4A
J4
HI 28VDC
TP3
TP4
IMU HEATERS
CR29 1N459
LO 28VDC
R36 13.40
R35 210
R34 1.0
K17
R39 1340
R38 50
CR18
R37 15.35
R61 735
R45 560
R52 1.5M
K17
K11
K8
S7 SW1
K5
K10
CR20 1N459
Q3
R40 100K
C7 10
K9
K12
CR22 1N459
TIMER-ELECTRONIC FLASHER
DS2
R46 51
IMU COLD
IMU HOT
DS1
R47 51
C10 10
CR27 1N459
K15
R54 15
BELL ASSEMBLY
DS4
PWR ON
PWR FAIL
DS3
K13
CR28
ALARM INHIBITED (SYSTEM RESET)
DS5
S7
R55 51
G & N ON (PTC INHIBITED)
DS6
R57 51
R53 51
K14
CR25 1N459
CR26 1N459
S7 SW4
K10
K14
R56 51
K5
K1
K2
CR21 1N459
C8 10
Q4
R41 100K
K11
K13
S7 SW3
J1
28V DC INTERLOCK
J2
115 V INTERLOCK

PARTS TABLE

ZONE	REF. DES.	PART NUMBER	DESCRIPTION	SCHEM DIAG OR VALUE, TOL & RATING
E-11	AR1	1897261	COMPARATOR	28VDC, 50MA
B-10	2			
D-10	3			
G-8	4	↓	↓	↓
F-11	BT1 THRU BT8	1897268-001	BATTERY	4.0 VOLTS
F-12	C 1	CTM104VBK(1896957-046)	CAP. MIL-C-27287/1	0.1 UF, ±10% 200VDC
C-12	2	CS13BE156K(1896954-103)	MIL-C-26655/2	15 ±10% 20
F-11	3	CE71C562G(1896872-119)	MIL-C-62/12	5600 +75/-10% 50
E-11	4	CS13BC276K(1896954-070)	MIL-C-26655/2	27 ±10% 10
C-10	5	CS13BB157K(-060)		150 6
B-10	6	CS13BB157K(-060)		150 6
D-8	7	CS13BF106K(-144)		10 35
B-8	8	CS13BF106K(-144)		10 35
F-8	9	CS13BD335K(-082)		3.3 15
D-7	10	CS13BG106K(-176)		10 50
D-10	C11	CS13BF476K(-156)		47 35
B-10	C12			
C-11	C13	↓	↓	↓
H-12	CR1	1015967-001	SEMI-CONDUCTOR (DIODE)	
G-12	2	1015937-001		
G-12	3	1897277-001		
F-12	4	1897277-001		
C-12	5	1N459(1896966-291)	MIL-S-19500/193A	
G-11	6	1015937-001		
G-11	7	1015939-008		
G-11	8	1015937-001		
F-11	9	1N3025B(1896966-187)	MIL-S-19500/115D	
F-11	10	1N3025B(1896966-187)	MIL-S-19500/115D	
E-11	11	1N459 (1896966-291)	MIL-S-19500/193A	
D-11	12	1897251-004		
D-11	13	1N3030B(1896966-070)	MIL-S-19500/115D	
F-10	14	1N3030B(-070)	/115D	
D-10	15	1N459 (-291)	/193A	
A-10	16	↓	↓	
E-9	17			
F-9	18	1897251-004		
A-9	19	1N459 (1896966-291)	MIL-S-19500/193A	
D-8	20			
B-8	21			
D-8	22	↓	↓	
G-7	23	1015939-008		
F-7	24	1N3030B(1896966-070)	MIL-S-19500/115D	
D-7	25	1N459 (-291)	/193A	
C-7	26	↓	↓	
E-7	27			
D-6	28	1015937-001		
F-6	29	1N459 (1896966-291)	MIL-S-19500/193A	
C-8	DS1	(4) MS25237-327	LAMP INCANDESCENT	
D-8	2	1015925-002	TIMER-ELEC FLASHER	
D-7	3	(4) MS25237-327	LAMP INCANDESCENT	
D-6	4	2900528	BELL ASSEMBLY	
C-6	5	(4) MS25237-327	LAMP INCANDESCENT	
D-5	6	(4) MS25237-327	LAMP INCANDESCENT	
H-12	F 1	F02A250V4AS(1897099-113)	FUSE-MIL-F-15160/02	4A, 250V
G-12	2	F02B125V2AS(-129)		2A, 125V
G-12	3	↓ (-129)		↓
G-6	4	F02A250V4AS(-113)	↓	4A, 250V
H-13	J 1	MS3127E-14-12P(1897115-120)	CONNECTOR	
F-13	2	-14-12PW(1897115-121)		
F-13	3	-12-10P(1897119-100)		
F-13	4	-18-32S(1897122-320)	↓	
G-12	K 1	1015982-003	RELAY	115V, 2PDT
G-12	2	1015802-004		28V,
C-11	3	1015982-004		28V,
E-11	4	1015832-312		22MA,
G-10	5	1015802-004		28V,
D-10	6	1015982-007		28V,
B-10	7	1015982-007		28V,
E-9	8	1015832-318		5.6MA,
A-9	9	-		
D-9	10	-		
B-9	11	-		
D-8	12	-		
C-7	13	-		
D-7	14	-		
E-7	15	-		5.6MA,
F-6	16	1015982-007		28V, 2PDT
E-6	17	1015837-001	RELAY	28V, 6PDT
	XDS1	1015869-783	LIGHT INDICATOR	
	XDS3	-785	LIGHT INDICATOR	
	XDS5	-748	IND. LT SW ASSY	
	XDS6	1897337-101	LIGHT INDICATOR	
	XF1	1015873-008	FUSEHOLDER	
	XF2	-001		
	XF3	-001		
	XF4	1015873-008	FUSEHOLDER	

ZONE	REF. DES.	PART NUMBER	DESCRIPTION	SCHEM DIAG OR VALUE, TOL & RATING
C-12	M 1	1016080-514	METER	10-0-10 ua
D-11	Q 1	1015928-001	TRANSISTOR	
G-10	2			
D-8	3			
B-8	4	↓		
F-7	5	1015935-		
G-7	6	1015928-		
G-7	7	1897309-	↓	
B-13	R 1	1016053-023	RESISTOR	2964 ±.01%
C-13	2	1897260-007	-VAR	1K ±5%
B-13	3	1016053-020		2722.4 ±.01%
D-12	4	RC20GF474J(1896952-121)		470K ±5%
D-12	5	RC20GF332J(1896952-061)		3.3K ±5%
C-12	6	RN60C1541F(1896976-307)		1.54K ±1%
C-12	7	RN60C1002F(1896976-385)		10K ±1%
B-12	8	1016053-005		2504.5 ±.01%
C-12	9	RC20GF155J(1896952-125)		1.5M ±5%
B-12	10	1016053-003		2308.8 ±.01%
B-12	11	RC32GF101J(1896953-039)		100 ±5%
G-12	12	1016053-004		2133.5 ±.01%
D-11	13	RN60C1503F(1896976-498)		150K ±1%
F-11	14	RC42GF101J(1896951-025)		100 ±5%
B-11	15	1016053-021		6295.5 ±.01%
E-11	16	1897260-005	-VAR	200 ±5%
D-11	17	RN60C1400C(1896984-250)		140 ±.25%
D-11	18	1897260-006	-VAR	500 ±5%
C-11	19	1897260-006	-VAR	500 ±5%
C-11	20	RC20GF301J(1896952-036)		300 ±5%
B-11	21	1016053-021		6295.5 ±.01%
B-11	22	1016053-005		2504.5 ±.01%
E-11	23	RC20GF102J(1896952-049)		1K ±5%
C-10	24	RC32GF151J(1896953-043)		150 ±5%
E-10	25	RC32GF101J(1896953-039)		100 ±5%
B-10	26	RN60C1502F(1896984-402)		15K ±1%
B-10	27	1897260-013	-VAR	50K ±5%
D-10	28	1897260-013	-VAR	50K ±5%
D-10	29	RN60C1502F(1896984-402)		15K ±1%
C-10	30	RC20GF102J(1896952-049)		1K ±5%
D-10	31	RC20GF301J(1896952-025)		300 ±5%
B-10	32	RC20GF301J(1896952-025)		300 ±5%
G-9	33	1897260-006	-VAR	500 ±5%
F-9	34	RN60C1000C(1896984-222)		100 ±.25%
F-9	35	1897260-005	-VAR	200 ±5%
G-9	36	1016053-019		1340 ±.01%
F-9	37	1016053-012		1535 ±.01%
F-9	38	1897260-003	-VAR	50 ±5%
G-9	39	1016053-019		1340 ±.01%
E-8	40	RC20GF104J(1896952-097)		100K ±5%
B-8	41	RC20GF104J(1896952-097)		100K
G-8	42	RC20GF122J(1896952-051)		1.2K
G-8	43	RC20GF684J(1896952-117)		680K
F-8	44	RC20GF684J(1896952-117)		680K
E-8	45	RC32GF561J(1896953-057)		560
D-8	46	RC42GF510J(1896951-018)		51
C-7	47	RC32GF510J(1896953-032)		51
G-7	48	RC42GF101J(1896951-025)		100
G-7	49	RC20GF100J(1896952-001)		10
F-7	50	1897260-010	-VAR	10K ±5%
G-6	51	RE70G1R21 (1897094-105)		1.2 ±1%
E-6	52	RC20GF155J (1896952-125)		1.5M ±5%
D-6	53	RC32GF510J (1896953-032)		51
E-6	54	RC42GF150J (1896951-005)		15
E-6	55	RC32GF510J (1896953-032)		51
C-6	56	RC42GF510J (1896951-018)		51
C-5	57	RC32GF510J (1896953-032)		51
D-12	58	RC20GF474J (1896952-113)		470K
D-10	59	RC20GF205J (1896952-128)		2M
B-10	60	RC20GF205J (1896952-128)		2M ±5%
F-9	61	1016053-001		735 ±.01%
B-11	R62	RN60C4992F (1896976-452)	RESISTOR	49.9K ±1%
H-13	S1	1015825-036	SWITCH	
B-13	S2	1021575		
B-13	S3			
B-12	S4			
B-12	S5			
B-11	S6	1021575		
D-9	S7	SEE DS5	SWITCH	
G-12	T1	1897291	TRANSFORMER	
F-10	TP1	1016166-004	TEST JACK	
G-10	TP2	-006		
G-6	TP3	-004		
F-6	TP4	1016166-006	TEST JACK	

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR TDRR 24042		3 NOV 65	RP
B		REVISED PER TDRR 25405		31 JAN 66	
C		REVISED PER TDRR 25596		1 FEB 66	
D		REVISED PER TDRR 26732		4 MAR 66	

2900133 D

3H

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ± DO NOT SCALE THIS DRAWING	AC ELECTRONICS DIVISION GENERAL MOTORS CORP. MILWAUKEE WIS. DRAWN F. Parker DATE 23 OCT 65 CHECKED APPROVAL APPROVAL	MANNED SPACECRAFT CENTER HOUSTON, TEXAS SCHEMATIC DIAGRAM BLOCK II PTC (PORTABLE TEMPERATURE CONTROLLER)
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 SIZE J2 2900133
CONTRACT NAS 9-497	MIT APPROVAL	SCALE NONE SHEET

2900133 D

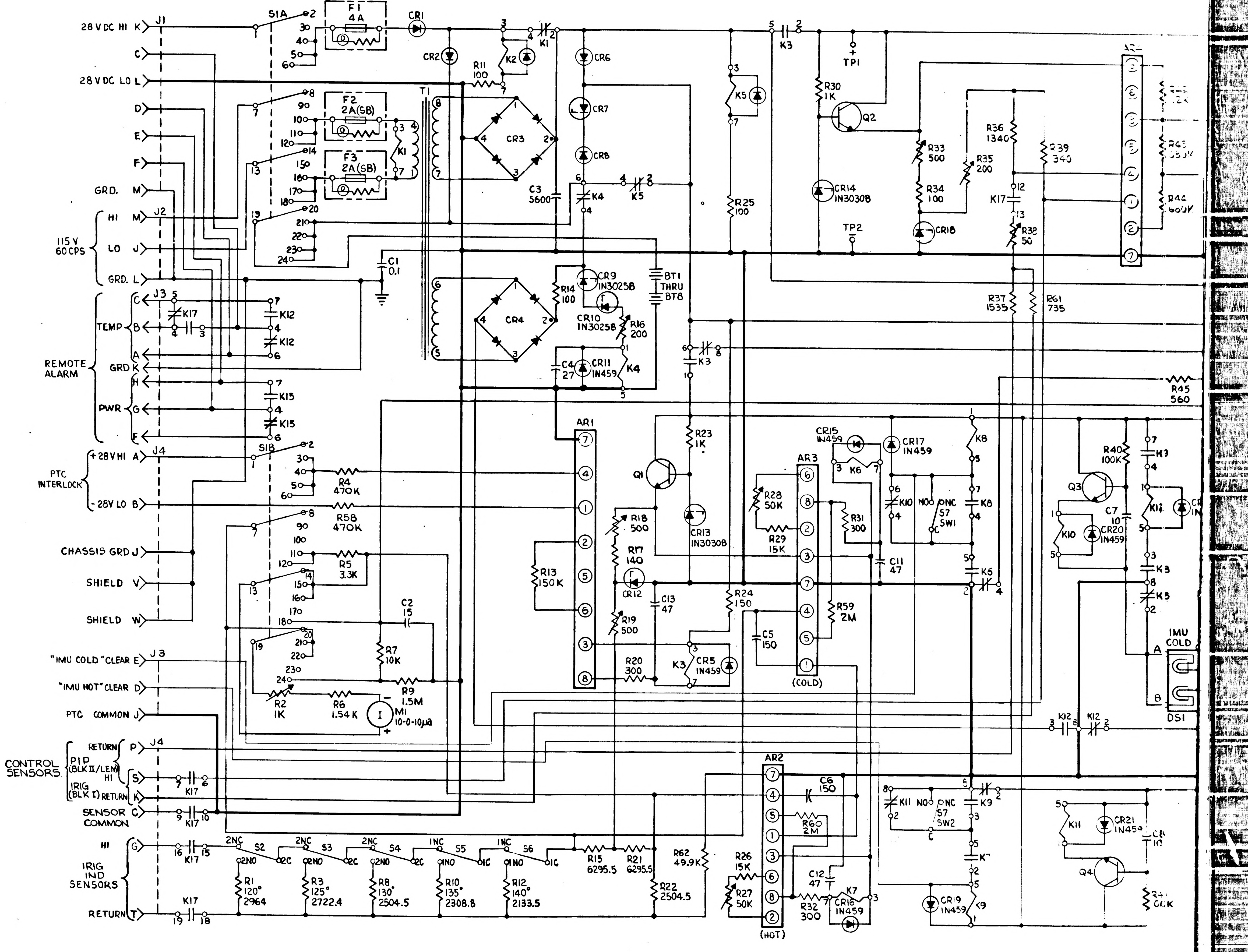
2-/-2900133

NOTES:

1. INTERPPET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ALL PART NUMBERS ARE FOR REFERENCE ONLY.
3. DRAWINGS FOR REFERENCE:

2900060	PORTABLE TEMPERATURE CONTROLLER ASSEMBLY

4. UNLESS OTHERWISE SPECIFIED:
   - A. RELAYS AND SWITCHES ARE SHOWN IN THE UNENERGIZED OR "OFF" POSITION.
   - B. VALUES ARE IN OHMS AND MICROFARADS.



28 V DC HI K
J1
C
28 V DC LO L
D
E
F
GRD. M
115 V 60 CPS
HI M
J2
LO J
GRD. L
J3
TEMP
C
B
A
REMOTE ALARM
GRD K
PWR
H
G
F
K17
K12
K15
PTC INTERLOCK
J4
+28 V HI A
-28 V LO B
S1A
S1B
F1 4A
F2 2A(SB)
F3 2A(SB)
CR1
CR2
R11 100
K2
K1
T1
CR3
CR4
C1 0.1
C3 5600
CR6
CR7
CR8
K4
K5
CR9 1N3025B
CR10 1N3025B
R14 100
R16 200
C4 27
CR11 1N459
BT1 THRU BT8
K3
TP1
R30 1K
Q2
CR14 1N3030B
TP2
R25 100
R33 500
R34 100
CR18
R36 1340
R35 200
R39 340
K17
R38 50
R37 1535
R61 735
AR4
R45 560
R4 470K
R58 470K
CHASSIS GRD J
SHIELD V
SHIELD W
R5 3.3K
C2 15
R7 10K
R9 1.5M
R2 1K
R6 1.54K
M1 10-0-10µa
"IMU COLD" CLEAR E
"IMU HOT" CLEAR D
PTC COMMON J
AR1
R13 150K
Q1
R23 1K
CR13 1N3030B
R18 500
R17 140
CR12
C13 47
R19 500
R20 300
CR5 1N459
R24 150
C5 150
AR3
(COLD)
R28 50K
R29 15K
R31 300
R59 2M
CR15 1N459
CR17 1N459
K6
K10
S7 SW1
C11 47
K8
Q3
R40 100K
C7 10
CR20 1N459
K9
IMU COLD
DS1
CONTROL SENSORS
RETURN P
PIP (BLK II/LEM) HI S
IRIG (BLK I) RETURN K
SENSOR COMMON G
IRIG IND SENSORS
HI G
RETURN T
S2
S3
S4
S5
S6
R1 120° 2964
R3 125° 2722.4
R8 130° 2504.5
R10 135° 2308.8
R12 140° 2133.5
R15 6295.5
R21 6295.5
R22 2504.5
R62 49.9K
AR2
(HOT)
C6 150
R60 2M
R26 15K
R27 50K
C12 47
K7
CR16 1N459
R32 300
K11
S7 SW2
CR19 1N459
CR21 1N459
Q4

2900133

1/2900133

APPLICATION	
NEXT ASSY	USED ON
2900031-011	2900031-011

REVISIONS 23920

SYM	DESCRIPTION	DATE	APPROVAL
A	REPLACES REV(-) WITH CHANGE PER MXC202378	24 JUN 65	MCR
B	REVISED PER MXC 203057	19 JUL 65	RWH
C	REVISED PER MXC 203588	8 AUG 65	RWH
D	REVISED PER MXC 203814	19 AUG 65	EF
E	REVISED PER MXC 204288	3 SEP 65	JWP MEM
F	INITIAL RELEASE CLASS A PER TDRR 23920	18 OCT 65	REW FE

REV	F	F
SHEET	21	22

REV STATUS OF SHEETS																				
REV	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

ACSP PN

DRAWN S. Agne DATE 19 APR 65
CHECKED W. Daill 20 APR 65
APPROVAL Williams 21 APR 65
APPROVAL Gediman 10/14/65
NASA APPROVAL
MIT APPROVAL 21 Oct 65
CONTRACT NAS9-497

WIRING HARNESS B

CODE IDENT NO.	SIZE		REV
99974	A	2900139	F

SCALE —

SHEET 1 OF 22

WIRING HARNESS B 2900139 F

NOTE NUMBER	GENERAL NOTES DESCRIPTION
1	NOTE ONE IS NOT APPLICABLE
2	INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-C-70327.
3	LACE HARNESS USING ITEM 12.
4	FASTEN MARKER SECURELY TO CONFORM TO CONFIGURATION USING ITEM 12.
5	A LETTER WITH AN ASTERISK SUFFIX INDICATES A LOWER CASE LETTER.
6	GRID MODULE IS ONE INCH BASIC FOR DIMENSIONING. UNLESS OTHERWISE SPECIFIED HARNESS DRAWING IS SHOWN AT TRUE POSITION. CENTERS OF HARNESS FEATURES SHALL BE WITHIN +.25 OR -.25 AND ENDS OF LEADS AND ACCESSORIES +.12 OR -.12 INCH TOLERANCE OF THE TRUE POSITIONS SHOWN. ALL TOLERANCES APPLY REGARDLESS OF FEATURE SIZE.
7	VENDOR ITEM - SEE SOURCE CONTROL OR SPECIFICATION CONTROL DRAWING
8	APPLY LEAD IDENTIFICATIONS PER ND 1002019 AT CENTER-TO-CENTER INTERVALS OF 1.2 INCHES.
9	SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM 9 OR ITEMS 10 AND 11.
10	IDENTIFY PER MIL-STD-130 (ES267) USING PART NUMBER
11	SPIRALLING OF LEAD IDENTIFICATION IS ALLOWED.
12	ASSEMBLE PER ND1002032.

MANNED SPACECRAFT CENTER HOUSTON, TEXAS | SIZE A | 2900139
SCALE-NONE | REV LTR F | SHEET 2 OF 22

MIL 2084 4-63

WIRING HARNESS B 2900139 F

NOTE NUMBER | GENERAL NOTES DESCRIPTION

TOLERANCE CHART, UNLESS OTHERWISE SPECIFIED --

APPLICABLE LENGTH FOR WIRE OR CABLE, STRIP WIRE, STRIP JACKET, CUT WIRE OR CUT SHIELD.	TOLERANCE WIRE OR CABLE	STRIP WIRE	STRIP JACKET	CUT WIRE	CUT SHIELD
UNDER 1 INCH	+ .06-.00	+.03-.00	+.06-.06	+.06-.06	+.06-.06
1 INCH TO 6 INCHES	+ .50-.00	+.06-.00	+.25-.25	+.25-.25	+.25-.25
6 INCHES TO 6 FEET	+1.00-.00		+.50-.50	+.50-.50	+.50-.50
OVER 6 FEET	+2.00-.00				

MANNED SPACECRAFT CENTER HOUSTON, TEXAS | SIZE A | 2900139
SCALE-NONE | REV LTR F | SHEET 3 OF 22

MIL 2084 4-63

WIRING HARNESS B 2900139 F

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2900139-001	WIRE PER ND1002181, TYPE 1, CLASS1, 24AWG, WHITE, 227 FEET TOTAL LENGTH
	2	1	2900139-002	WIRE PER ND1002181, TYPE 1, CLASS 1, 20AWG, WHITE, 11 INCHES TOTAL LENGTH
7	3	148	1015864-109	INSULATION SLEEVING, ELECTRICAL
7	4	3	1015817-500	CONNECTOR-RECEPTACLE, ELECTRICAL
7	5	94	1015817-424	PIN, CONTACT
7	6	7	1015817-420	PIN, CONTACT
7	7	6	1015817-620	PIN, CONTACT
7	8	1	1016128-001	BAND, IDENTIFICATION BLANK
	9	AR	SN60WRAP	SOLDER QQ-S-571 (ES2175-3)
	10	AR	SN60WS	SOLDER QQ-S-571 (ES2175-1)
	11	AR	MIL-F-14256	TYPE A OR W FLUX (ES2798)
	12	AR	MIL-T-713	LACING TAPE, TYPE P, WAXED, CLASS 2, BLACK (ES2732, NO. 18)

MANNED SPACECRAFT CENTER HOUSTON, TEXAS | SIZE A | 2900139
SCALE-NONE | REV LTR F | SHEET 4 OF 22

MIL 2084 4-63

WIRING HARNESS B 2900139 F

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 1	1		J31-B* XDS12-A	31 10				.20 .25	NO YES		5 3	
B 2	1		XDS12-A XDS12-C	10 10				.25 .25	YES YES		 3	
B 3	1		J31-B XDS11-G	31 9				.20 .25	NO YES		5 3	
B 4	1		J31-C XDS10-G	31 8				.20 .25	NO YES		5 3	
B 5	1		J31-D XDS10-H	31 8				.20 .25	NO YES		5 3	
B 6	1		J31-E XDS9-A	31 7				.20 .25	NO YES		5 3	
B 7	1		XDS9-A XDS9-C	7 7				.25 .25	YES YES		 3	
B 8	1		J31-F XDS9-G	31 7				.20 .25	NO YES		5 3	
B 9	1		J31-H XDS8-G	31 6				.20 .25	NO YES		5 3	
B 10	1		J31-J XDS7-G	31 5				.20 .25	NO YES		5 3	
B 11	1		J31-K XDS24-C	31 11				.20 .25	NO YES		5 3	
B 12	1		XDS24-C XDS24-D	11 11				.25 .25	YES YES		 3	

MANNED SPACECRAFT CENTER HOUSTON, TEXAS | SIZE A | 2900139
SCALE-NONE | REV LTR F | SHEET 5 OF 22

MIL 2084 4-63

WIRING HARNESS B

2900139 F ~~B~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 13	1		J31-L S1SW1-C	31 11				.20 .25	NO YES		5	
B 14	1		J31-M S1SW1-NC	31 11				.20 .25	NO YES		5	
B 15	1		J31-N XDS23-G	31 12				.20 .25	NO YES		5 3	
B 16	1		J31-P XDS22-G	31 13				.20 .25	NO YES		5 3	
B 17	1		J31-R XDS22-C	31 13				.20 .25	NO YES		5 3	
B 18	1		XDS22-C XDS22-D	13 13				.25 .25	YES YES		3	
B 19	1		J31-S XDS22-H	31 13				.20 .25	NO YES		5 3	
B 20	1		J31-T XDS34-G	31 25				.20 .25	NO YES		5 3	
B 21	1		J31-U XDS33-A	31 24				.20 .25	NO YES		5 3	
B 22	1		XDS33-A XDS33-B	24 24				.25 .25	YES YES		3	
B 23	1		J31-V XDS33-C	31 24				.20 .25	NO YES		5 3	
B 24	1		XDS33-C XDS33-D	24 24				.25 .25	YES YES		3	

MANNED SPACECRAFT CENTER HOUSTON, TEXAS | SIZE A | 2900139

SCALE - NONE | REV LTR ~~B~~ F | SHEET 6 OF 22

MIL 2084 4-63

WIRING HARNESS B

2900139 F ~~E~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 25	1		J31-W XDS32-A	31 23				.20 .25	NO YES		5 3	
B 26	1		XDS32-A XDS32-C	23 23				.25 .25	YES YES		3	
B 27	1		J31-X XDS46-G	31 32				.20 .25	NO YES		5 3	
B 28	1		J31-Y S8SW1-NC	31 32				.20 .25	NO YES		5	
B 29	1		J31-Z XDS45-G	31 33				.20 .25	NO YES		5 3	
B 30	1		J31-A* S7SW1-NC	31 33				.20 .25	NO YES		5	
B 31	1		J32-A XF1-1	30 39				.20 .25	NO YES		5	
B 32	2		J32-B XF1-2	30 39				.20 .25	NO YES		7	
B 33	1		J32-C XF1-1	30 39				.20 .25	NO YES		6	
B 34	1		J32-C XDS36-A	30 27				.20 .25	NO YES		3	
B 35	1		XDS36-A XDS36-B	27 27				.25 .25	YES YES		3	
B 36	1		XDS36-B XDS29-A	27 22				.25 .25	YES YES		3	

MANNED SPACECRAFT. CENTER HOUSTON, TEXAS | SIZE A | 2900139

SCALE - NONE | REV LTR ~~E~~ F | SHEET 7 OF 22

MIL 2084 4-63

WIRING HARNESS B

2900139 F ~~B~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 37	1		XDS29-A XDS29-B	22 22				.25 .25	YES YES		3	
B 38	1		XDS29-B S5SW2-C	22 22				.25 .25	YES YES			
B 39	1		S5SW2-C S4SW1-C	22 20				.25 .25	YES YES			
B 40	1		S4SW1-C XDS25-G	20 18				.25 .25	YES YES		3	
B 41	1		XDS25-G XDS16-G	18 14				.25 .25	YES YES		3	
B 42	1		XDS16-G XDS15-A	14 15				.25 .25	YES YES		3	
B 43	1		XDS15-A XDS15-C	15 15				.25 .25	YES YES		3	
B 44	1		XDS15-C XDS14-A	15 16				.25 .25	YES YES		3	
B 45	1		XDS14-A XDS14-C	16 16				.25 .25	YES YES		3	
B 46	1		XDS14-C XDS13-A	16 17				.25 .25	YES YES		3	
B 47	1		XDS13-A XDS13-C	17 17				.25 .25	YES YES		3	
B 48	1		XDS13-C XDS3-A	17 3				.25 .25	YES YES		3	

MANNED SPACECRAFT CENTER HOUSTON, TEXAS | SIZE A | 2900139

SCALE - NONE | REV LTR ~~B~~ F | SHEET 8 OF 22

MIL 2084 4-63

WIRING HARNESS B

2900139 F ~~E~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 49	1		XDS3-A XDS3-C	3 3				.25 .25	YES YES		3	
B 50	1		XDS3-C XDS2-A	3 2				.25 .25	YES YES		3	
B 51	1		XDS2-A XDS2-C	2 2				.25 .25	YES YES		3	
B 52	1		XDS2-C XDS1-A	2 1				.25 .25	YES YES		3	
B 53	1		XDS1-A XDS1-C	1 1				.25 .25	YES YES		3	
B 54	1		J32-D XF2-2	30 38				.20 .25	NO YES		5	
B 55	1		J32-E XF2-1	30 38				.20 .25	NO YES		6	
B 56	1		J32-E S1SW1-NO	30 11				.20 .25	NO YES			
B 57			DELETED									
B 58	1		J32-H XDS36-H	30 27				.20 .25	NO YES		5 3	
B 59			DELETED									
B 60	1		XDS29-C XDS29-D	22 22				.25 .25	YES YES		3	

MANNED SPACECRAFT CENTER HOUSTON, TEXAS | SIZE A | 2900139

SCALE - NONE | REV LTR ~~E~~ F | SHEET 9 OF 22

MIL 2084 4-63

WIRING HARNESS B

2900139 F ~~B~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 61	1		J32-J XDS26-H	30 19				.20 .25	NO YES		5 3	
B 62	1		J32-K XDS26-A	30 19				.20 .25	NO YES		6 3	
B 63	1		XDS26-A XDS26-B	19 19				.25 .25	YES YES		3	
B 64	1		J32-K XDS45-A	30 33				.20 .25	NO YES		3	
B 65	1		XDS45-A XDS45-C	33 33				.25 .25	YES YES		3	
B 66			DELETED									
B 67	1		XDS34-A XDS34-C	25 25				.25 .25	YES YES		3 3	
B 68	1		XDS34-C XDS22-A	25 13				.25 .25	YES YES		3	
B 69	1		XDS22-A XDS22-B	13 13				.25 .25	YES YES		3	
B 70	1		XDS22-B XDS23-A	13 12				.25 .25	YES YES		3	
B 71	1		XDS23-A XDS23-C	12 12				.25 .25	YES YES		3	
B 72	1		J32-L XDS8-A	30 6				.20 .25	NO YES		5 3	

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A
2900139
SCALE-NONE
REV LTR ~~B~~ F
SHEET 10 OF 22

MIL 2084 4-63

WIRING HARNESS B

2900139 F ~~B~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 73	1		XDS8-A XDS8-C	6 6				.25 .25	YES YES		3	
B 74	1		XDS8-C XDS10-A	6 8				.25 .25	YES YES		3	
B 75	1		XDS10-A XDS10-B	8 8				.25 .25	YES YES		3	
B 76	1		XDS10-B XDS11-A	8 9				.25 .25	YES YES		3	
B 77	1		XDS11-A XDS11-C	9 9				.25 .25	YES YES		3	
B 78	1		J32-M XDS7-A	30 5				.20 .25	NO YES		5 3	
B 79	1		XDS7-A XDS7-C	5 5				.25 .25	YES YES		3	
B 80	1		J32-N XDS10-C	30 8				.20 .25	NO YES		5 3	
B 81	1		XDS10-C XDS10-D	8 8				.25 .25	YES YES		3	
B 82	1		J32-S* XF5-1	30 35				.20 .25	NO YES		5	
B 83	1		J32-T* XF4-1	30 36				.20 .25	NO YES		5	
B 84	1		J32-U* XF3-1	30 37				.20 .25	NO YES		5	

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A
2900139
SCALE-NONE
REV LTR ~~B~~ F
SHEET 11 OF 22

MIL 2084 4-63

WIRING HARNESS B

2900139 F ~~B~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 85	1		J32-V* XF5-2	30 35				.20 .25	NO YES		5	
B 86	1		J32-W* XF4-2	30 36				.20 .25	NO YES		5	
B 87	1		J32-X* XF3-2	30 37				.20 .25	NO YES		5	
B 88	1		J32-Z* XF6-1	30 34				.20 .25	NO YES		5	
B 89	1		J32-AA XF6-2	30 34				.20 .25	NO YES		5	
B 90	1		J32-BB S6SW4-C	30 27				.20 .25	NO YES		5	
B 91	1		S6SW4-C S5SW1-C	27 22				.25 .25	YES YES			
B 92	1		J32-CC J32-DD	30 30				.20 .20	NO NO		6 6	
B 93	1		J32-CC XDS37-G	30 26				.20 .25	NO YES		3	
B 94	1		XDS37-G XDS35-G	26 28				.25 .25	YES YES		3	
B 95	1		XDS35-G XDS28-G	28 21				.25 .25	YES YES		3	
B 96	1		XDS28-G XDS27-G	21 20				.25 .25	YES YES		3	

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A
29001
SCALE-NONE
REV LTR ~~B~~ F
SHEET 12 OF 22

MIL 2084 4-63

WIRING HARNESS B

2900139 F ~~B~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 97	1		XDS27-G XDS27-H	20 20				.25 .25	YES YES		3	
B 98	1		XDS27-H XDS4-G	20 4				.25 .25	YES YES		3	
B 99	1		J32-CD J32-EE	30 30				.20 .20	NO NO		6	
B 100	1		J32-EE J32-FF	30 30				.20 .20	NO NO		6	
B 101	1		J32-FF J32-HH	30 30				.20 .20	NO NO		7	
B 102	1		J32-HH S8SW1-C	30 32				.20 .25	NO YES			
B 103	1		S7SW1-C ~~S8SW1-C~~ ~~XDS41-G~~ XDS41-G	33 25D				.25 .25	YES YES		3	
B 104	1		XDS32-G XDS33-G	23 24				.25 .25	YES YES		3 3	
B 105	1		XDS33-G XDS24-G	24 11				.25 .25	YES YES		3	
B 106	1		XDS24-G XDS21-G	11 13A				.25 .25	YES YES		3	
B 107	1		J33-J S6SW4-NC	29 27				.20 .25	NO YES		5	
B 108	1		J33-K S6SW4-NC	29 27				.20 .25	NO YES		5	

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
SIZE A
2900139
SCALE-NONE
REV LTR ~~B~~ F
SHEET 13 OF 22

MIL 2084 4-63

WIRING HARNESS B 2900139 F ~~B~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 109	1		J33-L	29				.20	NO		5	
			XDS37-A	26				.25	YES		3	
B 110	1		XDS37-A	26				.25	YES			
			XDS37-C	26				.25	YES		3	
B 111	1		J33-M	29				.20	NO		5	
			XDS36-G	27				.25	YES		3	
B 112	1		J33-N	29				.20	NO		5	
			XDS36-D	27				.25	YES		3	
B 113	1		J33-P	29				.20	NO		5	
			XDS36-C	27				.25	YES		3	
B 114	1		J33-R	29				.20	NO		5	
			S6SW1-C	27				.25	YES			
B 115	1		J33-S	29				.20	NO		5	
			S6SW1-NO	27				.25	YES			
B 116	1		S6SW1-NO	27				.25	YES			
			S5SW1-NO	22				.25	YES			
B 117	1		J33-T	29				.20	NO		5	
			S6SW2-NO	27				.25	YES			
B 118	1		S6SW2-NO	27				.25	YES			
			S4SW1-NO	20				.25	YES			
B 119	1		J33-U	29				.20	NO		5	
			S6SW3-C	27				.25	YES			
B 120	1		S6SW3-C	27				.25	YES			
			S6SW2-C	27				.25	YES			

MANNED SPACECRAFT CENTER HOUSTON, TEXAS	SIZE A	2900139
SCALE-NONE	REV LTR ~~B~~ F	SHEET 14 OF 22

WIRING HARNESS B 2900139 F ~~B~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 121	1		J33-V	29				.20	NO		5	
			S6SW3-NO	27				.25	YES			
B 122	1		S6SW3-NO	27				.25	YES			
			S5SW2-NO	22				.25	YES			
B 123	1		J33-W	29				.20	NO		5	
			XDS35-A	28				.25	YES		3	
B 124	1		XDS35-A	28				.25	YES			
			XDS35-B	28				.25	YES		3	
B 125	1		J33-X	29				.20	NO		5	
			XDS35-C	28				.25	YES		3	
B 126	1		XDS35-C	28				.25	YES			
			XDS35-D	28				.25	YES		3	
B 127	1		J33-Y	29				.20	NO		5	
			XDS29-G	22				.25	YES		3	
B 128	1		J33-Z	29				.20	NO		5	
			XDS28-A	21				.25	YES		3	
B 129	1		XDS28-A	21				.25	YES			
			XDS28-B	21				.25	YES		3	
B 130	1		J33-A*	29				.20	NO		5	
			XDS28-C	21				.25	YES		3	
B 131	1		XDS28-C	21				.25	YES			
			XDS28-D	21				.25	YES		3	
B 132	1		J33-B*	29				.20	NO		5	
			XDS27-A	20				.25	YES		3	

MANNED SPACECRAFT CENTER HOUSTON, TEXAS	SIZE A	2900139
SCALE-NONE	REV LTR ~~B~~ F	SHEET 15 OF 22

WIRING HARNESS B 2900139 F ~~B~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 133	1		XDS27-A	20				.25	YES			
			XDS27-B	20				.25	YES		3	
B 134	1		J33-C*	29				.20	NO		5	
			XDS27-D	20				.25	YES		3	
B 135	1		J33-D*	29				.20	NO		5	
			XDS27-C	20				.25	YES		3	
B 136	1		J33-E*	29				.20	NO		5	
			XDS26-G	19				.25	YES		3	
B 137	1		J33-F*	29				.20	NO		5	
			XDS26-D	19				.25	YES		3	
B 138	1		J33-H*	29				.20	NO		5	
			XDS26-C	19				.25	YES		3	
B 139	1		J33-J*	29				.20	NO		5	
			S3SW1-C	19				.25	YES			
B 140	1		J33-K*	29				.20	NO		5	
			S3SW1-NO	19				.25	YES			
B 141	1		J33-M*	29				.20	NO		5	
			S3SW1-NC	19				.25	YES			
B 142	1		J33-N*	29				.20	NO		5	
			XDS25-A	18				.25	YES		3	
B 143	1		XDS25-A	18				.25	YES			
			XDS25-B	18				.25	YES		3	
B 144	1		J33-P*	29				.20	NO		5	
			XDS25-C	18				.25	YES		3	

MANNED SPACECRAFT CENTER HOUSTON, TEXAS	SIZE A	2900139
SCALE-NONE	REV LTR ~~B~~ F	SHEET 16 OF 22

WIRING HARNESS B 2900139 F ~~B~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 145	1		XDS25-C	18				.25	YES			
			XDS25-D	18				.25	YES		3	
B 146	1		J33-R*	29				.20	NO		5	
			S2SW1-C	18				.25	YES			
B 147	1		J33-S*	29				.20	NO		5	
			S2SW1-NO	18				.25	YES			
B 148	1		J33-T*	29				.20	NO		5	
			S2SW1-NC	18				.25	YES			
B 149	1		J33-U*	29				.20	NO		5	
			S2SW2-C	18				.25	YES			
B 150	1		J33-V*	29				.20	NO		5	
			S2SW2-NO	18				.25	YES			
B 151	1		J33-W*	29				.20	NO		5	
			XDS16-D	14				.25	YES		3	
B 152	1		J33-X*	29				.20	NO		5	
			XDS16-C	14				.25	YES		3	
B 153	1		J33-Y*	29				.20	NO		5	
			XDS16-A	14				.25	YES		3	
B 154	1		XDS16-A	14				.25	YES			
			XDS16-B	14				.25	YES		3	
B 155	1		J33-Z*	29				.20	NO		5	
			XDS15-G	15				.25	YES		3	
B 156	1		J33-AA	29				.20	NO		5	
			XDS14-G	16				.25	YES		3	

MANNED SPACECRAFT CENTER HOUSTON, TEXAS	SIZE A	2900139
SCALE-NONE	REV LTR ~~B~~ F	SHEET 17 OF 22

WIRING HARNESS B

2900139 F ~~B~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 157	1		J33-BB XDS13-G	29 17				.20 .25	NO YES		5 3	
B 158	1		J33-CC XDS4-A	29 4				.20 .25	NO YES		5 3	
B 159	1		XDS4-A XDS4-C	4 4				.25 .25	YES YES		3	
B 160	1		J33-EE XDS3-G	29 3				.20 .25	NO YES		5 3	
B 161	1		J33-FF XDS2-G	29 2				.20 .25	NO YES		5 3	
B 162	1		J33-HH XDS1-G	29 2				.20 .25	NO YES		5 3	
B 163	1		J31-C* XDS41-A	31 25D				.20 .25	NO YES		5 3	
B 164	1		XDS41-A XDS41-B	25D 25D				.25 .25	YES YES		3	
B 165	1		J31-D* XDS41-C	31 25D				.20 .25	NO YES		5 3	
B 166	1		XDS41-C XDS41-D	25D 25D				.25 .25	YES YES		3	
B 167	1		J31-E* XDS19-A	31 13C				.20 .25	NO YES		5 3	
B 168	1		XDS19-A XDS19-B	13C 13C				.25 .25	YES YES		3	

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SIZE A

2900139

SCALE - NONE

REV LTR ~~B~~ F

SHEET 18 OF 22

MIL 2084 4-63

WIRING HARNESS B

2900139 F ~~B~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 169	1		J31-F* XDS19-C	31 13C				.20 .25	NO YES		5 3	
B 170	1		XDS19-C XDS19-D	13C 13C				.25 .25	YES YES		3	
B 171	1		J31-H* XDS20-A	31 13B				.20 .25	NO YES		5 3	
B 172	1		XDS20-A XDS20-B	13B 13B				.25 .25	YES YES		3	
B 173	1		J31-J* XDS20-C	31 13B				.20 .25	NO YES		5 3	
B 174	1		XDS20-C XDS20-D	13B 13B				.25 .25	YES YES		3	
B 175	1		J31-K* XDS21-A	31 13A				.25 .25	NO YES		5 3	
B 176	1		XDS21-A XDS21-C	13A 13A				.25 .25	YES YES		3	
B 177	1		J31-M* XDS42-A	31 25C				.20 .25	NO YES		5 3	
B 178	1		XDS42-A XDS42-C	25C 25C				.25 .25	YES YES		3	
B 179	1		J31-N* XDS44-A	31 25A				.20 .25	NO YES		5 3	
B 180	1		XDS44-A XDS44-B	25A 25A				.25 .25	YES YES		3	

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HOUSTON, TEXAS

SIZE A

2900139

SCALE - NONE

REV LTR ~~B~~ F

SHEET 19 OF 22

MIL 2084 4-63

WIRING HARNESS B

2900139 F ~~B~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 181	1		J31-P* XDS44-C	31 25A				.20 .25	NO YES		5 3	
B 182	1		XDS44-C XDS44-D	25A 25A				.25 .25	YES YES		3	
B 183	1		J31-R* XDS43-A	31 25B				.20 .25	NO YES		5 3	
B 184	1		XDS43-A XDS43-B	25B 25B				.25 .25	YES YES		3	
B 185	1		J31-S* XDS43-C	31 25B				.20 .25	NO YES		5 3	
B 186	1		XDS43-C XDS43-D	25B 25B				.25 .25	YES YES		3	
B 187	1		XDS41-G XDS42-G	25D 25C				.25 .25	YES YES		3	
B 188	1		XDS42-G XDS43-G	25C 25B				.25 .25	YES YES		3	
B 189	1		XDS43-G XDS44-G	25B 25A				.25 .25	YES YES		3	
B 190	1		XDS21-G XDS20-G	13A 13B				.25 .25	YES YES		3	
B 191	1		XDS20-G XDS19-G	13B 13C				.25 .25	YES YES		3	
B 192	1		XDS19-G XDS12-G	13C 10				.25 .25	YES YES		3	

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SIZE A

2900139

SCALE - NONE

REV LTR ~~B~~ F

SHEET 20 OF 22

MIL 2084 4-63

WIRING HARNESS B

29C0139 F ~~B~~

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM.JKT AREA NO.	STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
B 193	1		XDS44-G XDS32-G	25A 23				.25 .25	YES YES			
B 194	1		XDS45-C XDS46-A	33 32				.25 .25	YES YES		3	
B 195	1		XDS46-A XDS46-C	32 32				.25 .25	YES YES		3	
B 196			XDS46-C XDS34-A	32 25				.25 .25	YES YES			
B 197			J32-P XDS29-C	30 22				.20 .25	NO YES		5 3	
B 198			S7SW1-C S8SW1-C	33 32				.25 .25	YES YES			

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SIZE A

2900139

SCALE - NONE

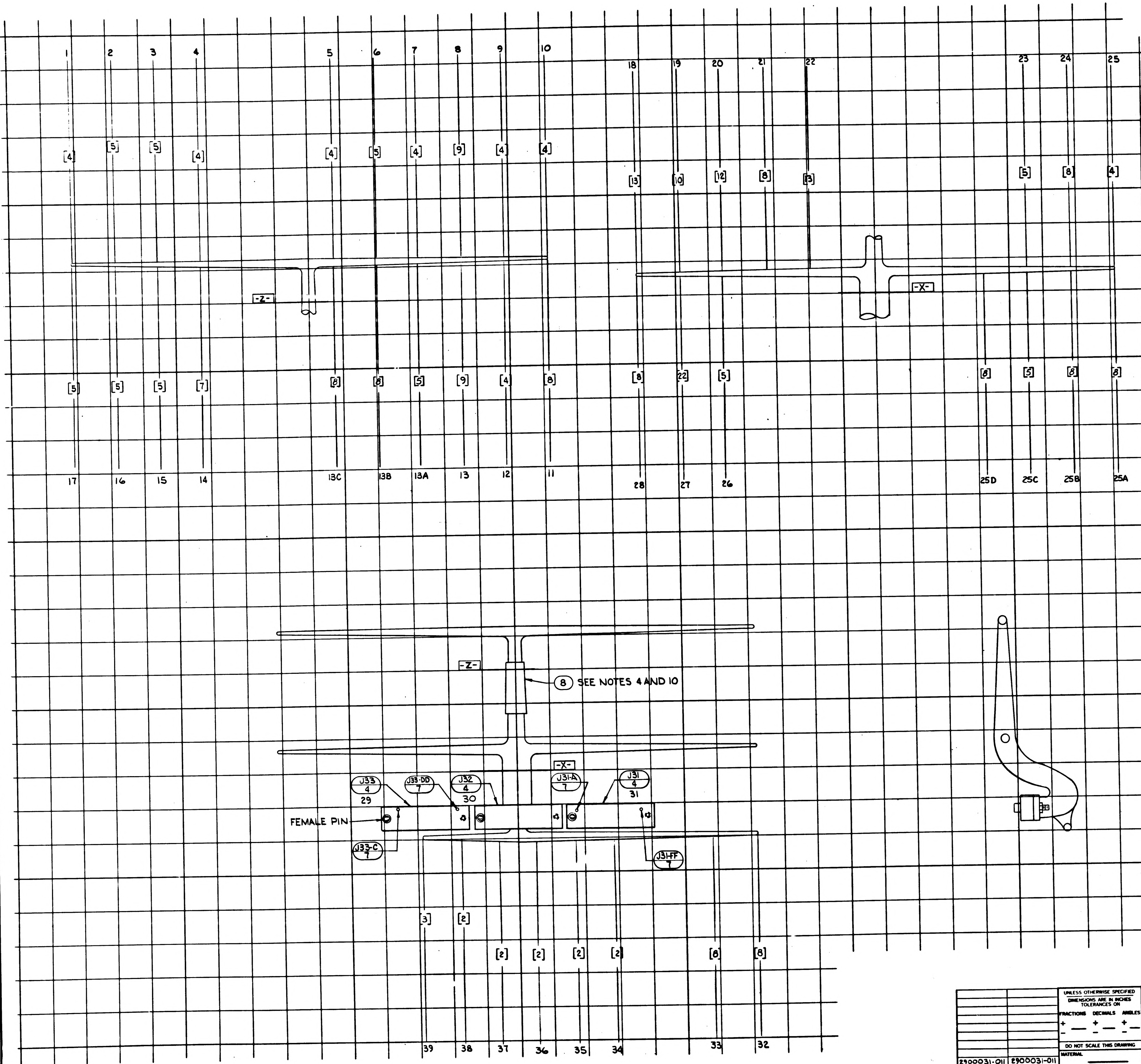
REV LTR ~~B~~ F

SHEET 21 OF 22

MIL 2084 4-63

REVISIONS			23420	
SYM	ZONE	DESCRIPTION CHG NO.	DATE	APPD.

SEE SHEET 1 FOR REVISION RECORD



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⑧ SEE NOTES 4 AND 10

2900031-011	2900031-011		
NEXT ASSY	USED ON		
APPLICATION			

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ___
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN S. Agne DATE 19 APR 65
CHECKED W. Dull 20 APR 65
APPROVAL W. Williams 21 APR 65
APPROVAL J. Jedman 10/18/65
NASA APPROVAL
MIT APPROVAL 10/21/65

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WIRING HARNESS B

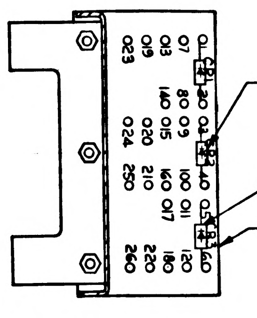
CODE IDENT NO. 99974
SIZE E
2900139
SCALE FULL
SHEET 22 OF 22

2900139

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM ㉓, OR ㉑ AND ㉒.
3. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267).
4. VENDOR ITEM, SEE SPECIFICATION CONTROL DRAWING
5. SPOT TIE WIRES AS REQUIRED, USING ITEM ⑳.
6. THE FOLLOWING ARE PART OF THIS ASSEMBLY:
   WIRING HARNESS C ITEM ⑱
7. DRAWINGS FOR REFERENCE
   SCHEMATIC DIAGRAM ITEM ⑲
8. MARK SCHEM AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND1002019, .09 HIGH, COLOR BLACK.
9. SELECT PARTS AT ASSEMBLY.

REVISIONS 23420					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.
C	-	REPLACES REV (B) WITH CHANGE PER MXC 202379	—	24 JUN 65	MCR
D	-	REVISED PER MXC 202645	-	30 JUN 65	
E	-	REVISED PER MXC 202749	—	7 JUL 65	
F		REVISED PER MXC 203052	—	JUL 65	WJR
G		REVISED PER MXC 203815	—	AUG 65	RWH
H		REVISED PER MXC 203868		19 AUG 65	
J		REVISED PER MXC 204290		3 SEP 65	
K		REVISED PER MXC 205300		28 SEP 65	
L		INITIAL RELEASE CLASS A PER TDRR 23420		8 OCT 65	


⑰ 2 REQD (CR1, CR2)
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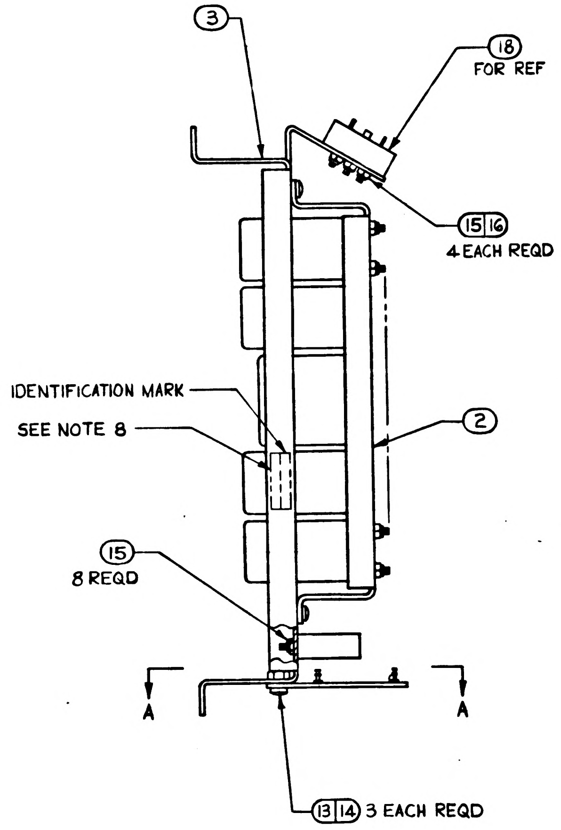
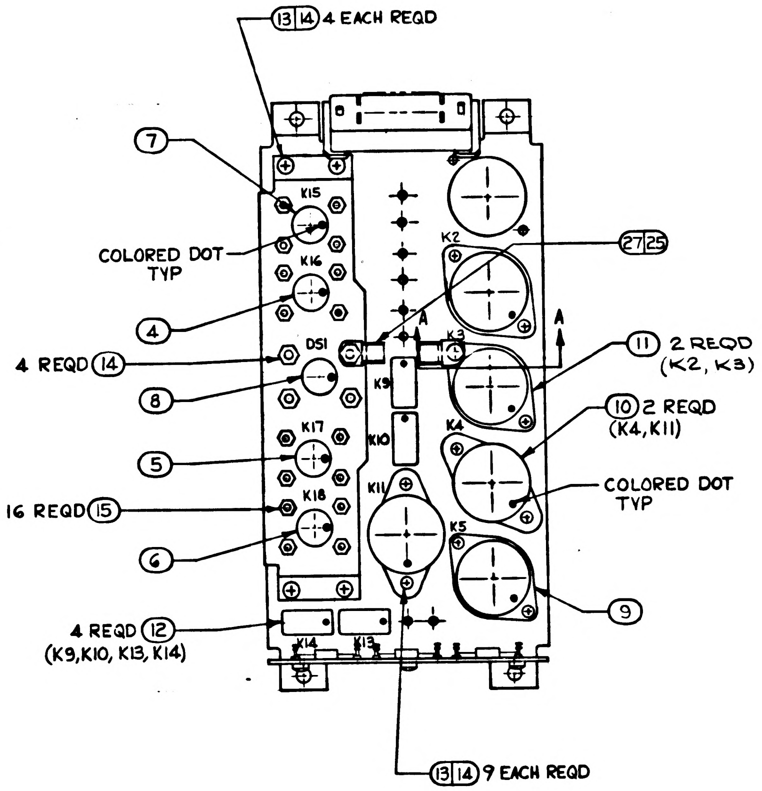
020 030 040 050 080 090 100 110 120
023 007 008 009 010 020 024 180 190 200 210 220 250 260

SECTION AA


③
⑱ FOR REF
⑮⑯ 4 EACH REQD
IDENTIFICATION MARK
SEE NOTE 8
②
⑮ 8 REQD
A
A
⑬⑭ 3 EACH REQD


⑬⑭ 4 EACH REQD
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COLORED DOT TYP
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DS1
4 REQD ⑭
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16 REQD ⑮
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K14
K13
K2
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K3
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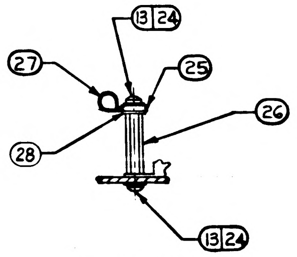
K9
K10
K11
K4
K5
⑪ 2 REQD (K2, K3)
⑩ 2 REQD (K4, K11)
COLORED DOT TYP
⑨
⑬⑭ 9 EACH REQD



PARTIAL SECTION AA

				1		29	1N645 (1896966-004)	SEMICONDUCTOR, MIL-S-19500
				1		28	AN960C6	WASHER, FLAT
SEE NOTE 9				2		27	1000220-6 1000220-5 1000220-4	CLAMP, CABLE CLAMP, CABLE CLAMP, CABLE
SEE NOTE 4				1		26	1015981-003	STAND-OFF, HEX, THREADED
SEE NOTE 4				2		25	1015986-040	WASHER, SADDLE
				2		24	MS35333-71	WASHER, LOCK, INTERNAL TOOTH
				AR		23	SN60 WRAP	SOLDER QQ-S-571 (ES2175-3)
				AR		22	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
				AR		21	SN60WS	SOLDER QQ-S-571 (ES2175-1)
				AR		20	MIL-T-713	LACING TAPE, TYPE P, CLASS 2, BLACK (ES2732-1 NO 18)
				X		19	2900326	SCHEMATIC DIAGRAM, ELECT
				1		18	2900140	WIRING HARNESS C
				2		17	1N649 (1896966-006)	SEMICONDUCTOR MIL-S-19500
				4		16	AN500AD4-8	SCREW, MACHINE FILLISTER HD
SEE NOTE 4				28		15	1016151-004	NUT, SELF LOCKING
				20		14	AN363C632	NUT, SELF LOCKING
				18		13	MS35216-25	SCREW, MACHINE, PAN HD
SEE NOTE 4				4		12	1015802-004	RELAY-ARMATURE
				2		11	1015837-001	RELAY-ARMATURE
				2		10	1015914-001	RELAY-ARMATURE
				1		9	1016024-001	RELAY-ARMATURE
				1		8	1015925-002	TIMER-ELECTRONIC, FLASHER
				1		7	1016096-011	RELAY, TIME DELAY
				1		6	1016096-004	
				1		5	1016096-003	
SEE NOTE 4				1		4	1016096-002	RELAY, TIME DELAY
				1		3	2900325	BRACKET, RELAY
				1		2	2900324	BRACKET, RELAY
				1		1	2900323	TERMINAL BOARD (INSEP ASSY)
				011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	QUANTITY REQUIRED					LIST OF PARTS AND MATERIALS		

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900031-011	2900031-011	-011
APPLICATION		

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Schwabe DATE 19 APR 65
CHECKED J. Stelma 21 APR 65
APPROVAL R. Foss 21 APR 65
APPROVAL L. Gedman 10/11/65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

BRACKET ASSEMBLY, RELAY

CODE IDENT NO. 99974
SIZE E
2900141
SCALE 1/1
SHEET 1 OF 1

APOLLO G&N Specification
PS2900143 REV ~~A~~ B
Original Issue Date:
Release Authority: TDRR 23420
Class A Release
CODE IDENT NO. 99974

PROCUREMENT SPECIFICATION

PRODUCT CONFIGURATION AND ACCEPTANCE TEST REQUIREMENTS

VERIFICATION RELAY ASSEMBLY

DRAWING NO. 2900143

Record of Revisions

Date	Revision Letter	TDRR No.	Pages Revised	Approvals	
				MIT	NASA
10-13-65	A	MXC 205943	4, 5 Was 5 pages now 6		
10-20-65	B	23420	ALL, INIT. REL.	WR	

This specification consists of page 1 to 6 inclusive.

APPROVALS	NASA/MSC	10-21-65 21 Oct 65 MIT/IL	ACSP

1. SCOPE

1.1 PURPOSE. This specification establishes the detail requirements for complete identification and acceptance of all units of the Verification Relay Assembly Part No. 2900143-011.

2. APPLICABLE DOCUMENTS

2.1 EFFECTIVE ISSUES. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, Military Standards and Specifications shall be the issue in effect on the date of request for proposal or invitation to bid.

SPECIFICATIONS

APOLLO G&N

ND1002214	General Specification for Preservation, Packaging, Packing and Container Marking of APOLLO Guidance and Navigation Major assemblies, Assemblies, Subassemblies Parts and Associated Ground Support Equipment

DRAWINGS

APOLLO G&N

2900143	Verification Relay Assembly

(Copies of specifications, standards, drawings, bulletins, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 CONFLICTING REQUIREMENTS. In event of a conflict between requirements, the following order of precedence shall apply. The contractor shall also notify MIT/IL APOLLO Management of the conflict.

a. The contract
b. This specification
c. Documents listed in this section

3. REQUIREMENTS

3.1 PERFORMANCE

3.1.1 Input Voltage. The Verification Relay Assembly, hereafter referred to as the assembly shall be capable of performing as specified herein when supplied with 28±3 vdc.

3.1.2 Characteristics

3.1.2.1 Switching. The assembly, when energized with the voltage specified in 3.1.1, shall provide switching functions by means of relays.

3.2 PRODUCT CONFIGURATION

3.2.1 Drawings. The configuration of the assembly shall be in accordance with APOLLO G&N Drawing 2900143 and all drawings and engineering data referenced thereon.

4. QUALITY ASSURANCE PROVISIONS

4.1 GENERAL. The contractor responsible for the manufacture of the assembly shall be responsible for the accomplishment of each test required herein.

4.1.1 Test Conditions

4.1.1.1 Environmental. Unless otherwise specified, the assembly shall be tested under the following ambient conditions:

a. Temperature: 25°±10°C
b. Relative Humidity: 90% max
c. Barometric Pressure: 28 to 32 inches of Hg

4.1.2 Nonconforming Units. Failure of the assembly to pass any examination or test of this specification shall automatically classify the assembly as nonconforming. Each nonconforming assembly corrected by the contractor shall be reinspected. Reinspection may be limited to the test or examination which defined the nonconformance, or, when directed by the cognizant inspector, a complete retest and reexamination may be required. Nonconforming assemblies which have not been corrected will be considered for acceptance only upon formal application by the contractor to the cognizant NASA representative.

4.2 TESTS

4.2.1 Drawing Compliance. The assembly shall be visually examined for compliance with the requirements of APOLLO G&N Drawing 2900143. Particular attention shall be given to inspection for nicks, scratches, burrs, dents, encapsulant defects, contaminants, pin misalignment, and legibility and appearance of markings.

4.2.2 Continuity and DC Resistance. The continuity and dc resistance test shall be performed in accordance with Table I.

TABLE I

CONTINUITY AND DC RESISTANCE

INPUT		RESISTANCE (ohms)			TEST NO.
28 vdc (Hi)	Lo	From (+)	To (-)		
		P1-A	P1-L	<1	1
		P1-B	P1-M	<1	2
		P1-B	P1-R	<1	3
		P1-A	P1-P	<1	4
		P1-W	P1-J	>10M	5
		P1-W	P1-F	>10M	6
		P2-X	P2-V	>10M	7
		P2-T	P2-Y	<1	8
		P2-A	P2-E	<1	9
		P2-B	P2-F	<1	10
		P2-C	P2-H	<1	11

TABLE I (Continued)

INPUT		RESISTANCE (ohms)			TEST
28 vdc (Hi)	Lo	From (+)	To (-)		NO.
		P1-P	P1-N	>10M	12
		P2-J	P2-H	>10M	13
		P2-J	P2-F	>10M	14
		P1-K	P1-L	>10M	15
		P1-H	P1-L	>10M	16
		P1-Y	P1-M	>10M	17
		P1-Y	P1-R	>10M	18
		P2-R	P2-Y	>10M	19
		P2-U	P2-Y	>10M	20
		P2-J	P2-E	>10M	21
P1-C	P1-S	P2-X	P2-V	<1	22
P1-C	↑	P1-W	P1-F	<1	23
P1-C		P1-H	P1-L	<1	24
P1-C		P1-Y	P1-M	<1	25
P1-C		P1-A	P1-P	<1	26
P1-C		P1-A	P1-L	>10M	27
P1-C		P1-B	P1-R	<1	28
P1-C		P1-B	P1-M	>10M	29
P1-D		P2-X	P2-V	<1	30
P1-D		P1-W	P1-J	<1	31
P1-D		P1-K	P1-L	<1	32
P1-D		P1-Y	P1-M	<1	33
P1-D		P1-A	P1-L	>10M	34
P1-D		P1-B	P1-M	>10M	35
P1-E		P1-N	P1-P	<1	36
P1-E		P1-Y	P1-R	<1	37
P1-E		P2-X	P2-V	<1	38
P1-E		P1-A	P1-P	>10M	39
P1-E		P1-B	P1-R	>10M	40
P2-K		P2-X	P2-V	<1	41
P2-K		P2-J	P2-E	<1	42
P2-K		P2-A	P2-E	>10M	43
P2-L		P2-X	P2-V	<1	44
P2-L		P2-J	P2-F	<1	45
P2-L		P2-B	P2-F	>10M	46
P2-M		P2-X	P2-V	<1	47
P2-M		P2-J	P2-H	<1	48
P2-M		P2-C	P2-H	>10M	49
P2-P		P2-X	P2-V	<1	50
P2-P		P2-R	P2-Y	<1	51
P2-P		P2-T	P2-Y	>10M	52
P2-N		P2-X	P2-V	<1	53
P2-N		P2-U	P2-Y	<1	54
P2-N	↓	P2-T	P2-Y	>10M	55
P2-P P2-N	P1-S	P2-R	P2-Y	>10M	56

5. PREPARATION FOR DELIVERY

5.1 GENERAL. Preparation for delivery shall be in accordance with Specification ND1002214.

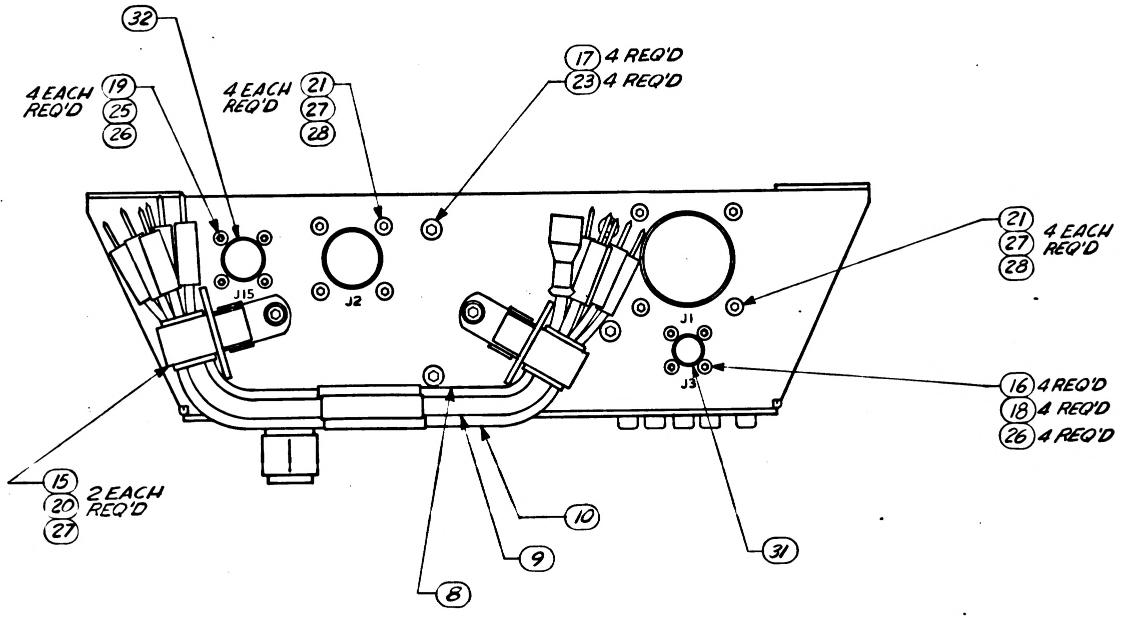
6. NOTES. None.

WS:lv

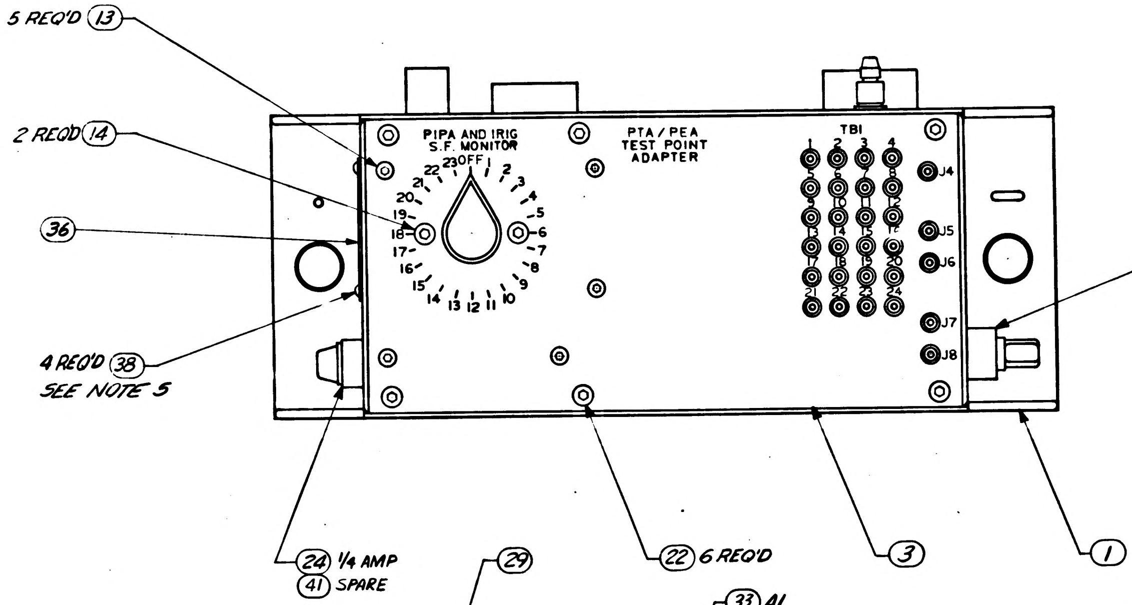
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM-SEE SPECIFICATION CONTROL DRAWING.
3. MARK APPLICABLE CONTRACT NO. AND SERIAL NO. ON ITEM 36 IN ACCORDANCE WITH ND 1002023, LETTERS AND NUMERALS TO BE .06 HIGH.
4. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND 1002019 .12 HIGH, COLOR BLACK, BELOW NAMEPLATE.
5. SECURE SCREWS USING ITEM 39.

REVISIONS c3391					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
F		① REPLACES REV E WITH CHANGE PER MXC 203174		7 JUL 65	KA RWH
G		REVISED PER MXC 203584		3 AUG 65	
H		REVISED PER MXC 203614		6 AUG 65	
J		REVISED PER MXC 205355		28 SEP 65	
K		REVISED PER MXC 205712		8 OCT 65	
L		INITIAL RELEASE CLASS A PER TDRR c3391		18 OCT 65	WEG

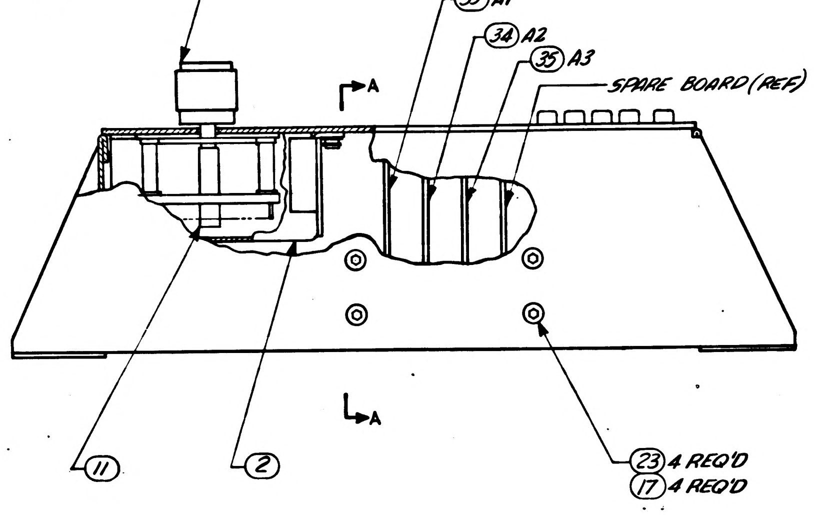


32
4 EACH REQ'D 19 25 26
4 EACH REQ'D 21 27 28
17 4 REQ'D
23 4 REQ'D
J15
J2
J1
J3
21 27 28 4 EACH REQ'D
16 4 REQ'D
18 4 REQ'D
26 4 REQ'D
15 20 27 2 EACH REQ'D
10
9
8
31

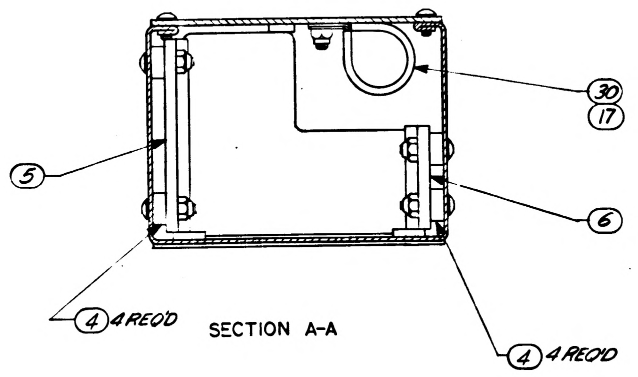


5 REQ'D 13
2 REQ'D 14
36
4 REQ'D 38 SEE NOTE 5
PIPA AND IRIG S.F. MONITOR
OFF
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
PTA/PEA TEST POINT ADAPTER
TB1
1 2 3 4
J4
J5
J6
J7
J8
41 1/4 AMP
12 28 VDC AGE (XFI REF.)
24 1/4 AMP
41 SPARE
22 6 REQ'D
3
1

CONDUCTOR CHART		
ITEM NO.(REF)	FROM	TO
31	D1 SHLD OF D1	A1-20 A1-3
32	E1 SHLD OF E1	SW1-25A SW1-25B



29
33 A1
34 A2
35 A3
SPARE BOARD (REF)
A
A
11
2
23 4 REQ'D
17 4 REQ'D



30
17
5
6
4 4 REQ'D
4 4 REQ'D

SECTION A-A

SEE NOTE 2

SEE NOTE 2

QUANTITY REQUIRED							
			011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			2		41	MS90078-5-1	(1897077-105) FUSE, STYLE F02
			╳		40	PS2900145	PROCUREMENT SPECIFICATION
			AR		39	MIL-S-22473 GRADE H	SEALING COMPOUND (ES2544-5)
			4		38	MS35233-2	SCREW, PAN HD
			╳		37	2900416	SCHEMATIC, DIAGRAM ELEC
			1		36	1004260-115	NAMEPLATE
			1		35	1902433-011	AC AMPLIFIER ASSY
			1		34	2900444-011	ELEC. COMP. BOARD ASSY
			1		33	2900144-011	PULSE AMPLIFIER ASSY
			1		32	2900418	CABLE ASSY E
			1		31	2900417	CABLE ASSY D
			1		30	MS21919-14	(1897073-14) CABLE, CLAMP
			1		29	MS91528-2K2B	(1897080-023) KNOB
			8		28	AN363C6-32	(1896990-261) NUT, SELF LOCKING
			10		27	AN960-C6	(1897006-26) WASHER, FLAT
			8		26	AN960-C4	(1897006-24) WASHER, FLAT
			4		25	MS35338-78	WASHER, LOCK
			1		24	MS26572-1	FUSE HOLDER SPARE
			8		23	1006783-29	SCREW, BUTTON HD. HEX. SOC.
			6		22	1006783-26	SCREW, BUTTON HD. HEX. SOC.
			8		21	1006783-23	SCREW, BUTTON HD. HEX. SOC.
			2		20	1006783-22	SCREW, BUTTON HD. HEX. SOC.
			4		19	1006783-20	SCREW, BUTTON HD. HEX. SOC.
			4		18	1006783-19	SCREW BUTTON HD. HEX. SOC.
			9		17	1016151-008	NUT, SELF LOCKING
			4		16	1016151-004	NUT, SELF LOCKING
			2		15	1016105-003	STRAP ASSY
			2		14	1015831-239	SCREW 100° FLAT HD. HEX. SOC.
			5		13	1015831-195	SCREW 100° FLAT HD. HEX. SOC.
			1		12	1015873-008	FUSE HOLDER IND.
			1		11	1015825-20	SWITCH, ROTARY
			1		10	2900415	CABLE ASSY C
			1		9	2900414	CABLE ASSY B
			1		8	2900413	CABLE ASSY A
			1		7	2900410	WIRING HARNESS A
			1		6	2900411	GUIDE, COMPONENT BOARD LOWER
			1		5	2900412	GUIDE, COMPONENT BOARD UPPER
			8		4	2900409	SPACER, COMPONENT BOARD
			1		3	2900408	PANEL, FRONT (INSEP. ASSY)
			1		2	2900407	BRACKET, SWITCH (INSEP. ASSY)
			1		1	2900406	CASE, ADAPTER (INSEP. ASSY)

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J.A. KOSIDOWSKI DATE 23 APR 65
CHECKED A. UDOVICH 26 APR 65
APPROVAL R.W. INGOLD 26 APR 65
APPROVAL 10-12-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PTA/PEA TEST POINT
ADAPTER ASSEMBLY

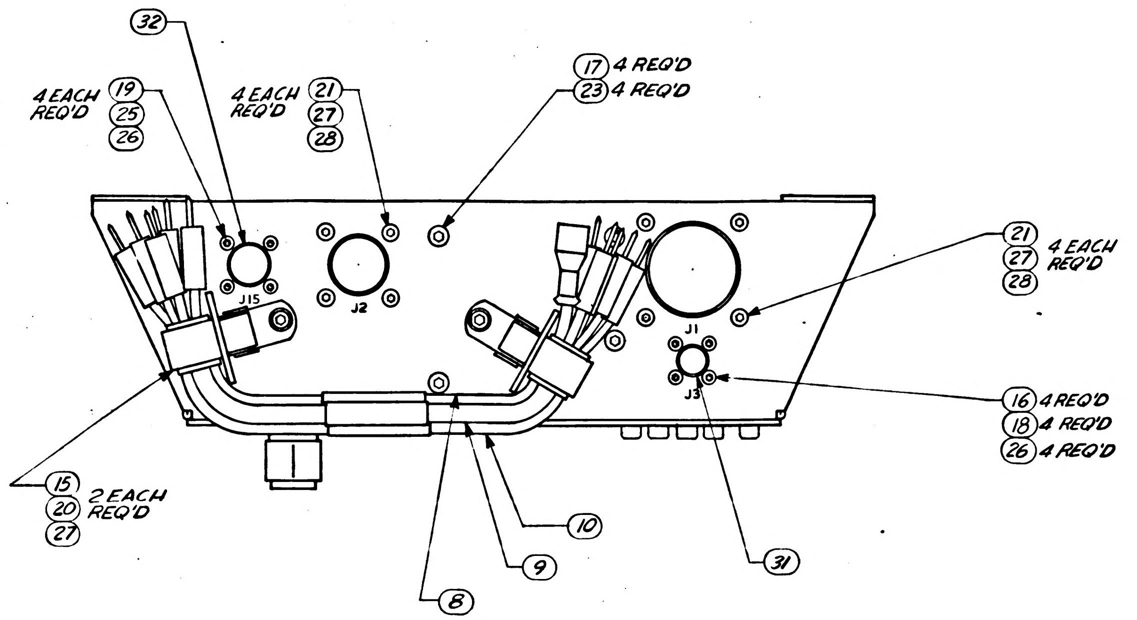
CODE IDENT NO. 99974
SIZE E
2900145
SCALE FULL
SHEET 1 OF 1

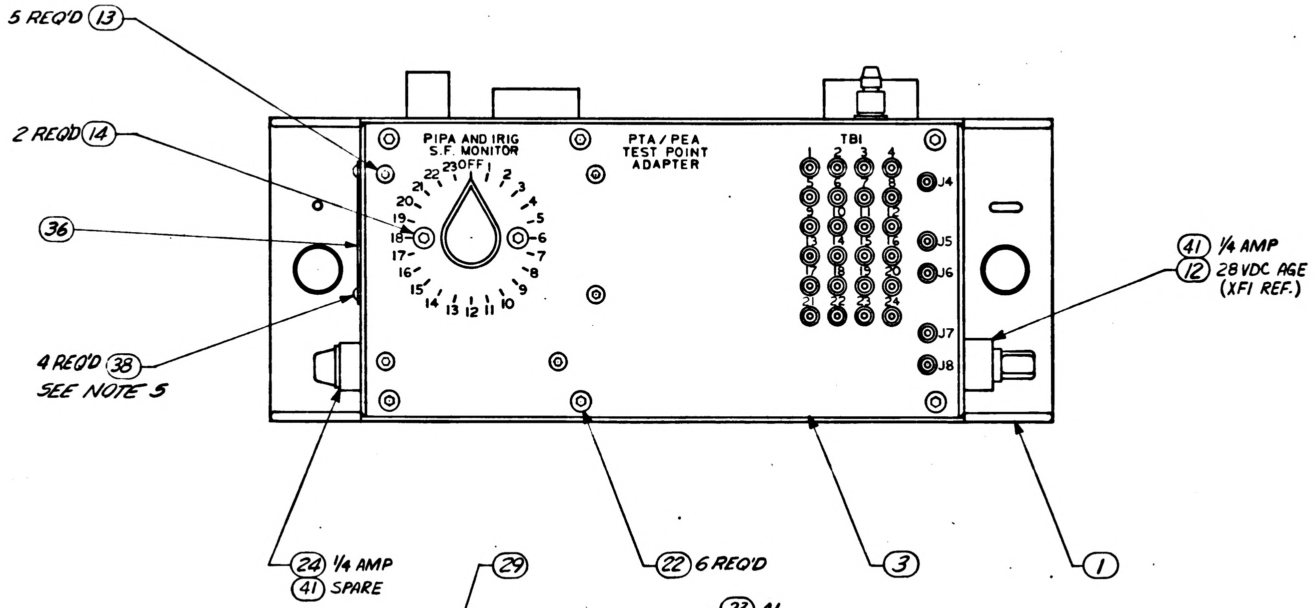
2900145 L

REVISIONS 23391					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
F		① REPLACES REV E WITH CHANGE PER MXC 203174		24 JUL 65	KA RWH
G		REVISED PER MXC 203584		3 AUG 65	
H		REVISED PER MXC 203614		6 AUG 65	
J		REVISED PER MXC 205355		28 SEP 65	RLP
K		REVISED PER MXC 205712		18 OCT 65	RLP
L		INITIAL RELEASE CLASS A PER TDRR 23391		18 OCT 65	WEG CW
M		REVISED PER TDRR 24065		23 NOV 65	LK CP

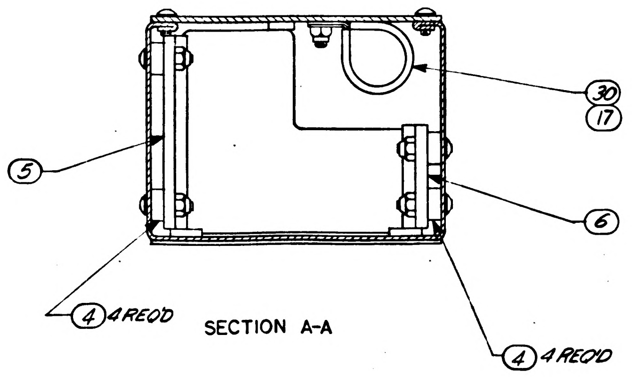
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. VENDOR ITEM-SEE SPECIFICATION CONTROL DRAWING
3. MARK APPLICABLE CONTRACT NO. AND SERIAL NO. ON ITEM 36 IN ACCORDANCE WITH ND 1002023, LETTERS AND NUMERALS TO BE .06 HIGH.
4. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NUMBER PER ND 1002019 .12 HIGH, COLOR BLACK, BELOW NAMEPLATE.
5. SECURE SCREWS USING ITEM 39.
6. UNPREPARED WIRES TERMINATING AT A1, A2, A3, J4, J5, J6, J7, J8, SW1 AND TB1 SHALL BE CUT TO LENGTH AS REQUIRED, STRIPPED .25, AND TINNED AT THIS ASSY.

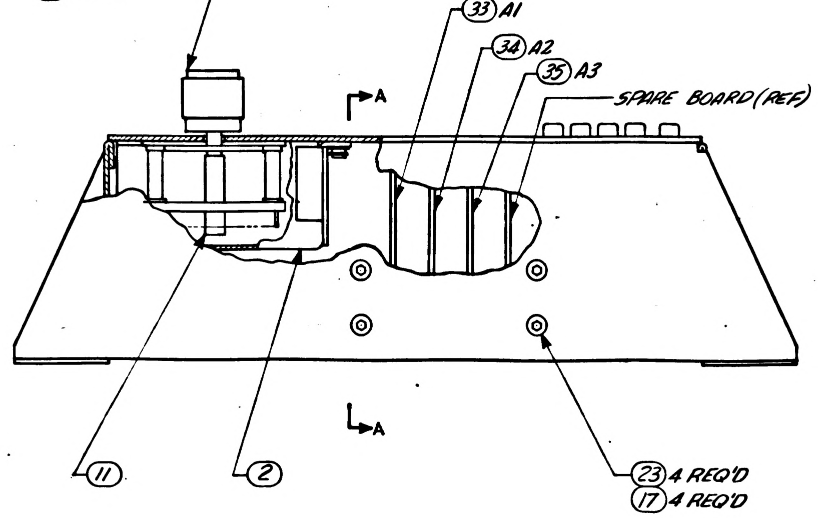

32
4 EACH REQ'D 19 25 26
4 EACH REQ'D 21 27 28
17 4 REQ'D
23 4 REQ'D
J15
J2
J1
J3
21 27 28 4 EACH REQ'D
16 4 REQ'D
18 4 REQ'D
26 4 REQ'D
15 20 27 2 EACH REQ'D
10
9
8
31


5 REQ'D 13
2 REQ'D 14
36
4 REQ'D 38
SEE NOTE 5
PIPA AND IRIG S.F. MONITOR
OFF 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
PTA/PEA TEST POINT ADAPTER
TB1
1 2 3 4
J4
J5
J6
J7
J8
41 1/4 AMP
12 28 VDC AGE (XFI REF.)
24 1/4 AMP
41 SPARE
22 6 REQ'D
3
1

CONDUCTOR CHART		
ITEM NO.(REF)	FROM	TO
31	D1 SHLD OF D1	A1-20 A1-3
32	E1 SHLD OF E1	SW1-25A SW1-25B


30
17
5
6
4 4 REQ'D
4 4 REQ'D

SECTION A-A


33 A1
34 A2
35 A3
SPARE BOARD (REF)
A
A
11
2
23 4 REQ'D
17 4 REQ'D

SEE NOTE 2

SEE NOTE 2

QUANTITY REQUIRED				EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			011				
			2		41	MS90078-5-1	(1897077-105) FUSE, STYLE F02
			☒		40	PS2900145	PROCUREMENT SPECIFICATION
			AR		39	MIL-S-22473 GRADE H	SEALING COMPOUND (ES2544-5)
			4		38	MS35233-2	SCREW, PAN HD
			☒		37	2900416	SCHEMATIC, DIAGRAM ELEC
			1		36	1004260-115	NAMEPLATE
			1		35	1902433-011	AC AMPLIFIER ASSY
			1		34	2900444-011	ELEC. COMP BOARD ASSY
			1		33	2900144-011	PULSE AMPLIFIER ASSY
			1		32	2900418	CABLE ASSY E
			1		31	2900417	CABLE ASSY D
			1		30	MS21919-14	(1897073-14) CABLE, CLAMP
			1		29	MS91528-2K2B	(1897080-023) KNOB
			8		28	AN363C6-32	(1896990-261) NUT, SELF LOCKING
			10		27	AN960-C6	(1897006-26) WASHER, FLAT
			8		26	AN960-C4	(1897006-24) WASHER, FLAT
			4		25	MS35338-78	WASHER, LOCK
			1		24	MS26572-1	FUSE HOLDER SPARE
			8		23	1006783-29	SCREW, BUTTON HD. HEX. SOC.
			6		22	1006783-26	SCREW, BUTTON HD. HEX. SOC.
			8		21	1006783-23	SCREW, BUTTON HD. HEX. SOC.
			2		20	1006783-22	SCREW, BUTTON HD. HEX. SOC.
			4		19	1006783-20	SCREW, BUTTON HD. HEX. SOC.
			4		18	1006783-19	SCREW BUTTON HD. HEX. SOC.
			9		17	1016151-008	NUT, SELF LOCKING
			4		16	1016151-004	NUT, SELF LOCKING
			2		15	1016105-003	STRAP ASSY
			2		14	1015831-239	SCREW 100° FLAT HD. HEX. SOC.
			5		13	1015831-195	SCREW 100° FLAT HD. HEX. SOC.
			1		12	1015873-008	FUSE HOLDER IND.
			1		11	1015825-20	SWITCH, ROTARY
			1		10	2900415	CABLE ASSY C
			1		9	2900414	CABLE ASSY B
			1		8	2900413	CABLE ASSY A
			1		7	2900410	WIRING HARNESS A
			1		6	2900411	GUIDE, COMPONENT BOARD LOWER
			1		5	2900412	GUIDE, COMPONENT BOARD UPPER
			8		4	2900409	SPACER, COMPONENT BOARD
			1		3	2900408	PANEL, FRONT (INSEP. ASSY)
			1		2	2900407	BRACKET, SWITCH (INSEP. ASSY)
			1		1	2900406	CASE, ADAPTER (INSEP. ASSY)

LIST OF PARTS AND MATERIALS

2900145 M

NEXT ASSY	USED ON	APPLICABLE DASH NO.
1900030	1900030	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS + − ANGLES + −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J.A. KOSIDOWSKI DATE 23 APR 65
CHECKED A. UDOVICH 26 APR 65
APPROVAL R.W. INGOLD 26 APR 65
APPROVAL 10-12-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PTA/PEA TEST POINT
ADAPTER ASSEMBLY

CODE IDENT NO. 99974
SIZE E
2900145
SCALE FULL
SHEET 1 OF 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. ALUMINUM ALLOY, QQ-A-250/8, TEMPER H34 (ES 2.05, 5052 H34)

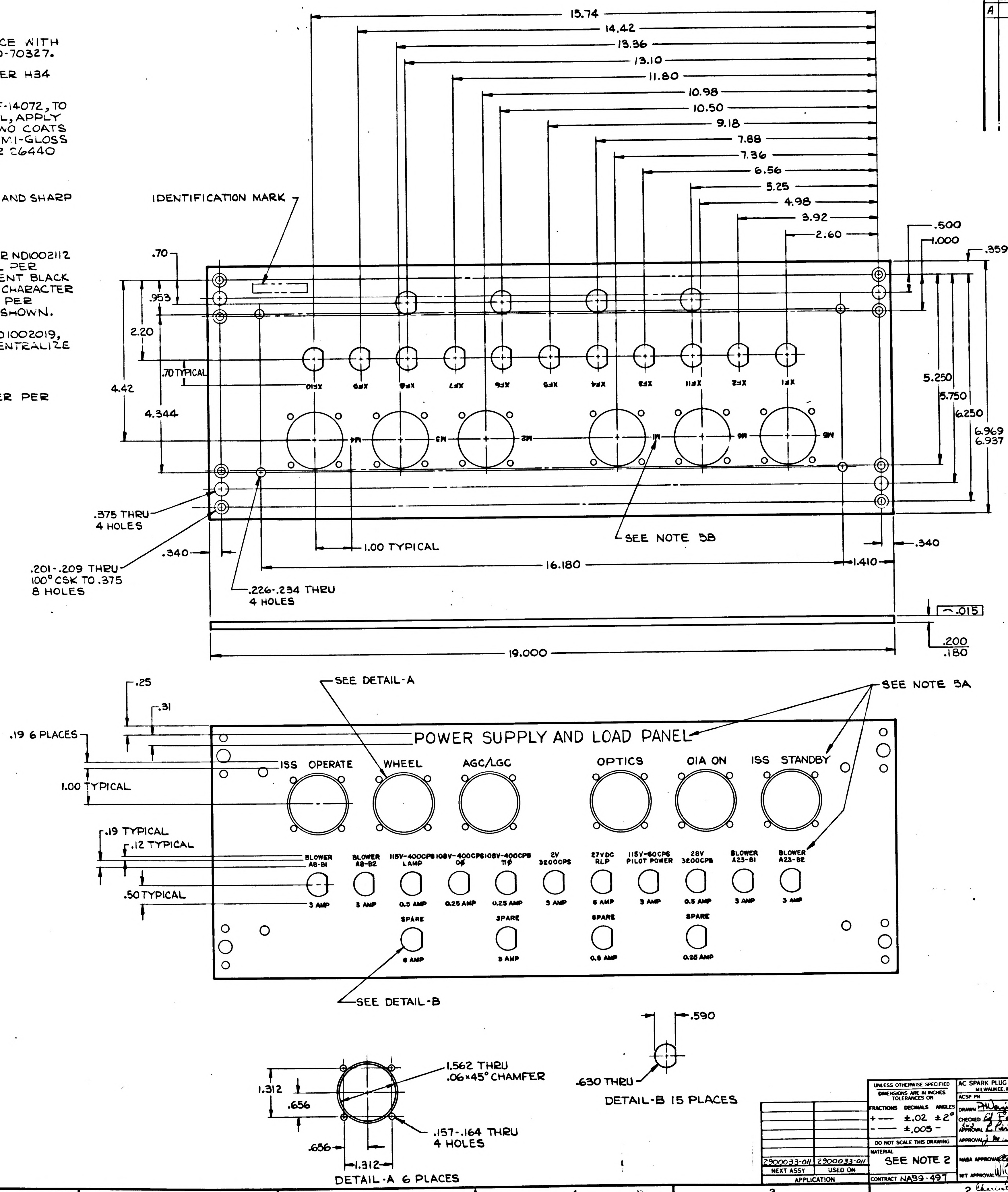
3. FINISH - APPLY FINISH P513 OF MIL-F-14072, TO FRONT AND EDGES OF PANEL, APPLY MIL-P-8585 PRIMER AND TWO COATS OF TT-E-529, CLASS B, SEMI-GLOSS ENAMEL, LIGHT GRAY COLOR 26440 OF FED-STD-595.

4. UNLESS OTHERWISE SPECIFIED:
   A. MUST BE FREE FROM BURRS AND SHARP EDGES.

5. MARKING:
   A. SILK SCREEN CHARACTERS PER ND1002112 USING SEMI-GLOSS ENAMEL PER ND1002111 COLOR INSTRUMENT BLACK NO.514 OF ANA BULLETIN 157. CHARACTER STYLE FUTURA DEMI-BOLD PER ND1002122. CENTRALIZE AS SHOWN.
   B. MARK CHARACTERS PER ND1002019, .12 HIGH, COLOR BLACK. CENTRALIZE AS SHOWN.

6. IDENTIFY USING DRAWING NUMBER PER MIL-STD-130 (ES267).

REVISIONS					23403
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR 23403		10 OCT 65	DKC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14.42
13.36
13.10
11.80
10.98
10.50
9.18
7.88
7.36
6.56
5.25
4.98
3.92
2.60
.500
1.000
.359
IDENTIFICATION MARK
.70
.953
2.20
.70 TYPICAL
4.42
4.344
XF10
XF9
XF8
XF7
XF6
XF5
XF4
XF3
XF11
XF2
XF1
M4
M3
M2
M1
M6
M5
5.250
5.750
6.250
6.969
6.937
.375 THRU
4 HOLES
1.00 TYPICAL
SEE NOTE 5B
.340
.340
.201-.209 THRU
100° CSK TO .375
8 HOLES
16.180
1.410
.226-.234 THRU
4 HOLES
.015
.200
.180
19.000
.25
.31
SEE DETAIL-A
SEE NOTE 5A
.19 6 PLACES
POWER SUPPLY AND LOAD PANEL
ISS OPERATE
WHEEL
AGC/LGC
OPTICS
OIA ON
ISS STANDBY
1.00 TYPICAL
.19 TYPICAL
.12 TYPICAL
.50 TYPICAL
BLOWER A8-B1
BLOWER A8-B2
115V-400CPS LAMP
108V-400CPS 0φ
108V-400CPS πφ
2V 3200CPS
27VDC RLP
115V-60CPS PILOT POWER
28V 3200CPS
BLOWER A23-B1
BLOWER A23-B2
3 AMP
3 AMP
0.5 AMP
0.25 AMP
0.25 AMP
3 AMP
6 AMP
3 AMP
0.5 AMP
3 AMP
3 AMP
SPARE
6 AMP
SPARE
3 AMP
SPARE
0.5 AMP
SPARE
0.25 AMP
SEE DETAIL-B
.590
.630 THRU
DETAIL-B 15 PLACES
1.312
.656
1.562 THRU
.06×45° CHAMFER
.157-.164 THRU
4 HOLES
.656
1.312
DETAIL-A 6 PLACES

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES +—— ±.02 ±2° -—— ±.005 -	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
		DO NOT SCALE THIS DRAWING	DRAWN P Wagner DATE 17 MAY 65 CHECKED Ed Foster 18 May 65 AWS APPROVAL L Prisinin 18 May 65 APPROVAL J. M. Watson 18-2-65	PANEL, FRONT
2900033-011	2900033-011	MATERIAL SEE NOTE 2	NASA APPROVAL	CODE IDENT NO. 99974 SIZE E 2900146
NEXT ASSY	USED ON		MIT APPROVAL W Griffith 20 Oct 65	
APPLICATION		CONTRACT NAS9-497		SCALE FULL SHEET 1 OF 1

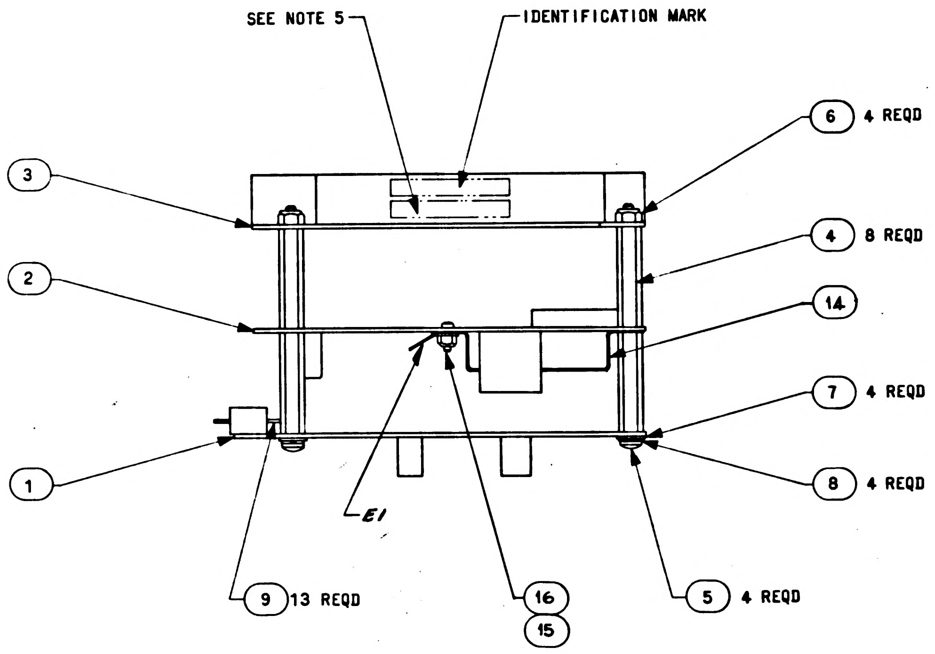
Charleston
18 MAY 65

2900146 A

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
REVISIONS 23417					
A		REVISED PER MXC 203029		16 JUL 65	RLP CW
B		INITIAL RELEASE CLASS A PER TDRR 23417		8 OCT 65	M

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM 13 OR 11 AND 12.
3. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267).
4. SERIALIZE PER ND 1002023.
5. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NO. PER ND 1002019, .09 HIGH, COLOR BLACK.
6. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.



	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	X		18	PS2900148	PROCUREMENT SPECIFICATION
	X		17	2900199	SCHEMATIC DIAGRAM, ELECTRICAL
	1		16	MS 35216-4	SCREW, PAN HD
	1		15	1016151-002	NUT, SELF LOCKING
	1		14	2900175	SHIELD, NOISE
	AR		13	SN60WRAP	SOLDER QQ-S-571 (ES2175-3)
	AR		12	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
	AR		11	SN60WS	SOLDER QQ-S-571 (ES2175-1)
	1		10	1900336	WIRE LIST DD
SEE NOTE 6	13		9	1015864-109	INSULATION, SLEEVING
	4		8	MS35333-71	WASHER, LOCK
	4		7	AN960C6 (1897006-026)	WASHER, FLAT
SEE NOTE 6	4		6	1016151-006	NUT, SELF LOCKING
	4		5	MS35216-25	SCREW, MACHINE, PAN HD
	8		4	1900483	STUD, MOUNTING
	1		3	1900333-011	TORQUE DRIVE AMPL CKT ASSY
	1		2	2900147-011	DEMODULATOR & DCA CKT ASSY
	1		1	1900327-011	PRE-AMPLIFIER CIRCUIT ASSY

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900036-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + _ − DECIMALS + _ − ANGLES + _ −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 26 APR 65
CHECKED J. GREEB 30 APR 65
APPROVAL E. NASS 3 MAY 65
APPROVAL
NASA APPROVAL
MIT APPROVAL
30 APR 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PRECISION ALIGNMENT SERVO AMPLIFIER
INNER GIMBAL

CODE IDENT NO. 99974
SIZE D
2900148
SCALE FULL
SHEET 1 of 1

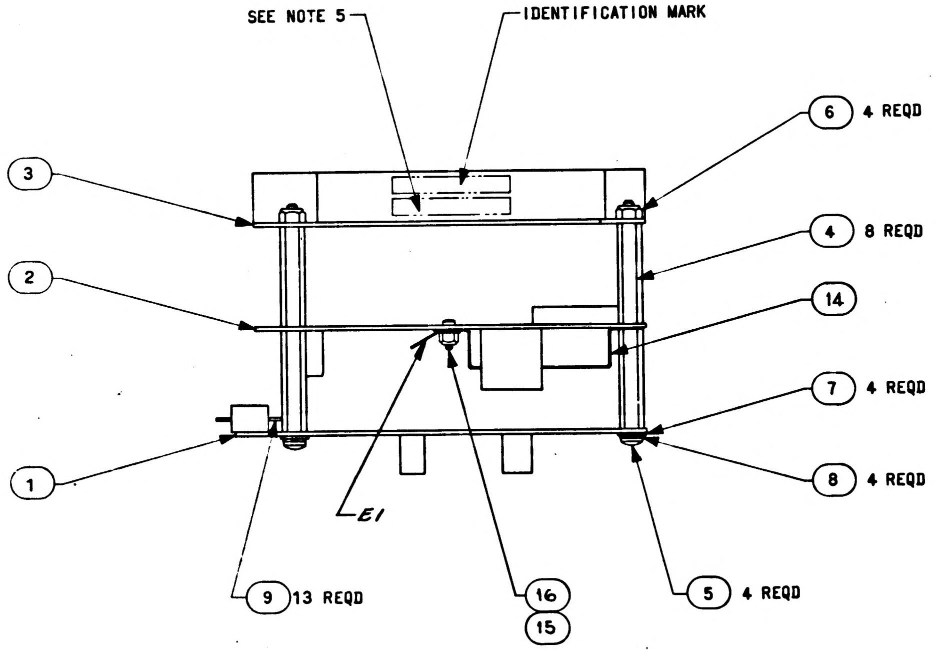
MIL 10770 A

2900149 B

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
REVISIONS ﾠ23417					
A	-	REVISED PER MXC 202886		15 JUL 65	EM
B		INITIAL RELEASE CLASS A PER TDRR 23417		19-OCT-65	JM

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM 13 OR 11 AND 12.
3. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267).
4. SERIALIZE PER ND 1002023.
5. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NO. PER ND 1002019, .09 HIGH, COLOR BLACK.
6. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.



	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	☒		18	2900198	SCHEMATIC DIAGRAM, ELECTRICAL
	☒		17	PS2900149	PROCUREMENT SPECIFICATION
	1		16	MS 35216-4	SCREW, PAN HD
	1		15	1016151-002	NUT, SELF LOCKING
	1		14	2900175	SHIELD, NOISE
	AR		13	SN60WRAP	SOLDER QQ-S-571 (ES2175-3)
	AR		12	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
	AR		11	SN60WS	SOLDER QQ-S-571 (ES2175-1)
	1		10	1900336	WIRE LIST DD
SEE NOTE 6	13		9	1015864-109	INSULATION, SLEEVING
	4		8	MS35333-71	WASHER, LOCK
	4		7	AN960C6 (1897006-026)	WASHER, FLAT
SEE NOTE 6	4		6	1016151-006	NUT, SELF LOCKING
	4		5	MS35216-25	SCREW, MACHINE, PAN HD
	8		4	1900483	STUD, MOUNTING
	1		3	1900333-021	TORQUE DRIVE AMPL CKT ASSY
	1		2	2900147-021	DEMODULATOR & DCA CKT ASSY
	1		1	1900327-021	PRE-AMPLIFIER CIRCUIT ASSY

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900036-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. GRIEB DATE 26 APR 65
CHECKED 30 APR 65
APPROVAL E. NASS 3 MAY 65
APPROVAL 10/12/65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PRECISION ALIGNMENT SERVO AMPLIFIER
MIDDLE GIMBAL

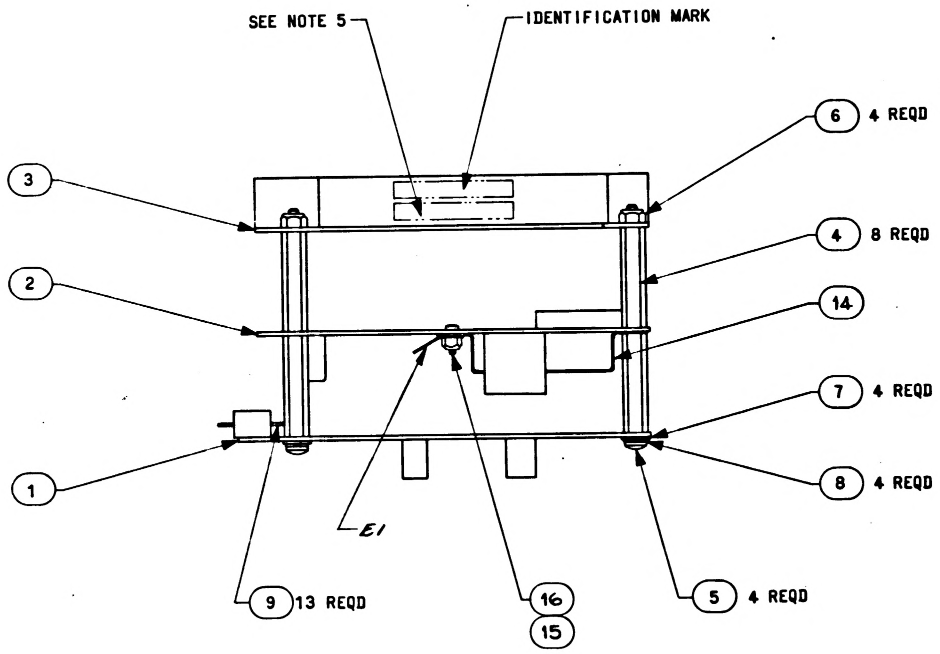
CODE IDENT NO 99974
SIZE D
2900149
SCALE FULL
SHEET 1 of 1

B 2900150

REVISIONS 23417					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		REVISED PER MXC 202887		65	
B		INITIAL RELEASE CLASS A PER TDRR 23417		19-OCT-65	JM

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM 13 OR 11 AND 12.
3. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267).
4. SERIALIZE PER ND 1002023.
5. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NO. PER ND 1002019, .09 HIGH, COLOR BLACK.
6. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.



	QUANTITY REQUIRED 011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
	☒		18	2900197	SCHEMATIC DIAGRAM, ELECT
	☒		17	PS2900150	PROCUREMENT SPECIFICATION
	1		16	MS 35216-4	SCREW, PAN HD
	1		15	1016151-002	NUT, SELF LOCKING
	1		14	2900175	SHIELD, NOISE
	AR		13	SN60WRAP	SOLDER QQ-S-571 (ES2175-3)
	AR		12	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
	AR		11	SN60WS	SOLDER QQ-S-571 (ES2175-1)
	1		10	1900336	WIRE LIST DD
SEE NOTE 6	13		9	1015864-109	INSULATION, SLEEVING
	4		8	MS35333-71	WASHER, LOCK
	4		7	AN960C6 (1897006-026)	WASHER, FLAT
SEE NOTE 6	4		6	1016151-006	NUT, SELF LOCKING
	4		5	MS35216-25	SCREW, MACHINE, PAN HD
	8		4	1900483	STUD, MOUNTING
	1		3	1900333-031	TORQUE DRIVE AMPL CKT ASSY
	1		2	2900147-021	DEMODULATOR & DCA CKT ASSY
	1		1	1900327-031	PRE-AMPLIFIER CIRCUIT ASSY

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900036-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN 26 APR 65 DATE
CHECKED J. GREEB 30 APR 65
APPROVAL E. NASS 3 MAY 65
APPROVAL Gedeman 19/2/65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PRECISION ALIGNMENT SERVO AMPLIFIER
OUTER GIMBAL

CODE IDENT NO 99974
SIZE D
2900150
SCALE FULL
SHEET 1 of 1

30 APR 65

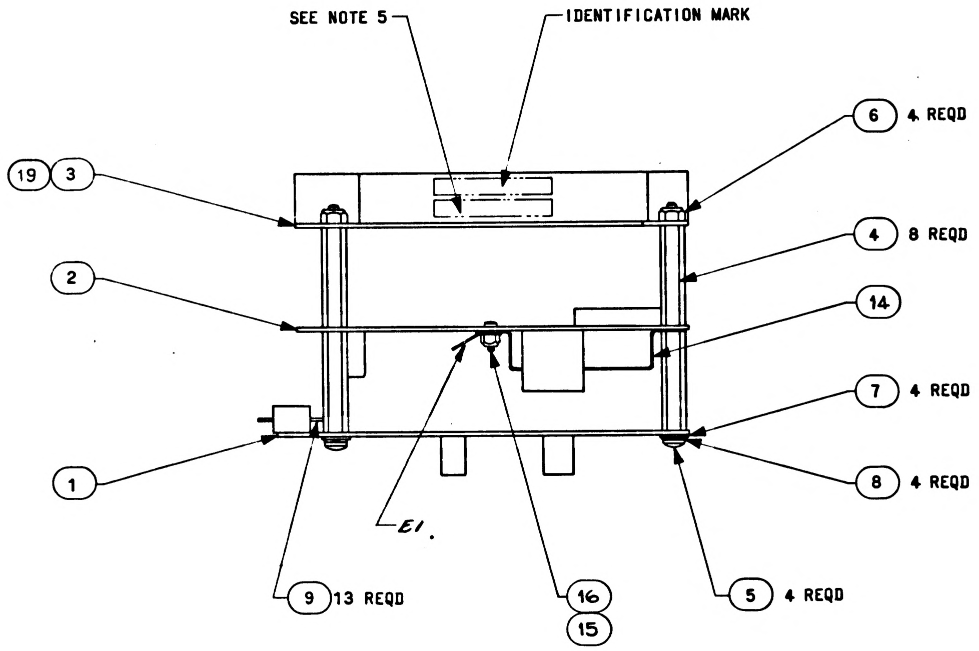
C 2900150

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		REVISED PER MXC 202887		65	
B		INITIAL RELEASE CLASS A PER TDRR 23417		19-OCT-65	JM
C		REVISED PER TDRR 28799		18 MAY 66	JHP CP

REVISIONS 23417

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. SOLDER PER ND 1002071 USING ITEM 13, OR ITEMS 11 AND 12.
3. IDENTIFY USING DRAWING NUMBER PREFIXED BY "ASSY" WITH APPLICABLE DASH NUMBER PER MIL-STD-130 (ES267).
4. SERIALIZE PER ND 1002023.
5. MARK "SCHEM" AND APPLICABLE SCHEMATIC DRAWING NO. PER ND 1002019, .09 HIGH, COLOR BLACK.
6. VENDOR ITEM - SEE SPECIFICATION CONTROL DRAWING.



LIST OF PARTS AND MATERIALS

			021	011	EFFECTIVITY	ITEM NO.	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
			☒	☒		20	2901411	SCHEMATIC DIAGRAM, ELECTRICAL
			1	1		19	1900333-041	TORQUE DRIVE AMPL CIRCUIT ASSY
			—	☒		18	2900197	SCHEMATIC DIAGRAM, ELECT
			—	☒		17	PS2900150	PROCUREMENT SPECIFICATION
			1	1		16	MS35216-4	SCREW, PAN HD
			1	1		15	1016151-002	NUT, SELF LOCKING
			1	1		14	2900175	SHIELD, NOISE
			AR	AR		13	SN60WRAP	SOLDER QQ-S-571 (ES2175-3)
			AR	AR		12	MIL-F-14256 TYPE A OR W	FLUX (ES2798)
			AR	AR		11	SN60WS	SOLDER QQ-S-571 (ES2175-1)
			1	1		10	1900336	WIRE LIST DD
SEE NOTE 6			13	13		9	1015864-109	INSULATION, SLEEVING
			4	4		8	MS35333-71	WASHER, LOCK
			4	4		7	AN960C6 (1897006-026)	WASHER, FLAT
SEE NOTE 6			4	4		6	1016151-006	NUT, SELF LOCKING
			4	4		5	MS35216-25	SCREW, MACHINE, PAN HD
			8	8		4	1900483	STUD, MOUNTING
			—	1		3	1900333-031	TORQUE DRIVE AMPL CKT ASSY
			1	1		2	2900147-021	DEMODULATOR & DCA CKT ASSY
			1	1		1	1900327-031	PRE-AMPLIFIER CIRCUIT ASSY

QUANTITY REQUIRED

NEXT ASSY	USED ON	APPLICABLE DASH NO.
2900036-021	2900023-021	-021
2900036-011	2900023-011	-011

APPLICATION

THE ASSEMBLY PART NUMBER IS THE DRAWING NUMBER AND THE DASH NUMBER THAT APPLIES

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ _ + _ + _
- - -

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 26 APR 65
CHECKED J. GRIEB 30 APR 65
APPROVAL E. NASS 3 MAY 65
APPROVAL Feldman 5/4/65
NASA APPROVAL
MIT APPROVAL

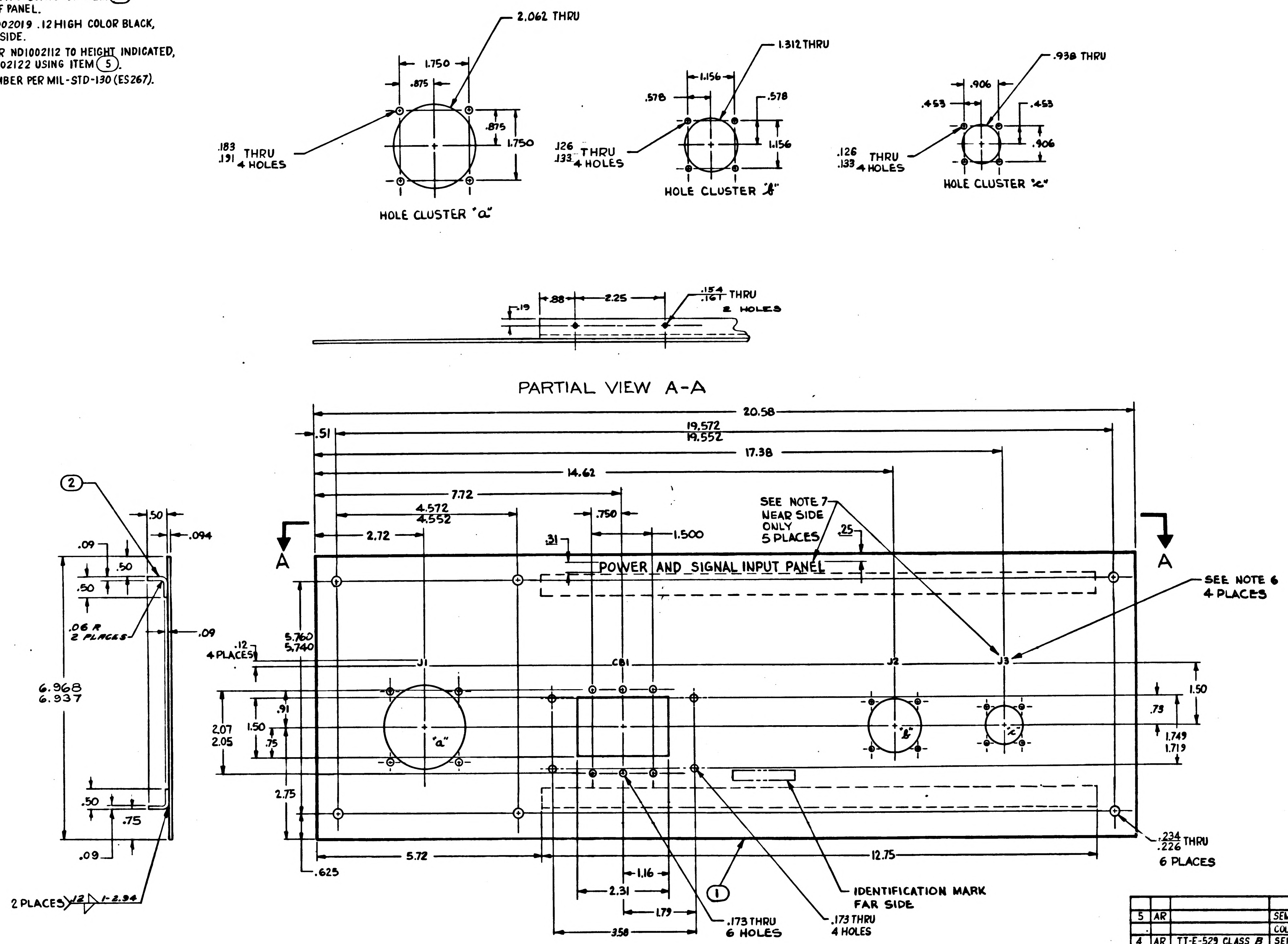
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PRECISION ALIGNMENT SERVO AMPLIFIER
OUTER GIMBAL

CODE IDENT NO 99974
SIZE D
2900150
SCALE FULL
SHEET 1 of 1

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: ALUMINUM ALLOY QQ-A-250/8, *TEMPER H-34* (*ES2105*, TYPE 5052, H-32)
3. WELD PER MIL-W-8604.
4. MUST BE FREE FROM BURRS AND SHARP EDGES.
5. FINISH:
   - A. APPLY FINISH P513 OF MIL-F-14072.
   - B. APPLY ITEM ③ AND TWO COATS OF ITEM ④ TO FRONT AND EDGES OF PANEL.
6. MARK CHARACTER PER ND1002019 .12 HIGH COLOR BLACK, CENTRALIZE AS SHOWN, FAR SIDE.
7. SILK SCREEN CHARACTERS PER ND1002112 TO HEIGHT INDICATED, FUTURA DEMI-BOLD PER ND1002122 USING ITEM ⑤.
8. IDENTIFY USING DRAWING NUMBER PER MIL-STD-130 (ES267).

REVISIONS 23363					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		INITIAL RELEASE CLASS A PER TDRR 23368		5-65	


2.062 THRU
1.750
.875
.875
1.750
.183 .191 THRU 4 HOLES
HOLE CLUSTER "a"
1.312 THRU
1.156
.578
.578
1.156
.126 .133 THRU 4 HOLES
HOLE CLUSTER "b"
.938 THRU
.906
.453
.453
.906
.126 .133 THRU 4 HOLES
HOLE CLUSTER "c"
.19
.88
2.25
.154 .161 THRU 2 HOLES
PARTIAL VIEW A-A
20.58
.51
19.572 19.552
17.38
14.62
7.72
4.572 4.552
2.72
.750
1.500
.31
.25
SEE NOTE 7 NEAR SIDE ONLY 5 PLACES
POWER AND SIGNAL INPUT PANEL
A
A
SEE NOTE 6 4 PLACES
J1
CB1
J2
J3
"a"
"b"
"c"
5.760 5.740
.12 4 PLACES
.91
1.50
.75
2.07 2.05
2.75
1.50
.73
1.749 1.719
5.72
12.75
.625
1.16
2.31
1.79
3.58
.234 .226 THRU 6 PLACES
.173 THRU 6 HOLES
.173 THRU 4 HOLES
IDENTIFICATION MARK FAR SIDE
①
②
.50
.094
.09
.50
.50
.06 R 2 PLACES
.09
6.968 6.937
.50
.75
.09
2 PLACES .12 1-2.94

5	AR		SEMI-GLOSS ENAMEL, INSTRUMENT BLACK,
			COLOR 514 OF ANA BUL 157 (ES 2563-11)
4	AR	TT-E-529 CLASS B	SEMI-GLOSS ENAMEL, LIGHT GRAY, COLOR
			26440 OF FED. STD-595.
3	AR	MIL-P-8585	PRIMER (ES2589)
2	2	2900155-002	ANGLE BRACKET
1	1	2900155-001	PANEL
ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION

LIST OF PARTS AND MATERIALS

1900677-021	1902134-021
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — DECIMALS ±.02 ±.005 ANGLES ± 2°
DO NOT SCALE THIS DRAWING
MATERIAL SEE NOTE 2
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Kilvragov DATE 26 APR 65
CHECKED J. GRIEB 30 APR 65
APPROVAL G. Stamacy
APPROVAL 9-27-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

PANEL, REAR (INSEPARABLE ASSEMBLY)
COOLANT AND POWER CONSOLE

CODE IDENT NO. 99974
SIZE E
2900155
SCALE FULL
SHEET 1 OF

2900155 A

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
REVISIONS					
A		REVISED PER D.O. 60554		JUN 65	FRW /
B		REVISED PER D.O. 60635	-	17 JUN 65	MCR / AU
C		INITIAL RELEASE CLASS A PER TDRR 23556		8 Oct 65	

NOTES:

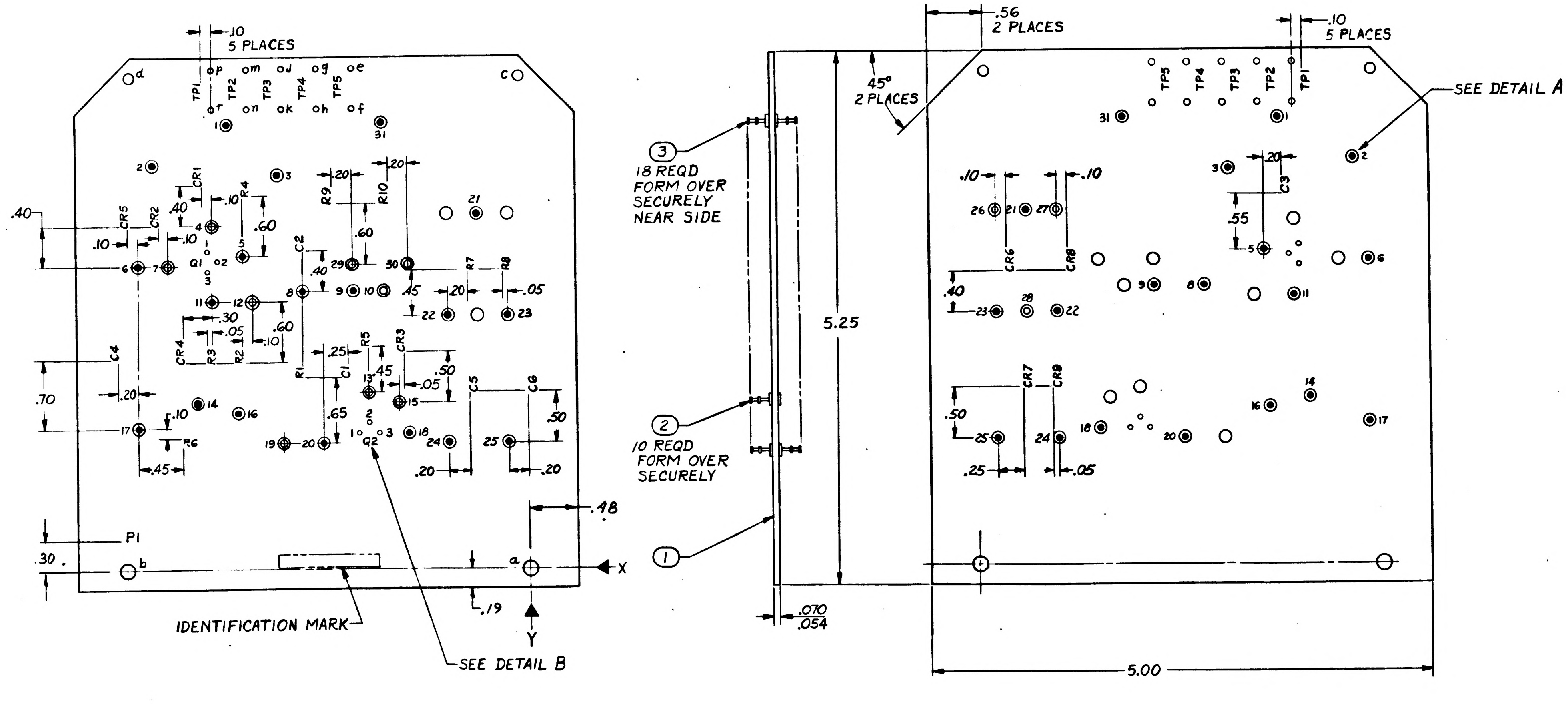
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. MATERIAL: LAMINATED GLASS CLOTH EPOXY RESIN PER MIL-P-18177 TYPE GEE (ES2744-1).
3. MUST BE FREE FROM BURRS AND SHARP EDGES.
4. HOLE DESIGNATIONS a THRU r ARE FOR MANUFACTURING REFERENCE ONLY AND SHALL NOT BE MARKED ON BOARD.
5. ARROWS INDICATE DIRECTION OF POSITIVE (+) DIMENSION.
6. MARK CHARACTERS .06 HIGH PER ND1002019, COLOR BLACK. CENTRALIZE AS SHOWN.
7. IDENTIFY USING DRAWING NUMBER PER MIL-STD-130 (ES267).
8. BLACK DOT DENOTES FEED THRU TERMINALS, ITEM ③.

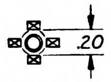
COORDINATE DIMENSIONS

HOLE NO.	COORDINATES X(HORIZ)	COORDINATES Y(VERT)	HOLE DESCRIPTION
1	3.00	4.40	.092-.097 THRU
2	3.75	4.00	
3	2.50	3.90	
4	3.15	3.40	
5	2.85	3.10	
6	3.90	3.00	
7	3.60	3.00	
8	2.25	2.75	
9	1.75	2.75	
10	1.45	2.75	
11	3.15	2.65	
12	2.75	2.65	
13	1.60	1.75	
14	3.30	1.65	
15	1.30	1.65	
16	2.90	1.55	
17	3.90	1.40	
18	1.20	1.35	
19	2.45	1.25	
20	2.05	1.25	
21	.50	3.50	
22	.80	2.50	
23	.20	2.50	
24	.80	1.25	
25	.20	1.25	
26	.20	3.50	
27	.80	3.50	
28	.50	2.50	
29	1.75	3.00	
30	1.20	3.00	
31	1.45	4.40	.092-.097 THRU

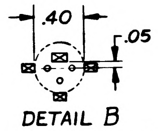
COORDINATE DIMENSIONS

HOLE NO.	COORDINATES X(HORIZ)	COORDINATES Y(VERT)	HOLE DESCRIPTION
Q1-1	3.200	3.150	.040 THRU
Q1-2	3.100	3.050	
Q1-3	3.200	2.950	
Q2-1	1.700	1.350	
Q2-2	1.600	1.450	
Q2-3	1.500	1.350	.040 THRU
a	.00	.00	.118-.125 THRU
b	4.031	.000	.118-.125 THRU
c	.08	4.86	.104 THRU
d	3.96	4.86	.104 THRU
e	1.75	4.92	.059-.067 THRU
f	1.75	4.52	
g	2.10	4.92	
h	2.10	4.52	
j	2.45	4.92	
k	2.45	4.52	
m	2.80	4.92	
n	2.80	4.52	
p	3.15	4.92	
r	3.15	4.52	.059-.067 THRU


.10
5 PLACES
TP1 TP2 TP3 TP4 TP5
CR1 CR2 CR3 CR4 CR5
R1 R2 R3 R4 R5 R6 R7 R8 R9 R10
C1 C2 C3 C4 C5 C6
Q1 Q2
P1
.40
.10
.60
.30
.05
.70
.20
.45
.25
.65
.50
.48
.19
IDENTIFICATION MARK
SEE DETAIL B
X
Y
③ 18 REQD FORM OVER SECURELY NEAR SIDE
② 10 REQD FORM OVER SECURELY
①
45° 2 PLACES
.56 2 PLACES
5.25
.070
.054
5.00
CR6 CR7 CR8 CR9
SEE DETAIL A



DETAIL A
LOCATE MARKING ABOUT TERMINALS AS SHOWN



DETAIL B
LOCATE MARKING FOR TRANSISTORS AS SHOWN 2 PLACES

SEE NOTE 2

ITEM NO.	NO. REQD	PART OR IDENTIFYING NUMBER	NOMENCLATURE OR DESCRIPTION
3	19	MS17157-6	TERMINAL, STUD, FEED THRU
2	12	MS17122-6	TERMINAL, STUD
1	1	2900157-001	TERMINAL BOARD

LIST OF PARTS AND MATERIALS

NEXT ASSY	USED ON
2900080-011	2900029-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — - DECIMALS ±.005 ±.02 ANGLES ±2° -
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN WEISSERT DATE 6-MAY-65
CHECKED Moige 18 MAY 65
ACJ APPROVAL R Pierini 24-May-65
APPROVAL 10-20-65
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

TERMINAL BOARD
(INSEPARABLE ASSEMBLY)
BUFFER

CODE IDENT NO. 99974
SIZE E
2900157
SCALE 2:1
SHEET 1 OF 1

20 MAY 65

2900157

NOTES:

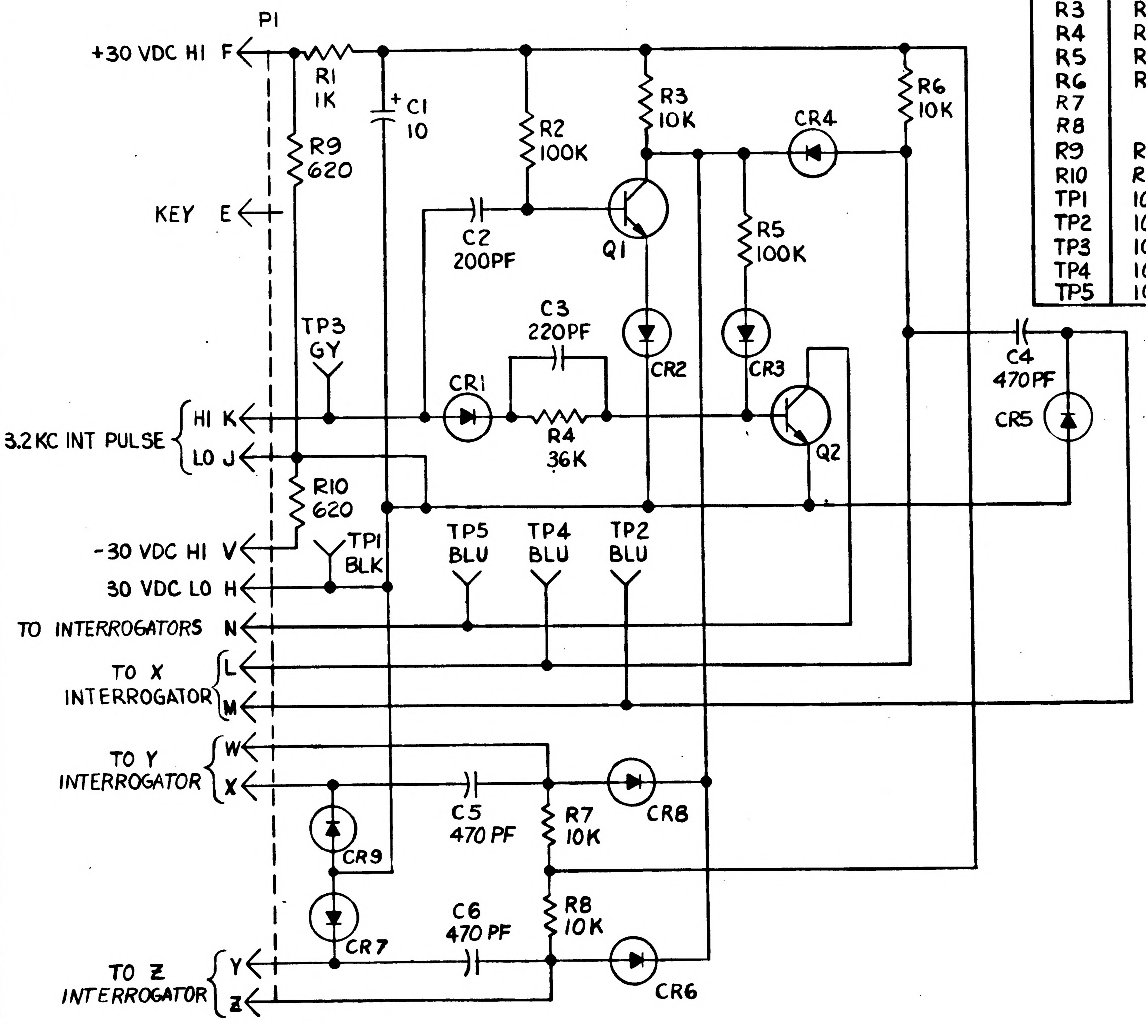
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ALL PART NUMBERS ARE FOR REFERENCE ONLY.
3. DRAWINGS FOR REFERENCE:
   2900080-011 BUFFER ASSEMBLY
4. UNLESS OTHERWISE SPECIFIED:
   A. VALUES ARE IN OHMS AND MICROFARADS.

REF DES	PART NUMBER	DESCRIPTION		SCHEMATIC DIAGRAM OR VALUE, TOL & RATING	
C1	CS13AG100K	CAPACITOR	MIL-C-26655/2	10 uf	± 20%
C2	CM15C201J03	↓	MIL-C-5/1	200 PF	± 5%
C3	CM15C221J03	↓	↓	220 PF	↓
C4	CM15D471J03	↓	↓	470 PF	↓
C5	↓	↓	↓	↓	↓
C6	↓	↓	↓	↓	↓
CR1	IN914	DIODE	MIL-S-19500/116		
CR2	↓	↓	↓		
CR3	↓	↓	↓		
CR4	↓	↓	↓		
CR5	↓	↓	↓		
CR6	↓	↓	↓		
CR7	↓	↓	↓		
CR8	↓	↓	↓		
CR9	↓	↓	↓		
P1	1015956-171	CONNECTOR ADAPTER			
Q1	1015928-001	TRANSISTOR	2N2193		
Q2	1015928-001	TRANSISTOR	2N2193		
R1	RC32GF102J	RESISTOR	MIL-R-11/6	1K	± 5%
R2	RC07GF104J	↓	MIL-R-11/8	100K	↓
R3	RC07GF103J	↓	↓	10K	↓
R4	RC07GF363J	↓	↓	36K	↓
R5	RC07GF104J	↓	↓	100K	↓
R6	RC07GF103J	↓	↓	10K	↓
R7	↓	↓	↓	10K	↓
R8	↓	↓	↓	10K	↓
R9	RC42GF621J	↓	MIL-R-11/7	620	↓
R10	RC42GF621J	↓	MIL-R-11/7	620	↓
TP1	1016347-003	JACK, MINIATURE			
TP2	1016347-008	↓	↓		
TP3	1016347-010	↓	↓		
TP4	1016347-008	↓	↓		
TP5	1016347-008	↓	↓		

C	2900158	2

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.O. 60554		1 JUN 65	FRW / W.D
B		REVISED PER D.O. 60635	—	16 JUN 65	MCR / AU
C		INITIAL RELEASE CLASS A PER TDRR 23556		18 OCT 65	FE



P1
+30 VDC HI F
R1 1K
C1 10
R2 100K
R3 10K
R6 10K
CR4
R9 620
KEY E
C2 200PF
Q1
R5 100K
C3 220PF
TP3 GY
CR1
CR2
CR3
C4 470PF
CR5
3.2KC INT PULSE
HI K
LO J
R4 36K
Q2
R10 620
-30 VDC HI V
TP1 BLK
TP5 BLU
TP4 BLU
TP2 BLU
30 VDC LO H
TO INTERROGATORS N
TO X INTERROGATOR
L
M
TO Y INTERROGATOR
W
X
C5 470 PF
R7 10K
CR8
CR9
C6 470 PF
R8 10K
CR7
CR6
TO Z INTERROGATOR
Y
Z

UNUSED TERMINALS

REF DES	TERMINAL NO
P1	A, B, C, D, P, R, S, T, U

NEXT ASSY	USED ON
2900080-011	2900029-011

APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — − DECIMALS + — − ANGLES + — −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 6 MAY 65
CHECKED 19 MAY 65
APPROVAL R. J. Schuler 24 MAY 65
10-22-65
APPROVAL J. M. Watson
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC DIAGRAM
ELECTRICAL - BUFFER ASSEMBLY

CODE IDENT NO. 99974
SIZE D
2900158
SCALE —
SHEET 1 OF 1

MIL 10770K

NOTES:

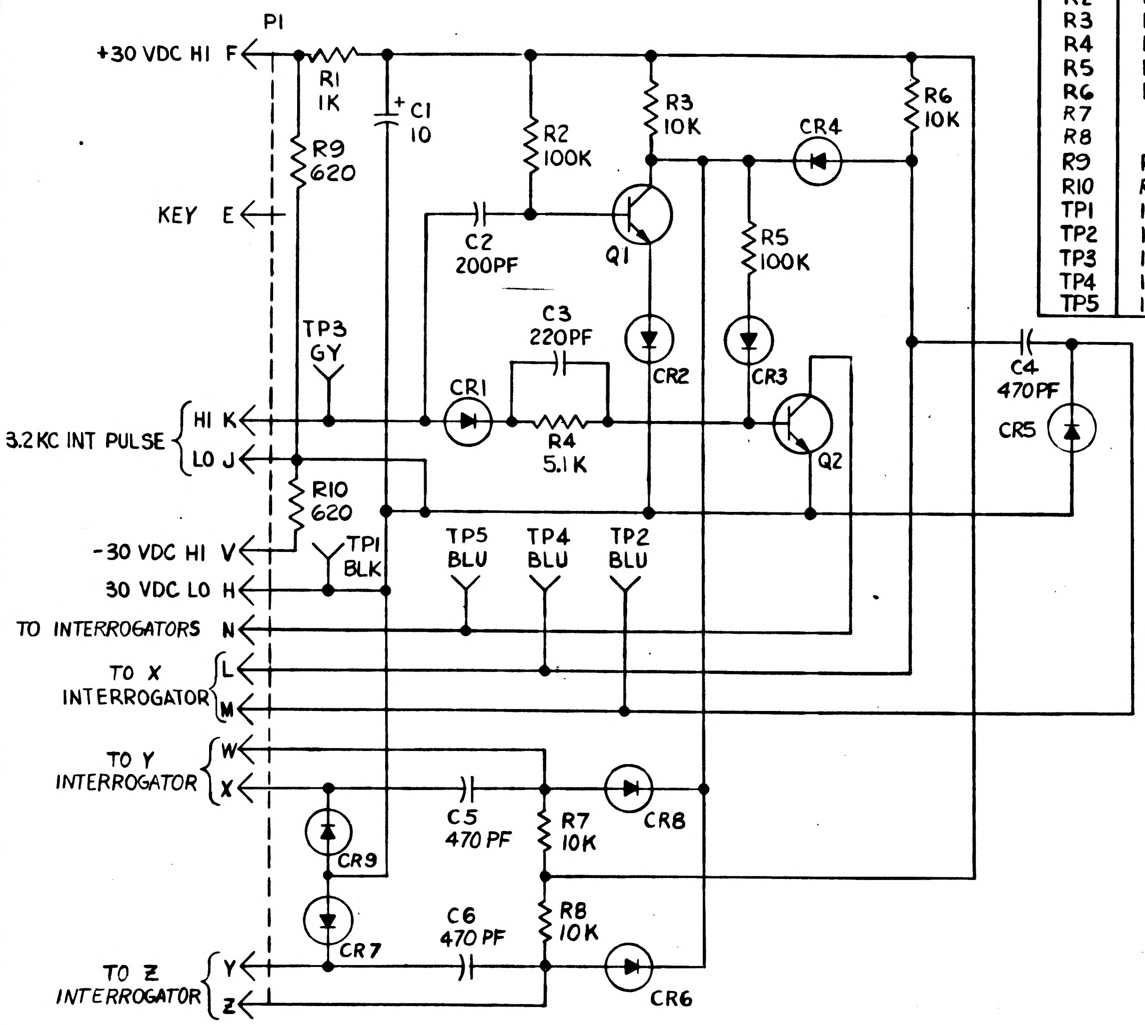
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ALL PART NUMBERS ARE FOR REFERENCE ONLY.
3. DRAWINGS FOR REFERENCE:
   2900080-011 BUFFER ASSEMBLY
4. UNLESS OTHERWISE SPECIFIED:
   A. VALUES ARE IN OHMS AND MICROFARADS.

REF DES	PART NUMBER	DESCRIPTION		SCHEMATIC DIAGRAM OR VALUE, TOL & RATING	
C1	CS13AG100K	CAPACITOR	MIL-C-26655/2	10 uf	± 20%
C2	CM15C201J03		MIL-C-5/1	200 PF	± 5%
C3	CM15C221J03			220 PF	
C4	CM15D471J03			470 PF	
C5					
C6					
CR1	IN914	DIODE	MIL-S-19500/116		
CR2					
CR3					
CR4					
CR5					
CR6					
CR7					
CR8					
CR9					
P1	1015956-171	CONNECTOR ADAPTER			
Q1	1015928-001	TRANSISTOR 2N2193			
Q2	1015928-001	TRANSISTOR 2N2193			
R1	RC32GF102J	RESISTOR	MIL-R-11/6	1K	±5%
R2	RC07GF104J		MIL-R-11/8	100K	
R3	RC07GF103J			10K	
R4	RC07GF512J			5.1K	
R5	RC07GF104J			100K	
R6	RC07GF103J			10K	
R7				10K	
R8				10K	
R9	RC42GF621J		MIL-R-11/7	620	
R10	RC42GF621J		MIL-R-11/7	620	
TP1	1016347-003	JACK, MINIATURE			
TP2	1016347-008				
TP3	1016347-010				
TP4	1016347-008				
TP5	1016347-008				

D 2900158

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.O. 60554		1 JUN 65	FRW / J.D
B		REVISED PER D.O. 60635	—	16 JUN 65	MCR / AU
C		INITIAL RELEASE CLASS A PER TDRR 23556		18 OCT 65	
D		REVISED PER TDRR 24870		28 DEC 65	WP / JD



P1
+30 VDC HI F
R1 1K
C1 10
R2 100K
R3 10K
R6 10K
R9 620
CR4
KEY E
C2 200PF
Q1
R5 100K
C3 220PF
CR2
CR3
TP3 GY
CR1
R4 5.1K
3.2KC INT PULSE
HI K
LO J
Q2
C4 470PF
CR5
R10 620
-30 VDC HI V
TP1 BLK
30 VDC LO H
TP5 BLU
TP4 BLU
TP2 BLU
TO INTERROGATORS N
TO X INTERROGATOR L M
TO Y INTERROGATOR W X
C5 470 PF
R7 10K
CR8
CR9
CR7
C6 470 PF
R8 10K
TO Z INTERROGATOR Y Z
CR6

UNUSED TERMINALS	
REF DES	TERMINAL NO
P1	A, B, C, D, P, R, S, T, U

2900080-011	2900029-011
NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 6 MAY 65
CHECKED 19 MAY 65
APPROVAL 24 MAY 65
APPROVAL 10-22-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

SCHEMATIC DIAGRAM
ELECTRICAL - BUFFER ASSEMBLY

CODE IDENT NO. 99974
SIZE D
2900158
SCALE —
SHEET 1 OF 1

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	SYM	DESCRIPTION	DATE	APPROVAL
2900080-011	2900029-011	A	REV. PER D.O. 60554	1 JUN 65	FRW / W.D.
		B	REV PER D.O. 60635	19 JUN 65	MCR / AU
		C	INITIAL RELEASE CLASS A PER TDRR 23556	18 OCT 65	FE / CW

Chadeston
20 MAY 65

REV STATUS OF SHEETS	REV	C	C	C	C	C	C
	SHEET	1	2	3	4	5	6

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN WEISSERT DATE 6-MAY-65
CHECKED Molye 20-MAY-65
APPROVAL R.J. Schrader 24 MAY 65
APPROVAL J M. Watson 10-27-65

NASA APPROVAL
MIT APPROVAL

CONTRACT NAS9-497

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

WIRE LIST A-A

CODE IDENT NO	SIZE		REV
99974	A	2900159	C
SCALE —		SHEET 1 OF 6	

WIRE LIST AA ▼ 2900159 C

NOTE NUMBER GENERAL NOTES DESCRIPTION

NOTE NUMBER	DESCRIPTION
1	NOT APPLICABLE
2	INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
3	SOLDER PER MIL-S-6872 (ES2505-1) USING ITEM 5, OR ITEMS 3 AND 4
4	WIRE TO BE LOCATED ON SIDE OPPOSITE FROM CONNECTOR
5	LENGTHS SPECIFIED ARE FOR LEADS BEFORE ATTACHING TO AN ACCESSORY

TOLERANCE CHART, UNLESS OTHERWISE SPECIFIED ---

APPLICABLE LENGTH FOR WIRE OR CABLE, STRIP WIRE, STRIP JACKET, CUT WIRE OR CUT SHIELD.	TOLERANCE				
	WIRE OR CABLE	STRIP WIRE	STRIP JACKET	CUT WIRE	CUT SHIELD
UNDER 1 INCH	+ .06-.00	+.03-.00	+.06-.06	+.06-.06	+.06-.06
1 INCH TO 6 INCHES	+ .50-.00	+.06-.00	+.25-.25	+.25-.25	+.25-.25
6 INCHES TO 6 FEET	+1.00-.00		+.50-.50	+.50-.50	+.50-.50
OVER 6 FEET	+2.00-.00				

MANNED SPACECRAFT CENTER HOUSTON, TEXAS | SIZE A | 2900159

SCALE - NONE | REV LTR C | SHEET 2 OF 6

MIL 2084 4-63

WIRE LIST AA ▼ 2900159 C

LIST OF MATERIALS

SEE NOTE NUMBER	ITEM	QTY	PART NO.	DESCRIPTION
	1	1	2900159-001	WIRE, BUS QQ-W-343 TYPE S COATED (ES110-1) 24AWG, 4 INCHES TOTAL LENGTH
	2	1	2900159-002	WIRE ND1002181, TYPE 1, CLASS 1, 24AWG COLOR WHITE, 59.0 INCHES TOTAL LENGTH
	3	AR	SN60WS	SOLDER, QQ-S-571 (ES2175-1)
	4	AR	MIL-F-14256	TYPE A OR W FLUX (ES2798)
	5	AR	SN60WRAP	SOLDER, QQ-S-571 (ES2175-3)

MANNED SPACECRAFT CENTER HOUSTON, TEXAS | SIZE A | 2900159

SCALE - NONE | REV LTR C | SHEET 3 OF 6

MIL 2084 4-63

WIRE LIST AA ▼ 2900159 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 1	1	1.00	TERM.14 TERM.17						NO NO			SEE NOTE 4
AA 2	2	1.50	TERM.3 TERM.4					.25 .25	YES YES			
AA 3	2	2.00	TERM.5 TERM.10					.25 .25	YES YES			
AA 4	2	1.75	TERM.10 TERM.15					.25 .25	YES YES			
AA 5	2	4.75	TERM.2 TERM.20					.25 .25	YES YES			SEE NOTE 4
AA 6	2	2.00	TERM.8 TERM.16					.25 .25	YES YES			SEE NOTE 4
AA 7	2	2.00	TERM.9 TERM.11					.25 .25	YES YES			SEE NOTE 4
AA 8	2	1.75	TP1 TERM.2					.25 .25	YES YES			SEE NOTE 4
AA 9	2	3.50	TP2 TERM.6					.25 .25	YES YES			SEE NOTE 4
AA 10	2	2.00	TP3 TERM.3					.25 .25	YES YES			SEE NOTE 4
AA 11	2	4.75	TP4 TERM.17					.25 .25	YES YES			SEE NOTE 4
AA 12	2	4.25	TP5 TERM.18					.25 .25	YES YES			SEE NOTE 4

MANNED SPACECRAFT CENTER HOUSTON, TEXAS | SIZE A | 2900159

SCALE - NONE | REV LTR C | SHEET 4 OF 6

MIL 2084 4-63

WIRE LIST AA ▼ 2900159 C

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 13	2	1.50	P1-F TERM.19					.25 .25	YES YES			
AA 14	2	1.50	P1-H TERM.20					.25 .25	YES YES			
AA 15	1	1.00	P1-H P1-J						NO NO			
AA 16	2	4.00	P1-K TERM.4					.25 .25	YES YES			
AA 17	2	3.00	P1-L TERM.17					.25 .25	YES YES			
AA 18	2	4.00	P1-M TERM.6					.25 .25	YES YES			
AA 19	2	2.00	P1-N TERM.18					.25 .25	YES YES			
AA 20	2	1.50	TERM.9 TERM.27					.25 .25	YES YES			SEE NOTE 4
AA 21	2	2.50	TERM.8 TERM.21					.25 .25	YES YES			SEE NOTE 4
AA 22	2	2.50	TERM.20 TERM.28					.25 .25	YES YES			SEE NOTE 4
AA 23	2	1.00	TERM.26 TERM.27					.25 .25	YES YES			SEE NOTE 4
AA 24	2	2.50	P1-W TERM.22					.25 .25	YES YES			

MANNED SPACECRAFT CENTER HOUSTON, TEXAS | SIZE A | 2900159

SCALE - NONE | REV LTR C | SHEET 5 OF 6

MIL 2084 4-63

2900159 C ~~B~~

WIRE LIST AA

LEAD IDENT	WIRE MATL ITEM	LEAD LG	CIRCUIT PT FROM (A) TO (B)	TERM. AREA NO.	JKT STRIP LG	SHLD STRIP LG	LEAD CUT LG	INS STRIP LG	TIN	NOTE ONE, FIG	ACCESSORY ITEMS	REMARKS
AA 25	1	1.00	P1-X TERM.24									
AA 26	1	1.00	P1-Y TERM.25									
AA 27	2	2.50	P1-Z TERM.23					.25 .25	YES YES			
AA 28	2	3.00	TERM.2 TERM.31					.25 .25	YES YES			SEE NOTE 4
AA 29	1	1.00	TERM.8 TERM.29						NO NO			
AA 30	2	3.50	TERM.30 P1-V					.25 .25	YES YES			

MANNED
SPACECRAFT
CENTER
HOUSTON, TEXAS

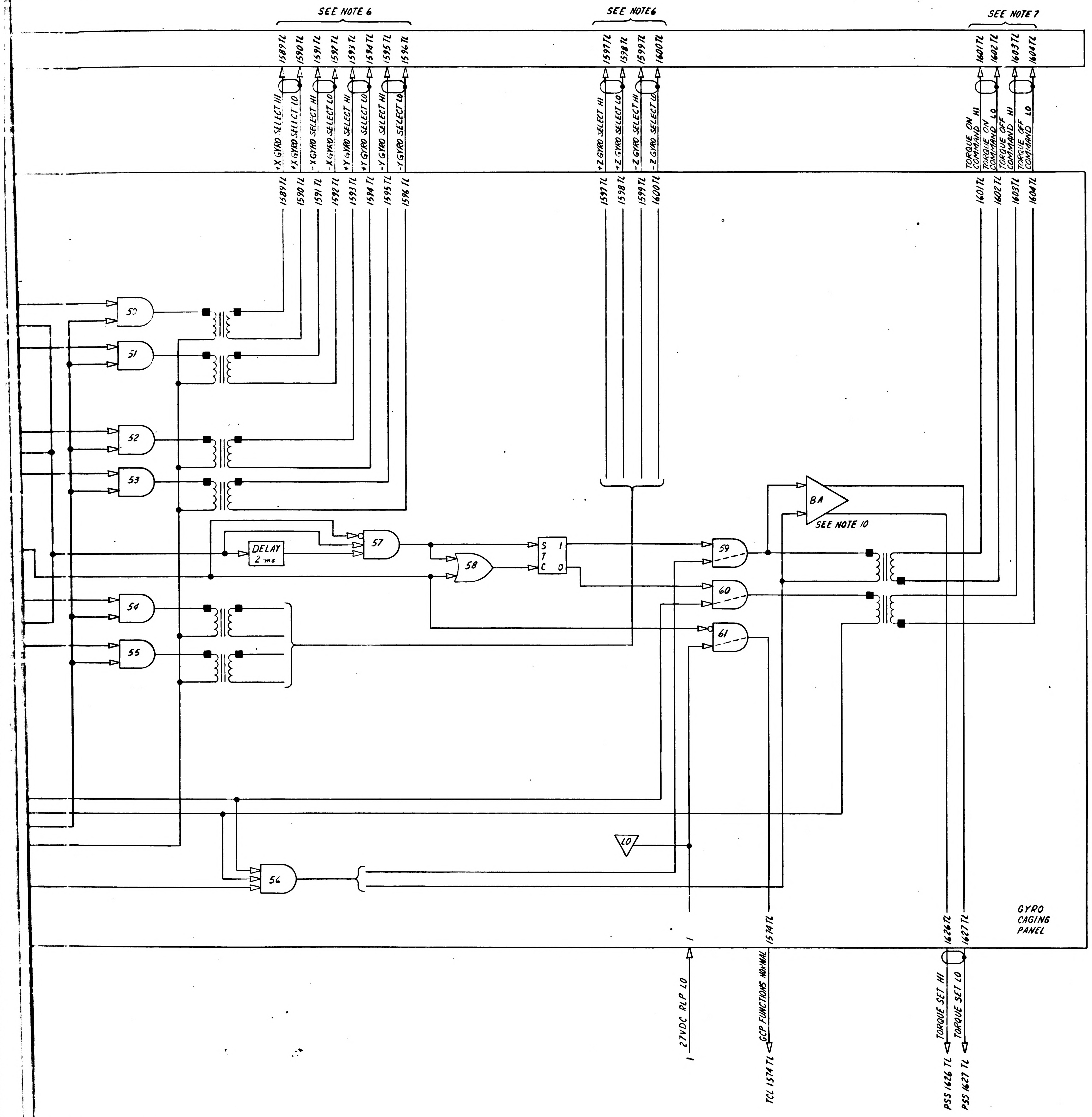
SIZE A

2900159

SCALE - NONE

REV LTR ~~B~~ C

SHEET 6 OF 6


SEE NOTE 6
1589TL
1590TL
1591TL
1592TL
1593TL
1594TL
1595TL
1596TL
+X GYRO SELECT HI
+X GYRO SELECT LO
-X GYRO SELECT HI
-X GYRO SELECT LO
+Y GYRO SELECT HI
+Y GYRO SELECT LO
-Y GYRO SELECT HI
-Y GYRO SELECT LO
SEE NOTE 6
1597TL
1598TL
1599TL
1600TL
+Z GYRO SELECT HI
+Z GYRO SELECT LO
-Z GYRO SELECT HI
-Z GYRO SELECT LO
SEE NOTE 7
1601TL
1602TL
1603TL
1604TL
TORQUE ON COMMAND HI
TORQUE ON COMMAND LO
TORQUE OFF COMMAND HI
TORQUE OFF COMMAND LO
50
51
52
53
54
55
56
57
58
59
60
61
DELAY 2 ms
S T C
1 0
BA
SEE NOTE 10
LO
GYRO CAGING PANEL
1
1574TL
1626TL
1627TL
27VDC RLP LO
1
GCP FUNCTIONS NORMAL
TCL 1574TL
TORQUE SET HI
TORQUE SET LO
PSS 1626 TL
PSS 1627 TL

REVISIONS 14-

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APP'D
A		REVISED PER TDRR 20587		3 65	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ ± ___ ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ___
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Kilvingeo DATE 11 MAY 65
CHECKED Ed Foster 13 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
GYRO CAGING PANEL
(BLOCK II AND LEM)

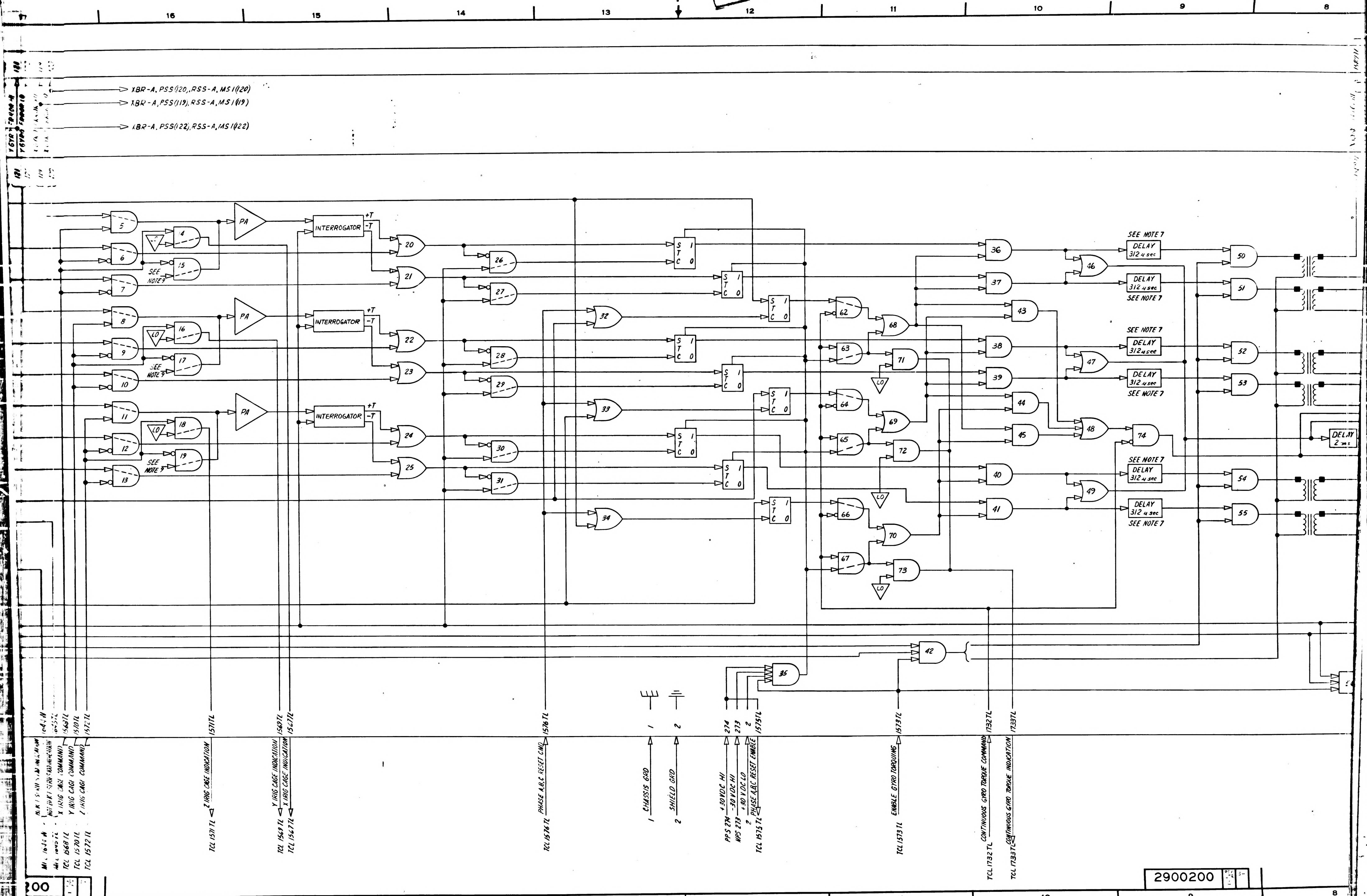
CODE IDENT NO. 99974
SIZE J_3
2900200
SCALE —
SHEET 1 OF 2

2900200 A

00200

4H

3/2900200



XBR-A, PSS(120), RSS-A, MS1(120)
XBR-A, PSS(119), RSS-A, MS1(119)
XBR-A, PSS(122), RSS-A, MS1(122)
Y GYR
PA
INTERROGATOR
+T
-T
S I T C O
LO
SEE NOTE 9
SEE NOTE 7
DELAY 312 μsec
DELAY 2 ms
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 62 63 64 65 66 67 68 69 70 71 72 73 74
1645 N
1568TL
1570TL
1572TL
X IRIG CAGE COMMAND
Y IRIG CAGE COMMAND
Z IRIG CAGE COMMAND
TCL 1568TL
TCL 1570TL
TCL 1572TL
1571TL
Z IRIG CAGE INDICATION
TCL 1571TL
1569TL
1567TL
Y IRIG CAGE INDICATION
X IRIG CAGE INDICATION
TCL 1569TL
TCL 1567TL
1576TL
PHASE A,B,C RESET CMD
TCL 1576TL
1
CHASSIS GRD
2
SHIELD GRD
274
273
2
1575TL
+30 VDC HI
-30 VDC HI
+30 VDC LO
PHASE A,B,C RESET ENABLE
PPS 274
NPS 273
TCL 1575TL
1573TL
ENABLE GYRO TORQUING
TCL 1573TL
1732TL
1733TL
CONTINUOUS GYRO TORQUE COMMAND
CONTINUOUS GYRO TORQUE INDICATION
TCL 1732TL
TCL 1733TL
2900200
200
16
15
14
13
12
11
10
9
8

2/2900200

NOTES

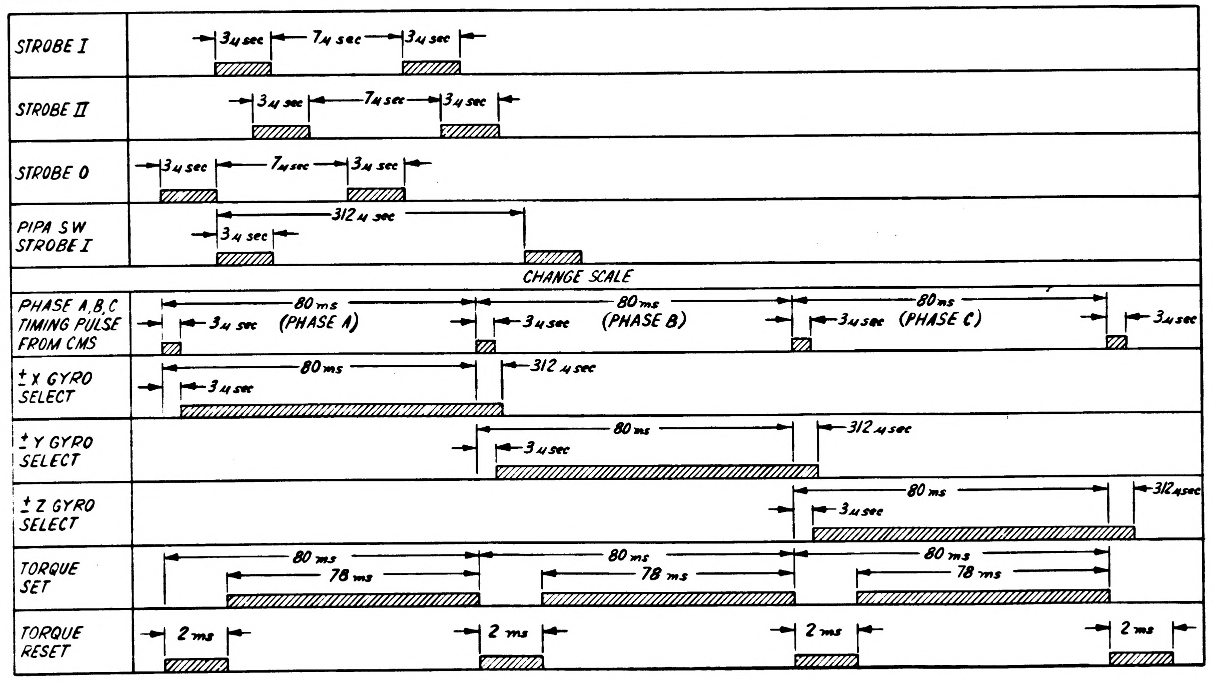
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS PER MIL-ST-806.
3. REFERENCE MECHANIZATION DIAGRAMS:

2900210	AC POWER POTECTION PANEL & POWER DISTRIBUTION (FTR)
RLP	RELAY AND LAMP POWER SUPPLY
PPS	+30 VDC POWER SUPPLY
NPS	-30 VDC POWER SUPPLY
2900208	POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTION (BLOCK I, II & LEM) (PDL)
PSS	PRIMARY SIGNAL SELECTOR (PARTIAL)
2900207	MONITOR PANEL (MPL)
2900209	COMPUTER SIMULATOR INTERFACE (CMS)
2900201	TEST CONTROL PANEL (BLOCK II & LEM)(TCL)
2900217	SIGNAL SELECTION & MEASUREMENT
PSS	PRIMARY SIGNAL SELECTOR
XBR-A	CROSSBAR-AC SIGNAL
2900218	OSCILLOGRAPH SIGNAL SELECTION
RSS-A	TO FIXED AC CHANNEL
RSS-C	TO SWITCHABLE AC CHANNEL
2900219	COUNTER SIGNAL SELECTION
PSS	PRIMARY SIGNAL SELECTOR (PARTIAL)
2900213	GSE GROUNDING (BLOCK II & LEM)
2900212	PIP & IRIG MONITORING
MS 1	PHASE SHIFT PANEL

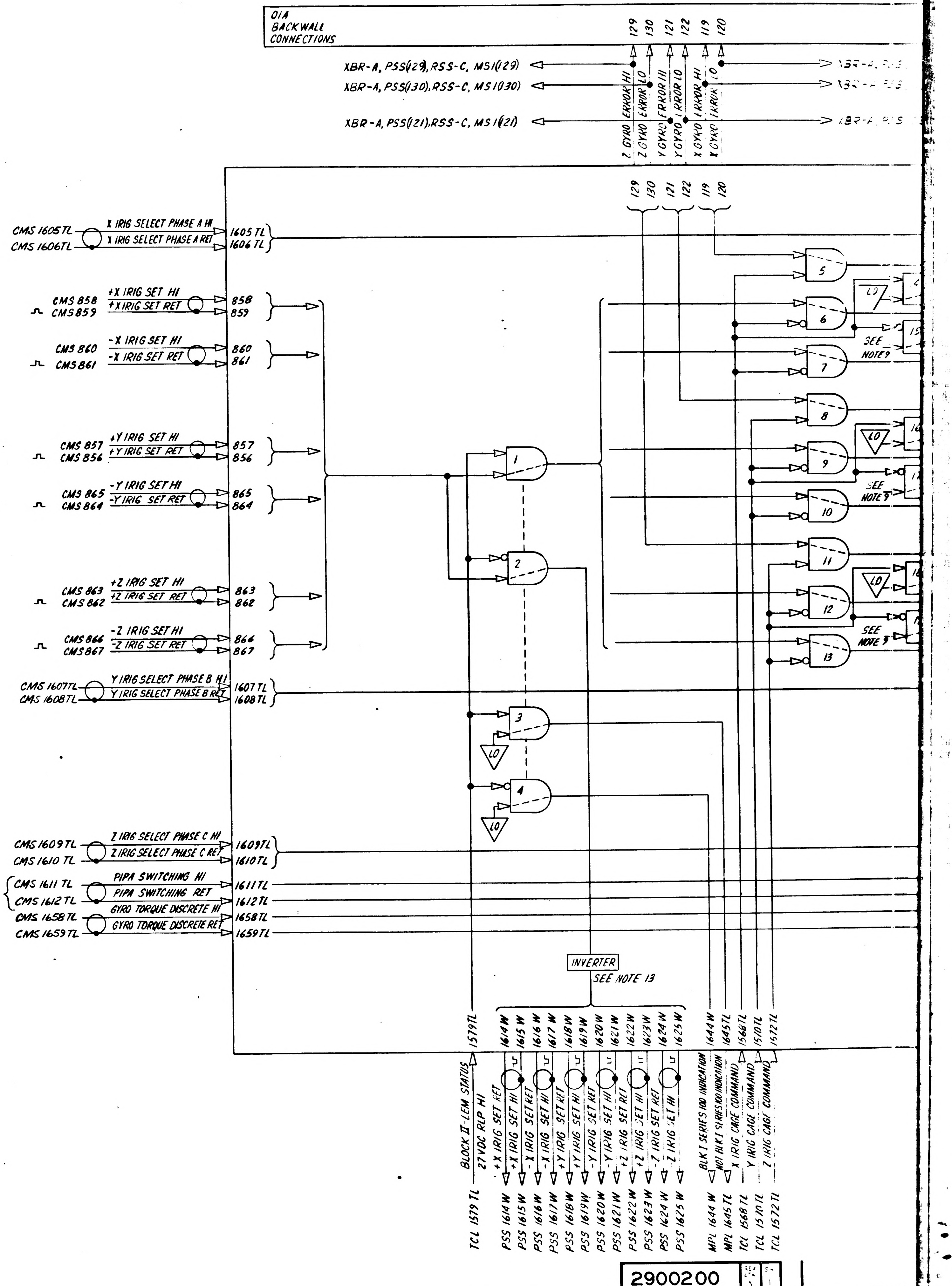
4. NONSTANDARD SYMBOLOGY

INDICATES "AND" GATE WITH SWITCHED SIGNAL

5. ALL INTERFACE NUMBERS SUFFIX BY THE FOLLOWING MEAN:
   A. W - BLOCK I SERIES 100 ONLY
   B. T - BLOCK II ONLY
   C. L - LEM ONLY
   D. BLANK - ALL G/N CONFIGURATIONS
   E. TW, TL OR WL - USED IN MORE THAN ONE G/N CONFIGURATIONS AS SHOWN.
6. OUTPUT CHARACTERISTICS
   Z_o < 100 OHMS
   PULSE AMPLITUDE - 5 TO 10 VOLTS
   PULSE WIDTH - 3.5 ± 1 µsec
   PULSE RISE TIME - < 1 µsec
   LOAD - 100 K OHMS SHUNTED WITH 1500 pf
7. OUTPUT CHARACTERISTICS
   Z_o < 100 OHMS
   PULSE AMPLITUDE - 5 TO 10 VOLTS
   PULSE WIDTH - 3.5 ± 1 µsec
   PULSE RISE TIME - < 1 µsec
   LOAD - 2.2 K OHMS SHUNTED WITH 1500 pf
8. PIPA SWITCHING 3200 PPS SIGNAL LAGS GYRO ERROR SIGNAL BY 135°
9. X, Y, Z GYRO ERROR LOW, RESPECTIVELY
10. TORQUE SET BUFFER AMPLIFIER Z_o < 2.0 K OHMS
11. TIMING DIAGRAM


STROBE I
3 µsec
7 µsec
3 µsec
STROBE II
3 µsec
7 µsec
3 µsec
STROBE 0
3 µsec
7 µsec
3 µsec
PIPA SW STROBE I
312 µsec
3 µsec
CHANGE SCALE
PHASE A, B, C TIMING PULSE FROM CMS
80 ms
3 µsec
(PHASE A)
80 ms
3 µsec
(PHASE B)
80 ms
3 µsec
(PHASE C)
3 µsec
± X GYRO SELECT
80 ms
3 µsec
312 µsec
± Y GYRO SELECT
80 ms
3 µsec
312 µsec
± Z GYRO SELECT
80 ms
3 µsec
312 µsec
TORQUE SET
80 ms
78 ms
80 ms
78 ms
80 ms
78 ms
TORQUE RESET
2 ms
2 ms
2 ms
2 ms

12. 312 µsec TIME DELAY ONLY IN CIRCUIT AT CUT-OFF TIME.
13. HIGH AND RETURN INVERTED TO CHANGE POSITIVE INPUT PULSES TO NEGATIVE OUTPUT PULSES.


01A BACKWALL CONNECTIONS
129
130
121
122
119
120
XBR-A, PSS(129), RSS-C, MS1(129)
XBR-A, PSS(130), RSS-C, MS1(130)
XBR-A, PSS(121), RSS-C, MS1(121)
Z GYRO ERROR HI
Z GYRO ERROR LO
Y GYRO ERROR HI
Y GYRO ERROR LO
X GYRO ERROR HI
X GYRO ERROR LO
CMS 1605TL
CMS 1606TL
X IRIG SELECT PHASE A HI
X IRIG SELECT PHASE A RET
1605 TL
1606 TL
CMS 858
CMS 859
+X IRIG SET HI
+X IRIG SET RET
858
859
CMS 860
CMS 861
-X IRIG SET HI
-X IRIG SET RET
860
861
CMS 857
CMS 856
+Y IRIG SET HI
+Y IRIG SET RET
857
856
CMS 865
CMS 864
-Y IRIG SET HI
-Y IRIG SET RET
865
864
CMS 863
CMS 862
+Z IRIG SET HI
+Z IRIG SET RET
863
862
CMS 866
CMS 867
-Z IRIG SET HI
-Z IRIG SET RET
866
867
CMS 1607TL
CMS 1608TL
Y IRIG SELECT PHASE B HI
Y IRIG SELECT PHASE B RET
1607 TL
1608 TL
CMS 1609 TL
CMS 1610 TL
Z IRIG SELECT PHASE C HI
Z IRIG SELECT PHASE C RET
1609TL
1610TL
SEE NOTE 8
CMS 1611 TL
CMS 1612 TL
PIPA SWITCHING HI
PIPA SWITCHING RET
1611TL
1612TL
CMS 1658 TL
CMS 1659 TL
GYRO TORQUE DISCRETE HI
GYRO TORQUE DISCRETE RET
1658TL
1659TL
1
2
3
4
5
6
7
8
9
10
11
12
13
LO
LO
LO
LO
LO
SEE NOTE 9
SEE NOTE 9
SEE NOTE 9
INVERTER
SEE NOTE 13
1579TL
1614W
1615W
1616W
1617W
1618W
1619W
1620W
1621W
1622W
1623W
1624W
1625W
1644W
1645TL
1568TL
1570TL
1572TL
BLOCK II-LEM STATUS
27 VDC RLP HI
+X IRIG SET RET
+X IRIG SET HI
-X IRIG SET RET
-X IRIG SET HI
+Y IRIG SET RET
+Y IRIG SET HI
-Y IRIG SET RET
-Y IRIG SET HI
+Z IRIG SET RET
+Z IRIG SET HI
-Z IRIG SET RET
-Z IRIG SET HI
BLK I SERIES 100 INDICATION
NOT BLK I SERIES 100 INDICATION
X IRIG CAGE COMMAND
Y IRIG CAGE COMMAND
Z IRIG CAGE COMMAND
TCL 1579 TL
PSS 1614 W
PSS 1615 W
PSS 1616 W
PSS 1617 W
PSS 1618 W
PSS 1619 W
PSS 1620 W
PSS 1621 W
PSS 1622 W
PSS 1623 W
PSS 1624 W
PSS 1625 W
MPL 1644 W
MPL 1645 TL
TCL 1568 TL
TCL 1570 TL
TCL 1572 TL

4 H

2900200

MIL FORM 1080 J3

1/2900200

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
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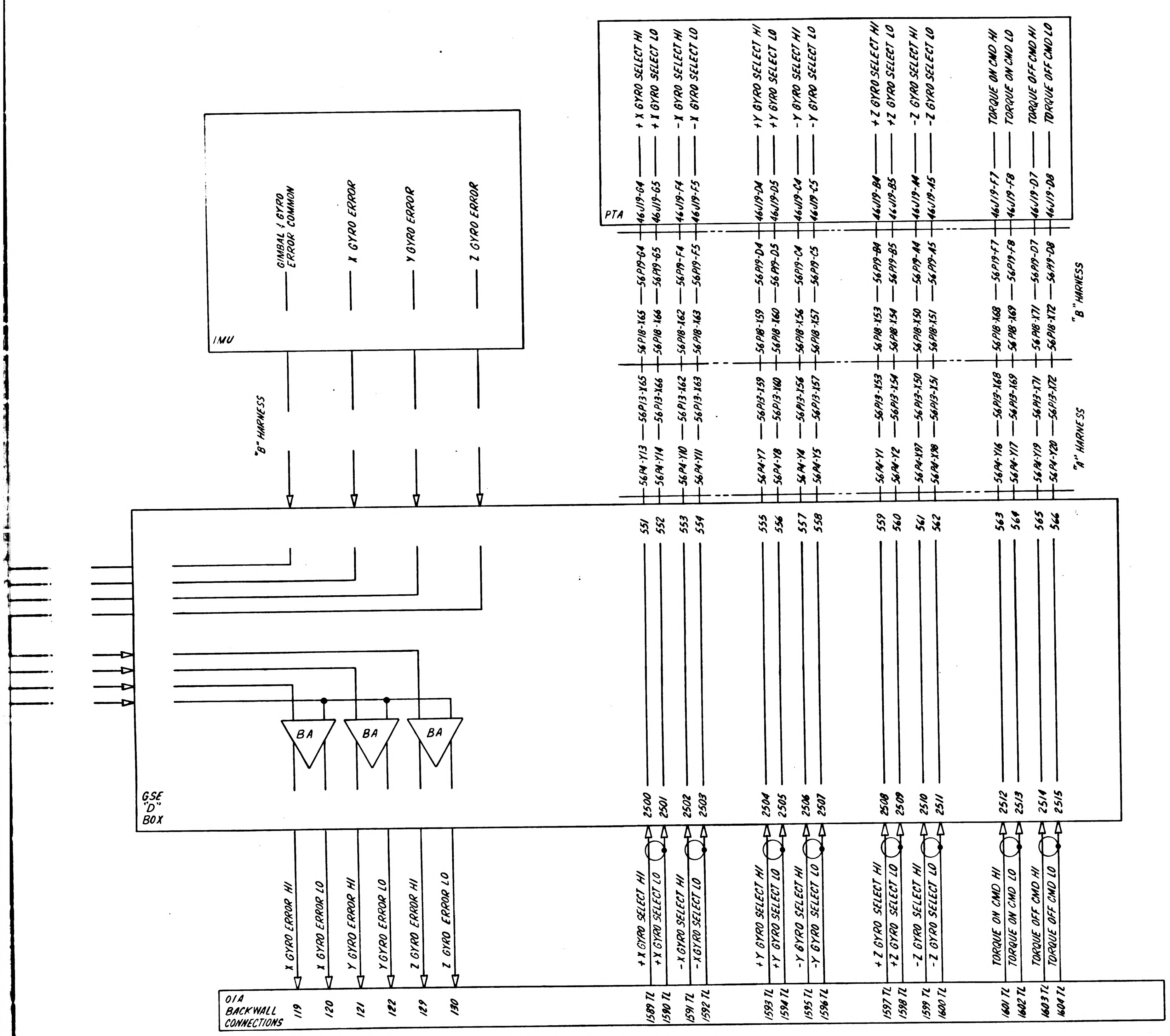
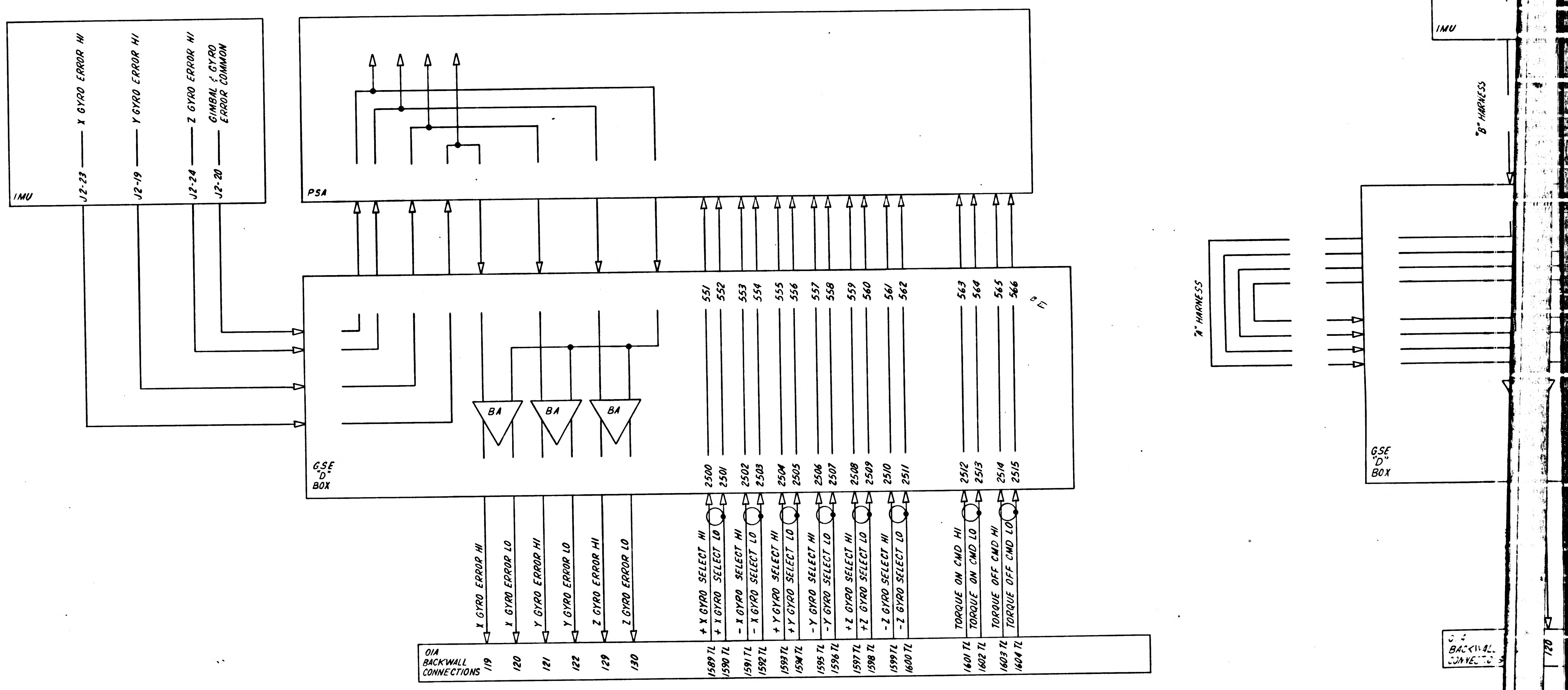


PTA
+X GYRO SELECT HI
+X GYRO SELECT LO
-X GYRO SELECT HI
-X GYRO SELECT LO
+Y GYRO SELECT HI
+Y GYRO SELECT LO
-Y GYRO SELECT HI
-Y GYRO SELECT LO
+Z GYRO SELECT HI
+Z GYRO SELECT LO
-Z GYRO SELECT HI
-Z GYRO SELECT LO
TORQUE ON CMD HI
TORQUE ON CMD LO
TORQUE OFF CMD HI
TORQUE OFF CMD LO
46J19-G4
46J19-G5
46J19-F4
46J19-F5
46J19-D4
46J19-D5
46J19-C4
46J19-C5
46J19-B4
46J19-B5
46J19-A4
46J19-A5
46J19-F7
46J19-F8
46J19-D7
46J19-D8
56P19-G4
56P19-G5
56P19-F4
56P19-F5
56P19-D4
56P19-D5
56P19-C4
56P19-C5
56P19-B4
56P19-B5
56P19-A4
56P19-A5
56P19-F7
56P19-F8
56P19-D7
56P19-D8
56P18-X65
56P18-X66
56P18-X62
56P18-X63
56P18-X59
56P18-X60
56P18-X56
56P18-X57
56P18-X53
56P18-X54
56P18-X50
56P18-X51
56P18-X68
56P18-X69
56P18-X71
56P18-X72
"B" HARNESS
56P13-X65
56P13-X66
56P13-X62
56P13-X63
56P13-X59
56P13-X60
56P13-X56
56P13-X57
56P13-X53
56P13-X54
56P13-X50
56P13-X51
56P13-X68
56P13-X69
56P13-X71
56P13-X72
56P4-Y13
56P4-Y14
56P4-Y10
56P4-Y11
56P4-Y7
56P4-Y8
56P4-Y4
56P4-Y5
56P4-Y1
56P4-Y2
56P4-X97
56P4-X98
56P4-Y16
56P4-Y17
56P4-Y19
56P4-Y20
"A" HARNESS
GIMBAL & GYRO ERROR COMMON
X GYRO ERROR
Y GYRO ERROR
Z GYRO ERROR
IMU
"B" HARNESS
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
BA
BA
BA
GSE "D" BOX
2500
2501
2502
2503
2504
2505
2506
2507
2508
2509
2510
2511
2512
2513
2514
2515
X GYRO ERROR HI
X GYRO ERROR LO
Y GYRO ERROR HI
Y GYRO ERROR LO
Z GYRO ERROR HI
Z GYRO ERROR LO
+X GYRO SELECT HI
+X GYRO SELECT LO
-X GYRO SELECT HI
-X GYRO SELECT LO
+Y GYRO SELECT HI
+Y GYRO SELECT LO
-Y GYRO SELECT HI
-Y GYRO SELECT LO
+Z GYRO SELECT HI
+Z GYRO SELECT LO
-Z GYRO SELECT HI
-Z GYRO SELECT LO
TORQUE ON CMD HI
TORQUE ON CMD LO
TORQUE OFF CMD HI
TORQUE OFF CMD LO
01A BACKWALL CONNECTIONS
119
120
121
122
129
130
1589 TL
1590 TL
1591 TL
1592 TL
1593 TL
1594 TL
1595 TL
1596 TL
1597 TL
1598 TL
1599 TL
1600 TL
1601 TL
1602 TL
1603 TL
1604 TL

LEM

2900200 A 2H

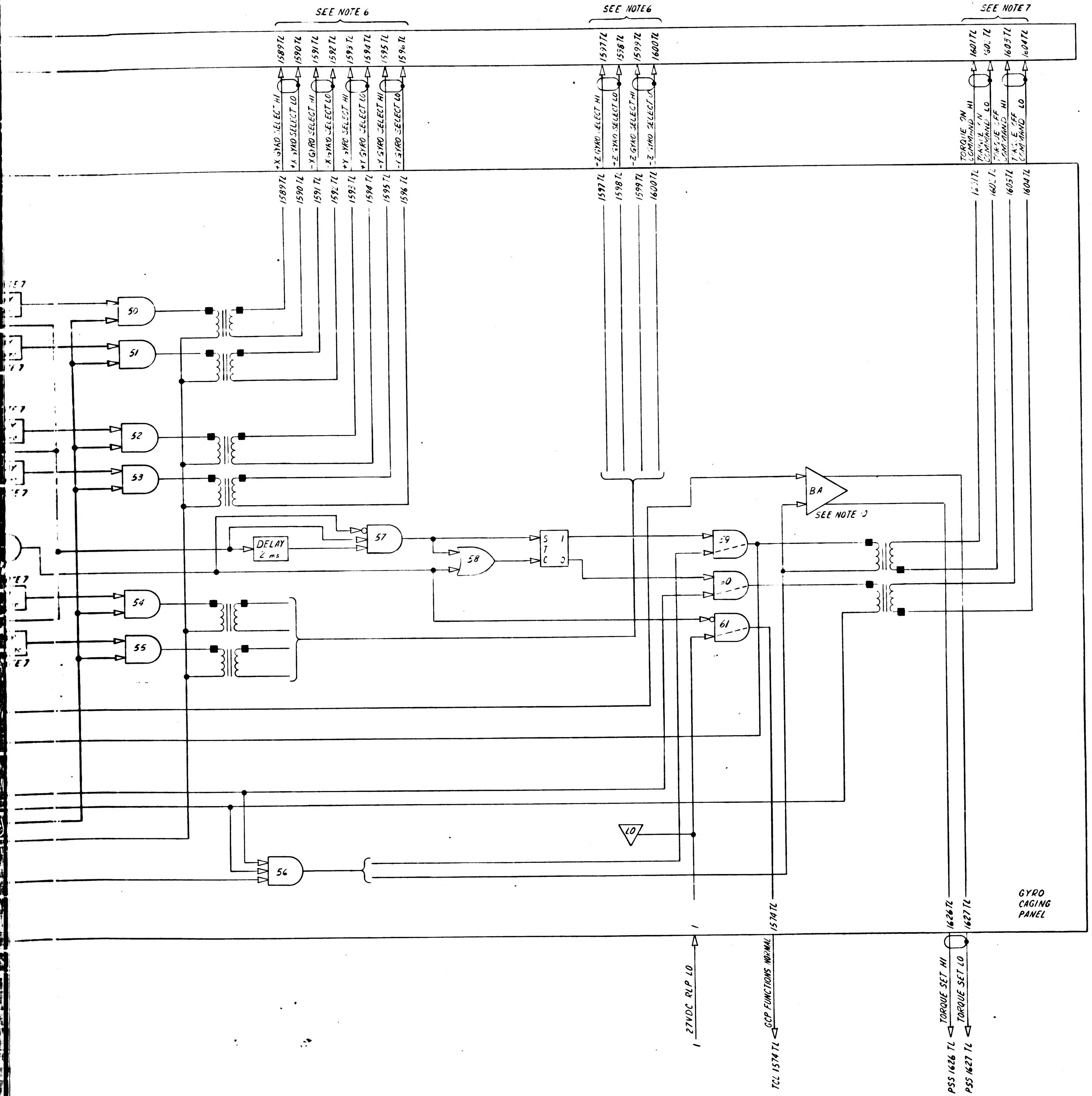
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS +— − DECIMALS +— − ANGLES +— −	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN J. Kilsinger DATE 11 MAY 65 CHECKED Foster 13 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM - GYRO CAGING PANEL (BLOCK II AND LEM)
DO NOT SCALE THIS DRAWING		
MATERIAL ———	NASA APPROVAL	CODE IDENT NO 99974 · SIZE J2 · 2900200
CONTRACT NAS 9-497	MIT APPROVAL	SCALE —— · SHEET 2 OF 2


IMU
J2-23 — X GYRO ERROR HI
J2-19 — Y GYRO ERROR HI
J2-24 — Z GYRO ERROR HI
J2-20 — GIMBAL & GYRO ERROR COMMON
PSA
GSE "D" BOX
BA
BA
BA
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
2500
2501
2502
2503
2504
2505
2506
2507
2508
2509
2510
2511
2512
2513
2514
2515
X GYRO ERROR HI
X GYRO ERROR LO
Y GYRO ERROR HI
Y GYRO ERROR LO
Z GYRO ERROR HI
Z GYRO ERROR LO
+ X GYRO SELECT HI
+ X GYRO SELECT LO
- X GYRO SELECT HI
- X GYRO SELECT LO
+ Y GYRO SELECT HI
+ Y GYRO SELECT LO
- Y GYRO SELECT HI
- Y GYRO SELECT LO
+ Z GYRO SELECT HI
+ Z GYRO SELECT LO
- Z GYRO SELECT HI
- Z GYRO SELECT LO
TORQUE ON CMD HI
TORQUE ON CMD LO
TORQUE OFF CMD HI
TORQUE OFF CMD LO
OIA BACKWALL CONNECTIONS
119
120
121
122
129
130
1589 TL
1590 TL
1591 TL
1592 TL
1593 TL
1594 TL
1595 TL
1596 TL
1597 TL
1598 TL
1599 TL
1600 TL
1601 TL
1602 TL
1603 TL
1604 TL
"A" HARNESS
"B" HARNESS
IMU
GIMBAL & GYRO
GSE "D" BOX
BACKWALL
120

BLOCK II

2900200 REV LTR A SH 2

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20587		13 JUL 65	KCP
B		REVISED PER TDRR 21895		65	



SEE NOTE 6
1589TL
1590TL
1591TL
1592TL
1593TL
1594TL
1595TL
1596TL
+X GYRO SELECT HI
+X GYRO SELECT LO
-X GYRO SELECT HI
-X GYRO SELECT LO
+Y GYRO SELECT HI
+Y GYRO SELECT LO
-Y GYRO SELECT HI
-Y GYRO SELECT LO
SEE NOTE 6
1597TL
1598TL
1599TL
1600TL
+Z GYRO SELECT HI
+Z GYRO SELECT LO
-Z GYRO SELECT HI
-Z GYRO SELECT LO
SEE NOTE 7
1601TL
1602TL
1603TL
1604TL
TORQUE ON COMMAND HI
TORQUE ON COMMAND LO
TORQUE OFF COMMAND HI
TORQUE OFF COMMAND LO
50
51
52
53
54
55
56
57
58
59
60
61
DELAY 2 ms
S
T
C
1
0
BA
SEE NOTE 10
LO
GYRO CAGING PANEL
1
1574TL
1626TL
1627TL
27VDC RLP LO
GCP FUNCTIONS NORMAL
TCL 1574TL
TORQUE SET HI
TORQUE SET LO
PSS 1626 TL
PSS 1627 TL

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —
DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN J. Kilvinger DATE 11 MAY 65
CHECKED Ed Foster 13 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

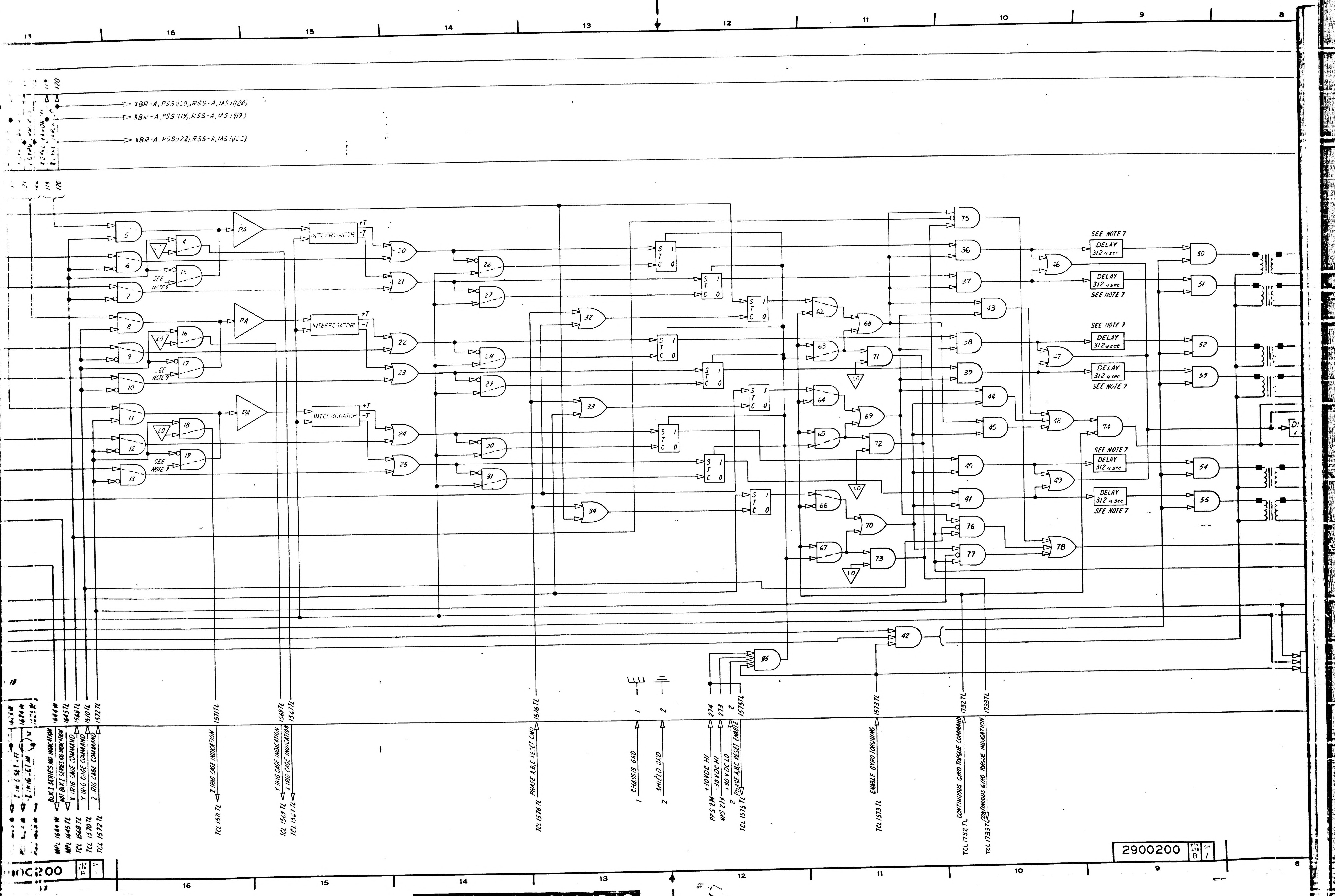
MECHANIZATION DIAGRAM -
GYRO CAGING PANEL
(BLOCK II AND LEM)

CODE IDENT NO. 99974
SIZE J3
2900200
SCALE —
SHEET 1 OF 2

4H

2900200 REV LTR B SH 1

3/2900200


17
16
15
14
13
12
11
10
9
8
119
120
XBR-A, PSS(120), RSS-A, MS(120)
XBR-A, PSS(119), RSS-A, MS(119)
XBR-A, PSS(122), RSS-A, MS(122)
PA
PA
PA
INTERROGATOR
INTERROGATOR
INTERROGATOR
+T
-T
LO
SEE NOTE 9
S
T
C
I
O
SEE NOTE 7
DELAY 312 μsec
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
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24
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66
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68
69
70
71
72
73
74
75
76
77
78
1623W
1624W
1644W
1645TL
1568TL
1570TL
1572TL
1571TL
1569TL
1567TL
1576TL
274
273
2
1575TL
1573TL
1732TL
1733TL
Z IRIG SET-EI
Z IRIG SET W
BLK I SERIES 100 INDICATION
NOT BLK I SERIES 100 INDICATION
X IRIG CAGE COMMAND
Y IRIG CAGE COMMAND
Z IRIG CAGE COMMAND
Z IRIG CAGE INDICATION
Y IRIG CAGE INDICATION
X IRIG CAGE INDICATION
PHASE A,B,C RESET CMD
CHASSIS GRD
SHIELD GRD
+30VDC HI
-30VDC HI
+30 V DC LO
PHASE A,B,C RESET ENABLE
ENABLE GYRO TORQUING
CONTINUOUS GYRO TORQUE COMMAND
CONTINUOUS GYRO TORQUE INDICATION
MPL 1644W
MPL 1645TL
TCL 1568TL
TCL 1570TL
TCL 1572TL
TCL 1571TL
TCL 1569TL
TCL 1567TL
TCL 1576TL
PPS 274
NPS 273
TCL 1575TL
TCL 1573TL
TCL 1732TL
TCL 1733TL
2900200
REV LTR B
SH 1

2/2900200

5800500

NOTES

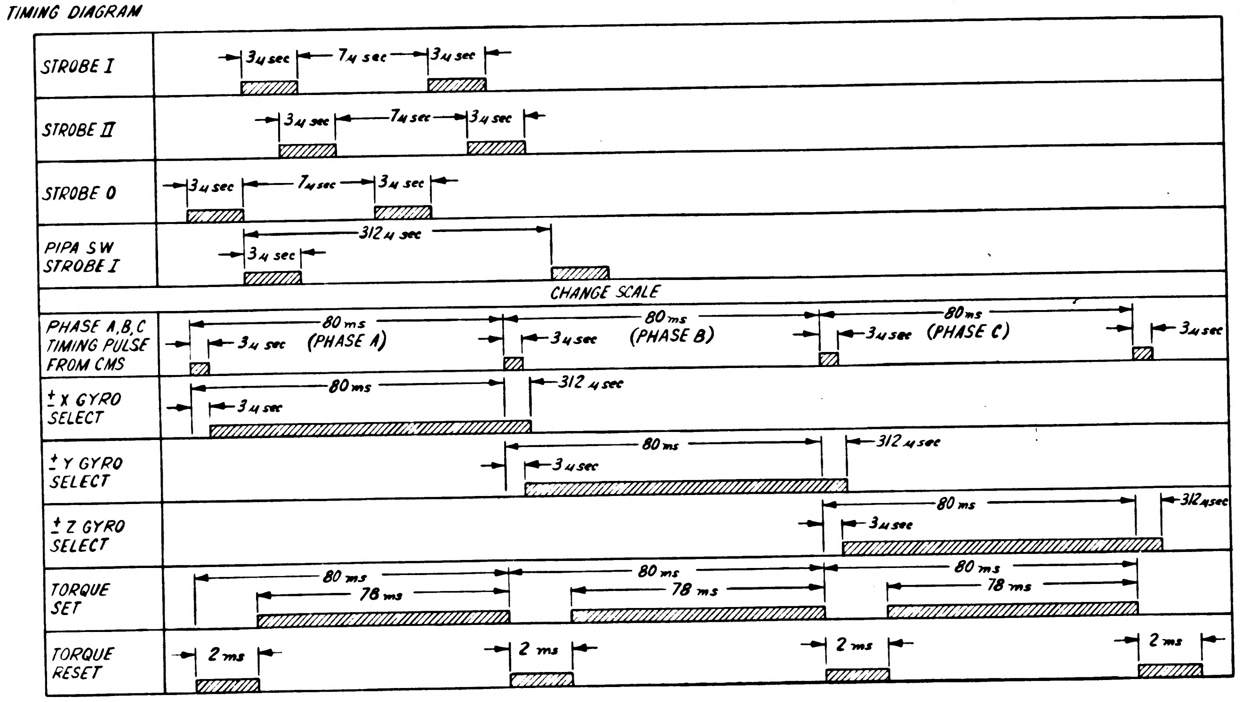
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS PER MIL-ST-806.
3. REFERENCE MECHANIZATION DIAGRAMS:

2900210	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR)
RLP	RELAY AND LAMP POWER SUPPLY
PPS	+30 VDC POWER SUPPLY
NPS	-30 VDC POWER SUPPLY
2900208	POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTION (BLOCK I, II & LEM) (PDL)
PSS	PRIMARY SIGNAL SELECTOR (PARTIAL)
2900207	MONITOR PANEL (MPL)
2900209	COMPUTER SIMULATOR INTERFACE (CMS)
2900201	TEST CONTROL PANEL (BLOCK II & LEM)(TCL)
2900217	SIGNAL SELECTION & MEASUREMENT
PSS	PRIMARY SIGNAL SELECTOR
XBR-A	CROSSBAR - AC SIGNAL
2900218	OSCILLOGRAPH SIGNAL SELECTION
RSS-A	TO FIXED AC CHANNEL
RSS-C	TO SWITCHABLE AC CHANNEL
2900219	COUNTER SIGNAL SELECTION
PSS	PRIMARY SIGNAL SELECTOR (PARTIAL)
2900213	GSE GROUNDING (BLOCK II & LEM)
2900212	PIP & IRIG MONITORING
MS I	PHASE SHIFT PANEL

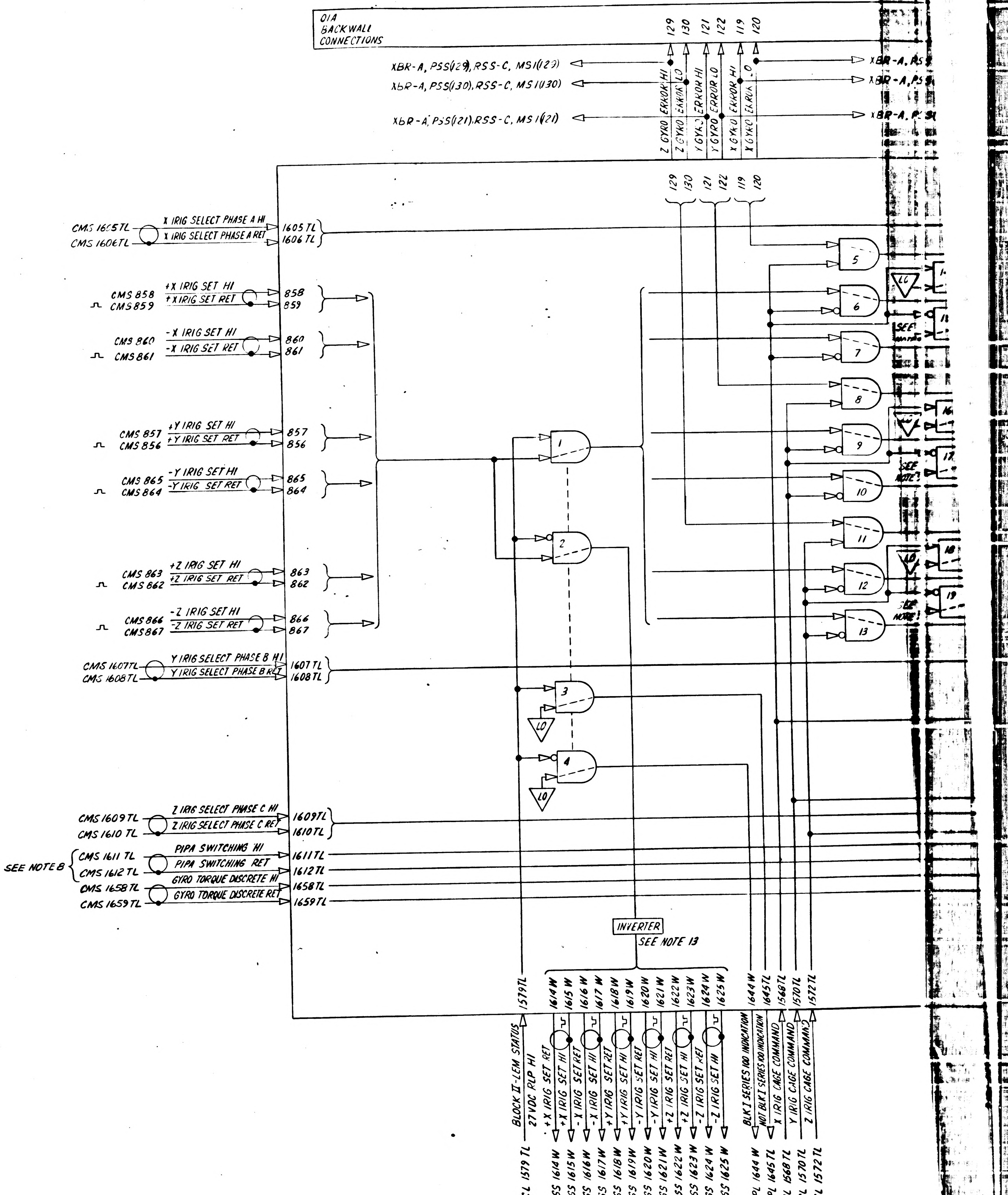
4. NONSTANDARD SYMBOLOGY

INDICATES "AND" GATE WITH SWITCHED SIGNAL

5. ALL INTERFACE NUMBERS SUFFIX BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G/N CONFIGURATIONS
   - E. TW, TL OR WL - USED IN MORE THAN ONE G/N CONFIGURATIONS AS SHOWN.
6. OUTPUT CHARACTERISTICS
   - Z_0 < 100 OHMS
   - PULSE AMPLITUDE - 5 TO 10 VOLTS
   - PULSE WIDTH - 3.5 ± 1 μsec
   - PULSE RISE TIME - < 1 μsec
   - LOAD - 100 K OHMS SHUNTED WITH 1500 pf
7. OUTPUT CHARACTERISTICS
   - Z_0 < 100 OHMS
   - PULSE AMPLITUDE - 5 TO 10 VOLTS
   - PULSE WIDTH - 3.5 ± 1 μsec
   - PULSE RISE TIME - < 1 μsec
   - LOAD - 2.2 K OHMS SHUNTED WITH 1500 pf
8. PIPA SWITCHING 3200 PPS SIGNAL LAGS GYRO ERROR SIGNAL BY 135°
9. X, Y, Z GYRO ERROR LOW, RESPECTIVELY
10. TORQUE SET BUFFER AMPLIFIER Z_0 < 2.0 K OHMS
11. TIMING DIAGRAM


STROBE I
3 μsec
7 μ sec
3 μ sec
STROBE II
3 μ sec
7 μ sec
3 μ sec
STROBE 0
3 μ sec
7 μ sec
3 μ sec
PIPA SW STROBE I
3 μ sec
312 μ sec
CHANGE SCALE
PHASE A, B, C TIMING PULSE FROM CMS
80 ms
3 μ sec
(PHASE A)
80 ms
(PHASE B)
3 μ sec
3 μ sec
(PHASE C)
80 ms
3 μ sec
± X GYRO SELECT
80 ms
3 μ sec
312 μ sec
± Y GYRO SELECT
80 ms
3 μ sec
312 μ sec
± Z GYRO SELECT
80 ms
3 μ sec
312 μ sec
TORQUE SET
80 ms
78 ms
80 ms
78 ms
80 ms
78 ms
TORQUE RESET
2 ms
2 ms
2 ms
2 ms

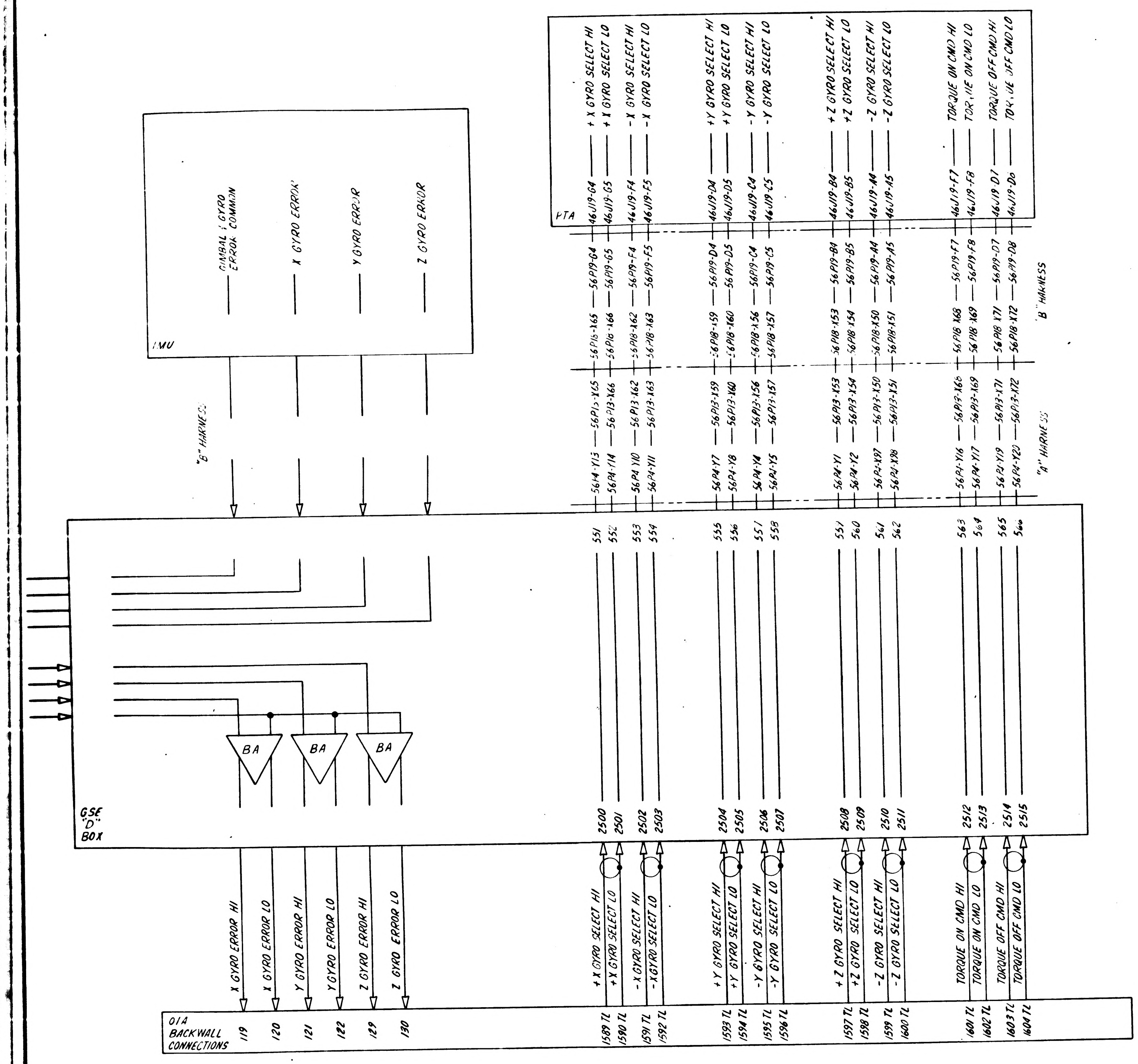
12. 312 μsec TIME DELAY ONLY IN CIRCUIT AT CUT-OFF TIME.
13. HIGH AND RETURN INVERTED TO CHANGE POSITIVE INPUT PULSES TO NEGATIVE OUTPUT PULSES.


OIA BACKWALL CONNECTIONS
129 130 121 122 119 120
Z GYRO ERROR HI
Z GYRO ERROR LO
Y GYRO ERROR HI
Y GYRO ERROR LO
X GYRO ERROR HI
X GYRO ERROR LO
XBR-A, PSS(129), RSS-C, MS1(129)
XBR-A, PSS(130), RSS-C, MS1(130)
XBR-A, PSS(121), RSS-C, MS1(121)
CMS 1605TL
CMS 1606TL
X IRIG SELECT PHASE A HI
X IRIG SELECT PHASE A RET
1605TL
1606TL
CMS 858
CMS 859
+X IRIG SET HI
+X IRIG SET RET
858
859
CMS 860
CMS 861
-X IRIG SET HI
-X IRIG SET RET
860
861
CMS 857
CMS 856
+Y IRIG SET HI
+Y IRIG SET RET
857
856
CMS 865
CMS 864
-Y IRIG SET HI
-Y IRIG SET RET
865
864
CMS 863
CMS 862
+Z IRIG SET HI
+Z IRIG SET RET
863
862
CMS 866
CMS 867
-Z IRIG SET HI
-Z IRIG SET RET
866
867
CMS 1607TL
CMS 1608TL
Y IRIG SELECT PHASE B HI
Y IRIG SELECT PHASE B RET
1607TL
1608TL
CMS 1609TL
CMS 1610TL
Z IRIG SELECT PHASE C HI
Z IRIG SELECT PHASE C RET
1609TL
1610TL
SEE NOTE 8
CMS 1611TL
CMS 1612TL
CMS 1658TL
CMS 1659TL
PIPA SWITCHING HI
PIPA SWITCHING RET
GYRO TORQUE DISCRETE HI
GYRO TORQUE DISCRETE RET
1611TL
1612TL
1658TL
1659TL
1 2 3 4 5 6 7 8 9 10 11 12 13
LO
SEE NOTE
INVERTER
SEE NOTE 13
1579TL
1614W 1615W 1616W 1617W 1618W 1619W 1620W 1621W 1622W 1623W 1624W 1625W
1644W 1645TL 1568TL 1570TL 1572TL
BLOCK II-LEM STATUS
27VDC RLP HI
+X IRIG SET RET
+X IRIG SET HI
-X IRIG SET RET
-X IRIG SET HI
+Y IRIG SET RET
+Y IRIG SET HI
-Y IRIG SET RET
-Y IRIG SET HI
+Z IRIG SET RET
+Z IRIG SET HI
-Z IRIG SET RET
-Z IRIG SET HI
BLK I SERIES 100 INDICATION
NOT BLK I SERIES 100 INDICATION
X IRIG CAGE COMMAND
Y IRIG CAGE COMMAND
Z IRIG CAGE COMMAND
TCL 1579 TL
PSS 1614W
PSS 1615W
PSS 1616W
PSS 1617W
PSS 1618W
PSS 1619W
PSS 1620W
PSS 1621W
PSS 1622W
PSS 1623W
PSS 1624W
PSS 1625W
MPL 1644W
MPL 1645TL
TCL 1568TL
TCL 1570TL
TCL 1572TL

2900200	REV LTR R	SH 1

1/2900200

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20587		13 JUL 65	KLP
B		REVISION STATUS CHANGED		2 SEP 65	MGP


PTA
+X GYRO SELECT HI
+X GYRO SELECT LO
-X GYRO SELECT HI
-X GYRO SELECT LO
+Y GYRO SELECT HI
+Y GYRO SELECT LO
-Y GYRO SELECT HI
-Y GYRO SELECT LO
+Z GYRO SELECT HI
+Z GYRO SELECT LO
-Z GYRO SELECT HI
-Z GYRO SELECT LO
TORQUE ON CMD HI
TORQUE ON CMD LO
TORQUE OFF CMD HI
TORQUE OFF CMD LO
46J19-G4
46J19-G5
46J19-F4
46J19-F5
46J19-D4
46J19-D5
46J19-C4
46J19-C5
46J19-B4
46J19-B5
46J19-A4
46J19-A5
46J19-F7
46J19-F8
46J19-D7
46J19-D8
56P19-G4
56P19-G5
56P19-F4
56P19-F5
56P19-D4
56P19-D5
56P19-C4
56P19-C5
56P19-B4
56P19-B5
56P19-A4
56P19-A5
56P19-F7
56P19-F8
56P19-D7
56P19-D8
56P18-X65
56P18-X66
56P18-X62
56P18-X63
56P18-X59
56P18-X60
56P18-X56
56P18-X57
56P18-X53
56P18-X54
56P18-X50
56P18-X51
56P18-X68
56P18-X69
56P18-X71
56P18-X72
"B" HARNESS
56P13-X65
56P13-X66
56P13-X62
56P13-X63
56P13-X59
56P13-X60
56P13-X56
56P13-X57
56P13-X53
56P13-X54
56P13-X50
56P13-X51
56P13-X68
56P13-X69
56P13-X71
56P13-X72
56P4-Y13
56P4-Y14
56P4-Y10
56P4-Y11
56P4-Y7
56P4-Y8
56P4-Y4
56P4-Y5
56P4-Y1
56P4-Y2
56P4-X97
56P4-X98
56P4-Y16
56P4-Y17
56P4-Y19
56P4-Y20
"A" HARNESS
IMU
GIMBAL & GYRO ERROR COMMON
X GYRO ERROR
Y GYRO ERROR
Z GYRO ERROR
"B" HARNESS
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
BA
BA
BA
GSE "D" BOX
2500
2501
2502
2503
2504
2505
2506
2507
2508
2509
2510
2511
2512
2513
2514
2515
X GYRO ERROR HI
X GYRO ERROR LO
Y GYRO ERROR HI
Y GYRO ERROR LO
Z GYRO ERROR HI
Z GYRO ERROR LO
+X GYRO SELECT HI
+X GYRO SELECT LO
-X GYRO SELECT HI
-X GYRO SELECT LO
+Y GYRO SELECT HI
+Y GYRO SELECT LO
-Y GYRO SELECT HI
-Y GYRO SELECT LO
+Z GYRO SELECT HI
+Z GYRO SELECT LO
-Z GYRO SELECT HI
-Z GYRO SELECT LO
TORQUE ON CMD HI
TORQUE ON CMD LO
TORQUE OFF CMD HI
TORQUE OFF CMD LO
OIA BACKWALL CONNECTIONS
119
120
121
122
129
130
1589 TL
1590 TL
1591 TL
1592 TL
1593 TL
1594 TL
1595 TL
1596 TL
1597 TL
1598 TL
1599 TL
1600 TL
1601 TL
1602 TL
1603 TL
1604 TL

LEM

2900200 B 2H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

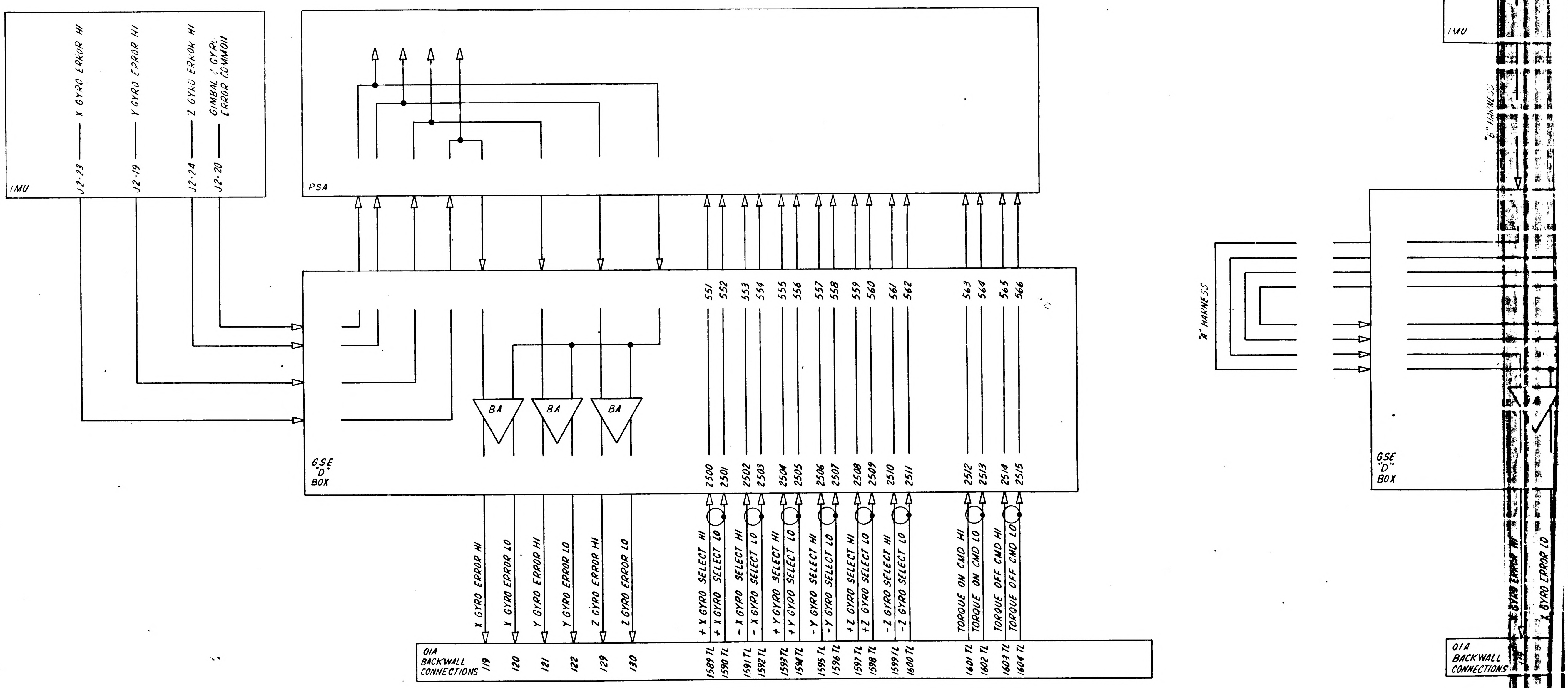
AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN J. Kilvinger DATE 11 MAY 65
CHECKED 13M
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
GYRO CAGING PANEL
(BLOCK II AND LEM)

CODE IDENT NO 99974
SIZE J_2
2900200
SCALE
SHEET 2 OF 2

S00500

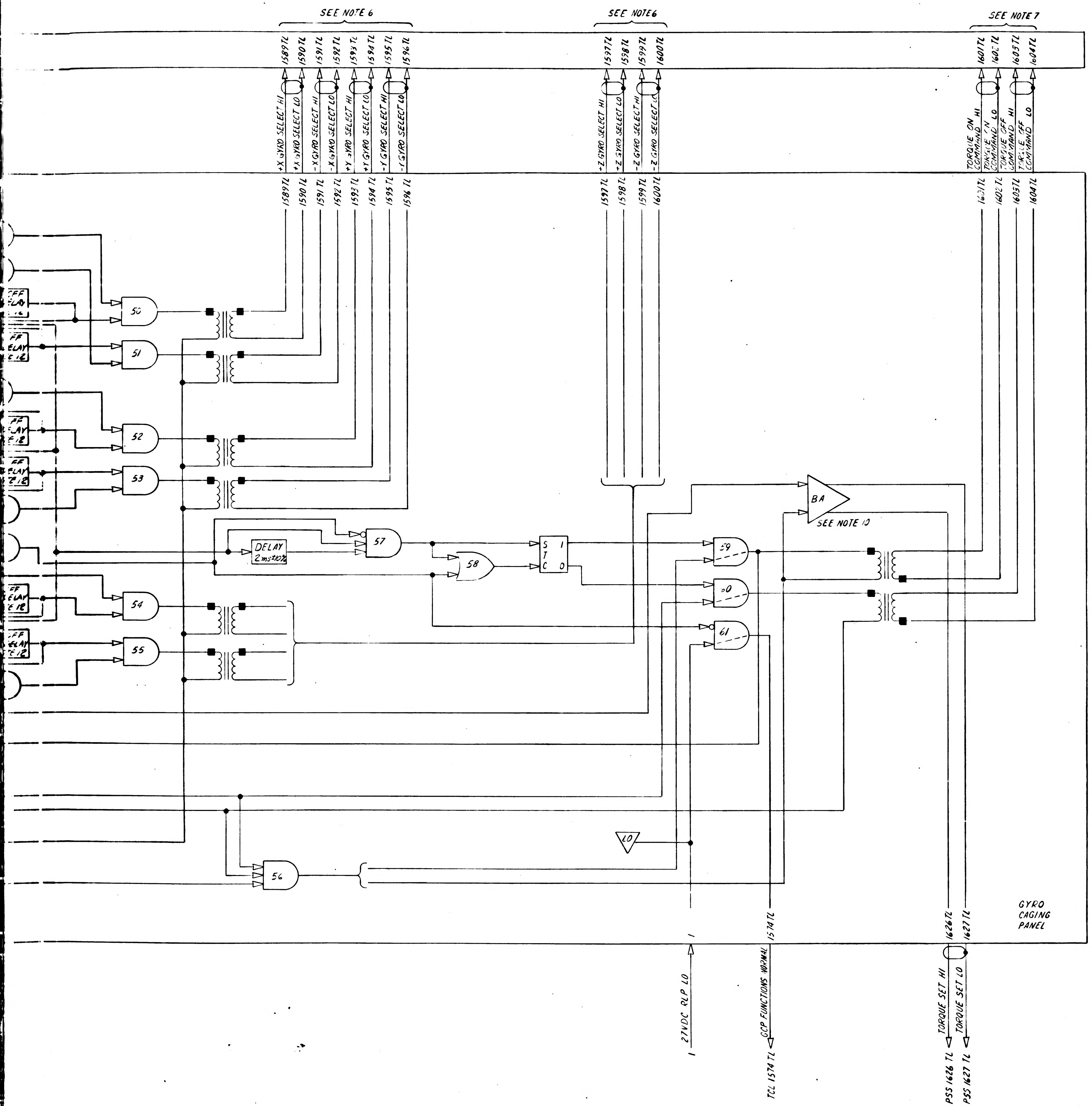

IMU
X GYRO ERROR HI
Y GYRO ERROR HI
Z GYRO ERROR HI
GIMBAL & GYRO ERROR COMMON
J2-23
J2-19
J2-24
J2-20
PSA
GSE "D" BOX
BA
BA
BA
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
2500
2501
2502
2503
2504
2505
2506
2507
2508
2509
2510
2511
2512
2513
2514
2515
X GYRO ERROR HI
X GYRO ERROR LO
Y GYRO ERROR HI
Y GYRO ERROR LO
Z GYRO ERROR HI
Z GYRO ERROR LO
+ X GYRO SELECT HI
+ X GYRO SELECT LO
- X GYRO SELECT HI
- X GYRO SELECT LO
+ Y GYRO SELECT HI
+ Y GYRO SELECT LO
- Y GYRO SELECT HI
- Y GYRO SELECT LO
+ Z GYRO SELECT HI
+ Z GYRO SELECT LO
- Z GYRO SELECT HI
- Z GYRO SELECT LO
TORQUE ON CMD HI
TORQUE ON CMD LO
TORQUE OFF CMD HI
TORQUE OFF CMD LO
OIA BACKWALL CONNECTIONS
119
120
121
122
129
130
1589 TL
1590 TL
1591 TL
1592 TL
1593 TL
1594 TL
1595 TL
1596 TL
1597 TL
1598 TL
1599 TL
1600 TL
1601 TL
1602 TL
1603 TL
1604 TL
IMU
GIMBAL & GYRO
"C" HARNESS
"A" HARNESS
GSE "D" BOX
OIA BACKWALL CONNECTIONS
X GYRO ERROR HI
X GYRO ERROR LO

BLOCK II

2900200	REV LTR B	SH 2

1/2900200

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20587		13 JUL 65	
B		REVISED PER TDRR 21895		65	
C		REVISED PER TDRR 21896		8 SEP 65	MCR AU


SEE NOTE 6
1589TL
1590TL
1591TL
1592TL
1593TL
1594TL
1595TL
1596TL
+X GYRO SELECT HI
+X GYRO SELECT LO
-X GYRO SELECT HI
-X GYRO SELECT LO
+Y GYRO SELECT HI
+Y GYRO SELECT LO
-Y GYRO SELECT HI
-Y GYRO SELECT LO
SEE NOTE 6
1597TL
1598TL
1599TL
1600TL
+Z GYRO SELECT HI
+Z GYRO SELECT LO
-Z GYRO SELECT HI
-Z GYRO SELECT LO
SEE NOTE 7
1601TL
1602TL
1603TL
1604TL
TORQUE ON COMMAND HI
TORQUE ON COMMAND LO
TORQUE OFF COMMAND HI
TORQUE OFF COMMAND LO
OFF DELAY
50
51
52
53
54
55
56
57
58
59
60
61
DELAY 2ms±10%
S T C
1 0
BA
SEE NOTE 10
LO
GYRO CAGING PANEL
1
1574TL
1626TL
1627TL
27VDC RLP LO
GCP FUNCTIONS NORMAL
TORQUE SET HI
TORQUE SET LO
TCL 1574 TL
PSS 1626 TL
PSS 1627 TL

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

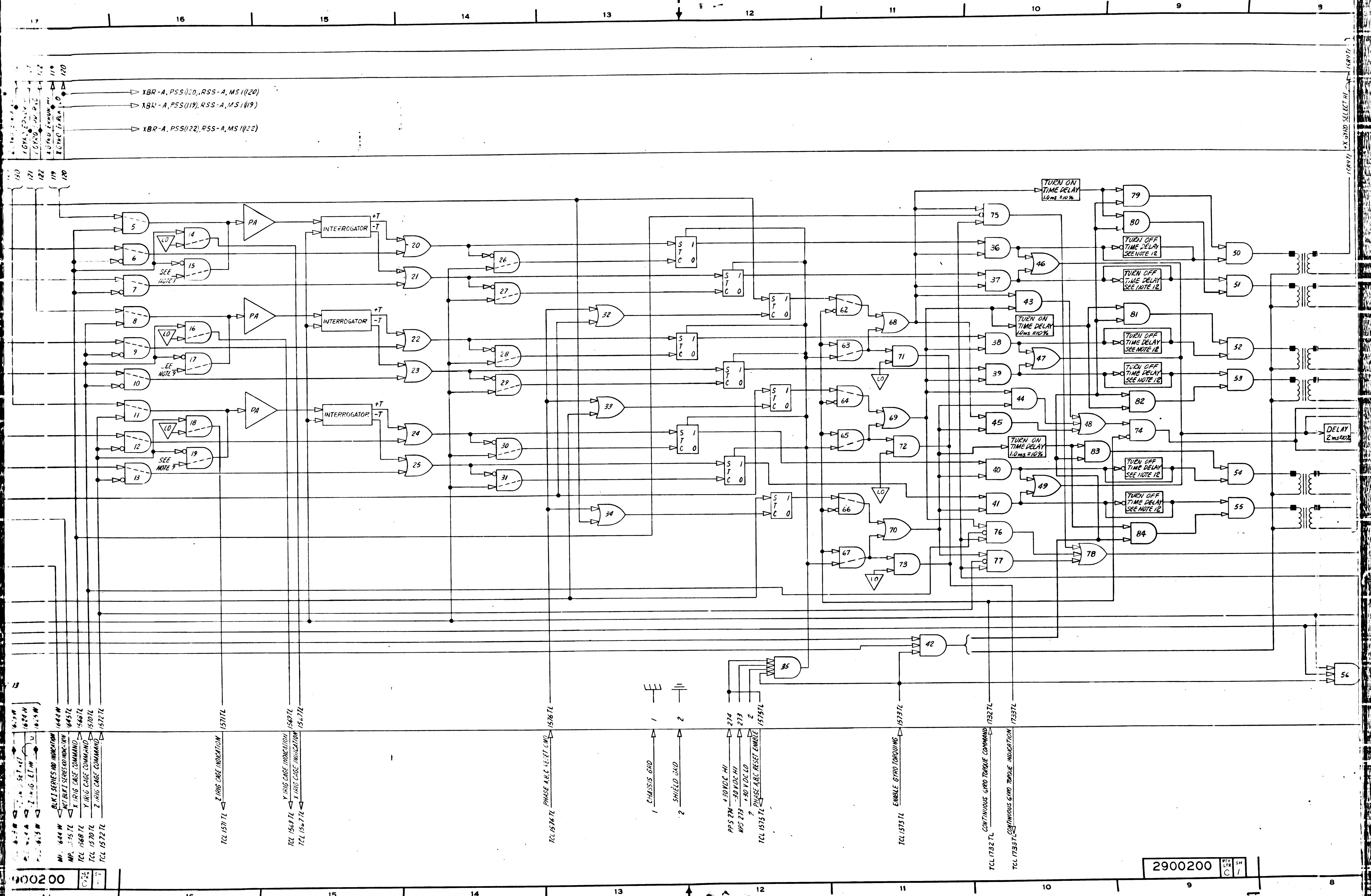
AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN J. Kilvinger DATE 11 MAY 65
CHECKED 13 MAY
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM -
GYRO CAGING PANEL
(BLOCK II AND LEM)

CODE IDENT NO 99974
SIZE J3
2900200
SCALE —
SHEET 1 OF 2

2900200 REV LTR C SH 1


17
16
15
14
13
12
11
10
9
8
119
120
XBR-A, PSS(120), RSS-A, MS1(120)
XBR-A, PSS(119), RSS-A, MS1(119)
XBR-A, PSS(122), RSS-A, MS1(122)
Y GYRO
Z GYRO
X GYRO ERROR HI
X GYRO ERROR LO
130
121
122
119
120
PA
PA
PA
INTERROGATOR
INTERROGATOR
INTERROGATOR
+T
-T
LO
SEE NOTE 9
S
T
C
I
O
TURN ON TIME DELAY 1.0ms ±10%
TURN OFF TIME DELAY SEE NOTE 12
DELAY 2ms ±10%
+X GYRO SELECT HI
1589TL
13
1629W
1624W
1625W
Z IRIG SET HI
Z IRIG SET LO
1644W
1645TL
1568TL
1570TL
1572TL
BLK I SERIES 100 INDICATION
NOT BLK I SERIES 100 INDICATION
X IRIG CAGE COMMAND
Y IRIG CAGE COMMAND
Z IRIG CAGE COMMAND
MP. 1644W
MP. 1645TL
TCL 1568TL
TCL 1570TL
TCL 1572TL
1571TL
Z IRIG CAGE INDICATION
TCL 1571TL
1569TL
1567TL
Y IRIG CAGE INDICATION
X IRIG CAGE INDICATION
TCL 1569TL
TCL 1567TL
1576TL
PHASE A,B,C RESET CMD
TCL 1576TL
1
2
CHASSIS GRD
SHIELD GRD
1
2
274
273
2
1575TL
+30VDC HI
-30VDC HI
+30VDC LO
PHASE A,B,C RESET ENABLE
PPS 274
NPS 273
2
TCL 1575TL
1573TL
ENABLE GYRO TORQUING
TCL 1573TL
1732TL
1733TL
CONTINUOUS GYRO TORQUE COMMAND
CONTINUOUS GYRO TORQUE INDICATION
TCL 1732TL
TCL 1733TL
900200
REV LTR C
SH 1
2900200
REV LTR C
SH 1

2/2900200

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS PER MIL-ST-806.

3. REFERENCE MECHANIZATION DIAGRAMS:
   - 2900210 AC POWER POTECTION PANEL & POWER DISTRIBUTION (FTR)
   - RLP RELAY AND LAMP POWER SUPPLY
   - PPS +30 VDC POWER SUPPLY
   - NPS -30 VDC POWER SUPPLY
   - 2900208 POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTION (BLOCK I, II & LEM) (PDL)
   - PSS PRIMARY SIGNAL SELECTOR (PARTIAL)
   - 2900207 MONITOR PANEL (MPL)
   - 2900209 COMPUTER SIMULATOR INTERFACE (CMS)
   - 2900201 TEST CONTROL PANEL (BLOCK II & LEM)(TCL)
   - 2900217 SIGNAL SELECTION & MEASUREMENT
   - PSS PRIMARY SIGNAL SELECTOR
   - XBR-A CROSSBAR - AC SIGNAL
   - 2900218 OSCILLOGRAPH SIGNAL SELECTION
   - RSS-A TO FIXED AC CHANNEL
   - RSS-C TO SWITCHABLE AC CHANNEL
   - 2900219 COUNTER SIGNAL SELECTION
   - PSS PRIMARY SIGNAL SELECTOR (PARTIAL)
   - 2900213 GSE GROUNDING (BLOCK II & LEM)
   - 2900212 PIP & IRIG MONITORING
   - MS 1 PHASE SHIFT PANEL

4. NONSTANDARD SYMBOLOGY

   INDICATES "AND" GATE WITH SWITCHED SIGNAL

5. ALL INTERFACE NUMBERS SUFFIX BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G/N CONFIGURATIONS
   - E. TW, TL OR WL - USED IN MORE THAN ONE G/N CONFIGURATIONS AS SHOWN.

6. OUTPUT CHARACTERISTICS
   - Z_o < 100 OHMS
   - PULSE AMPLITUDE - 5 TO 10 VOLTS
   - PULSE WIDTH - 3.5 ± 1 μsec
   - PULSE RISE TIME - < 1 μsec
   - LOAD - 100 K OHMS SHUNTED WITH 1500 pf

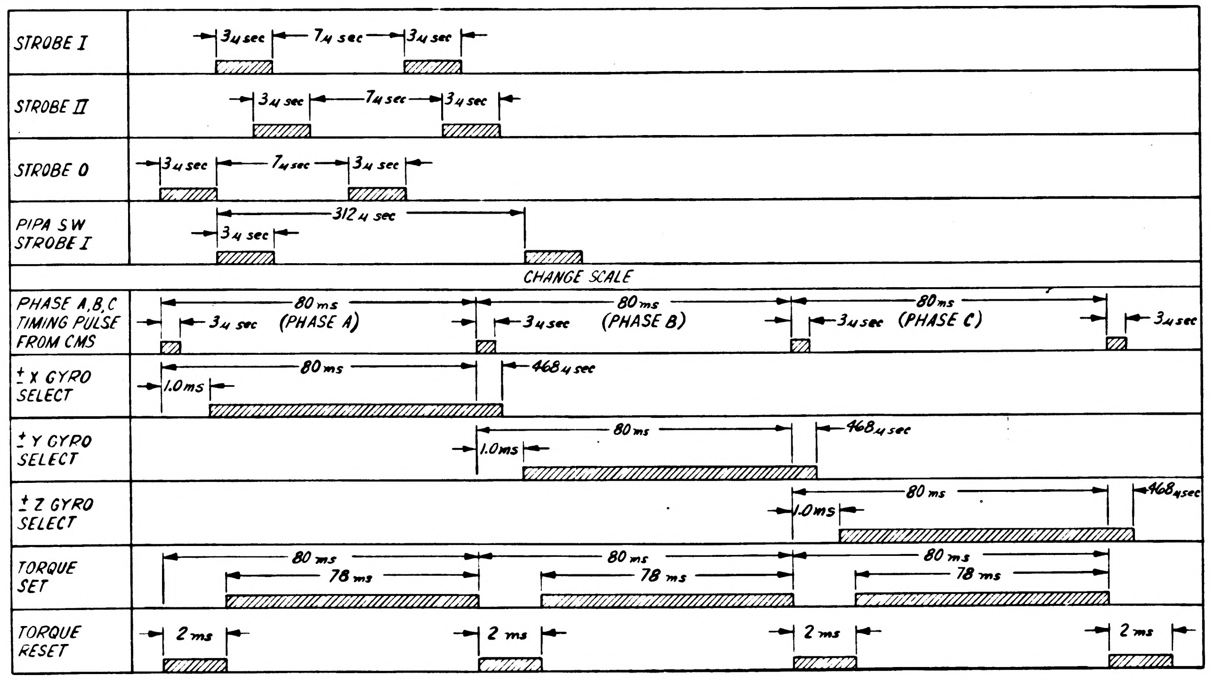
7. OUTPUT CHARACTERISTICS
   - Z_o < 100 OHMS
   - PULSE AMPLITUDE - 5 TO 10 VOLTS
   - PULSE WIDTH - 3.5 ± 1 μsec
   - PULSE RISE TIME - < 1 μsec
   - LOAD - 2.2 K OHMS SHUNTED WITH 1500 pf

8. PIPA SWITCHING 3200 PPS SIGNAL LAGS GYRO ERROR SIGNAL BY 135°

9. X, Y, Z GYRO ERROR LOW, RESPECTIVELY

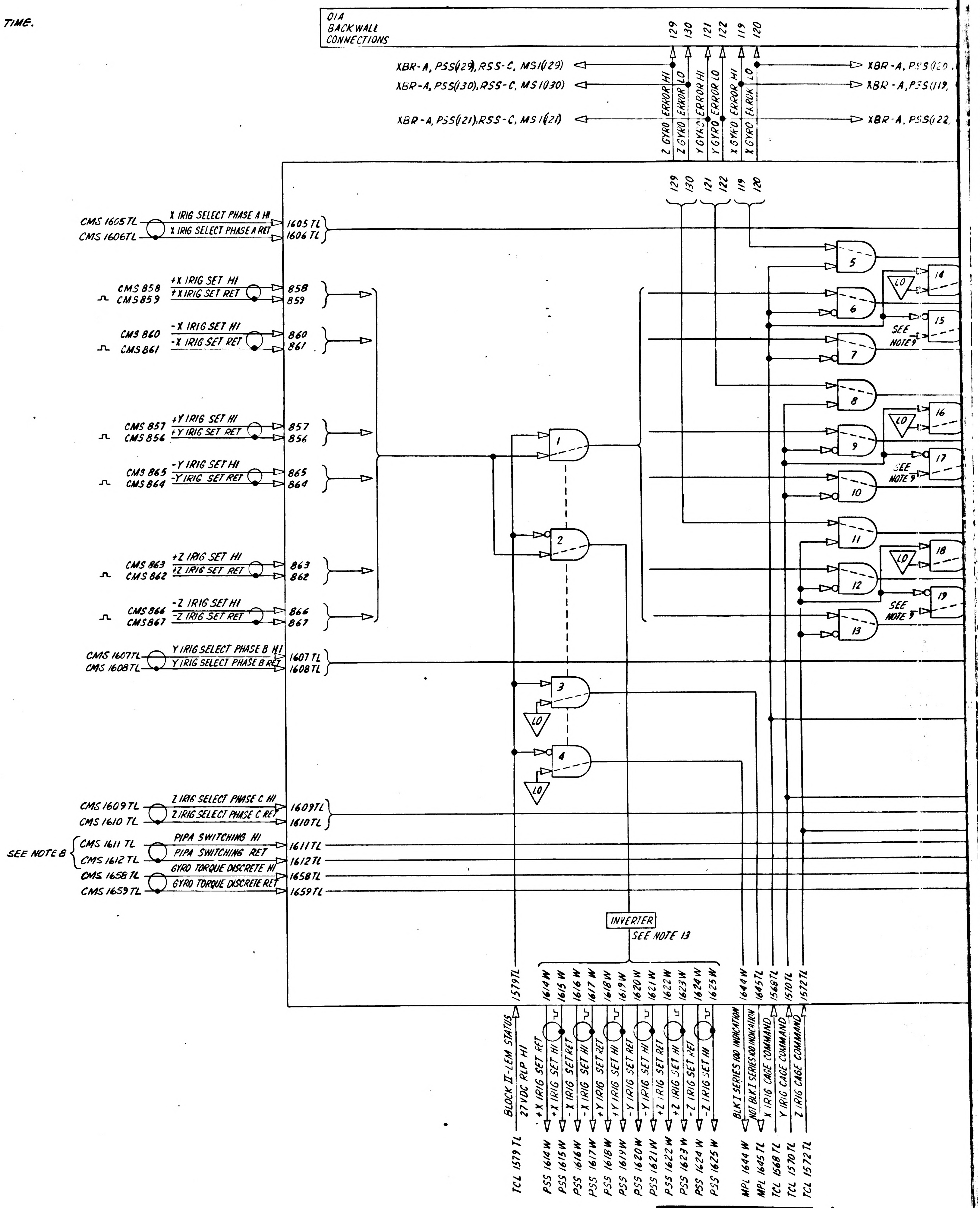
10. TORQUE SET BUFFER AMPLIFIER Z_o < 2.0 K OHMS

11. TIMING DIAGRAM



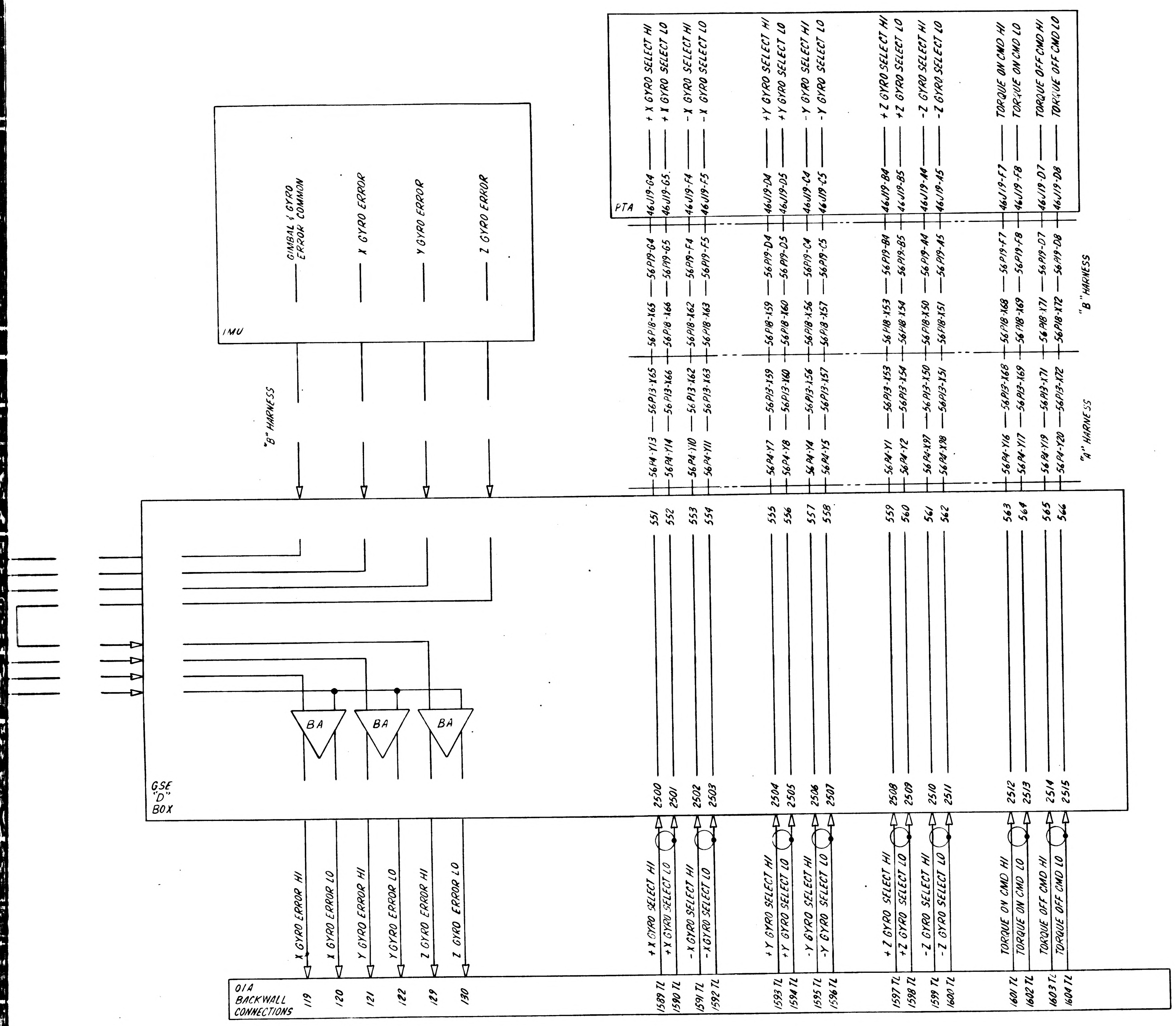
12. 468 μsec ± 156 μsec TIME DELAY ONLY IN CIRCUIT AT CUT-OFF TIME.

13. HIGH AND RETURN INVERTED TO CHANGE POSITIVE INPUT PULSES TO NEGATIVE OUTPUT PULSES.


01A BACKWALL CONNECTIONS
129
130
121
122
119
120
XBR-A, PSS(129), RSS-C, MS1(129)
XBR-A, PSS(130), RSS-C, MS1(130)
XBR-A, PSS(121), RSS-C, MS1(21)
XBR-A, PSS(120
XBR-A, PSS(119,
XBR-A, PSS(122,
Z GYRO ERROR HI
Z GYRO ERROR LO
Y GYRO ERROR HI
Y GYRO ERROR LO
X GYRO ERROR HI
X GYRO ERROR LO
CMS 1605TL
CMS 1606TL
X IRIG SELECT PHASE A HI
X IRIG SELECT PHASE A RET
1605TL
1606TL
CMS 858
CMS 859
+X IRIG SET HI
+X IRIG SET RET
858
859
CMS 860
CMS 861
-X IRIG SET HI
-X IRIG SET RET
860
861
CMS 857
CMS 856
+Y IRIG SET HI
+Y IRIG SET RET
857
856
CMS 865
CMS 864
-Y IRIG SET HI
-Y IRIG SET RET
865
864
CMS 863
CMS 862
+Z IRIG SET HI
+Z IRIG SET RET
863
862
CMS 866
CMS 867
-Z IRIG SET HI
-Z IRIG SET RET
866
867
CMS 1607TL
CMS 1608TL
Y IRIG SELECT PHASE B HI
Y IRIG SELECT PHASE B RET
1607TL
1608TL
CMS 1609TL
CMS 1610TL
Z IRIG SELECT PHASE C HI
Z IRIG SELECT PHASE C RET
1609TL
1610TL
SEE NOTE 8
CMS 1611TL
CMS 1612TL
PIPA SWITCHING HI
PIPA SWITCHING RET
1611TL
1612TL
CMS 1658TL
CMS 1659TL
GYRO TORQUE DISCRETE HI
GYRO TORQUE DISCRETE RET
1658TL
1659TL
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
LO
SEE NOTE 9
INVERTER
SEE NOTE 13
1579TL
1614W
1615W
1616W
1617W
1618W
1619W
1620W
1621W
1622W
1623W
1624W
1625W
1644W
1645TL
1568TL
1570TL
1572TL
BLOCK II-LEM STATUS
27VDC RLP HI
+X IRIG SET RET
+X IRIG SET HI
-X IRIG SET RET
-X IRIG SET HI
+Y IRIG SET RET
+Y IRIG SET HI
-Y IRIG SET RET
-Y IRIG SET HI
+Z IRIG SET RET
+Z IRIG SET HI
-Z IRIG SET RET
-Z IRIG SET HI
BLK I SERIES 100 INDICATION
NOT BLK I SERIES 100 INDICATION
X IRIG CAGE COMMAND
Y IRIG CAGE COMMAND
Z IRIG CAGE COMMAND
TCL 1579TL
PSS 1614W
PSS 1615W
PSS 1616W
PSS 1617W
PSS 1618W
PSS 1619W
PSS 1620W
PSS 1621W
PSS 1622W
PSS 1623W
PSS 1624W
PSS 1625W
MPL 1644W
MPL 1645TL
TCL 1568TL
TCL 1570TL
TCL 1572TL

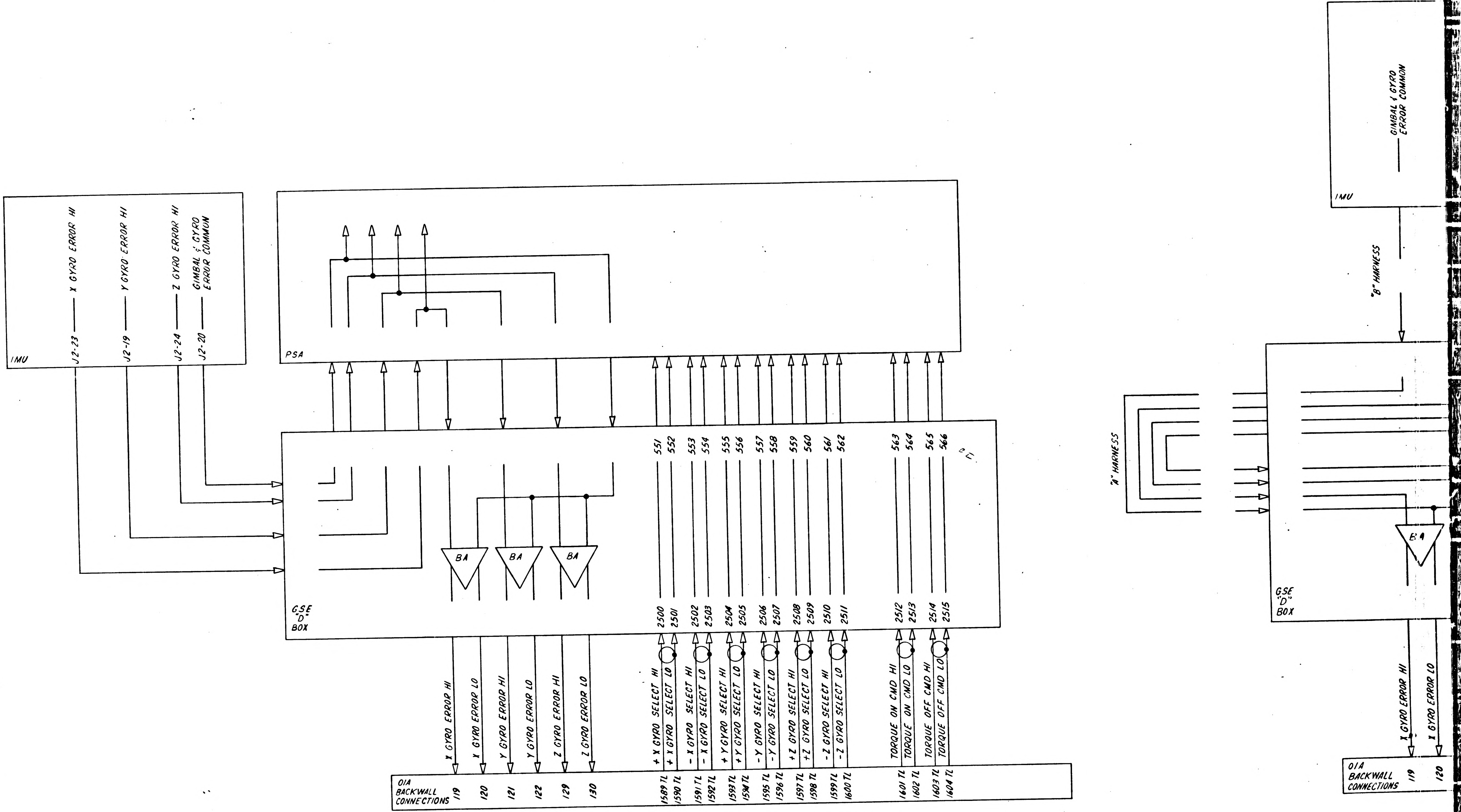
2900200	REV LTR C	SH 1

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20587		13 JUL 65	KLP
B		REVISION STATUS CHANGED		2 SEP 65	
C		REVISION STATUS CHANGED		8 SEP 65	UCR AU


PTA
46J19-G4 — +X GYRO SELECT HI
46J19-G5 — +X GYRO SELECT LO
46J19-F4 — -X GYRO SELECT HI
46J19-F5 — -X GYRO SELECT LO
46J19-D4 — +Y GYRO SELECT HI
46J19-D5 — +Y GYRO SELECT LO
46J19-C4 — -Y GYRO SELECT HI
46J19-C5 — -Y GYRO SELECT LO
46J19-B4 — +Z GYRO SELECT HI
46J19-B5 — +Z GYRO SELECT LO
46J19-A4 — -Z GYRO SELECT HI
46J19-A5 — -Z GYRO SELECT LO
46J19-F7 — TORQUE ON CMD HI
46J19-F8 — TORQUE ON CMD LO
46J19-D7 — TORQUE OFF CMD HI
46J19-D8 — TORQUE OFF CMD LO
56P18-X65 — 56P19-G4
56P18-X66 — 56P19-G5
56P18-X62 — 56P19-F4
56P18-X63 — 56P19-F5
56P18-X59 — 56P19-D4
56P18-X60 — 56P19-D5
56P18-X56 — 56P19-C4
56P18-X57 — 56P19-C5
56P18-X53 — 56P19-B4
56P18-X54 — 56P19-B5
56P18-X50 — 56P19-A4
56P18-X51 — 56P19-A5
56P18-X68 — 56P19-F7
56P18-X69 — 56P19-F8
56P18-X71 — 56P19-D7
56P18-X72 — 56P19-D8
"B" HARNESS
56P4-Y13 — 56P13-X65
56P4-Y14 — 56P13-X66
56P4-Y10 — 56P13-X62
56P4-Y11 — 56P13-X63
56P4-Y7 — 56P13-X59
56P4-Y8 — 56P13-X60
56P4-Y4 — 56P13-X56
56P4-Y5 — 56P13-X57
56P4-Y1 — 56P13-X53
56P4-Y2 — 56P13-X54
56P4-X97 — 56P13-X50
56P4-X98 — 56P13-X51
56P4-Y16 — 56P13-X68
56P4-Y17 — 56P13-X69
56P4-Y19 — 56P13-X71
56P4-Y20 — 56P13-X72
"A" HARNESS
IMU
GIMBAL & GYRO ERROR COMMON
X GYRO ERROR
Y GYRO ERROR
Z GYRO ERROR
"B" HARNESS
551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566
BA
BA
BA
GSE "D" BOX
2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515
X GYRO ERROR HI
X GYRO ERROR LO
Y GYRO ERROR HI
Y GYRO ERROR LO
Z GYRO ERROR HI
Z GYRO ERROR LO
+X GYRO SELECT HI
+X GYRO SELECT LO
-X GYRO SELECT HI
-X GYRO SELECT LO
+Y GYRO SELECT HI
+Y GYRO SELECT LO
-Y GYRO SELECT HI
-Y GYRO SELECT LO
+Z GYRO SELECT HI
+Z GYRO SELECT LO
-Z GYRO SELECT HI
-Z GYRO SELECT LO
TORQUE ON CMD HI
TORQUE ON CMD LO
TORQUE OFF CMD HI
TORQUE OFF CMD LO
01A BACKWALL CONNECTIONS
119 120 121 122 129 130
1589 TL 1590 TL 1591 TL 1592 TL 1593 TL 1594 TL 1595 TL 1596 TL 1597 TL 1598 TL 1599 TL 1600 TL 1601 TL 1602 TL 1603 TL 1604 TL

LEM

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN J. Kleinzeyer DATE 11 MAY 65	MECHANIZATION DIAGRAM - GYRO CAGING PANEL (BLOCK II AND LEM)
	CHECKED	
DO NOT SCALE THIS DRAWING	APPROVAL APPROVAL	
MATERIAL	NASA APPROVAL	CODE IDENT NO 99974 · SIZE J2 · 2900200
CONTRACT NAS9-497	MIT APPROVAL	SCALE · SHEET 2 OF 2

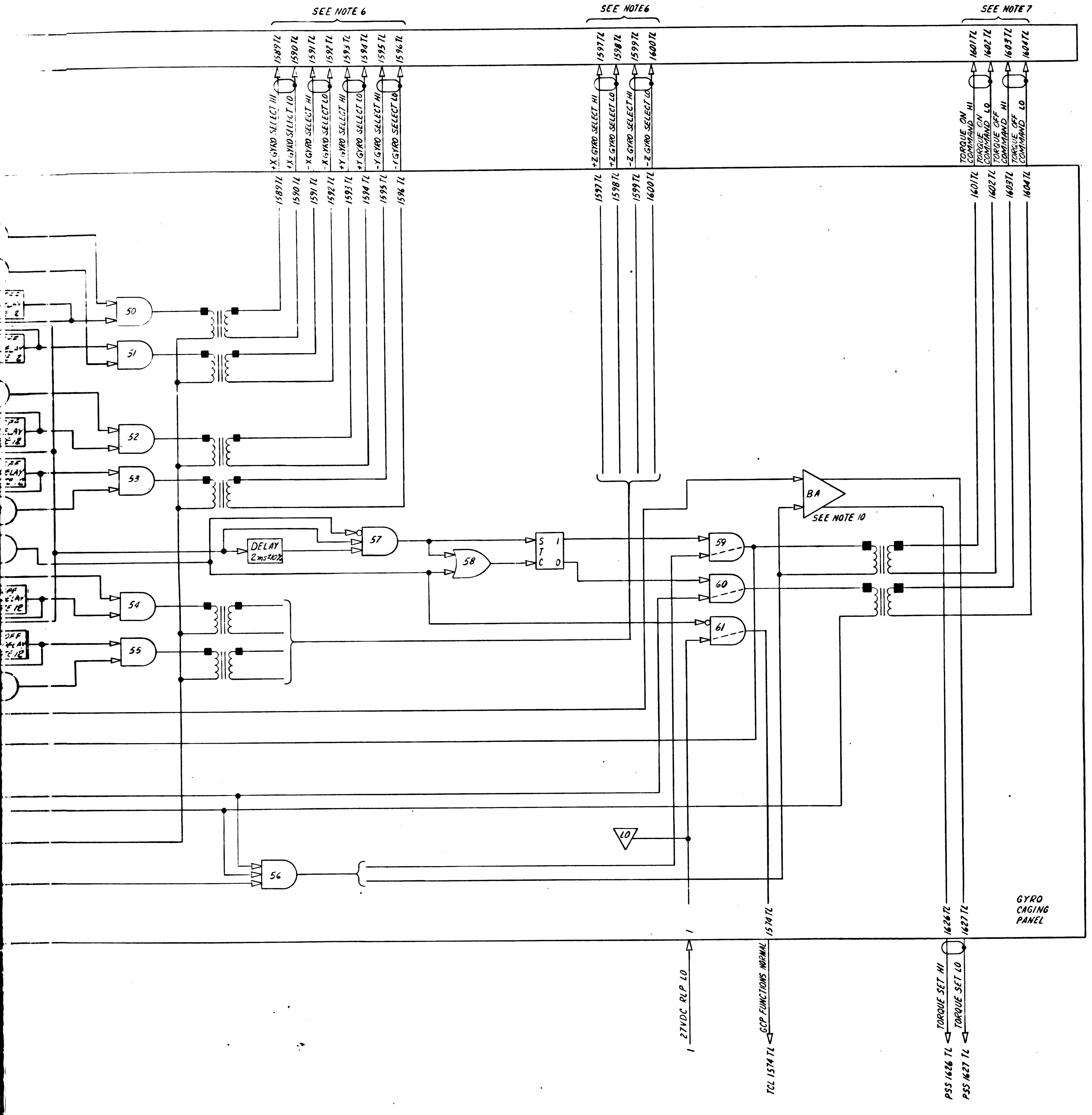

IMU
X GYRO ERROR HI
Y GYRO ERROR HI
Z GYRO ERROR HI
GIMBAL & GYRO ERROR COMMON
J2-23
J2-19
J2-24
J2-20
PSA
GSE "D" BOX
BA
551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566
2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515
X GYRO ERROR HI
X GYRO ERROR LO
Y GYRO ERROR HI
Y GYRO ERROR LO
Z GYRO ERROR HI
Z GYRO ERROR LO
+X GYRO SELECT HI
+X GYRO SELECT LO
-X GYRO SELECT HI
-X GYRO SELECT LO
+Y GYRO SELECT HI
+Y GYRO SELECT LO
-Y GYRO SELECT HI
-Y GYRO SELECT LO
+Z GYRO SELECT HI
+Z GYRO SELECT LO
-Z GYRO SELECT HI
-Z GYRO SELECT LO
TORQUE ON CMD HI
TORQUE ON CMD LO
TORQUE OFF CMD HI
TORQUE OFF CMD LO
OIA BACKWALL CONNECTIONS
119 120 121 122 129 130
1589 TL 1590 TL 1591 TL 1592 TL 1593 TL 1594 TL 1595 TL 1596 TL 1597 TL 1598 TL 1599 TL 1600 TL
1601 TL 1602 TL 1603 TL 1604 TL
IMU
GIMBAL & GYRO ERROR COMMON
"B" HARNESS
"A" HARNESS
GSE "D" BOX
BA
X GYRO ERROR HI
X GYRO ERROR LO
OIA BACKWALL CONNECTIONS
119
120

BLOCK II

2900200 REV C 2

1/2900200

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TCRR 20587		3 [illegible] 65	
B		REVISED PER TDRR 21895		[illegible] 65	
C		REVISED PER TDRR 21896		8 SEP 65	VCC
D		REVISED PER TDRR 21897		9 SEP 65	VCC


SEE NOTE 6
1589TL
1590TL
1591TL
1592TL
1593TL
1594TL
1595TL
1596TL
+X GYRO SELECT HI
+X GYRO SELECT LO
-X GYRO SELECT HI
-X GYRO SELECT LO
+Y GYRO SELECT HI
+Y GYRO SELECT LO
-Y GYRO SELECT HI
-Y GYRO SELECT LO
SEE NOTE6
1597TL
1598TL
1599TL
1600TL
+Z GYRO SELECT HI
+Z GYRO SELECT LO
-Z GYRO SELECT HI
-Z GYRO SELECT LO
SEE NOTE 7
1601TL
1602TL
1603TL
1604TL
TORQUE ON COMMAND HI
TORQUE ON COMMAND LO
TORQUE OFF COMMAND HI
TORQUE OFF COMMAND LO
50
51
52
53
54
55
56
57
58
59
60
61
DELAY 2ms±10%
S T C
1 0
BA
SEE NOTE 10
LO
1
1574TL
1626TL
1627TL
GYRO CAGING PANEL
27VDC RLP LO
GCP FUNCTIONS NORMAL
TCL 1574 TL
TORQUE SET HI
TORQUE SET LO
PSS 1626 TL
PSS 1627 TL

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

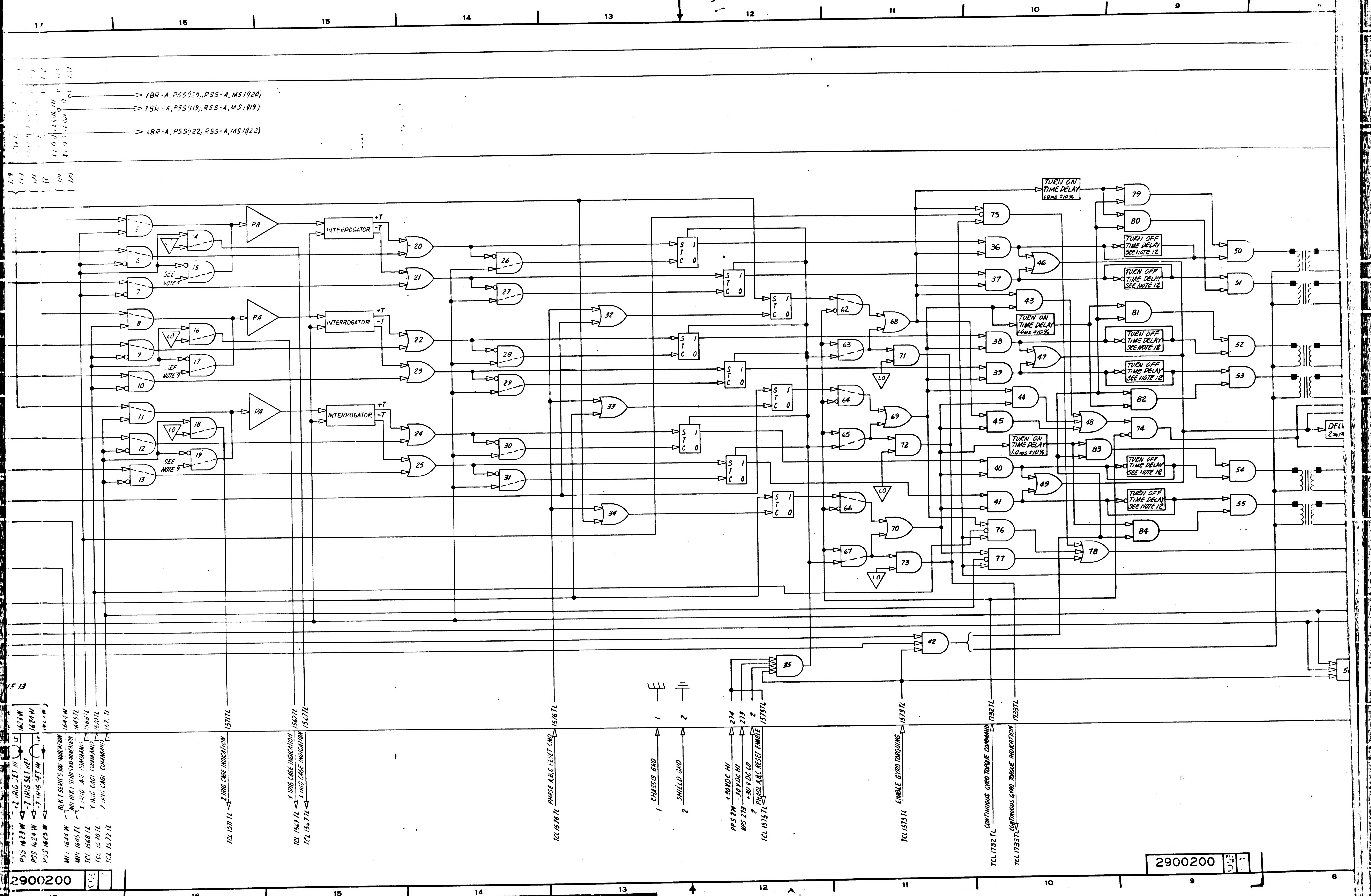
AC SPARK PLUG DIVISION. GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Kilvinger DATE 11 MAY 65
CHECKED Ed Foster 13 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
GYRO CAGING PANEL
(BLOCK II AND LEM)

CODE IDENT NO. 99974
SIZE J3
2900200
SCALE —
SHEET 1 OF 2

4H


17
16
15
14
13
12
11
10
9
IBR-A, PSS(120), RSS-A, MS1(120)
IBR-A, PSS(119), RSS-A, MS1(119)
IBR-A, PSS(122), RSS-A, MS1(122)
PA
PA
PA
INTERROGATOR
INTERROGATOR
INTERROGATOR
+T
-T
LO
SEE NOTE 9
S T C
I O
TURN ON TIME DELAY 1.0ms ±10%
TURN OFF TIME DELAY SEE NOTE 12
DEL 2ms
NOTE 13
1623W
1624W
1625W
1644W
1645TL
1568TL
1570TL
1572TL
1571TL
1569TL
1567TL
1576TL
274
273
2
1575TL
1573TL
1732TL
1733TL
+Z IRIG SET HI
-Z IRIG SET RET
-Z IRIG SET HI
BLK I SERIES 100 INDICATION
NOT BLK I SERIES 100 INDICATION
X IRIG CAGE COMMAND
Y IRIG CAGE COMMAND
Z IRIG CAGE COMMAND
Z IRIG CAGE INDICATION
Y IRIG CAGE INDICATION
X IRIG CAGE INDICATION
PHASE A,B,C RESET CMD
CHASSIS GRD
SHIELD GRD
+30VDC HI
-30VDC HI
+30VDC LO
PHASE A,B,C RESET ENABLE
ENABLE GYRO TORQUING
CONTINUOUS GYRO TORQUE COMMAND
CONTINUOUS GYRO TORQUE INDICATION
PSS 1623W
PSS 1624W
PSS 1625W
MPL 1644W
MPL 1645TL
TCL 1568TL
TCL 1570TL
TCL 1572TL
TCL 1571TL
TCL 1569TL
TCL 1567TL
TCL 1576TL
1
2
PPS 274
NPS 273
TCL 1575TL
TCL 1573TL
TCL 1732TL
TCL 1733TL
2900200
2900200

2X2900200

NOTES

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS PER MIL-ST-806.
3. REFERENCE MECHANIZATION DIAGRAMS:

2900210	AC POWER POTECTION PANEL & POWER DISTRIBUTION (FTR)
RLP	RELAY AND LAMP POWER SUPPLY
PPS	+30 VDC POWER SUPPLY
NPS	-30 VDC POWER SUPPLY
2900208	POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTION (BLOCK I, II & LEM) (PDL)
PSS	PRIMARY SIGNAL SELECTOR (PARTIAL)
2900207	MONITOR PANEL (MPL)
2900209	COMPUTER SIMULATOR INTERFACE (CMS)
2900201	TEST CONTROL PANEL (BLOCK II & LEM)(TCL)
2900217	SIGNAL SELECTION & MEASUREMENT
PSS	PRIMARY SIGNAL SELECTOR
XBR-A	CROSSBAR - AC SIGNAL
2900218	OSCILLOGRAPH SIGNAL SELECTION
RSS-A	TO FIXED AC CHANNEL
RSS-C	TO SWITCHABLE AC CHANNEL
2900219	COUNTER SIGNAL SELECTION
PSS	PRIMARY SIGNAL SELECTOR (PARTIAL)
2900213	GSE GROUNDING (BLOCK II & LEM)
2900212	PIP & IRIG MONITORING
MS 1	PHASE SHIFT PANEL

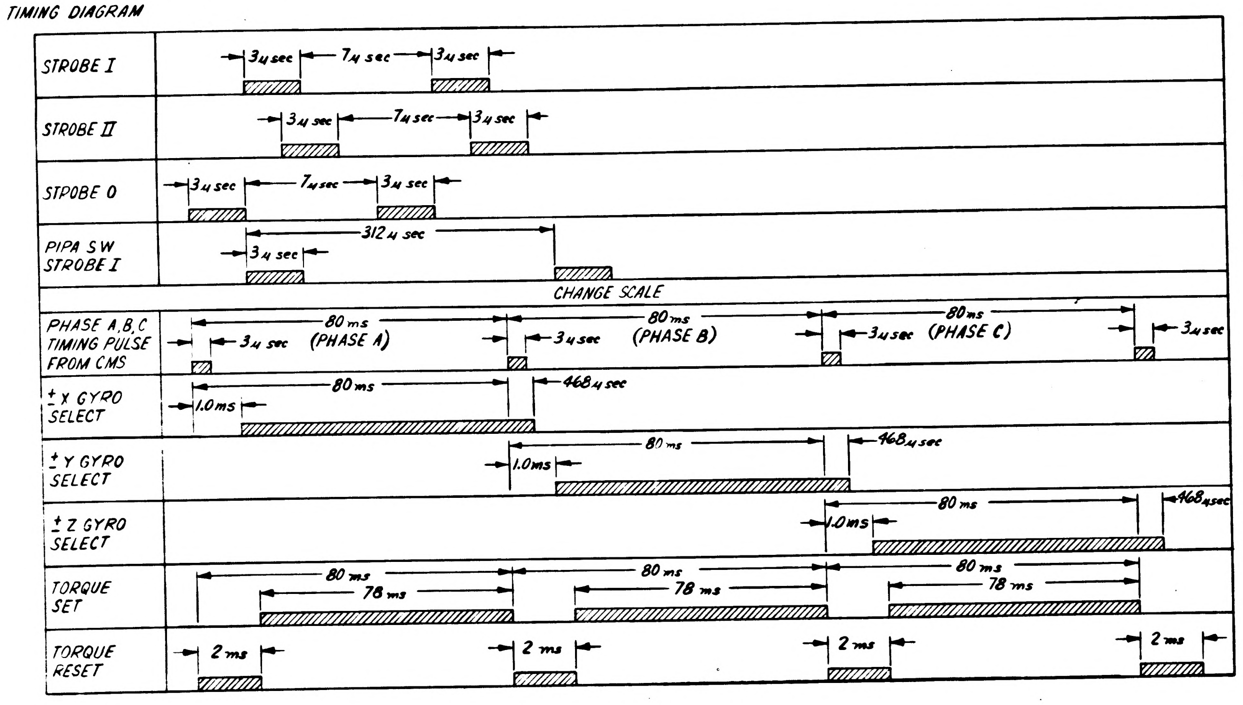
4. NONSTANDARD SYMBOLOGY

INDICATES "AND" GATE WITH SWITCHED SIGNAL

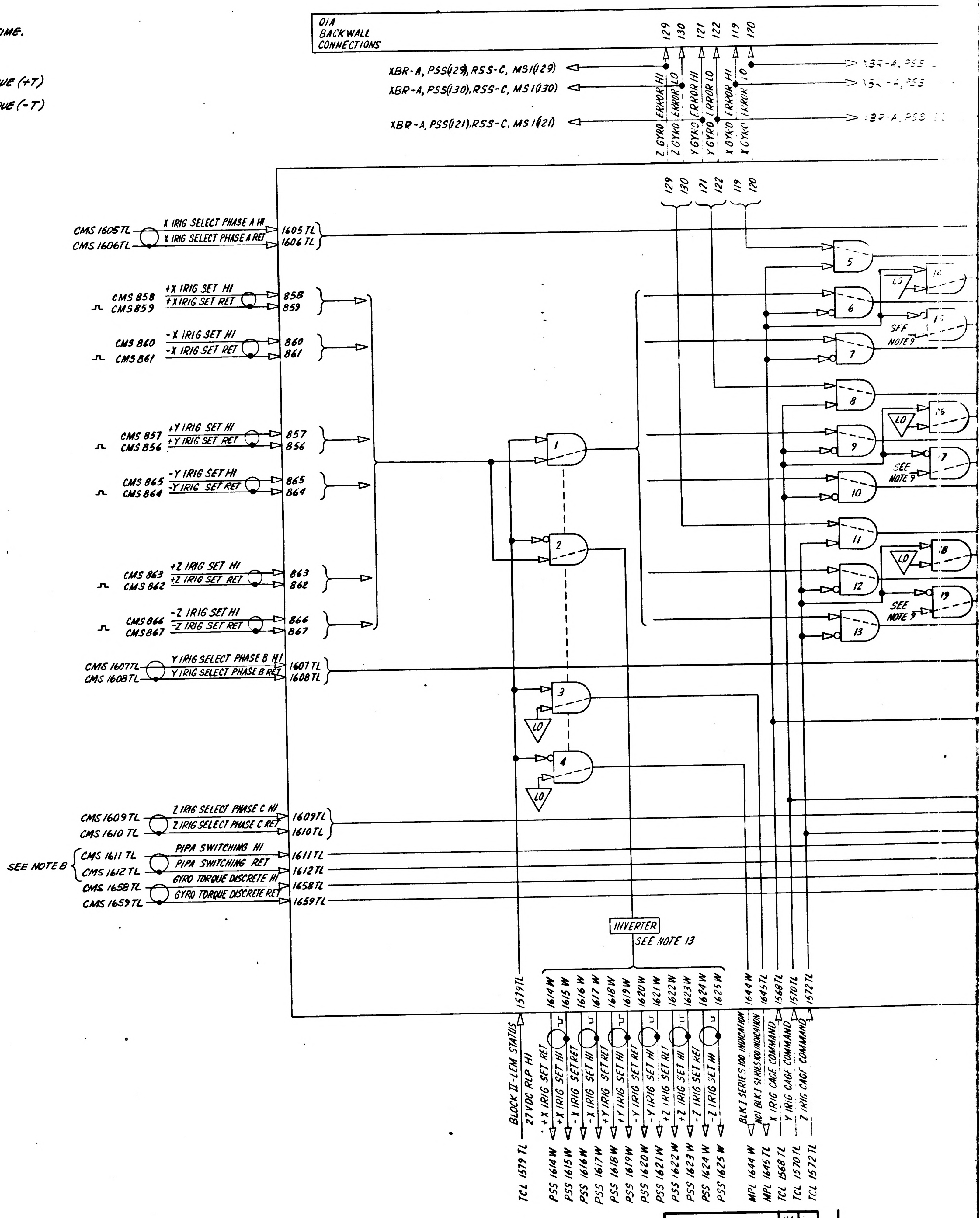
5. ALL INTERFACE NUMBERS SUFFIX BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G/N CONFIGURATIONS
   - E. TW, TL OR WL - USED IN MORE THAN ONE G/N CONFIGURATIONS AS SHOWN.
6. OUTPUT CHARACTERISTICS.

   $Z_o < 100$ OHMS
   PULSE AMPLITUDE - 5 TO 10 VOLTS
   PULSE WIDTH - 3.5 ± 1 μsec
   PULSE RISE TIME - < 1 μsec
   LOAD - 100 K OHMS SHUNTED WITH 1500 pf
7. OUTPUT CHARACTERISTICS

   $Z_o < 100$ OHMS
   PULSE AMPLITUDE - 5 TO 10 VOLTS
   PULSE WIDTH - 3.5 ± 1 μsec
   PULSE RISE TIME - < 1 μsec
   LOAD - 2.2 K OHMS SHUNTED WITH 1500 pf
8. PIPA SWITCHING 3200 PPS SIGNAL LAGS GYRO ERROR SIGNAL BY 135°
9. X, Y, Z GYRO ERROR LOW, RESPECTIVELY
10. TORQUE SET BUFFER AMPLIFIER $Z_o < 2.0$ K OHMS
11. TIMING DIAGRAM


STROBE I
3 μ sec
7 μ sec
3 μ sec
STROBE II
3 μ sec
7 μ sec
3 μ sec
STROBE 0
3 μ sec
7 μ sec
3 μ sec
PIPA SW STROBE I
312 μ sec
3 μ sec
CHANGE SCALE
PHASE A, B, C TIMING PULSE FROM CMS
80 ms
3 μ sec (PHASE A)
80 ms
3 μ sec (PHASE B)
80 ms
3 μ sec (PHASE C)
3 μ sec
± X GYRO SELECT
80 ms
1.0 ms
468 μ sec
± Y GYRO SELECT
80 ms
1.0 ms
468 μ sec
± Z GYRO SELECT
80 ms
1.0 ms
468 μ sec
TORQUE SET
80 ms
78 ms
80 ms
78 ms
80 ms
78 ms
TORQUE RESET
2 ms
2 ms
2 ms
2 ms

12. 468 μsec ± 156 μsec TIME DELAY ONLY IN CIRCUIT AT CUT-OFF TIME.
13. HIGH AND RETURN INVERTED TO CHANGE POSITIVE INPUT PULSES TO NEGATIVE OUTPUT PULSES.
14. TT PHASE GYRO ERROR SIGNAL SHALL PRODUCE A POSITIVE TORQUE (+T) OUTPUT OF INTERROGATOR. O PHASE GYRO ERROR SIGNAL SHALL PRODUCE A NEGATIVE TORQUE (-T) OUTPUT OF INTERROGATOR.

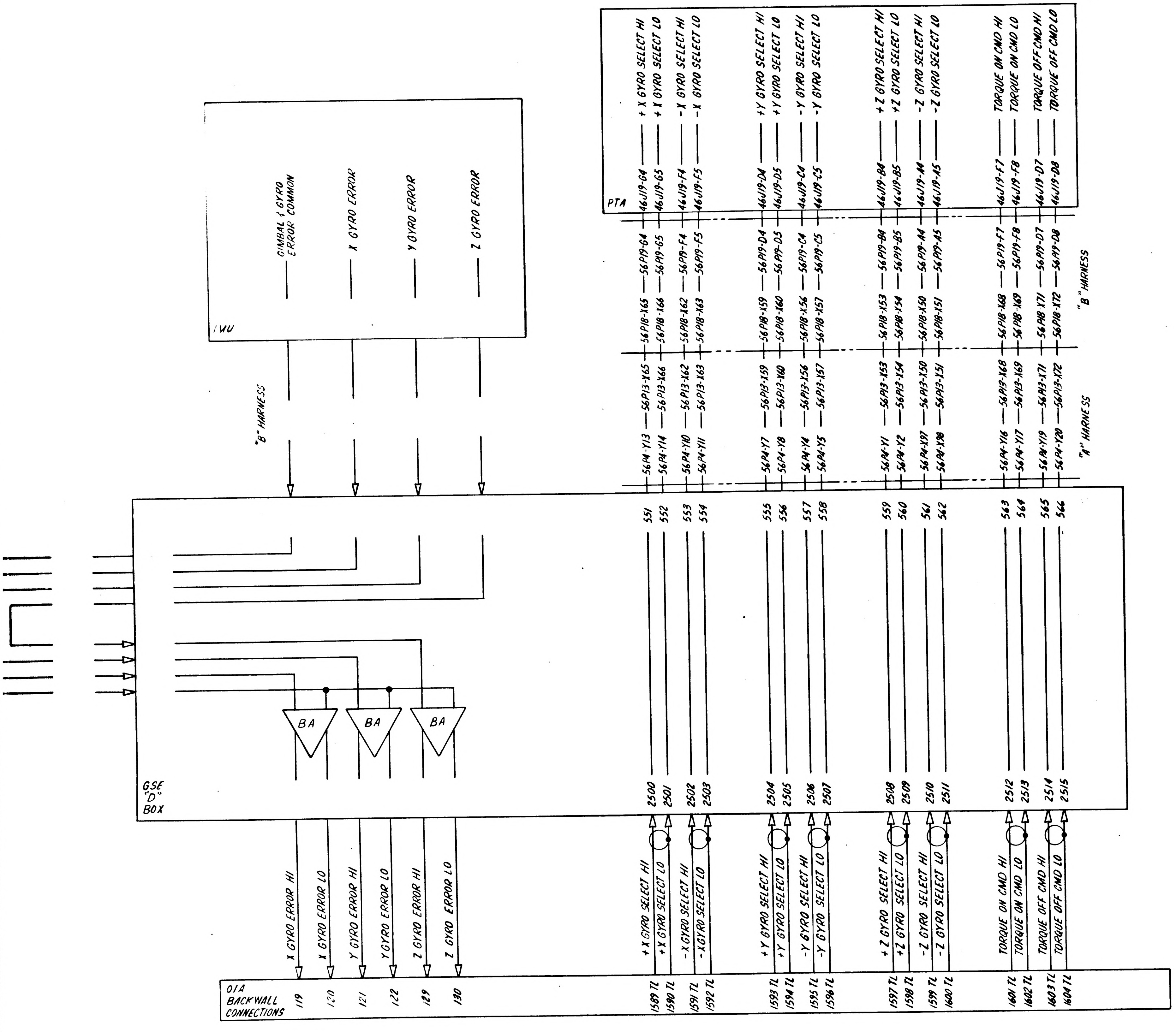

01A BACKWALL CONNECTIONS
129
130
121
122
119
120
Z GYRO ERROR HI
Z GYRO ERROR LO
Y GYRO ERROR HI
Y GYRO ERROR LO
X GYRO ERROR HI
X GYRO ERROR LO
XBR-A, PSS(129), RSS-C, MS1(129)
XBR-A, PSS(130), RSS-C, MS1(130)
XBR-A, PSS(121), RSS-C, MS1(121)
XBR-A, PSS
XBR-A, PSS
XBR-A, PSS
CMS 1605TL
CMS 1606TL
X IRIG SELECT PHASE A HI
X IRIG SELECT PHASE A RET
1605 TL
1606 TL
CMS 858
CMS 859
+X IRIG SET HI
+X IRIG SET RET
858
859
CMS 860
CMS 861
-X IRIG SET HI
-X IRIG SET RET
860
861
CMS 857
CMS 856
+Y IRIG SET HI
+Y IRIG SET RET
857
856
CMS 865
CMS 864
-Y IRIG SET HI
-Y IRIG SET RET
865
864
CMS 863
CMS 862
+Z IRIG SET HI
+Z IRIG SET RET
863
862
CMS 866
CMS 867
-Z IRIG SET HI
-Z IRIG SET RET
866
867
CMS 1607TL
CMS 1608TL
Y IRIG SELECT PHASE B HI
Y IRIG SELECT PHASE B RET
1607 TL
1608 TL
CMS 1609TL
CMS 1610 TL
Z IRIG SELECT PHASE C HI
Z IRIG SELECT PHASE C RET
1609TL
1610TL
SEE NOTE 8
CMS 1611 TL
CMS 1612 TL
PIPA SWITCHING HI
PIPA SWITCHING RET
1611TL
1612TL
CMS 1658TL
CMS 1659TL
GYRO TORQUE DISCRETE HI
GYRO TORQUE DISCRETE RET
1658TL
1659TL
1
2
3
4
LO
LO
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
LO
LO
LO
SEE NOTE 9
SEE NOTE 9
SEE NOTE 9
INVERTER
SEE NOTE 13
1579TL
1614W
1615W
1616W
1617W
1618W
1619W
1620W
1621W
1622W
1623W
1624W
1625W
1644W
1645TL
1568TL
1570TL
1572TL
BLOCK II-LEM STATUS
27VDC RLP HI
+X IRIG SET RET
+X IRIG SET HI
-X IRIG SET RET
-X IRIG SET HI
+Y IRIG SET RET
+Y IRIG SET HI
-Y IRIG SET RET
-Y IRIG SET HI
+Z IRIG SET RET
+Z IRIG SET HI
-Z IRIG SET RET
-Z IRIG SET HI
BLK I SERIES 100 INDICATION
NOT BLK I SERIES 100 INDICATION
X IRIG CAGE COMMAND
Y IRIG CAGE COMMAND
Z IRIG CAGE COMMAND
TCL 1579 TL
PSS 1614W
PSS 1615W
PSS 1616W
PSS 1617W
PSS 1618W
PSS 1619W
PSS 1620W
PSS 1621W
PSS 1622W
PSS 1623W
PSS 1624W
PSS 1625W
MPL 1644 W
MPL 1645 TL
TCL 1568 TL
TCL 1570 TL
TCL 1572 TL

2900200 REV D SH 1

MIL FORM 1080 J3

1/2900200

SYM	ZONE	REVISIONS DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20587		3 [illegible] 65	
B		REVISION STATUS CHANGED		3 SEP 65	
C		REVISION STATUS CHANGED		3 SEP 65	
D		REVISION STATUS CHANGED		9 SEP 65	


IMU
GIMBAL & GYRO ERROR COMMON
X GYRO ERROR
Y GYRO ERROR
Z GYRO ERROR
"B" HARNESS
PTA
+ X GYRO SELECT HI
+ X GYRO SELECT LO
- X GYRO SELECT HI
- X GYRO SELECT LO
+Y GYRO SELECT HI
+Y GYRO SELECT LO
-Y GYRO SELECT HI
-Y GYRO SELECT LO
+Z GYRO SELECT HI
+Z GYRO SELECT LO
-Z GYRO SELECT HI
-Z GYRO SELECT LO
TORQUE ON CMD HI
TORQUE ON CMD LO
TORQUE OFF CMD HI
TORQUE OFF CMD LO
46J19-G4
46J19-G5
46J19-F4
46J19-F5
46J19-D4
46J19-D5
46J19-C4
46J19-C5
46J19-B4
46J19-B5
46J19-A4
46J19-A5
46J19-F7
46J19-F8
46J19-D7
46J19-D8
56P19-G4
56P19-G5
56P19-F4
56P19-F5
56P19-D4
56P19-D5
56P19-C4
56P19-C5
56P19-B4
56P19-B5
56P19-A4
56P19-A5
56P19-F7
56P19-F8
56P19-D7
56P19-D8
56P18-X65
56P18-X66
56P18-X62
56P18-X63
56P18-X59
56P18-X60
56P18-X56
56P18-X57
56P18-X53
56P18-X54
56P18-X50
56P18-X51
56P18-X68
56P18-X69
56P18-X71
56P18-X72
"B" HARNESS
56P13-X65
56P13-X66
56P13-X62
56P13-X63
56P13-X59
56P13-X60
56P13-X56
56P13-X57
56P13-X53
56P13-X54
56P13-X50
56P13-X51
56P13-X68
56P13-X69
56P13-X71
56P13-X72
56P4-Y13
56P4-Y14
56P4-Y10
56P4-Y11
56P4-Y7
56P4-Y8
56P4-Y4
56P4-Y5
56P4-Y1
56P4-Y2
56P4-X97
56P4-X98
56P4-Y16
56P4-Y17
56P4-Y19
56P4-Y20
"A" HARNESS
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
BA
BA
BA
GSE "D" BOX
2500
2501
2502
2503
2504
2505
2506
2507
2508
2509
2510
2511
2512
2513
2514
2515
X GYRO ERROR HI
X GYRO ERROR LO
Y GYRO ERROR HI
Y GYRO ERROR LO
Z GYRO ERROR HI
Z GYRO ERROR LO
+ X GYRO SELECT HI
+ X GYRO SELECT LO
- X GYRO SELECT HI
- X GYRO SELECT LO
+ Y GYRO SELECT HI
+ Y GYRO SELECT LO
- Y GYRO SELECT HI
- Y GYRO SELECT LO
+ Z GYRO SELECT HI
+ Z GYRO SELECT LO
- Z GYRO SELECT HI
- Z GYRO SELECT LO
TORQUE ON CMD HI
TORQUE ON CMD LO
TORQUE OFF CMD HI
TORQUE OFF CMD LO
01A BACKWALL CONNECTIONS
119
120
121
122
129
130
1589 TL
1590 TL
1591 TL
1592 TL
1593 TL
1594 TL
1595 TL
1596 TL
1597 TL
1598 TL
1599 TL
1600 TL
1601 TL
1602 TL
1603 TL
1604 TL

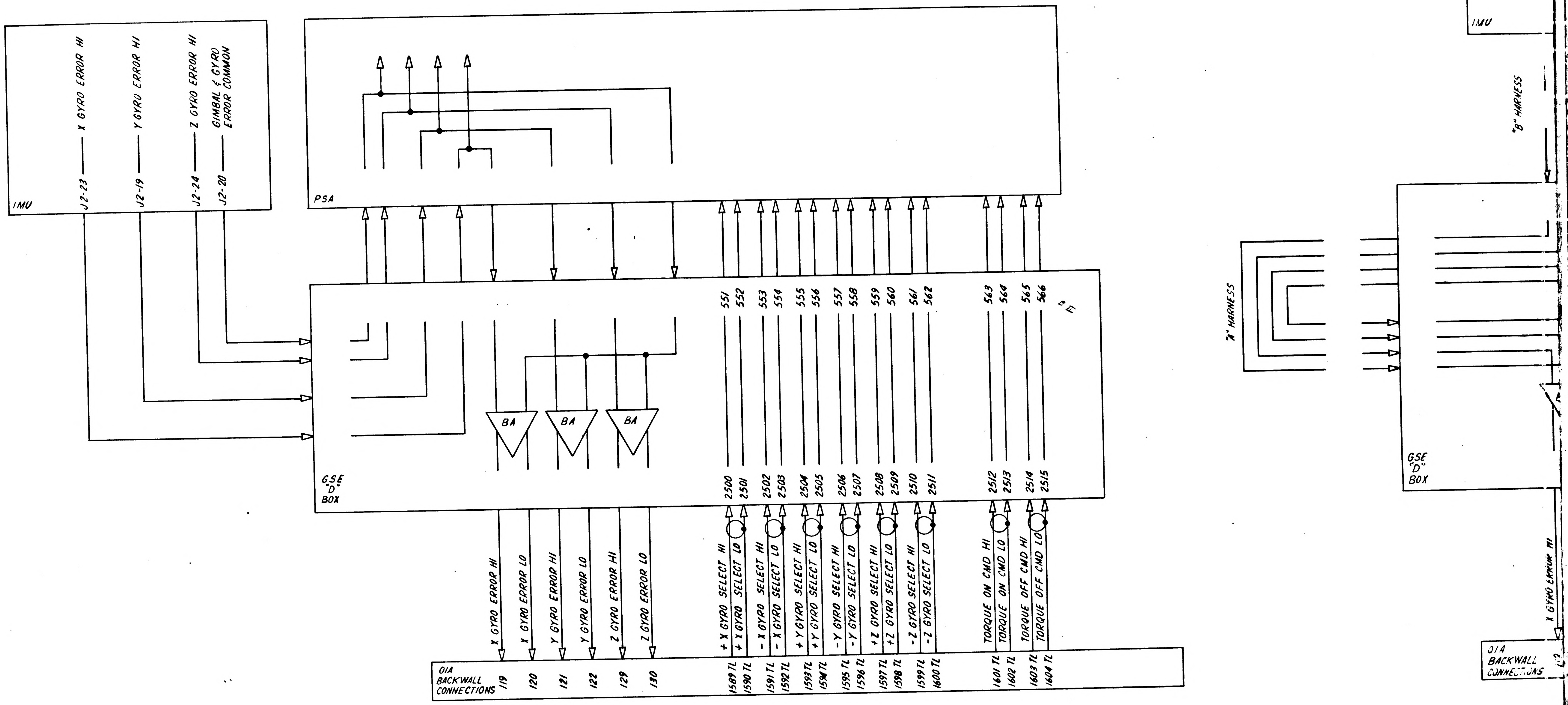
LEM

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
DO NOT SCALE THIS DRAWING	DRAWN J. Klinger DATE 11 MAY 65 CHECKED [illegible] Foster 13 MAY 65 APPROVAL [illegible] APPROVAL [illegible]	MECHANIZATION DIAGRAM - GYRO CAGING PANEL (BLOCK II AND LEM)
MATERIAL	NASA APPROVAL [illegible] 3/10	CODE IDENT NO 99974 · SIZE J2 · 2900200
CONTRACT NAS 9-497	MIT APPROVAL [illegible]	SCALE — · SHEET 2 OF 2

2900200 2H

2900200

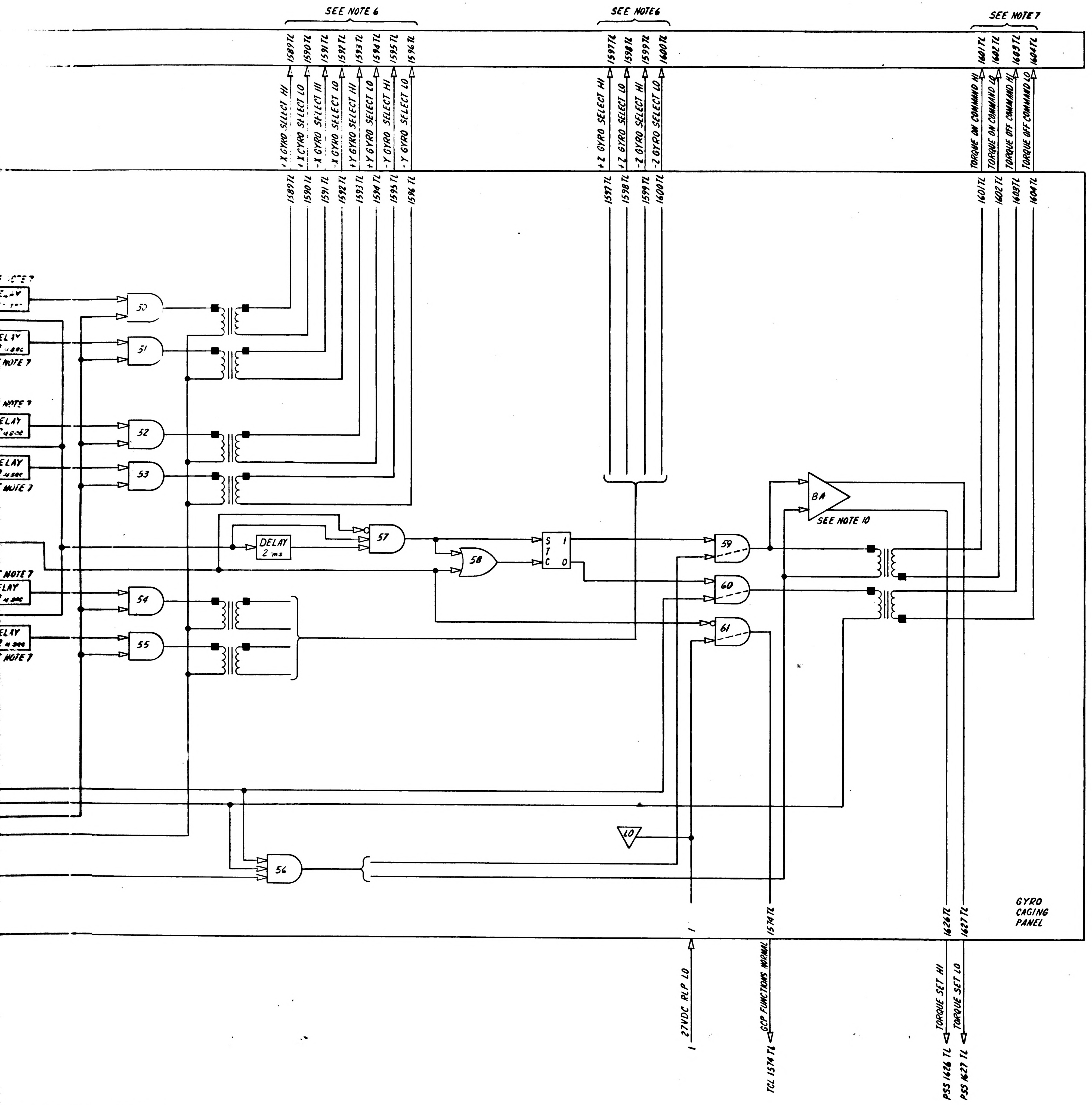
272900200


IMU
J2-23
X GYRO ERROR HI
J2-19
Y GYRO ERROR HI
J2-24
Z GYRO ERROR HI
J2-20
GIMBAL & GYRO ERROR COMMON
PSA
GSE "D" BOX
BA
BA
BA
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
2500
2501
2502
2503
2504
2505
2506
2507
2508
2509
2510
2511
2512
2513
2514
2515
X GYRO ERROR HI
X GYRO ERROR LO
Y GYRO ERROR HI
Y GYRO ERROR LO
Z GYRO ERROR HI
Z GYRO ERROR LO
+ X GYRO SELECT HI
+ X GYRO SELECT LO
- X GYRO SELECT HI
- X GYRO SELECT LO
+ Y GYRO SELECT HI
+ Y GYRO SELECT LO
- Y GYRO SELECT HI
- Y GYRO SELECT LO
+ Z GYRO SELECT HI
+ Z GYRO SELECT LO
- Z GYRO SELECT HI
- Z GYRO SELECT LO
TORQUE ON CMD HI
TORQUE ON CMD LO
TORQUE OFF CMD HI
TORQUE OFF CMD LO
01A BACKWALL CONNECTIONS
119
120
121
122
129
130
1589 TL
1590 TL
1591 TL
1592 TL
1593 TL
1594 TL
1595 TL
1596 TL
1597 TL
1598 TL
1599 TL
1600 TL
1601 TL
1602 TL
1603 TL
1604 TL
"A" HARNESS
"B" HARNESS
IMU
GIMBAL & GYRO
GSE "D" BOX
X GYRO ERROR HI
01A BACKWALL CONNECTIONS

BLOCK II

2900200 | RE. LTR J | SH 2

1/2900200


SEE NOTE 6
1589TL
1590TL
1591TL
1592TL
1593TL
1594TL
1595TL
1596TL
+X GYRO SELECT HI
+X GYRO SELECT LO
-X GYRO SELECT HI
-X GYRO SELECT LO
+Y GYRO SELECT HI
+Y GYRO SELECT LO
-Y GYRO SELECT HI
-Y GYRO SELECT LO
SEE NOTE6
1597TL
1598TL
1599TL
1600TL
+Z GYRO SELECT HI
+Z GYRO SELECT LO
-Z GYRO SELECT HI
-Z GYRO SELECT LO
SEE NOTE 7
1601TL
1602TL
1603TL
1604TL
TORQUE ON COMMAND HI
TORQUE ON COMMAND LO
TORQUE OFF COMMAND HI
TORQUE OFF COMMAND LO
NOTE 7
ELAY
50
51
52
53
54
55
56
57
58
59
60
61
DELAY
2 ms
S
T
C
1
0
BA
SEE NOTE 10
LO
GYRO
CAGING
PANEL
1
1574TL
1626TL
1627TL
27VDC RLP LO
GCP FUNCTIONS NORMAL
TCL 1574TL
TORQUE SET HI
TORQUE SET LO
PSS 1626 TL
PSS 1627 TL

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

4 H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ ± ___ ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ___
CONTRACT NAS 9-497

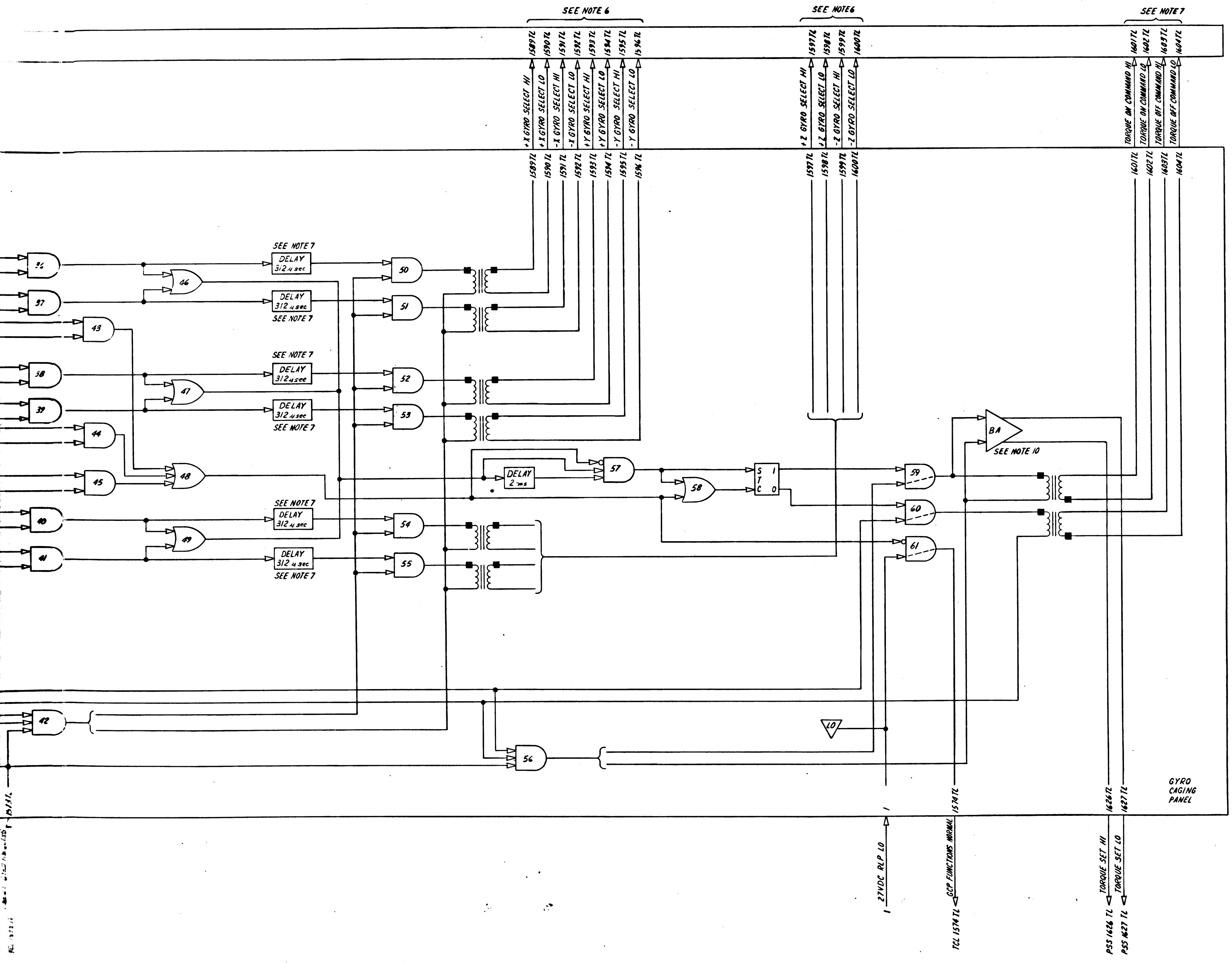
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Kilvinger DATE 11 MAY 65
CHECKED Ed Foster 13 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
GYRO CAGING PANEL
(BLOCK II AND LEM)

CODE IDENT NO. ~~99974~~
SIZE J3
2900200
SCALE ___
SHEET 1 OF 2

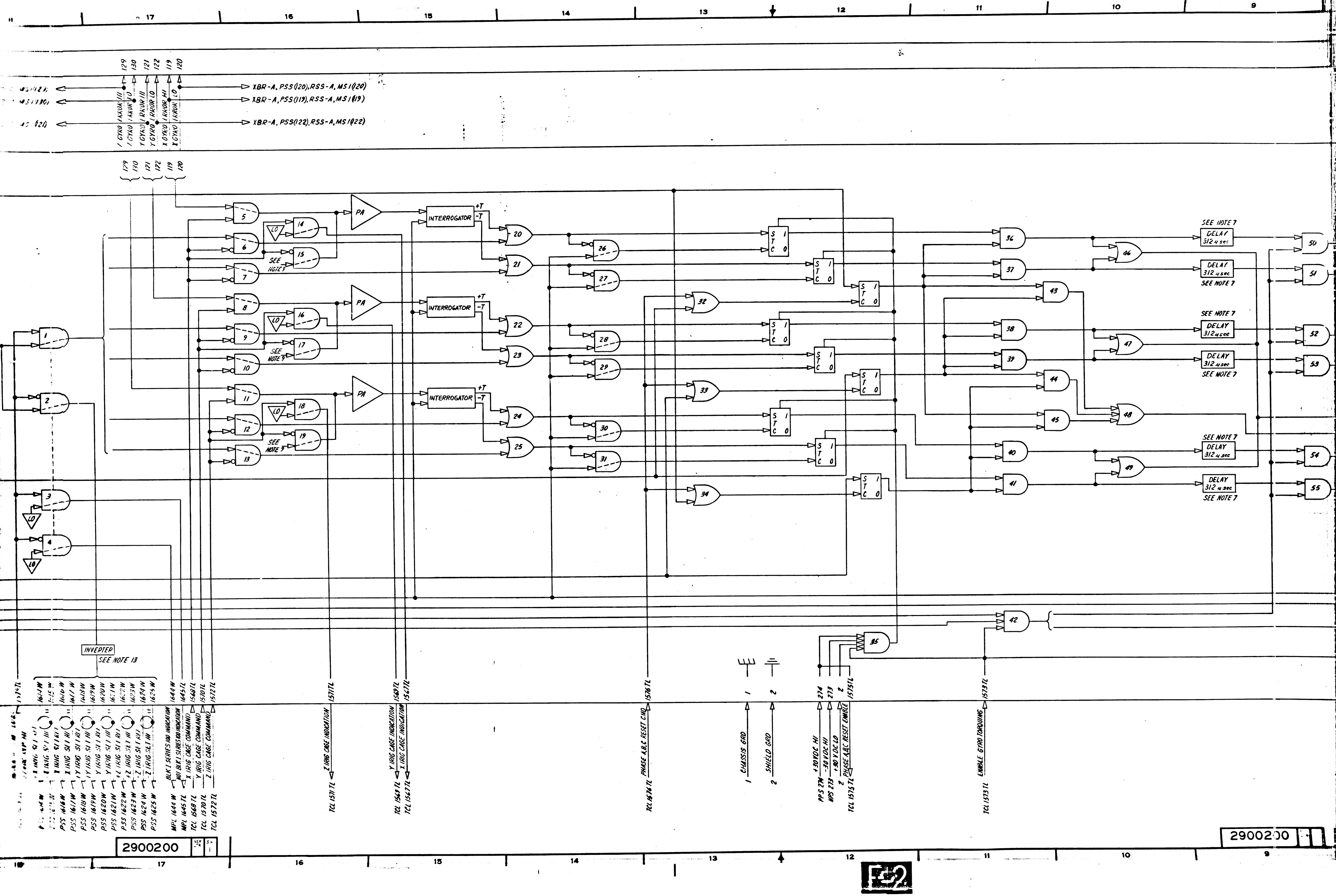
2900200


SEE NOTE 6
1589TL
1590TL
1591TL
1592TL
1593TL
1594TL
1595TL
1596TL
+X GYRO SELECT HI
+X GYRO SELECT LO
-X GYRO SELECT HI
-X GYRO SELECT LO
+Y GYRO SELECT HI
+Y GYRO SELECT LO
-Y GYRO SELECT HI
-Y GYRO SELECT LO
SEE NOTE6
1597TL
1598TL
1599TL
1600TL
+Z GYRO SELECT HI
+Z GYRO SELECT LO
-Z GYRO SELECT HI
-Z GYRO SELECT LO
SEE NOTE 7
1601TL
1602TL
1603TL
1604TL
TORQUE ON COMMAND HI
TORQUE ON COMMAND LO
TORQUE OFF COMMAND HI
TORQUE OFF COMMAND LO
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
SEE NOTE 7
DELAY 312 μsec
DELAY 2 ms
S I
T
C O
BA
SEE NOTE 10
LO
GYRO
CAGING
PANEL
1
1574TL
1626TL
1627TL
27VDC RLP LO
GCP FUNCTIONS NORMAL
TCL 1574TL
TORQUE SET HI
TORQUE SET LO
PSS 1626 TL
PSS 1627 TL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + — + — + — − − −	AC SPARK PLUG DIVISION GMC MILWAUKEE, WISCONSIN
	ACSP PN
	DRAWN [illegible] DATE [illegible]
	CHECKED [illegible]
	APPROVAL [illegible]
DO NOT SCALE THIS DRAWING	APPROVAL
MATERIAL —	NASA APPROVAL [illegible]
CONTRACT 1453-497	MIT APPROVAL [illegible]

2900200 REV LTR SH 1

E3


17
16
15
14
13
12
11
10
9
129
130
121
122
119
120
Z GYRO ERROR HI
Z GYRO ERROR LO
Y GYRO ERROR HI
Y GYRO ERROR LO
X GYRO ERROR HI
X GYRO ERROR LO
MS1(129)
MS1(130)
MS1(121)
XBR-A, PSS(120), RSS-A, MS1(120)
XBR-A, PSS(119), RSS-A, MS1(119)
XBR-A, PSS(122), RSS-A, MS1(122)
PA
INTERROGATOR
+T
-T
LO
SEE NOTE 9
S
T
C
I
O
SEE NOTE 7
DELAY 312 μsec
INVERTER
SEE NOTE 13
1574TL
1614W
1615W
1616W
1617W
1618W
1619W
1620W
1621W
1622W
1623W
1624W
1625W
1644W
1645TL
1568TL
1570TL
1572TL
1571TL
1569TL
1567TL
1576TL
1575TL
1573TL
274
273
X IRIG SET HI
X IRIG SET RI
Y IRIG SET HI
Y IRIG SET RI
+Z IRIG SET HI
-Z IRIG SET RI
-Z IRIG SET HI
PSS 1616W
PSS 1617W
PSS 1618W
PSS 1619W
PSS 1620W
PSS 1621W
PSS 1622W
PSS 1623W
PSS 1624W
PSS 1625W
BLK I SERIES 100 INDICATION
NOT BLK I SERIES 100 INDICATION
X IRIG CAGE COMMAND
Y IRIG CAGE COMMAND
Z IRIG CAGE COMMAND
MPL 1644W
MPL 1645TL
TCL 1568TL
TCL 1570TL
TCL 1572TL
Z IRIG CAGE INDICATION
TCL 1571TL
Y IRIG CAGE INDICATION
X IRIG CAGE INDICATION
TCL 1569TL
TCL 1567TL
PHASE A,B,C RESET CMD
TCL 1576TL
1
2
CHASSIS GRD
SHIELD GRD
+30 VDC HI
-30 VDC HI
+30 VDC LO
PHASE A,B,C RESET ENABLE
PPS 274
NPS 273
TCL 1575TL
ENABLE GYRO TORQUING
TCL 1573TL
2900200
REV
SH
1

NOTES

1. INTEPPPET DPAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
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3. REFERENCE MECHANIZATION DIAGRAMS:

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NPS	-30 VDC POWER SUPPLY
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2900217	SIGNAL SELECTION & MEASUREMENT
PSS	PRIMARY SIGNAL SELECTOR
XBR-A	CROSSBAR - AC SIGNAL
2900218	OSCILLOGRAPH SIGNAL SELECTION
RSS-A	TO FIXED AC CHANNEL
RSS-C	TO SWITCHABLE AC CHANNEL
2900219	COUNTER SIGNAL SELECTION
PSS	PRIMARY SIGNAL SELECTOR (PARTIAL)
2900213	GSE GROUNDING (BLOCK II & LEM)
2900212	PIP & IRIG MONITORING
MS I	PHASE SHIFT PANEL

4. NONSTANDARD SYMBOLOGY

INDICATES "AND" GATE WITH SWITCHED SIGNAL

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   C. L - LEM ONLY
   D. BLANK - ALL G/N CONFIGURATIONS
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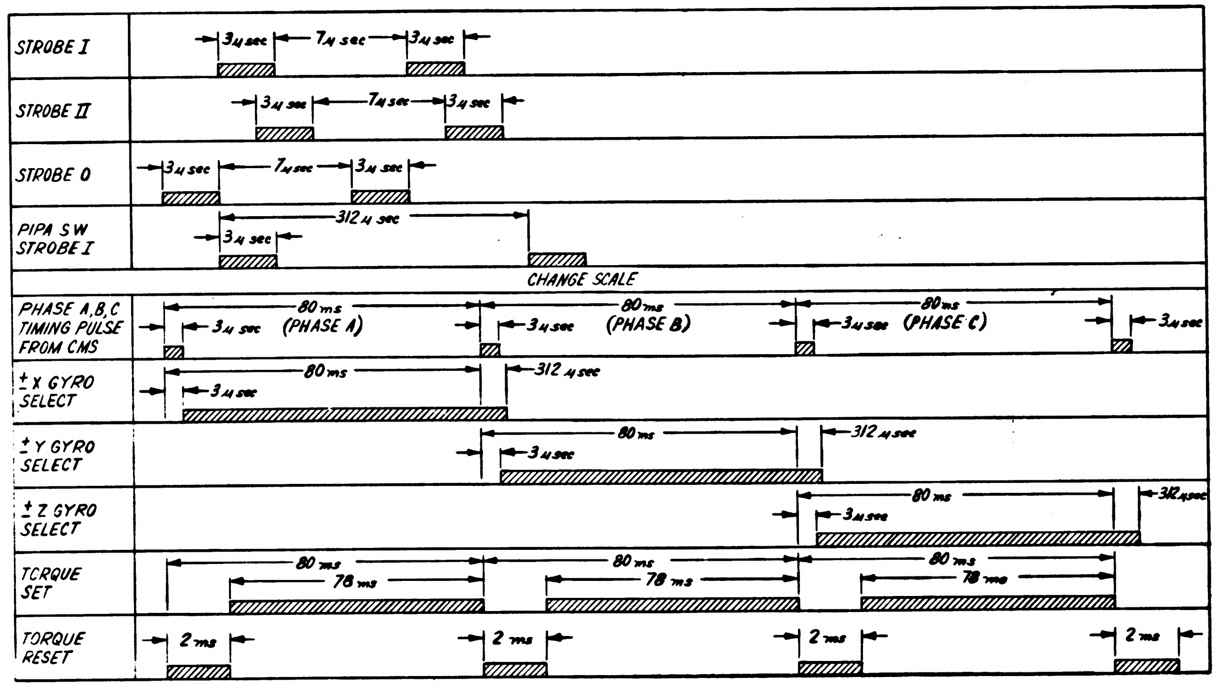
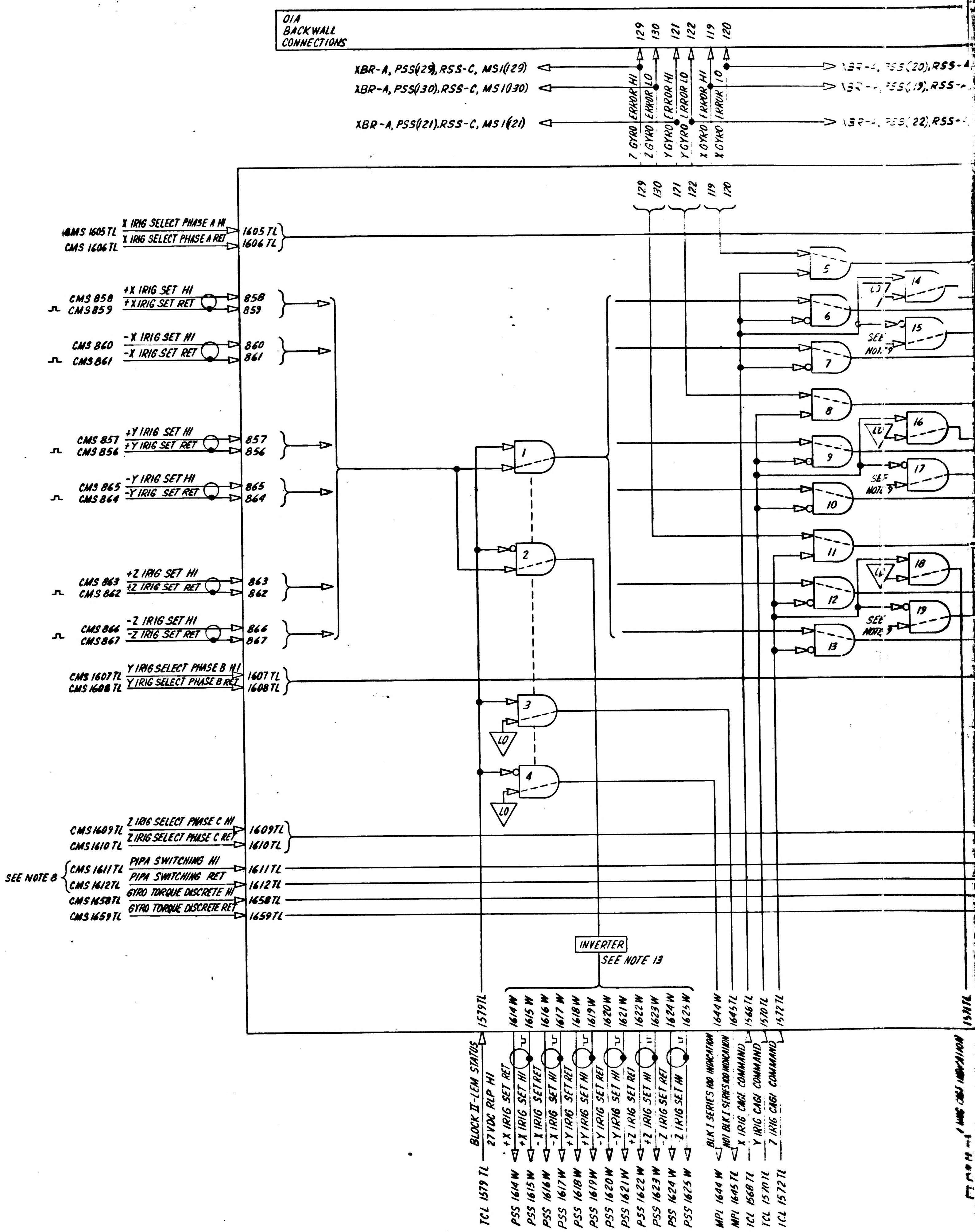
   PULSE WIDTH - 3.5 ± 1 μsec
   PULSE RISE TIME - < 1 μsec
   LOAD - 2.2 K OHMS SHUNTED WITH 1500 pf
8. PIPA SWITCHING 3200 PPS SIGNAL LAGS GYRO ERROR SIGNAL BY 135°
9. X, Y, Z GYRO ERROR LOW, RESPECTIVELY
10. TORQUE SET BUFFER AMPLIFIER Z_o < 2.0 K OHMS
11. TIMING DIAGRAM

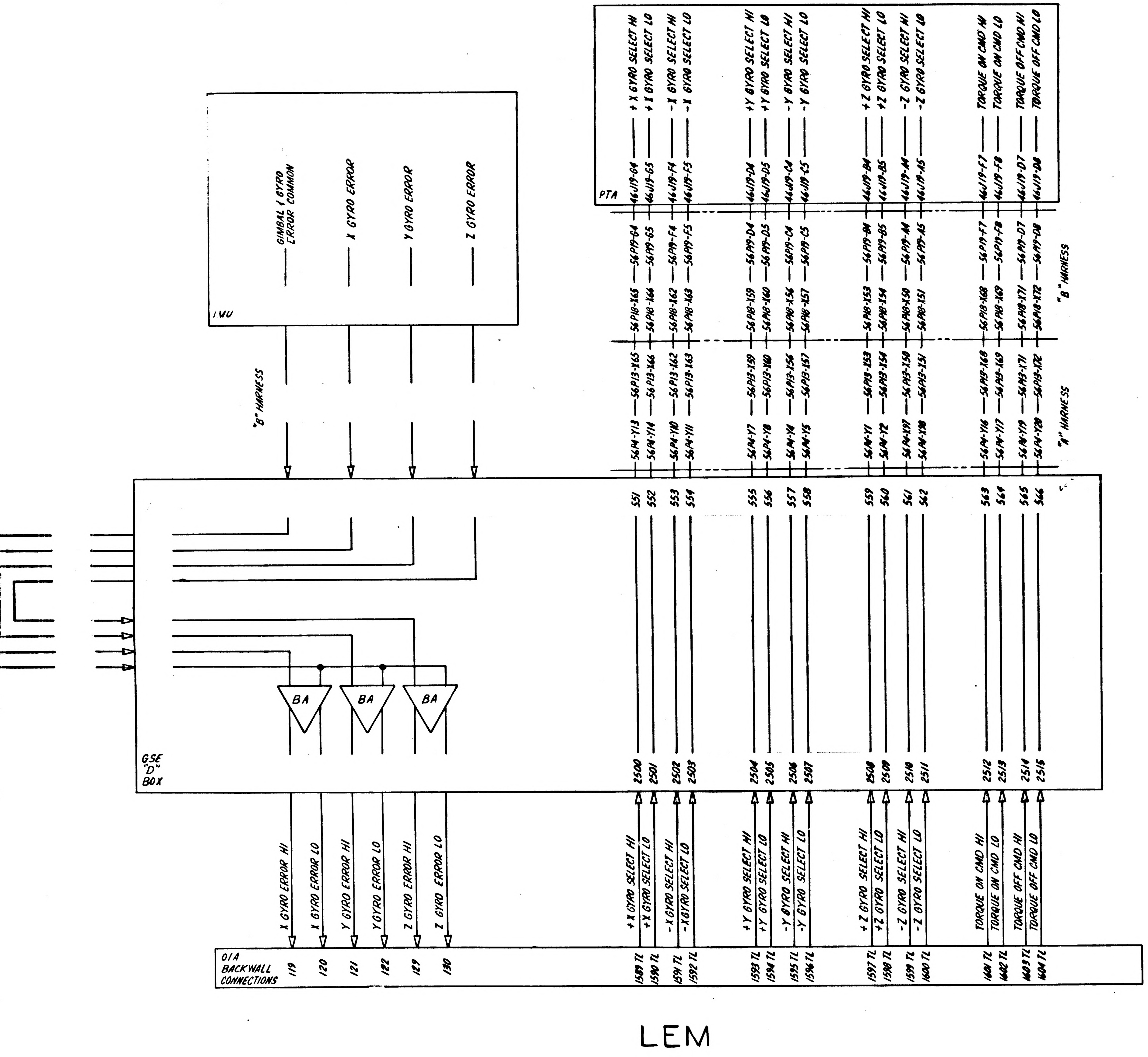

STROBE I
3μ sec
7μ sec
STROBE II
STROBE 0
PIPA SW STROBE I
312 μ sec
CHANGE SCALE
PHASE A, B, C TIMING PULSE FROM CMS
80 ms
(PHASE A)
(PHASE B)
(PHASE C)
± X GYRO SELECT
± Y GYRO SELECT
± Z GYRO SELECT
TORQUE SET
78 ms
TORQUE RESET
2 ms

12. 312 μsec TIME DELAY ONLY IN CIRCUIT AT CUT-OFF TIME.
13. HIGH AND RETURN INVERTED TO CHANGE POSITIVE INPUT PULSES TO NEGATIVE OUTPUT PULSES.


01A BACKWALL CONNECTIONS
129
130
121
122
119
120
XBR-A, PSS(129), RSS-C, MS1(129)
XBR-A, PSS(130), RSS-C, MS1(130)
XBR-A, PSS(121), RSS-C, MS1(121)
Z GYRO ERROR HI
Z GYRO ERROR LO
Y GYRO ERROR HI
Y GYRO ERROR LO
X GYRO ERROR HI
X GYRO ERROR LO
PSS(20), RSS-A
PSS(19), RSS-
PSS(22), RSS-
CMS 1605 TL
CMS 1606 TL
X IRIG SELECT PHASE A HI
X IRIG SELECT PHASE A RET
1605 TL
1606 TL
CMS 858
CMS 859
+X IRIG SET HI
+X IRIG SET RET
858
859
CMS 860
CMS 861
-X IRIG SET HI
-X IRIG SET RET
860
861
CMS 857
CMS 856
+Y IRIG SET HI
+Y IRIG SET RET
857
856
CMS 865
CMS 864
-Y IRIG SET HI
-Y IRIG SET RET
865
864
CMS 863
CMS 862
+Z IRIG SET HI
+Z IRIG SET RET
863
862
CMS 866
CMS 867
-Z IRIG SET HI
-Z IRIG SET RET
866
867
CMS 1607 TL
CMS 1608 TL
Y IRIG SELECT PHASE B HI
Y IRIG SELECT PHASE B RET
1607 TL
1608 TL
CMS 1609 TL
CMS 1610 TL
Z IRIG SELECT PHASE C HI
Z IRIG SELECT PHASE C RET
1609 TL
1610 TL
SEE NOTE 8
CMS 1611 TL
CMS 1612 TL
CMS 1658 TL
CMS 1659 TL
PIPA SWITCHING HI
PIPA SWITCHING RET
GYRO TORQUE DISCRETE HI
GYRO TORQUE DISCRETE RET
1611 TL
1612 TL
1658 TL
1659 TL
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
LO
SEE NOTE 9
INVERTER
SEE NOTE 13
1579 TL
1614 W
1615 W
1616 W
1617 W
1618 W
1619 W
1620 W
1621 W
1622 W
1623 W
1624 W
1625 W
1644 W
1645 TL
1568 TL
1570 TL
1572 TL
BLOCK II-LEM STATUS
27 VDC RLP HI
+X IRIG SET RET
+X IRIG SET HI
-X IRIG SET RET
-X IRIG SET HI
+Y IRIG SET RET
+Y IRIG SET HI
-Y IRIG SET RET
-Y IRIG SET HI
+Z IRIG SET RET
+Z IRIG SET HI
-Z IRIG SET RET
-Z IRIG SET HI
BLK I SERIES 100 INDICATION
NOT BLK I SERIES 100 INDICATION
X IRIG CAGE COMMAND
Y IRIG CAGE COMMAND
Z IRIG CAGE COMMAND
TCL 1579 TL
PSS 1614 W
PSS 1615 W
PSS 1616 W
PSS 1617 W
PSS 1618 W
PSS 1619 W
PSS 1620 W
PSS 1621 W
PSS 1622 W
PSS 1623 W
PSS 1624 W
PSS 1625 W
MPL 1644 W
MPL 1645 TL
TCL 1568 TL
TCL 1570 TL
TCL 1572 TL
1571 TL

2900200	REV LTR	SH 1

MIL FORM 1050 J3


IMU
GIMBAL & GYRO ERROR COMMON
X GYRO ERROR
Y GYRO ERROR
Z GYRO ERROR
"B" HARNESS
PTA
+ X GYRO SELECT HI
+ X GYRO SELECT LO
- X GYRO SELECT HI
- X GYRO SELECT LO
+Y GYRO SELECT HI
+Y GYRO SELECT LO
- Y GYRO SELECT HI
- Y GYRO SELECT LO
+ Z GYRO SELECT HI
+Z GYRO SELECT LO
- Z GYRO SELECT HI
- Z GYRO SELECT LO
TORQUE ON CMD HI
TORQUE ON CMD LO
TORQUE OFF CMD HI
TORQUE OFF CMD LO
46J19-G4
46J19-G5
46J19-F4
46J19-F5
46J19-D4
46J19-D5
46J19-C4
46J19-C5
46J19-B4
46J19-B5
46J19-A4
46J19-A5
46J19-F7
46J19-F8
46J19-D7
46J19-D8
56P19-G4
56P19-G5
56P19-F4
56P19-F5
56P19-D4
56P19-D5
56P19-C4
56P19-C5
56P19-B4
56P19-B5
56P19-A4
56P19-A5
56P19-F7
56P19-F8
56P19-D7
56P19-D8
56P18-X65
56P18-X66
56P18-X62
56P18-X63
56P18-X59
56P18-X60
56P18-X56
56P18-X57
56P18-X53
56P18-X54
56P18-X50
56P18-X51
56P18-X68
56P18-X69
56P18-X71
56P18-X72
"B" HARNESS
56P13-X65
56P13-X66
56P13-X62
56P13-X63
56P13-X59
56P13-X60
56P13-X56
56P13-X57
56P13-X53
56P13-X54
56P13-X50
56P13-X51
56P13-X68
56P13-X69
56P13-X71
56P13-X72
56P4-Y13
56P4-Y14
56P4-Y10
56P4-Y11
56P4-Y7
56P4-Y8
56P4-Y4
56P4-Y5
56P4-Y1
56P4-Y2
56P4-X97
56P4-X98
56P4-Y16
56P4-Y17
56P4-Y19
56P4-Y20
"A" HARNESS
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
BA
BA
BA
GSE "D" BOX
2500
2501
2502
2503
2504
2505
2506
2507
2508
2509
2510
2511
2512
2513
2514
2515
X GYRO ERROR HI
X GYRO ERROR LO
Y GYRO ERROR HI
Y GYRO ERROR LO
Z GYRO ERROR HI
Z GYRO ERROR LO
+X GYRO SELECT HI
+X GYRO SELECT LO
-X GYRO SELECT HI
-X GYRO SELECT LO
+Y GYRO SELECT HI
+Y GYRO SELECT LO
-Y GYRO SELECT HI
-Y GYRO SELECT LO
+Z GYRO SELECT HI
+Z GYRO SELECT LO
-Z GYRO SELECT HI
-Z GYRO SELECT LO
TORQUE ON CMD HI
TORQUE ON CMD LO
TORQUE OFF CMD HI
TORQUE OFF CMD LO
O/A BACKWALL CONNECTIONS
119
120
121
122
129
130
1589 TL
1590 TL
1591 TL
1592 TL
1593 TL
1594 TL
1595 TL
1596 TL
1597 TL
1598 TL
1599 TL
1600 TL
1601 TL
1602 TL
1603 TL
1604 TL
LEM

SYM	ZONE	REVISIONS DESCRIPTION	CHG NO	DATE	APPD

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

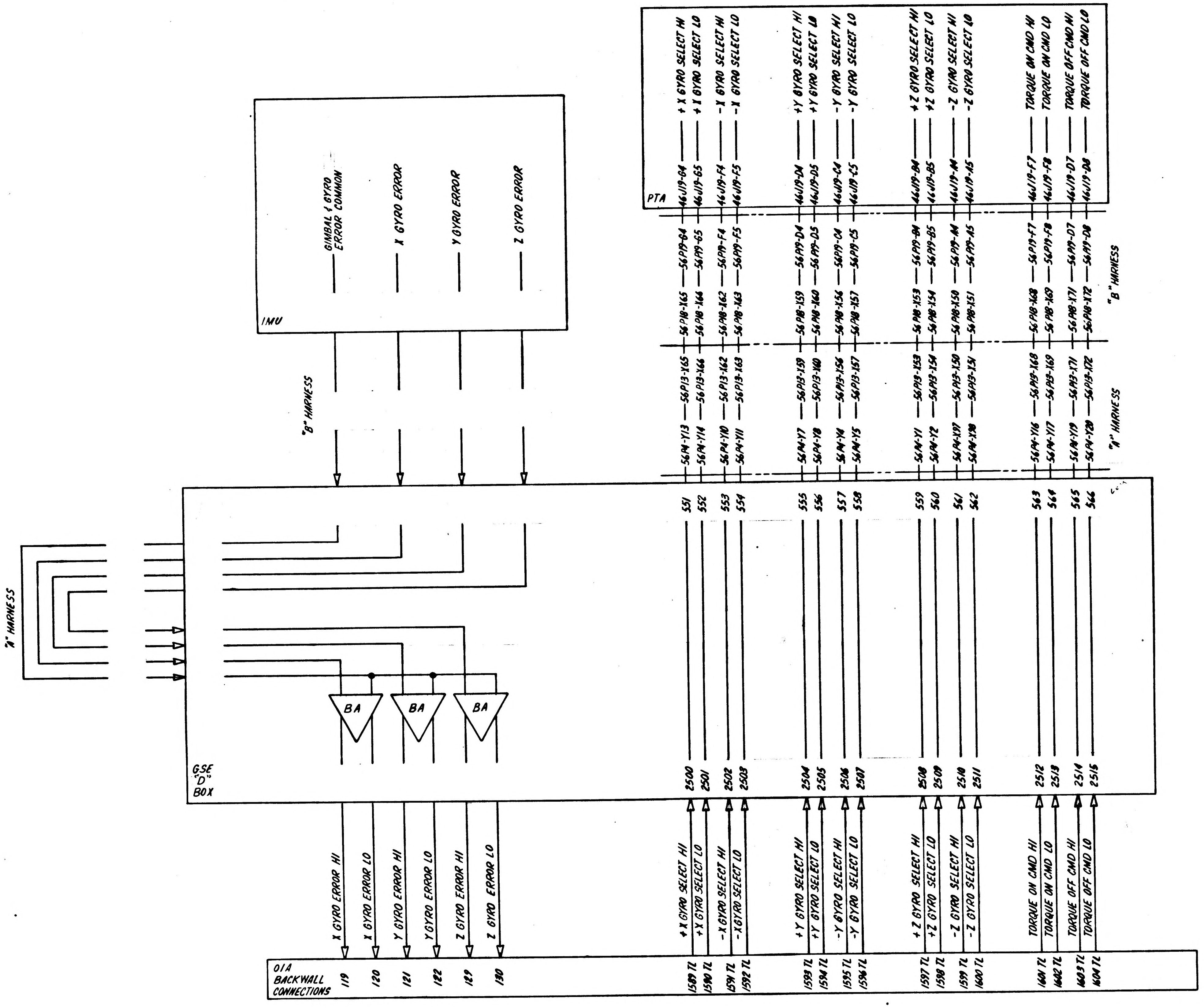
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Kilsinger DATE 11 MAY 65
CHECKED Ed Foster 13 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL 3/10/65
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
GYRO CAGING PANEL
(BLOCK II AND LEM)

CODE IDENT NO. 99974
SIZE J2
2900200
SCALE —
SHEET 2 OF 2

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPR

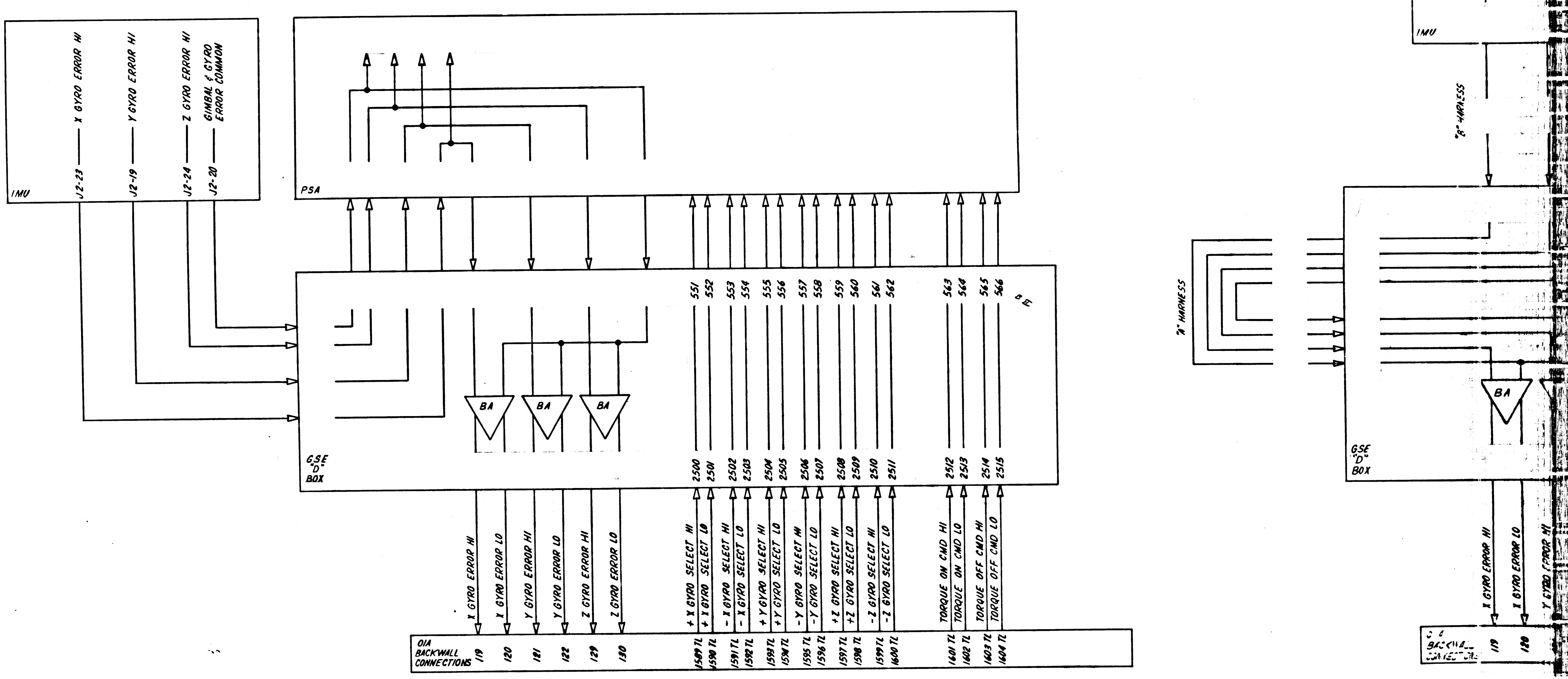


PTA
+X GYRO SELECT HI — 46J19-G4 — 56P19-G4 — 56P18-X65 — 56P13-X65 — 56P4-Y13 — 551
+X GYRO SELECT LO — 46J19-G5 — 56P19-G5 — 56P18-X66 — 56P13-X66 — 56P4-Y14 — 552
-X GYRO SELECT HI — 46J19-F4 — 56P19-F4 — 56P18-X62 — 56P13-X62 — 56P4-Y10 — 553
-X GYRO SELECT LO — 46J19-F5 — 56P19-F5 — 56P18-X63 — 56P13-X63 — 56P4-Y11 — 554
+Y GYRO SELECT HI — 46J19-D4 — 56P19-D4 — 56P18-X59 — 56P13-X59 — 56P4-Y7 — 555
+Y GYRO SELECT LO — 46J19-D5 — 56P19-D5 — 56P18-X60 — 56P13-X60 — 56P4-Y8 — 556
-Y GYRO SELECT HI — 46J19-C4 — 56P19-C4 — 56P18-X56 — 56P13-X56 — 56P4-Y4 — 557
-Y GYRO SELECT LO — 46J19-C5 — 56P19-C5 — 56P18-X57 — 56P13-X57 — 56P4-Y5 — 558
+Z GYRO SELECT HI — 46J19-B4 — 56P19-B4 — 56P18-X53 — 56P13-X53 — 56P4-Y1 — 559
+Z GYRO SELECT LO — 46J19-B5 — 56P19-B5 — 56P18-X54 — 56P13-X54 — 56P4-Y2 — 560
-Z GYRO SELECT HI — 46J19-A4 — 56P19-A4 — 56P18-X50 — 56P13-X50 — 56P4-X97 — 561
-Z GYRO SELECT LO — 46J19-A5 — 56P19-A5 — 56P18-X51 — 56P13-X51 — 56P4-X98 — 562
TORQUE ON CMD HI — 46J19-F7 — 56P19-F7 — 56P18-X68 — 56P13-X68 — 56P4-Y16 — 563
TORQUE ON CMD LO — 46J19-F8 — 56P19-F8 — 56P18-X69 — 56P13-X69 — 56P4-Y17 — 564
TORQUE OFF CMD HI — 46J19-D7 — 56P19-D7 — 56P18-X71 — 56P13-X71 — 56P4-Y19 — 565
TORQUE OFF CMD LO — 46J19-D8 — 56P19-D8 — 56P18-X72 — 56P13-X72 — 56P4-Y20 — 566
"B" HARNESS
"A" HARNESS
IMU
GIMBAL & GYRO ERROR COMMON
X GYRO ERROR
Y GYRO ERROR
Z GYRO ERROR
"B" HARNESS
"A" HARNESS
BA
BA
BA
GSE "D" BOX
2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515
X GYRO ERROR HI — 119
X GYRO ERROR LO — 120
Y GYRO ERROR HI — 121
Y GYRO ERROR LO — 122
Z GYRO ERROR HI — 129
Z GYRO ERROR LO — 130
+X GYRO SELECT HI — 1589 TL
+X GYRO SELECT LO — 1590 TL
-X GYRO SELECT HI — 1591 TL
-X GYRO SELECT LO — 1592 TL
+Y GYRO SELECT HI — 1593 TL
+Y GYRO SELECT LO — 1594 TL
-Y GYRO SELECT HI — 1595 TL
-Y GYRO SELECT LO — 1596 TL
+Z GYRO SELECT HI — 1597 TL
+Z GYRO SELECT LO — 1598 TL
-Z GYRO SELECT HI — 1599 TL
-Z GYRO SELECT LO — 1600 TL
TORQUE ON CMD HI — 1601 TL
TORQUE ON CMD LO — 1602 TL
TORQUE OFF CMD HI — 1603 TL
TORQUE OFF CMD LO — 1604 TL
O/A BACKWALL CONNECTIONS

LEM

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CE HOUSTON, TEXA
DO NOT SCALE THIS DRAWING	ACSP PN	
MATERIAL	DRAWN J. Kilsinger DATE 11 MA 64 CHECKED APPROVAL APPROVAL	MECHANIZATI GYRO CAGI (BLOCK II AND
CONTRACT NAS 9-497	NASA APPROVAL MIT APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 290020 SCALE —

2900200 REV LTR SH 2

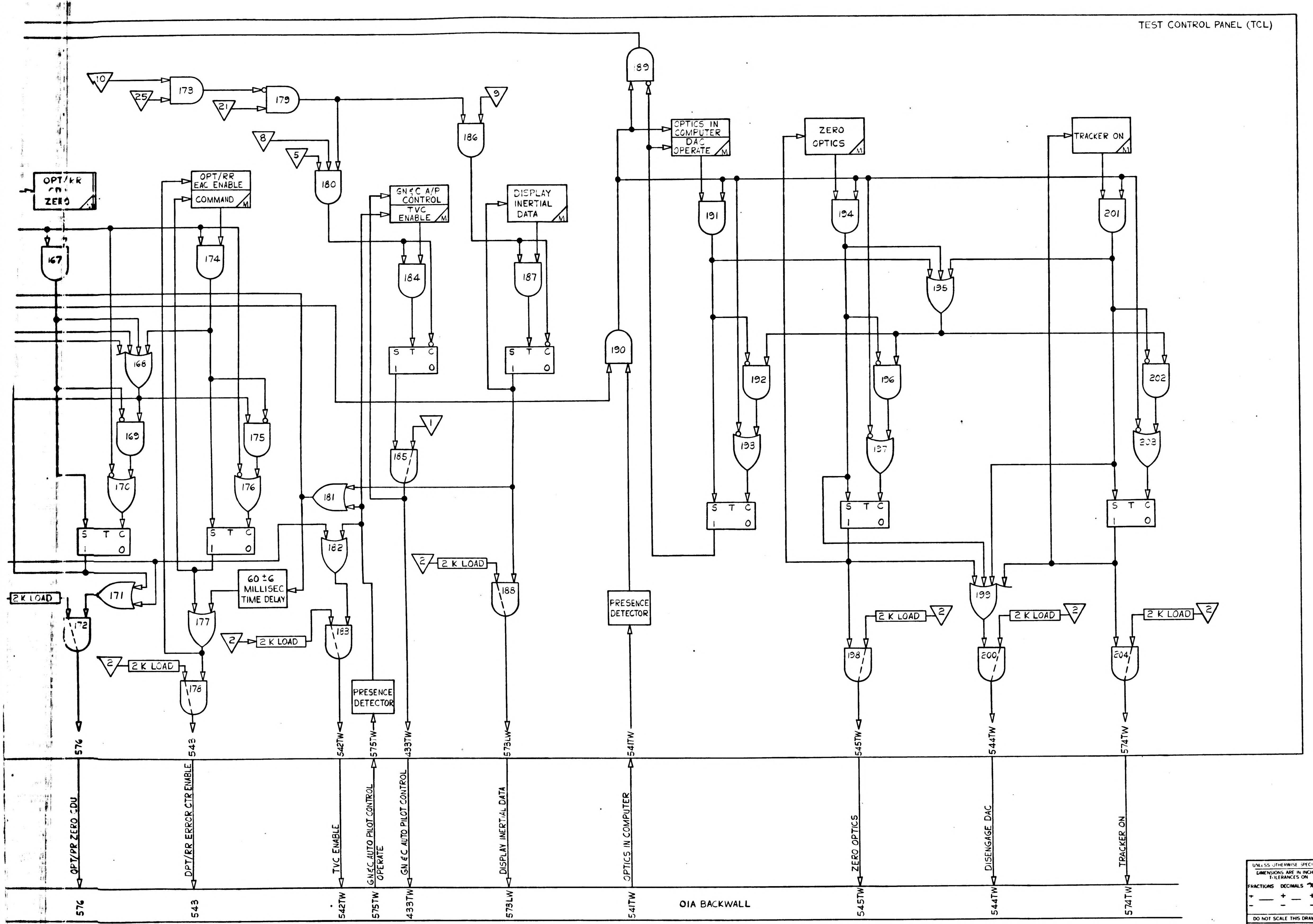

IMU
J2-23 X GYRO ERROR HI
J2-19 Y GYRO ERROR HI
J2-24 Z GYRO ERROR HI
J2-20 GIMBAL & GYRO ERROR COMMON
PSA
GSE "D" BOX
BA
BA
BA
551
552
553
554
555
556
557
558
559
560
561
562
563
564
565
566
2500
2501
2502
2503
2504
2505
2506
2507
2508
2509
2510
2511
2512
2513
2514
2515
X GYRO ERROR HI
X GYRO ERROR LO
Y GYRO ERROR HI
Y GYRO ERROR LO
Z GYRO ERROR HI
Z GYRO ERROR LO
+ X GYRO SELECT HI
+ X GYRO SELECT LO
- X GYRO SELECT HI
- X GYRO SELECT LO
+ Y GYRO SELECT HI
+ Y GYRO SELECT LO
- Y GYRO SELECT HI
- Y GYRO SELECT LO
+ Z GYRO SELECT HI
+ Z GYRO SELECT LO
- Z GYRO SELECT HI
- Z GYRO SELECT LO
TORQUE ON CMD HI
TORQUE ON CMD LO
TORQUE OFF CMD HI
TORQUE OFF CMD LO
OIA BACKWALL CONNECTIONS
119
120
121
122
129
130
1589 TL
1590 TL
1591 TL
1592 TL
1593 TL
1594 TL
1595 TL
1596 TL
1597 TL
1598 TL
1599 TL
1600 TL
1601 TL
1602 TL
1603 TL
1604 TL
IMU
GIMBAL & GYRO ERROR COMMON
"B" HARNESS
"A" HARNESS
GSE "D" BOX
BA
X GYRO ERROR HI
X GYRO ERROR LO
Y GYRO ERROR HI
OIA BACKWALL CONNECTIONS
119
120

BLOCK II

2900200 REV LTR SH 2

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP

REVISIONS 14254


TEST CONTROL PANEL (TCL)
OPT/RR CDU ZERO
OPT/RR EAC ENABLE
COMMAND
M
GN&C A/P CONTROL
TVC ENABLE
DISPLAY INERTIAL DATA
OPTICS IN COMPUTER
DAC OPERATE
ZERO OPTICS
TRACKER ON
10
25
21
8
5
9
1
2
2 K LOAD
173
179
180
186
189
167
174
184
187
191
194
201
195
168
190
192
196
202
169
175
185
193
197
203
170
176
181
S T C
1 0
182
60 ± 6 MILLISEC TIME DELAY
171
172
177
183
178
188
PRESENCE DETECTOR
198
199
200
204
576
543
542TW
575TW
433TW
573LW
541TW
545TW
544TW
574TW
OPT/RR ZERO CDU
OPT/RR ERROR CTR ENABLE
TVC ENABLE
GN&C AUTO PILOT CONTROL OPERATE
GN&C AUTO PILOT CONTROL
DISPLAY INERTIAL DATA
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
OIA BACKWALL

2H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS 2-437

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN

ACSP PN

DRAWN P. Szczurek DATE 10 MAY 65
CHECKED [illegible]
APPROVAL [illegible]
APPROVAL
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
TEST CONTROL PANEL
(BLOCK II & LEM)

CODE IDENT NO 99974
SIZE J2
2900201
SCALE NONE
SHEET 1 OF 5

2900201 REF A SHT 1

2/2900201

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS
   - 2900203 – TEMPERATURE MONITOR & CONTROL PANEL (TMC)
   - 2900208 – POWER AND DUMMY LOAD PANEL-PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL, PSS)
   - 2900223 – GIMBAL POSITION CONTROL PANEL (GPC)
   - 2900207 – MONITOR PANEL (MPL)
   - 2900209 – COMPUTER SIMULATOR INTERFACE (CMS)
   - 2900206 – TEST SELECTOR PANEL (TES)
   - 2900217 – SIGNAL SELECTOR AND MEASUREMENT
     - CROSSBAR - AC SIGNALS (XBR-A)
     - CROSSBAR - DC SIGNALS (XBR-B)
   - 2900218 – OSCILLOGRAPH SIGNAL SELECTION
     - TO FIXED DC CHANNEL (RSS-B)
     - TO SWITCHABLE AC CHANNEL (RSS-C)
   - 2900200 – GYRO CAGING PANEL (GCP)
   - 2900210 – AC POWER PROTECTION PANEL AND POWER DISTRIBUTION (FTR)
     - RELAY AND LAMP POWER SUPPLY (RLP)
   - 2900213 – GSE GROUNDING
4. NON STANDARD SYMBOLOGY

INDICATES "AND" GATE WITH SWITCHED SIGNAL

NAME / NAME M — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME / NAME A — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION)

NAME M — INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME A — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

NAME M — INDICATES UNLIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME — INDICATES INDICATOR LIGHT

5. T, W AND L SUFFIXES ON INTERFACE NUMBERS DENOTE FUNCTIONAL USAGE OF THAT INTERFACE. INTERPRET AS FOLLOWS:
   - T - UNIQUE TO BLOCK II CONFIGURATION
   - W - UNIQUE TO BLOCK I SERIES 100 CONFIGURATION
   - L - UNIQUE TO LEM CONFIGURATION
   - TW, TL, OR LW - COMMON TO THE TWO INDICATED CONFIGURATIONS
   - NO SUFFIX - COMMON TO ALL THREE CONFIGURATIONS
6. ALL TIME DELAYS SHALL HAVE RESET TIMES OF 20 MS OR LESS.
7. SIGNAL REFERENCE:

▽1 = G & N + 28 VDC HI
▽2 = G & N + 28 VDC LO
▽3 = 27 VDC HI OIA ON
▽4 = 27 VDC RLP LO
▽5 = OPTICS POWER ON
▽6 = CGC/LGC POWER ON
▽7 = OSS LEVEL TEST

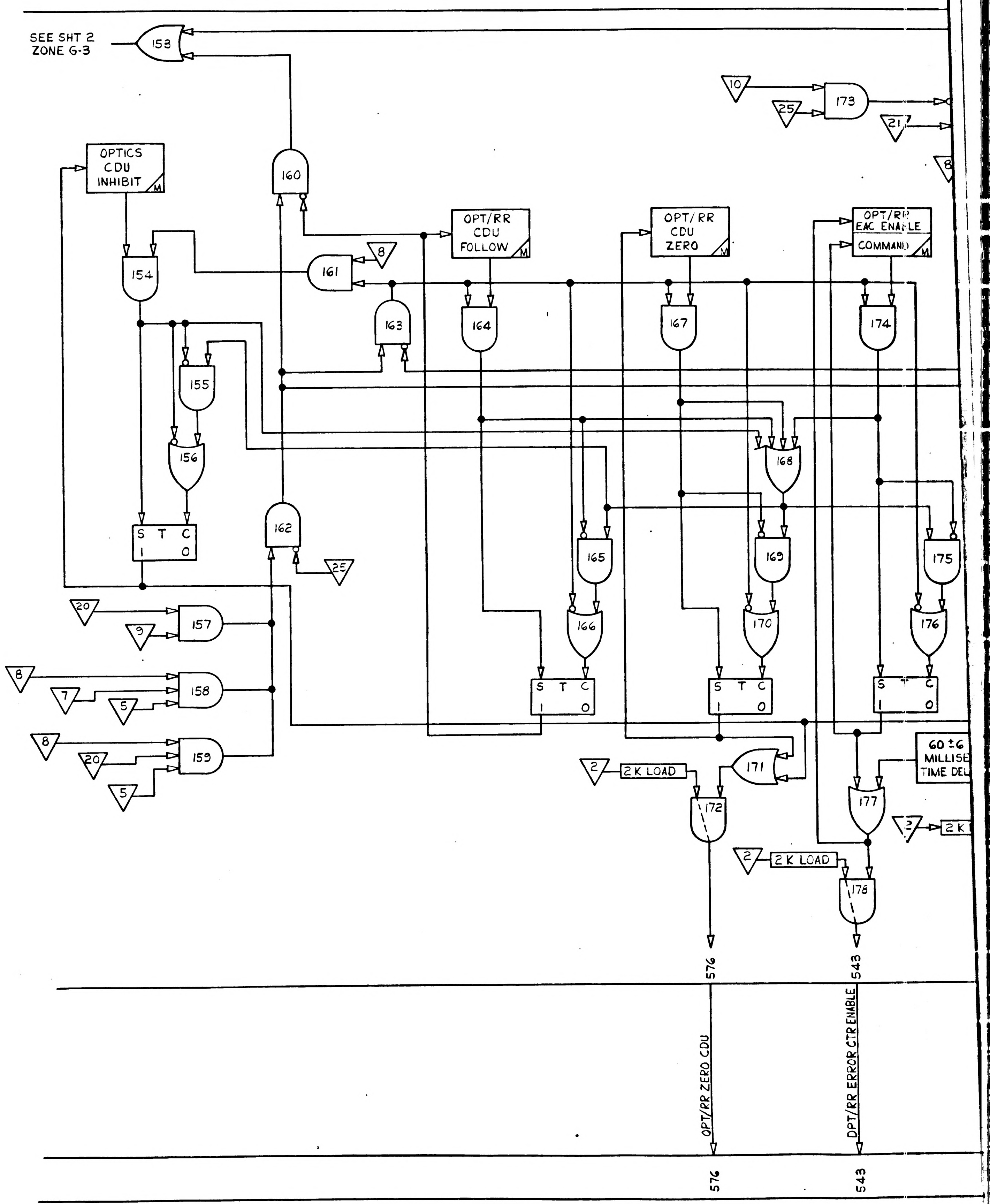
SIGNAL REFERENCE (CONT.)

▽8 = BLOCK II TEST CONFIG
▽9 = LEM TEST CONFIG
▽10 = ISS LEVEL TEST
▽11 = ISS STANDBY
▽12 = GYRO TORQUING ENABLED
▽13 = PIPA LOOPS INHIBITED
▽14 = ISS LEVEL STANDBY
▽15 = ISS LEVEL OPERATE
▽16 = ISS OPERATE
▽17 = WHEELS STOPPED
▽18 = SELECT COARSE ALIGN
▽19 = ENABLE WHEELS OFF
▽20 = ISS LEVEL OPERATE + 90 SEC
▽21 = OPERATE + 90 SEC
▽22 = OSS LEVEL OPTICS POWER ON
▽23 = TURN ON-LOOPS CLOSED
▽24 = TURN ON-LOOPS OPEN
▽25 = MASTER RESET DEPRESSED

8. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

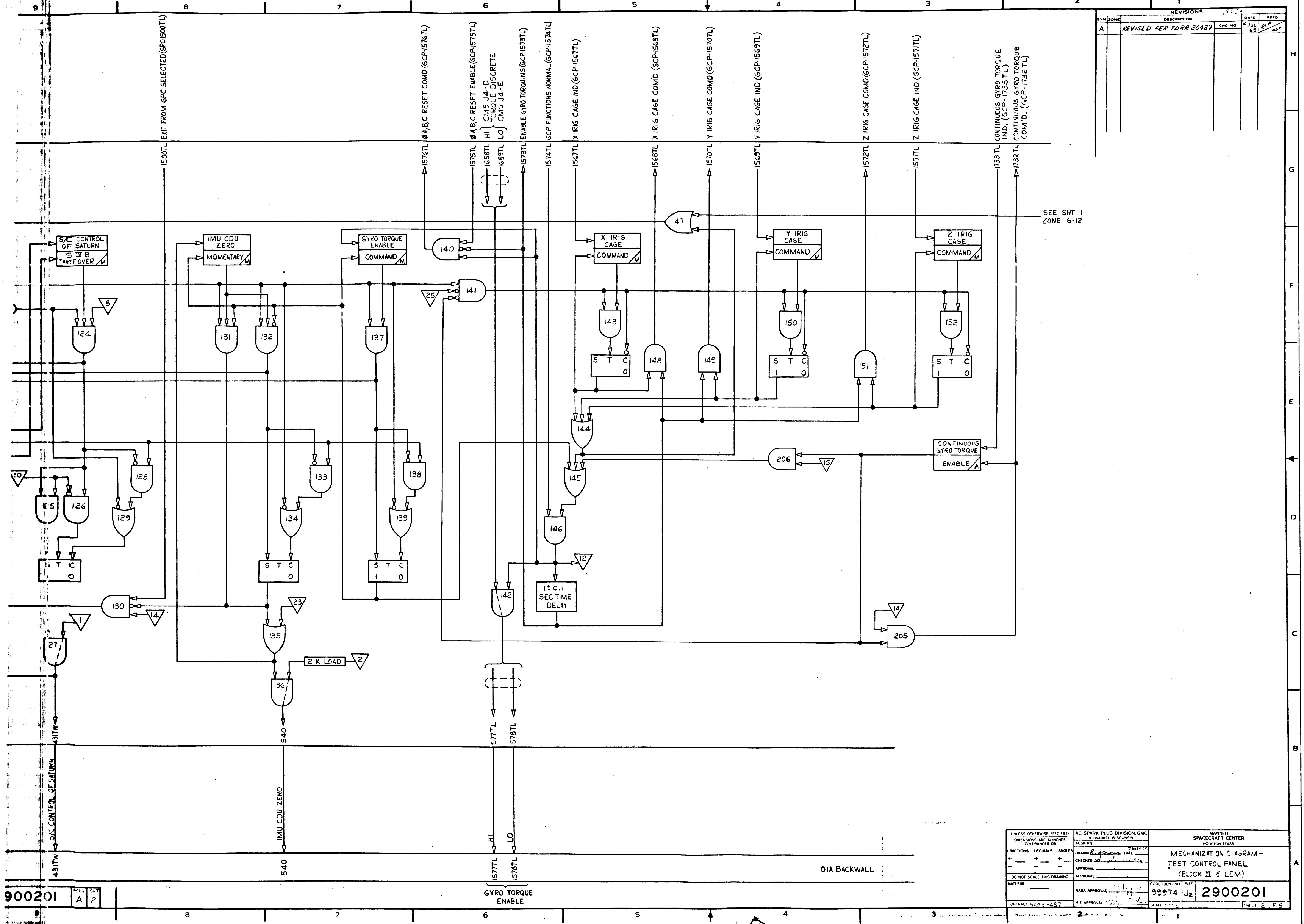
BLOCK II	SH 3	SH 2	SH 1
		SH 4	
LEM	SH 3	SH 2	SH 1
		SH 5	

9. AS A DESIGN GOAL, THE INTERCONNECTIONS BETWEEN THE A/B COMPONENT AND THE GSE WILL BE MAINTAINED AS INTERFACE DEVICES.


SEE SHT 2 ZONE G-3
153
10
25
173
21
8
OPTICS CDU INHIBIT M
160
OPT/RR CDU FOLLOW M
OPT/RR CDU ZERO M
OPT/RR EAC ENABLE COMMAND M
154
161
8
163
164
167
174
155
156
168
162
165
169
175
S T C 1 0
25
20
9
157
166
170
176
8
7
5
158
8
20
5
159
60 ± 6 MILLISE TIME DEL
2 K LOAD
171
172
177
3
2 K
2
2 K LOAD
178
576
OPT/RR ZERO CDU
576
543
OPT/RR ERROR CTR ENABLE
543

	REV	SHT
2900201	A	1

1-2900201


9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
1500TL EXIT FROM GPC SELECTED (GPC-1500TL)
1576TL ØA,B,C RESET COMD (GCP-1576TL)
1575TL ØA,B,C RESET ENABLE (GCP-1575TL)
1658TL HI
1659TL LO
CMS J4-D
TORQUE DISCRETE
CMS J4-E
1573TL ENABLE GYRO TORQUING (GCP-1573TL)
1574TL GCP FUNCTIONS NORMAL (GCP-1574TL)
1567TL X IRIG CAGE IND (GCP-1567TL)
1568TL X IRIG CAGE COMD (GCP-1568TL)
1570TL Y IRIG CAGE COMD (GCP-1570TL)
1569TL Y IRIG CAGE IND (GCP-1569TL)
1572TL Z IRIG CAGE COMD (GCP-1572TL)
1571TL Z IRIG CAGE IND (GCP-1571TL)
1733 TL CONTINUOUS GYRO TORQUE IND. (GCP-1733 TL)
1732TL CONTINUOUS GYRO TORQUE COM'D. (GCP-1732 TL)
SEE SHT 1
ZONE G-12
S/C CONTROL OF SATURN
S IV B TAKEOVER
M
IMU CDU ZERO
MOMENTARY
M
GYRO TORQUE ENABLE
COMMAND
M
X IRIG CAGE
COMMAND
M
Y IRIG CAGE
COMMAND
M
Z IRIG CAGE
COMMAND
M
CONTINUOUS GYRO TORQUE
ENABLE
A
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
205
206
S T C
1 0
8
10
1
14
23
25
12
15
14
2 K LOAD
2
1±0.1 SEC TIME DELAY
431TW
S/C CONTROL OF SATURN
431TW
540
IMU CDU ZERO
540
1577TL
1578TL
HI
LO
1577TL
1578TL
GYRO TORQUE ENABLE
OIA BACKWALL
2H

REVISIONS		19254			
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20489		2 JUL 65	RLP MCH

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN R. Arvesse DATE 7 MAY 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

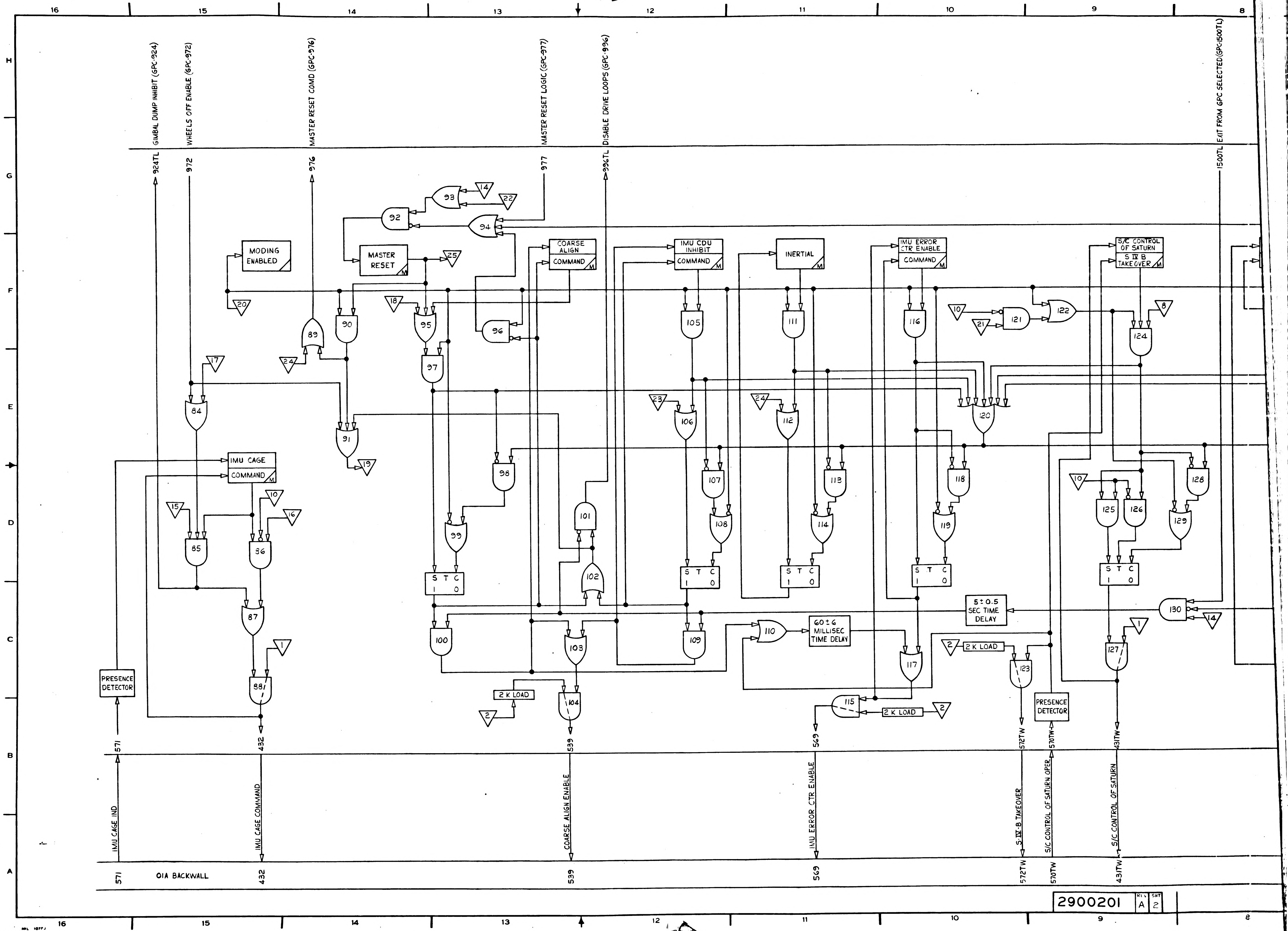
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM –
TEST CONTROL PANEL
(BLOCK II & LEM)

CODE IDENT NO 99974
SIZE J_2
2900201
SCALE NONE
SHEET 2 OF 5

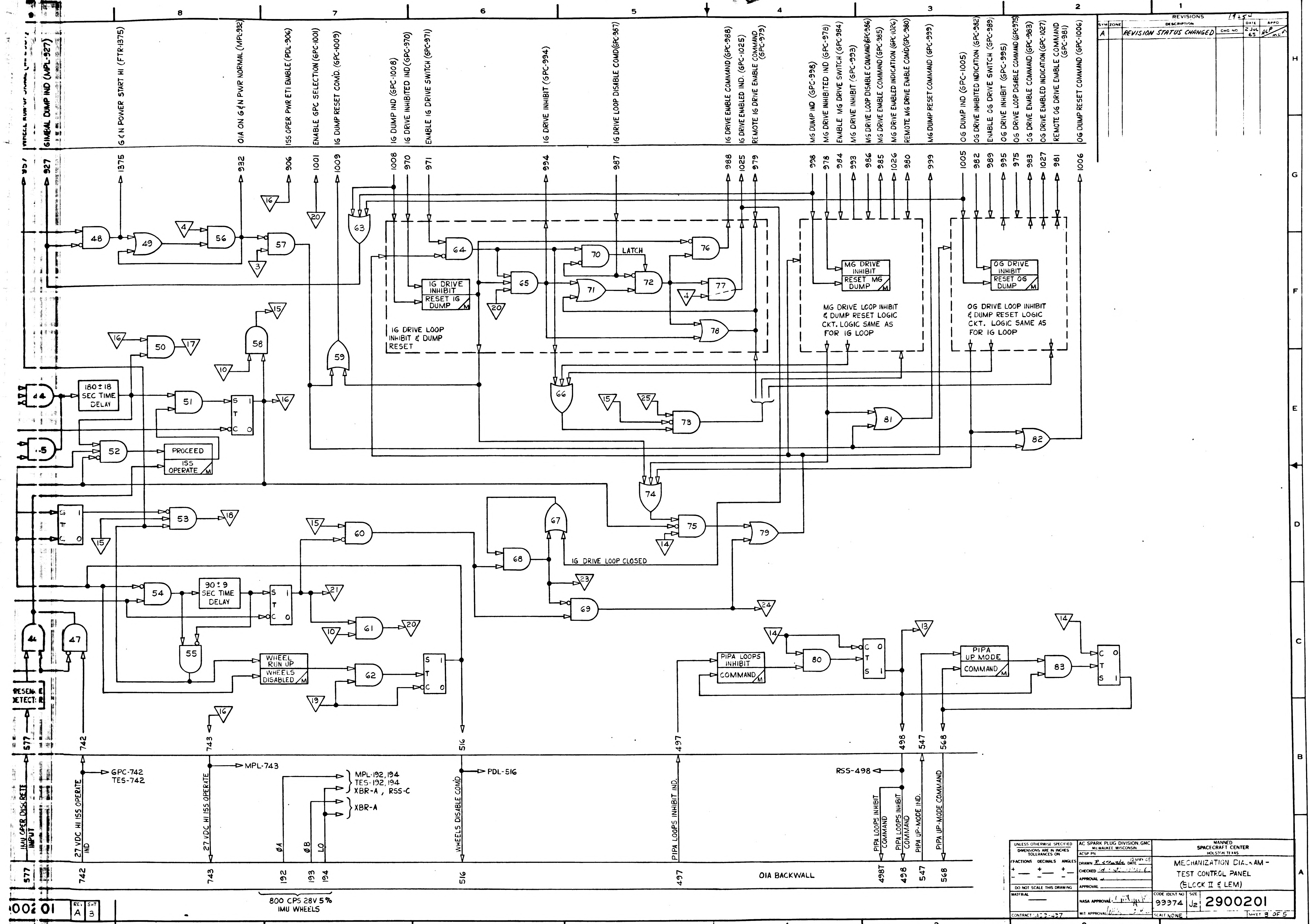
900201 | A | 2

2/2900201


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
GIMBAL DUMP INHIBIT (GPC-924)
WHEELS OFF ENABLE (GPC-972)
MASTER RESET COMD (GPC-976)
MASTER RESET LOGIC (GPC-977)
DISABLE DRIVE LOOPS (GPC-996)
1500TL EXIT FROM GPC SELECTED (GPC-1500TL)
924TL
972
976
977
996TL
MODING ENABLED
MASTER RESET
COARSE ALIGN COMMAND
IMU CDU INHIBIT COMMAND
INERTIAL
IMU ERROR CTR ENABLE COMMAND
S/C CONTROL OF SATURN
S IV B TAKEOVER
IMU CAGE COMMAND
M
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
S T C
1 0
60 ± 6 MILLISEC TIME DELAY
5 ± 0.5 SEC TIME DELAY
2 K LOAD
PRESENCE DETECTOR
1
2
8
10
14
15
16
17
18
19
20
21
22
23
24
25
571
432
539
569
572TW
570TW
431TW
IMU CAGE IND
IMU CAGE COMMAND
COARSE ALIGN ENABLE
IMU ERROR CTR ENABLE
S-IV-B TAKEOVER
S/C CONTROL OF SATURN OPER
S/C CONTROL OF SATURN
OIA BACKWALL
MIL 1077

2900201	REV A	SHT 2

1/2900201


WHEEL RUN-UP SIGNAL (MPL-937)
GIMBAL DUMP IND (MPL-927)
G & N POWER START HI (FTR-1375)
OIA ON G & N PWR NORMAL (MPL-932)
ISS OPER PWR ETI ENABLE (PDL-906)
ENABLE GPC SELECTION (GPC-1001)
IG DUMP RESET COMD. (GPC-1009)
IG DUMP IND (GPC-1008)
IG DRIVE INHIBITED IND (GPC-970)
ENABLE IG DRIVE SWITCH (GPC-971)
IG DRIVE INHIBIT (GPC-994)
IG DRIVE LOOP DISABLE COMD (GPC-987)
IG DRIVE ENABLE COMMAND (GPC-988)
IG DRIVE ENABLED IND. (GPC-1025)
REMOTE IG DRIVE ENABLE COMMAND (GPC-979)
MG DUMP IND (GPC-998)
MG DRIVE INHIBITED IND (GPC-978)
ENABLE MG DRIVE SWITCH (GPC-984)
MG DRIVE INHIBIT (GPC-993)
MG DRIVE LOOP DISABLE COMMAND (GPC-986)
MG DRIVE ENABLE COMMAND (GPC-985)
MG DRIVE ENABLED INDICATION (GPC-1026)
REMOTE MG DRIVE ENABLE COMD (GPC-980)
MG DUMP RESET COMMAND (GPC-999)
OG DUMP IND (GPC-1005)
OG DRIVE INHIBITED INDICATION (GPC-982)
ENABLE OG DRIVE SWITCH (GPC-989)
OG DRIVE INHIBIT (GPC-995)
OG DRIVE LOOP DISABLE COMMAND (GPC-975)
OG DRIVE ENABLE COMMAND (GPC-983)
OG DRIVE ENABLED INDICATION (GPC-1027)
REMOTE OG DRIVE ENABLE COMMAND (GPC-981)
OG DUMP RESET COMMAND (GPC-1006)
937 927 1375 932 906 1001 1009 1008 970 971 994 987 988 1025 979 998 978 984 993 986 985 1026 980 999 1005 982 989 995 975 983 1027 981 1006
8 7 6 5 4 3 2 1
H G F E D C B A
48 49 56 57 63 64 65 70 71 72 76 77 78 LATCH
IG DRIVE INHIBIT
RESET IG DUMP
M
IG DRIVE LOOP INHIBIT & DUMP RESET
MG DRIVE INHIBIT
RESET MG DUMP
MG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
OG DRIVE INHIBIT
RESET OG DUMP
OG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
16 20 4 3 15 17 10 25 14 18 21 23 24 19 13
44 .5 180 ± 18 SEC TIME DELAY
50 51 52 53 58 59 66 73 81 82
S I T C O
PROCEED
ISS OPERATE
74 75 79 67 68 69 60 61 62 54 55 47
IG DRIVE LOOP CLOSED
90 ± 9 SEC TIME DELAY
WHEEL RUN UP
WHEELS DISABLED
PRESENCE DETECTOR
PIPA LOOPS INHIBIT
COMMAND
80 83
PIPA UP MODE
742 743 516 497 498 547 568 577
GPC-742
TES-742
MPL-743
MPL-192, 194
TES-192, 194
XBR-A , RSS-C
XBR-A
PDL-516
RSS-498
IMU OPER DISCRETE INPUT
27 VDC HI ISS OPERATE IND
27 VDC HI ISS OPERATE
ØA ØB LO
WHEELS DISABLE COMD
PIPA LOOPS INHIBIT IND.
PIPA LOOPS INHIBIT COMMAND
PIPA LOOPS INHIBIT COMMAND
PIPA UP-MODE IND.
PIPA UP-MODE COMMAND
192 193 194
OIA BACKWALL
498T
800 CPS 28V 5%
IMU WHEELS
ZH

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 Jul 65	RLP MCM

1925

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ ± ___ ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ___
CONTRACT NAS 9-427

AC SPARK PLUG DIVISION. GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN R. Schwabe DATE 10 MAY 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

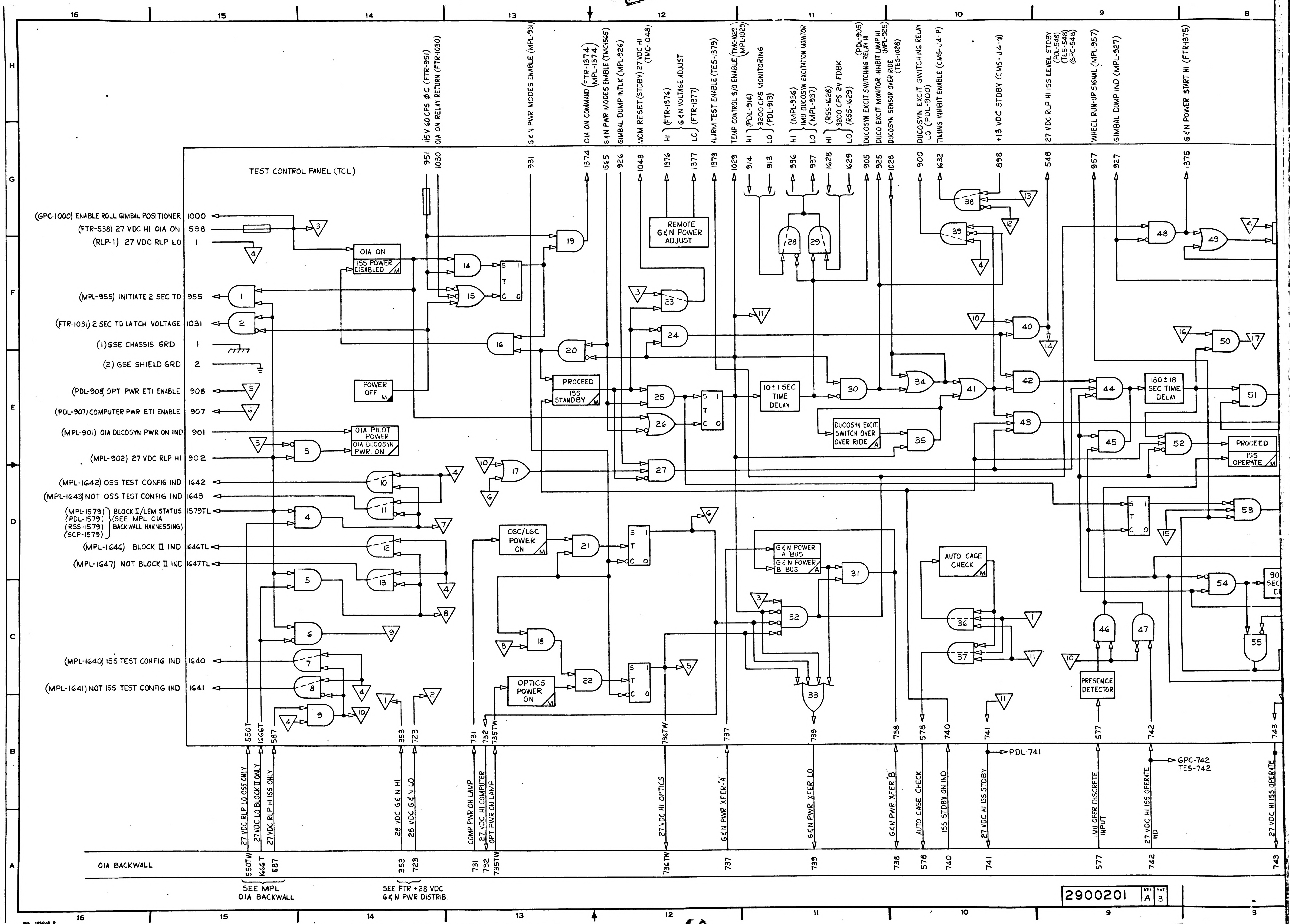
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM -
TEST CONTROL PANEL
(BLOCK II & LEM)

CODE IDENT NO 99974
SIZE J2
2900201
SCALE NONE
SHEET 3 OF 5

002 01
REV A
SHT 3

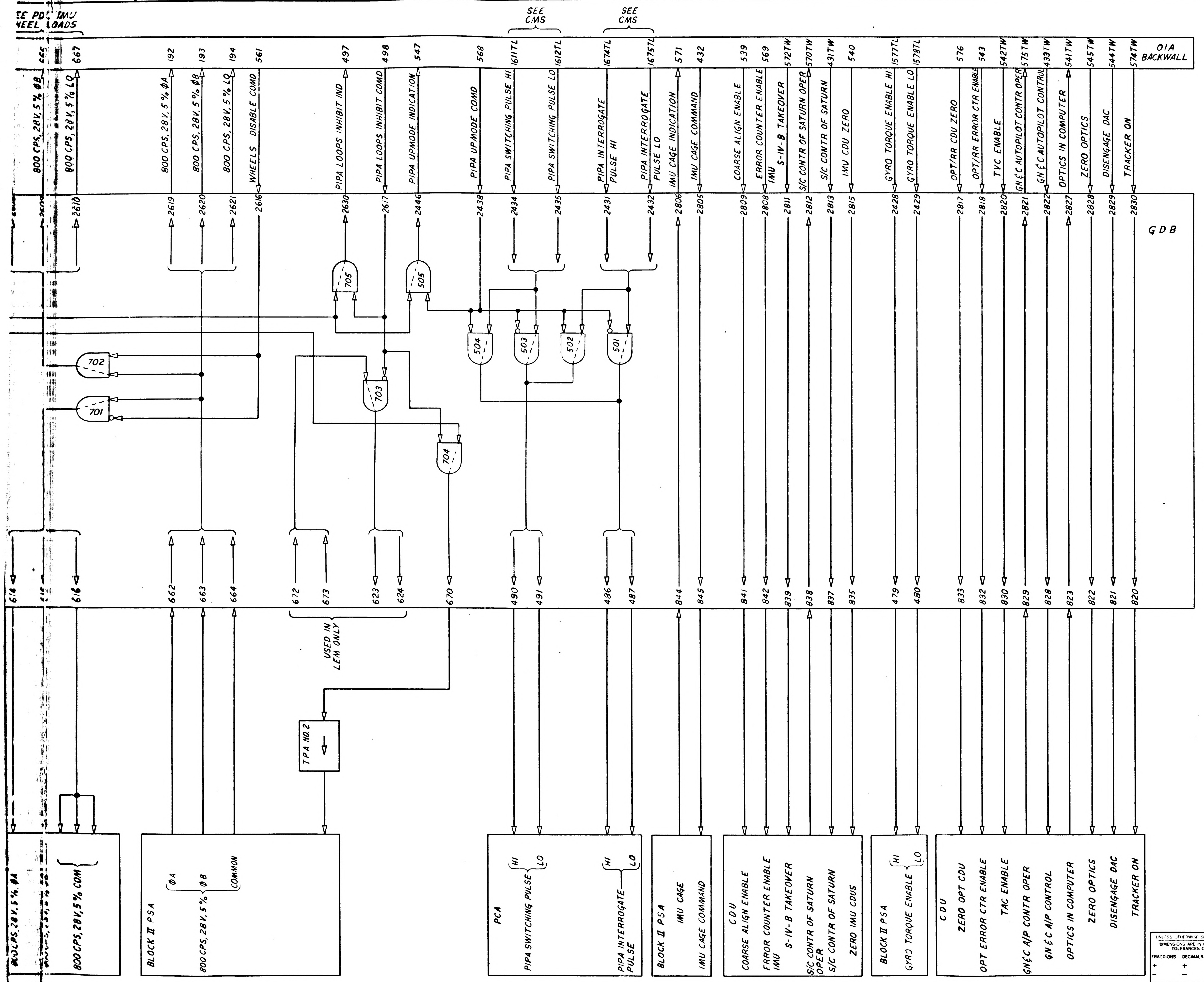
2/2900201



TEST CONTROL PANEL (TCL)
(GPC-1000) ENABLE ROLL GIMBAL POSITIONER 1000
(FTR-538) 27 VDC HI OIA ON 538
(RLP-1) 27 VDC RLP LO 1
(MPL-955) INITIATE 2 SEC TD 955
(FTR-1031) 2 SEC TD LATCH VOLTAGE 1031
(1) GSE CHASSIS GRD 1
(2) GSE SHIELD GRD 2
(PDL-908) OPT PWR ETI ENABLE 908
(PDL-907) COMPUTER PWR ETI ENABLE 907
(MPL-901) OIA DUCOSYN PWR ON IND 901
(MPL-902) 27 VDC RLP HI 902
(MPL-1642) OSS TEST CONFIG IND 1642
(MPL-1643) NOT OSS TEST CONFIG IND 1643
(MPL-1579) (PDL-1579) (RSS-1579) (GCP-1579) BLOCK II/LEM STATUS (SEE MPL OIA BACKWALL HARNESSING) 1579TL
(MPL-1646) BLOCK II IND 1646TL
(MPL-1647) NOT BLOCK II IND 1647TL
(MPL-1640) ISS TEST CONFIG IND 1640
(MPL-1641) NOT ISS TEST CONFIG IND 1641
115V 60CPS ØC (FTR-951) 951
OIA ON RELAY RETURN (FTR-1030) 1030
G&N PWR MODES ENABLE (MPL-931) 931
OIA ON COMMAND (FTR-1374) (MPL-1374) 1374
G&N PWR MODES ENBLE (TMC-1565) 1565
GIMBAL DUMP INTLK (MPL-926) 926
MOM RESET (STDBY) 27 VDC HI (TMC-1048) 1048
HI (FTR-1376) G&N VOLTAGE ADJUST 1376
LO (FTR-1377) 1377
ALARM TEST ENABLE (TES-1379) 1379
TEMP CONTROL S/O ENABLE (TMC-1029) (MPL-1029) 1029
HI (PDL-914) 3200 CPS MONITORING 914
LO (PDL-913) 913
HI (MPL-936) IMU DUCOSYN EXCITATION MONITOR 936
LO (MPL-937) 937
HI (RSS-1628) 3200 CPS 2V FDBK 1628
LO (RSS-1629) 1629
DUCOSYN EXCIT SWITCHING RELAY HI (PDL-905) 905
DUCO EXCIT MONITOR INHIBIT LAMP HI (MPL-925) 925
DUCOSYN SENSOR OVER RIDE (TES-1028) 1028
DUCOSYN EXCIT SWITCHING RELAY LO (PDL-900) 900
TIMING INHIBIT ENABLE (CMS-J4-P) 1632
+13 VDC STDBY (CMS-J4-?) 898
27 VDC RLP HI ISS LEVEL STDBY (PDL-548) (TES-548) (GPC-548) 548
WHEEL RUN-UP SIGNAL (MPL-957) 957
GIMBAL DUMP IND (MPL-927) 927
G&N POWER START HI (FTR-1375) 1375
OIA ON
ISS POWER DISABLED M
POWER OFF M
PROCEED
ISS STANDBY M
OIA PILOT POWER
OIA DUCOSYN PWR. ON
REMOTE G&N POWER ADJUST
10 ± 1 SEC TIME DELAY
DUCOSYN EXCIT SWITCH OVER OVER RIDE A
CGC/LGC POWER ON M
OPTICS POWER ON M
G&N POWER A BUS
G&N POWER B BUS A
AUTO CAGE CHECK M
PRESENCE DETECTOR
180 ± 18 SEC TIME DELAY
PROCEED
ISS OPERATE M
90 SEC
S T C 1 0
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
550T 1666T 587 353 723 731 732 735TW 736TW 737 739 738 578 740 741 577 742 743
27 VDC RLP LO OSS ONLY
27 VDC LO BLOCK II ONLY
27 VDC RLP HI ISS ONLY
28 VDC G&N HI
28 VDC G&N LO
COMP PWR ON LAMP
27 VDC HI COMPUTER
OPT PWR ON LAMP
27 VDC HI OPTICS
G&N PWR XFER "A"
G&N PWR XFER LO
G&N PWR XFER "B"
AUTO CAGE CHECK
ISS STDBY ON IND
27 VDC HI ISS STDBY
PDL-741
IMU OPER DISCRETE INPUT
27 VDC HI ISS OPERATE IND
GPC-742 TES-742
27 VDC HI ISS OPERATE
OIA BACKWALL
550TW 1666T 587 353 723 731 732 735TW 736TW 737 739 738 578 740 741 577 742 743
SEE MPL OIA BACKWALL
SEE FTR +28 VDC G&N PWR DISTRIB.
16 15 14 13 12 11 10 9 8
H G F E D C B A
2900201 REV A SHT 3

1/2900201

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP / MGM


SEE PD IMU WHEEL LOADS
SEE CMS
SEE CMS
OIA BACKWALL
667
192
193
194
561
497
498
547
568
1611TL
1612TL
1674TL
1675TL
571
432
539
569
572TW
570TW
431TW
540
1577TL
1578TL
576
543
542TW
575TW
433TW
541TW
545TW
544TW
574TW
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
PIPA LOOPS INHIBIT IND
PIPA LOOPS INHIBIT COMD
PIPA UPMODE INDICATION
PIPA UPMODE COMD
PIPA SWITCHING PULSE HI
PIPA SWITCHING PULSE LO
PIPA INTERROGATE PULSE HI
PIPA INTERROGATE PULSE LO
IMU CAGE INDICATION
IMU CAGE COMMAND
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
S-IV-B TAKEOVER
S/C CONTR OF SATURN OPER
S/C CONTR OF SATURN
IMU CDU ZERO
GYRO TORQUE ENABLE HI
GYRO TORQUE ENABLE LO
OPT/RR CDU ZERO
OPT/RR ERROR CTR ENABLE
TVC ENABLE
GN&C AUTOPILOT CONTR OPER
GN&C AUTOPILOT CONTROL
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
2610
2619
2620
2621
2616
2630
2617
2446
2438
2434
2435
2431
2432
2806
2805
2809
2808
2811
2812
2813
2815
2428
2429
2817
2818
2820
2821
2822
2827
2828
2829
2830
GDB
705
505
504
503
502
501
702
701
703
704
614
616
662
663
664
672
673
623
624
670
490
491
486
487
844
845
841
842
839
838
837
835
479
480
833
832
830
829
828
823
822
821
820
USED IN LEM ONLY
TPA NO 2
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% COM
BLOCK II PSA
ØA
800 CPS, 28V, 5% ØB
COMMON
PCA
PIPA SWITCHING PULSE
HI
LO
PIPA INTERROGATE PULSE
HI
LO
BLOCK II PSA
IMU CAGE
IMU CAGE COMMAND
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
S-IV-B TAKEOVER
S/C CONTR OF SATURN OPER
S/C CONTR OF SATURN
ZERO IMU CDUS
BLOCK II PSA
GYRO TORQUE ENABLE
HI
LO
CDU
ZERO OPT CDU
OPT ERROR CTR ENABLE
TAC ENABLE
GN&C A/P CONTR OPER
GN&C A/P CONTROL
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
2900201
REV LTR A
SH 4
2H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

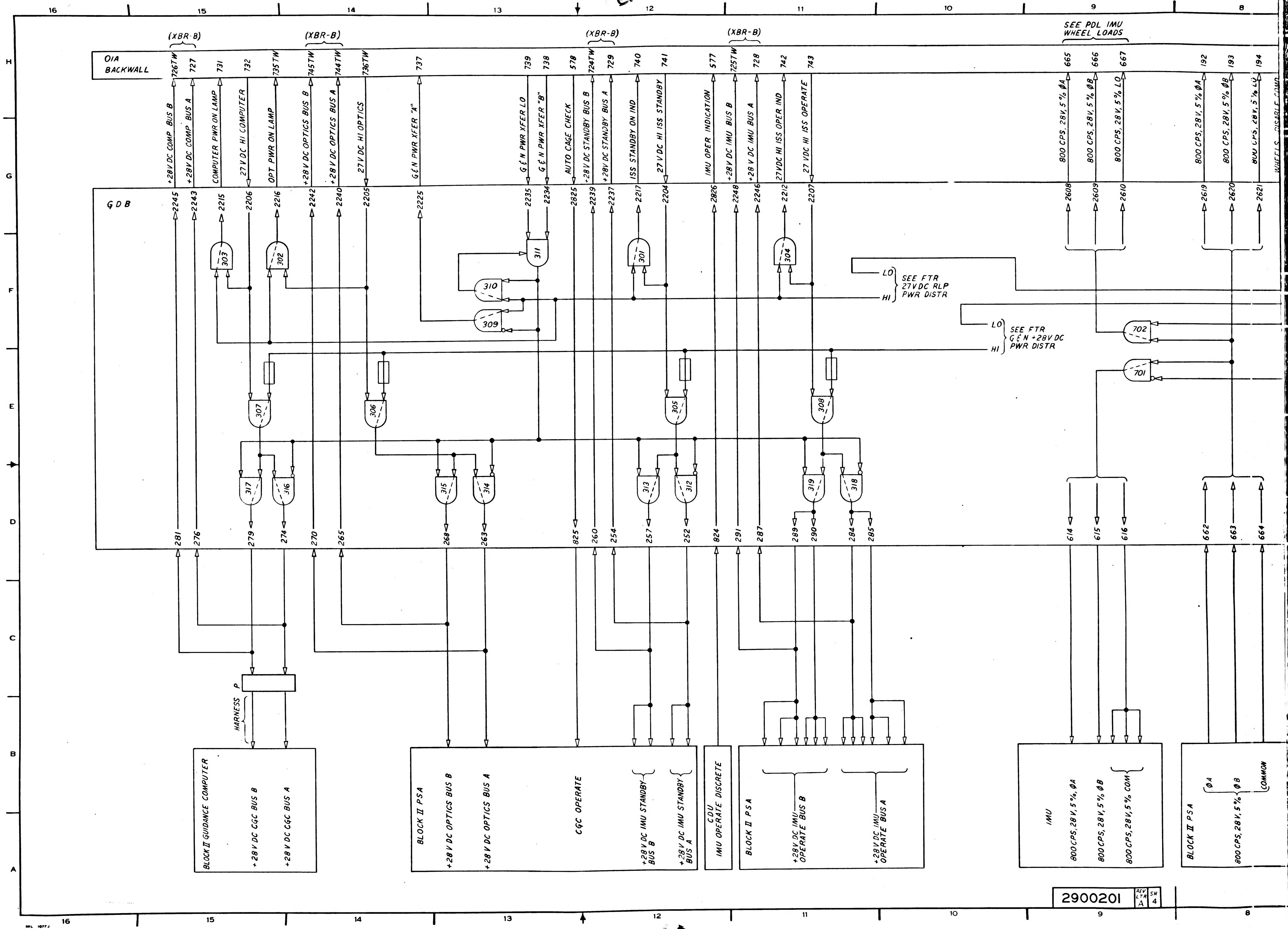
AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Bendel DATE 2-MAY-65
CHECKED Ed Foster 17MAY65
APPROVAL J. Triggs J. H.
APPROVAL J. M. Watson
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
TEST CONTROL PANEL
(BLOCK II)

CODE IDENT NO 99974
SIZE J2
2900201
SCALE
SHEET 4 OF 5

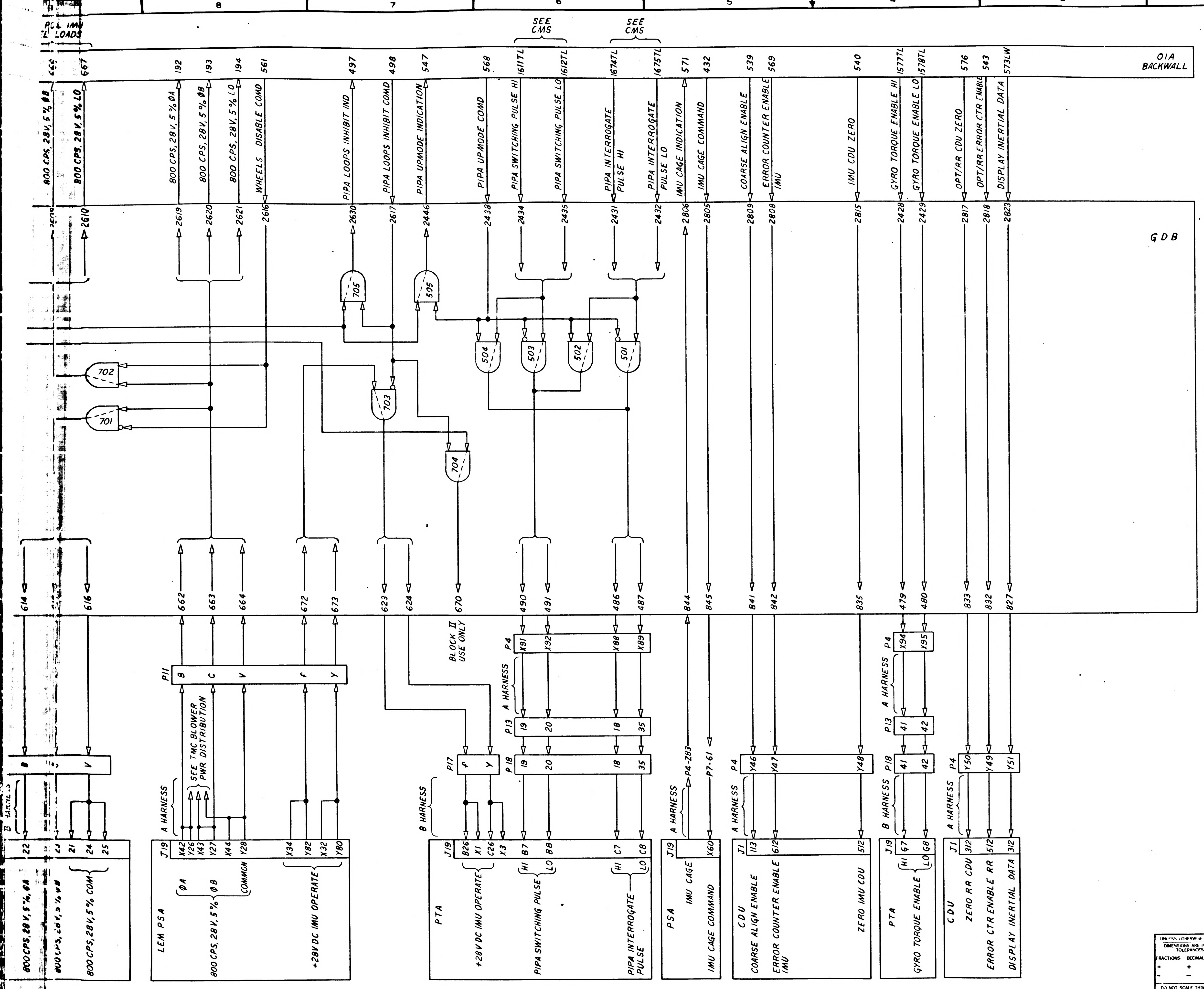
2/2900201


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
(XBR-B)
(XBR-B)
(XBR-B)
(XBR-B)
SEE PDL IMU WHEEL LOADS
OIA BACKWALL
726TW
727
731
732
735TW
745TW
744TW
736TW
737
739
738
578
724TW
729
740
741
577
725TW
728
742
743
665
666
667
192
193
194
+28V DC COMP BUS B
+28V DC COMP BUS A
COMPUTER PWR ON LAMP
27 V DC HI COMPUTER
OPT PWR ON LAMP
+28 V DC OPTICS BUS B
+28 V DC OPTICS BUS A
27 V DC HI OPTICS
G & N PWR XFER "A"
G & N PWR XFER LO
G & N PWR XFER "B"
AUTO CAGE CHECK
+28 V DC STANDBY BUS B
+28V DC STANDBY BUS A
ISS STANDBY ON IND
27 V DC HI ISS STANDBY
IMU OPER INDICATION
+28 V DC IMU BUS B
+28 V DC IMU BUS A
27VDC HI ISS OPER IND
27 VDC HI ISS OPERATE
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
GDB
2245
2243
2215
2206
2216
2242
2240
2205
2225
2235
2234
2825
2239
2237
2217
2204
2826
2248
2246
2212
2207
2608
2609
2610
2619
2620
2621
303
302
311
310
309
301
304
307
306
305
308
317
316
315
314
313
312
319
318
702
701
LO
HI
SEE FTR 27VDC RLP PWR DISTR
LO
HI
SEE FTR G & N +28V DC PWR DISTR
281
276
279
274
270
265
268
263
825
260
254
257
252
824
291
287
289
290
284
285
614
615
616
662
663
664
P
HARNESS
BLOCK II GUIDANCE COMPUTER
+28 V DC CGC BUS B
+28 V DC CGC BUS A
BLOCK II PSA
+28 V DC OPTICS BUS B
+28 V DC OPTICS BUS A
CGC OPERATE
+28 V DC IMU STANDBY BUS B
+28 V DC IMU STANDBY BUS A
CDU
IMU OPERATE DISCRETE
BLOCK II PSA
+28 V DC IMU OPERATE BUS B
+28 V DC IMU OPERATE BUS A
IMU
800 CPS, 28 V, 5%, ØA
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% COM
BLOCK II PSA
800 CPS, 28 V, 5%
ØA
ØB
COMMON

2900201 REV LTR A SH 4

1/2900201

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RCP / MGM

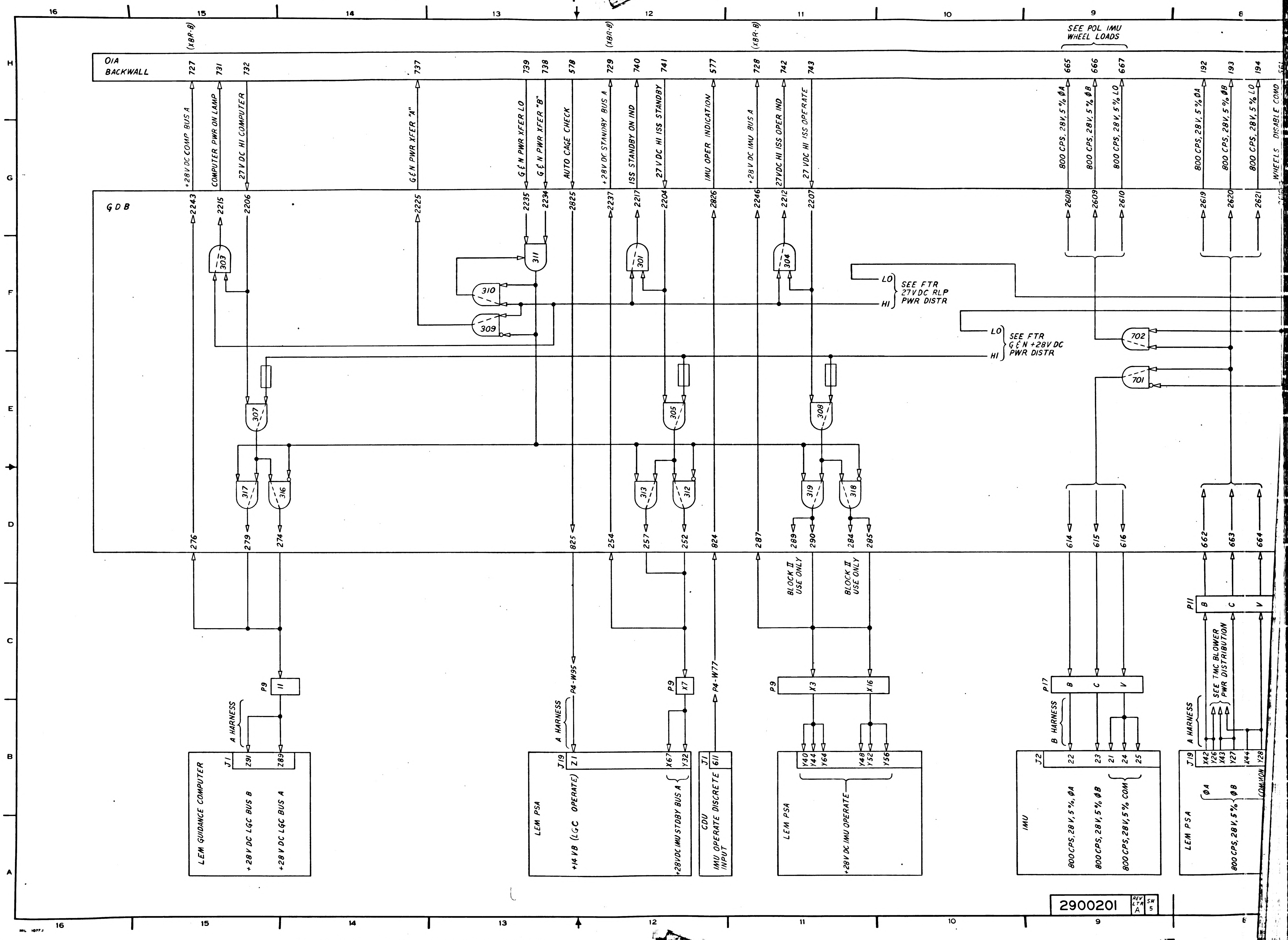


OIA BACKWALL
GDB
SEE CMS
SEE CMS
PCL IMU
EL LOADS
667
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
2610
192
193
194
561
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
2619
2620
2621
2616
497
498
547
568
PIPA LOOPS INHIBIT IND
PIPA LOOPS INHIBIT COMD
PIPA UPMODE INDICATION
PIPA UPMODE COMD
2630
2617
2446
2438
1611TL
1612TL
PIPA SWITCHING PULSE HI
PIPA SWITCHING PULSE LO
2434
2435
1674TL
1675TL
PIPA INTERROGATE PULSE HI
PIPA INTERROGATE PULSE LO
2431
2432
571
432
IMU CAGE INDICATION
IMU CAGE COMMAND
2806
2805
539
569
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
2809
2808
540
IMU CDU ZERO
2815
1577TL
1578TL
GYRO TORQUE ENABLE HI
GYRO TORQUE ENABLE LO
2428
2429
576
543
573LW
OPT/RR CDU ZERO
OPT/RR ERROR CTR ENABLE
DISPLAY INERTIAL DATA
2817
2818
2823
705
505
504
503
502
501
702
701
703
704
614
616
662
663
664
672
673
623
624
670
BLOCK II USE ONLY
490
491
486
487
844
845
841
842
835
479
480
833
832
827
P11
B
C
V
F
Y
P4
X91
X92
X88
X89
A HARNESS
P13
19
20
18
35
P17
F
Y
P18
19
20
18
35
P4
X94
X95
A HARNESS
P13
41
42
P18
41
42
P4-283
P7-61
P4
Y46
Y47
Y48
P4
Y50
Y49
Y51
B
V
B HARNESS
22
21
24
25
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% COM
SEE TMC BLOWER PWR DISTRIBUTION
A HARNESS
J19
X42
X26
X43
Y27
X44
Y28
X34
Y82
X32
Y80
ØA
ØB
COMMON
800 CPS, 28V, 5% ØB
+28V DC IMU OPERATE
LEM PSA
B HARNESS
J19
B26
X1
C26
X3
B7
B8
HI
LO
C7
C8
HI
LO
PTA
+28V DC IMU OPERATE
PIPA SWITCHING PULSE
PIPA INTERROGATE PULSE
A HARNESS
J19
IMU CAGE
X60
PSA
IMU CAGE COMMAND
A HARNESS
J1
113
612
512
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
ZERO IMU CDU
B HARNESS
J19
G7
G8
HI
LO
PTA
GYRO TORQUE ENABLE
A HARNESS
J1
312
512
312
CDU
ZERO RR CDU
ERROR CTR ENABLE RR
DISPLAY INERTIAL DATA

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + − DECIMALS + − ANGLES + −	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
	ACSP PN		
	DRAWN Bender DATE 11-MAY-65	MECHANIZATION DIAGRAM TEST CONTROL PANEL (LEM)	
	CHECKED		
DO NOT SCALE THIS DRAWING	APPROVAL		
	APPROVAL		
MATERIAL	NASA APPROVAL	CODE IDENT NO 99974	SIZE J2 · 2900201
CONTRACT NAS 9-497	MIT APPROVAL	SCALE	SHEET 5 OF 5

2900201	REV LTR A	SH 5

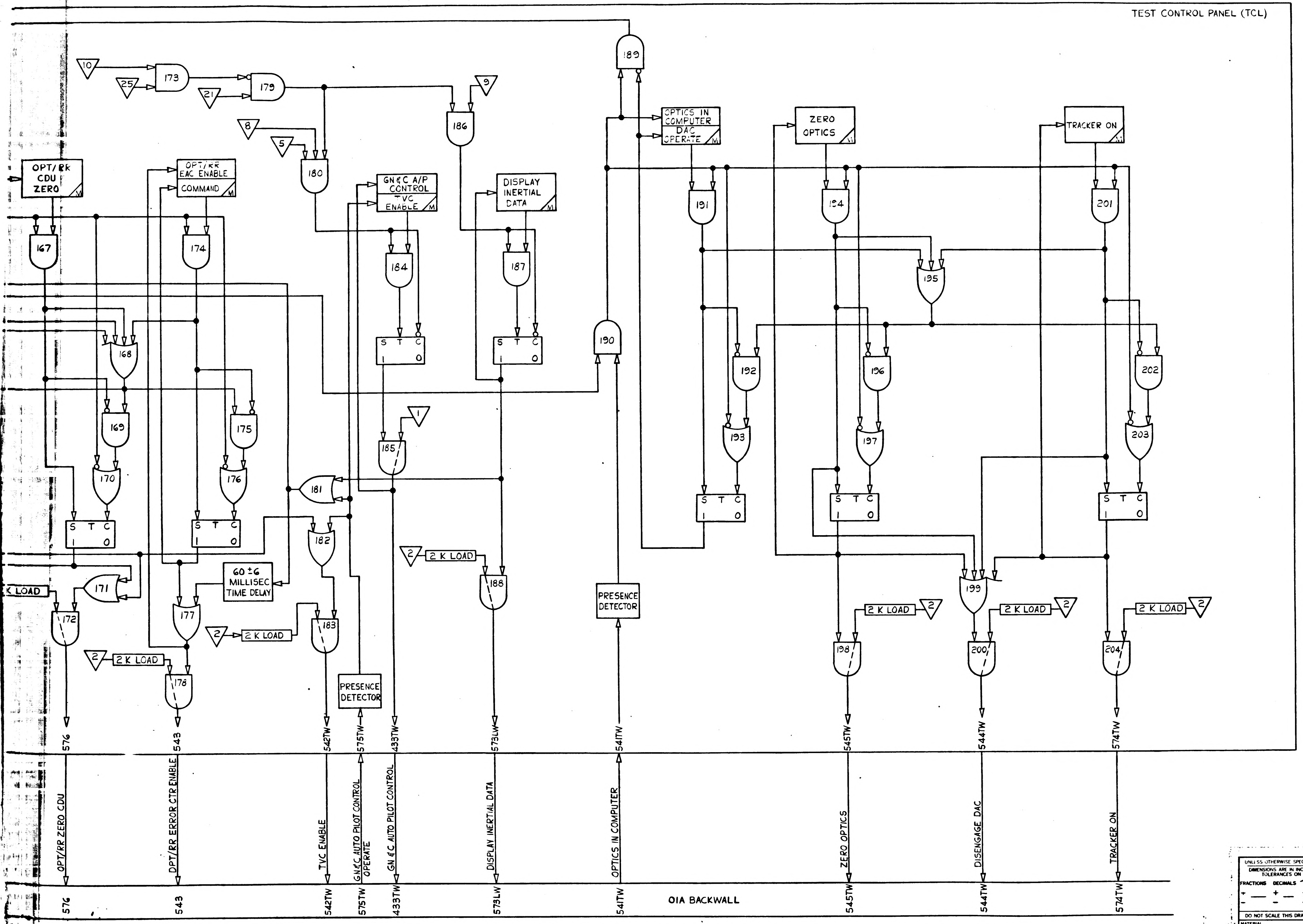
2/2900201


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
(XBR-B)
(XBR-B)
(XBR-B)
SEE POL IMU WHEEL LOADS
OIA BACKWALL
727
731
732
737
739
738
578
729
740
741
577
728
742
743
665
666
667
192
193
194
+28V DC COMP BUS A
COMPUTER PWR ON LAMP
27 V DC HI COMPUTER
G&N PWR XFER "A"
G&N PWR XFER LO
G&N PWR XFER "B"
AUTO CAGE CHECK
+28V DC STANDBY BUS A
ISS STANDBY ON IND
27 V DC HI ISS STANDBY
IMU OPER INDICATION
+28 V DC IMU BUS A
27VDC HI ISS OPER IND
27 VDC HI ISS OPERATE
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
GDB
2243
2215
2206
2225
2235
2234
2825
2237
2217
2204
2826
2246
2212
2207
2608
2609
2610
2619
2620
2621
303
311
310
309
301
304
307
305
308
317
316
313
312
319
318
702
701
LO
HI
SEE FTR 27VDC RLP PWR DISTR
LO
HI
SEE FTR G&N +28V DC PWR DISTR
276
279
274
825
254
257
252
824
287
289
290
284
285
614
615
616
662
663
664
BLOCK II USE ONLY
BLOCK II USE ONLY
P9
11
A HARNESS
P4-W95
A HARNESS
P9
X7
P4-W77
P9
X3
X16
P17
B
C
V
B HARNESS
P11
B
C
V
SEE TMC BLOWER PWR DISTRIBUTION
A HARNESS
J1
Z91
Z89
LEM GUIDANCE COMPUTER
+28V DC LGC BUS B
+28V DC LGC BUS A
J19
Z1
X67
Y32
LEM PSA
+14 VB (LGC OPERATE)
+28VDC IMU STDBY BUS A
J1
611
CDU
IMU OPERATE DISCRETE INPUT
Y40
Y44
Y64
Y48
Y52
Y56
LEM PSA
+28V DC IMU OPERATE
J2
22
23
21
24
25
IMU
800CPS,28V,5%,ØA
800CPS,28V,5%,ØB
800CPS,28V,5% COM
J19
X42
Y26
X43
Y27
X44
Y28
LEM PSA
ØA
800 CPS,28V,5% ØB
COMMON

2900201 REV LTR A SH 5

1/2900201

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP
		REVISION STATUS CHANGED		7 JUL 65	



TEST CONTROL PANEL (TCL)
OPT/RR CDU ZERO
OPT/RR EAC ENABLE
COMMAND
GN&C A/P CONTROL
TVC ENABLE
DISPLAY INERTIAL DATA
OPTICS IN COMPUTER
DAC OPERATE
ZERO OPTICS
TRACKER ON
60 ± 6 MILLISEC TIME DELAY
PRESENCE DETECTOR
2 K LOAD
S T C
1 0
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
576
543
542TW
575TW
433TW
573LW
541TW
545TW
544TW
574TW
OPT/RR ZERO CDU
OPT/RR ERROR CTR ENABLE
TVC ENABLE
GN&C AUTO PILOT CONTROL OPERATE
GN & C AUTO PILOT CONTROL
DISPLAY INERTIAL DATA
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
OIA BACKWALL

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Schwalbe DATE 10 MAY 65
CHECKED 17 MAI 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM -
TEST CONTROL PANEL
(BLOCK II & LEM)

CODE IDENT NO 99974
SIZE J2
2900201
SCALE NONE
SHEET 1 OF 5

00201 REV B SHT 1

2900201 B

2729002011

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS
   - 2900203 – TEMPERATURE MONITOR & CONTROL PANEL (TMC)
   - 2900208 – POWER AND DUMMY LOAD PANEL-PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL, PSS)
   - 2900223 – GIMBAL POSITION CONTROL PANEL (GPC)
   - 2900207 – MONITOR PANEL (MPL)
   - 2900209 – COMPUTER SIMULATOR INTERFACE (CMS)
   - 2900206 – TEST SELECTOR PANEL (TES)
   - 2900217 – SIGNAL SELECTOR AND MEASUREMENT CROSSBAR-AC SIGNALS (XBR-A) CROSSBAR-DC SIGNALS (XBR-B)
   - 2900218 – OSCILLOGRAPH SIGNAL SELECTION TO FIXED DC CHANNEL (RSS-B) TO SWITCHABLE AC CHANNEL (RSS-C)
   - 2900200 – GYRO CAGING PANEL (GCP)
   - 2900210 – AC POWER PROTECTION PANEL AND POWER DISTRIBUTION (FTR) RELAY AND LAMP POWER SUPPLY (RLP)
   - 2900213 – GSE GROUNDING
4. NON STANDARD SYMBOLOGY

INDICATES "AND" GATE WITH SWITCHED SIGNAL

NAME / NAME M — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME / NAME A — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION)

NAME M — INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME A — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

NAME M — INDICATES UNLIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME — INDICATES INDICATOR LIGHT

5. T, W AND L SUFFIXES ON INTERFACE NUMBERS DENOTE FUNCTIONAL USAGE OF THAT INTERFACE. INTERPRET AS FOLLOWS:
   - T - UNIQUE TO BLOCK II CONFIGURATION
   - W - UNIQUE TO BLOCK I SERIES 100 CONFIGURATION
   - L - UNIQUE TO LEM CONFIGURATION
   - TW, TL, OR LW - COMMON TO THE TWO INDICATED CONFIGURATIONS
   - NO SUFFIX - COMMON TO ALL THREE CONFIGURATIONS
6. ALL TIME DELAYS SHALL HAVE RESET TIMES OF 20 MS OR LESS.
7. SIGNAL REFERENCE:

1 = G & N + 28 VDC HI
2 = G & N + 28 VDC LO
3 = 27 VDC HI OIA ON
4 = 27 VDC RLP LO
5 = OPTICS POWER ON
6 = CGC/LGC POWER ON
7 = OSS LEVEL TEST

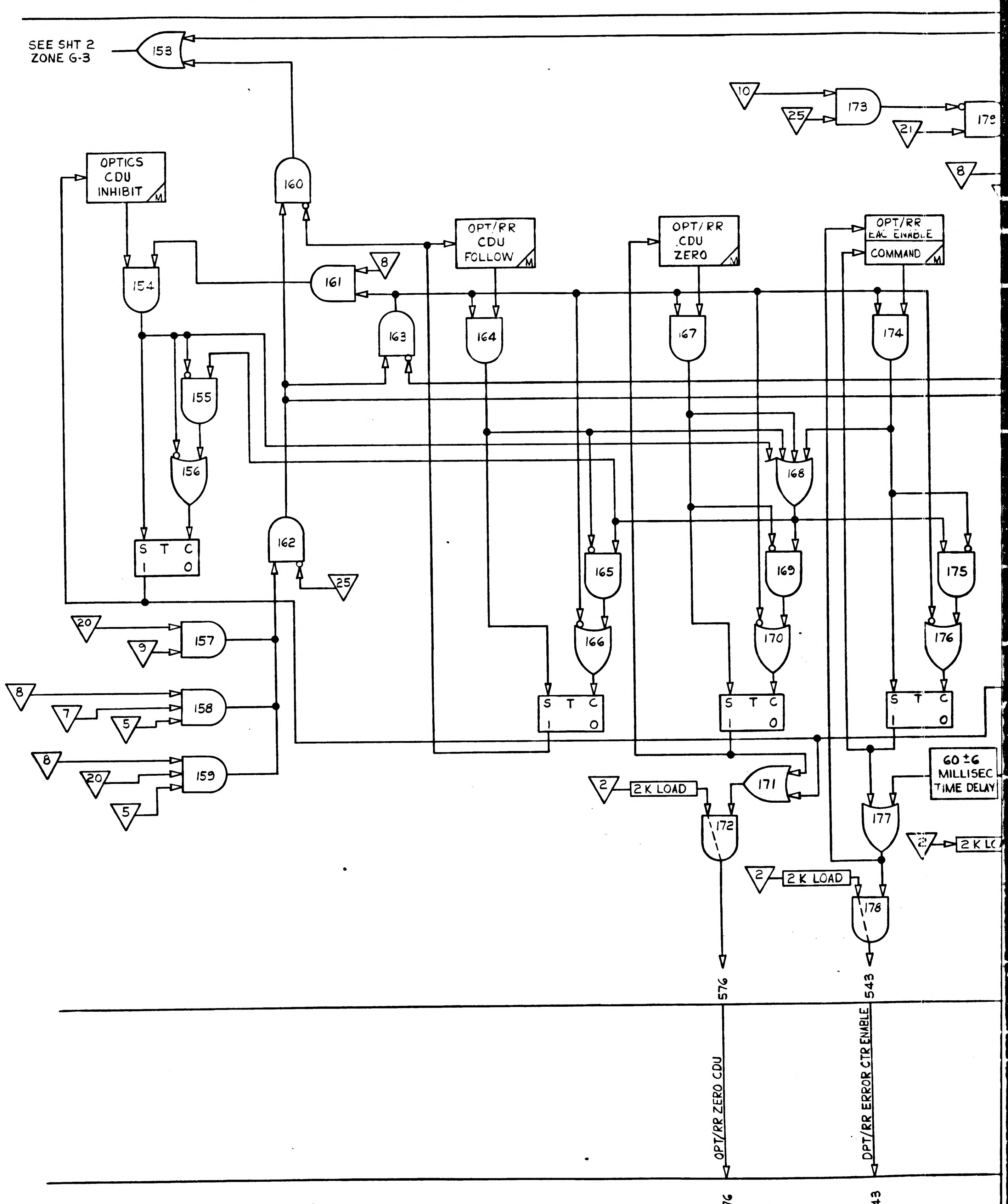
SIGNAL REFERENCE (CONT.)

8 = BLOCK II TEST CONFIG
9 = LEM TEST CONFIG
10 = ISS LEVEL TEST
11 = ISS STANDBY
12 = GYRO TORQUING ENABLED
13 = PIPA LOOPS INHIBITED
14 = ISS LEVEL STANDBY
15 = ISS LEVEL OPERATE
16 = ISS OPERATE
17 = WHEELS STOPPED
18 = SELECT COARSE ALIGN
19 = ENABLE WHEELS OFF
20 = ISS LEVEL OPERATE + 90 SEC
21 = OPERATE + 90 SEC
22 = OSS LEVEL OPTICS POWER ON
23 = TURN ON-LOOPS CLOSED
24 = TURN ON-LOOPS OPEN
25 = MASTER RESET DEPRESSED

8. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

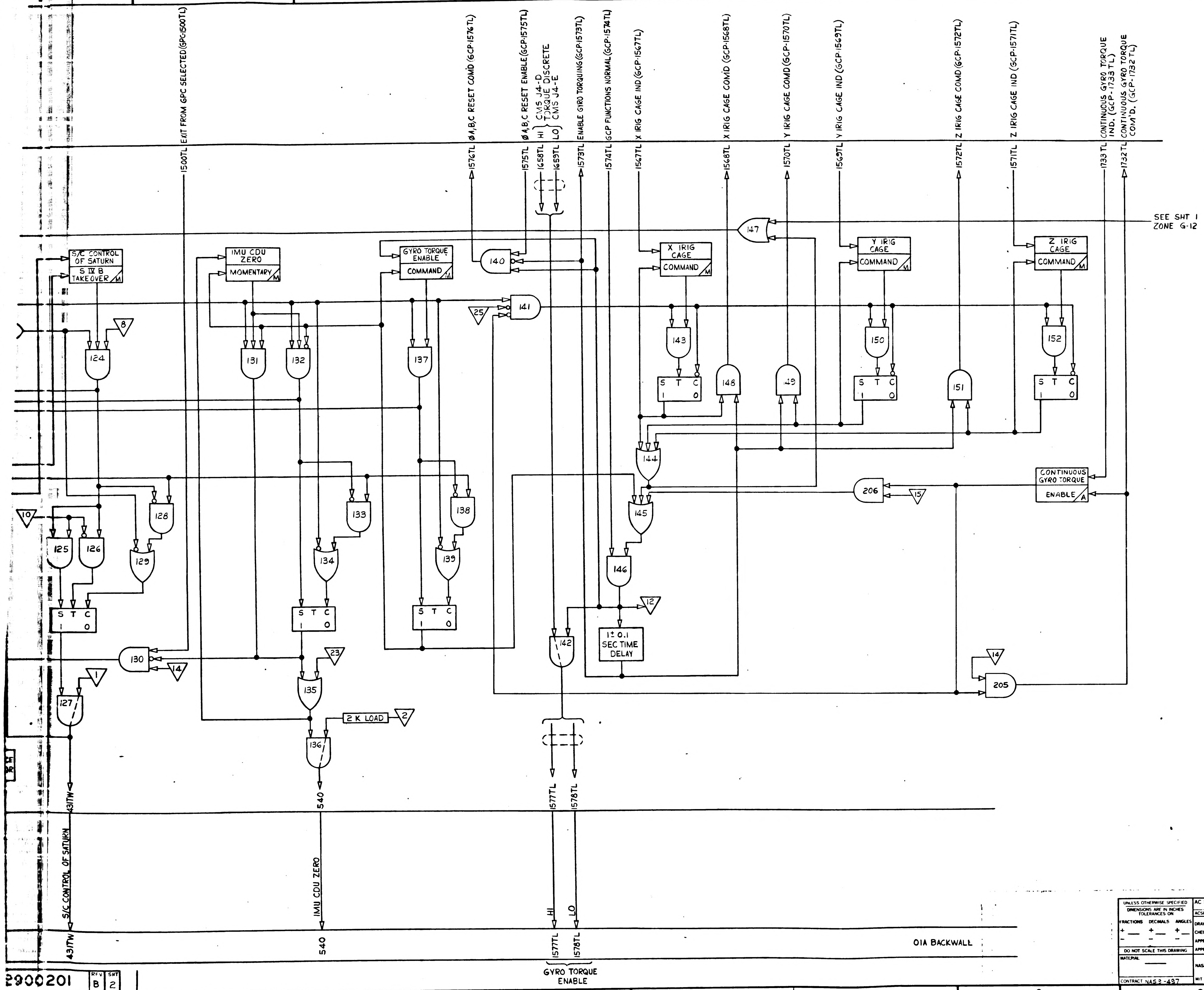
BLOCK II	SH 3	SH 2	SH 1
		SH 4	
LEM	SH 3	SH 2	SH 1
		SH 5	

9. *AS A DESIGN GOAL, THE INTERCONNECTIONS BETWEEN THE A/B COMPONENT AND THE GSE WILL BE MAINTAINED AS INTERFACE DEVICES.*



SEE SHT 2 ZONE G-3
153
10
25
173
21
17?
8
OPTICS CDU INHIBIT M
160
OPT/RR CDU FOLLOW M
OPT/RR CDU ZERO
OPT/RR EAC ENABLE
COMMAND M
154
161
8
163
164
167
174
155
156
168
S T C I O
162
25
165
169
175
20
9
157
166
170
176
8
7
5
158
S T C I O
S T C I O
8
20
5
159
2
2 K LOAD
171
60 ± 6 MILLISEC TIME DELAY
172
177
2
2 K LOAD
178
2 K L
576
OPT/RR ZERO CDU
576
543
OPT/RR ERROR CTR ENABLE
543

REVISIONS 19224					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20489		2 JUL 65	RLP / MCM
B		REVISION STATUS CHANGED	—	7 JUL 65	J J J / MCM

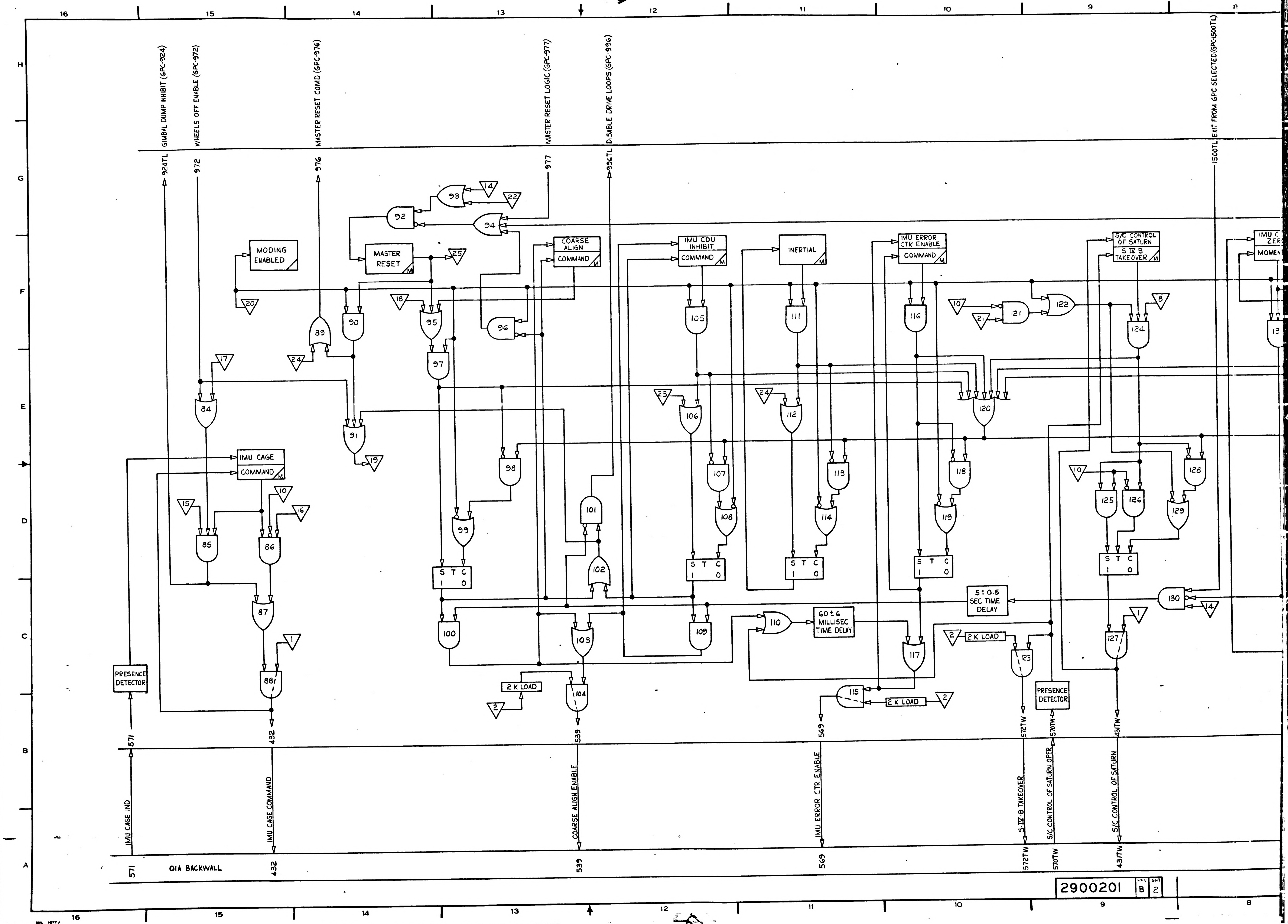


8
7
6
5
4
3
2
1
1500TL EXIT FROM GPC SELECTED (GPC-1500TL)
1576TL ØA,B,C RESET COMD (GCP-1576TL)
1575TL ØA,B,C RESET ENABLE (GCP-1575TL)
1658TL HI
1659TL LO
CMS J4-D
TORQUE DISCRETE
CMS J4-E
1573TL ENABLE GYRO TORQUING (GCP-1573TL)
1574TL GCP FUNCTIONS NORMAL (GCP-1574TL)
1567TL X IRIG CAGE IND (GCP-1567TL)
1568TL X IRIG CAGE COMD (GCP-1568TL)
1570TL Y IRIG CAGE COMD (GCP-1570TL)
1569TL Y IRIG CAGE IND (GCP-1569TL)
1572TL Z IRIG CAGE COMD (GCP-1572TL)
1571TL Z IRIG CAGE IND (GCP-1571TL)
1733TL CONTINUOUS GYRO TORQUE IND. (GCP-1733TL)
1732TL CONTINUOUS GYRO TORQUE COM'D. (GCP-1732TL)
SEE SHT 1 ZONE G-12
S/C CONTROL OF SATURN
S IV B TAKE OVER M
IMU CDU ZERO
MOMENTARY M
GYRO TORQUE ENABLE
COMMAND M
X IRIG CAGE
COMMAND M
Y IRIG CAGE
COMMAND M
Z IRIG CAGE
COMMAND M
CONTINUOUS GYRO TORQUE
ENABLE A
147
140
141
143
150
152
148
149
151
144
145
146
206
205
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
142
S T C 1 0
8
10
25
1
14
23
2
15
12
14
2 K LOAD
1 ± 0.1 SEC TIME DELAY
431TW
540
1577TL
1578TL
S/C CONTROL OF SATURN
IMU CDU ZERO
HI
LO
431TW
540
1577TL
1578TL
OIA BACKWALL
GYRO TORQUE ENABLE
H
G
F
E
D
C
B
A

2900201 REV B SHT 2

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± — ± — ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
DO NOT SCALE THIS DRAWING	DRAWN R. Schuele DATE 7 MAY 65 CHECKED APPROVAL APPROVAL	MECHANIZATION DIAGRAM – TEST CONTROL PANEL (BLOCK II & LEM)
MATERIAL —	NASA APPROVAL MIT APPROVAL	CODE IDENT NO 99974 SIZE J2 2900201
CONTRACT NAS 9-497		SCALE NONE SHEET 2 OF 5

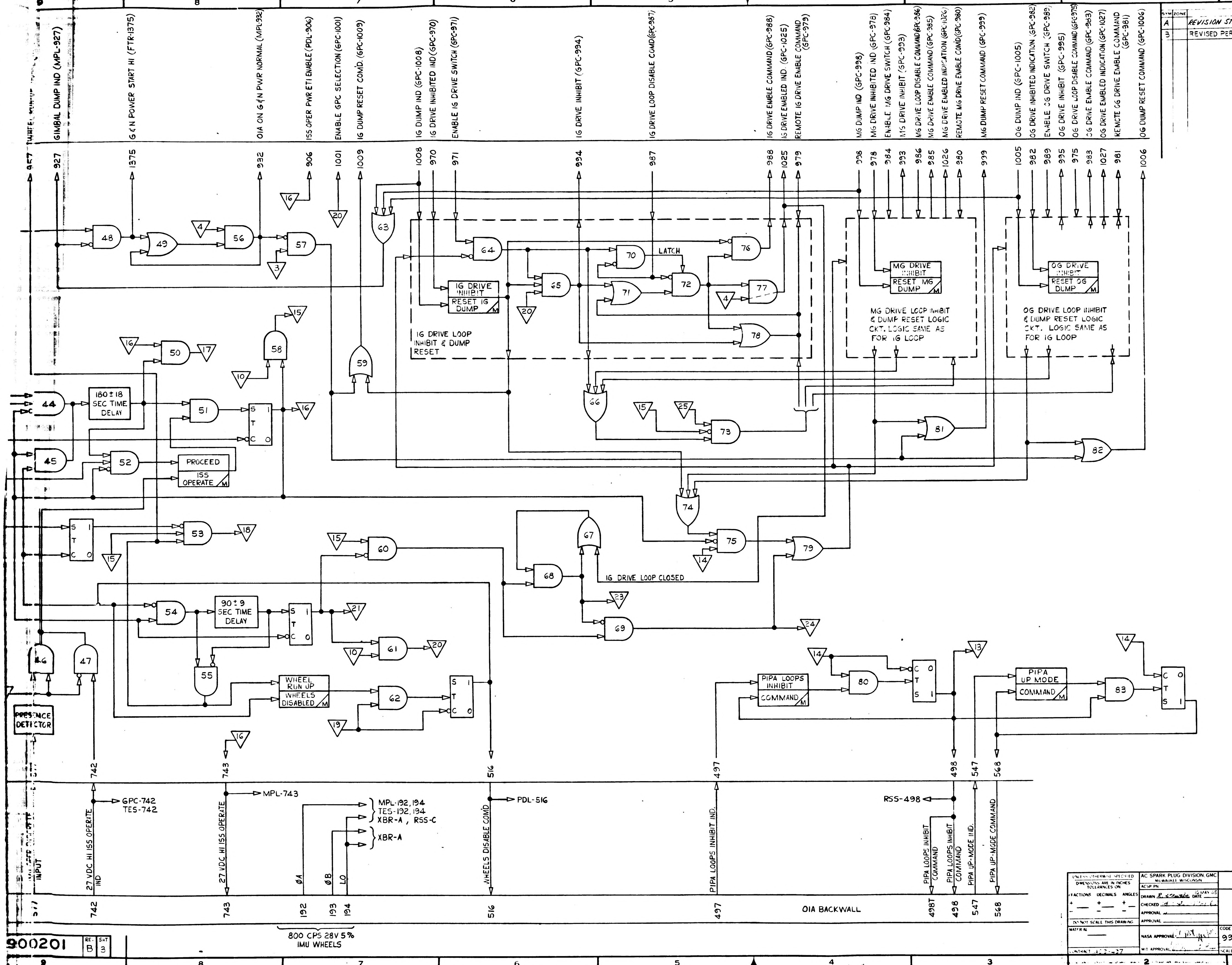
2/2900201


GIMBAL DUMP INHIBIT (GPC-924)
924TL
WHEELS OFF ENABLE (GPC-972)
972
MASTER RESET COMD (GPC-976)
976
MASTER RESET LOGIC (GPC-977)
977
DISABLE DRIVE LOOPS (GPC-936)
936TL
1500TL EXIT FROM GPC SELECTED (GPC-1500TL)
MODING ENABLED
MASTER RESET
COARSE ALIGN
COMMAND
IMU CDU INHIBIT
COMMAND
INERTIAL
IMU ERROR CTR ENABLE
COMMAND
S/C CONTROL OF SATURN
S IV B TAKEOVER
IMU CAGE
COMMAND
PRESENCE DETECTOR
2 K LOAD
60 ± 6 MILLISEC TIME DELAY
5 ± 0.5 SEC TIME DELAY
S T C
1 0
571
432
539
569
572TW
570TW
431TW
IMU CAGE IND
IMU CAGE COMMAND
COARSE ALIGN ENABLE
IMU ERROR CTR ENABLE
S-IV-B TAKEOVER
S/C CONTROL OF SATURN OPER
S/C CONTROL OF SATURN
01A BACKWALL
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

2900201 REV B SHT 2

1/2900201

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP
3		REVISED PER TDRR 20492		65	



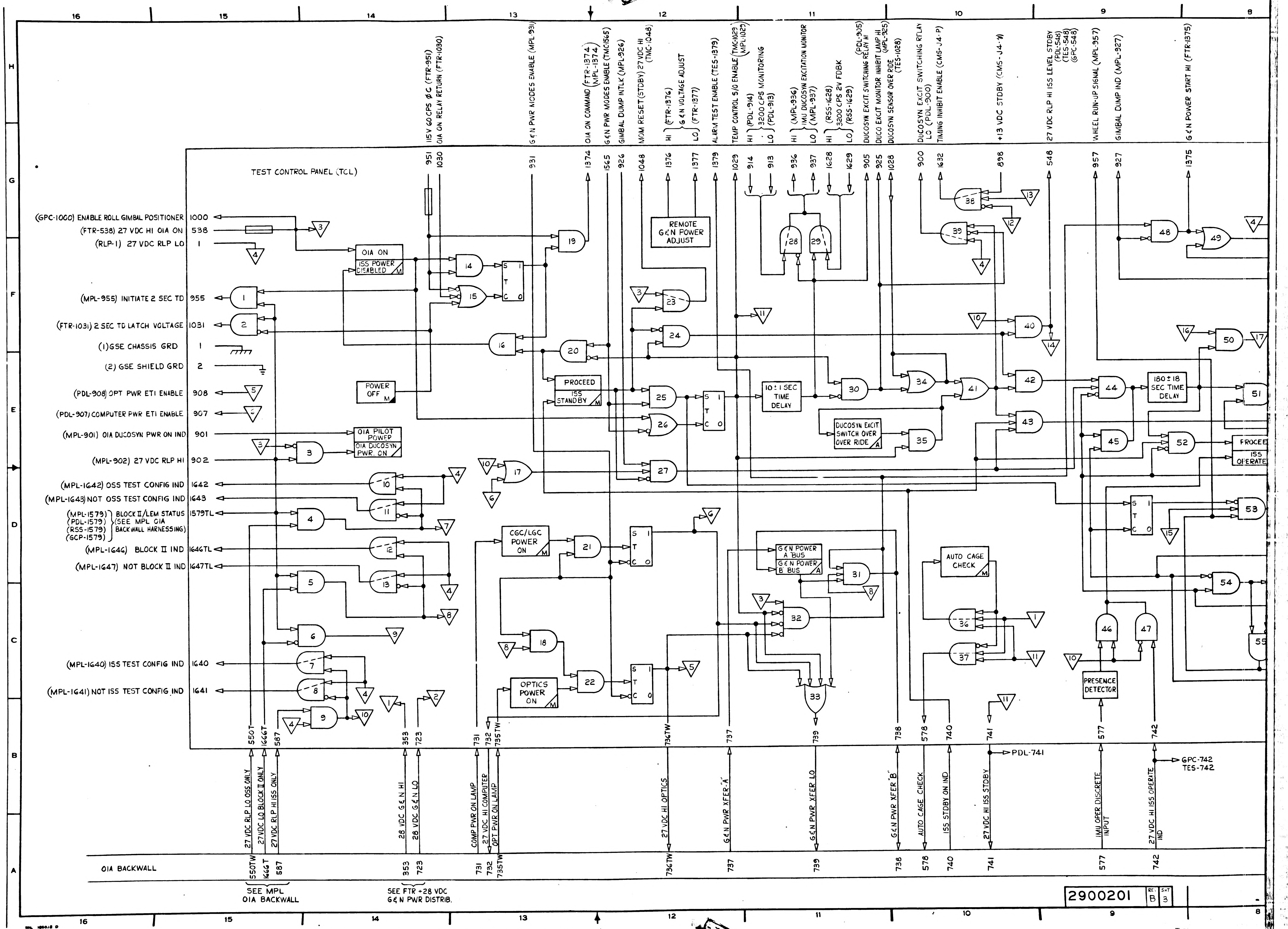
GIMBAL DUMP IND (MPL-927)
G & N POWER START HI (FTR-1375)
OIA ON G & N PWR NORMAL (MPL-932)
ISS OPER PWR ETI ENABLE (PDL-906)
ENABLE GPC SELECTION (GPC-1001)
IG DUMP RESET COMD. (GPC-1009)
IG DUMP IND (GPC-1008)
IG DRIVE INHIBITED IND (GPC-970)
ENABLE IG DRIVE SWITCH (GPC-971)
IG DRIVE INHIBIT (GPC-994)
IG DRIVE LOOP DISABLE COMD (GPC-987)
IG DRIVE ENABLE COMMAND (GPC-988)
IG DRIVE ENABLED IND (GPC-1025)
REMOTE IG DRIVE ENABLE COMMAND (GPC-979)
MG DUMP IND (GPC-998)
MG DRIVE INHIBITED IND (GPC-978)
ENABLE MG DRIVE SWITCH (GPC-984)
MG DRIVE INHIBIT (GPC-993)
MG DRIVE LOOP DISABLE COMMAND (GPC-986)
MG DRIVE ENABLE COMMAND (GPC-985)
MG DRIVE ENABLED INDICATION (GPC-1026)
REMOTE MG DRIVE ENABLE COMD (GPC-980)
MG DUMP RESET COMMAND (GPC-999)
OG DUMP IND (GPC-1005)
OG DRIVE INHIBITED INDICATION (GPC-982)
ENABLE OG DRIVE SWITCH (GPC-989)
OG DRIVE INHIBIT (GPC-995)
OG DRIVE LOOP DISABLE COMMAND (GPC-975)
OG DRIVE ENABLE COMMAND (GPC-983)
OG DRIVE ENABLED INDICATION (GPC-1027)
REMOTE OG DRIVE ENABLE COMMAND (GPC-981)
OG DUMP RESET COMMAND (GPC-1006)
957 927 1375 932 906 1001 1009 1008 970 971 994 987 988 1025 979 998 978 984 993 986 985 1026 980 999 1005 982 989 995 975 983 1027 981 1006
44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83
LATCH
IG DRIVE INHIBIT
RESET IG DUMP
IG DRIVE LOOP INHIBIT & DUMP RESET
MG DRIVE INHIBIT
RESET MG DUMP
MG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
OG DRIVE INHIBIT
RESET OG DUMP
OG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
180 ± 18 SEC TIME DELAY
PROCEED
ISS OPERATE
90 ± 9 SEC TIME DELAY
WHEEL RUN UP
WHEELS DISABLED
IG DRIVE LOOP CLOSED
PIPA LOOPS INHIBIT
COMMAND
PIPA UP MODE
COMMAND
S I T C O
PRESENCE DETECTOR
M
3 4 10 13 14 15 16 17 18 19 20 21 23 24 25
742 743 516 497 498 547 568
GPC-742
TES-742
MPL-743
MPL-192, 194
TES-192, 194
XBR-A, RSS-C
XBR-A
PDL-516
RSS-498
27 VDC HI ISS OPERATE IND
27 VDC HI ISS OPERATE
ØA ØB LO
WHEELS DISABLE COMD
PIPA LOOPS INHIBIT IND.
PIPA LOOPS INHIBIT COMMAND
PIPA LOOPS INHIBIT COMMAND
PIPA UP-MODE IND.
PIPA UP-MODE COMMAND
PRESENCE INPUT
742 743 192 193 194 516 497 498T 498 547 568
OIA BACKWALL
800 CPS 28V 5% IMU WHEELS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ± DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN ACSP PN DRAWN R. [illegible] DATE 16 MAY 65 CHECKED APPROVAL APPROVAL	MANNED SPACECRAFT CENTER HOUSTON TEXAS MECHANIZATION DIAGRAM - TEST CONTROL PANEL (BLOCK II & LEM)
MATERIAL — CONTRACT [illegible]	NASA APPROVAL MIT APPROVAL	CODE IDENT NO. 99974 SIZE J2 2900201 SCALE NONE SHEET 3 OF 5

2900201 B

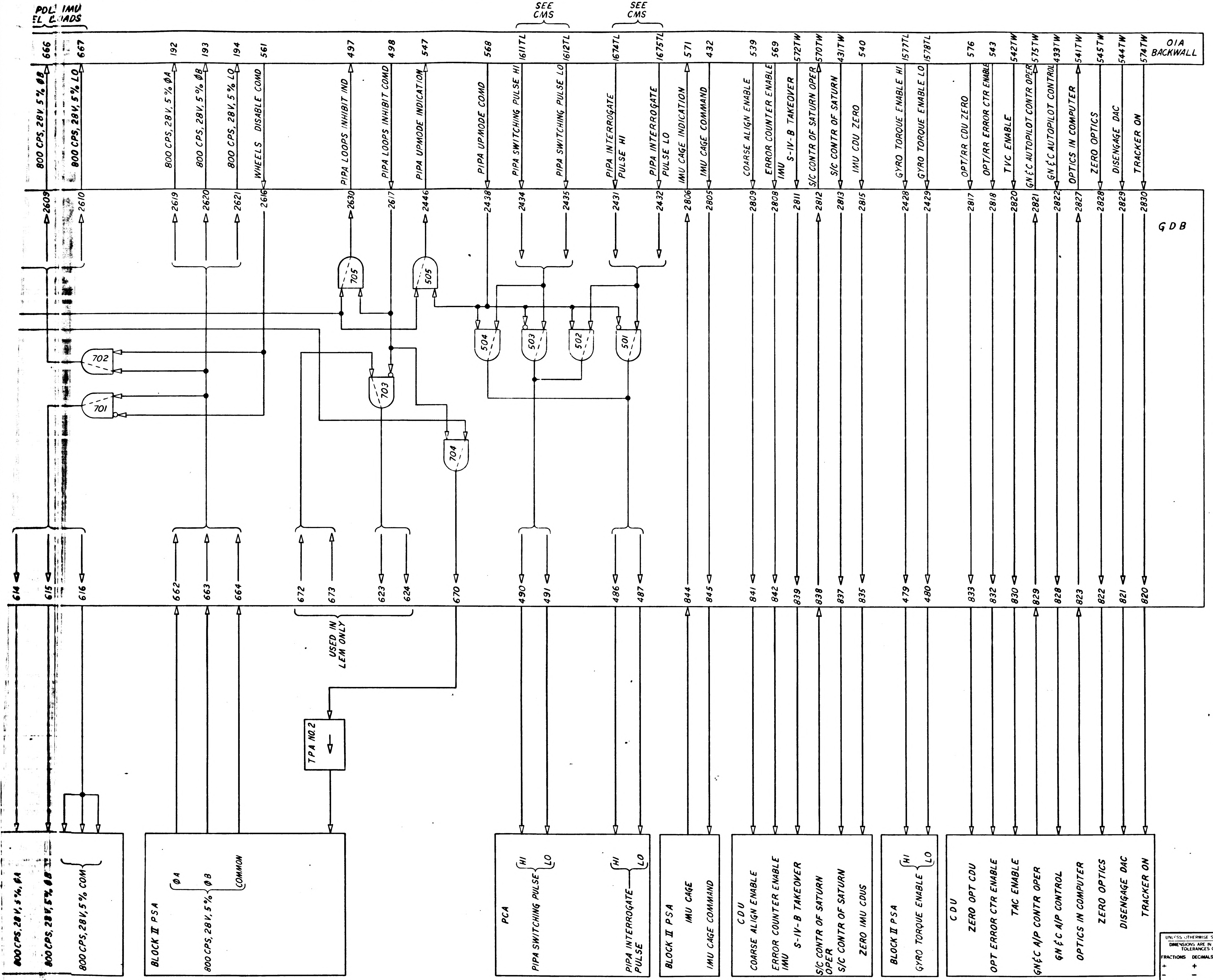
900201 RE. B SHT 3

2/2900201


TEST CONTROL PANEL (TCL)
(GPC-1000) ENABLE ROLL GIMBAL POSITIONER 1000
(FTR-538) 27 VDC HI OIA ON 538
(RLP-1) 27 VDC RLP LO 1
(MPL-955) INITIATE 2 SEC TD 955
(FTR-1031) 2 SEC TD LATCH VOLTAGE 1031
(1) GSE CHASSIS GRD 1
(2) GSE SHIELD GRD 2
(PDL-908) OPT PWR ETI ENABLE 908
(PDL-907) COMPUTER PWR ETI ENABLE 907
(MPL-901) OIA DUCOSYN PWR ON IND 901
(MPL-902) 27 VDC RLP HI 902
(MPL-1642) OSS TEST CONFIG IND 1642
(MPL-1643) NOT OSS TEST CONFIG IND 1643
(MPL-1579) (PDL-1579) (RSS-1579) (GCP-1579) BLOCK II/LEM STATUS (SEE MPL OIA BACKWALL HARNESSING) 1579TL
(MPL-1646) BLOCK II IND 1646TL
(MPL-1647) NOT BLOCK II IND 1647TL
(MPL-1640) ISS TEST CONFIG IND 1640
(MPL-1641) NOT ISS TEST CONFIG IND 1641
115V 60CPS ØC (FTR-951) 951
OIA ON RELAY RETURN (FTR-1030) 1030
G&N PWR MODES ENABLE (MPL 931) 931
OIA ON COMMAND (FTR-1374) (MPL-1374) 1374
G&N PWR MODES ENABLE (TMC1565) 1565
GIMBAL DUMP INTLK (MPL-926) 926
MOM RESET (STDBY) 27 VDC HI (TMC-1048) 1048
HI (FTR-1376) G&N VOLTAGE ADJUST 1376
LO (FTR-1377) 1377
ALARM TEST ENABLE (TES-1379) 1379
TEMP CONTROL S/O ENABLE (TMC-1029) (MPL-1029) 1029
HI (PDL-914) 3200 CPS MONITORING 914
LO (PDL-913) 913
HI (MPL-936) IMU DUCOSYN EXCITATION MONITOR 936
LO (MPL-937) 937
HI (RSS-1628) 3200 CPS 2V FDBK 1628
LO (RSS-1629) 1629
DUCOSYN EXCIT SWITCHING RELAY HI (PDL-905) 905
DUCO EXCIT MONITOR INHIBIT LAMP HI (MPL-925) 925
DUCOSYN SENSOR OVER RIDE (TES-1028) 1028
DUCOSYN EXCIT SWITCHING RTLAY LO (PDL-900) 900
TIMING INHIBIT ENABLE (CMS-J4-P) 632
+13 VDC STDBY (CMS-J4-?) 898
27 VDC RLP HI ISS LEVEL STDBY (PDL-548) (TES-548) (GPC-548) 548
WHEEL RUN-UP SIGNAL (MPL-957) 957
GIMBAL DUMP IND (MPL-927) 927
G&N POWER START HI (FTR-1375) 1375
OIA ON
ISS POWER DISABLED M
REMOTE G&N POWER ADJUST
POWER OFF M
PROCEED
ISS STANDBY M
OIA PILOT POWER
OIA DUCOSYN PWR. ON
10 ± 1 SEC TIME DELAY
DUCOSYN EXCIT. SWITCH OVER OVER RIDE A
180 ± 18 SEC TIME DELAY
PROCEE
ISS OPERATE
CGC/LGC POWER ON M
OPTICS POWER ON M
G&N POWER A BUS
G&N POWER B BUS A
AUTO CAGE CHECK M
PRESENCE DETECTOR
S I T C O
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
550T 1666T 587 353 723 731 732 735TW 736TW 737 739 738 578 740 741 577 742
→ PDL-741
→ GPC-742 TES-742
27 VDC RLP LO OSS ONLY
27 VDC LO BLOCK II ONLY
27 VDC RLP HI ISS ONLY
28 VDC G&N HI
28 VDC G&N LO
COMP PWR ON LAMP
27 VDC HI COMPUTER
OPT PWR ON LAMP
27 VDC HI OPTICS
G&N PWR XFER "A"
G&N PWR XFER LO
G&N PWR XFER "B"
AUTO CAGE CHECK
ISS STDBY ON IND
27 VDC HI ISS STDBY
IMU OPER DISCRETE INPUT
27 VDC HI ISS OPERATE IND
OIA BACKWALL
550TW 1666T 587 353 723 731 732 735TW 736TW 737 739 738 578 740 741 577 742
SEE MPL OIA BACKWALL
SEE FTR +28 VDC G&N PWR DISTRIB.
16 15 14 13 12 11 10 9 8
H G F E D C B A
2900201 B 3

1/2900201

REVISIONS 14254					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP mcm
B		REVISION STATUS CHANGED		7 JUL 65	JJJ mcm



9
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5
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2
1
PDL
EL LOADS
IMU
SEE CMS
SEE CMS
666
667
192
193
194
561
497
498
547
568
1611TL
1612TL
1674TL
1675TL
571
432
539
569
572TW
570TW
431TW
540
1577TL
1578TL
576
543
542TW
575TW
433TW
541TW
545TW
544TW
574TW
OIA BACKWALL
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
PIPA LOOPS INHIBIT IND
PIPA LOOPS INHIBIT COMD
PIPA UPMODE INDICATION
PIPA UPMODE COMD
PIPA SWITCHING PULSE HI
PIPA SWITCHING PULSE LO
PIPA INTERROGATE PULSE HI
PIPA INTERROGATE PULSE LO
IMU CAGE INDICATION
IMU CAGE COMMAND
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
S-IV-B TAKEOVER
S/C CONTR OF SATURN OPER
S/C CONTR OF SATURN
IMU CDU ZERO
GYRO TORQUE ENABLE HI
GYRO TORQUE ENABLE LO
OPT/RR CDU ZERO
OPT/RR ERROR CTR ENABLE
TVC ENABLE
GN & C AUTOPILOT CONTR OPER
GN & C AUTOPILOT CONTROL
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
2609
2610
2619
2620
2621
2616
2630
2617
2446
2438
2434
2435
2431
2432
2806
2805
2809
2808
2811
2812
2813
2815
2428
2429
2817
2818
2820
2821
2822
2827
2828
2829
2830
GDB
705
505
504
503
502
501
702
701
703
704
614
615
616
662
663
664
672
673
623
624
670
490
491
486
487
844
845
841
842
839
838
837
835
479
480
833
832
830
829
828
823
822
821
820
USED IN LEM ONLY
TPA NO.2
800 CPS, 28V, 5%, ØA
800 CPS, 28V, 5%, ØB
800 CPS, 28V, 5% COM
BLOCK II PSA
800 CPS, 28V, 5%
ØA
ØB
COMMON
PCA
PIPA SWITCHING PULSE
HI
LO
PIPA INTERROGATE PULSE
HI
LO
BLOCK II PSA
IMU CAGE
IMU CAGE COMMAND
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
S-IV-B TAKEOVER
S/C CONTR OF SATURN OPER
S/C CONTR OF SATURN
ZERO IMU CDUS
BLOCK II PSA
GYRO TORQUE ENABLE
HI
LO
CDU
ZERO OPT CDU
OPT ERROR CTR ENABLE
TAC ENABLE
GN & C A/P CONTR OPER
GN & C A/P CONTROL
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
H
G
F
E
D
C
B
A

2900201 | REV LTR B | SH 4

ZH

2900201 B

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS + − ANGLES + −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

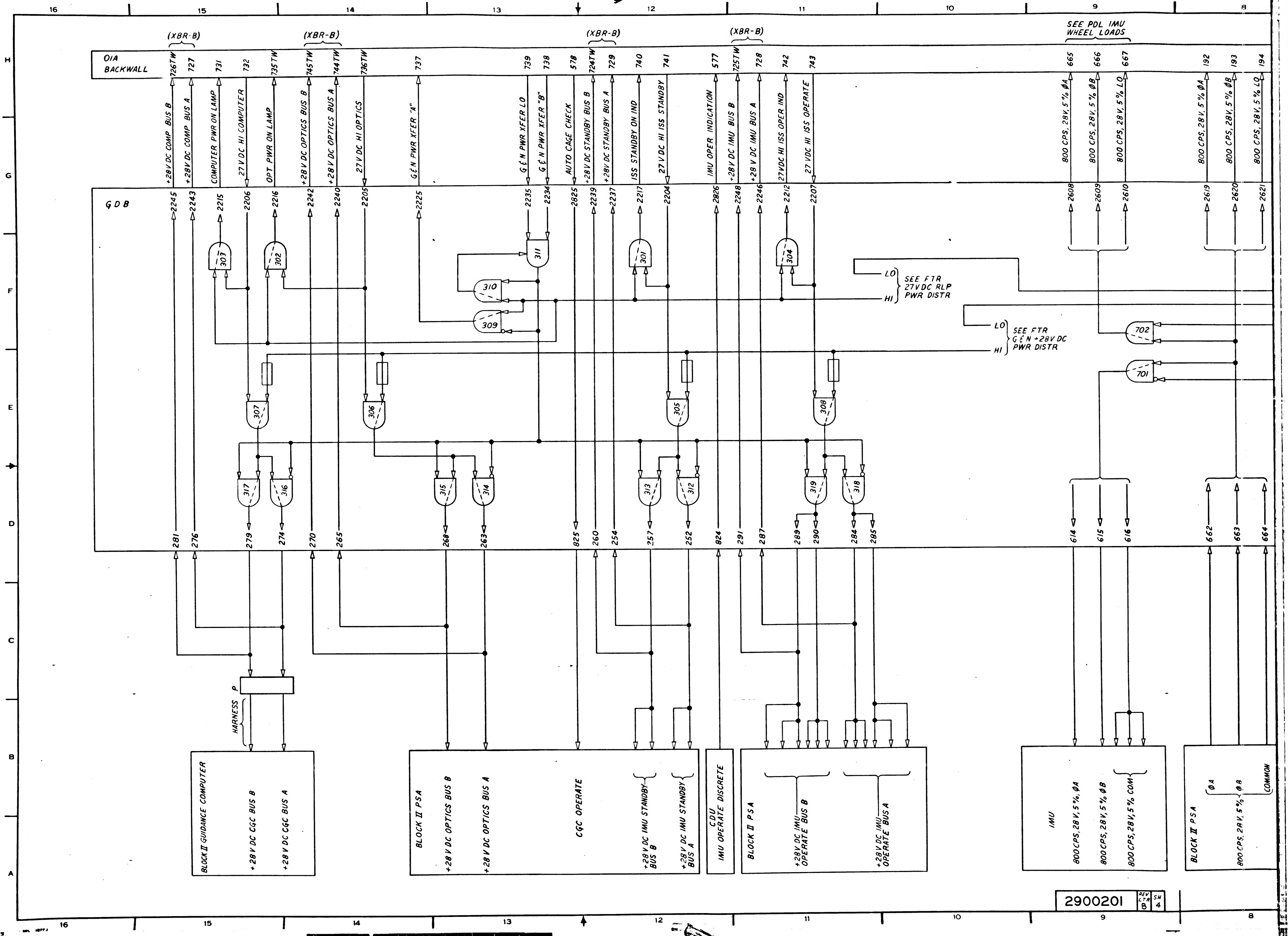
AC SPARK PLUG DIVISION. GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Bendel DATE 12-MAY-65
CHECKED Ed Foster 17MAY65
APPROVAL J. Iragg J.H.
APPROVAL J. McWaters
NASA APPROVAL
MIT APPROVAL W Kupfer 10 May 65

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM
TEST CONTROL PANEL
(BLOCK II)

CODE IDENT NO 99974 | SIZE J2 | 2900201
SCALE | SHEET 4 OF 5

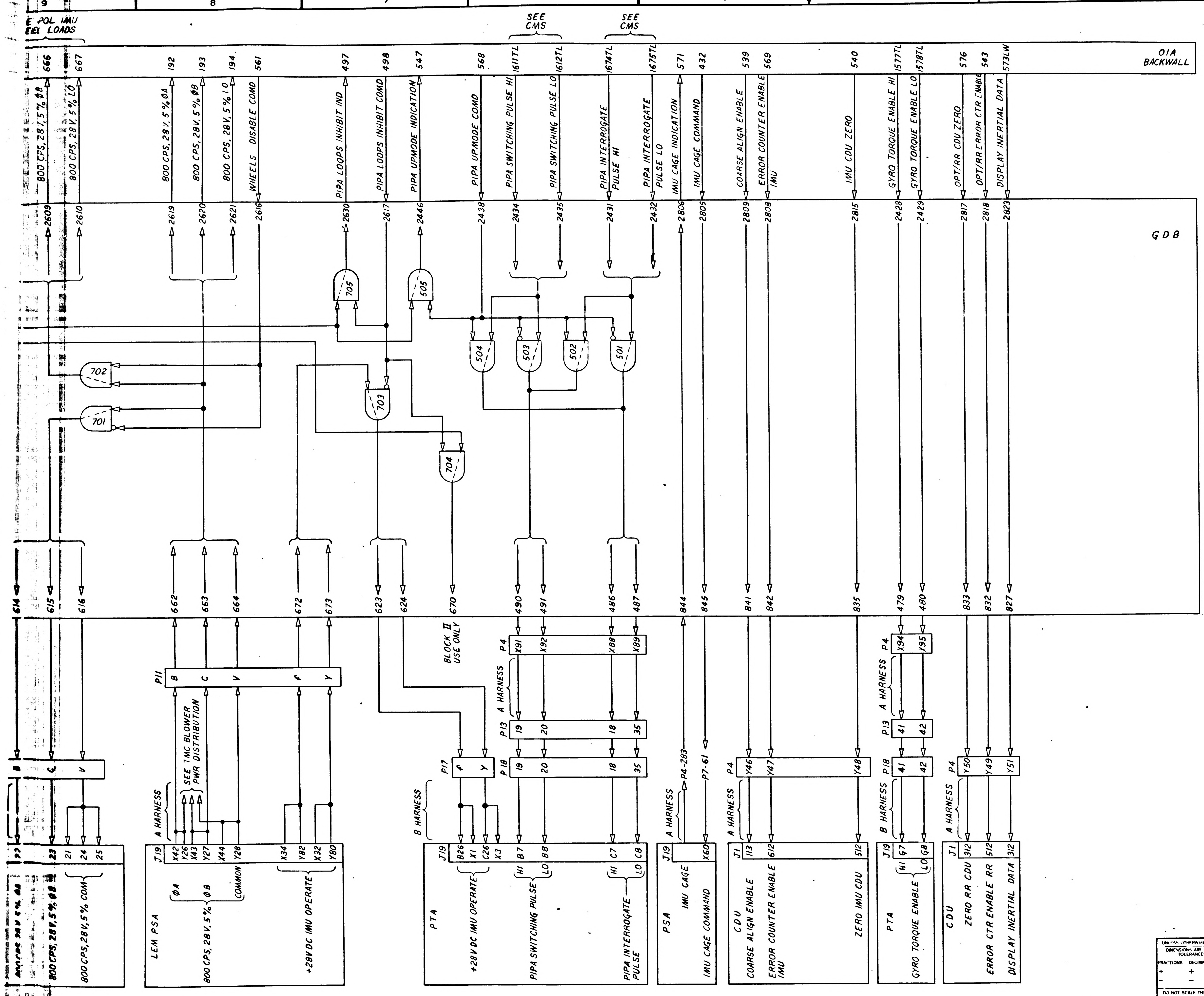
272900201


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
(XBR-B)
(XBR-B)
(XBR-B)
(XBR-B)
SEE PDL IMU WHEEL LOADS
OIA BACKWALL
726TW
727
731
732
735TW
745TW
744TW
736TW
737
739
738
578
724TW
729
740
741
577
725TW
728
742
743
665
666
667
192
193
194
+28V DC COMP BUS B
+28V DC COMP BUS A
COMPUTER PWR ON LAMP
27 V DC HI COMPUTER
OPT PWR ON LAMP
+28 V DC OPTICS BUS B
+28 V DC OPTICS BUS A
27 V DC HI OPTICS
G & N PWR XFER "A"
G & N PWR XFER LO
G & N PWR XFER "B"
AUTO CAGE CHECK
+28V DC STANDBY BUS B
+28V DC STANDBY BUS A
ISS STANDBY ON IND
27 V DC HI ISS STANDBY
IMU OPER INDICATION
+28V DC IMU BUS B
+28 V DC IMU BUS A
27VDC HI ISS OPER IND
27 VDC HI ISS OPERATE
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28 V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
GDB
2245
2243
2215
2206
2216
2242
2240
2205
2225
2235
2234
2825
2239
2237
2217
2204
2826
2248
2246
2212
2207
2608
2609
2610
2619
2620
2621
303
302
311
310
309
301
304
LO
HI
SEE FTR 27VDC RLP PWR DISTR
LO
HI
SEE FTR G & N +28V DC PWR DISTR
702
701
307
306
305
308
317
316
315
314
313
312
319
318
281
276
279
274
270
265
268
263
825
260
254
257
252
824
291
287
289
290
284
285
614
615
616
662
663
664
P
HARNESS
BLOCK II GUIDANCE COMPUTER
+28 V DC CGC BUS B
+28 V DC CGC BUS A
BLOCK II PSA
+28 V DC OPTICS BUS B
+28 V DC OPTICS BUS A
CGC OPERATE
+28 V DC IMU STANDBY BUS B
+28 V DC IMU STANDBY BUS A
CDU IMU OPERATE DISCRETE
BLOCK II PSA
+28V DC IMU OPERATE BUS B
+28V DC IMU OPERATE BUS A
IMU
800CPS, 28V, 5%, ØA
800CPS, 28V, 5% ØB
800CPS, 28V, 5% COM
BLOCK II PSA
ØA
800 CPS, 28V, 5% ØB
COMMON

2900201 REV LTR B SH 4

1-2900201

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		KEVISION STATUS CHANGED		2 JUL 65	RCP MEM
B		REVISION STATUS CHANGED		7 JUL 65	JJJ MEM


E POL IMU
EEL LOADS
666
667
192
193
194
561
497
498
547
568
SEE CMS
1611TL
1612TL
SEE CMS
1674TL
1675TL
571
432
539
569
540
1577TL
1578TL
576
543
573LW
OIA BACKWALL
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% LO
800 CPS, 28 V, 5% ØA
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% LO
WHEELS DISABLE COMD
PIPA LOOPS INHIBIT IND
PIPA LOOPS INHIBIT COMD
PIPA UPMODE INDICATION
PIPA UPMODE COMD
PIPA SWITCHING PULSE HI
PIPA SWITCHING PULSE LO
PIPA INTERROGATE PULSE HI
PIPA INTERROGATE PULSE LO
IMU CAGE INDICATION
IMU CAGE COMMAND
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
IMU CDU ZERO
GYRO TORQUE ENABLE HI
GYRO TORQUE ENABLE LO
OPT/RR CDU ZERO
OPT/RR ERROR CTR ENABLE
DISPLAY INERTIAL DATA
2609
2610
2619
2620
2621
2616
2630
2617
2446
2438
2434
2435
2431
2432
2806
2805
2809
2808
2815
2428
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2817
2818
2823
GDB
705
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664
672
673
623
624
670
490
491
486
487
844
845
841
842
835
479
480
833
832
827
BLOCK II USE ONLY
P11
B
C
V
F
Y
P4
X91
X92
X88
X89
A HARNESS
P13
19
20
18
35
P18
19
20
18
35
P4
X94
X95
A HARNESS
P13
41
42
P18
41
42
B
C
V
SEE TMC BLOWER PWR DISTRIBUTION
A HARNESS
P17
F
Y
B HARNESS
A HARNESS
P4-283
P7-61
P4
Y46
Y47
Y48
A HARNESS
B HARNESS
P4
Y50
Y49
Y51
A HARNESS
22
23
21
24
25
J19
X42
Y26
X43
Y27
X44
Y28
X34
Y82
X32
Y80
J19
B26
X1
C26
X3
B7
B8
C7
C8
J19
X60
J1
113
612
512
J19
G7
G8
J1
312
512
312
800 CPS 28 V 5% ØA
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% COM
LEM PSA
ØA
ØB
COMMON
800 CPS, 28 V, 5%
+28 V DC IMU OPERATE
PTA
+28 V DC IMU OPERATE
HI
LO
PIPA SWITCHING PULSE
HI
LO
PIPA INTERROGATE PULSE
PSA
IMU CAGE
IMU CAGE COMMAND
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
ZERO IMU CDU
PTA
HI
LO
GYRO TORQUE ENABLE
CDU
ZERO RR CDU
ERROR CTR ENABLE RR
DISPLAY INERTIAL DATA
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

2900201 REV LTR B SH 5

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ \+ \+
- \- \-
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Bender DATE 11-MAY-65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

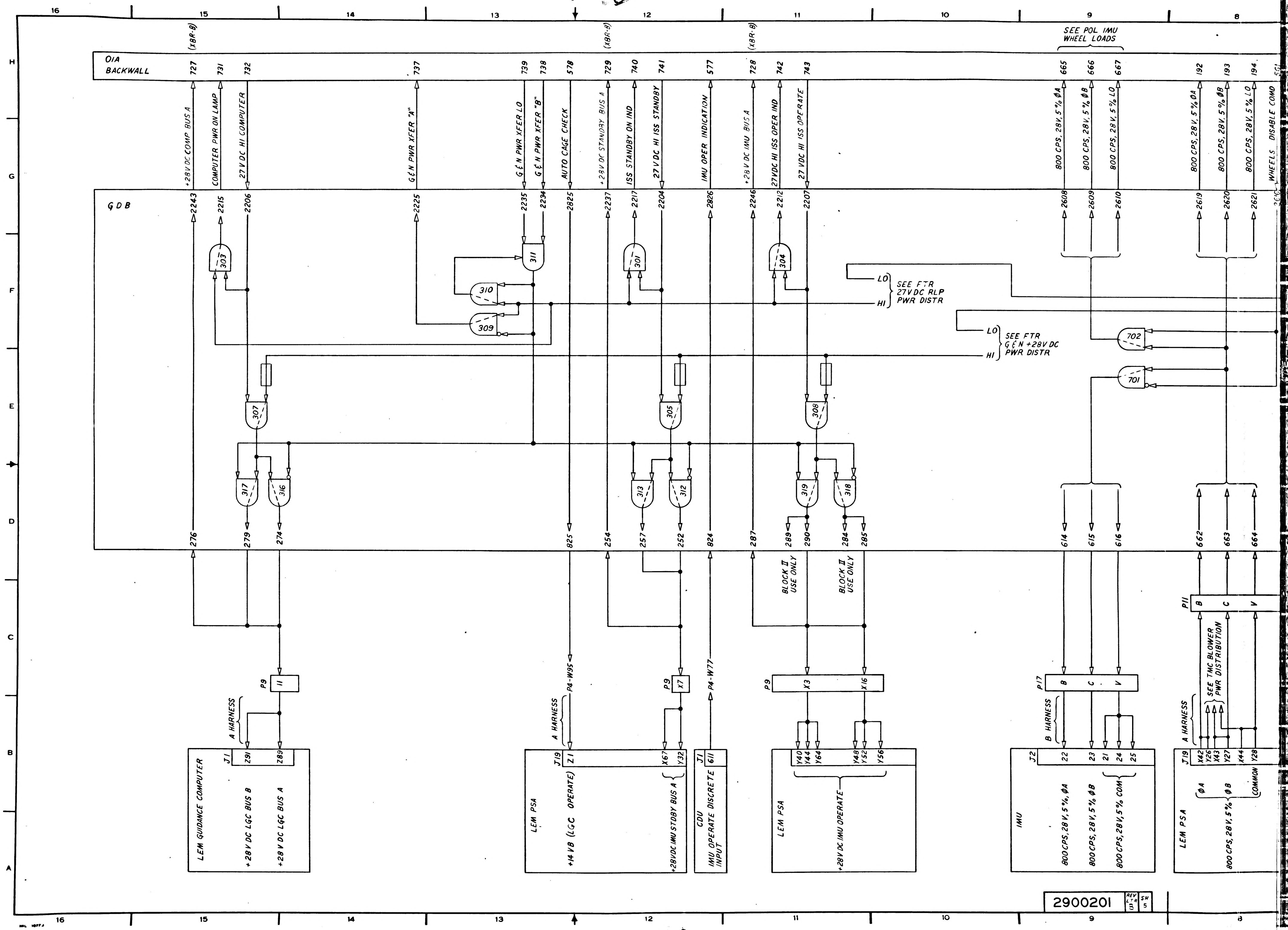
MECHANIZATION DIAGRAM
TEST CONTROL PANEL
(LEM)

CODE IDENT NO 99974
SIZE J_2
2900201
SCALE
SHEET 5 OF 5

2900201 B

2 H

2/2900201



OIA BACKWALL
GDB
(XBR-B)
+28 V DC COMP BUS A
COMPUTER PWR ON LAMP
27 V DC HI COMPUTER
G & N PWR XFER "A"
G & N PWR XFER LO
G & N PWR XFER "B"
AUTO CAGE CHECK
+28 V DC STANDBY BUS A
ISS STANDBY ON IND
27 V DC HI ISS STANDBY
IMU OPER INDICATION
+28 V DC IMU BUS A
27 VDC HI ISS OPER IND
27 VDC HI ISS OPERATE
SEE POL IMU WHEEL LOADS
800 CPS, 28 V, 5% ØA
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% LO
WHEELS DISABLE COMD
727
731
732
737
739
738
578
729
740
741
577
728
742
743
665
666
667
192
193
194
2243
2215
2206
2225
2235
2234
2825
2237
2217
2204
2826
2246
2212
2207
2608
2609
2610
2619
2620
2621
303
311
310
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305
308
317
316
313
312
319
318
702
701
LO
HI
SEE FTR 27 V DC RLP PWR DISTR
SEE FTR G & N +28 V DC PWR DISTR
276
279
274
825
254
257
252
824
287
289
290
284
285
614
615
616
662
663
664
BLOCK II USE ONLY
P9
11
X7
X3
X16
P4-W95
P4-W77
P17
B
C
V
P11
SEE TMC BLOWER PWR DISTRIBUTION
A HARNESS
B HARNESS
J1
291
289
LEM GUIDANCE COMPUTER
+28 V DC LGC BUS B
+28 V DC LGC BUS A
J19
Z1
X67
Y32
LEM PSA
+14 VB (LGC OPERATE)
+28 VDC IMU STDBY BUS A
611
CDU
IMU OPERATE DISCRETE INPUT
Y40
Y44
Y64
Y48
Y52
Y56
+28 V DC IMU OPERATE
J2
22
23
21
24
25
IMU
800 CPS, 28 V, 5% ØA
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% COM
X42
X26
X43
Y27
X44
Y28
ØA
ØB
COMMON
800 CPS, 28 V, 5%
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

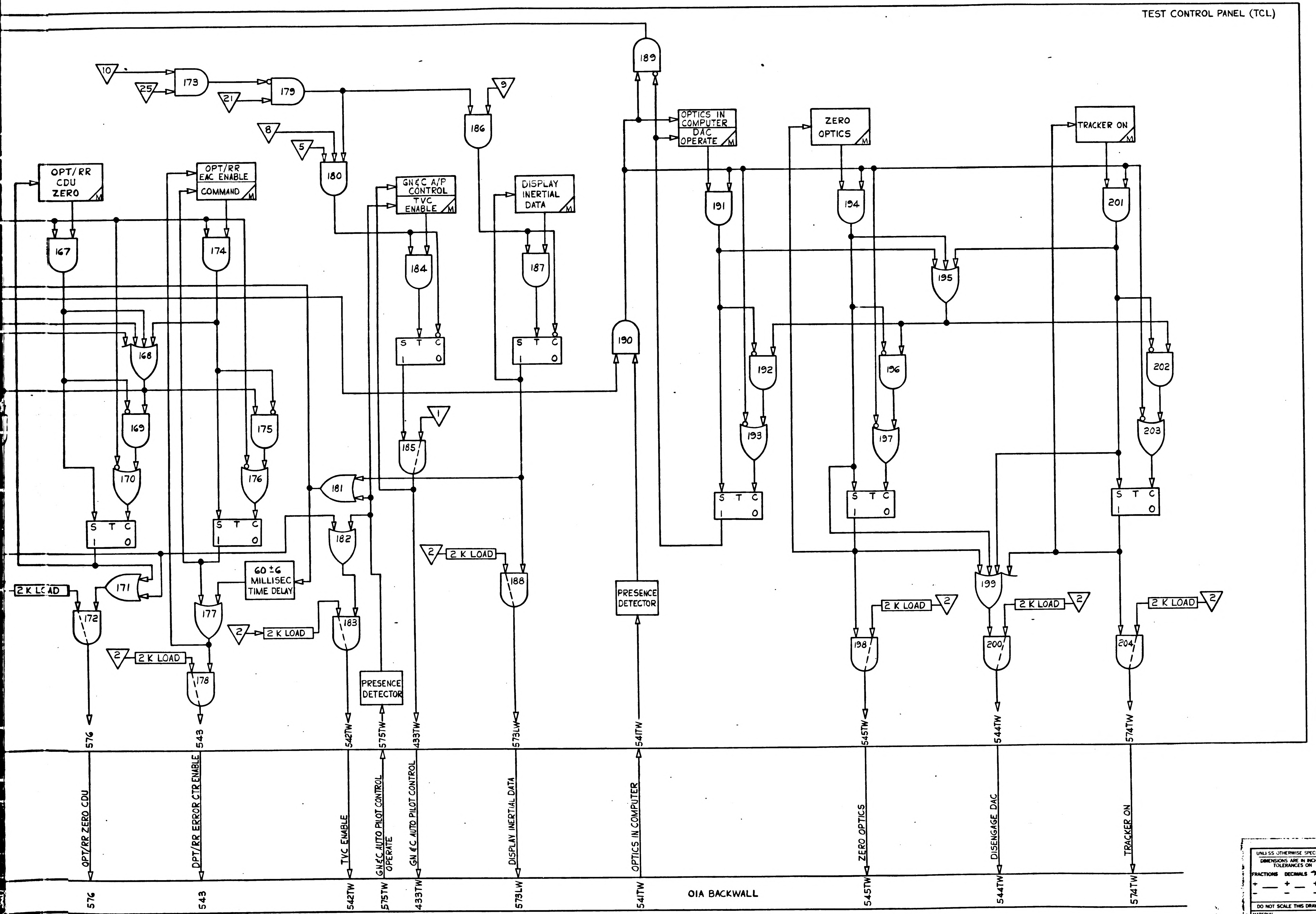
2900201 REV LTR B SH 5

1050065

1729900201

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		*REVISION STATUS CHANGED*		2 JUL 65	RLP / Red
B		REVISION STATUS CHANGED		7 JUL 65	JJJ / MEM
C		REVISION STATUS CHANGED		8 JUL 65	JJJ / MEM

REVISIONS 19254



TEST CONTROL PANEL (TCL)
10
25
173
21
179
9
186
8
5
180
189
OPTICS IN COMPUTER
DAC OPERATE
M
ZERO OPTICS
M
TRACKER ON
M
OPT/RR CDU ZERO
M
OPT/RR EAC ENABLE
COMMAND
M
GN&C A/P CONTROL
TVC ENABLE
M
DISPLAY INERTIAL DATA
M
167
174
184
187
191
194
201
195
168
S T C
1 0
190
192
196
202
169
175
1
185
193
197
203
170
176
181
182
188
60 ± 6 MILLISEC TIME DELAY
2 K LOAD
2
171
172
177
183
178
PRESENCE DETECTOR
199
198
200
204
576
543
542TW
575TW
433TW
573LW
541TW
545TW
544TW
574TW
OPT/RR ZERO CDU
OPT/RR ERROR CTR ENABLE
TVC ENABLE
GN&C AUTO PILOT CONTROL OPERATE
GN&C AUTO PILOT CONTROL
DISPLAY INERTIAL DATA
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
01A BACKWALL

2H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ———
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Schwabe DATE 10 MAY 65
CHECKED Ed Foster 17 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM -
TEST CONTROL PANEL
(BLOCK II & LEM)

CODE IDENT NO 99974
SIZE J2
2900201
SCALE NONE
SHEET 1 OF 5

2900201 REV C SHT 1

2900201 C

2/2900201

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS
   - 2900203 – TEMPERATURE MONITOR & CONTROL PANEL (TMC)
   - 2900208 – POWER AND DUMMY LOAD PANEL-PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL, PSS)
   - 2900223 – GIMBAL POSITION CONTROL PANEL (GPC)
   - 2900207 – MONITOR PANEL (MPL)
   - 2900209 – COMPUTER SIMULATOR INTERFACE (CMS)
   - 2900206 – TEST SELECTOR PANEL (TES)
   - 2900217 – SIGNAL SELECTOR AND MEASUREMENT
     - CROSSBAR-AC SIGNALS (XBR-A)
     - CROSSBAR-DC SIGNALS (XBR-B)
   - 2900218 – OSCILLOGRAPH SIGNAL SELECTION
     - TO FIXED DC CHANNEL (RSS-B)
     - TO SWITCHABLE AC CHANNEL (RSS-C)
   - 2900200 – GYRO CAGING PANEL (GCP)
   - 2900210 – AC POWER PROTECTION PANEL AND POWER DISTRIBUTION (FTR)
     - RELAY AND LAMP POWER SUPPLY (RLP)
   - 2900213 – GSE GROUNDING
4. NON STANDARD SYMBOLOGY

	INDICATES "AND" GATE WITH SWITCHED SIGNAL
NAME NAME	INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME NAME	INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION)
NAME	INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME	INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
NAME	INDICATES UNLIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME	INDICATES INDICATOR LIGHT

5. T, W, AND L SUFFIXES ON INTERFACE NUMBERS DENOTE FUNCTIONAL USAGE OF THAT INTERFACE. INTERPRET AS FOLLOWS:
   - T - UNIQUE TO BLOCK II CONFIGURATION
   - W - UNIQUE TO BLOCK I SERIES 100 CONFIGURATION
   - L - UNIQUE TO LEM CONFIGURATION
   - TW, TL, OR LW - COMMON TO THE TWO INDICATED CONFIGURATIONS
   - NO SUFFIX - COMMON TO ALL THREE CONFIGURATIONS
6. ALL TIME DELAYS SHALL HAVE RESET TIMES OF 20 MS OR LESS.
7. SIGNAL REFERENCE:

1 = G & N + 28 VDC HI
2 = G & N + 28 VDC LO
3 = 27 VDC HI OIA ON
4 = 27 VDC RLP LO
5 = OPTICS POWER ON
6 = CGC/LGC POWER ON
7 = OSS LEVEL TEST

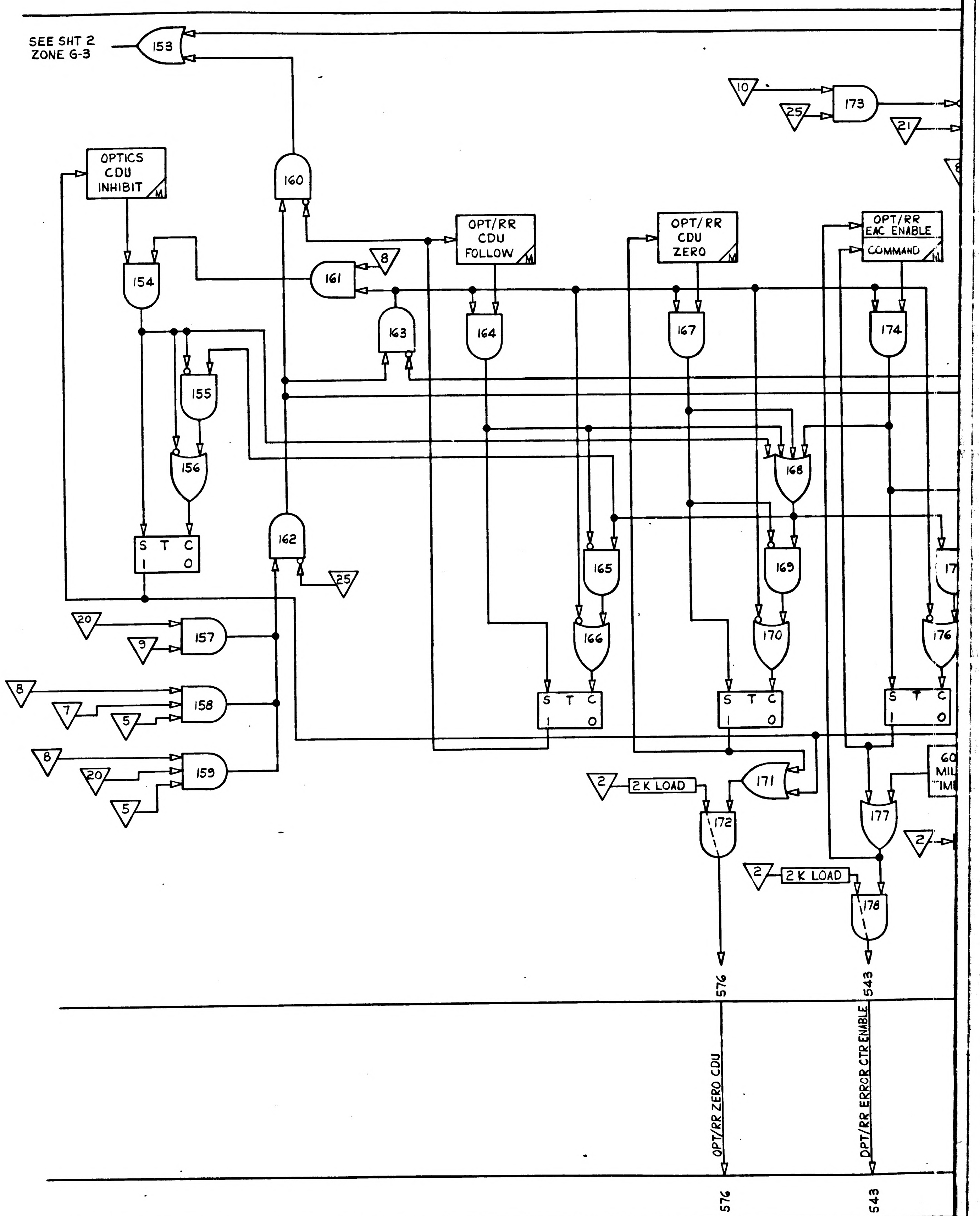
SIGNAL REFERENCE (CONT.)

8 = BLOCK II TEST CONFIG
9 = LEM TEST CONFIG
10 = ISS LEVEL TEST
11 = ISS STANDBY
12 = GYRO TORQUING ENABLED
13 = PIPA LOOPS INHIBITED
14 = ISS LEVEL STANDBY
15 = ISS LEVEL OPERATE
16 = ISS OPERATE
17 = WHEELS STOPPED
18 = SELECT COARSE ALIGN
19 = ENABLE WHEELS OFF
20 = ISS LEVEL OPERATE + 90 SEC
21 = OPERATE + 90 SEC
22 = OSS LEVEL OPTICS POWER ON
23 = TURN ON-LOOPS CLOSED
24 = TURN ON-LOOPS OPEN
25 = MASTER RESET DEPRESSED

8. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

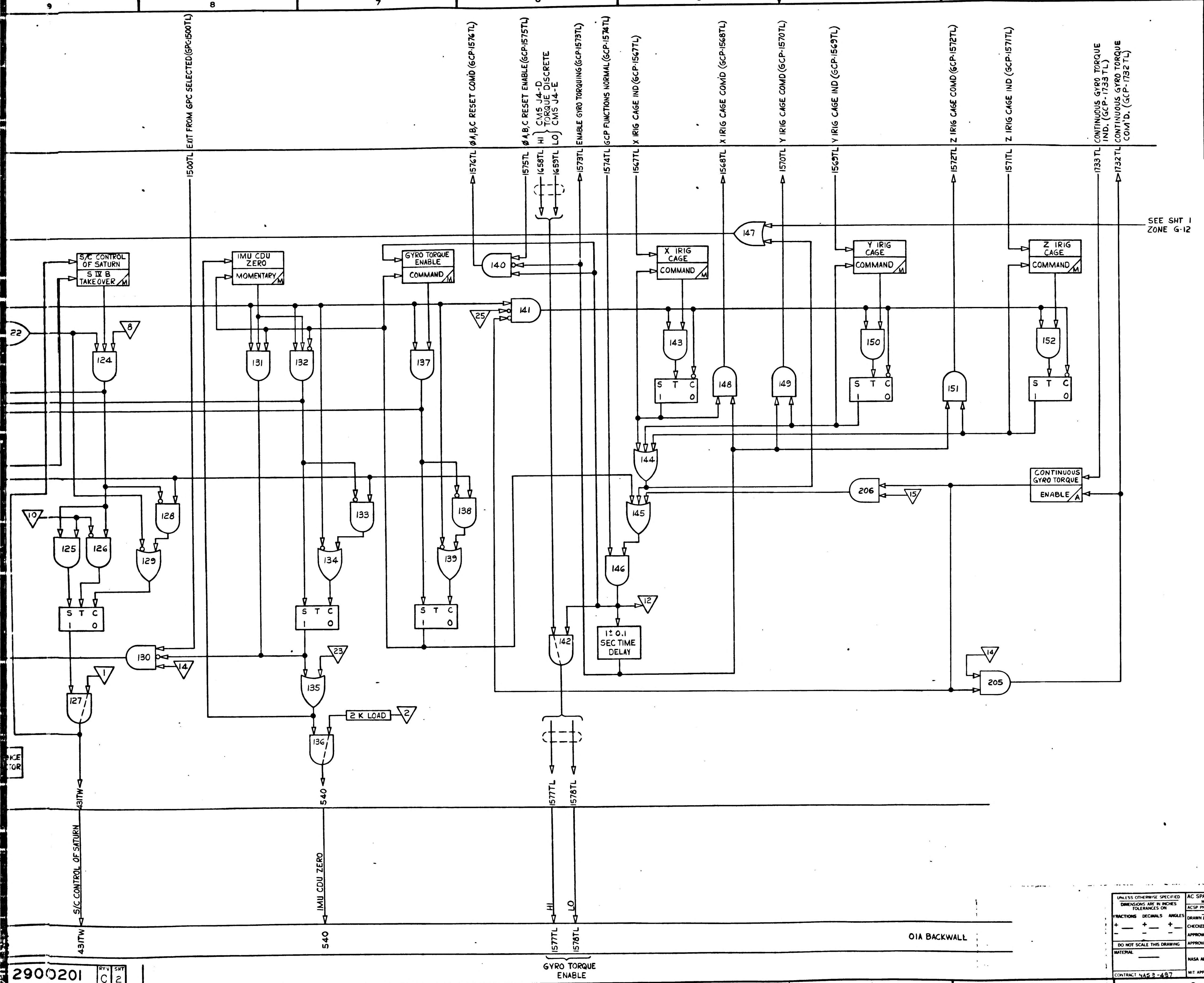
BLOCK II	SH 3	SH 2	SH 1
		SH 4	
LEM	SH 3	SH 2	SH 1
		SH 5	

9. *AS A DESIGN GOAL, THE INTERCONNECTIONS BETWEEN THE A/B COMPONENT AND THE GSE WILL BE MAINTAINED AS INTERFACE DEVICES.*


SEE SHT 2
ZONE G-3
153
10
25
173
21
8
OPTICS CDU INHIBIT M
160
154
161
8
163
OPT/RR CDU FOLLOW M
164
OPT/RR CDU ZERO M
167
OPT/RR EAC ENABLE
COMMAND
174
155
156
168
S T C I O
162
25
165
169
20
9
157
166
170
176
8
7
5
158
S T C I O
S T C I O
8
20
5
159
2
2K LOAD
171
172
177
2
2
2K LOAD
178
576
543
OPT/RR ZERO CDU
OPT/RR ERROR CTR ENABLE
576
543

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20489		2 JUL 65	RLP / MEM
B		REVISION STATUS CHANGED	—	7 JUL 65	JJJ / MEM
C		REVISION STATUS CHANGED	—	8 JUL 65	JJJ / MEM

REVISIONS 19254



9
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1
H
G
F
E
D
C
B
A
1500TL EXIT FROM GPC SELECTED (GPC-1500TL)
1576TL ØA,B,C RESET COMD (GCP-1576TL)
1575TL ØA,B,C RESET ENABLE (GCP-1575TL)
1658TL HI
1659TL LO
CMS J4-D
TORQUE DISCRETE
CMS J4-E
1573TL ENABLE GYRO TORQUING (GCP-1573TL)
1574TL GCP FUNCTIONS NORMAL (GCP-1574TL)
1567TL X IRIG CAGE IND (GCP-1567TL)
1568TL X IRIG CAGE COMD (GCP-1568TL)
1570TL Y IRIG CAGE COMD (GCP-1570TL)
1569TL Y IRIG CAGE IND (GCP-1569TL)
1572TL Z IRIG CAGE COMD (GCP-1572TL)
1571TL Z IRIG CAGE IND (GCP-1571TL)
1733TL CONTINUOUS GYRO TORQUE IND. (GCP-1733 TL)
1732TL CONTINUOUS GYRO TORQUE COM'D. (GCP-1732TL)
SEE SHT 1 ZONE G-12
147
S/C CONTROL OF SATURN
S IV B TAKEOVER M
IMU CDU ZERO
MOMENTARY M
GYRO TORQUE ENABLE
COMMAND M
140
141
25
X IRIG CAGE
COMMAND M
Y IRIG CAGE
COMMAND M
Z IRIG CAGE
COMMAND M
22
8
124
131
132
137
143
150
152
S T C
1 0
148
149
151
144
CONTINUOUS GYRO TORQUE
ENABLE A
206
15
145
10
128
133
138
125
126
129
134
139
146
12
1 ± 0.1 SEC TIME DELAY
142
130
14
23
1
135
127
2K LOAD
2
136
205
431TW
540
1577TL
1578TL
S/C CONTROL OF SATURN
IMU CDU ZERO
HI
LO
OIA BACKWALL
GYRO TORQUE ENABLE
ICE
TOR
2H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ——
DECIMALS ± ——
ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Schwalle DATE 7 MAY 65
CHECKED 11 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

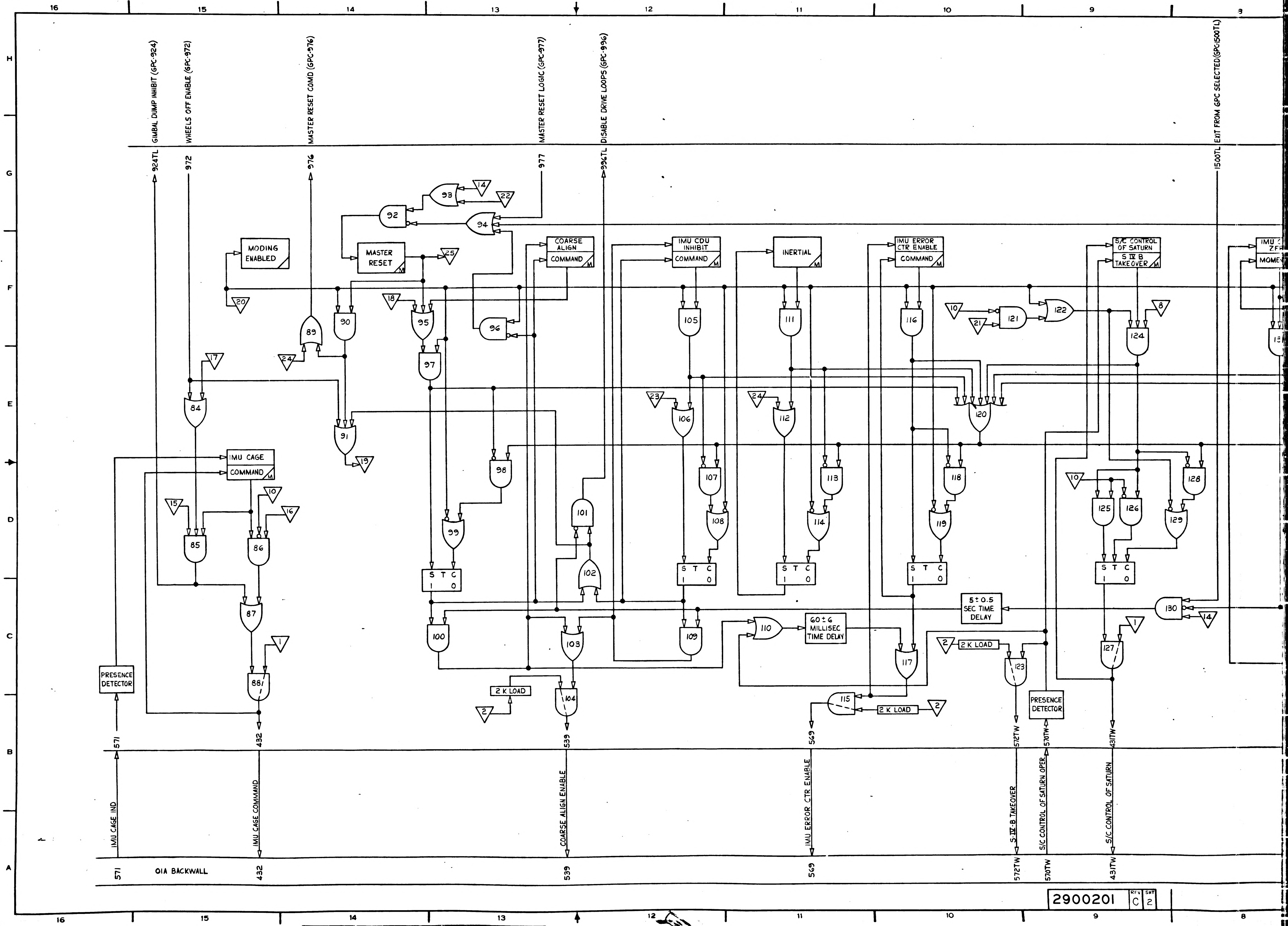
MECHANIZATION DIAGRAM –
TEST CONTROL PANEL
(BLOCK II & LEM)

CODE IDENT NO 99974
SIZE J2
2900201
SCALE NONE
SHEET 2 OF 5

2900201	REV C	SHT 2

2900201 C

2/2900201



GIMBAL DUMP INHIBIT (GPC-924)
WHEELS OFF ENABLE (GPC-972)
MASTER RESET COMD (GPC-976)
MASTER RESET LOGIC (GPC-977)
DISABLE DRIVE LOOPS (GPC-996)
1500TL EXIT FROM GPC SELECTED (GPC1500TL)
924TL
972
976
977
996TL
MODING ENABLED
MASTER RESET
COARSE ALIGN
COMMAND
IMU CDU INHIBIT
COMMAND
INERTIAL
IMU ERROR CTR ENABLE
COMMAND
S/C CONTROL OF SATURN
S IV B TAKEOVER
IMU CAGE
COMMAND
M
PRESENCE DETECTOR
5 ± 0.5 SEC TIME DELAY
60 ± 6 MILLISEC TIME DELAY
2 K LOAD
S T C
1 0
571
432
539
569
572TW
570TW
431TW
IMU CAGE IND
IMU CAGE COMMAND
COARSE ALIGN ENABLE
IMU ERROR CTR ENABLE
S IV B TAKEOVER
S/C CONTROL OF SATURN OPER.
S/C CONTROL OF SATURN
OIA BACKWALL
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
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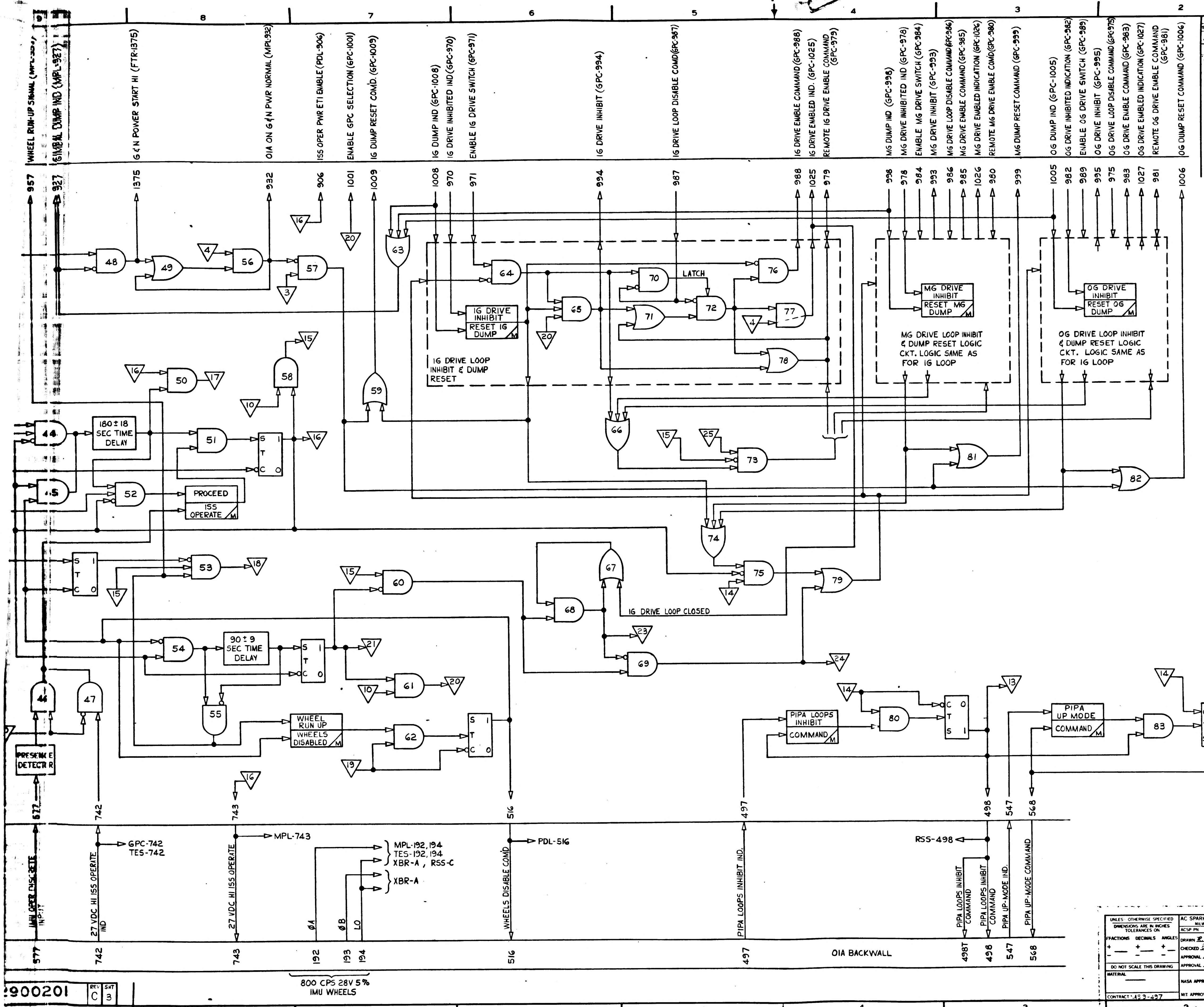
119
120
121
122
123
124
125
126
127
128
129
130
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
2900201
C
2

1/2900201

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP mem
B		REVISED PER TDRR 20492		7 JUL 65	JJJ mem
C		REVISED PER TDRR 20493		8 JUL 65	JJJ mem

19254



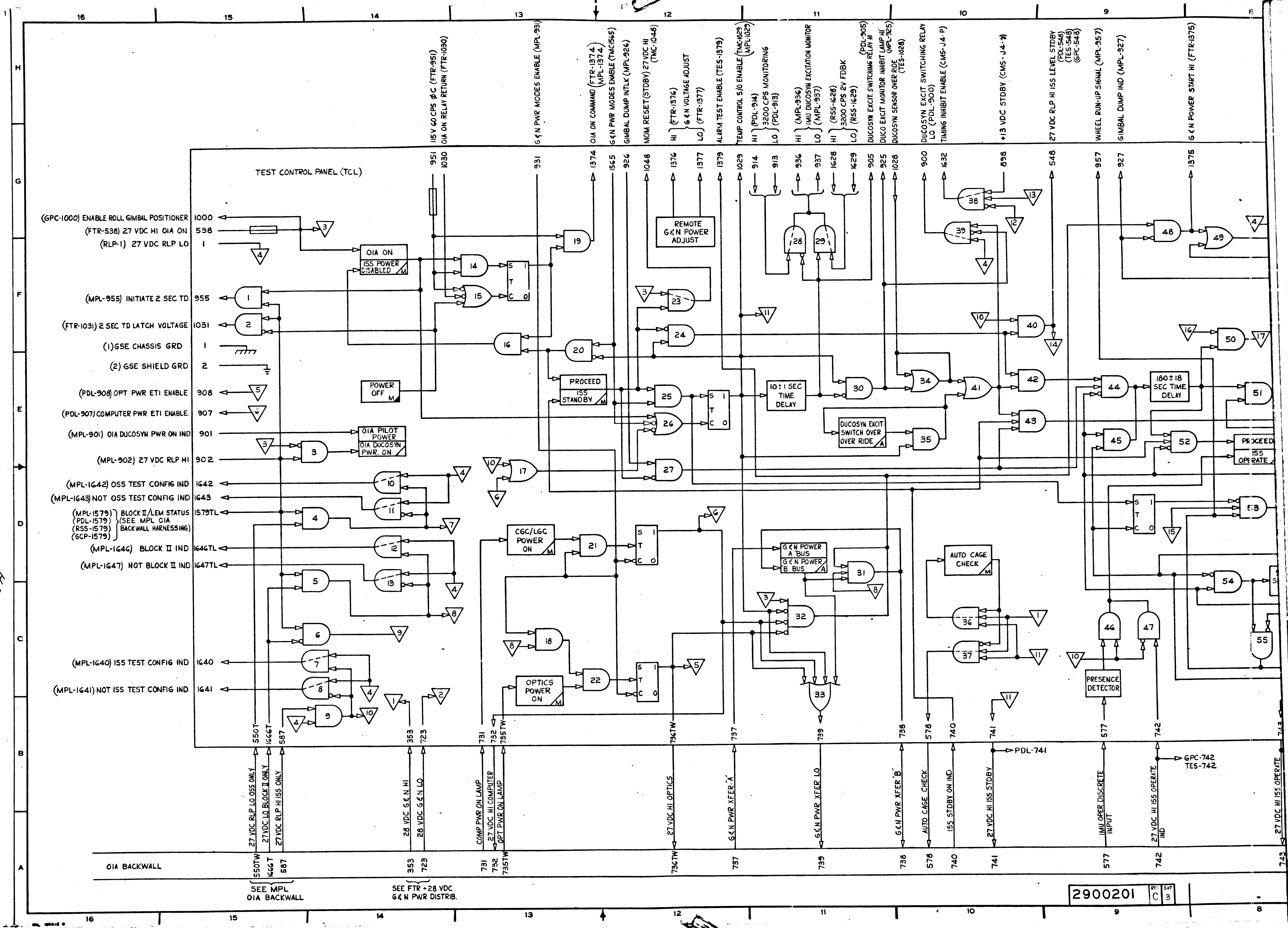
957 WHEEL RUN-UP SIGNAL (MPL-957)
927 GIMBAL DUMP IND (MPL-927)
1375 G & N POWER START HI (FTR-1375)
932 OIA ON G & N PWR NORMAL (MPL-932)
906 ISS OPER PWR ETI ENABLE (PDL-906)
1001 ENABLE GPC SELECTION (GPC-1001)
1009 IG DUMP RESET COMD. (GPC-1009)
1008 IG DUMP IND (GPC-1008)
970 IG DRIVE INHIBITED IND (GPC-970)
971 ENABLE IG DRIVE SWITCH (GPC-971)
994 IG DRIVE INHIBIT (GPC-994)
987 IG DRIVE LOOP DISABLE COMD (GPC-987)
988 IG DRIVE ENMBLE COMMAND (GPC-988)
1025 IG DRIVE ENABLED IND. (GPC-1025)
979 REMOTE IG DRIVE ENABLE COMMAND (GPC-979)
998 MG DUMP IND (GPC-998)
978 MG DRIVE INHIBITED IND (GPC-978)
984 ENABLE MG DRIVE SWITCH (GPC-984)
993 MG DRIVE INHIBIT (GPC-993)
986 MG DRIVE LOOP DISABLE COMMAND (GPC-986)
985 MG DRIVE ENABLE COMMAND (GPC-985)
1026 MG DRIVE ENABLED INDICATION (GPC-1026)
980 REMOTE MG DRIVE ENABLE COMD (GPC-980)
999 MG DUMP RESET COMMAND (GPC-999)
1005 OG DUMP IND (GPC-1005)
982 OG DRIVE INHIBITED INDICATION (GPC-982)
989 ENABLE OG DRIVE SWITCH (GPC-989)
995 OG DRIVE INHIBIT (GPC-995)
975 OG DRIVE LOOP DISABLE COMMAND (GPC-975)
983 OG DRIVE ENABLE COMMAND (GPC-983)
1027 OG DRIVE ENABLED INDICATION (GPC-1027)
981 REMOTE OG DRIVE ENABLE COMMAND (GPC-981)
1006 OG DUMP RESET COMMAND (GPC-1006)
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
48
49
56
57
63
64
65
70
LATCH
71
72
76
77
78
IG DRIVE INHIBIT
RESET IG DUMP
M
IG DRIVE LOOP INHIBIT & DUMP RESET
MG DRIVE INHIBIT
RESET MG DUMP
MG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
OG DRIVE INHIBIT
RESET OG DUMP
OG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
44
45
180 ± 18 SEC TIME DELAY
50
51
52
53
54
55
58
59
60
61
62
66
67
68
69
73
74
75
79
80
81
82
83
S
T
C
I
O
PROCEED ISS OPERATE
90 ± 9 SEC TIME DELAY
WHEEL RUN UP
WHEELS DISABLED
IG DRIVE LOOP CLOSED
PIPA LOOPS INHIBIT
COMMAND
PIPA UP MODE
COMMAND
46
47
PRESENCE DETECTOR
3
4
10
13
14
15
16
17
18
19
20
21
23
24
25
577
742
743
516
497
498
547
568
GPC-742
TES-742
MPL-743
MPL-192, 194
TES-192, 194
XBR-A, RSS-C
XBR-A
PDL-516
RSS-498
IMU OPER DISCRETE INP-17
27 VDC HI ISS OPERATE IND
27 VDC HI ISS OPERATE
ØA
ØB
LO
WHEELS DISABLE COMD
PIPA LOOPS INHIBIT IND.
PIPA LOOPS INHIBIT COMMAND
PIPA UP-MODE IND.
PIPA UP-MODE COMMAND
577
742
743
192
193
194
516
497
OIA BACKWALL
498T
498
547
568
800 CPS 28V 5% IMU WHEELS

2900201 REV C SHT 3

2H

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
FRACTIONS ± __ DECIMALS ± __ ANGLES ± __	ACSP PN	MECHANIZATION DIAGRAM - TEST CONTROL PANEL (BLOCK II & LEM)
DO NOT SCALE THIS DRAWING	DRAWN R. Schwabe DATE 10 MAY 65 CHECKED 17 MAY 65 APPROVAL APPROVAL	
MATERIAL __	NASA APPROVAL	CODE IDENT NO 99974 SIZE J2 2900201
CONTRACT NAS 9-497	MIT APPROVAL	SCALE NONE SHEET 3 OF 5

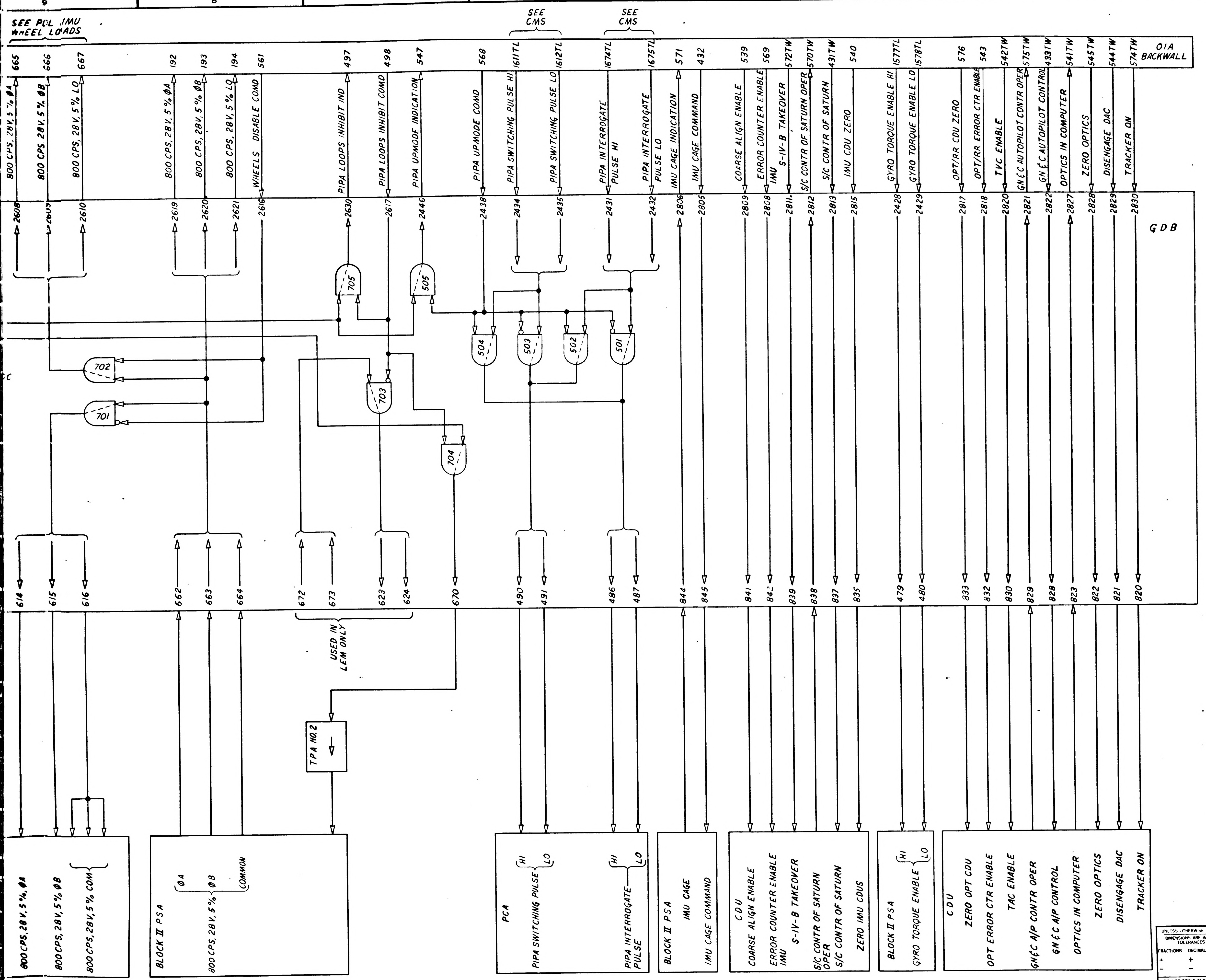
2/2900201


TEST CONTROL PANEL (TCL)
(GPC-1000) ENABLE ROLL GIMBAL POSITIONER 1000
(FTR-538) 27 VDC HI OIA ON 538
(RLP-1) 27 VDC RLP LO 1
(MPL-955) INITIATE 2 SEC TD 955
(FTR-1031) 2 SEC TD LATCH VOLTAGE 1031
(1) GSE CHASSIS GRD 1
(2) GSE SHIELD GRD 2
(PDL-908) OPT PWR ETI ENABLE 908
(PDL-907) COMPUTER PWR ETI ENABLE 907
(MPL-901) OIA DUCOSYN PWR ON IND 901
(MPL-902) 27 VDC RLP HI 902
(MPL-1642) OSS TEST CONFIG IND 1642
(MPL-1643) NOT OSS TEST CONFIG IND 1643
(MPL-1579) (PDL-1579) (RSS-1579) (GCP-1579) BLOCK II/LEM STATUS (SEE MPL OIA BACKWALL HARNESSING) 1579TL
(MPL-1646) BLOCK II IND 1646TL
(MPL-1647) NOT BLOCK II IND 1647TL
(MPL-1640) ISS TEST CONFIG IND 1640
(MPL-1641) NOT ISS TEST CONFIG IND 1641
115V 60 CPS ØC (FTR-951)
OIA ON RELAY RETURN (FTR-1030)
G&N PWR MODES ENABLE (MPL-931)
OIA ON COMMAND (FTR-1374 / MPL-1374)
G&N PWR MODES ENABLE (TMC-1565)
GIMBAL DUMP INTLK (MPL-926)
MOM RESET (STDBY) 27 VDC HI (TMC-1048)
HI (FTR-1376) LO (FTR-1377) G&N VOLTAGE ADJUST
ALARM TEST ENABLE (TES-1379)
TEMP CONTROL S/O ENABLE (TMC-1029 / MPL-1029)
HI (PDL-914) LO (PDL-913) 3200 CPS MONITORING
HI (MPL-936) LO (MPL-937) IMU DUCOSYN EXCITATION MONITOR
HI (RSS-1628) LO (RSS-1629) 3200 CPS 2V FDBK
DUCOSYN EXCIT SWITCHING RELAY HI (PDL-905)
DUCO EXCIT MONITOR INHIBIT LAMP HI (MPL-925)
DUCOSYN SENSOR OVER RIDE (TES-1028)
DUCOSYN EXCIT SWITCHING RELAY LO (PDL-900)
TIMING INHIBIT ENABLE (CMS-J4-P)
+13 VDC STDBY (CMS-J4-V)
27 VDC RLP HI ISS LEVEL STDBY (PDL-548) (TES-548) (GPC-548)
WHEEL RUN-UP SIGNAL (MPL-957)
GIMBAL DUMP IND (MPL-927)
G&N POWER START HI (FTR-1375)
951 1030 931 1374 1565 926 1048 1376 1377 1379 1029 914 913 936 937 1628 1629 905 925 1028 900 1632 898 548 957 927 1375
REMOTE G&N POWER ADJUST
OIA ON
ISS POWER DISABLED M
POWER OFF M
PROCEED
ISS STANDBY M
OIA PILOT POWER
OIA DUCOSYN PWR. ON
10±1 SEC TIME DELAY
DUCOSYN EXCIT. SWITCH OVER OVER RIDE A
180±18 SEC TIME DELAY
PROCEED
ISS OPERATE
CGC/LGC POWER ON M
OPTICS POWER ON M
G&N POWER A BUS
G&N POWER B BUS A
AUTO CAGE CHECK M
PRESENCE DETECTOR
S I T C O
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
550T 1666T 587 353 723 731 732 735TW 736TW 737 739 738 578 740 741 577 742 743
27 VDC RLP LO OSS ONLY
27 VDC LO BLOCK II ONLY
27 VDC RLP HI ISS ONLY
28 VDC G&N HI
28 VDC G&N LO
COMP PWR ON LAMP
27 VDC HI COMPUTER
OPT PWR ON LAMP
27 VDC HI OPTICS
G&N PWR XFER 'A'
G&N PWR XFER LO
G&N PWR XFER 'B'
AUTO CAGE CHECK
ISS STDBY ON IND
27 VDC HI ISS STDBY
IMU OPER DISCRETE INPUT
27 VDC HI ISS OPERATE IND
27 VDC HI ISS OPERATE
PDL-741
GPC-742 TES-742
OIA BACKWALL
550TW 1666T 587 353 723 731 732 735TW 736TW 737 739 738 578 740 741 577 742 743
SEE MPL OIA BACKWALL
SEE FTR +28 VDC G&N PWR DISTRIB.
16 15 14 13 12 11 10 9 8
H G F E D C B A
2900201 C 3

1/2900201

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP / MGM
B		REVISION STATUS CHANGED		7 JUL 65	JJJ / MGM
C		REVISION STATUS CHANGED		8 JUL 65	JJJ / MGM

REVISIONS 14254


SEE PDL IMU WHEEL LOADS
SEE CMS
SEE CMS
OIA BACKWALL
665 800 CPS, 28V, 5% ØA
666 800 CPS, 28V, 5% ØB
667 800 CPS, 28V, 5% LO
192 800 CPS, 28V, 5% ØA
193 800 CPS, 28V, 5% ØB
194 800 CPS, 28V, 5% LO
561 WHEELS DISABLE COMD
497 PIPA LOOPS INHIBIT IND
498 PIPA LOOPS INHIBIT COMD
547 PIPA UPMODE INDICATION
568 PIPA UPMODE COMD
1611TL PIPA SWITCHING PULSE HI
1612TL PIPA SWITCHING PULSE LO
1674TL PIPA INTERROGATE PULSE HI
1675TL PIPA INTERROGATE PULSE LO
571 IMU CAGE INDICATION
432 IMU CAGE COMMAND
539 COARSE ALIGN ENABLE
569 ERROR COUNTER ENABLE IMU
572TW S-IV-B TAKEOVER
570TW S/C CONTR OF SATURN OPER
431TW S/C CONTR OF SATURN
540 IMU CDU ZERO
1577TL GYRO TORQUE ENABLE HI
1578TL GYRO TORQUE ENABLE LO
576 OPT/RR CDU ZERO
543 OPT/RR ERROR CTR ENABLE
542TW TVC ENABLE
575TW GN & C AUTOPILOT CONTR OPER
493TW GN & C AUTOPILOT CONTROL
541TW OPTICS IN COMPUTER
545TW ZERO OPTICS
544TW DISENGAGE DAC
574TW TRACKER ON
2608 2609 2610 2619 2620 2621 2616 2630 2617 2446 2438 2434 2435 2431 2432 2806 2805 2809 2808 2811 2812 2813 2815 2428 2429 2817 2818 2820 2821 2822 2827 2828 2829 2830
GDB
705 505 504 503 502 501 702 701 703 704
614 615 616 662 663 664 672 673 623 624 670 490 491 486 487 844 845 841 842 839 838 837 835 479 480 833 832 830 829 828 823 822 821 820
USED IN LEM ONLY
TPA NO. 2
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% COM
BLOCK II PSA
800 CPS, 28V, 5% ØA ØB COMMON
PCA
PIPA SWITCHING PULSE HI LO
PIPA INTERROGATE PULSE HI LO
BLOCK II PSA
IMU CAGE
IMU CAGE COMMAND
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
S-IV-B TAKEOVER
S/C CONTR OF SATURN OPER
S/C CONTR OF SATURN
ZERO IMU CDUS
BLOCK II PSA
GYRO TORQUE ENABLE HI LO
CDU
ZERO OPT CDU
OPT ERROR CTR ENABLE
TAC ENABLE
GN & C A/P CONTR OPER
GN & C A/P CONTROL
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
9 8 7 6 5 4 3 2 1
H G F E D C B A
2H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Bendel DATE 2-MAY-65
CHECKED Ed Foster 17MAY65
APPROVAL J. Triggs J.H.
APPROVAL J. M. Watson
NASA APPROVAL
MIT APPROVAL W Kupfer 20 May 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
TEST CONTROL PANEL
(BLOCK II)

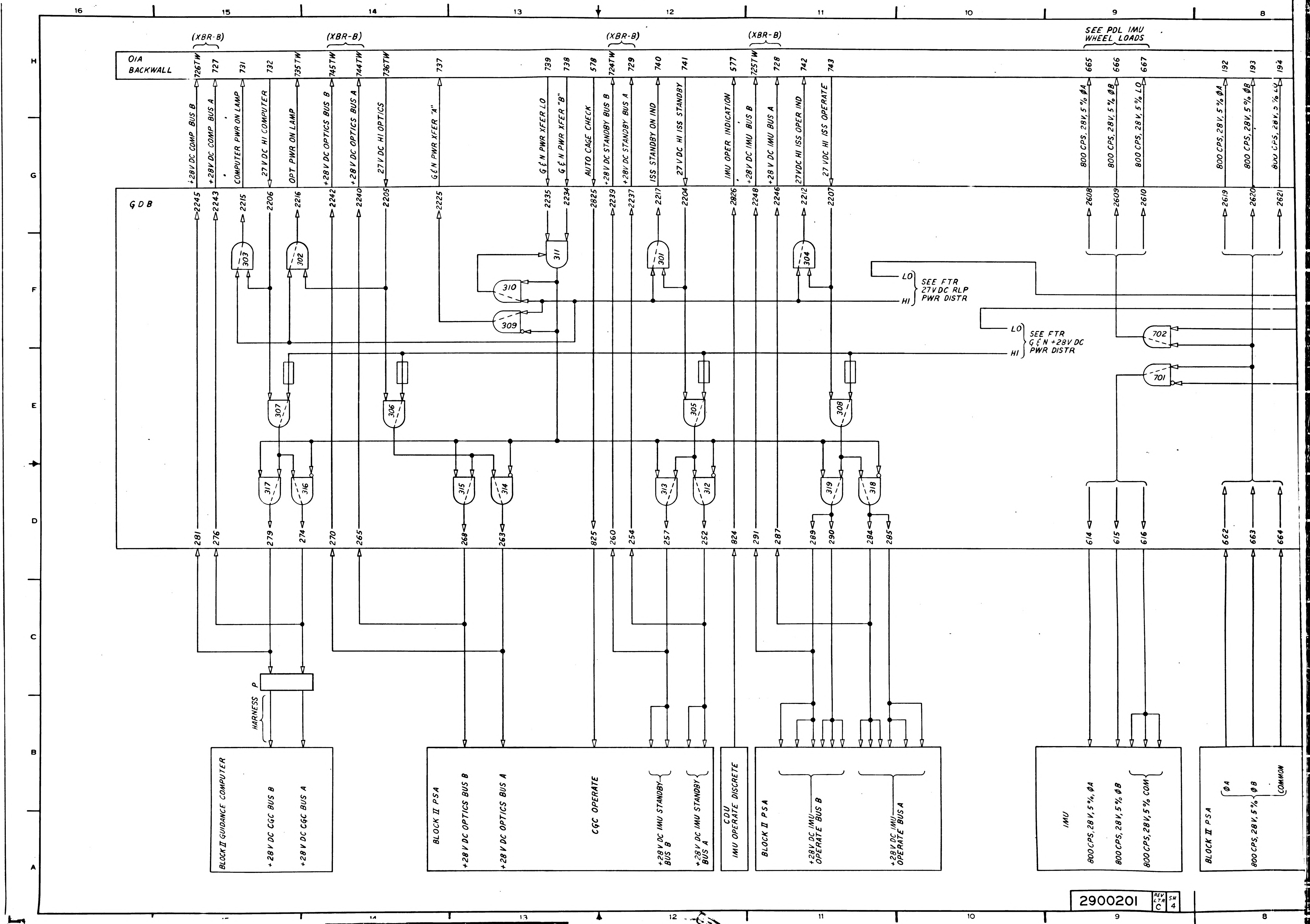
CODE IDENT NO	SIZE	
99974	J2	2900201

SCALE
SHEET 4 OF 5

2900201 C

2900201 REV LTR C SH 4

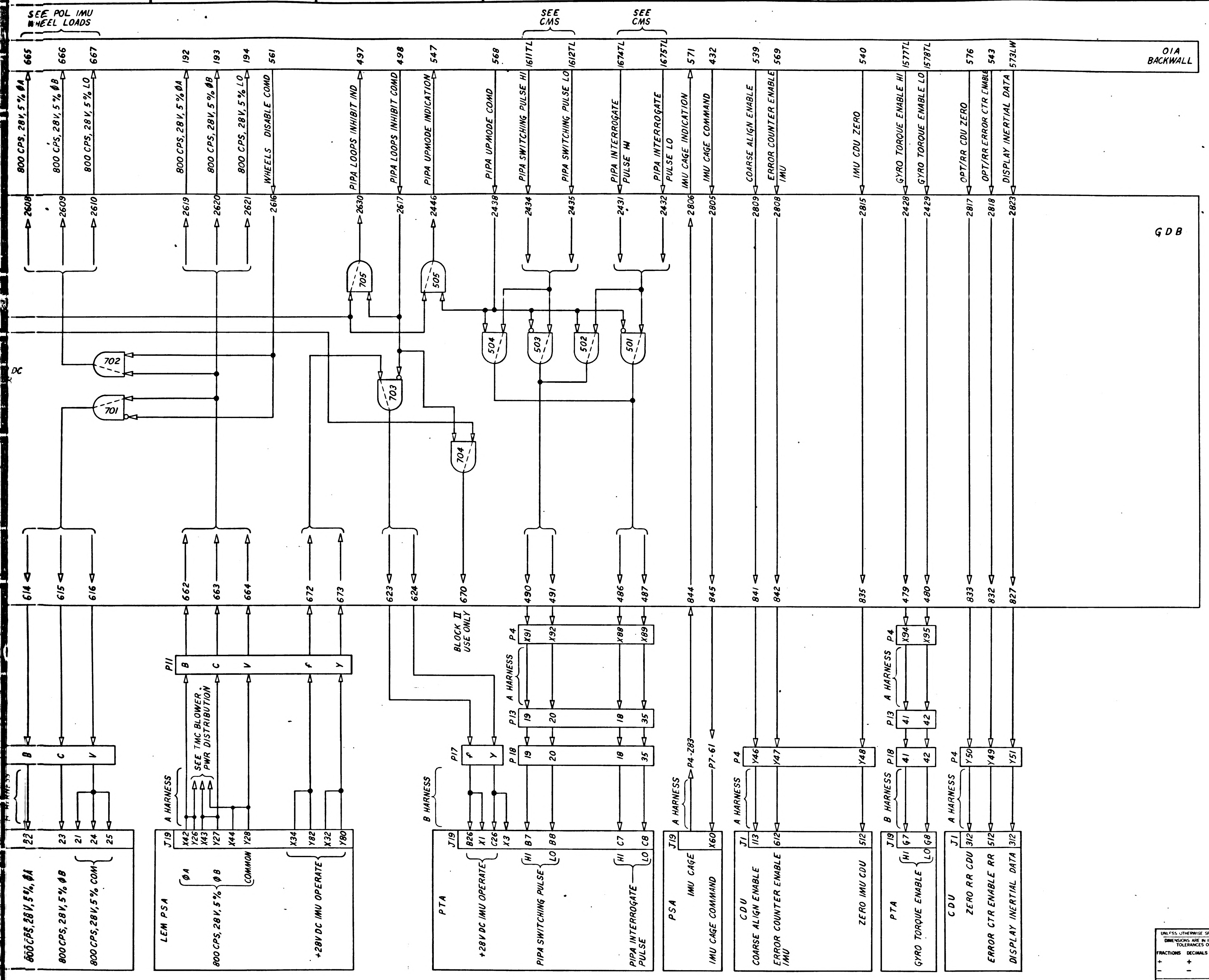
2/2900201


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
(XBR-B)
(XBR-B)
(XBR-B)
(XBR-B)
SEE PDL IMU WHEEL LOADS
OIA BACKWALL
726TW
727
731
732
735TW
745TW
744TW
736TW
737
739
738
578
724TW
729
740
741
577
725TW
728
742
743
665
666
667
192
193
194
+28V DC COMP BUS B
+28V DC COMP BUS A
COMPUTER PWR ON LAMP
27 V DC HI COMPUTER
OPT PWR ON LAMP
+28 V DC OPTICS BUS B
+28 V DC OPTICS BUS A
27 V DC HI OPTICS
G & N PWR XFER "A"
G & N PWR XFER LO
G & N PWR XFER "B"
AUTO CAGE CHECK
+28 V DC STANDBY BUS B
+28V DC STANDBY BUS A
ISS STANDBY ON IND
27 V DC HI ISS STANDBY
IMU OPER INDICATION
+28V DC IMU BUS B
+28 V DC IMU BUS A
27VDC HI ISS OPER IND
27 VDC HI ISS OPERATE
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
GDB
2245
2243
2215
2206
2216
2242
2240
2205
2225
2235
2234
2825
2239
2237
2217
2204
2826
2248
2246
2212
2207
2608
2609
2610
2619
2620
2621
303
302
311
310
309
301
304
307
306
305
308
317
316
315
314
313
312
319
318
702
701
LO
HI
SEE FTR 27VDC RLP PWR DISTR
LO
HI
SEE FTR G & N +28V DC PWR DISTR
281
276
279
274
270
265
268
263
825
260
254
257
252
824
291
287
289
290
284
285
614
615
616
662
663
664
P
HARNESS
BLOCK II GUIDANCE COMPUTER
+28 V DC CGC BUS B
+28 V DC CGC BUS A
BLOCK II PSA
+28 V DC OPTICS BUS B
+28 V DC OPTICS BUS A
CGC OPERATE
+28 V DC IMU STANDBY BUS B
+28 V DC IMU STANDBY BUS A
CDU
IMU OPERATE DISCRETE
BLOCK II PSA
+28V DC IMU OPERATE BUS B
+28V DC IMU OPERATE BUS A
IMU
800 CPS, 28 V, 5%, ØA
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% COM
BLOCK II PSA
ØA
ØB
COMMON
800 CPS, 28 V, 5%

2900201 REV LTR C SH 4

1/2900201

REVISIONS		19254			
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RCP / MEM
B		REVISION STATUS CHANGED		7 JUL 65	JJJ / MEM
C		REVISION STATUS CHANGED		8 JUL 65	JJJ / MEM



SEE POL IMU WHEEL LOADS
SEE CMS
SEE CMS
OIA BACKWALL
GDB
665
666
667
192
193
194
561
497
498
547
568
1611TL
1612TL
1674TL
1675TL
571
432
539
569
540
1577TL
1578TL
576
543
573LW
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
PIPA LOOPS INHIBIT IND
PIPA LOOPS INHIBIT COMD
PIPA UPMODE INDICATION
PIPA UPMODE COMD
PIPA SWITCHING PULSE HI
PIPA SWITCHING PULSE LO
PIPA INTERROGATE PULSE HI
PIPA INTERROGATE PULSE LO
IMU CAGE INDICATION
IMU CAGE COMMAND
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
IMU CDU ZERO
GYRO TORQUE ENABLE HI
GYRO TORQUE ENABLE LO
OPT/RR CDU ZERO
OPT/RR ERROR CTR ENABLE
DISPLAY INERTIAL DATA
2608
2609
2610
2619
2620
2621
2616
2630
2617
2446
2438
2434
2435
2431
2432
2806
2805
2809
2808
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2428
2429
2817
2818
2823
705
505
504
503
502
501
702
701
703
704
DC
614
615
616
662
663
664
672
673
623
624
670
490
491
486
487
844
845
841
842
835
479
480
833
832
827
BLOCK II USE ONLY
P4
X91
X92
X88
X89
A HARNESS
P13
19
20
18
35
P18
19
20
18
35
P11
B
C
V
F
Y
SEE TMC BLOWER, PWR DISTRIBUTION
P17
F
Y
B HARNESS
P4
X94
X95
A HARNESS
P13
41
42
P18
41
42
P4
Y46
Y47
Y48
P4-283
P7-61
A HARNESS
A HARNESS
B HARNESS
P4
Y50
Y49
Y51
A HARNESS
B
C
V
A HARNESS
22
23
21
24
25
800 CPS, 28V, 5%, ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% COM
J19
X42
Y26
X43
Y27
X44
Y28
X34
Y82
X32
Y80
LEM PSA
ØA
800 CPS, 28V, 5% ØB
COMMON
+28V DC IMU OPERATE
PTA
J19
B26
X1
C26
X3
B7
B8
C7
C8
+28V DC IMU OPERATE
HI
LO
PIPA SWITCHING PULSE
HI
LO
PIPA INTERROGATE PULSE
PSA
J19
IMU CAGE
X60
IMU CAGE COMMAND
CDU
J1
113
612
512
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
ZERO IMU CDU
PTA
J19
67
68
HI
LO
GYRO TORQUE ENABLE
CDU
J1
312
512
312
ZERO RR CDU
ERROR CTR ENABLE RR
DISPLAY INERTIAL DATA

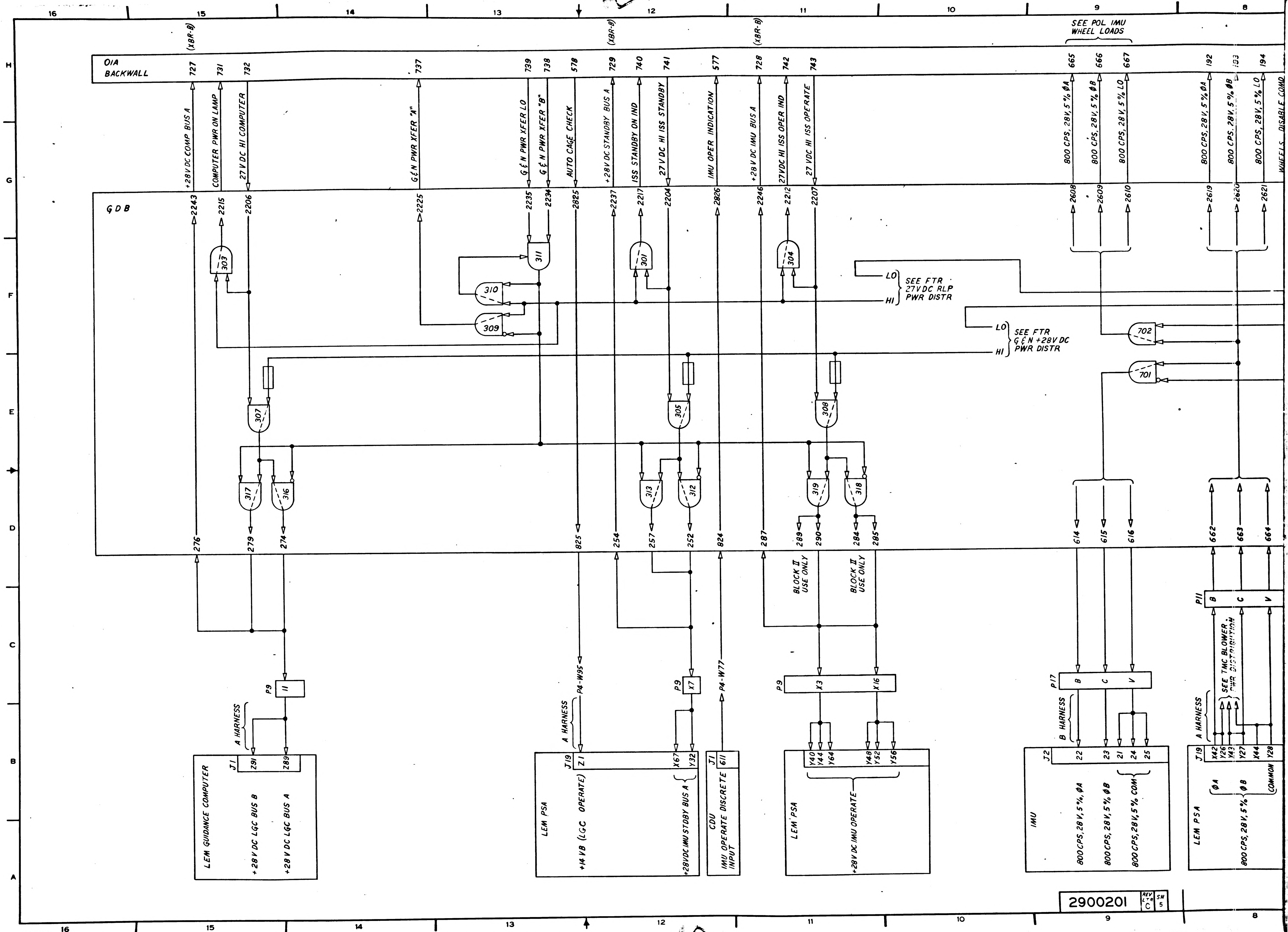
2H

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + − DECIMALS + − ANGLES + −	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN Bender DATE 11-MAY-65 CHECKED APPROVAL APPROVAL	MECHANIZATION DIAGRAM TEST CONTROL PANEL (LEM)
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 2900201
CONTRACT NAS 9-497	MIT APPROVAL	SCALE · SHEET 5 OF 5

2900201 REV LTR C SH 5

2900201 C

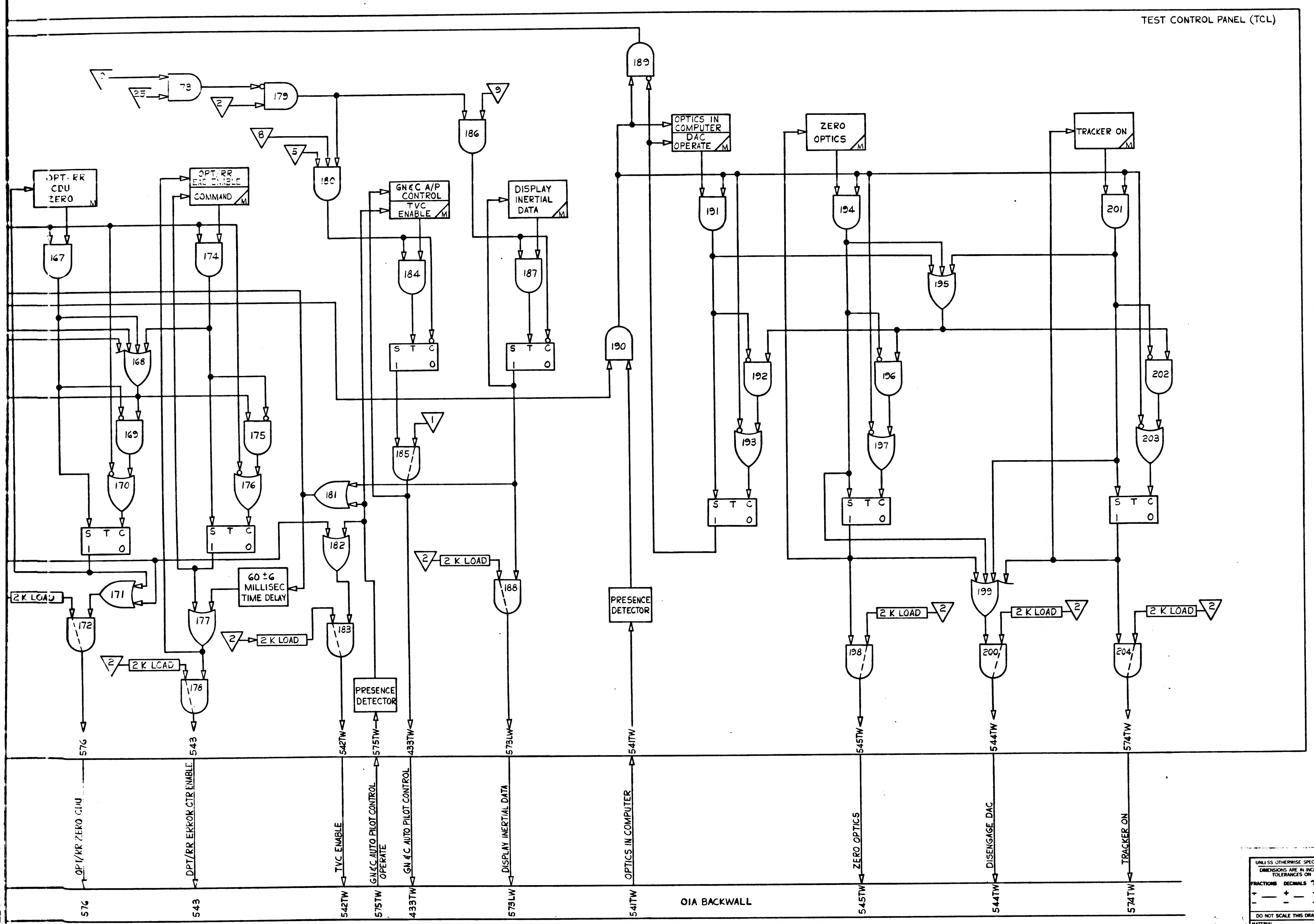
2/2900201


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
(XBR-B)
(XBR-B)
(XBR-B)
SEE POL IMU
WHEEL LOADS
OIA
BACKWALL
727
731
732
737
739
738
578
729
740
741
577
728
742
743
665
666
667
192
193
194
+28 VDC COMP BUS A
COMPUTER PWR ON LAMP
27 VDC HI COMPUTER
G&N PWR XFER "A"
G&N PWR XFER LO
G&N PWR XFER "B"
AUTO CAGE CHECK
+28V DC STANDBY BUS A
ISS STANDBY ON IND
27 V DC HI ISS STANDBY
IMU OPER INDICATION
+28 V DC IMU BUS A
27VDC HI ISS OPER IND
27 VDC HI ISS OPERATE
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
GDB
2243
2215
2206
2225
2235
2234
2825
2237
2217
2204
2826
2246
2212
2207
2608
2609
2610
2619
2620
2621
303
311
310
309
301
304
307
305
308
317
316
313
312
319
318
702
701
LO
HI
SEE FTR
27VDC RLP
PWR DISTR
LO
HI
SEE FTR
G&N +28V DC
PWR DISTR
276
279
274
825
254
257
252
824
287
289
290
284
285
614
615
616
662
663
664
BLOCK II
USE ONLY
BLOCK II
USE ONLY
P11
B
C
V
P9
11
A HARNESS
J1
Z91
Z89
LEM GUIDANCE COMPUTER
+28 V DC LGC BUS B
+28 V DC LGC BUS A
P4-W95
A HARNESS
J19
Z1
LEM PSA
+14 VB (LGC OPERATE)
P9
X7
X67
Y32
+28VDC IMU STDBY BUS A
P4-W77
J1
611
CDU
IMU OPERATE DISCRETE
INPUT
P9
X3
X16
Y40
Y44
Y64
Y48
Y52
Y56
LEM PSA
+28V DC IMU OPERATE
P17
B
C
V
B HARNESS
J2
22
23
21
24
25
IMU
800 CPS, 28 V, 5%, ØA
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% COM
A HARNESS
SEE TMC BLOWER
PWR DISTRIBUTION
J19
X42
Y26
X43
Y27
X44
Y28
LEM PSA
ØA
ØB
COMMON
800 CPS, 28 V, 5%

2900201 REV LTR C SH 5

1/2900201

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	
B		REVISION STATUS CHANGED		7 JUL 65	
C		REVISION STATUS CHANGED		8 JUL 65	
D		REVISION STATUS CHANGED		9 JUL 65	


TEST CONTROL PANEL (TCL)
OPT-RR CDU ZERO M
OPT-RR ERR ENABLE COMMAND M
GN&C A/P CONTROL TVC ENABLE M
DISPLAY INERTIAL DATA M
OPTICS IN COMPUTER DAC OPERATE M
ZERO OPTICS M
TRACKER ON M
73
179
186
180
189
190
167
168
169
170
171
172
174
175
176
177
178
181
182
183
184
185
187
188
191
192
193
194
195
196
197
198
199
200
201
202
203
204
S T C
1 0
60 ±6 MILLISEC TIME DELAY
PRESENCE DETECTOR
2 K LOAD
576
543
542TW
575TW
433TW
573LW
541TW
545TW
544TW
574TW
OPT/RR ZERO CDU
OPT/RR ERROR CTR ENABLE
TVC ENABLE
GN&C AUTO PILOT CONTROL OPERATE
GN&C AUTO PILOT CONTROL
DISPLAY INERTIAL DATA
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
OIA BACKWALL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ___ ± ___ ± ___	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
	ACSP PN	
	DRAWN R. Szczesniak DATE 10 MAY 65 CHECKED 7 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM - TEST CONTROL PANEL (BLOCK II & LEM)
DO NOT SCALE THIS DRAWING		
MATERIAL ___	NASA APPROVAL	CODE IDENT NO 99974 · SIZE J2 · 2900201
CONTRACT NAS 9-497	MIT APPROVAL	SCALE NONE · SHEET 2 OF 5

2900201 D

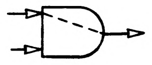
2900201 | D | 1

2H

2/2900201

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS
   - 2900203 – TEMPERATURE MONITOR & CONTROL PANEL (TMC)
   - 2900208 – POWER AND DUMMY LOAD PANEL-PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL, PSS)
   - 2900223 – GIMBAL POSITION CONTROL PANEL (GPC)
   - 2900207 - MONITOR PANEL (MPL)
   - 2900209 - COMPUTER SIMULATOR INTERFACE (CMS)
   - 2900206 - TEST SELECTOR PANEL (TES)
   - 2900217 – SIGNAL SELECTOR AND MEASUREMENT
     - CROSSBAR-AC SIGNALS (XBR-A)
     - CROSSBAR-DC SIGNALS (XBR-B)
   - 2900218 – OSCILLOGRAPH SIGNAL SELECTION
     - TO FIXED DC CHANNEL (RSS-B)
     - TO SWITCHABLE AC CHANNEL (RSS-C)
   - 2900200 - GYRO CAGING PANEL (GCP)
   - 2900210 - AC POWER PROTECTION PANEL AND POWER DISTRIBUTION (FTR)
     - RELAY AND LAMP POWER SUPPLY (RLP)
   - 2900213 – GSE GROUNDING
4. NON STANDARD SYMBOLOGY


INDICATES "AND" GATE WITH SWITCHED SIGNAL

NAME NAME M	INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME NAME A	INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION)
NAME M	INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
NAME M	INDICATES UNLIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME	INDICATES INDICATOR LIGHT

5. T, W, AND L SUFFIXES ON INTERFACE NUMBERS DENOTE FUNCTIONAL USAGE OF THAT INTERFACE. INTERPRET AS FOLLOWS:
   - T- UNIQUE TO BLOCK II CONFIGURATION
   - W- UNIQUE TO BLOCK I SERIES 100 CONFIGURATION
   - L - UNIQUE TO LEM CONFIGURATION
   - TW, TL, OR LW – COMMON TO THE TWO INDICATED CONFIGURATIONS
   - NO SUFFIX - COMMON TO ALL THREE CONFIGURATIONS
6. ALL TIME DELAYS SHALL HAVE RESET TIMES OF 20 MS OR LESS.
7. SIGNAL REFERENCE:

▽1 = G & N + 28 VDC HI
▽2 = G & N + 28 VDC LO
▽3 = 27 VDC HI OIA ON
▽4 = 27 VDC RLP LO
▽5 = OPTICS POWER ON
▽6 = CGC/LGC POWER ON
▽7 = OSS LEVEL TEST

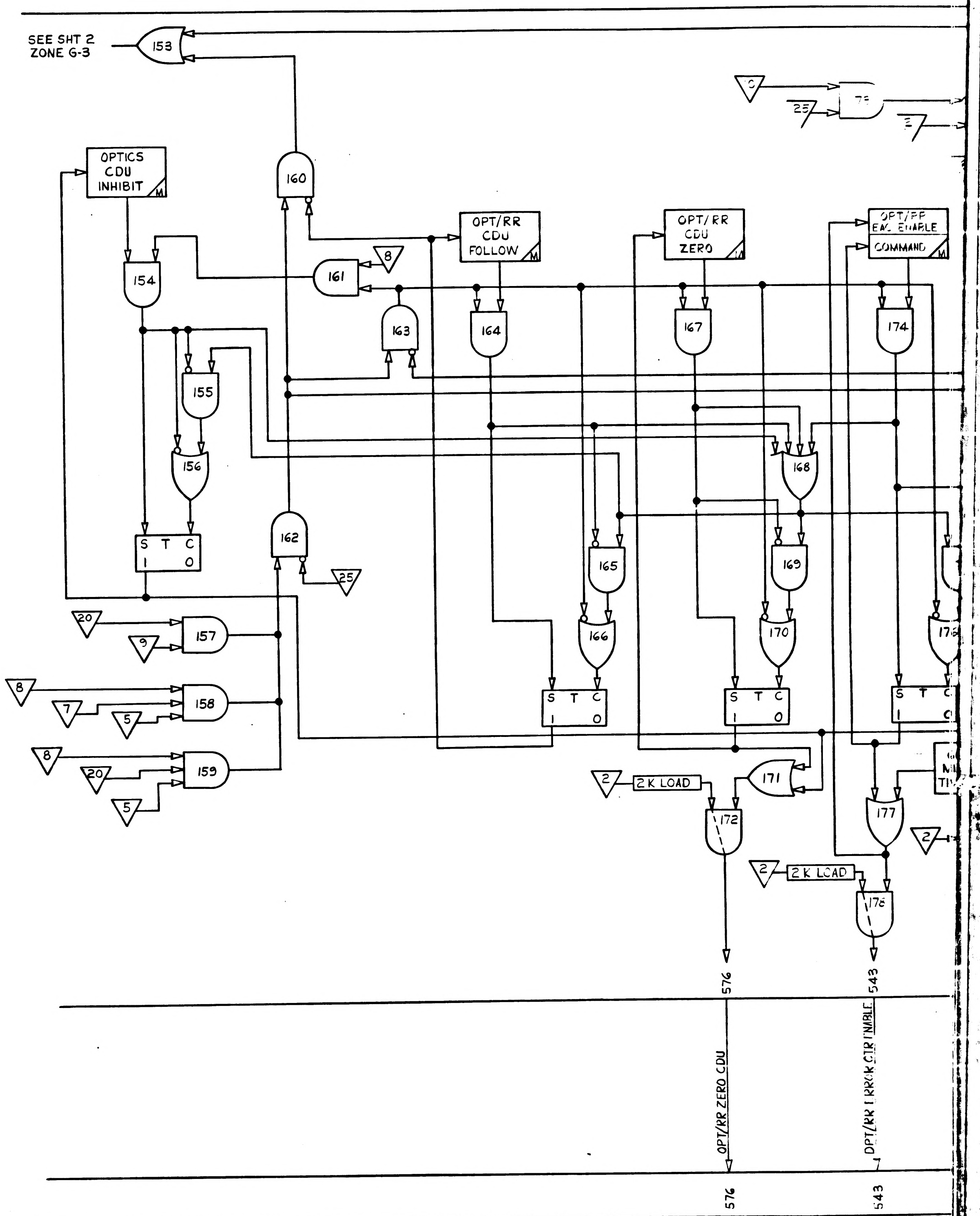
SIGNAL REFERENCE (CONT.)

▽8 = BLOCK II TEST CONFIG
▽9 = LEM TEST CONFIG
▽10 = ISS LEVEL TEST
▽11 = ISS STANDBY
▽12 = GYRO TORQUING ENABLED
▽13 = PIPA LOOPS INHIBITED
▽14 = ISS LEVEL STANDBY
▽15 = ISS LEVEL OPERATE
▽16 = ISS OPERATE
▽17 = WHEELS STOPPED
▽18 = SELECT COARSE ALIGN
▽19 = ENABLE WHEELS OFF
▽20 = ISS LEVEL OPERATE + 90 SEC
▽21 = OPERATE + 90 SEC
▽22 = OSS LEVEL OPTICS POWER ON
▽23 = TURN ON-LOOPS CLOSED
▽24 = TURN ON-LOOPS OPEN
▽25 = MASTER RESET DEPRESSED

8. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK II	SH 3	SH 2	SH 1
		SH 4	
LEM	SH 3	SH 2	SH 1
		SH 5	

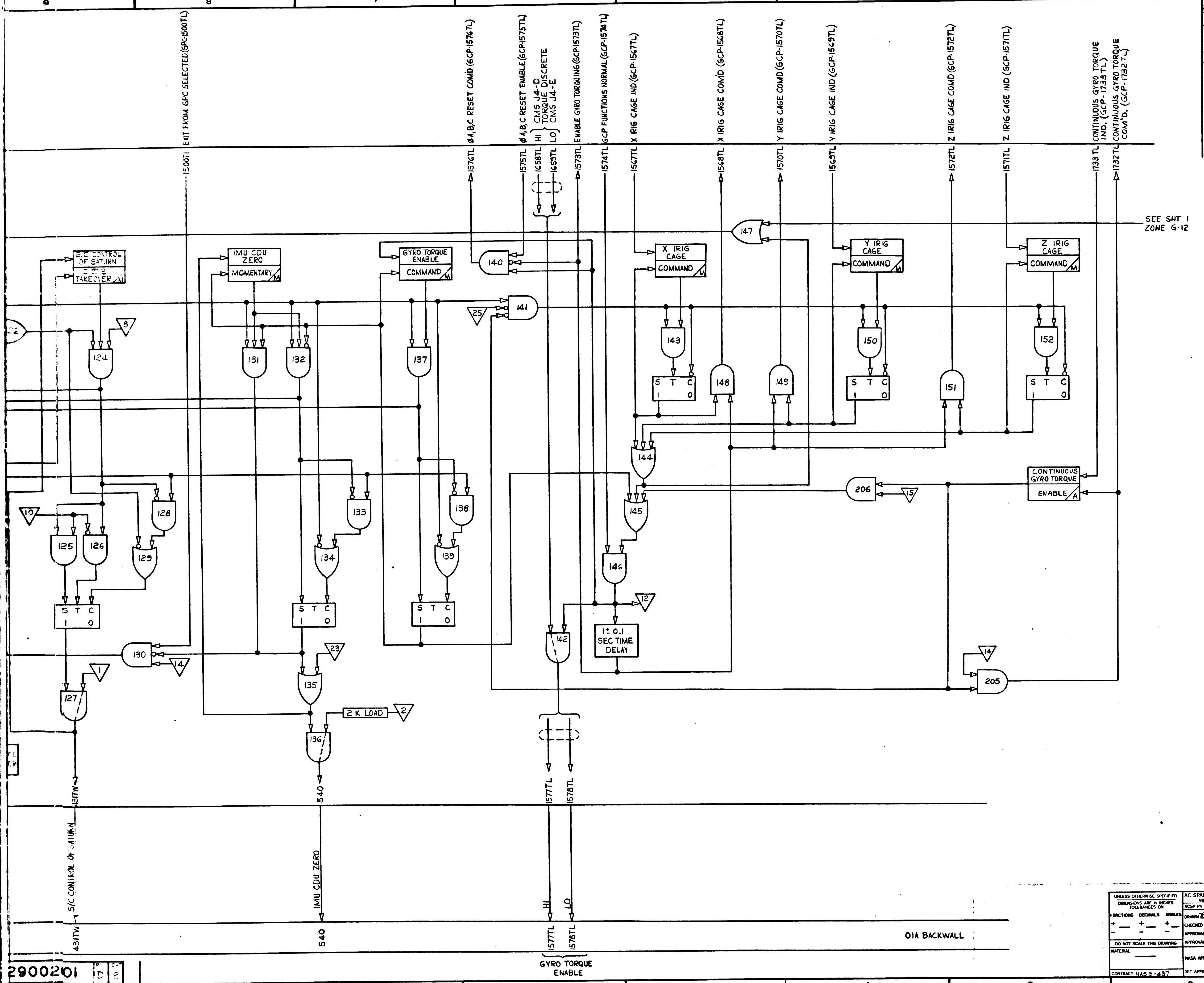
9. *AS A DESIGN GOAL, THE INTERCONNECTIONS BETWEEN THE A/B COMPONENT AND THE GSE WILL BE MAINTAINED AS INTERFACE DEVICES.*



SEE SHT 2 ZONE G-3
153
75
25
2
OPTICS CDU INHIBIT M
160
OPT/RR CDU FOLLOW M
OPT/RR CDU ZERO M
OPT/RR ENABLE COMMAND M
8
154
161
163
164
167
174
155
156
168
S T C
1 0
162
25
165
169
166
170
176
20
9
157
8
7
5
158
8
20
5
159
2
2K LOAD
171
172
177
2
2K LOAD
178
576
543
OPT/RR ZERO CDU
OPT/RR ERROR CTR ENABLE
576
543

2900201	RE D	SH 1

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20489		2 JUL 65	
B		REVISION STATUS CHANGED	—	7 JUL 65	
C		REVISION STATUS CHANGED	—	8 JUL 65	
D		REVISION STATUS CHANGED		9 JUL 65	


EXIT FROM GPC SELECTED (GPC-1500TL)
1500TL
Ø A,B,C RESET COMD (GCP-1576TL)
1576TL
Ø A,B,C RESET ENABLE (GCP-1575TL)
1575TL
HI
LO
CMS J4-D
TORQUE DISCRETE
CMS J4-E
1658TL
1659TL
ENABLE GYRO TORQUING (GCP-1573TL)
1573TL
GCP FUNCTIONS NORMAL (GCP-1574TL)
1574TL
X IRIG CAGE IND (GCP-1567TL)
1567TL
X IRIG CAGE COMD (GCP-1568TL)
1568TL
Y IRIG CAGE COMD (GCP-1570TL)
1570TL
Y IRIG CAGE IND (GCP-1569TL)
1569TL
Z IRIG CAGE COMD (GCP-1572TL)
1572TL
Z IRIG CAGE IND (GCP-1571TL)
1571TL
CONTINUOUS GYRO TORQUE IND. (GCP-1733TL)
1733TL
CONTINUOUS GYRO TORQUE COM'D. (GCP-1732TL)
1732TL
SEE SHT 1 ZONE G-12
147
S/C CONTROL OF SATURN
S IV B TAKEOVER M
IMU CDU ZERO
MOMENTARY M
GYRO TORQUE ENABLE
COMMAND M
140
X IRIG CAGE
COMMAND M
Y IRIG CAGE
COMMAND M
Z IRIG CAGE
COMMAND M
141
25
8
124
131
132
137
143
148
149
150
151
152
S T C
1 0
144
CONTINUOUS GYRO TORQUE
ENABLE A
206
15
145
10
128
133
138
125
126
129
134
139
146
12
1 ± 0.1 SEC TIME DELAY
130
14
23
142
135
127
1
2 K LOAD
2
136
205
431TW
540
1577TL
1578TL
S/C CONTROL OF SATURN
IMU CDU ZERO
HI
LO
OIA BACKWALL
GYRO TORQUE ENABLE

2900201 | D | 2

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Schwab DATE 7 MAY 65
CHECKED 17 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 20 May 65

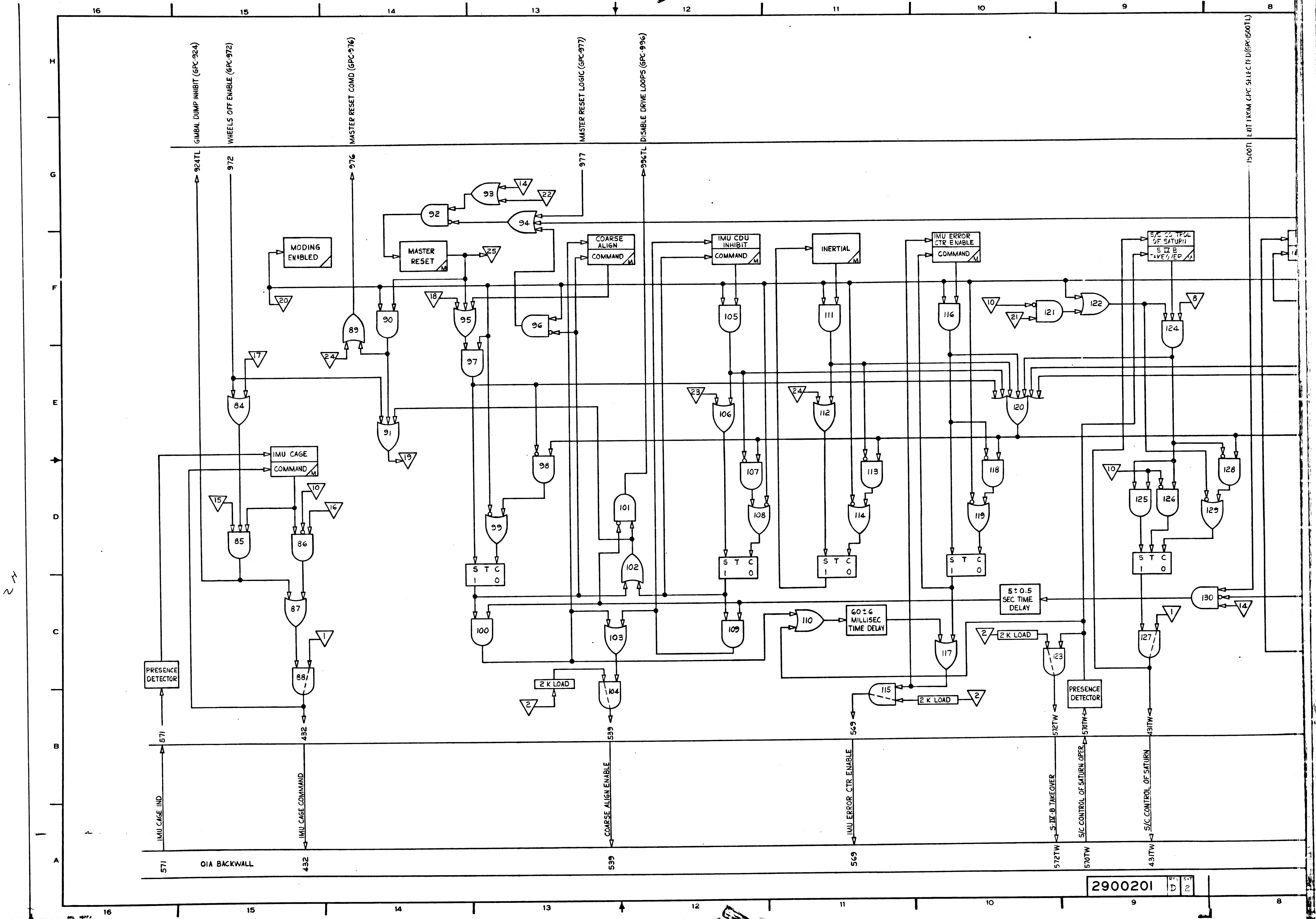
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM -
TEST CONTROL PANEL
(BLOCK II & LEM)

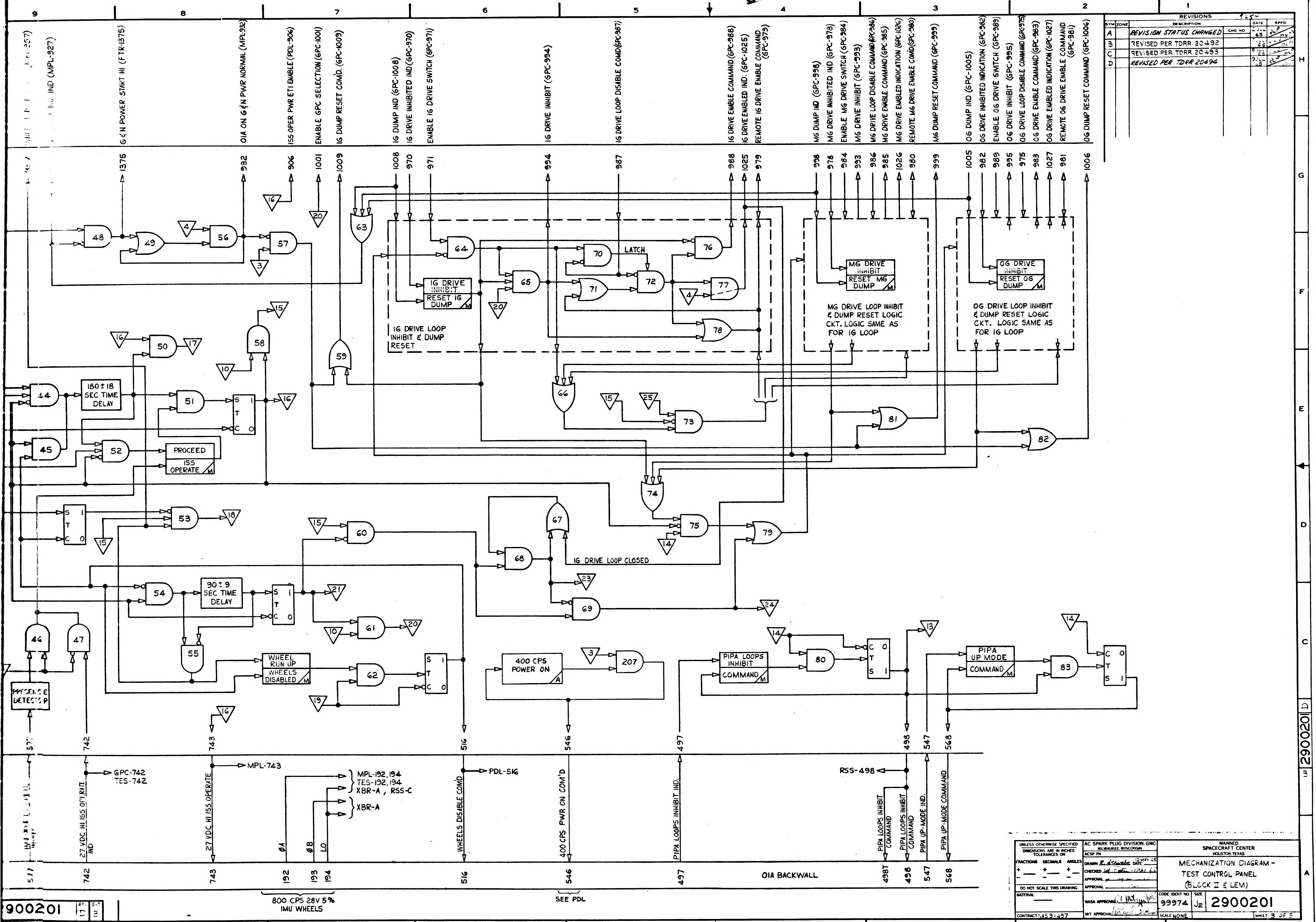
CODE IDENT NO. 99974
SIZE J2
2900201
SCALE NONE
SHEET 2 OF 5

2900201 D

2-2900201


GIMBAL DUMP INHIBIT (GPC-924)
WHEELS OFF ENABLE (GPC-972)
MASTER RESET COMD (GPC-976)
MASTER RESET LOGIC (GPC-977)
DISABLE DRIVE LOOPS (GPC-996)
1500TL EXIT FROM GPC SELECTED (GPC-1500TL)
924TL
972
976
977
996TL
MODING ENABLED
MASTER RESET
COARSE ALIGN
COMMAND
IMU CDU INHIBIT
COMMAND
INERTIAL
IMU ERROR CTR ENABLE
COMMAND
S/C CONTROL OF SATURN
S IVB TAKEOVER
IMU CAGE
COMMAND
PRESENCE DETECTOR
PRESENCE DETECTOR
5 ± 0.5 SEC TIME DELAY
60 ± 6 MILLISEC TIME DELAY
2 K LOAD
2 K LOAD
2 K LOAD
S T C
1 0
571
432
539
569
572TW
570TW
431TW
IMU CAGE IND
IMU CAGE COMMAND
COARSE ALIGN ENABLE
IMU ERROR CTR ENABLE
S-IV-B TAKEOVER
S/C CONTROL OF SATURN OPER.
S/C CONTROL OF SATURN
OIA BACKWALL
571
432
539
569
572TW
570TW
431TW
2900201
REV D
SHT 2
16 15 14 13 12 11 10 9 8
H G F E D C B A

2900201


9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
IND (MPL-927)
G & N POWER START HI (FTR-1375)
OIA ON G & N PWR NORMAL (MPL-932)
ISS OPER PWR ETI ENABLE (PDL-906)
ENABLE GPC SELECTION (GPC-1001)
IG DUMP RESET COM'D. (GPC-1009)
IG DUMP IND (GPC-1008)
IG DRIVE INHIBITED IND (GPC-970)
ENABLE IG DRIVE SWITCH (GPC-971)
IG DRIVE INHIBIT (GPC-994)
IG DRIVE LOOP DISABLE COM'D (GPC-987)
IG DRIVE ENABLE COMMAND (GPC-988)
IG DRIVE ENABLED IND. (GPC-1025)
REMOTE IG DRIVE ENABLE COMMAND (GPC-979)
MG DUMP IND (GPC-996)
MG DRIVE INHIBITED IND (GPC-978)
ENABLE MG DRIVE SWITCH (GPC-984)
MG DRIVE INHIBIT (GPC-993)
MG DRIVE LOOP DISABLE COMMAND (GPC-986)
MG DRIVE ENABLE COMMAND (GPC-985)
MG DRIVE ENABLED INDICATION (GPC-1026)
REMOTE MG DRIVE ENABLE COM'D (GPC-980)
MG DUMP RESET COMMAND (GPC-999)
OG DUMP IND (GPC-1005)
OG DRIVE INHIBITED INDICATION (GPC-982)
ENABLE OG DRIVE SWITCH (GPC-989)
OG DRIVE INHIBIT (GPC-995)
OG DRIVE LOOP DISABLE COMMAND (GPC-975)
OG DRIVE ENABLE COMMAND (GPC-983)
OG DRIVE ENABLED INDICATION (GPC-1027)
REMOTE OG DRIVE ENABLE COMMAND (GPC-981)
OG DUMP RESET COMMAND (GPC-1006)
1375
932
906
1001
1009
1008
970
971
994
987
988
1025
979
996
978
984
993
986
985
1026
980
999
1005
982
989
995
975
983
1027
981
1006
48
49
56
57
63
64
65
70
71
72
76
77
78
LATCH
IG DRIVE INHIBIT
RESET IG DUMP
M
IG DRIVE LOOP INHIBIT & DUMP RESET
MG DRIVE INHIBIT
RESET MG DUMP
MG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
OG DRIVE INHIBIT
RESET OG DUMP
OG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
16
20
4
3
15
17
10
44
45
180 ± 18 SEC TIME DELAY
50
51
52
58
59
S I T C O
PROCEED
ISS OPERATE
66
73
25
74
75
79
81
82
14
53
18
54
90 ± 9 SEC TIME DELAY
55
60
61
21
62
67
68
69
IG DRIVE LOOP CLOSED
23
24
46
47
PRESENCE DETECTOR
WHEEL RUN UP
WHEELS DISABLED
19
400 CPS POWER ON
A
207
PIPA LOOPS INHIBIT
COMMAND
80
C O T S I
13
PIPA UP MODE
COMMAND
83
577
742
743
516
546
497
498
547
568
GPC-742
TES-742
MPL-743
MPL-192,194
TES-192,194
XBR-A, RSS-C
XBR-A
PDL-516
RSS-498
27 VDC HI ISS OPERATE IND
27 VDC HI ISS OPERATE
ØA
ØB
LO
WHEELS DISABLE COM'D
400 CPS PWR ON COM'D
PIPA LOOPS INHIBIT IND.
PIPA LOOPS INHIBIT COMMAND
PIPA LOOPS INHIBIT COMMAND
PIPA UP-MODE IND.
PIPA UP-MODE COMMAND
192
193
194
498T
OIA BACKWALL
800 CPS 28V 5% IMU WHEELS
SEE PDL
900201
17
3
2900201 D
ZH

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		7 JUL 65	
B		REVISED PER TDRR 20492		65	
C		REVISED PER TDRR 20493		8 JUL 65	
D		REVISED PER TDRR 20494		9 JUL 65	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

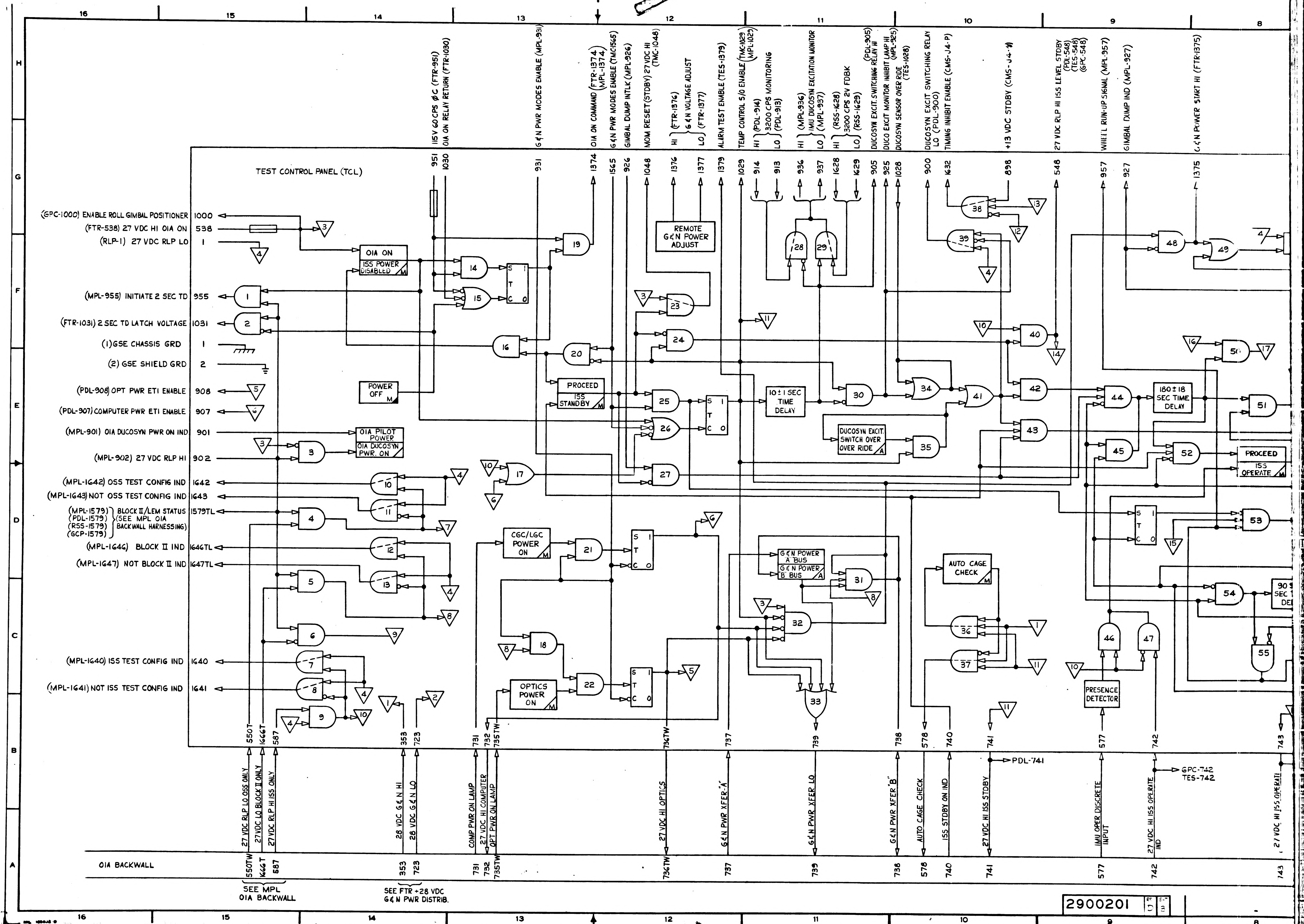
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Schwabe DATE 10 MAY 65
CHECKED Foster 17 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

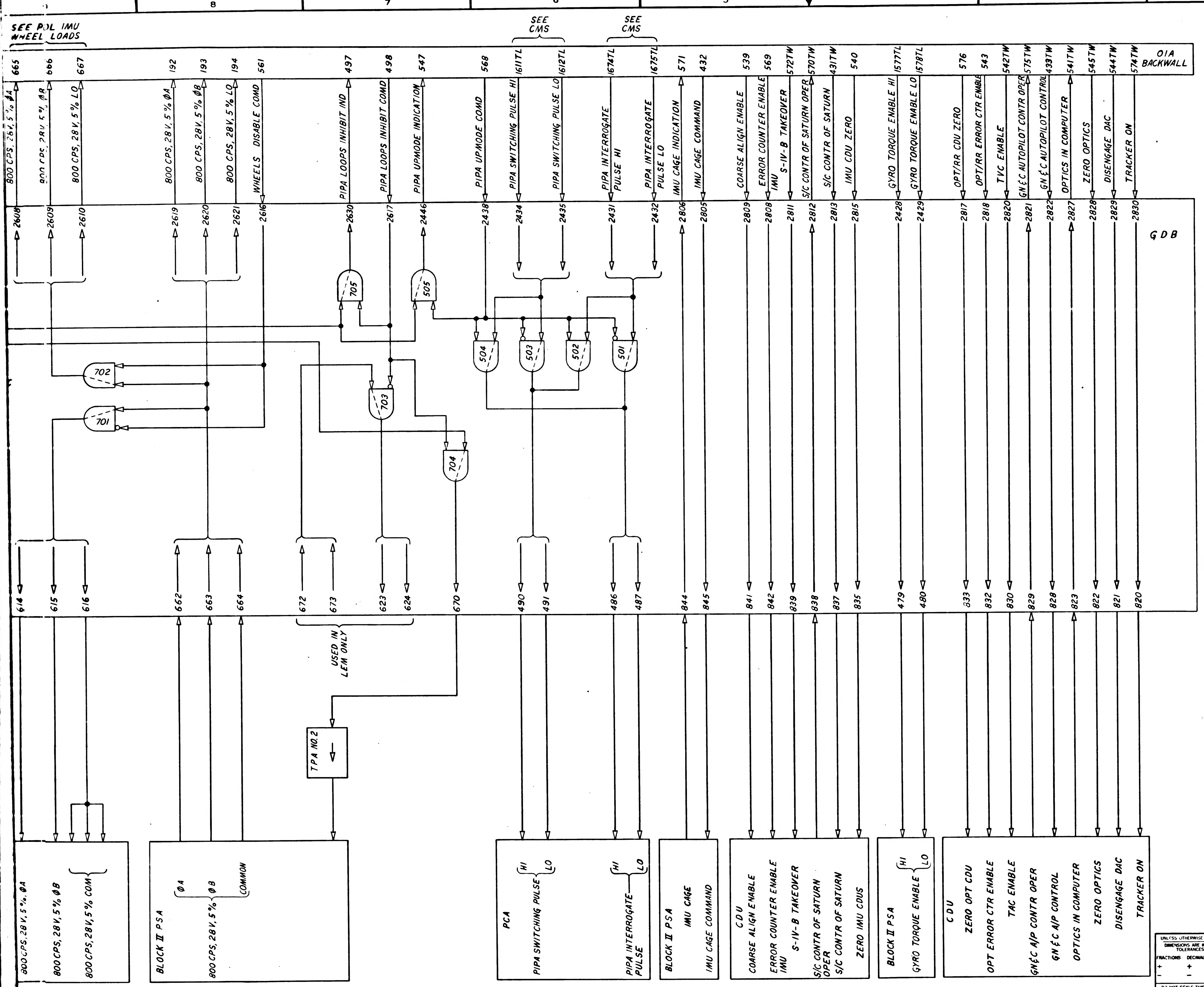
MECHANIZATION DIAGRAM -
TEST CONTROL PANEL
(BLOCK II & LEM)

CODE IDENT NO. 99974
SIZE J2
2900201
SCALE NONE
SHEET 3 OF 5

2/2900201


TEST CONTROL PANEL (TCL)
(GPC-1000) ENABLE ROLL GIMBAL POSITIONER 1000
(FTR-538) 27 VDC HI OIA ON 538
(RLP-1) 27 VDC RLP LO 1
(MPL-955) INITIATE 2 SEC TD 955
(FTR-1031) 2 SEC TD LATCH VOLTAGE 1031
(1) GSE CHASSIS GRD 1
(2) GSE SHIELD GRD 2
(PDL-908) OPT PWR ETI ENABLE 908
(PDL-907) COMPUTER PWR ETI ENABLE 907
(MPL-901) OIA DUCOSYN PWR ON IND 901
(MPL-902) 27 VDC RLP HI 902
(MPL-1642) OSS TEST CONFIG IND 1642
(MPL-1643) NOT OSS TEST CONFIG IND 1643
(MPL-1579) (PDL-1579) (RSS-1579) (GCP-1579) BLOCK II/LEM STATUS (SEE MPL OIA BACKWALL HARNESSING) 1579TL
(MPL-1646) BLOCK II IND 1646TL
(MPL-1647) NOT BLOCK II IND 1647TL
(MPL-1640) ISS TEST CONFIG IND 1640
(MPL-1641) NOT ISS TEST CONFIG IND 1641
115V 60CPS ØC (FTR-951) 951
OIA ON RELAY RETURN (FTR-1030) 1030
G&N PWR MODES ENABLE (MPL-931) 931
OIA ON COMMAND (FTR-1374) (MPL-1374) 1374
G&N PWR MODES ENABLE (TMC1565) 1565
GIMBAL DUMP INTLK (MPL-926) 926
MOM RESET (STDBY) 27 VDC HI (TMC-1048) 1048
HI (FTR-1376) G&N VOLTAGE ADJUST LO (FTR-1377) 1376 1377
ALARM TEST ENABLE (TES-1379) 1379
TEMP CONTROL S/O ENABLE (TMC-1029) (MPL-1029) 1029
HI (PDL-914) 3200 CPS MONITORING LO (PDL-913) 914 913
HI (MPL-936) IMU DUCOSYN EXCITATION MONITOR LO (MPL-937) 936 937
HI (RSS-1628) 3200 CPS 2V FDBK LO (RSS-1629) 1628 1629
DUCOSYN EXCIT. SWITCHING RELAY HI (PDL-905) 905
DUCO EXCIT MONITOR INHIBIT LAMP HI (MPL-925) 925
DUCOSYN SENSOR OVER RIDE (TES-1028) 1028
DUCOSYN EXCIT SWITCHING RELAY LO (PDL-900) 900
TIMING INHIBIT ENABLE (CMS-J4-P) 1632
+13 VDC STDBY (CMS-J4-Y) 898
27 VDC RLP HI ISS LEVEL STDBY (PDL-548) (TES-548) (GPC-548) 548
WHEEL RUN-UP SIGNAL (MPL-957) 957
GIMBAL DUMP IND (MPL-927) 927
G&N POWER START HI (FTR-1375) 1375
OIA ON
ISS POWER DISABLED M
S I T C O
POWER OFF M
OIA PILOT POWER
OIA DUCOSYN PWR. ON
REMOTE G&N POWER ADJUST
PROCEED
ISS STANDBY M
10±1 SEC TIME DELAY
DUCOSYN EXCIT. SWITCH OVER OVER RIDE A
CGC/LGC POWER ON M
OPTICS POWER ON M
G&N POWER A BUS
G&N POWER B BUS A
AUTO CAGE CHECK M
PRESENCE DETECTOR
180±18 SEC TIME DELAY
PROCEED
ISS OPERATE M
90± SEC DE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
550T 1666T 587 353 723 731 732 735TW 736TW 737 739 738 578 740 741 577 742 743
27 VDC RLP LO OSS ONLY
27VDC LO BLOCK II ONLY
27VDC RLP HI ISS ONLY
28 VDC G&N HI
28 VDC G&N LO
COMP PWR ON LAMP
27 VDC HI COMPUTER
OPT PWR ON LAMP
27 VDC HI OPTICS
G&N PWR XFER "A"
G&N PWR XFER LO
G&N PWR XFER "B"
AUTO CAGE CHECK
ISS STDBY ON IND
27 VDC HI ISS STDBY
PDL-741
IMU OPER DISCRETE INPUT
27 VDC HI ISS OPERATE IND
GPC-742 TES-742
27 VDC HI ISS OPERATE
OIA BACKWALL
550TW 1666T 587 353 723 731 732 735TW 736TW 737 739 738 578 740 741 577 742 743
SEE MPL OIA BACKWALL
SEE FTR +28 VDC G&N PWR DISTRIB.
16 15 14 13 12 11 10 9 8
H G F E D C B A
2900201

1/2900201


SEE PDL IMU WHEEL LOADS
SEE CMS
SEE CMS
665
666
667
192
193
194
561
497
498
547
568
1611TL
1612TL
1674TL
1675TL
571
432
539
569
572TW
570TW
431TW
540
1577TL
1578TL
576
543
542TW
575TW
433TW
541TW
545TW
544TW
574TW
OIA BACKWALL
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
PIPA LOOPS INHIBIT IND
PIPA LOOPS INHIBIT COMD
PIPA UPMODE INDICATION
PIPA UPMODE COMD
PIPA SWITCHING PULSE HI
PIPA SWITCHING PULSE LO
PIPA INTERROGATE PULSE HI
PIPA INTERROGATE PULSE LO
IMU CAGE INDICATION
IMU CAGE COMMAND
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
S-IV-B TAKEOVER
S/C CONTR OF SATURN OPER
S/C CONTR OF SATURN
IMU CDU ZERO
GYRO TORQUE ENABLE HI
GYRO TORQUE ENABLE LO
OPT/RR CDU ZERO
OPT/RR ERROR CTR ENABLE
TVC ENABLE
GN&C AUTOPILOT CONTR OPER
GN&C AUTOPILOT CONTROL
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
2608
2609
2610
2619
2620
2621
2616
2630
2617
2446
2438
2434
2435
2431
2432
2806
2805
2809
2808
2811
2812
2813
2815
2428
2429
2817
2818
2820
2821
2822
2827
2828
2829
2830
GDB
705
505
504
503
502
501
702
701
703
704
614
615
616
662
663
664
672
673
623
624
670
490
491
486
487
844
845
841
842
839
838
837
835
479
480
833
832
830
829
828
823
822
821
820
USED IN LEM ONLY
TPA NO.2
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% COM
BLOCK II PSA
ØA
ØB
COMMON
800 CPS, 28V, 5%
PCA
PIPA SWITCHING PULSE
HI
LO
PIPA INTERROGATE PULSE
HI
LO
BLOCK II PSA
IMU CAGE
IMU CAGE COMMAND
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
S-IV-B TAKEOVER
S/C CONTR OF SATURN OPER
S/C CONTR OF SATURN
ZERO IMU CDUS
BLOCK II PSA
GYRO TORQUE ENABLE
HI
LO
CDU
ZERO OPT CDU
OPT ERROR CTR ENABLE
TAC ENABLE
GN&C A/P CONTR OPER
GN&C A/P CONTROL
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	
B		REVISION STATUS CHANGED		JUL 65	
C		REVISION STATUS CHANGED		8 JUL 65	
D		REVISION STATUS CHANGED		JUL 65	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS + − ANGLES + −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bendel DATE 12-MAY-65
CHECKED Ed Foster 17MAY65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
TEST CONTROL PANEL
(BLOCK II)

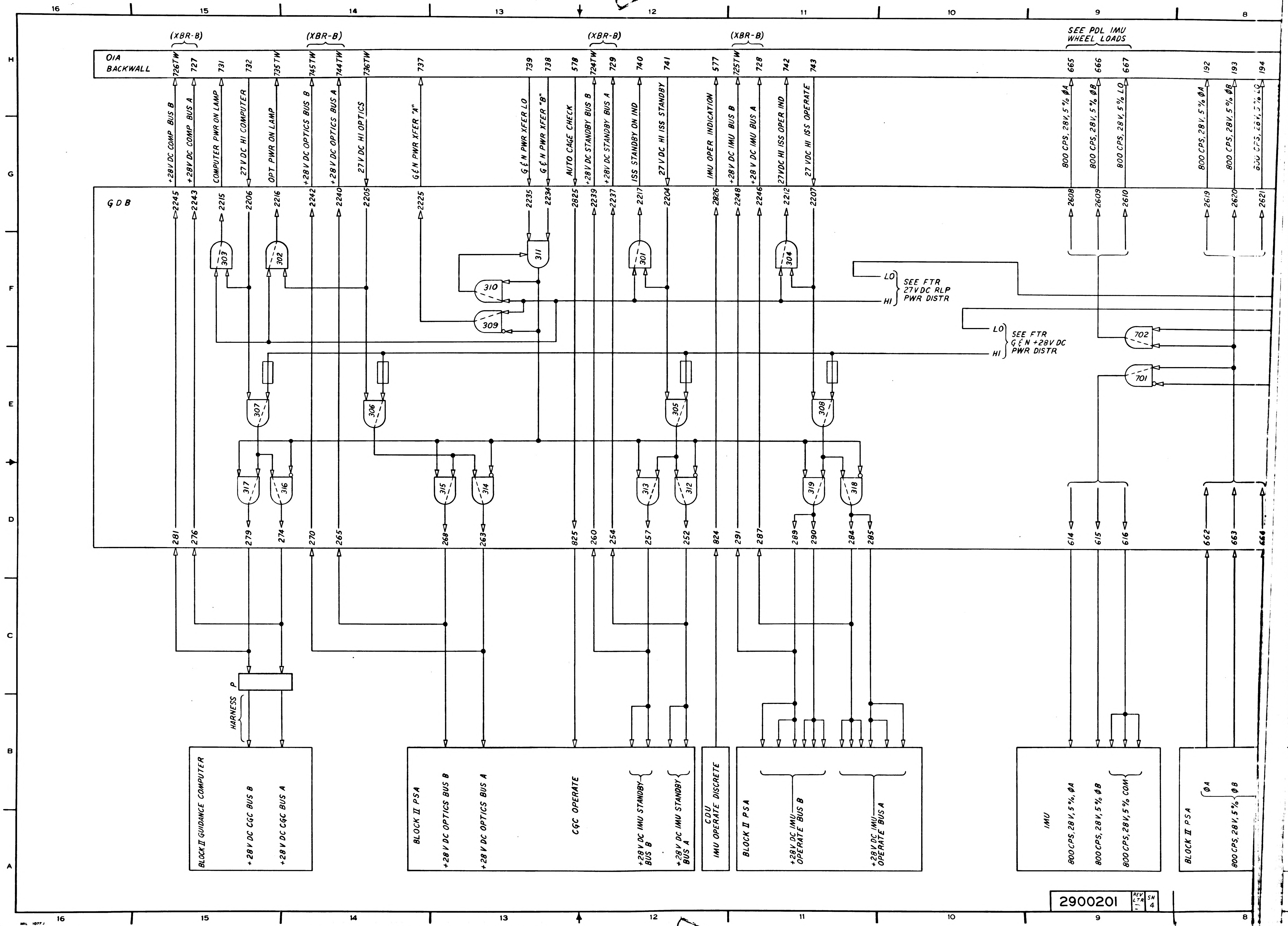
CODE IDENT NO 99974
SIZE J2
2900201
SCALE
SHEET 4 OF 5

2900201 REV LTR SH 4

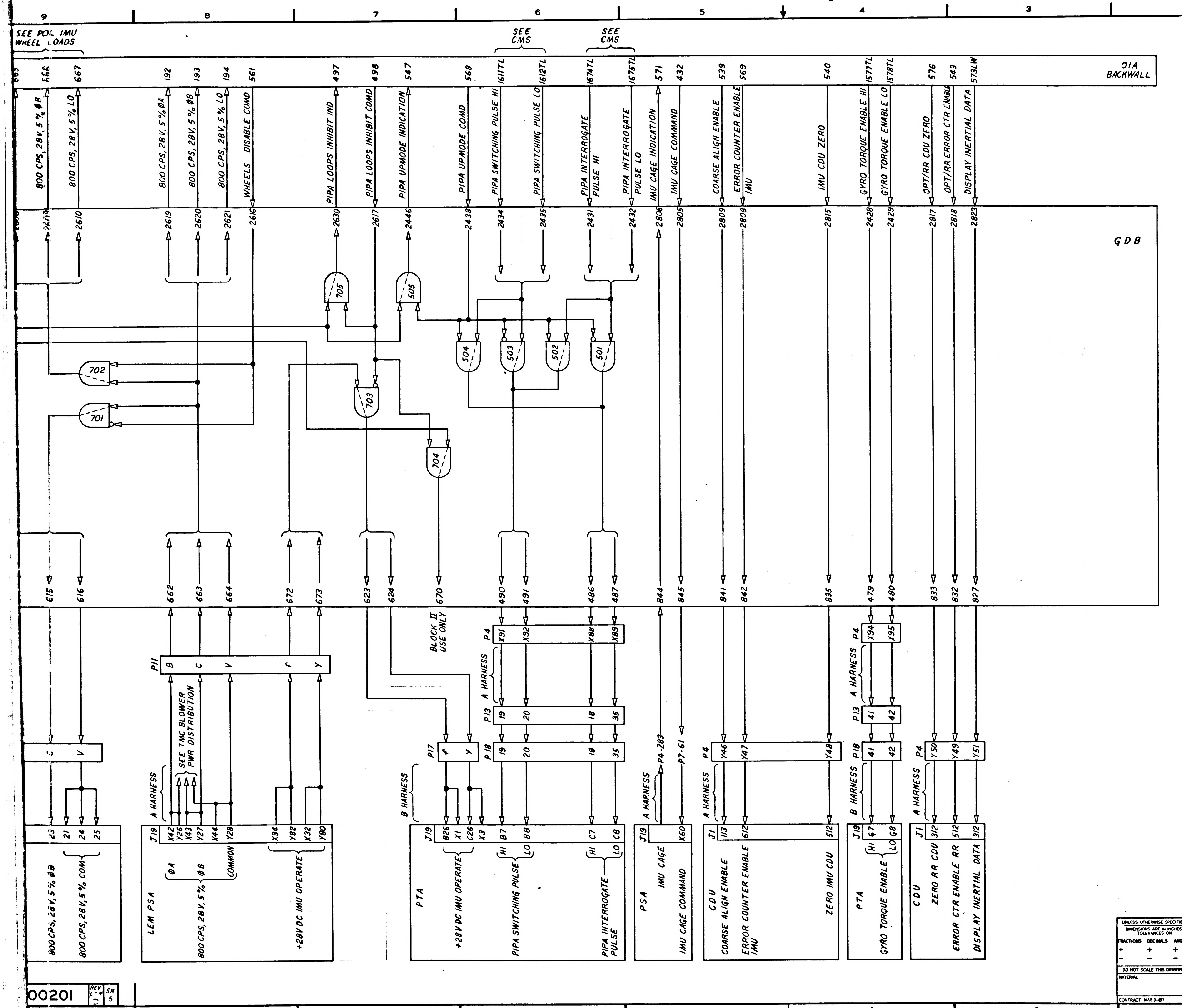
2900201 D

2H

2/2900201


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
(XBR-B)
(XBR-B)
(XBR-B)
(XBR-B)
SEE PDL IMU WHEEL LOADS
OIA BACKWALL
726TW
727
731
732
735TW
745TW
744TW
736TW
737
739
738
578
724TW
729
740
741
577
725TW
728
742
743
665
666
667
192
193
194
+28V DC COMP BUS B
+28V DC COMP BUS A
COMPUTER PWR ON LAMP
27V DC HI COMPUTER
OPT PWR ON LAMP
+28V DC OPTICS BUS B
+28V DC OPTICS BUS A
27V DC HI OPTICS
G&N PWR XFER "A"
G&N PWR XFER LO
G&N PWR XFER "B"
AUTO CAGE CHECK
+28V DC STANDBY BUS B
+28V DC STANDBY BUS A
ISS STANDBY ON IND
27V DC HI ISS STANDBY
IMU OPER INDICATION
+28V DC IMU BUS B
+28V DC IMU BUS A
27VDC HI ISS OPER IND
27 VDC HI ISS OPERATE
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
GDB
2245
2243
2215
2206
2216
2242
2240
2205
2225
2235
2234
2825
2239
2237
2217
2204
2826
2248
2246
2212
2207
2608
2609
2610
2619
2620
2621
303
302
311
310
309
301
304
LO
HI
SEE FTR 27VDC RLP PWR DISTR
LO
HI
SEE FTR G&N +28V DC PWR DISTR
702
701
307
306
305
308
317
316
315
314
313
312
319
318
281
276
279
274
270
265
268
263
825
260
254
257
252
824
291
287
289
290
284
285
614
615
616
662
663
664
P
HARNESS
BLOCK II GUIDANCE COMPUTER
+28V DC CGC BUS B
+28V DC CGC BUS A
BLOCK II PSA
+28V DC OPTICS BUS B
+28V DC OPTICS BUS A
CGC OPERATE
+28V DC IMU STANDBY BUS B
+28V DC IMU STANDBY BUS A
CDU
IMU OPERATE DISCRETE
BLOCK II PSA
+28V DC IMU OPERATE BUS B
+28V DC IMU OPERATE BUS A
IMU
800 CPS, 28V, 5%, ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% COM
BLOCK II PSA
ØA
ØB
800 CPS, 28V, 5%
2900201
REV LTR
-
SH 4

1/2900201


SEE PGL IMU WHEEL LOADS
SEE CMS
SEE CMS
OIA BACKWALL
665
666
667
192
193
194
561
497
498
547
568
1611TL
1612TL
1674TL
1675TL
571
432
539
569
540
1577TL
1578TL
576
543
573LW
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
PIPA LOOPS INHIBIT IND
PIPA LOOPS INHIBIT COMD
PIPA UPMODE INDICATION
PIPA UPMODE COMD
PIPA SWITCHING PULSE HI
PIPA SWITCHING PULSE LO
PIPA INTERROGATE PULSE HI
PIPA INTERROGATE PULSE LO
IMU CAGE INDICATION
IMU CAGE COMMAND
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
IMU CDU ZERO
GYRO TORQUE ENABLE HI
GYRO TORQUE ENABLE LO
OPT/RR CDU ZERO
OPT/RR ERROR CTR ENABLE
DISPLAY INERTIAL DATA
2608
2609
2610
2619
2620
2621
2616
2630
2617
2446
2438
2434
2435
2431
2432
2806
2805
2809
2808
2815
2428
2429
2817
2818
2823
GDB
705
505
504
503
502
501
702
701
703
704
615
616
662
663
664
672
673
623
624
670
490
491
486
487
844
845
841
842
835
479
480
833
832
827
BLOCK II USE ONLY
P4
X91
X92
X88
X89
X94
X95
P11
B
C
V
F
Y
A HARNESS
P13
19
20
18
35
41
42
P17
P18
P4-283
P7-61
Y46
Y47
Y48
Y50
Y49
Y51
C
V
SEE TMC BLOWER PWR DISTRIBUTION
A HARNESS
B HARNESS
A HARNESS
A HARNESS
B HARNESS
A HARNESS
23
21
24
25
J19
X42
Y26
X43
Y27
X44
Y28
X34
Y82
X32
Y80
B26
X1
C26
X3
B7
B8
C7
C8
X60
J1
113
612
512
G7
G8
312
512
312
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% COM
LEM PSA
ØA
ØB
COMMON
800 CPS, 28V, 5%
+28V DC IMU OPERATE
PTA
+28V DC IMU OPERATE
HI
LO
PIPA SWITCHING PULSE
PIPA INTERROGATE PULSE
PSA
IMU CAGE
IMU CAGE COMMAND
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
ZERO IMU CDU
PTA
GYRO TORQUE ENABLE
CDU
ZERO RR CDU
ERROR CTR ENABLE RR
DISPLAY INERTIAL DATA
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
2H
00201
REV D
SH 5
2/2900201

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP MEM
B		REVISION STATUS CHANGED		7 JUL 65	MEM
C		REVISION STATUS CHANGED		8 JUL 65	MEM
D		REVISION STATUS CHANGED		9 JUL 65	[illegible]

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

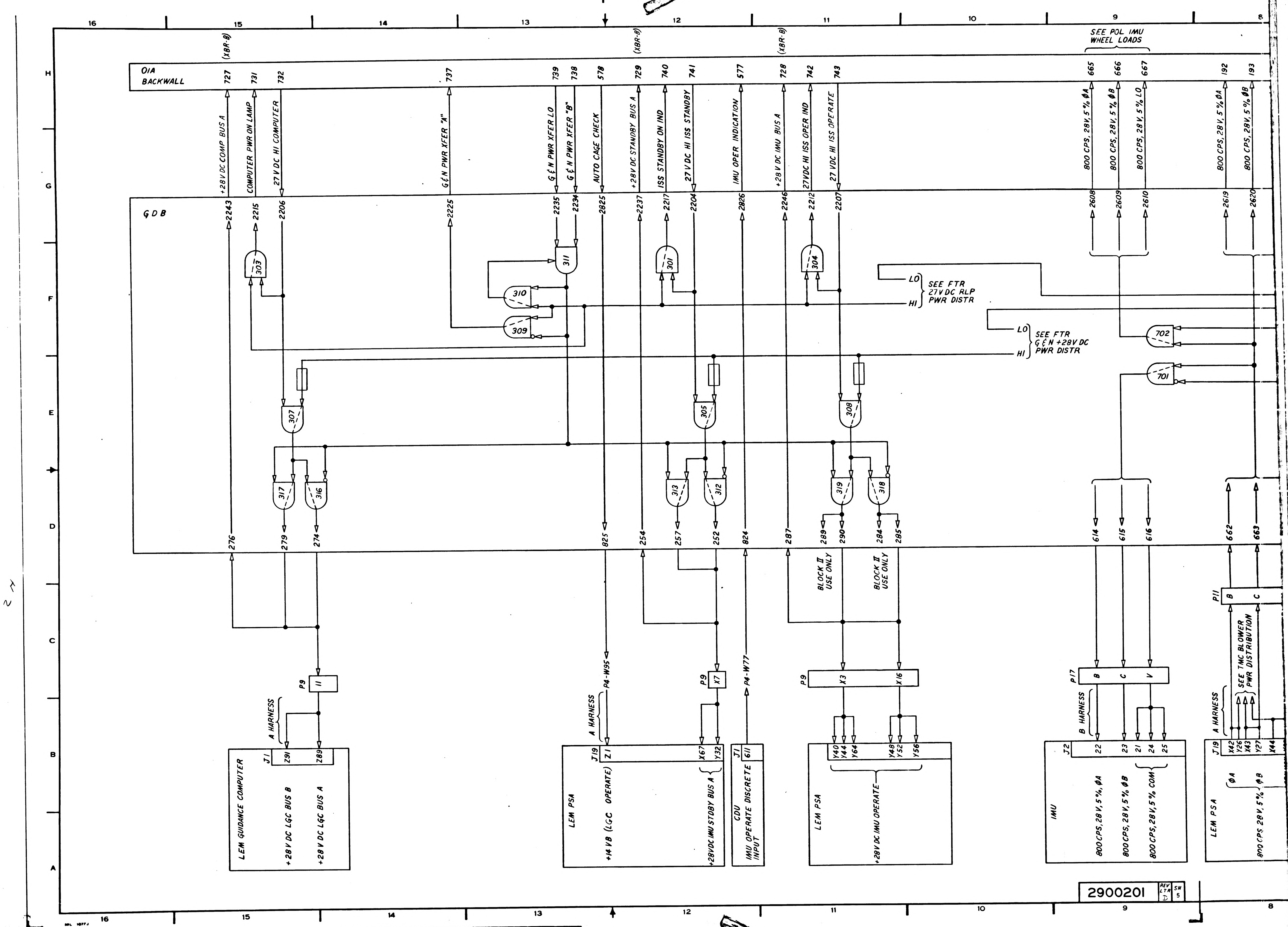
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 11-MAY-65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
TEST CONTROL PANEL
(LEM)

CODE IDENT NO. 99974
SIZE J_2
2900201
SCALE
SHEET 5 OF 5

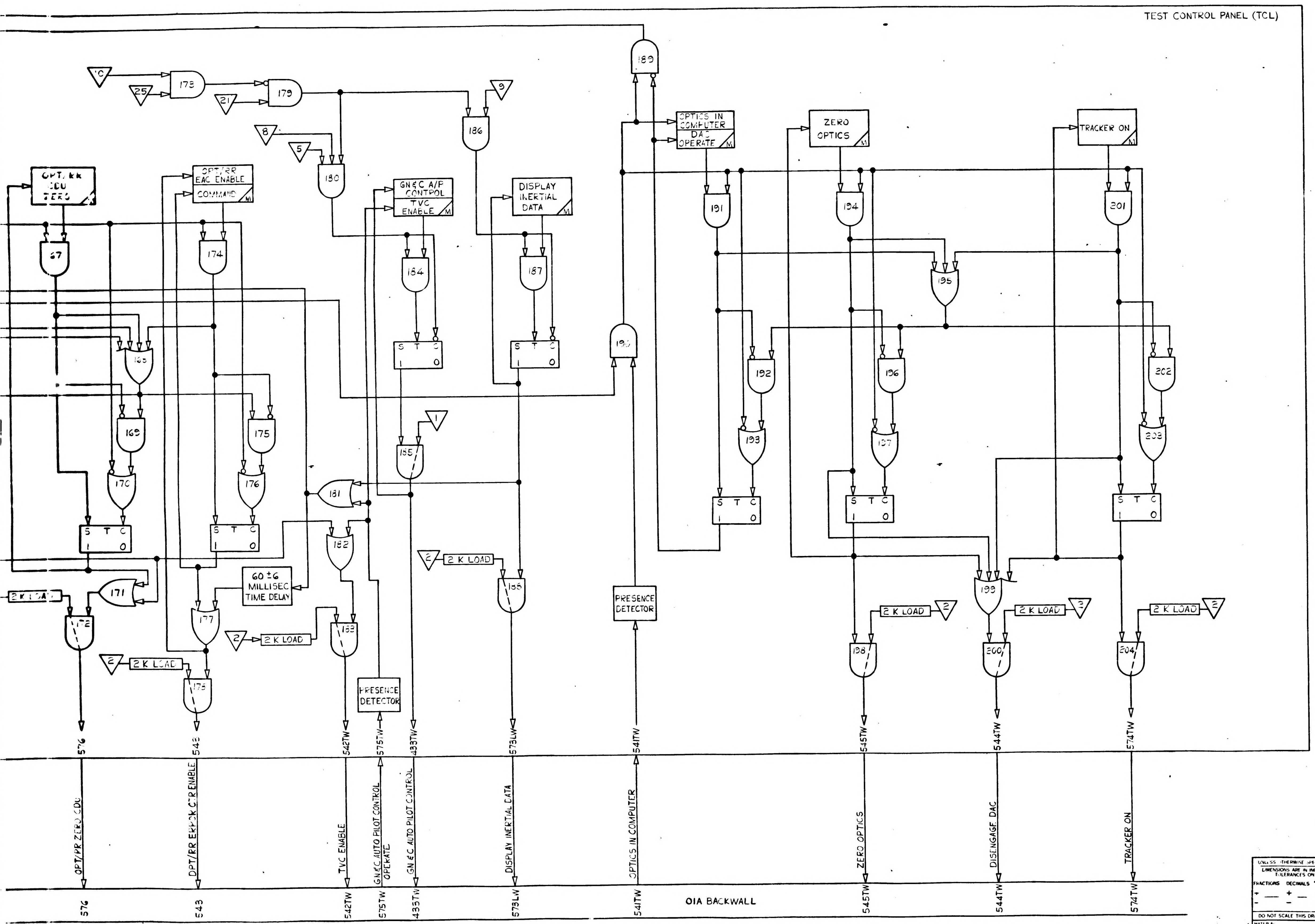
2900201 D



OIA BACKWALL
GDB
(XBR-B)
727 731 732 737 739 738 578 729 740 741 577 728 742 743 665 666 667 192 193
+28V DC COMP BUS A
COMPUTER PWR ON LAMP
27 V DC HI COMPUTER
G & N PWR XFER "A"
G & N PWR XFER LO
G & N PWR XFER "B"
AUTO CAGE CHECK
+28 V DC STANDBY BUS A
ISS STANDBY ON IND
27 V DC HI ISS STANDBY
IMU OPER INDICATION
+28 V DC IMU BUS A
27VDC HI ISS OPER IND
27 VDC HI ISS OPERATE
SEE POL IMU WHEEL LOADS
800 CPS, 28 V, 5% ØA
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% LO
2243 2215 2206 2225 2235 2234 2825 2237 2217 2204 2826 2246 2212 2207 2608 2609 2610 2619 2620
303 311 310 309 301 304 307 305 308 317 316 313 312 319 318 702 701
LO HI SEE FTR 27 V DC RLP PWR DISTR
LO HI SEE FTR G & N +28V DC PWR DISTR
276 279 274 825 254 257 252 824 287 289 290 284 285 614 615 616 662 663
BLOCK II USE ONLY
BLOCK II USE ONLY
P11 B C
SEE TMC BLOWER PWR DISTRIBUTION
P9 11
P4-W95
P9 X7
P4-W77
P9 X3 X16
P17 B C V
A HARNESS
A HARNESS
B HARNESS
A HARNESS
J1 Z91 Z89
LEM GUIDANCE COMPUTER
+28 V DC LGC BUS B
+28 V DC LGC BUS A
J19 Z1 X67 Y32
LEM PSA
+14 VB (LGC OPERATE)
+28VDC IMU STDBY BUS A
J1 611
CDU
IMU OPERATE DISCRETE INPUT
Y40 Y44 Y64 Y48 Y52 Y56
LEM PSA
+28 V DC IMU OPERATE
J2 22 23 21 24 25
IMU
800 CPS, 28 V, 5% ØA
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% COM
J19 X42 Y26 X43 Y27 X44
LEM PSA
ØA
800 CPS 28 V, 5% ØB
16 15 14 13 12 11 10 9 8
H G F E D C B A
2900201 REV LTR D SH 5

1/2900201

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RP MCM
3		REVISION STATUS CHANGED		7 JUL 65	JJJ MCM
C		REVISION STATUS CHANGED		8 JUL 65	JJJ MCM
D		REVISION STATUS CHANGED		9 JUL 65	RP
E		REVISION STATUS CHANGED		31 AUG 65	RP


TEST CONTROL PANEL (TCL)
OPT. RR CDU ZERO
OPT/RR EAC ENABLE
COMMAND
GN&C A/P CONTROL
TVC ENABLE
DISPLAY INERTIAL DATA
OPTICS IN COMPUTER
DAC OPERATE
ZERO OPTICS
TRACKER ON
60 ± 6 MILLISEC TIME DELAY
PRESENCE DETECTOR
2 K LOAD
S T C
1 0
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
576
543
542TW
575TW
433TW
573LW
541TW
545TW
544TW
574TW
OPT/RR ZERO CDU
OPT/RR ERROR CTR ENABLE
TVC ENABLE
GN&C AUTO PILOT CONTROL OPERATE
GN&C AUTO PILOT CONTROL
DISPLAY INERTIAL DATA
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
OIA BACKWALL

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ ± ___ ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ___
CONTRACT

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM –
TEST CONTROL PANEL
(BLOCK II & LEM)

CODE IDENT NO 99974
SIZE V2
2900201
SCALE NONE
SHEET 1 OF 5

2900201	E	1

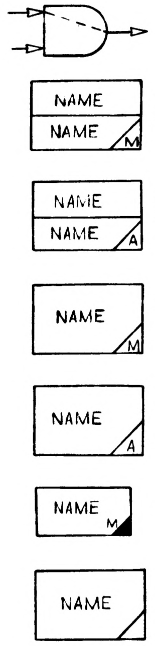
27/2900201

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS

2900203 – TEMPERATURE MONITOR & CONTROL PANEL (TMC)
2900208 – POWER AND DUMMY LOAD PANEL-PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL, PSS)
2900223 – GIMBAL POSITION CONTROL PANEL (GPC)
2900207 – MONITOR PANEL (MPL)
2900209 – COMPUTER SIMULATOR INTERFACE (CMS)
2900206 – TEST SELECTOR PANEL (TES)
2900217 – SIGNAL SELECTOR AND MEASUREMENT
CROSSBAR-AC SIGNALS (XBR-A)
CROSSBAR-DC SIGNALS (XBR-B)
2900218 – OSCILLOGRAPH SIGNAL SELECTION
TO FIXED DC CHANNEL (RSS-B)
TO SWITCHABLE AC CHANNEL (RSS-C)
2900200 – GYRO CAGING PANEL (GCP)
2900210 – AC POWER PROTECTION PANEL AND POWER DISTRIBUTION (FTR)
RELAY AND LAMP POWER SUPPLY (RLP)
2900213 – GSE GROUNDING

4. NON STANDARD SYMBOLOGY



NAME
NAME M
NAME
NAME A
NAME M
NAME A
NAME M
NAME

INDICATES AND GATE WITH SWITCHED SIGNAL

INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)

INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION)

INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

INDICATES UNLIGHTED PUSHBUTTON (MOMENTARY ACTION)

INDICATES INDICATOR LIGHT

5. T, W AND L SUFFIXES ON INTERFACE NUMBERS DENOTE FUNCTIONAL USAGE OF THAT INTERFACE. INTERPRET AS FOLLOWS:

T - UNIQUE TO BLOCK II CONFIGURATION
W - UNIQUE TO BLOCK I SERIES 100 CONFIGURATION
L - UNIQUE TO LEM CONFIGURATION
TW, TL, OR LW - COMMON TO THE TWO INDICATED CONFIGURATIONS
NO SUFFIX - COMMON TO ALL THREE CONFIGURATIONS

6. ALL TIME DELAYS SHALL HAVE RESET TIMES OF 20 MS OR LESS.

7. SIGNAL REFERENCE:

▽1 = G & N + 28 VDC HI
▽2 = G & N + 28 VDC LO
▽3 = 27 VDC HI OIA ON
▽4 = 27 VDC RLP LO
▽5 = OPTICS POWER ON
▽6 = CGC/LGC POWER ON
▽7 = OSS LEVEL TEST

SIGNAL REFERENCE (CONT.)

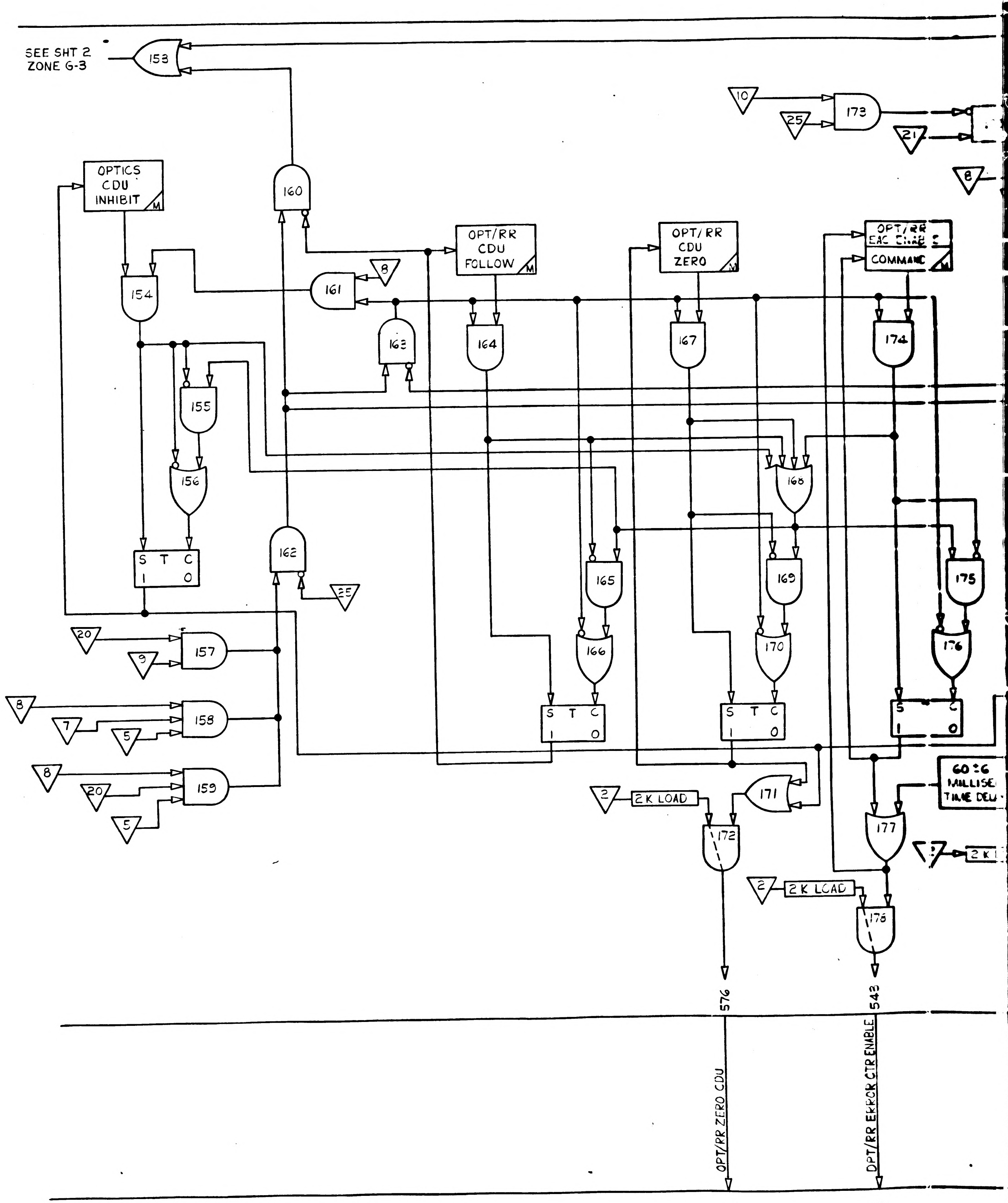
▽8 = BLOCK II TEST CONFIG
▽9 = LEM TEST CONFIG
▽10 = ISS LEVEL TEST
▽11 = ISS STANDBY
▽12 = GYRO TORQUING ENABLED
▽13 = PIPA LOOPS INHIBITED
▽14 = ISS LEVEL STANDBY
▽15 = ISS LEVEL OPERATE
▽16 = ISS OPERATE
▽17 = WHEELS STOPPED
▽18 = SELECT COARSE ALIGN
▽19 = ENABLE WHEELS OFF
▽20 = ISS LEVEL OPERATE + 90 SEC
▽21 = OPERATE + 90 SEC
▽22 = OSS LEVEL OPTICS POWER ON
▽23 = TURN ON-LOOPS CLOSED
▽24 = TURN ON-LOOPS OPEN
▽25 = MASTER RESET DEPRESSED

8. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK II: SH 3 | SH 2 | SH 1 / SH 4

LEM: SH 3 | SH 2 | SH 1 / SH 5

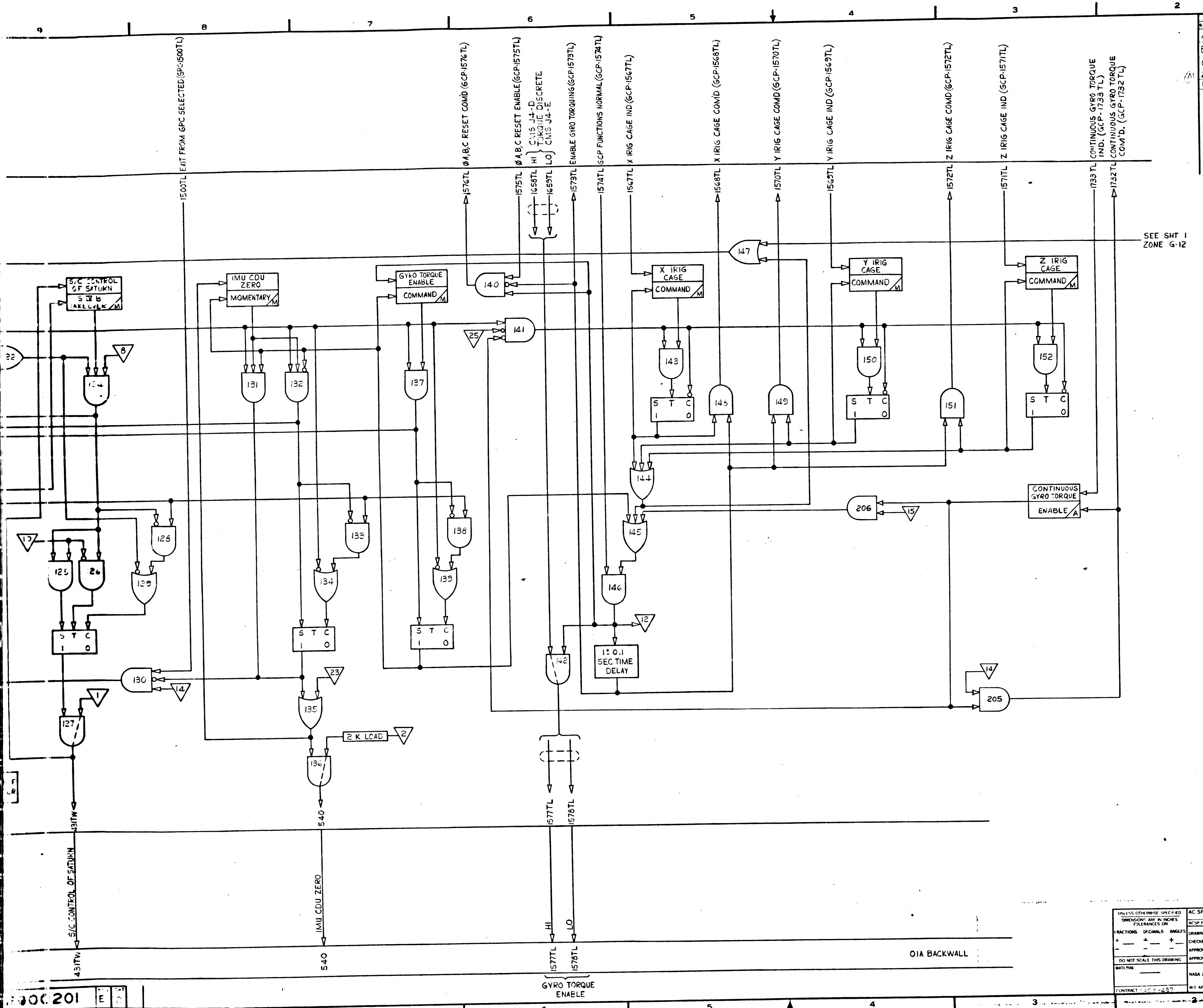
9. AS A DESIGN GOAL, THE INTERCONNECTIONS BETWEEN THE A/B COMPONENT AND THE GSE WILL BE MAINTAINED AS INTERFACE DEVICES.



SEE SHT 2 ZONE G-3
153
10
25
173
21
8
OPTICS CDU INHIBIT M
160
OPT/RR CDU FOLLOW M
OPT/RR CDU ZERO M
OPT/RR EAC ENABLE
COMMAND M
154
161
8
163
164
167
174
155
156
168
S T C I O
162
25
165
169
175
20
9
157
166
170
176
8
7
5
158
S T C I O
S T C I O
S C I O
8
20
5
159
2
2K LOAD
171
172
60±6 MILLISEC TIME DELAY
177
2
2K LOAD
178
2K
576
OPT/RR ZERO CDU
576
543
OPT/RR ERROR CTR ENABLE
543

2900201 | E | 1

17 2900201



9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
1500TL EXIT FROM GPC SELECTED (GPC-1500TL)
1576TL ØA,B,C RESET COMD (GCP-1576TL)
1575TL ØA,B,C RESET ENABLE (GCP-1575TL)
1658TL HI CMS J4-D
TORQUE DISCRETE
1659TL LO CMS J4-E
1573TL ENABLE GYRO TORQUING (GCP-1573TL)
1574TL GCP FUNCTIONS NORMAL (GCP-1574TL)
1567TL X IRIG CAGE IND (GCP-1567TL)
1568TL X IRIG CAGE COMD (GCP-1568TL)
1570TL Y IRIG CAGE COMD (GCP-1570TL)
1569TL Y IRIG CAGE IND (GCP-1569TL)
1572TL Z IRIG CAGE COMD (GCP-1572TL)
1571TL Z IRIG CAGE IND (GCP-1571TL)
1733TL CONTINUOUS GYRO TORQUE IND. (GCP-1733 TL)
1732TL CONTINUOUS GYRO TORQUE COM'D. (GCP-1732 TL)
SEE SHT 1 ZONE G-12
147
S/C CONTROL OF SATURN
S IV B
M
IMU CDU ZERO
MOMENTARY
M
GYRO TORQUE ENABLE
COMMAND
M
140
141
X IRIG CAGE
COMMAND
M
Y IRIG CAGE
COMMAND
M
Z IRIG CAGE
COMMAND
M
22
8
25
124
131
132
137
143
150
152
S T C
1 0
148
149
151
144
CONTINUOUS GYRO TORQUE
ENABLE
A
206
15
145
13
128
133
138
125
126
129
134
139
146
12
1± 0.1 SEC TIME DELAY
142
130
14
23
135
205
127
2 K LOAD
2
136
431TW
540
1577TL
1578TL
S/C CONTROL OF SATURN
IMU CDU ZERO
HI
LO
01A BACKWALL
GYRO TORQUE ENABLE
2900201 E
2H

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20489		2 JUL 65	RLP
B		REVISION STATUS CHANGED	–	65	
C		REVISION STATUS CHANGED	—	65	
D		REVISION STATUS CHANGED		9 JUL 65	RLP
E		REVISION STATUS CHANGED		31 AUG 65	RLP

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + — DECIMALS + — ANGLES + —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. [illegible] DATE 7 MAY 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

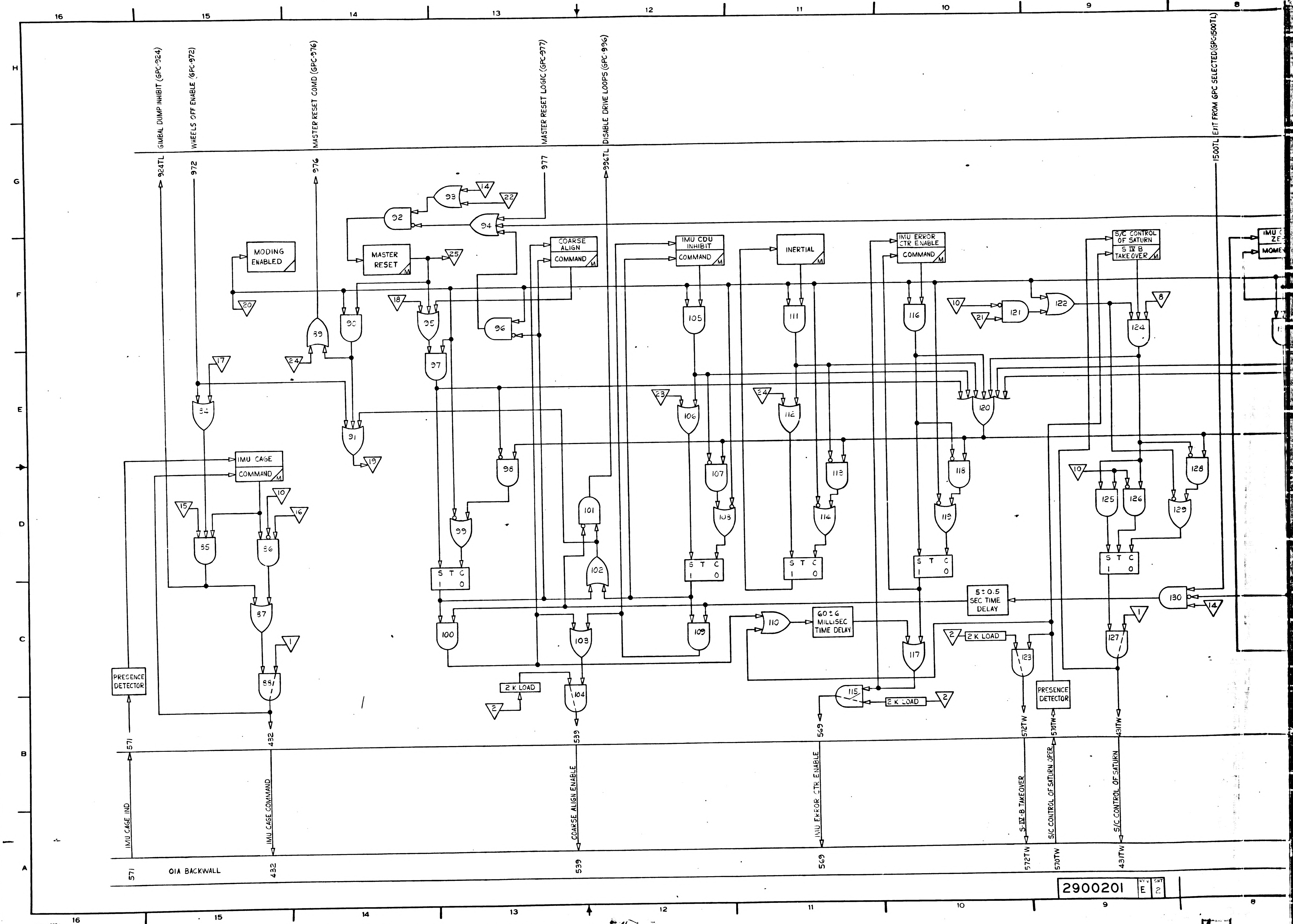
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM –
TEST CONTROL PANEL
(BLOCK II & LEM)

CODE IDENT NO 99974
SIZE J2
2900201
SCALE NONE
SHEET 2 OF 3

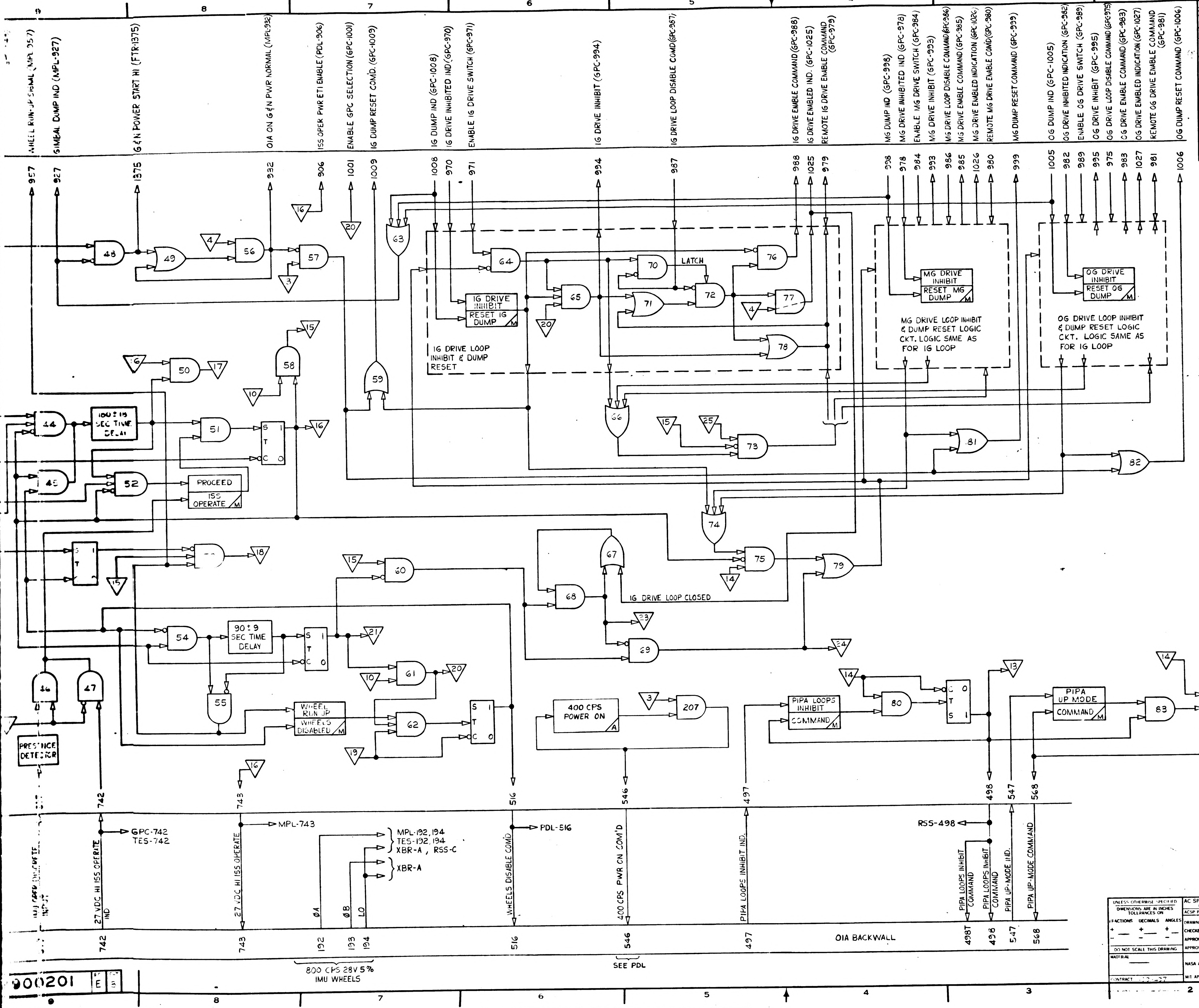
2900201 E SHT 2

2/2900201


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
GIMBAL DUMP INHIBIT (GPC-924)
WHEELS OFF ENABLE (GPC-972)
MASTER RESET COMD (GPC-976)
MASTER RESET LOGIC (GPC-977)
DISABLE DRIVE LOOPS (GPC-996)
1500TL EXIT FROM GPC SELECTED (GPC-1500TL)
924TL
972
976
977
996TL
MODING ENABLED
MASTER RESET
COARSE ALIGN COMMAND
IMU CDU INHIBIT COMMAND
INERTIAL
IMU ERROR CTR ENABLE COMMAND
S/C CONTROL OF SATURN
S IV B TAKE OVER
IMU CAGE COMMAND
PRESENCE DETECTOR
S T C 1 0
5±0.5 SEC TIME DELAY
60±6 MILLISEC TIME DELAY
2 K LOAD
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
571
432
539
569
572TW
570TW
431TW
IMU CAGE IND
IMU CAGE COMMAND
COARSE ALIGN ENABLE
IMU ERROR CTR ENABLE
S-IV-B TAKEOVER
S/C CONTROL OF SATURN OPER
S/C CONTROL OF SATURN
01A BACKWALL
2900201
E
2

1/2900201

SYM	ZONE	REVISIONS DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP MLM
B		REVISED PER TDRR 20492		65	MLM
C		REVISED PER TDRR 20493		65	MLM
D		REVISED PER TDRR 20494		9 JUL 65	RLP
E		REVISED PER TDRR 21898		31 AUG 65	RLP W.T.


WHEEL RUN-UP SIGNAL (MPL 957)
GIMBAL DUMP IND (MPL-927)
G & N POWER START HI (FTR-1375)
OIA ON G & N PWR NORMAL (MPL-932)
ISS OPER PWR ETI ENABLE (PDL-906)
ENABLE GPC SELECTION (GPC-1001)
IG DUMP RESET COMD. (GPC-1009)
IG DUMP IND (GPC-1008)
IG DRIVE INHIBITED IND (GPC-970)
ENABLE IG DRIVE SWITCH (GPC-971)
IG DRIVE INHIBIT (GPC-994)
IG DRIVE LOOP DISABLE COMD (GPC-987)
IG DRIVE ENABLE COMMAND (GPC-988)
IG DRIVE ENABLED IND. (GPC-1025)
REMOTE IG DRIVE ENABLE COMMAND (GPC-979)
MG DUMP IND (GPC-998)
MG DRIVE INHIBITED IND (GPC-978)
ENABLE MG DRIVE SWITCH (GPC-984)
MG DRIVE INHIBIT (GPC-993)
MG DRIVE LOOP DISABLE COMMAND (GPC-986)
MG DRIVE ENABLE COMMAND (GPC-985)
MG DRIVE ENABLED INDICATION (GPC-1026)
REMOTE MG DRIVE ENABLE COMD (GPC-980)
MG DUMP RESET COMMAND (GPC-999)
OG DUMP IND (GPC-1005)
OG DRIVE INHIBITED INDICATION (GPC-982)
ENABLE OG DRIVE SWITCH (GPC-989)
OG DRIVE INHIBIT (GPC-995)
OG DRIVE LOOP DISABLE COMMAND (GPC-975)
OG DRIVE ENABLE COMMAND (GPC-983)
OG DRIVE ENABLED INDICATION (GPC-1027)
REMOTE OG DRIVE ENABLE COMMAND (GPC-981)
OG DUMP RESET COMMAND (GPC-1006)
957
927
1375
932
906
1001
1009
1008
970
971
994
987
988
1025
979
998
978
984
993
986
985
1026
980
999
1005
982
989
995
975
983
1027
981
1006
48
49
56
57
63
64
65
70
LATCH
71
72
76
77
78
IG DRIVE INHIBIT
RESET IG DUMP
M
IG DRIVE LOOP INHIBIT & DUMP RESET
MG DRIVE INHIBIT
RESET MG DUMP
MG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
OG DRIVE INHIBIT
RESET OG DUMP
OG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
50
58
59
66
73
81
82
44
45
100 ± 15 SEC TIME DELAY
51
52
PROCEED
ISS OPERATE
S
T
C
I
74
75
79
67
68
IG DRIVE LOOP CLOSED
60
69
54
90 ± 9 SEC TIME DELAY
O
55
61
62
WHEEL RUN UP
WHEELS DISABLED
46
47
PRESENCE DETECTOR
400 CPS POWER ON
A
207
PIPA LOOPS INHIBIT
COMMAND
80
PIPA UP MODE
COMMAND
83
1
3
4
10
13
14
15
16
17
18
19
20
21
23
24
25
742
743
516
546
497
498
547
568
GPC-742
TES-742
MPL-743
MPL-192, 194
TES-192, 194
XBR-A, RSS-C
XBR-A
PDL-516
RSS-498
IMU OPER DISCRETE INPUT
27 VDC HI ISS OPERATE IND
27 VDC HI ISS OPERATE
ØA
ØB
LO
WHEELS DISABLE COMD
400 CPS PWR ON COM'D
PIPA LOOPS INHIBIT IND.
PIPA LOOPS INHIBIT COMMAND
PIPA LOOPS INHIBIT COMMAND
PIPA UP-MODE IND.
PIPA UP-MODE COMMAND
192
193
194
498T
OIA BACKWALL
800 CPS 28V 5% IMU WHEELS
SEE PDL

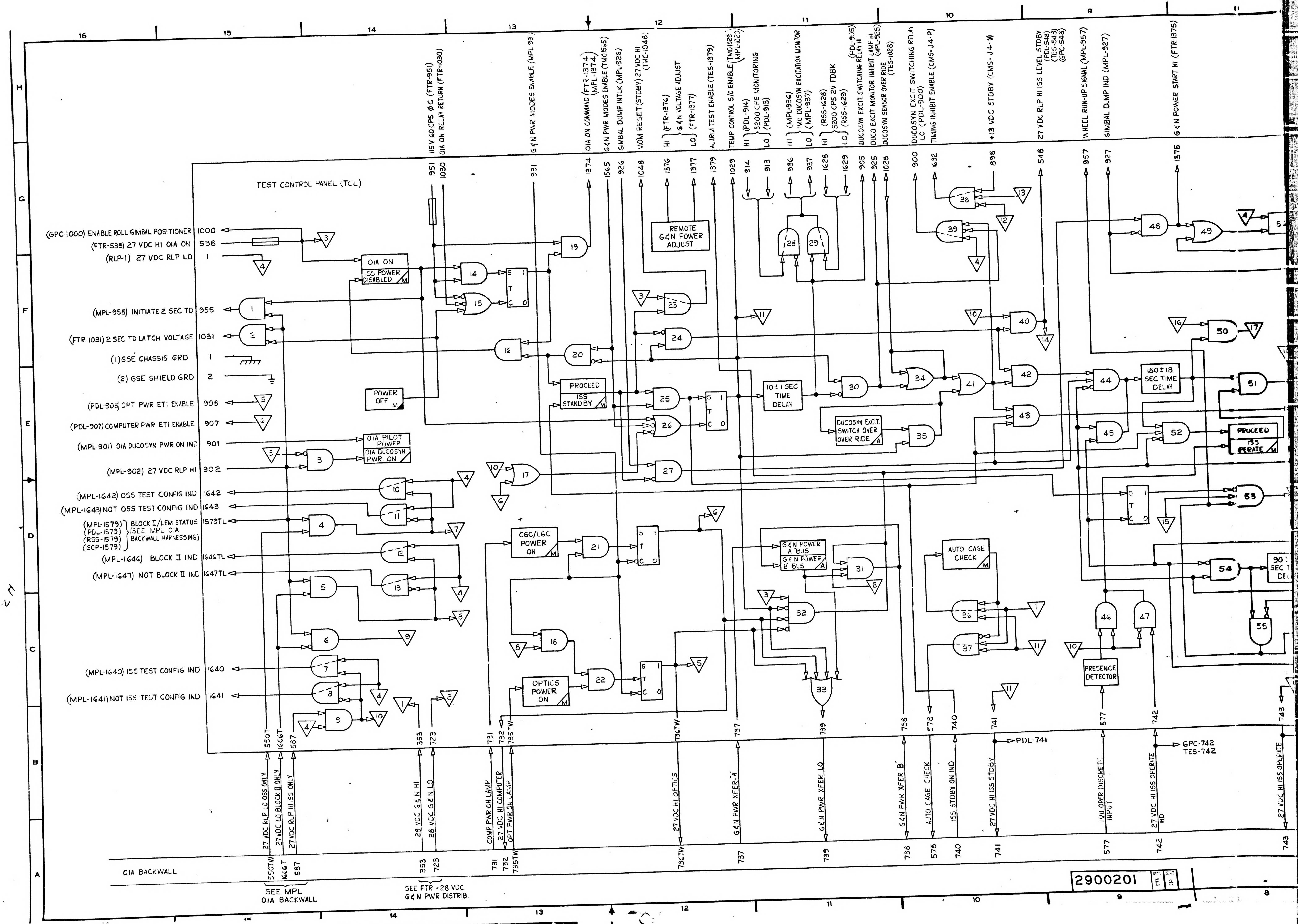
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ± DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
	ACSP PN DRAWN [illegible] DATE CHECKED APPROVAL APPROVAL	MECHANIZATION DIAGRAM - TEST CONTROL PANEL (BLOCK II & LEM)
MATERIAL —	NASA APPROVAL	CODE IDENT NO 93374 · SIZE J2 · 2900201
CONTRACT -27	MIT APPROVAL	SCALE NONE · SHEET 3 OF 5

2900201 E 3

Z4

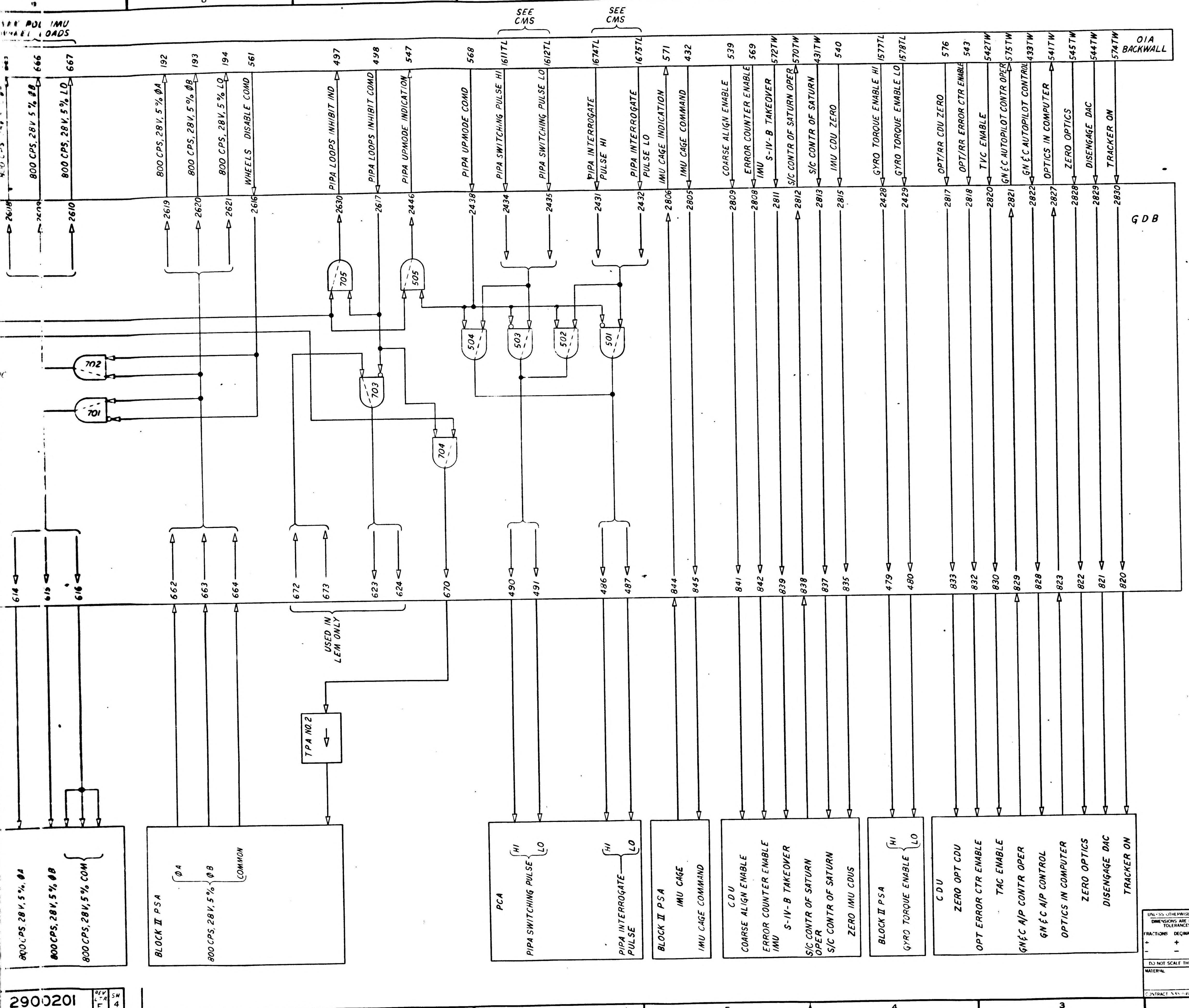
S00501

2/2900201


TEST CONTROL PANEL (TCL)
(GPC-1000) ENABLE ROLL GIMBAL POSITIONER 1000
(FTR-538) 27 VDC HI OIA ON 538
(RLP-1) 27 VDC RLP LO 1
(MPL-955) INITIATE 2 SEC TD 955
(FTR-1031) 2 SEC TD LATCH VOLTAGE 1031
(1) GSE CHASSIS GRD 1
(2) GSE SHIELD GRD 2
(PDL-908) OPT PWR ETI ENABLE 908
(PDL-907) COMPUTER PWR ETI ENABLE 907
(MPL-901) OIA DUCOSYN PWR ON IND 901
(MPL-902) 27 VDC RLP HI 902
(MPL-1642) OSS TEST CONFIG IND 1642
(MPL-1643) NOT OSS TEST CONFIG IND 1643
(MPL-1579) (PDL-1579) (RSS-1579) (GCP-1579) BLOCK II/LEM STATUS (SEE MPL OIA BACKWALL HARNESSING) 1579TL
(MPL-1646) BLOCK II IND 1646TL
(MPL-1647) NOT BLOCK II IND 1647TL
(MPL-1640) ISS TEST CONFIG IND 1640
(MPL-1641) NOT ISS TEST CONFIG IND 1641
115V 60CPS ØC (FTR-951)
OIA ON RELAY RETURN (FTR-1030)
G&N PWR MODES ENABLE (MPL-931)
OIA ON COMMAND (FTR-1374) (MPL-1374)
G&N PWR MODES ENABLE (TMC1565)
GIMBAL DUMP INTLK (MPL-926)
MOM RESET (STDBY) 27 VDC HI (TMC-1048)
HI (FTR-1376) G&N VOLTAGE ADJUST LO (FTR-1377)
ALARM TEST ENABLE (TES-1379)
TEMP CONTROL S/O ENABLE (TMC-1029) (MPL-1029)
HI (PDL-914) 3200 CPS MONITORING LO (PDL-913)
HI (MPL-936) IMU DUCOSYN EXCITATION MONITOR LO (MPL-937)
HI (RSS-1628) 3200 CPS 2V FDBK LO (RSS-1629)
DUCOSYN EXCIT. SWITCHING RELAY HI (PDL-905)
DUCO EXCIT MONITOR INHIBIT LAMP HI (MPL-925)
DUCOSYN SENSOR OVER RIDE (TES-1028)
DUCOSYN EXCIT SWITCHING RTLAY LO (PDL-900)
TIMING INHIBIT ENABLE (CMS-J4-P)
+13 VDC STDBY (CMS-J4-W)
27 VDC RLP HI ISS LEVEL STDBY (PDL-548) (TES-548) (GPC-548)
WHEEL RUN-UP SIGNAL (MPL-957)
GIMBAL DUMP IND (MPL-927)
G&N POWER START HI (FTR-1375)
951 1030 931 1374 1565 926 1048 1376 1377 1379 1029 914 913 936 937 1628 1629 905 925 1028 900 1632 898 548 957 927 1375
OIA ON
ISS POWER DISABLED M
POWER OFF M
OIA PILOT POWER
OIA DUCOSYN PWR. ON
REMOTE G&N POWER ADJUST
PROCEED
ISS STANDBY M
10±1 SEC TIME DELAY
DUCOSYN EXCIT SWITCH OVER OVER RIDE A
180±18 SEC TIME DELAY
PROCEED
ISS OPERATE M
CGC/LGC POWER ON M
OPTICS POWER ON M
G&N POWER A BUS
G&N POWER B BUS A
AUTO CAGE CHECK M
PRESENCE DETECTOR
90± SEC T DEL
S T C I O
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
550T 1666T 587 353 723 731 732 735TW 736TW 737 739 738 578 740 741 577 742 743
PDL-741
GPC-742 TES-742
27 VDC RLP LO OSS ONLY
27VDC LO BLOCK II ONLY
27 VDC RLP HI ISS ONLY
28 VDC G&N HI
28 VDC G&N LO
COMP PWR ON LAMP
27 VDC HI COMPUTER
OPT PWR ON LAMP
27 VDC HI OPTICS
G&N PWR XFER A
G&N PWR XFER LO
G&N PWR XFER B
AUTO CAGE CHECK
ISS STDBY ON IND
27 VDC HI ISS STDBY
IMU OPER DISCRETE INPUT
27 VDC HI ISS OPERATE IND
27 VDC HI ISS OPERATE
550TW 1666T 587 353 723 731 732 735TW 736TW 737 739 738 578 740 741 577 742 743
OIA BACKWALL
SEE MPL OIA BACKWALL
SEE FTR +28 VDC G&N PWR DISTRIB.
16 15 14 13 12 11 10 9 8
H G F E D C B A
2900201 E 3
1/2900201

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP mcm
B		REVISION STATUS CHANGED		JUL 65	JJJ mcm
C		REVISION STATUS CHANGED		8 JUL 65	JJJ mcm
D		REVISION STATUS CHANGED		9 JUL 65	RLP
E		REVISION STATUS CHANGED		31 AUG 65	RLP W.T.

REVISIONS 14254


SEE PUL IMU
WHEEL LOADS
666
667
800 CPS, 28V 5% ØB
800 CPS, 28V, 5% LO
2608
2609
2610
192
193
194
561
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
2619
2620
2621
2616
497
498
547
568
PIPA LOOPS INHIBIT IND
PIPA LOOPS INHIBIT COMD
PIPA UPMODE INDICATION
PIPA UPMODE COMD
2630
2617
2446
2438
SEE CMS
SEE CMS
1611TL
1612TL
1674TL
1675TL
PIPA SWITCHING PULSE HI
PIPA SWITCHING PULSE LO
PIPA INTERROGATE PULSE HI
PIPA INTERROGATE PULSE LO
2434
2435
2431
2432
571
432
IMU CAGE INDICATION
IMU CAGE COMMAND
2806
2805
539
569
572TW
570TW
431TW
540
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE
IMU
S-IV-B TAKEOVER
S/C CONTR OF SATURN OPER
S/C CONTR OF SATURN
IMU CDU ZERO
2809
2808
2811
2812
2813
2815
1577TL
1578TL
GYRO TORQUE ENABLE HI
GYRO TORQUE ENABLE LO
2428
2429
576
543
542TW
575TW
433TW
541TW
545TW
544TW
574TW
OPT/RR CDU ZERO
OPT/RR ERROR CTR ENABLE
TVC ENABLE
GN & C AUTOPILOT CONTR OPER
GN & C AUTOPILOT CONTROL
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
2817
2818
2820
2821
2822
2827
2828
2829
2830
O1A BACKWALL
GDB
705
505
504
503
502
501
702
701
703
704
614
615
616
662
663
664
672
673
623
624
670
490
491
486
487
844
845
841
842
839
838
837
835
479
480
833
832
830
829
828
823
822
821
820
USED IN LEM ONLY
TPA NO.2
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% COM
BLOCK II PSA
800 CPS, 28V, 5%
ØA
ØB
COMMON
PCA
PIPA SWITCHING PULSE
HI
LO
PIPA INTERROGATE PULSE
HI
LO
BLOCK II PSA
IMU CAGE
IMU CAGE COMMAND
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE
IMU
S-IV-B TAKEOVER
S/C CONTR OF SATURN OPER
S/C CONTR OF SATURN
ZERO IMU CDUS
BLOCK II PSA
GYRO TORQUE ENABLE
HI
LO
CDU
ZERO OPT CDU
OPT ERROR CTR ENABLE
TAC ENABLE
GN&C A/P CONTR OPER
GN & C A/P CONTROL
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON

2900201 REV LTR F SH 4

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS + − ANGLES + −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Bendel DATE 2-MAY-65
CHECKED Ed Foster 17 MAY 65
APPROVAL J. Trigg J. H.
APPROVAL M. Watson
NASA APPROVAL
MIT APPROVAL W Kupfer 20 Aug 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
TEST CONTROL PANEL
(BLOCK II)

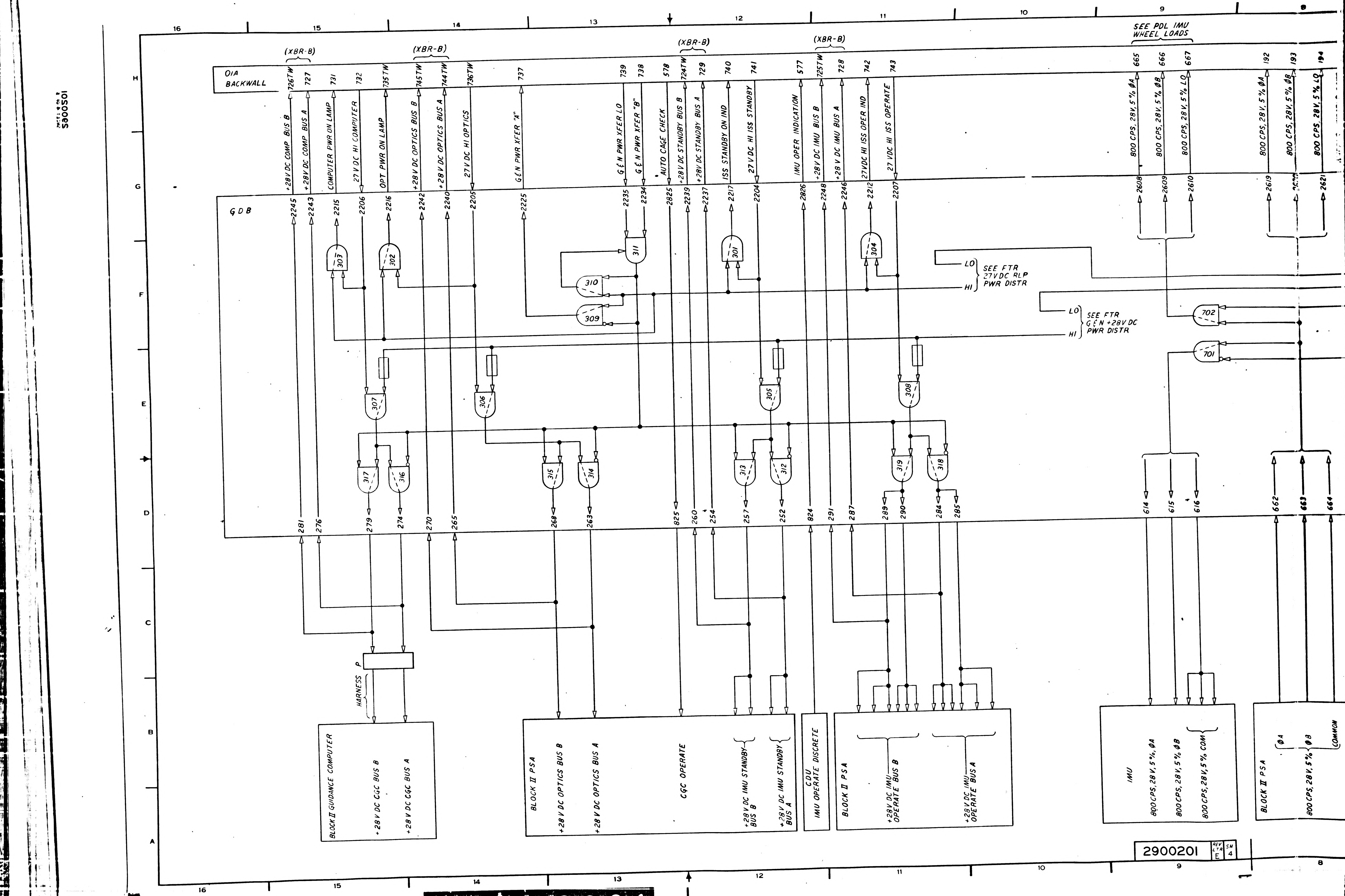
CODE IDENT NO 99974
SIZE J_2
2900201
SCALE
SHEET 4 OF 5

2900201 E

2H

S80501

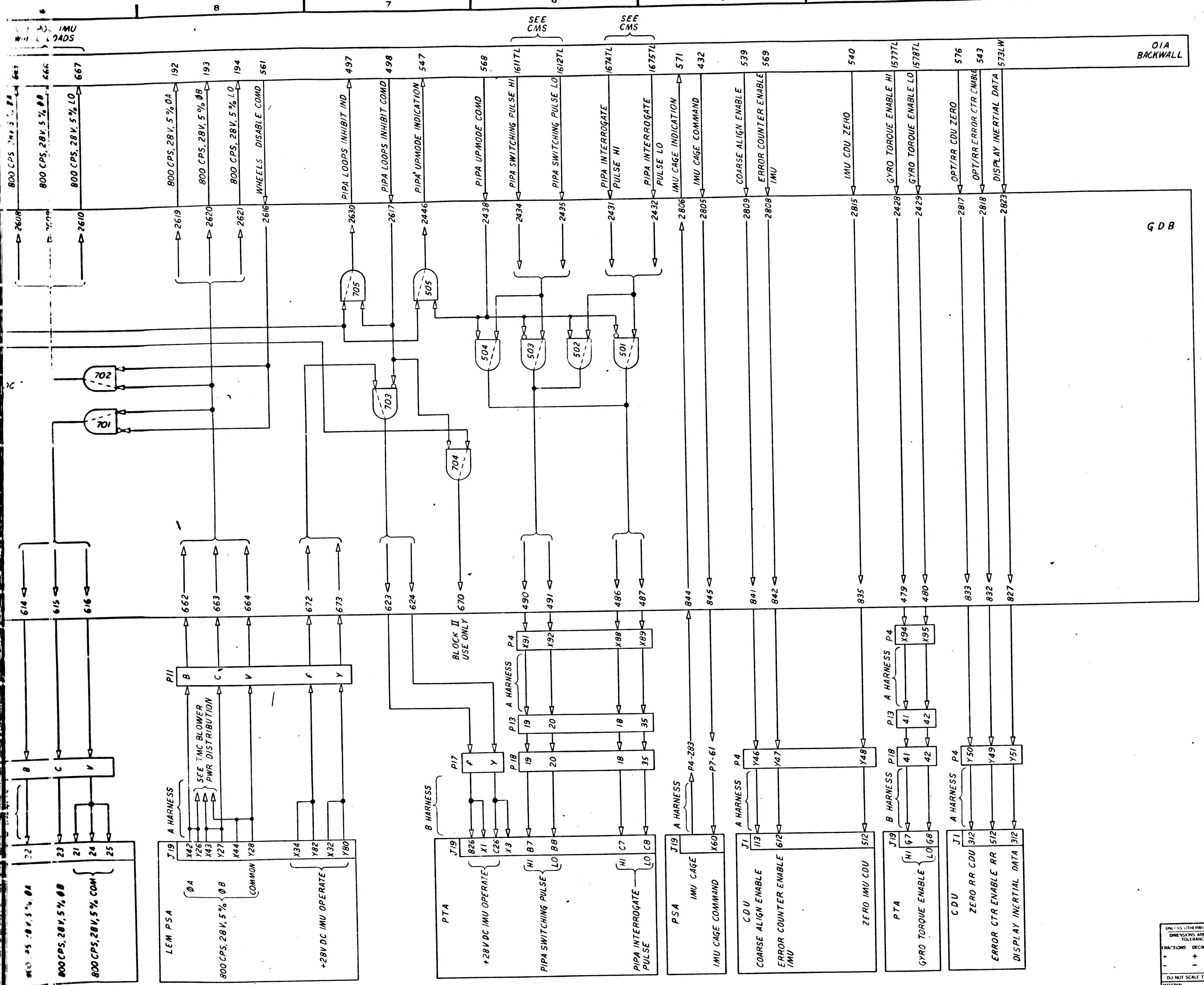
27 2900201



16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
(XBR-B)
(XBR-B)
(XBR-B)
(XBR-B)
SEE PDL IMU WHEEL LOADS
OIA BACKWALL
726TW
727
731
732
735TW
745TW
744TW
736TW
737
739
738
578
724TW
729
740
741
577
725TW
728
742
743
665
666
667
192
193
194
+28V DC COMP BUS B
+28V DC COMP BUS A
COMPUTER PWR ON LAMP
27 V DC HI COMPUTER
OPT PWR ON LAMP
+28 V DC OPTICS BUS B
+28 V DC OPTICS BUS A
27 V DC HI OPTICS
G&N PWR XFER "A"
G&N PWR XFER LO
G&N PWR XFER "B"
AUTO CAGE CHECK
+28 V DC STANDBY BUS B
+28 V DC STANDBY BUS A
ISS STANDBY ON IND
27 V DC HI ISS STANDBY
IMU OPER INDICATION
+28 V DC IMU BUS B
+28 V DC IMU BUS A
27 V DC HI ISS OPER IND
27 VDC HI ISS OPERATE
800 CPS, 28 V, 5% ØA
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% LO
800 CPS, 28 V, 5% ØA
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% LO
GDB
2245
2243
2215
2206
2216
2242
2240
2205
2225
2235
2234
2825
2239
2237
2217
2204
2826
2248
2246
2212
2207
2608
2609
2610
2619
2620
2621
303
302
311
301
304
310
309
LO
HI
SEE FTR 27 V DC RLP PWR DISTR
LO
HI
SEE FTR G&N +28 V DC PWR DISTR
702
701
307
306
305
308
317
316
315
314
313
312
319
318
281
276
279
274
270
265
268
263
825
260
254
257
252
824
291
287
289
290
284
285
614
615
616
662
663
664
P
HARNESS
BLOCK II GUIDANCE COMPUTER
+28 V DC CGC BUS B
+28 V DC CGC BUS A
BLOCK II PSA
+28 V DC OPTICS BUS B
+28 V DC OPTICS BUS A
CGC OPERATE
+28 V DC IMU STANDBY BUS B
+28 V DC IMU STANDBY BUS A
CDU IMU OPERATE DISCRETE
BLOCK II PSA
+28 V DC IMU OPERATE BUS B
+28 V DC IMU OPERATE BUS A
IMU
800 CPS, 28 V, 5% ØA
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% COM
BLOCK II PSA
ØA
800 CPS, 28 V, 5% ØB
COMMON
2900201
REV LTR E
SH 4

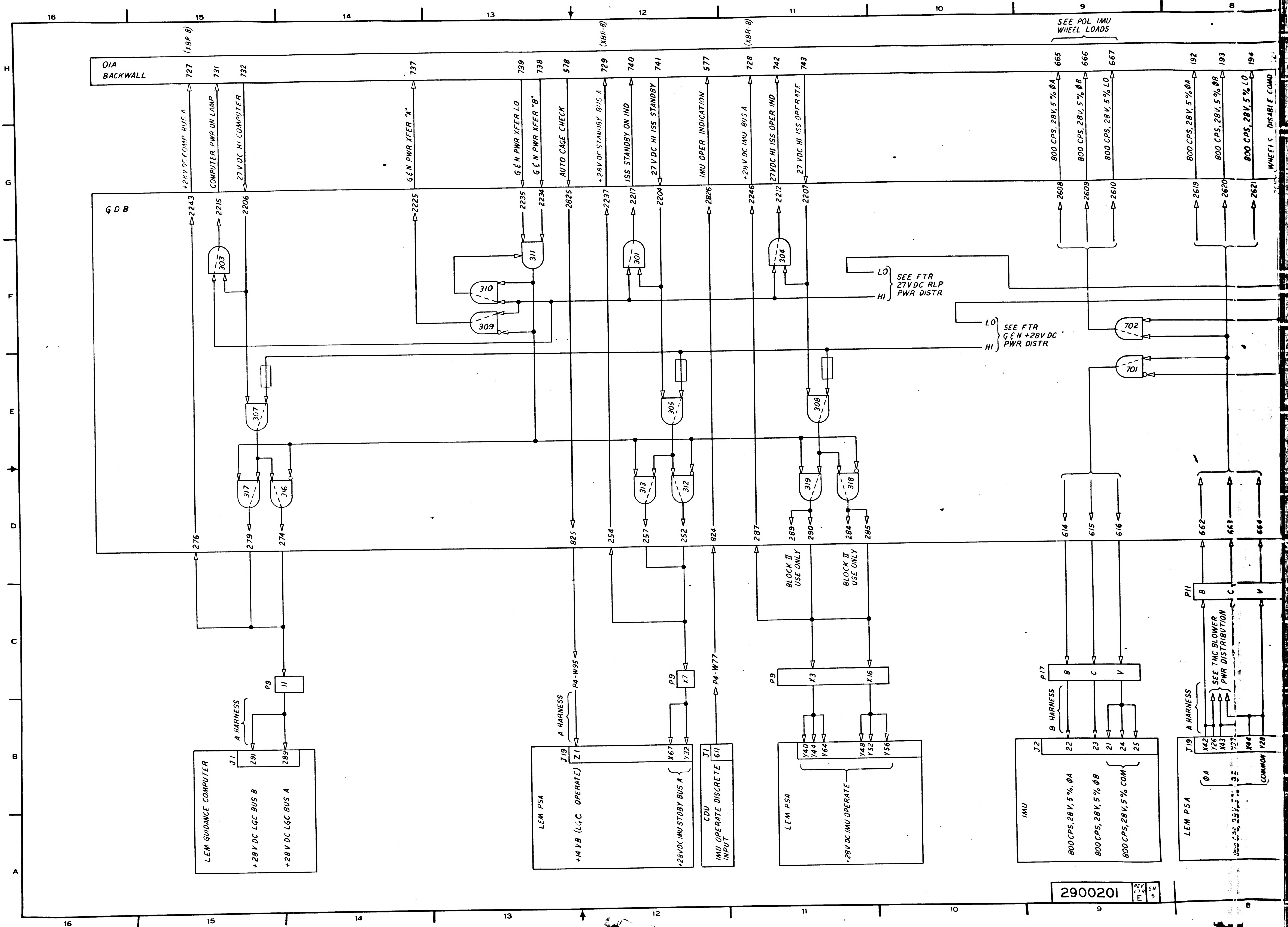
1Z2900201

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP mcm
B		REVISION STATUS CHANGED		7 65	mcm
C		REVISION STATUS CHANGED		65	mcm
D		REVISION STATUS CHANGED		9 JUL 65	RLP
E		REVISION STATUS CHANGED		31 AUG 65	RLP WT



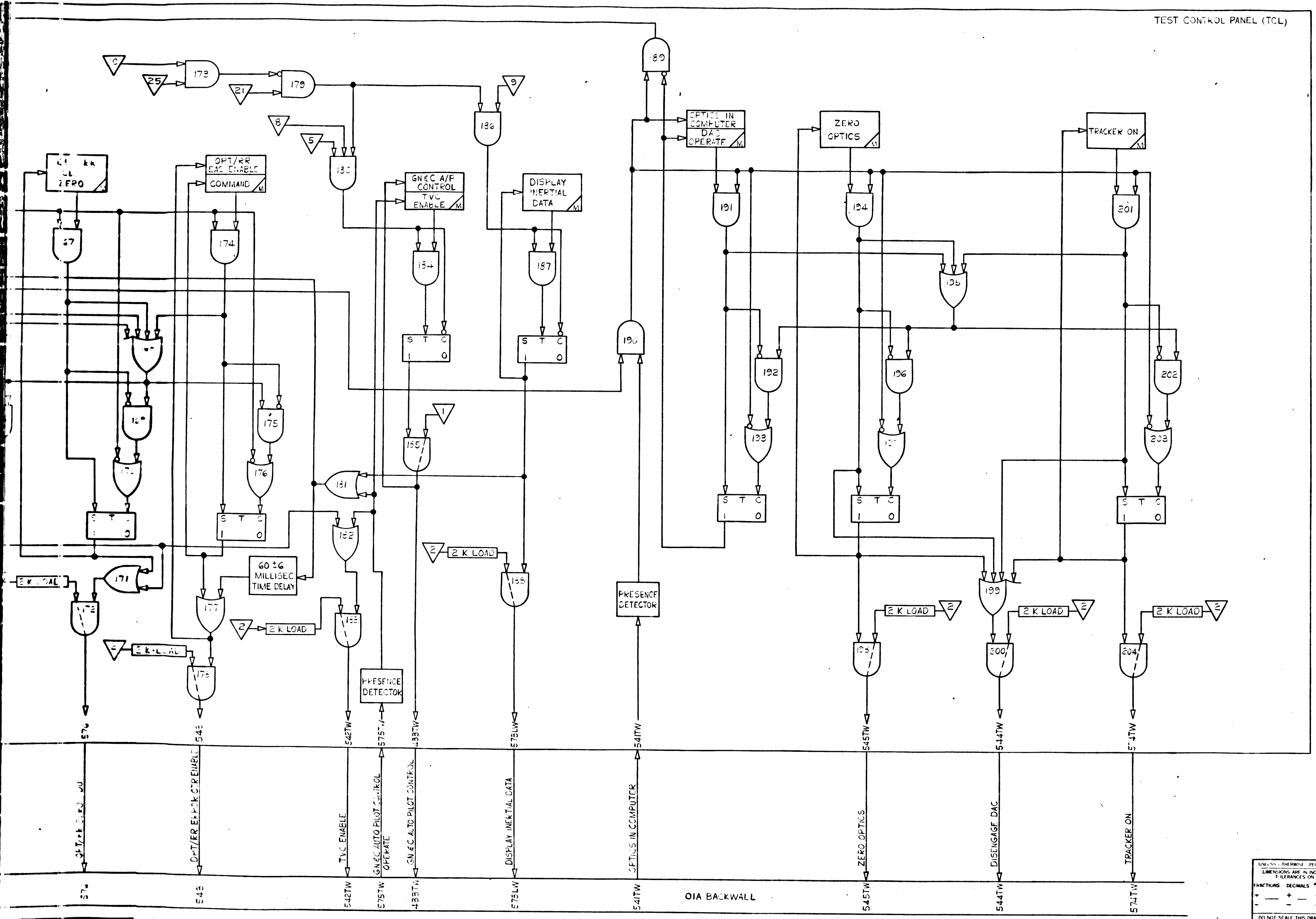
IMU WHEEL LOADS
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
667
192
193
194
561
497
498
547
568
1611TL
1612TL
1674TL
1675TL
571
432
539
569
540
1577TL
1578TL
576
543
573LW
SEE CMS
SEE CMS
OIA BACKWALL
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
PIPA LOOPS INHIBIT IND
PIPA LOOPS INHIBIT COMD
PIPA UPMODE INDICATION
PIPA UPMODE COMD
PIPA SWITCHING PULSE HI
PIPA SWITCHING PULSE LO
PIPA INTERROGATE PULSE HI
PIPA INTERROGATE PULSE LO
IMU CAGE INDICATION
IMU CAGE COMMAND
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
IMU CDU ZERO
GYRO TORQUE ENABLE HI
GYRO TORQUE ENABLE LO
OPT/RR CDU ZERO
OPT/RR ERROR CTR ENABLE
DISPLAY INERTIAL DATA
2608
2609
2610
2619
2620
2621
2616
2630
2617
2446
2438
2434
2435
2431
2432
2806
2805
2809
2808
2815
2428
2429
2817
2818
2823
GDB
705
505
504
503
502
501
702
701
703
704
614
615
616
662
663
664
672
673
623
624
670
490
491
486
487
844
845
841
842
835
479
480
833
832
827
BLOCK II USE ONLY
P11
B
C
V
F
Y
P4
X91
X92
X88
X89
A HARNESS
P13
19
20
18
35
P18
19
20
18
35
P17
F
Y
P4-283
P7-61
P4
Y46
Y47
Y48
X94
X95
41
42
41
42
Y50
Y49
Y51
B
C
V
SEE TMC BLOWER PWR DISTRIBUTION
A HARNESS
B HARNESS
A HARNESS
A HARNESS
B HARNESS
A HARNESS
22
23
21
24
25
J19
X42
Y26
X43
Y27
X44
Y28
X34
Y82
X32
Y80
J19
B26
X1
C26
X3
B7
B8
C7
C8
HI
LO
HI
LO
J19
X60
J1
113
612
512
J19
G7
G8
HI
LO
J1
312
512
312
800CPS, 28V, 5% ØA
800CPS, 28V, 5% ØB
800CPS, 28V, 5% COM
LEM PSA
ØA
ØB
COMMON
800 CPS, 28V, 5%
+28V DC IMU OPERATE
PTA
+28VDC IMU OPERATE
PIPA SWITCHING PULSE
PIPA INTERROGATE PULSE
PSA
IMU CAGE
IMU CAGE COMMAND
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
ZERO IMU CDU
PTA
GYRO TORQUE ENABLE
CDU
ZERO RR CDU
ERROR CTR ENABLE RR
DISPLAY INERTIAL DATA

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN Bender DATE 11-MAY-65 CHECKED APPROVAL APPROVAL	MECHANIZATION DIAGRAM TEST CONTROL PANEL (LEM)
MATERIAL	NASA APPROVAL	CODE IDENT NO 99974 SIZE J2 2900201
CONTRACT NAS	MIT APPROVAL	SCALE OF 5


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
(XBR-8)
OIA
BACKWALL
727
731
732
737
739
738
578
729
740
741
577
728
742
743
SEE POL IMU
WHEEL LOADS
665
666
667
192
193
194
+28V DC COMP BUS A
COMPUTER PWR ON LAMP
27 V DC HI COMPUTER
G & N PWR XFER "A"
G & N PWR XFER LO
G & N PWR XFER "B"
AUTO CAGE CHECK
+28 V DC STANDBY BUS A
ISS STANDBY ON IND
27 VDC HI ISS STANDBY
IMU OPER INDICATION
+28 V DC IMU BUS A
27VDC HI ISS OPER IND
27 VDC HI ISS OPERATE
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
GDB
2243
2215
2206
2225
2235
2234
2825
2237
2217
2204
2826
2246
2212
2207
2608
2609
2610
2619
2620
2621
303
311
310
309
301
304
307
305
308
317
316
313
312
319
318
702
701
LO
HI
SEE FTR
27VDC RLP
PWR DISTR
SEE FTR
G & N +28V DC
PWR DISTR
276
279
274
825
254
257
252
824
287
289
290
284
285
614
615
616
662
663
664
BLOCK II
USE ONLY
BLOCK II
USE ONLY
P11
B
C
V
SEE TMC BLOWER
PWR DISTRIBUTION
P9
11
P4-W95
X7
P4-W77
X3
X16
P17
B
C
V
A HARNESS
B HARNESS
A HARNESS
A HARNESS
J1
291
289
LEM GUIDANCE COMPUTER
+28 V DC LGC BUS B
+28 V DC LGC BUS A
J19
Z1
X67
Y32
LEM PSA
+14 VB (LGC OPERATE)
+28VDC IMU STDBY BUS A
J1
611
CDU
IMU OPERATE DISCRETE INPUT
Y40
Y44
Y64
Y48
Y52
Y56
LEM PSA
+28 V DC IMU OPERATE
J2
22
23
21
24
25
IMU
800 CPS, 28 V, 5% ØA
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% COM
J19
X42
Y26
X43
X27
X44
Y28
LEM PSA
ØA
COMMON
2900201
REV LTR
E
SH
5

1729000201

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP
3		REVISION STATUS CHANGED		7 JUL 65	
C		REVISION STATUS CHANGED		8 JUL 65	
D		REVISION STATUS CHANGED		7 JUL 65	RLP
E		REVISION STATUS CHANGED		31 AUG 65	RLP
F		REVISION STATUS CHANGED		1 SEP 65	RLP


TEST CONTROL PANEL (TCL)
C
25
21
178
179
9
8
5
186
189
130
OPTICS IN COMPUTER
DAC OPERATE
M
ZERO OPTICS
M
TRACKER ON
M
ZERO
OPT/RR EAC ENABLE
COMMAND
M
GN&C A/P CONTROL
TVC ENABLE
M
DISPLAY INERTIAL DATA
M
67
174
184
187
191
194
201
195
190
192
196
202
193
203
175
176
171
172
177
173
181
182
183
185
155
199
200
204
S T C
1 0
1
2
2 K LOAD
60 ±6 MILLISEC TIME DELAY
PRESENCE DETECTOR
576
543
542TW
575TW
433TW
573LW
541TW
545TW
544TW
574TW
OPT/RR ZERO CDU
OPT/RR ERROR CTR ENABLE
TVC ENABLE
GN&C AUTO PILOT CONTROL OPERATE
GN&C AUTO PILOT CONTROL
DISPLAY INERTIAL DATA
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
OIA BACKWALL
2900201
F

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION GMC MILWAUKEE WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN DATE CHECKED APPROVAL APPROVAL	MECHANIZATION DIAGRAM - TEST CONTROL PANEL (BLOCK II & LEM)
MATERIAL	NASA APPROVAL	CODE IDENT NO 99974
CONTRACT	MIT APPROVAL	SIZE J2
		2900201
		SCALE
		SHEET OF

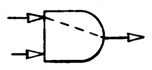
27 2900201

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS

2900203 – TEMPERATURE MONITOR & CONTROL PANEL (TMC)
2900208 – POWER AND DUMMY LOAD PANEL-PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL, PSS)
2900223 – GIMBAL POSITION CONTROL PANEL (GPC)
2900207 – MONITOR PANEL (MPL)
2900209 – COMPUTER SIMULATOR INTERFACE (CMS)
2900206 – TEST SELECTOR PANEL (TES)
2900217 – SIGNAL SELECTOR AND MEASUREMENT
CROSSBAR – AC SIGNALS (XBR-A)
CROSSBAR – DC SIGNALS (XBR-B)
2900218 – OSCILLOGRAPH SIGNAL SELECTION
TO FIXED DC CHANNEL (RSS-B)
TO SWITCHABLE AC CHANNEL (RSS-C)
2900200 – GYRO CAGING PANEL (GCP)
2900210 – AC POWER PROTECTION PANEL AND POWER DISTRIBUTION (FTR)
RELAY AND LAMP POWER SUPPLY (RLP)
2900213 – GSE GROUNDING

4. NON STANDARD SYMBOLOGY


INDICATES "AND" GATE WITH SWITCHED SIGNAL

NAME / NAME M – INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME / NAME A – INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION)

NAME M – INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME A – INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

NAME M – INDICATES UNLIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME – INDICATES INDICATOR LIGHT

5. T, W AND L SUFFIXES ON INTERFACE NUMBERS DENOTE FUNCTIONAL USAGE OF THAT INTERFACE. INTERPRET AS FOLLOWS:

T – UNIQUE TO BLOCK II CONFIGURATION
W – UNIQUE TO BLOCK I SERIES 100 CONFIGURATION
L – UNIQUE TO LEM CONFIGURATION
TW, TL, OR LW – COMMON TO THE TWO INDICATED CONFIGURATIONS
NO SUFFIX – COMMON TO ALL THREE CONFIGURATIONS

6. ALL TIME DELAYS SHALL HAVE RESET TIMES OF 20 MS OR LESS.

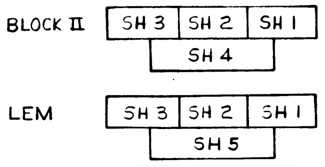
7. SIGNAL REFERENCE:

▽1 = G & N + 28 VDC HI
▽2 = G & N + 28 VDC LO
▽3 = 27 VDC HI OIA ON
▽4 = 27 VDC RLP LO
▽5 = OPTICS POWER ON
▽6 = CGC/LGC POWER ON
▽7 = OSS LEVEL TEST

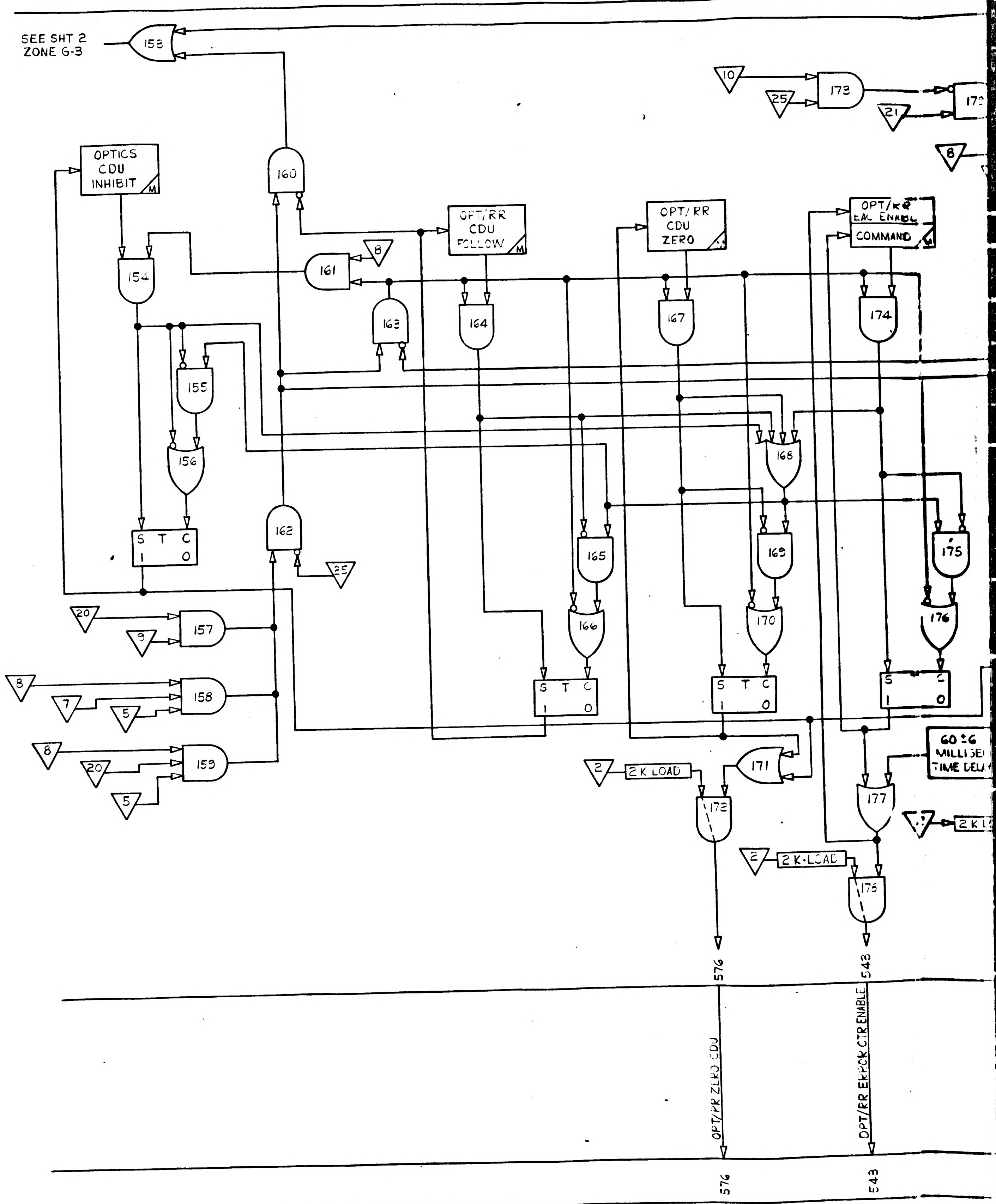
SIGNAL REFERENCE (CONT.)

▽8 = BLOCK II TEST CONFIG
▽9 = LEM TEST CONFIG
▽10 = ISS LEVEL TEST
▽11 = ISS STANDBY
▽12 = GYRO TORQUING ENABLED
▽13 = PIPA LOOPS INHIBITED
▽14 = ISS LEVEL STANDBY
▽15 = ISS LEVEL OPERATE
▽16 = ISS OPERATE
▽17 = WHEELS STOPPED
▽18 = SELECT COARSE ALIGN
▽19 = ENABLE WHEELS OFF
▽20 = ISS LEVEL OPERATE + 90 SEC
▽21 = OPERATE + 90 SEC
▽22 = OSS LEVEL OPTICS POWER ON
▽23 = TURN ON-LOOPS CLOSED
▽24 = TURN ON-LOOPS OPEN
▽25 = MASTER RESET DEPRESSED

8. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:


BLOCK II
SH 3
SH 2
SH 1
SH 4
LEM
SH 3
SH 2
SH 1
SH 5

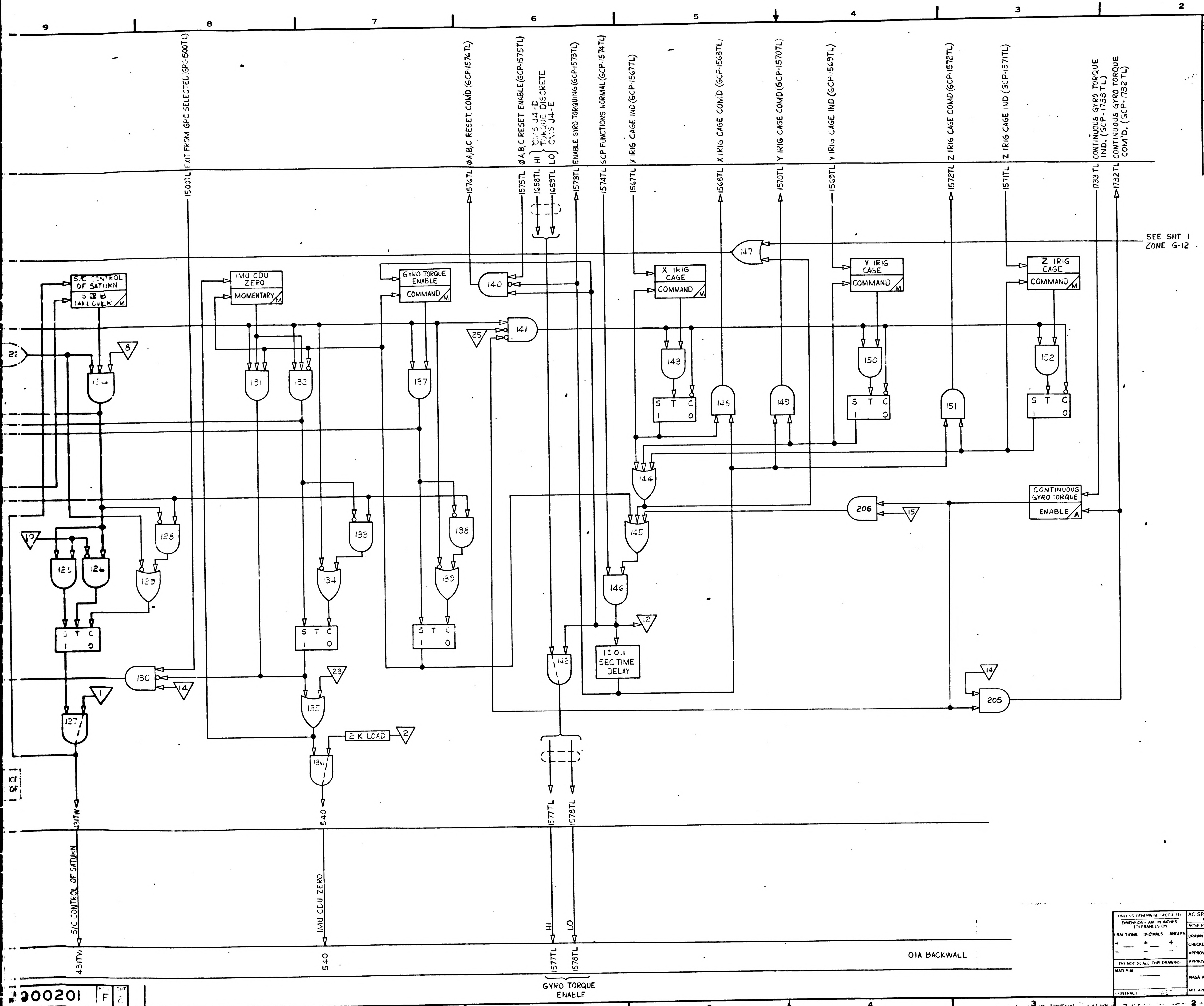
9. AS A DESIGN GOAL, THE INTERCONNECTIONS BETWEEN THE A/R COMPONENT AND THE GSE WILL BE MAINTAINED AS INTERFACE DEVICES.


SEE SHT 2
ZONE G-3
153
OPTICS
CDU
INHIBIT
M
160
154
161
8
163
OPT/RR
CDU
FOLLOW
M
164
OPT/RR
CDU
ZERO
167
10
25
173
21
17
8
OPT/RR
EAC ENABLE
COMMAND
174
155
156
S T C
1 0
162
25
168
165
169
175
166
170
176
20
9
157
8
7
5
158
8
20
5
159
S T C
1 0
S T C
1 0
S C
1 0
60 ± 6
MILLISEC
TIME DELAY
2
2 K LOAD
171
172
177
2 K L
2
2 K-LOAD
178
576
543
OPT/RR ZERO CDU
OPT/RR ERROR CTR ENABLE
576
543

2900201 F 1

1 4 2900201

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20489		2 JUL 65	RLP mcm
B		REVISION STATUS CHANGED		7 JUL 65	JJJ mcm
C		REVISION STATUS CHANGED	—	8 JUL 65	JJJ mcm
D		REVISION STATUS CHANGED		9 JUL 65	RLP
E		REVISION STATUS CHANGED		31 AUG 65	RLP
F		REVISION STATUS CHANGED		1 SEP 65	RLP


9
8
7
6
5
4
3
2
1
1500TL EXIT FROM GPC SELECTED (GPC-1500TL)
1576TL ØA,B,C RESET COMD (GCP-1576TL)
1575TL ØA,B,C RESET ENABLE (GCP-1575TL)
1658TL HI
1659TL LO
CMS J4-D
TORQUE DISCRETE
CMS J4-E
1573TL ENABLE GYRO TORQUING (GCP-1573TL)
1574TL GCP FUNCTIONS NORMAL (GCP-1574TL)
1567TL X IRIG CAGE IND (GCP-1567TL)
1568TL X IRIG CAGE COMD (GCP-1568TL)
1570TL Y IRIG CAGE COMD (GCP-1570TL)
1569TL Y IRIG CAGE IND (GCP-1569TL)
1572TL Z IRIG CAGE COMD (GCP-1572TL)
1571TL Z IRIG CAGE IND (GCP-1571TL)
1733 TL CONTINUOUS GYRO TORQUE IND. (GCP-1733 TL)
1732 TL CONTINUOUS GYRO TORQUE COM'D. (GCP-1732 TL)
SEE SHT 1
ZONE G-12
S/C CONTROL OF SATURN
S IV B
TAKE OVER
M
IMU CDU ZERO
MOMENTARY
M
GYRO TORQUE ENABLE
COMMAND
M
X IRIG CAGE
COMMAND
M
Y IRIG CAGE
COMMAND
M
Z IRIG CAGE
COMMAND
M
CONTINUOUS GYRO TORQUE
ENABLE
A
22
8
124
131
132
137
140
141
25
143
148
149
150
151
152
147
144
145
146
206
15
12
1±0.1 SEC TIME DELAY
142
205
14
125
126
128
129
133
134
138
139
19
S T C
1 0
130
14
127
1
135
23
136
2 K LOAD
2
431TW
S/C CONTROL OF SATURN
431TW
540
IMU CDU ZERO
540
1577TL
1578TL
HI
LO
1577TL
1578TL
GYRO TORQUE ENABLE
01A BACKWALL
H
G
F
E
D
C
B
A

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN DATE 7 MAY
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

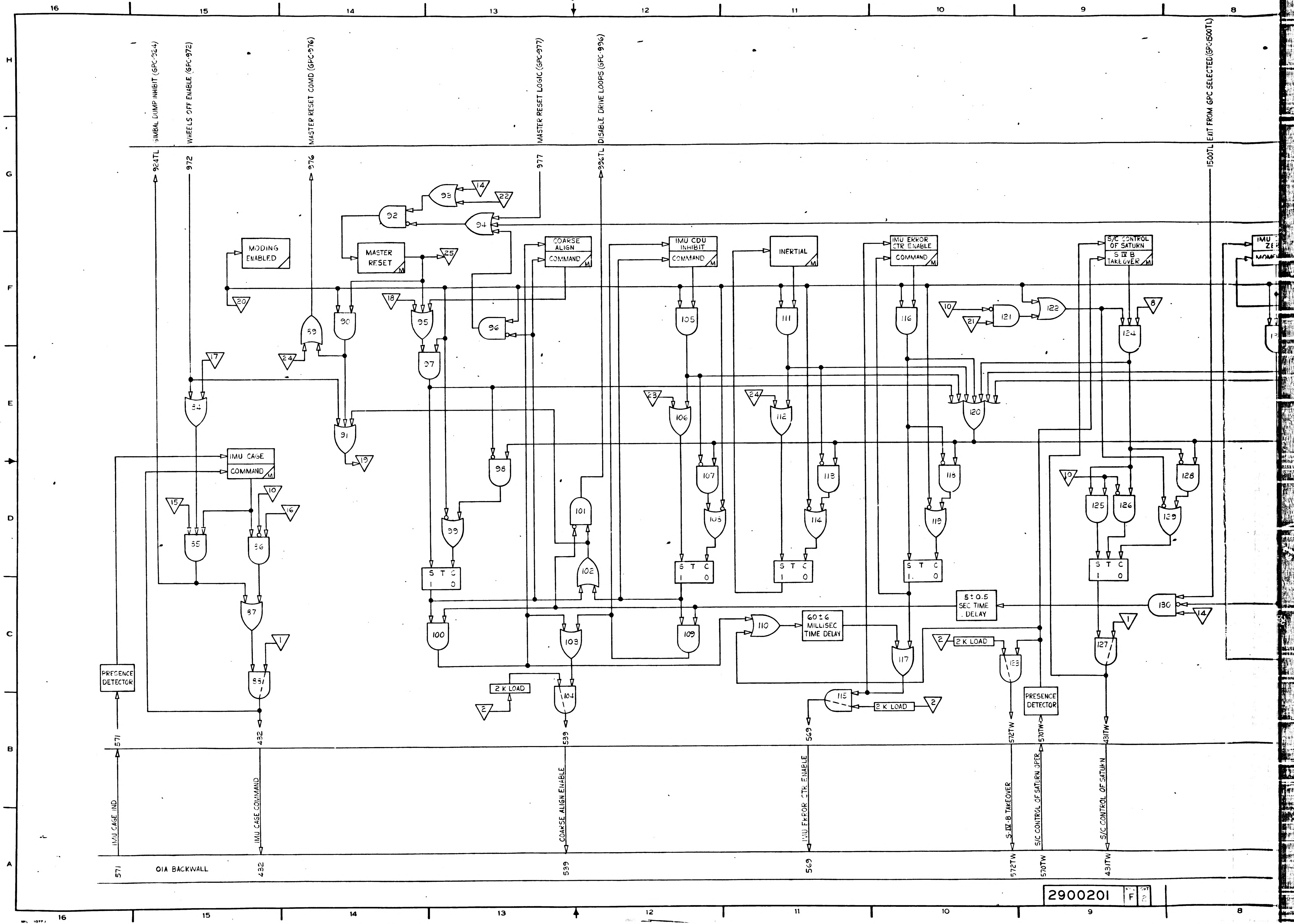
MECHANIZATION DIAGRAM –
TEST CONTROL PANEL
(BLOCK II & LEM)

CODE IDENT NO 39974
SIZE J2
2900201
SCALE
SHEET 2 OF 2

2900201 F

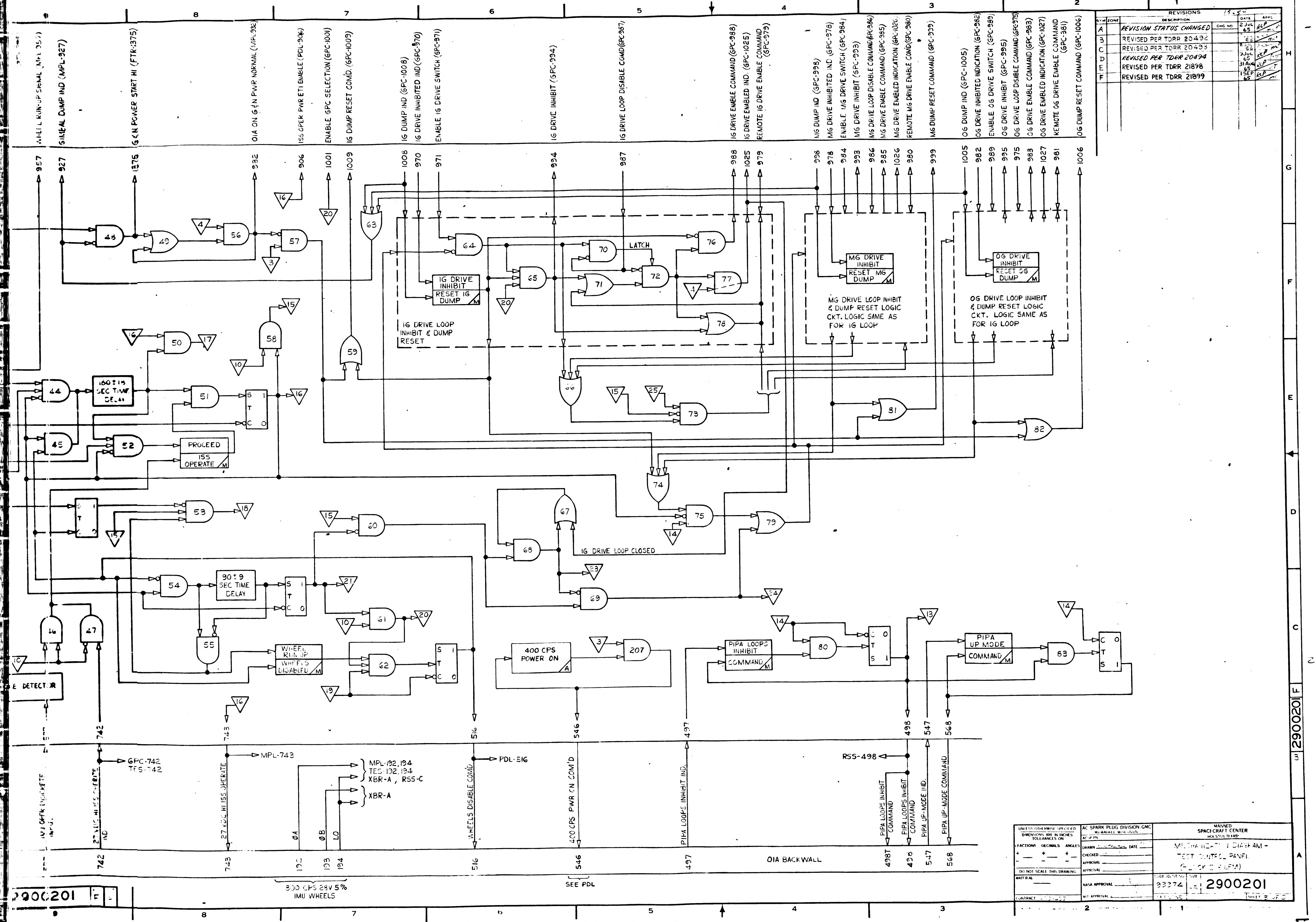
2900201 F SHT 2

2/2900201



GIMBAL DUMP INHIBIT (GPC-924)
WHEELS OFF ENABLE (GPC-972)
MASTER RESET COMD (GPC-976)
MASTER RESET LOGIC (GPC-977)
DISABLE DRIVE LOOPS (GPC-996)
EXIT FROM GPC SELECTED (GPC-1500TL)
924TL
972
976
977
996TL
1500TL
MODING ENABLED
MASTER RESET
COARSE ALIGN
COMMAND
IMU CDU INHIBIT
COMMAND
INERTIAL
IMU ERROR CTR ENABLE
COMMAND
S/C CONTROL OF SATURN
S IV B TAKEOVER
IMU ZE
MOME
IMU CAGE
COMMAND
PRESENCE DETECTOR
PRESENCE DETECTOR
2 K LOAD
2 K LOAD
2 K LOAD
60±6 MILLISEC TIME DELAY
5±0.5 SEC TIME DELAY
S T C
1 0
571
432
539
569
572TW
570TW
431TW
IMU CAGE IND
IMU CAGE COMMAND
COARSE ALIGN ENABLE
IMU ERROR CTR ENABLE
S-IV-B TAKEOVER
S/C CONTROL OF SATURN OPER
S/C CONTROL OF SATURN
OIA BACKWALL
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
2900201
F

1/2900201


WHEEL RUN-UP SIGNAL (MPL-957)
957
GIMBAL DUMP IND (MPL-927)
927
G & N POWER START HI (FTR-375)
375
OIA ON G & N PWR NORMAL (MPL-932)
932
ISS OPER PWR ETI ENABLE (PDL-906)
906
ENABLE GPC SELECTION (GPC-1001)
1001
IG DUMP RESET COMD. (GPC-1009)
1009
IG DUMP IND (GPC-1008)
1008
IG DRIVE INHIBITED IND (GPC-970)
970
ENABLE IG DRIVE SWITCH (GPC-971)
971
IG DRIVE INHIBIT (GPC-994)
994
IG DRIVE LOOP DISABLE COMD (GPC-987)
987
IG DRIVE ENABLE COMMAND (GPC-988)
988
IG DRIVE ENABLED IND. (GPC-1025)
1025
REMOTE IG DRIVE ENABLE COMMAND (GPC-979)
979
MG DUMP IND (GPC-998)
998
MG DRIVE INHIBITED IND (GPC-978)
978
ENABLE MG DRIVE SWITCH (GPC-984)
984
MG DRIVE INHIBIT (GPC-993)
993
MG DRIVE LOOP DISABLE COMMAND (GPC-986)
986
MG DRIVE ENABLE COMMAND (GPC-985)
985
MG DRIVE ENABLED INDICATION (GPC-1026)
1026
REMOTE MG DRIVE ENABLE COMD (GPC-980)
980
MG DUMP RESET COMMAND (GPC-999)
999
OG DUMP IND (GPC-1005)
1005
OG DRIVE INHIBITED INDICATION (GPC-982)
982
ENABLE OG DRIVE SWITCH (GPC-989)
989
OG DRIVE INHIBIT (GPC-995)
995
OG DRIVE LOOP DISABLE COMMAND (GPC-975)
975
OG DRIVE ENABLE COMMAND (GPC-983)
983
OG DRIVE ENABLED INDICATION (GPC-1027)
1027
REMOTE OG DRIVE ENABLE COMMAND (GPC-981)
981
OG DUMP RESET COMMAND (GPC-1006)
1006
48
49
56
57
63
64
65
70
LATCH
71
72
76
77
78
IG DRIVE INHIBIT
RESET IG DUMP
M
IG DRIVE LOOP INHIBIT & DUMP RESET
MG DRIVE INHIBIT
RESET MG DUMP
M
MG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
OG DRIVE INHIBIT
RESET OG DUMP
M
OG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
44
45
180 ± 15 SEC TIME DELAY
50
51
52
58
59
66
73
81
82
S
T
C
1
0
PROCEED
ISS OPERATE
M
53
54
55
60
61
62
67
68
69
74
75
79
IG DRIVE LOOP CLOSED
90 ± 9 SEC TIME DELAY
WHEEL RUN UP
WHEELS DISABLED
M
46
47
E DETECTOR
400 CPS POWER ON
A
207
PIPA LOOPS INHIBIT
COMMAND
M
80
13
PIPA UP MODE
COMMAND
M
83
1
3
4
10
14
15
16
17
18
19
20
21
23
24
25
742
GPC-742
TES-742
743
MPL-743
27 VDC HI ISS OPERATE
27 VDC HI ISS OPERATE IND
INU OPER DISCRETE INPUT
MPL-192, 194
TES-192, 194
XBR-A, RSS-C
XBR-A
ØA
ØB
LO
192
193
194
300 CPS 28V 5%
IMU WHEELS
516
PDL-516
WHEELS DISABLE COMD
546
400 CPS PWR ON COM'D
SEE PDL
497
PIPA LOOPS INHIBIT IND.
OIA BACKWALL
498
RSS-498
498T
PIPA LOOPS INHIBIT COMMAND
547
PIPA UP-MODE IND.
568
PIPA UP-MODE COMMAND
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
2/4
2900201 F 3

REVISIONS 19-5

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP MLM
B		REVISED PER TDRR 20492		65	MLM
C		REVISED PER TDRR 20493		8 JUL 65	MLM
D		REVISED PER TDRR 20494		9 JUL 65	RLP
E		REVISED PER TDRR 21898		31 AUG 65	RLP
F		REVISED PER TDRR 21899		1 SEP 65	RLP

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

AC SPARK PLUG DIVISION GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

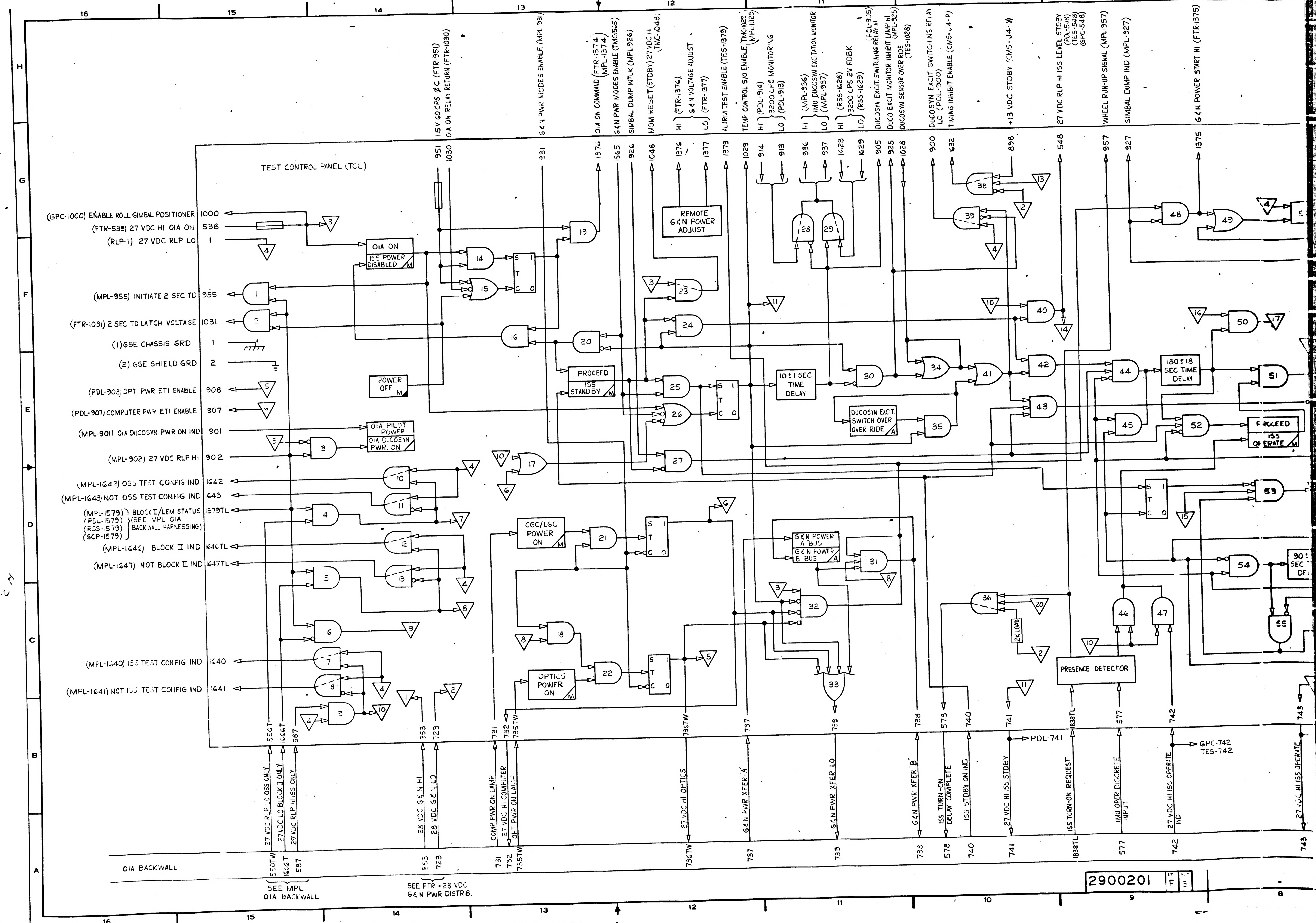
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM -
TEST CONTROL PANEL
(BLOCK II & LEM)

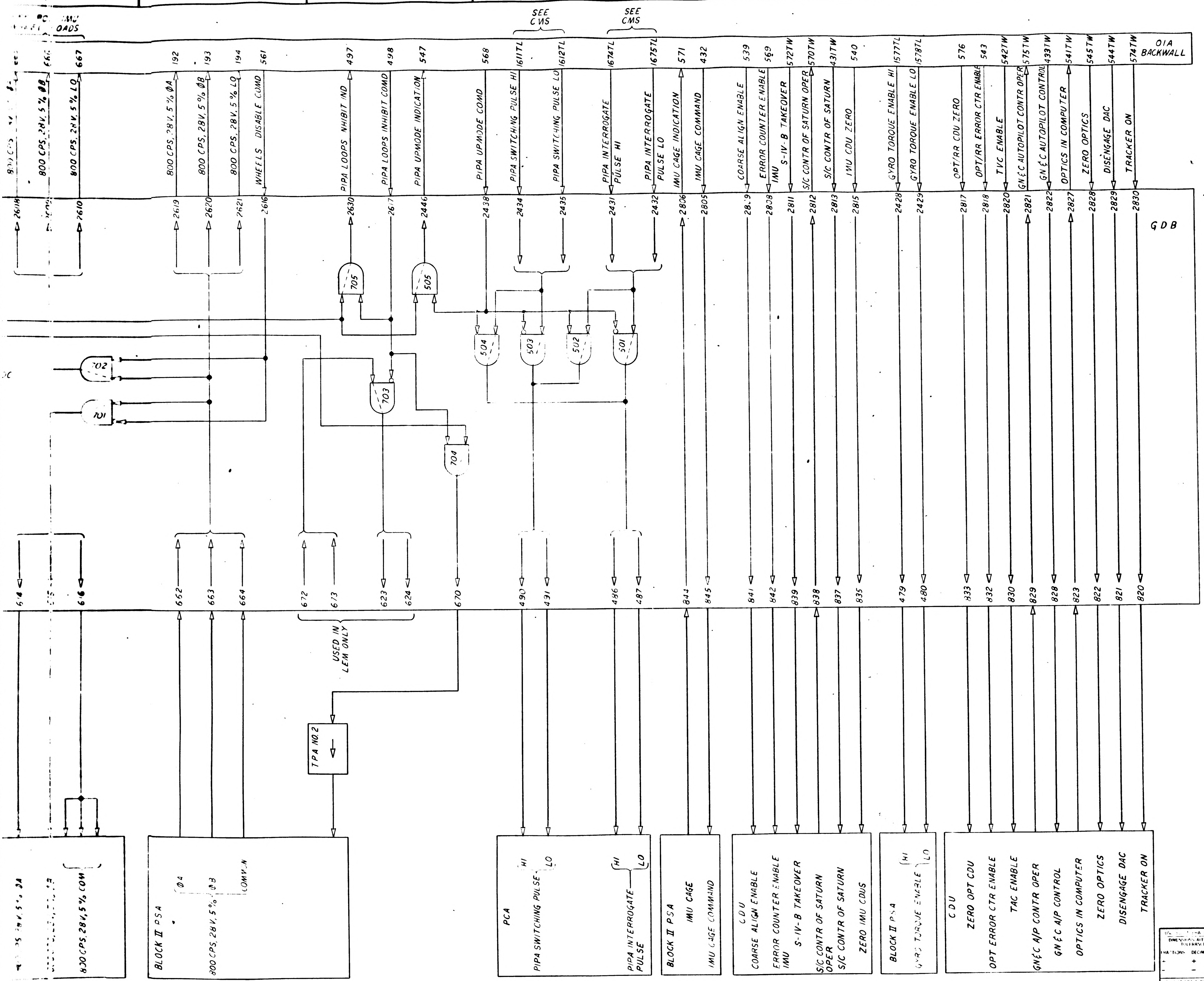
CODE IDENT NO 93374
SIZE J
2900201
SHEET 3 OF 5

2900201 F

2/2900201


TEST CONTROL PANEL (TCL)
(GPC-1000) ENABLE ROLL GIMBAL POSITIONER 1000
(FTR-538) 27 VDC HI OIA ON 538
(RLP-1) 27 VDC RLP LO 1
(MPL-955) INITIATE 2 SEC TD 955
(FTR-1031) 2 SEC TD LATCH VOLTAGE 1031
(1) GSE CHASSIS GRD 1
(2) GSE SHIELD GRD 2
(PDL-908) OPT PWR ETI ENABLE 908
(PDL-907) COMPUTER PWR ETI ENABLE 907
(MPL-901) OIA DUCOSYN PWR ON IND 901
(MPL-902) 27 VDC RLP HI 902
(MPL-1642) OSS TEST CONFIG IND 1642
(MPL-1643) NOT OSS TEST CONFIG IND 1643
(MPL-1579) (PDL-1579) (RSS-1579) (GCP-1579) BLOCK II/LEM STATUS (SEE MPL OIA BACKWALL HARNESSING) 1579TL
(MPL-1646) BLOCK II IND 1646TL
(MPL-1647) NOT BLOCK II IND 1647TL
(MPL-1640) ISS TEST CONFIG IND 1640
(MPL-1641) NOT ISS TEST CONFIG IND 1641
115V 60 CPS ØC (FTR-951) 951
OIA ON RELAY RETURN (FTR-1030) 1030
G&N PWR MODES ENABLE (MPL-931) 931
OIA ON COMMAND (FTR-1374) (MPL-1374) 1374
G&N PWR MODES ENABLE (TMC-1565) 1565
GIMBAL DUMP INTLK (MPL-926) 926
MOM RESET (STDBY) 27 VDC HI (TMC-1048) 1048
HI (FTR-1376) G&N VOLTAGE ADJUST 1376
LO (FTR-1377) 1377
ALARM TEST ENABLE (TES-1379) 1379
TEMP CONTROL S/O ENABLE (TMC-1029) (MPL-1029) 1029
HI (PDL-914) 3200 CPS MONITORING 914
LO (PDL-913) 913
HI (MPL-936) IMU DUCOSYN EXCITATION MONITOR 936
LO (MPL-937) 937
HI (RSS-1628) 3200 CPS 2V FDBK 1628
LO (RSS-1629) 1629
DUCOSYN EXCIT. SWITCHING RELAY HI (PDL-905) 905
DUCO EXCIT MONITOR INHIBIT LAMP HI (MPL-925) 925
DUCOSYN SENSOR OVER RIDE (TES-1028) 1028
DUCOSYN EXCIT SWITCHING RELAY LO (PDL-900) 900
TIMING INHIBIT ENABLE (CMS-J4-P) 1632
+13 VDC STDBY (CMS-J4-R) 898
27 VDC RLP HI ISS LEVEL STDBY (PDL-548) (TES-548) (GPC-548) 548
WHEEL RUN-UP SIGNAL (MPL-957) 957
GIMBAL DUMP IND (MPL-927) 927
G&N POWER START HI (FTR-1375) 1375
REMOTE G&N POWER ADJUST
OIA ON
ISS POWER DISABLED M
POWER OFF M
OIA PILOT POWER
OIA DUCOSYN PWR. ON
PROCEED
ISS STANDBY M
10±1 SEC TIME DELAY
DUCOSYN EXCIT SWITCH OVER OVER RIDE A
180±18 SEC TIME DELAY
PROCEED
ISS OPERATE M
CGC/LGC POWER ON M
OPTICS POWER ON M
G&N POWER A BUS
G&N POWER B BUS A
2K LOAD
PRESENCE DETECTOR
90 SEC DE
S T C I O
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
550T 1666T 587 353 723 731 732 735TW 736TW 737 739 738 578 740 741 1838TL 577 742 743
27 VDC RLP LO OSS ONLY
27 VDC LO BLOCK II ONLY
27 VDC RLP HI ISS ONLY
28 VDC G&N HI
28 VDC G&N LO
COMP PWR ON LAMP
27 VDC HI COMPUTER
OPT PWR ON LAMP
27 VDC HI OPTICS
G&N PWR XFER A
G&N PWR XFER LO
G&N PWR XFER B
ISS TURN-ON DELAY COMPLETE
ISS STDBY ON IND
27 VDC HI ISS STDBY
PDL-741
ISS TURN-ON REQUEST
IMU OPER DISCRETE INPUT
27 VDC HI ISS OPERATE IND
GPC-742 TES-742
27 VDC HI ISS OPERATE
OIA BACKWALL
550TW 1666T 587 353 723 731 732 735TW 736TW 737 739 738 578 740 741 1838TL 577 742 743
SEE MPL OIA BACKWALL
SEE FTR +28 VDC G&N PWR DISTRIB.
H G F E D C B A
16 15 14 13 12 11 10 9 8
2900201 F

1/2900201


SEE CMS
SEE CMS
OIA BACKWALL
192
193
194
561
497
498
547
568
1611TL
1612TL
1674TL
1675TL
571
432
539
569
572TW
570TW
431TW
540
1577TL
1578TL
576
543
542TW
575TW
433TW
541TW
545TW
544TW
574TW
667
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
PIPA LOOPS INHIBIT IND
PIPA LOOPS INHIBIT COMD
PIPA UPMODE INDICATION
PIPA UPMODE COMD
PIPA SWITCHING PULSE HI
PIPA SWITCHING PULSE LO
PIPA INTERROGATE PULSE HI
PIPA INTERROGATE PULSE LO
IMU CAGE INDICATION
IMU CAGE COMMAND
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
S-IV-B TAKEOVER
S/C CONTR OF SATURN OPER
S/C CONTR OF SATURN
IMU CDU ZERO
GYRO TORQUE ENABLE HI
GYRO TORQUE ENABLE LO
OPT/RR CDU ZERO
OPT/RR ERROR CTR ENABLE
TVC ENABLE
GN&C AUTOPILOT CONTR OPER
GN&C AUTOPILOT CONTROL
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
2611B
2610
2619
2620
2621
2616
2630
2617
2446
2438
2434
2435
2431
2432
2806
2805
2809
2808
2811
2812
2813
2815
2428
2429
2817
2818
2820
2821
2822
2827
2828
2829
2830
GDB
705
505
504
503
502
501
702
701
703
704
614
616
662
663
664
672
673
623
624
670
490
491
496
497
844
845
841
842
839
838
837
835
479
480
833
832
830
829
828
823
822
821
820
USED IN LEM ONLY
TPA NO. 2
BLOCK II PSA
ØA
ØB
LOMMON
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
PCA
HI
LO
PIPA SWITCHING PULSE
HI
LO
PIPA INTERROGATE PULSE
BLOCK II PSA
IMU CAGE
IMU CAGE COMMAND
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
S-IV-B TAKEOVER
S/C CONTR OF SATURN OPER
S/C CONTR OF SATURN
ZERO IMU CDUS
BLOCK II PSA
HI
LO
GYRO TORQUE ENABLE
CDU
ZERO OPT CDU
OPT ERROR CTR ENABLE
TAC ENABLE
GN&C A/P CONTR OPER
GN&C A/P CONTROL
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

SYM	ZONE	REVISIONS DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP mcm
B		REVISION STATUS CHANGED		65	mcm
C		REVISION STATUS CHANGED		8 JUL 65	mcm
D		REVISION STATUS CHANGED		9 JUL 65	RLP MT
E		REVISION STATUS CHANGED		31 AUG 65	RLP W.D.
F		REVISED PER TDRR 21899		1 SEP 65	RLP

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL

AC SPARK PLUG DIVISION GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Bendel 2-MAY-65 DATE
CHECKED Ed Exter 17 May 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

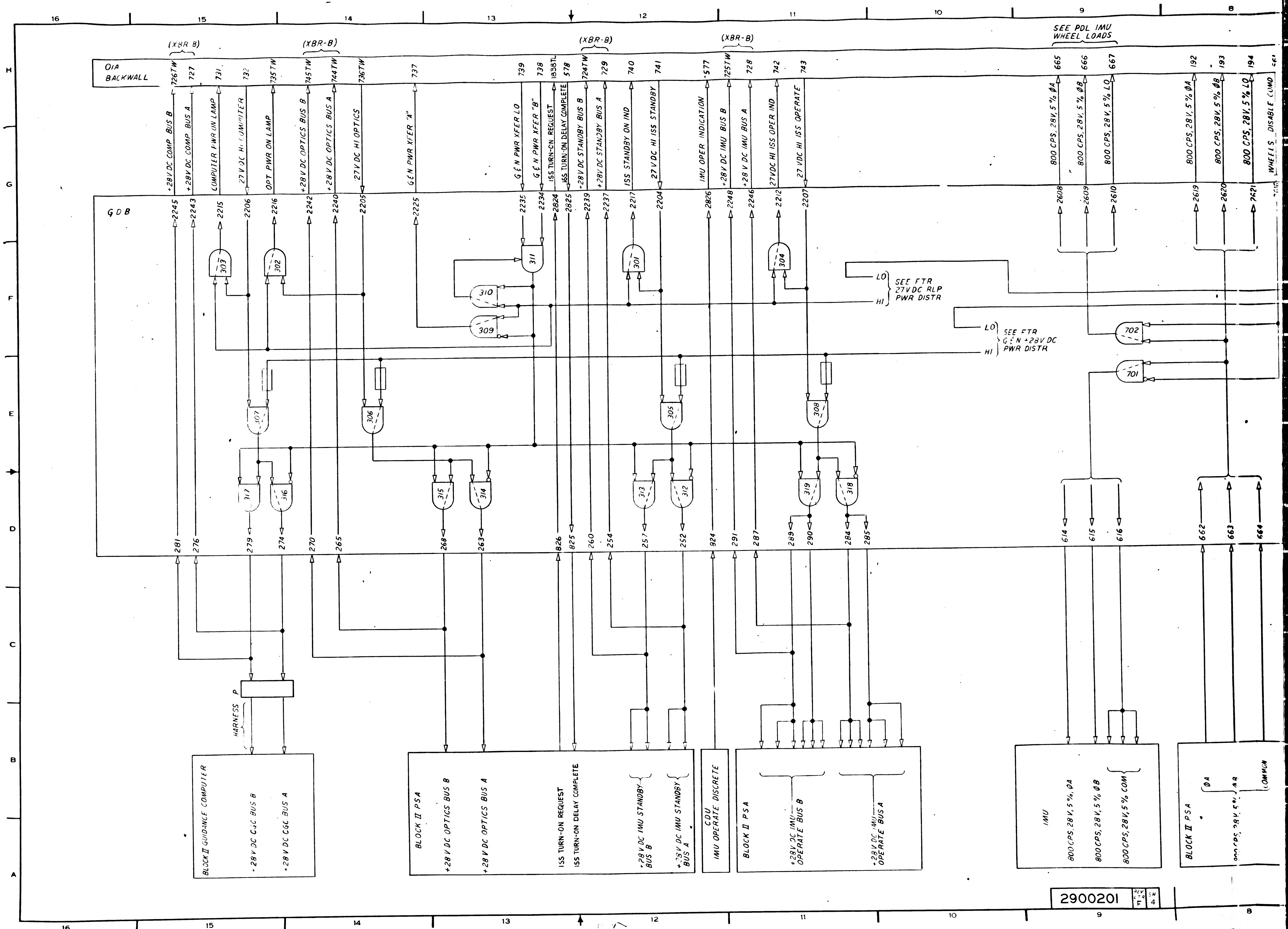
MECHANIZATION DIAGRAM
TEST CONTROL PANEL
(BLOCK II)

CODE IDENT NO 99974
SIZE J2
2900201
SHEET 4 OF 5

2900201 F

2900201 F H 4

2/2900201


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
(XBR B)
(XBR-B)
(XBR-B)
(XBR-B)
SEE PDL IMU WHEEL LOADS
OIA BACKWALL
726TW
727
731
732
735TW
745TW
744TW
736TW
737
739
738
1838TL
578
724TW
729
740
741
577
725TW
728
742
743
665
666
667
192
193
194
+28V DC COMP BUS B
+28V DC COMP BUS A
COMPUTER PWR ON LAMP
27 V DC HI COMPUTER
OPT PWR ON LAMP
+28V DC OPTICS BUS B
+28V DC OPTICS BUS A
27 V DC HI OPTICS
G&N PWR XFER "A"
G&N PWR XFER LO
G&N PWR XFER "B"
ISS TURN-ON REQUEST
ISS TURN-ON DELAY COMPLETE
+28V DC STANDBY BUS B
+28V DC STANDBY BUS A
ISS STANDBY ON IND
27 V DC HI ISS STANDBY
IMU OPER INDICATION
+28V DC IMU BUS B
+28 V DC IMU BUS A
27VDC HI ISS OPER IND
27 VDC HI ISS OPERATE
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
GDB
2245
2243
2215
2206
2216
2242
2240
2205
2225
2235
2234
2824
2825
2239
2237
2217
2204
2826
2248
2246
2212
2207
2608
2609
2610
2619
2620
2621
301
302
303
304
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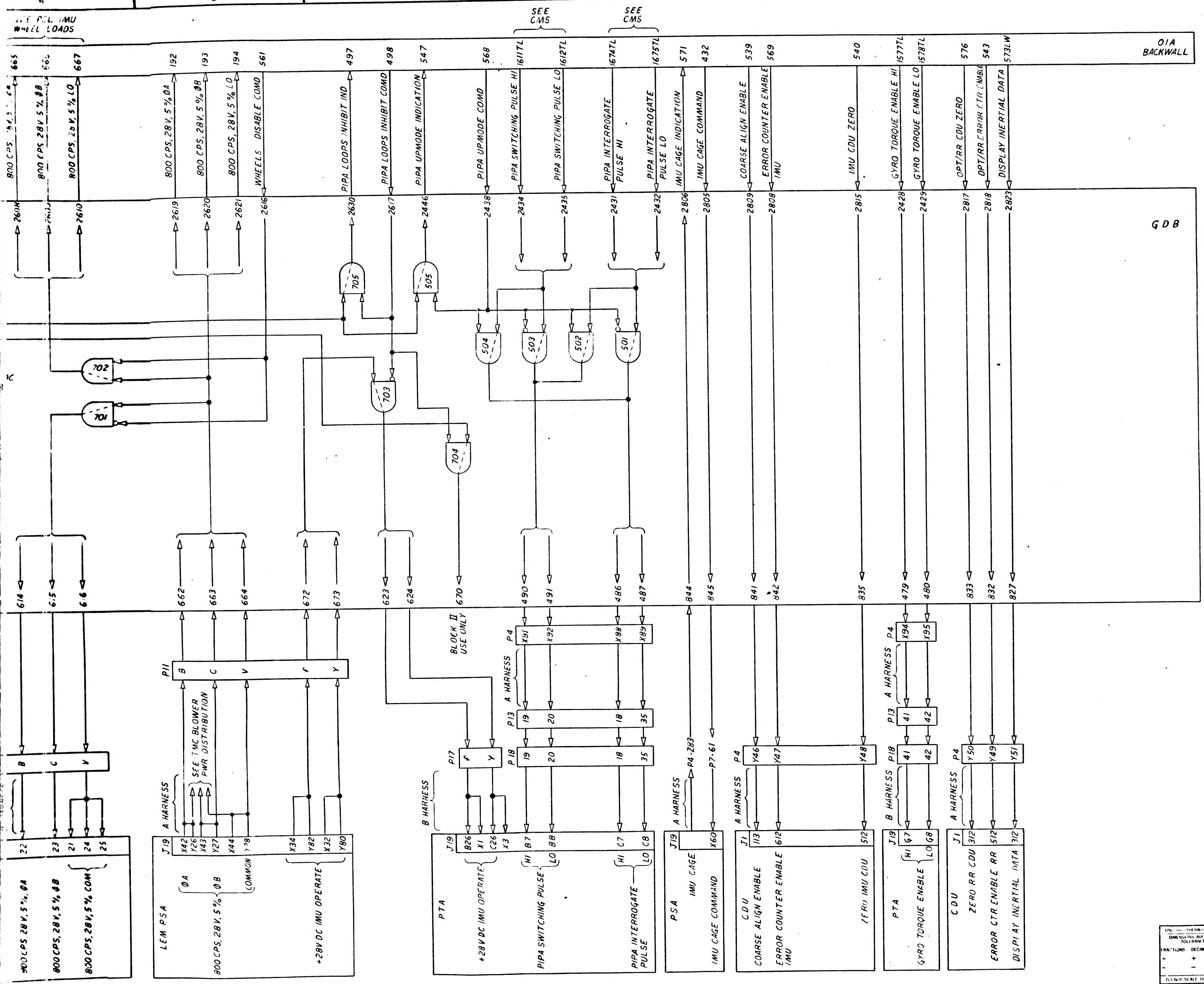
306
307
308
309
310
311
312
313
314
315
316
317
318
319
701
702
LO
HI
SEE FTR 27VDC RLP PWR DISTR
LO
HI
SEE FTR G&N +28V DC PWR DISTR
281
276
279
274
270
265
268
263
826
825
260
254
257
252
824
291
287
289
290
284
285
614
615
616
662
663
664
P
HARNESS
BLOCK II GUIDANCE COMPUTER
+28 V DC CGC BUS B
+28 V DC CGC BUS A
BLOCK II PSA
+28 V DC OPTICS BUS B
+28 V DC OPTICS BUS A
ISS TURN-ON REQUEST
ISS TURN-ON DELAY COMPLETE
+28 V DC IMU STANDBY BUS B
+28 V DC IMU STANDBY BUS A
CDU
IMU OPERATE DISCRETE
BLOCK II PSA
+28V DC IMU OPERATE BUS B
+28V DC IMU OPERATE BUS A
IMU
800 CPS, 28 V, 5%, ØA
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% COM
BLOCK II PSA
ØA
ØB
COMMON
2900201
REV LTR F
SH 4

1/2900201

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP MCM
B		REVISION STATUS CHANGED		7 [illegible] 65	MCM
C		REVISION STATUS CHANGED		8 [illegible] 65	MCM
D		REVISION STATUS CHANGED		9 JUL 65	RLP
E		REVISION STATUS CHANGED		31 AUG 65	RLP
F		REVISED PER TDRR 21899		1 SEP 65	RLP


SEE PGL IMU WHEEL LOADS
665
667
800 CPS 28V 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
2611
2610
192
193
194
561
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
2619
2620
2621
2616
497
498
547
PIPA LOOPS INHIBIT IND
PIPA LOOPS INHIBIT COMD
PIPA UPMODE INDICATION
2630
2617
2446
SEE CMS
568
1611TL
1612TL
PIPA UPMODE COMD
PIPA SWITCHING PULSE HI
PIPA SWITCHING PULSE LO
2438
2434
2435
SEE CMS
1674TL
1675TL
PIPA INTERROGATE PULSE HI
PIPA INTERROGATE PULSE LO
2431
2432
571
432
IMU CAGE INDICATION
IMU CAGE COMMAND
2806
2805
539
569
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
2809
2808
540
IMU CDU ZERO
2815
1577TL
1578TL
GYRO TORQUE ENABLE HI
GYRO TORQUE ENABLE LO
2428
2429
576
543
573LW
OPT/RR CDU ZERO
OPT/RR ERROR CTR ENABLE
DISPLAY INERTIAL DATA
2817
2818
2823
OIA BACKWALL
GDB
705
505
504
503
502
501
702
701
703
704
614
615
616
662
663
664
672
673
623
624
670
490
491
486
487
844
845
841
842
835
479
480
833
832
827
BLOCK II USE ONLY
P4
X91
X92
X88
X89
A HARNESS
P13
19
20
18
35
P18
19
20
18
35
P11
B
C
V
F
Y
SEE TMC BLOWER PWR DISTRIBUTION
A HARNESS
B
C
V
22
23
21
24
25
800 CPS 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% COM
J19
X42
X26
X43
Y27
X44
Y28
X34
Y82
X32
Y80
LEM PSA
ØA
ØB
800 CPS, 28V, 5%
COMMON
+28V DC IMU OPERATE
P17
F
Y
B HARNESS
J19
B26
X1
C26
X3
B7
B8
C7
C8
HI
LO
HI
LO
PTA
+28V DC IMU OPERATE
PIPA SWITCHING PULSE
PIPA INTERROGATE PULSE
A HARNESS
P4-283
P7-61
J19
X60
PSA
IMU CAGE
IMU CAGE COMMAND
P4
Y46
Y47
Y48
A HARNESS
J1
113
612
512
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
ZERO IMU CDU
P4
X94
X95
A HARNESS
P13
41
42
P18
41
42
B HARNESS
J19
G7
G8
HI
LO
PTA
GYRO TORQUE ENABLE
P4
Y50
Y49
Y51
A HARNESS
J1
312
512
312
CDU
ZERO RR CDU
ERROR CTR ENABLE RR
DISPLAY INERTIAL DATA
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+	+	+
−	−	−

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS [illegible]

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Bender DATE 11-MAY-65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

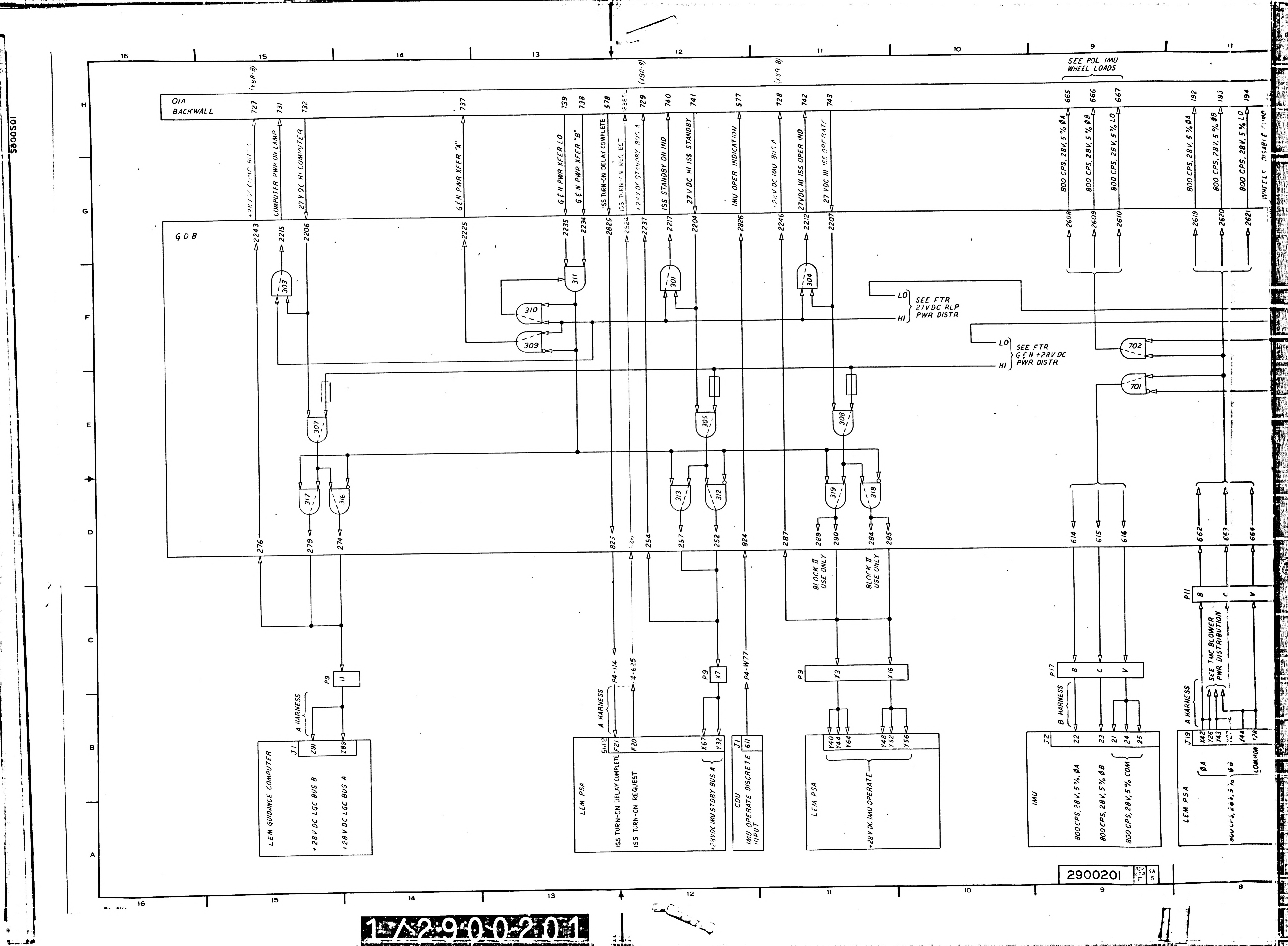
MECHANIZATION DIAGRAM
TEST CONTROL PANEL
(LEM)

CODE IDENT NO 99974
SIZE J2
2900201
SCALE
SHEET [illegible] OF 5

2900201 F B

2900201 F 5

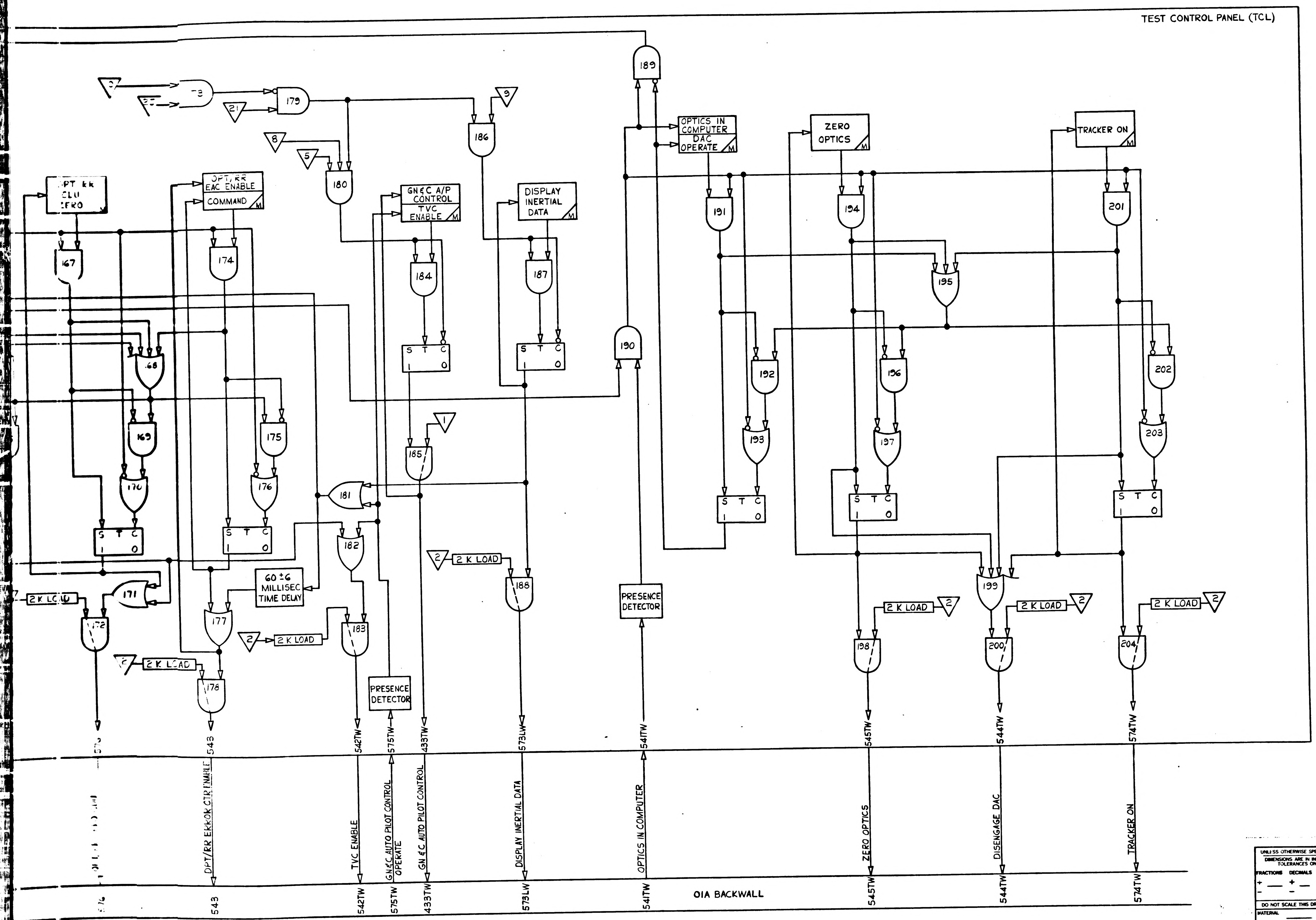
2/2900201



5800501
OIA BACKWALL
GDB
(X8A-8)
727
731
732
737
739
738
578
729
740
741
577
728
742
743
665
666
667
192
193
194
SEE POL IMU WHEEL LOADS
+28V DC COMP BUS
COMPUTER PWR ON LAMP
27 V DC HI COMPUTER
G&N PWR XFER "A"
G&N PWR XFER LO
G&N PWR XFER "B"
ISS TURN-ON DELAY COMPLETE
ISS TURN-ON REQ. EQT
+28V DC STANDBY BUS A
ISS STANDBY ON IND
27 V DC HI ISS STANDBY
IMU OPER INDICATION
+28V DC IMU BUS A
27VDC HI ISS OPER IND
27 VDC HI ISS OPERATE
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
2243
2215
2206
2225
2235
2234
2825
2824
2237
2217
2204
2826
2246
2212
2207
2608
2609
2610
2619
2620
2621
303
311
310
309
301
304
307
305
308
317
316
313
312
319
318
702
701
LO
HI
SEE FTR 27VDC RLP PWR DISTR
SEE FTR G&N +28V DC PWR DISTR
276
279
274
825
826
254
257
252
824
287
289
290
284
285
614
615
616
662
663
664
BLOCK II USE ONLY
BLOCK II USE ONLY
P9
11
A HARNESS
J1
291
289
LEM GUIDANCE COMPUTER
+28 V DC LGC BUS B
+28 V DC LGC BUS A
P4-114
4-625
P9
X7
P4-W77
A HARNESS
SHT2
F21
F20
X67
Y32
LEM PSA
ISS TURN-ON DELAY COMPLETE
ISS TURN-ON REQUEST
+28VDC IMU STDBY BUS A
J1
611
CDU
IMU OPERATE DISCRETE INPUT
P9
X3
X16
Y40
Y44
Y64
Y48
Y52
Y56
LEM PSA
+28V DC IMU OPERATE
P17
B
C
V
B HARNESS
J2
22
23
21
24
25
IMU
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% COM
P11
B
C
V
SEE TMC BLOWER PWR DISTRIBUTION
A HARNESS
J19
X42
Y26
X43
X44
Y28
ØA
COMMON
800 CPS, 28V, 5%
LEM PSA
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
2900201
REV LTR F
SH 5

1/2900201

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 65	
B		REVISION STATUS CHANGED		JUL 65	
C		REVISION STATUS CHANGED		8 JUL 65	
D		REVISION STATUS CHANGED		9 JUL 65	
E		REVISION STATUS CHANGED		31 AUG 65	
F		REVISION STATUS CHANGED		1 SEP 65	
G		REVISION STATUS CHANGED		2 SEP 65	


TEST CONTROL PANEL (TCL)
OPT/RR CLU ZERO
OPT/RR EAC ENABLE COMMAND M
GN&C A/P CONTROL TVC ENABLE M
DISPLAY INERTIAL DATA M
OPTICS IN COMPUTER DAC OPERATE M
ZERO OPTICS M
TRACKER ON M
167
168
169
170
171
172
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
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200
201
202
203
204
S T C 1 0
60 ± 6 MILLISEC TIME DELAY
PRESENCE DETECTOR
2 K LOAD
542TW
575TW
433TW
573LW
541TW
545TW
544TW
574TW
543
OPT/RR ERROR CTR ENABLE
TVC ENABLE
GN&C AUTO PILOT CONTROL OPERATE
GN&C AUTO PILOT CONTROL
DISPLAY INERTIAL DATA
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
01A BACKWALL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ___ ± ___ ± ___ DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN R. Schwalk DATE 10 MAY 65 CHECKED 17 MAY 65 APPROVAL APPROVAL	MANNED SPACECRAFT CENTER HOUSTON TEXAS	MECHANIZATION DIAGRAM – TEST CONTROL PANEL (BLOCK II & LEM)
MATERIAL ___	NASA APPROVAL	CODE IDENT NO 99974	SIZE D2 2300201
CONTRACT NAS 9-497	MIT APPROVAL	SCALE NONE	SHEET 1 OF 5

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS
   - 2900203 – TEMPERATURE MONITOR & CONTROL PANEL (TMC)
   - 2900208 – POWER AND DUMMY LOAD PANEL-PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL, PSS)
   - 2900223 – GIMBAL POSITION CONTROL PANEL (GPC)
   - 2900207 – MONITOR PANEL (MPL)
   - 2900209 – COMPUTER SIMULATOR INTERFACE (CMS)
   - 2900206 – TEST SELECTOR PANEL (TES)
   - 29002.7 – SIGNAL SELECTOR AND MEASUREMENT
     - CROSSBAR – AC SIGNALS (XBR-A)
     - CROSSBAR – DC SIGNALS (XBR-B)
   - 29002 8 – OSCILLOGRAPH SIGNAL SELECTION
     - TO FIXED DC CHANNEL (RSS-B)
     - TO SWITCHABLE AC CHANNEL (RSS-C)
   - 2900200 – GYRO CAGING PANEL (GCP)
   - 2900210 – AC POWER PROTECTION PANEL AND POWER DISTRIBUTION (FTR)
     - RELAY AND LAMP POWER SUPPLY (RLP)
   - 2900213 – GSE GROUNDING
4. NON STANDARD SYMBOLOGY
   - INDICATES "AND" GATE WITH SWITCHED SIGNAL
   - NAME / NAME M — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
   - NAME / NAME A — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION)
   - NAME M — INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
   - NAME A — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
   - NAME M — INDICATES UNLIGHTED PUSHBUTTON (MOMENTARY ACTION)
   - NAME — INDICATES INDICATOR LIGHT
5. T, W, AND L SUFFIXES ON INTERFACE NUMBERS DENOTE FUNCTIONAL USAGE OF THAT INTERFACE. INTERPRET AS FOLLOWS:
   - T – UNIQUE TO BLOCK II CONFIGURATION
   - W – UNIQUE TO BLOCK I SERIES 100 CONFIGURATION
   - L – UNIQUE TO LEM CONFIGURATION
   - TW, TL, OR LW – COMMON TO THE TWO INDICATED CONFIGURATIONS
   - NO SUFFIX – COMMON TO ALL THREE CONFIGURATIONS
6. ALL TIME DELAYS SHALL HAVE RESET TIMES OF 20 MS OR LESS.
7. SIGNAL REFERENCE:
   - ▽1 = G & N + 28 VDC HI
   - ▽2 = G & N + 28 VDC LO
   - ▽3 = 27 VDC HI OIA ON
   - ▽4 = 27 VDC RLP LO
   - ▽5 = OPTICS POWER ON
   - ▽6 = CGC/LGC POWER ON
   - ▽7 = OSS LEVEL TEST

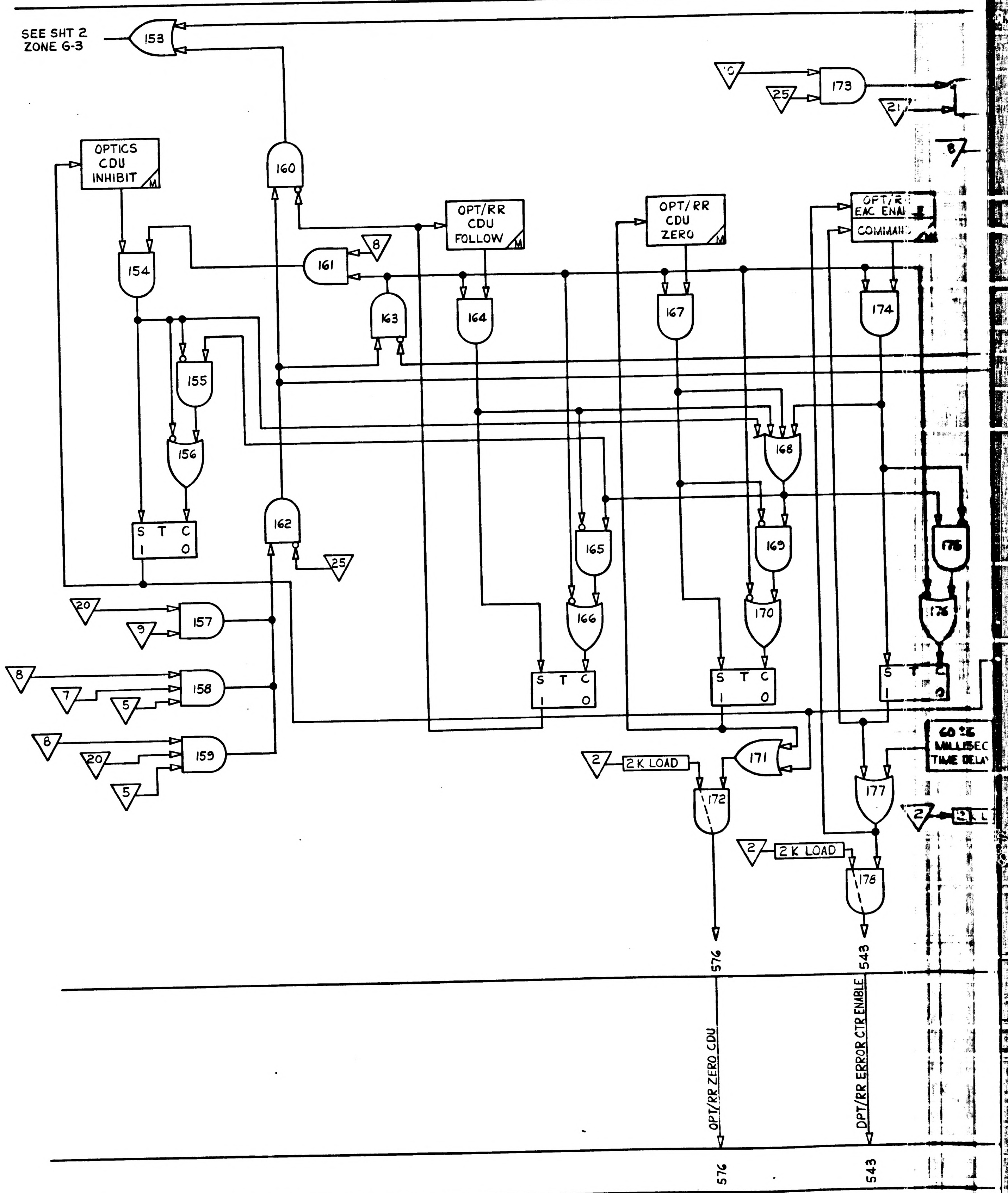
SIGNAL REFERENCE (CONT.)

- ▽8 = BLOCK II TEST CONFIG
- ▽9 = LEM TEST CONFIG
- ▽10 = ISS LEVEL TEST
- ▽11 = ISS STANDBY
- ▽12 = GYRO TORQUING ENABLED
- ▽13 = PIPA LOOPS INHIBITED
- ▽14 = ISS LEVEL STANDBY
- ▽15 = ISS LEVEL OPERATE
- ▽16 = ISS OPERATE
- ▽17 = WHEELS STOPPED
- ▽18 = SELECT COARSE ALIGN
- ▽19 = ENABLE WHEELS OFF
- ▽20 = ISS LEVEL OPERATE + 90 SEC
- ▽21 = OPERATE + 90 SEC
- ▽22 = OSS LEVEL OPTICS POWER ON
- ▽23 = TURN ON-LOOPS CLOSED
- ▽24 = TURN ON-LOOPS OPEN
- ▽25 = MASTER RESET DEPRESSED

8. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

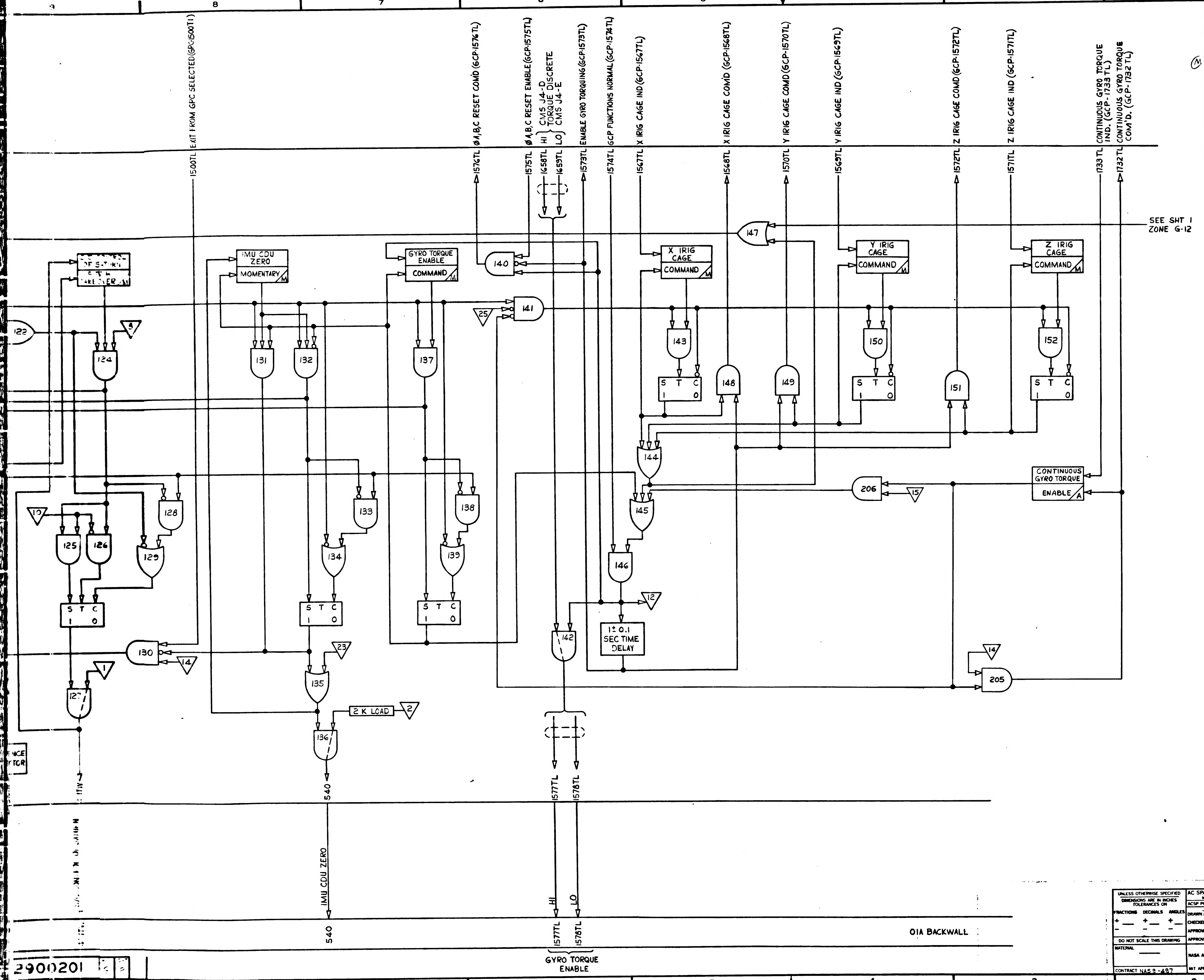
BLOCK II	SH 3	SH 2	SH 1
		SH 4	
LEM	SH 3	SH 2	SH 1
		SH 5	

9. *AS A DESIGN GOAL, THE INTERCONNECTIONS BETWEEN THE A/B COMPONENT AND THE GSE WILL BE MAINTAINED AS INTERFACE DEVICES.*


SEE SHT 2
ZONE G-3
153
OPTICS CDU INHIBIT M
160
OPT/RR CDU FOLLOW M
OPT/RR CDU ZERO M
OPT/RR EAC ENA COMMAND
154
161
8
163
164
167
174
173
10
25
21
8
155
156
S T C 1 0
162
25
165
166
168
169
170
175
176
20
9
157
8
7
5
158
8
20
5
159
2
2K LOAD
171
172
60 ± 5 MILLISEC TIME DELAY
177
2
2K LOAD
178
576
543
OPT/RR ZERO CDU
OPT/RR ERROR CTR ENABLE

2900201	REV. S	SH. 1

1/2900201


EXIT FROM GPC SELECTED (GPC-1500TL)
1500TL
Ø A,B,C RESET COMD (GCP-1576TL)
1576TL
Ø A,B,C RESET ENABLE (GCP-1575TL)
1575TL
HI CMS J4-D
TORQUE DISCRETE
LO CMS J4-E
1658TL
1659TL
ENABLE GYRO TORQUING (GCP-1573TL)
1573TL
GCP FUNCTIONS NORMAL (GCP-1574TL)
1574TL
X IRIG CAGE IND (GCP-1567TL)
1567TL
X IRIG CAGE COMD (GCP-1568TL)
1568TL
Y IRIG CAGE COMD (GCP-1570TL)
1570TL
Y IRIG CAGE IND (GCP-1569TL)
1569TL
Z IRIG CAGE COMD (GCP-1572TL)
1572TL
Z IRIG CAGE IND (GCP-1571TL)
1571TL
CONTINUOUS GYRO TORQUE IND. (GCP-1733TL)
1733 TL
CONTINUOUS GYRO TORQUE COM'D. (GCP-1732TL)
1732TL
SEE SHT 1 ZONE G-12
147
IMU CDU ZERO
MOMENTARY
GYRO TORQUE ENABLE
COMMAND
X IRIG CAGE
COMMAND
Y IRIG CAGE
COMMAND
Z IRIG CAGE
COMMAND
140
141
25
122
124
131
132
137
143
148
149
150
151
152
S T C
1 0
144
206
15
CONTINUOUS GYRO TORQUE
ENABLE
10
125
126
128
129
133
134
138
139
145
146
12
1± 0.1 SEC TIME DELAY
142
130
14
23
135
136
2 K LOAD
2
127
1
205
540
IMU CDU ZERO
1577TL
1578TL
HI
LO
GYRO TORQUE ENABLE
01A BACKWALL
M
A

REVISIONS

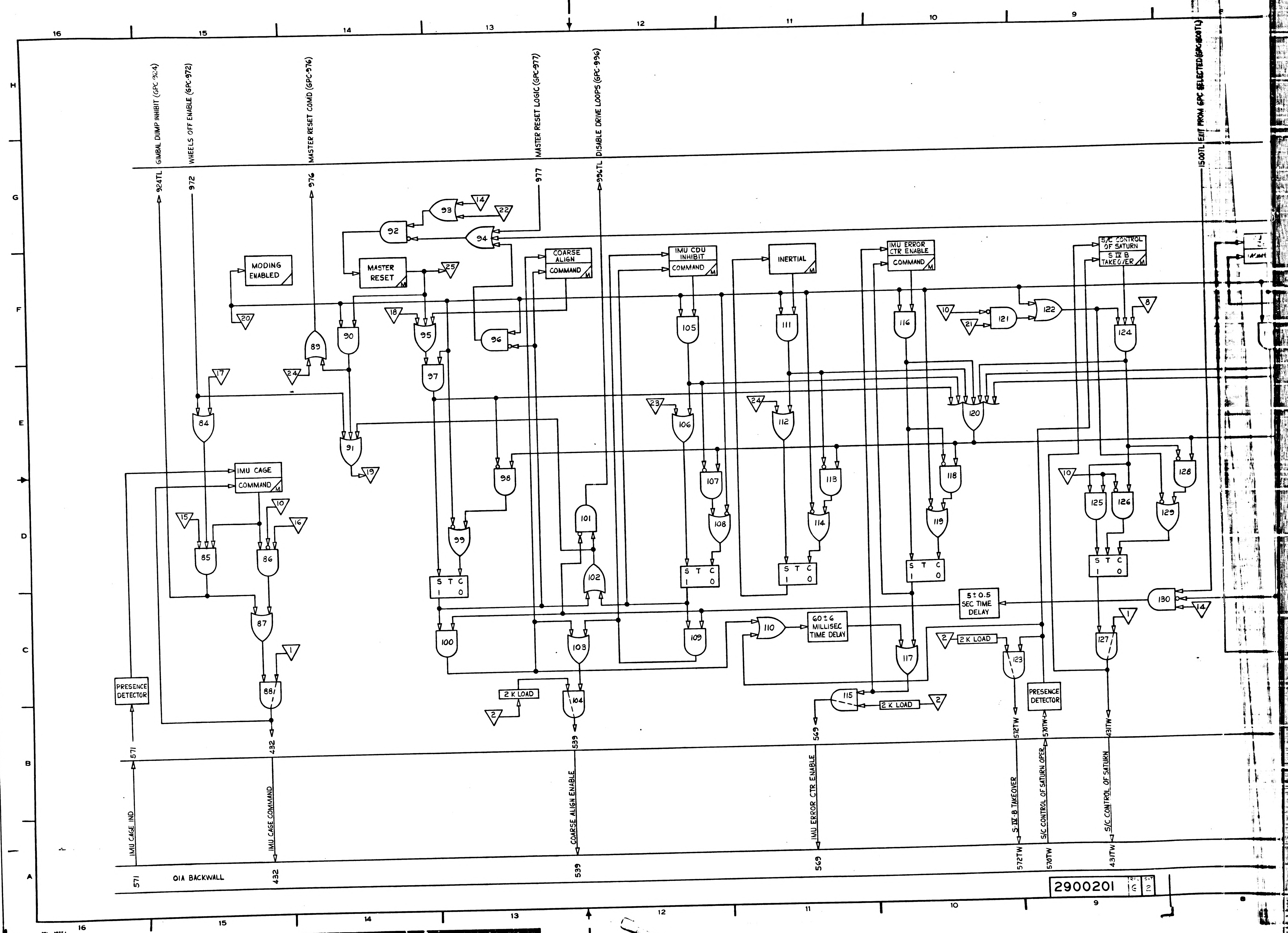
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20489		2 65	
B		REVISION STATUS CHANGED	—	7 JUL 65	
C		REVISION STATUS CHANGED	—	8 65	
D		REVISION STATUS CHANGED		9 JUL 65	
E		REVISION STATUS CHANGED		31 AUG 65	
F		REVISION STATUS CHANGED		1 SEP 65	
G		REVISION STATUS CHANGED		2 SEP 65	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN R. Schwalke DATE 7 MAY 65 CHECKED 17 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM – TEST CONTROL PANEL (BLOCK II & LEM)
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 2900201
CONTRACT NAS 9-497	MIT APPROVAL	SCALE NONE · SHEET 2 OF 5

2900201 G

2900201

2/2900201


GIMBAL DUMP INHIBIT (GPC-924)
WHEELS OFF ENABLE (GPC-972)
MASTER RESET COMD (GPC-976)
MASTER RESET LOGIC (GPC-977)
DISABLE DRIVE LOOPS (GPC-996)
1500TL EXIT FROM GPC SELECTED (GPC-1500TL)
924TL
972
976
977
996TL
MODING ENABLED
MASTER RESET
COARSE ALIGN
COMMAND
IMU CDU INHIBIT
COMMAND
INERTIAL
IMU ERROR CTR ENABLE
COMMAND
S/C CONTROL OF SATURN
S IV B TAKEOVER
IMU CAGE
COMMAND
5 ± 0.5 SEC TIME DELAY
60 ± 6 MILLISEC TIME DELAY
2 K LOAD
PRESENCE DETECTOR
S T C
1 0
84
85
86
87
881
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
571
432
539
569
572TW
570TW
431TW
IMU CAGE IND
IMU CAGE COMMAND
COARSE ALIGN ENABLE
IMU ERROR CTR ENABLE
S-IV-B TAKEOVER
S/C CONTROL OF SATURN OPER.
S/C CONTROL OF SATURN
01A BACKWALL
16
15
14
13
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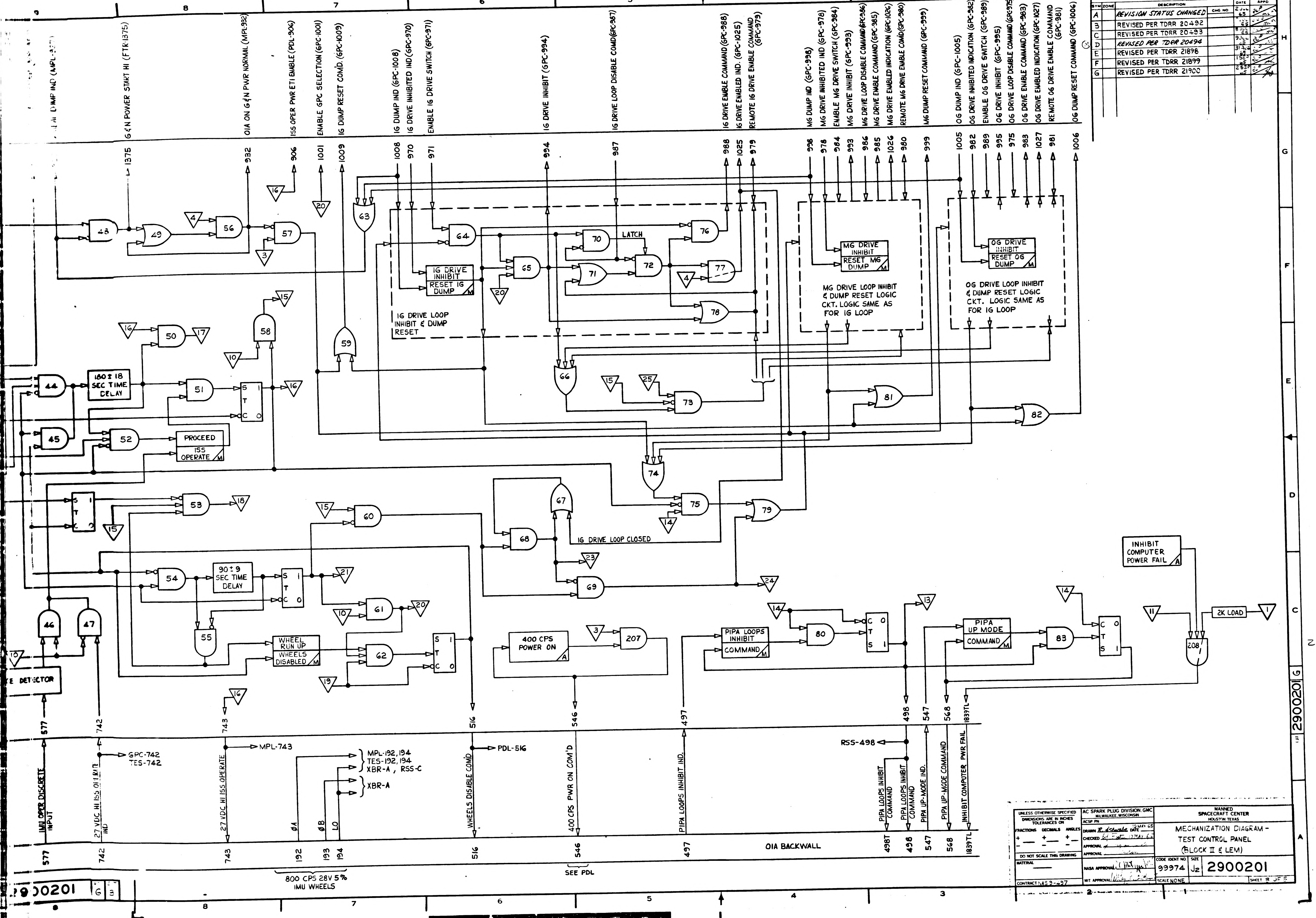
2900201 REV G SHT 2

1/2900201


9
8
7
6
5
4
3
2
1
IMU DUMP IND (MPL-327)
G & N POWER START HI (FTR-1375)
OIA ON G & N PWR NORMAL (MPL-932)
ISS OPER PWR ETI ENABLE (PDL-906)
ENABLE GPC SELECTION (GPC-1001)
IG DUMP RESET COMD. (GPC-1009)
IG DUMP IND (GPC-1008)
IG DRIVE INHIBITED IND (GPC-970)
ENABLE IG DRIVE SWITCH (GPC-971)
IG DRIVE INHIBIT (GPC-994)
IG DRIVE LOOP DISABLE COMD (GPC-987)
IG DRIVE ENABLE COMMAND (GPC-988)
IG DRIVE ENABLED IND. (GPC-1025)
REMOTE IG DRIVE ENABLE COMMAND (GPC-979)
MG DUMP IND (GPC-998)
MG DRIVE INHIBITED IND (GPC-978)
ENABLE MG DRIVE SWITCH (GPC-984)
MG DRIVE INHIBIT (GPC-993)
MG DRIVE LOOP DISABLE COMMAND (GPC-986)
MG DRIVE ENABLE COMMAND (GPC-985)
MG DRIVE ENABLED INDICATION (GPC-1026)
REMOTE MG DRIVE ENABLE COMD (GPC-980)
MG DUMP RESET COMMAND (GPC-999)
OG DUMP IND (GPC-1005)
OG DRIVE INHIBITED INDICATION (GPC-982)
ENABLE OG DRIVE SWITCH (GPC-989)
OG DRIVE INHIBIT (GPC-995)
OG DRIVE LOOP DISABLE COMMAND (GPC-975)
OG DRIVE ENABLE COMMAND (GPC-983)
OG DRIVE ENABLED INDICATION (GPC-1027)
REMOTE OG DRIVE ENABLE COMMAND (GPC-981)
OG DUMP RESET COMMAND (GPC-1006)
1375
932
906
1001
1009
1008
970
971
994
987
988
1025
979
998
978
984
993
986
985
1026
980
999
1005
982
989
995
975
983
1027
981
1006
48
49
56
57
63
64
65
70
LATCH
71
72
76
77
78
IG DRIVE INHIBIT
RESET IG DUMP
M
IG DRIVE LOOP INHIBIT & DUMP RESET
MG DRIVE INHIBIT
RESET MG DUMP
M
MG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
OG DRIVE INHIBIT
RESET OG DUMP
M
OG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
44
180 ± 18 SEC TIME DELAY
45
50
51
52
58
59
66
73
74
75
79
81
82
PROCEED
ISS OPERATE
M
S
T
C
I
O
53
54
90 ± 9 SEC TIME DELAY
55
60
61
62
67
68
69
IG DRIVE LOOP CLOSED
46
47
E DETECTOR
WHEEL RUN UP
WHEELS DISABLED
M
400 CPS POWER ON
A
207
PIPA LOOPS INHIBIT
COMMAND
M
80
PIPA UP MODE
COMMAND
M
83
INHIBIT COMPUTER POWER FAIL
A
2K LOAD
208
3
10
11
13
14
15
16
17
19
20
21
23
24
25
1
577
742
743
516
546
497
498
547
568
1839TL
IMU OPER DISCRETE INPUT
27 VDC HI ISS OPERATE IND
GPC-742
TES-742
27 VDC HI ISS OPERATE
MPL-743
ØA
ØB
LO
MPL-192, 194
TES-192, 194
XBR-A, RSS-C
XBR-A
WHEELS DISABLE COMD
PDL-516
400 CPS PWR ON COM'D
PIPA LOOPS INHIBIT IND.
RSS-498
PIPA LOOPS INHIBIT COMMAND
PIPA UP-MODE IND.
PIPA UP-MODE COMMAND
INHIBIT COMPUTER PWR FAIL
577
742
743
192
193
194
516
546
497
OIA BACKWALL
498T
498
547
568
1839TL
800 CPS 28V 5% IMU WHEELS
SEE PDL
2900201
G
3
H
G
F
E
D
C
A
2900201 G

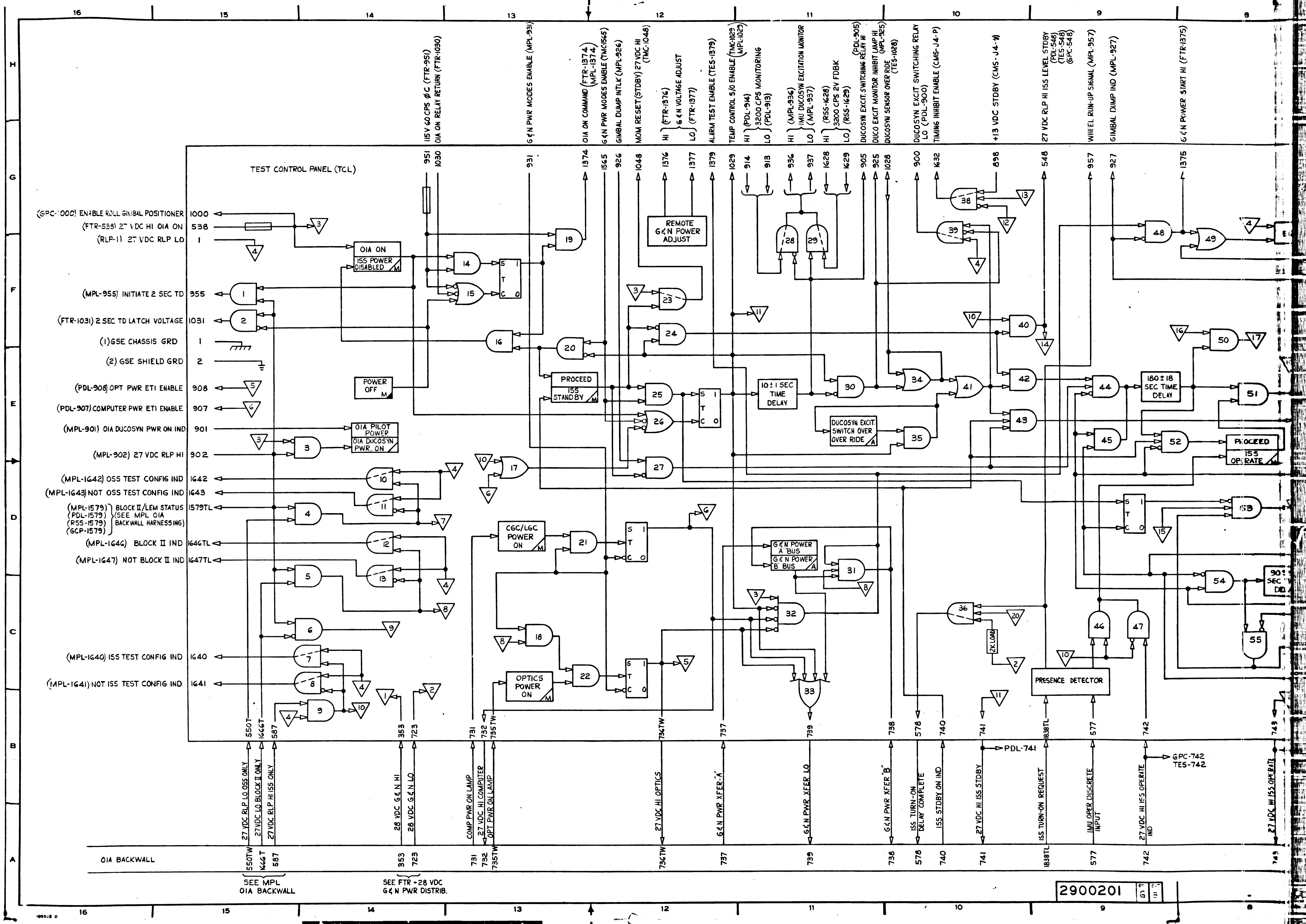
REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	
B		REVISED PER TDRR 20492		JUL 65	
C		REVISED PER TDRR 20493		8 JUL 65	
D		REVISED PER TDRR 20494		9 JUL 65	
E		REVISED PER TDRR 21898		31 AUG 65	
F		REVISED PER TDRR 21899		1 SEP 65	
G		REVISED PER TDRR 21900		2 SEP 65	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS		
	ACSP PN			
	DRAWN R. Schwabe DATE 10 MAY 65 CHECKED Ed Foster 17 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM - TEST CONTROL PANEL (BLOCK II & LEM)		
DO NOT SCALE THIS DRAWING				
MATERIAL ___	NASA APPROVAL	CODE IDENT NO. 99974	SIZE J2	2900201
CONTRACT NAS 9-497	MIT APPROVAL	SCALE NONE		SHEET 3 OF 5

2H

2-/2900201


TEST CONTROL PANEL (TCL)
(GPC-1000) ENABLE ROLL GIMBAL POSITIONER 1000
(FTR-538) 27 VDC HI OIA ON 538
(RLP-1) 27 VDC RLP LO 1
(MPL-955) INITIATE 2 SEC TD 955
(FTR-1031) 2 SEC TD LATCH VOLTAGE 1031
(1) GSE CHASSIS GRD 1
(2) GSE SHIELD GRD 2
(PDL-908) OPT PWR ETI ENABLE 908
(PDL-907) COMPUTER PWR ETI ENABLE 907
(MPL-901) OIA DUCOSYN PWR ON IND 901
(MPL-902) 27 VDC RLP HI 902
(MPL-1642) OSS TEST CONFIG IND 1642
(MPL-1643) NOT OSS TEST CONFIG IND 1643
(MPL-1579) (PDL-1579) (RSS-1579) (GCP-1579) BLOCK II/LEM STATUS (SEE MPL OIA BACKWALL HARNESSING) 1579TL
(MPL-1646) BLOCK II IND 1646TL
(MPL-1647) NOT BLOCK II IND 1647TL
(MPL-1640) ISS TEST CONFIG IND 1640
(MPL-1641) NOT ISS TEST CONFIG IND 1641
115V 60 CPS ØC (FTR-951)
OIA ON RELAY RETURN (FTR-1030)
G&N PWR MODES ENABLE (MPL-931)
OIA ON COMMAND (FTR-1374) (MPL-1374)
G&N PWR MODES ENABLE (TMC-1565)
GIMBAL DUMP INTLK (MPL-926)
MOM RESET (STDBY) 27 VDC HI (TMC-1048)
HI (FTR-1376) G&N VOLTAGE ADJUST LO (FTR-1377)
ALARM TEST ENABLE (TES-1379)
TEMP CONTROL S/O ENABLE (TMC-1029) (MPL-1029)
HI (PDL-914) 3200 CPS MONITORING LO (PDL-913)
HI (MPL-936) IMU DUCOSYN EXCITATION MONITOR LO (MPL-937)
HI (RSS-1628) 3200 CPS 2V FDBK LO (RSS-1629)
DUCOSYN EXCIT. SWITCHING RELAY HI (PDL-905)
DUCO EXCIT MONITOR INHIBIT LAMP HI (MPL-925)
DUCOSYN SENSOR OVER RIDE (TES-1028)
DUCOSYN EXCIT SWITCHING RELAY LO (PDL-900)
TIMING INHIBIT ENABLE (CMS-J4-P)
+13 VDC STDBY (CMS-J4-d)
27 VDC RLP HI ISS LEVEL STDBY (PDL-548) (TES-548) (GPC-548)
WHEEL RUN-UP SIGNAL (MPL-957)
GIMBAL DUMP IND (MPL-927)
G&N POWER START HI (FTR-1375)
951 1030 931 1374 1565 926 1048 1376 1377 1379 1029 914 913 936 937 1628 1629 905 925 1028 900 1632 898 548 957 927 1375
OIA ON
ISS POWER DISABLED M
REMOTE G&N POWER ADJUST
POWER OFF M
PROCEED ISS STANDBY M
OIA PILOT POWER
OIA DUCOSYN PWR. ON
10±1 SEC TIME DELAY
DUCOSYN EXCIT. SWITCH OVER OVER RIDE A
180±18 SEC TIME DELAY
PROCEED ISS OPERATE
CGC/LGC POWER ON M
OPTICS POWER ON M
G&N POWER A BUS
G&N POWER B BUS A
2K LOAD
PRESENCE DETECTOR
90 SEC
S I T C O
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55
550T 1666T 587 353 723 731 732 735TW 736TW 737 739 738 578 740 741 1838TL 577 742 743
27 VDC RLP LO OSS ONLY
27 VDC LO BLOCK II ONLY
27 VDC RLP HI ISS ONLY
28 VDC G&N HI
28 VDC G&N LO
COMP PWR ON LAMP
27 VDC HI COMPUTER
OPT PWR ON LAMP
27 VDC HI OPTICS
G&N PWR XFER "A"
G&N PWR XFER LO
G&N PWR XFER "B"
ISS TURN-ON DELAY COMPLETE
ISS STDBY ON IND
27 VDC HI ISS STDBY
PDL-741
ISS TURN-ON REQUEST
IMU OPER DISCRETE INPUT
27 VDC HI ISS OPERATE IND
GPC-742 TES-742
27 VDC HI ISS OPERATE
OIA BACKWALL
550TW 1666T 587 353 723 731 732 735TW 736TW 737 739 738 578 740 741 1838TL 577 742 743
SEE MPL OIA BACKWALL
SEE FTR +28 VDC G&N PWR DISTRIB.
16 15 14 13 12 11 10 9 8
H G F E D C B A
2900201

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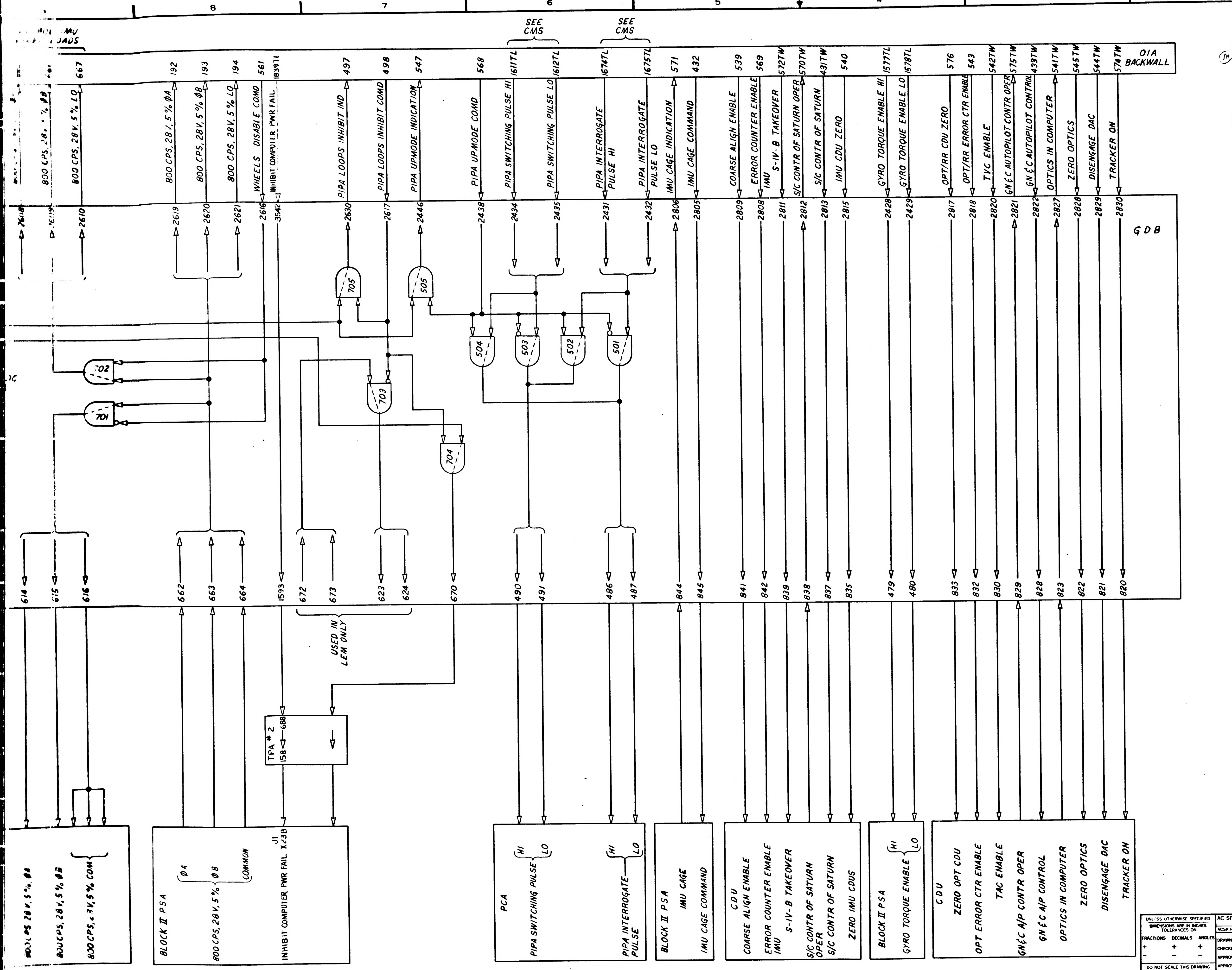

SEE CMS
SEE CMS
01A BACKWALL
GDB
MU LOADS
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
667
2610
192
193
194
561
1839TL
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
INHIBIT COMPUTER PWR FAIL
2619
2620
2621
2616
3542
497
498
547
568
1611TL
1612TL
1674TL
1675TL
571
432
PIPA LOOPS INHIBIT IND
PIPA LOOPS INHIBIT COMD
PIPA UPMODE INDICATION
PIPA UPMODE COMD
PIPA SWITCHING PULSE HI
PIPA SWITCHING PULSE LO
PIPA INTERROGATE PULSE HI
PIPA INTERROGATE PULSE LO
IMU CAGE INDICATION
IMU CAGE COMMAND
2630
2617
2446
2438
2434
2435
2431
2432
2806
2805
539
569
572TW
570TW
431TW
540
1577TL
1578TL
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
S-IV-B TAKEOVER
S/C CONTR OF SATURN OPER
S/C CONTR OF SATURN
IMU CDU ZERO
GYRO TORQUE ENABLE HI
GYRO TORQUE ENABLE LO
2809
2808
2811
2812
2813
2815
2428
2429
576
543
542TW
575TW
433TW
541TW
545TW
544TW
574TW
OPT/RR CDU ZERO
OPT/RR ERROR CTR ENABLE
TVC ENABLE
GN & C AUTOPILOT CONTR OPER
GN & C AUTOPILOT CONTROL
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
2817
2818
2820
2821
2822
2827
2828
2829
2830
705
505
504
503
502
501
702
701
703
704
614
615
616
662
663
664
1593
672
673
623
624
670
490
491
486
487
844
845
841
842
839
838
837
835
479
480
833
832
830
829
828
823
822
821
820
USED IN LEM ONLY
TPA # 2
158
688
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% COM
BLOCK II PSA
ØA
ØB
COMMON
800 CPS, 28V, 5%
J1
X23B
INHIBIT COMPUTER PWR FAIL
PCA
PIPA SWITCHING PULSE
HI
LO
PIPA INTERROGATE PULSE
HI
LO
BLOCK II PSA
IMU CAGE
IMU CAGE COMMAND
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
S-IV-B TAKEOVER
S/C CONTR OF SATURN OPER
S/C CONTR OF SATURN
ZERO IMU CDUS
BLOCK II PSA
GYRO TORQUE ENABLE
HI
LO
CDU
ZERO OPT CDU
OPT ERROR CTR ENABLE
TAC ENABLE
GN & C A/P CONTR OPER
GN & C A/P CONTROL
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

REVISIONS 1425J

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP
B		REVISION STATUS CHANGED		65	
C		REVISION STATUS CHANGED		8 JUL 65	
Ⓜ D		REVISION STATUS CHANGED		9 JUL 65	
E		REVISION STATUS CHANGED		31 AUG 65	
F		REVISED PER TDRR 21899		SEP 65	
G		REVISED PER TDRR 21900		2 SEP 65	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS + − ANGLES + −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bendel DATE 12-MAY-65
CHECKED Ed Foster 17MAY65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

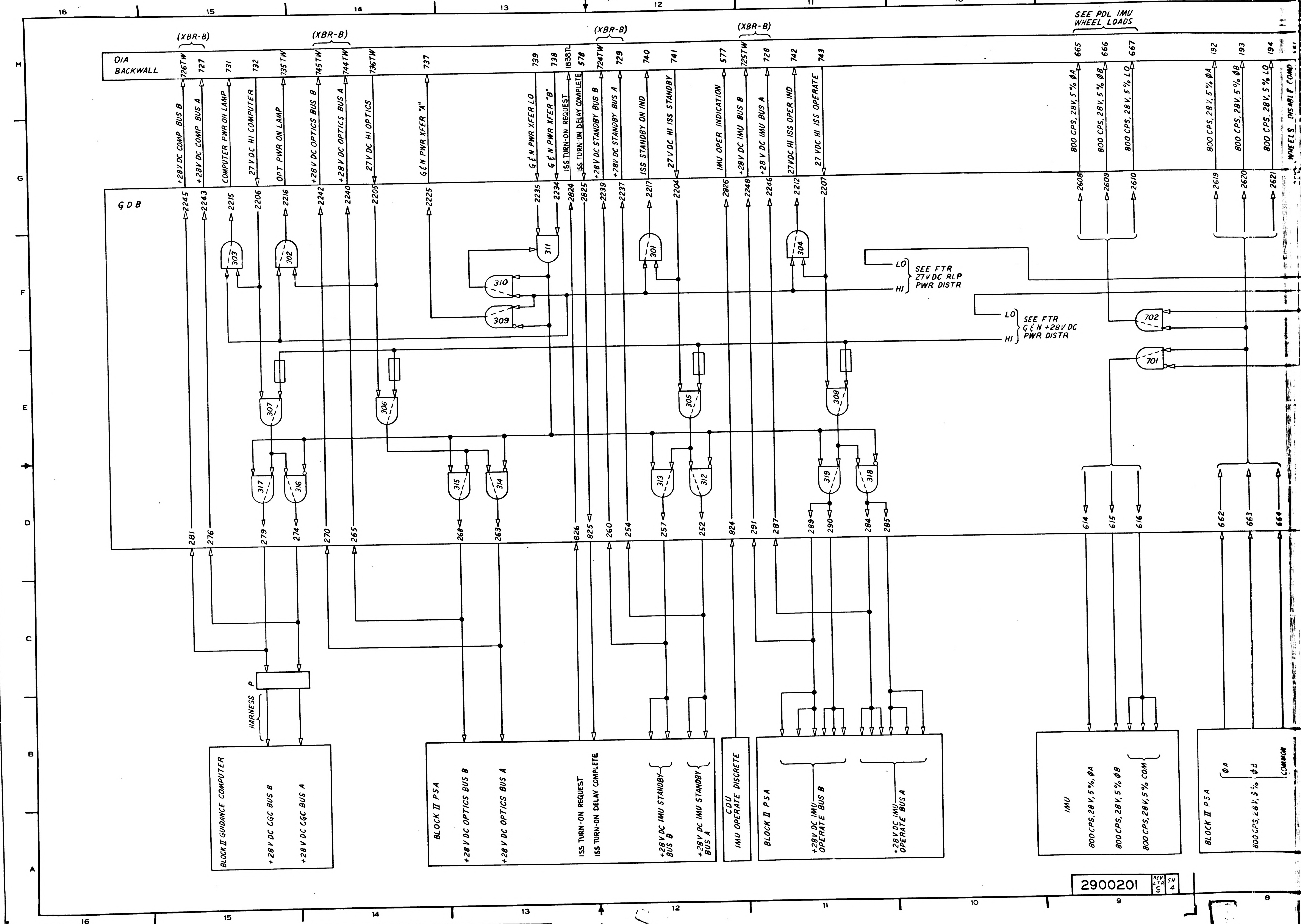
MECHANIZATION DIAGRAM
TEST CONTROL PANEL
(BLOCK II)

CODE IDENT NO. 99974
SIZE J2
2900201
SCALE
SHEET 4 OF 5

2900201 REV G SH 4

2900201 G

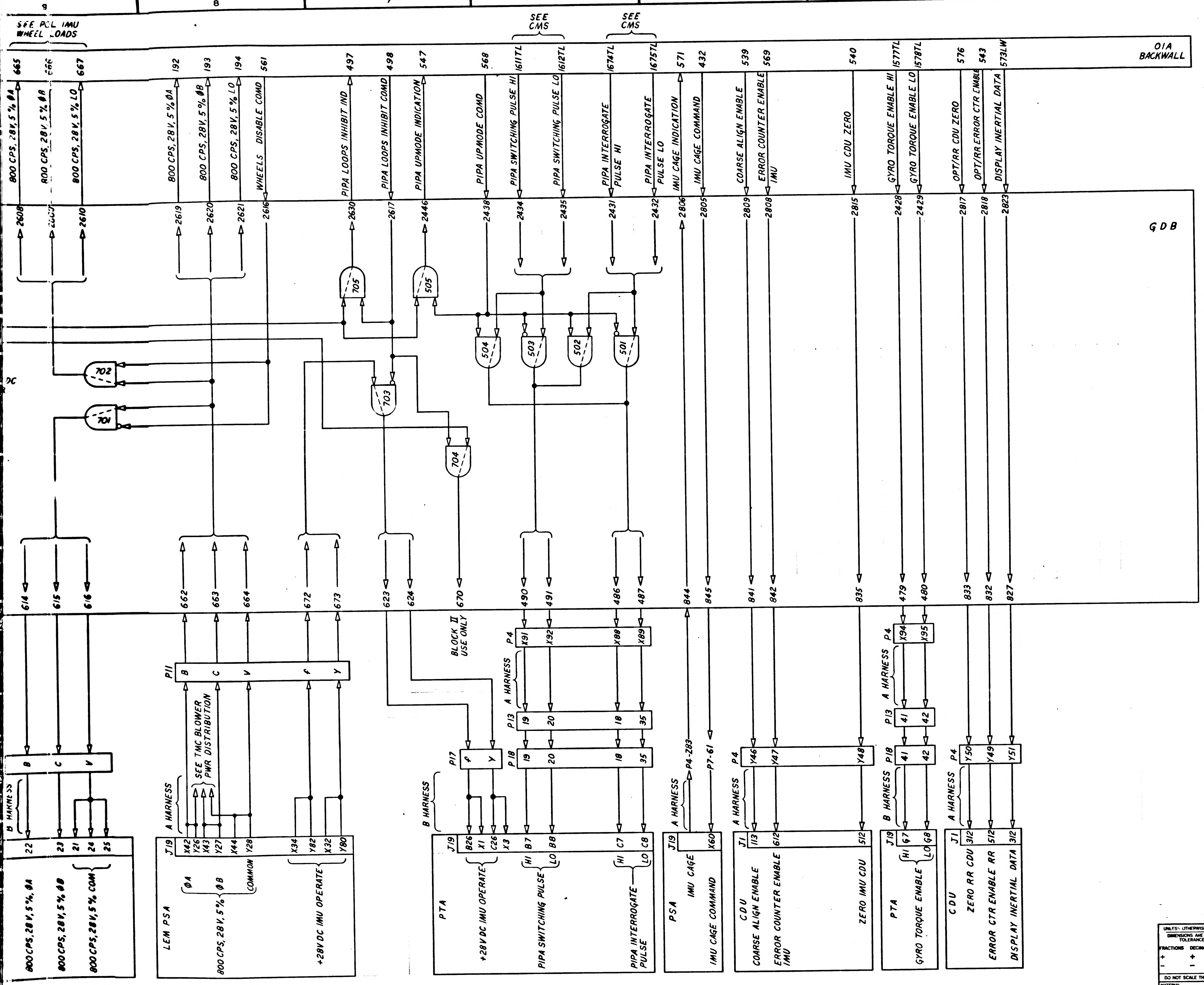
2/2900201


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
(XBR-B)
(XBR-B)
(XBR-B)
(XBR-B)
SEE PDL IMU WHEEL LOADS
OIA BACKWALL
726TW
727
731
732
735TW
745TW
744TW
736TW
737
739
738
1838TL
578
724TW
729
740
741
577
725TW
728
742
743
665
666
667
192
193
194
+28V DC COMP BUS B
+28V DC COMP BUS A
COMPUTER PWR ON LAMP
27 V DC HI COMPUTER
OPT PWR ON LAMP
+28 V DC OPTICS BUS B
+28 V DC OPTICS BUS A
27 V DC HI OPTICS
G&N PWR XFER "A"
G&N PWR XFER LO
G&N PWR XFER "B"
ISS TURN-ON REQUEST
ISS TURN-ON DELAY COMPLETE
+28 V DC STANDBY BUS B
+28 V DC STANDBY BUS A
ISS STANDBY ON IND
27 V DC HI ISS STANDBY
IMU OPER INDICATION
+28 V DC IMU BUS B
+28 V DC IMU BUS A
27 VDC HI ISS OPER IND
27 VDC HI ISS OPERATE
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
GDB
2245
2243
2215
2206
2216
2242
2240
2205
2225
2235
2234
2824
2825
2239
2237
2217
2204
2826
2248
2246
2212
2207
2608
2609
2610
2619
2620
2621
303
302
311
310
309
301
304
307
306
305
308
702
701
317
316
315
314
313
312
319
318
LO
HI
SEE FTR 27V DC RLP PWR DISTR
LO
HI
SEE FTR G&N +28V DC PWR DISTR
281
276
279
274
270
265
268
263
826
825
260
254
257
252
824
291
287
289
290
284
285
614
615
616
662
663
664
P
HARNESS
BLOCK II GUIDANCE COMPUTER
+28 V DC CGC BUS B
+28 V DC CGC BUS A
BLOCK II PSA
+28 V DC OPTICS BUS B
+28 V DC OPTICS BUS A
ISS TURN-ON REQUEST
ISS TURN-ON DELAY COMPLETE
+28 V DC IMU STANDBY BUS B
+28 V DC IMU STANDBY BUS A
CDU
IMU OPERATE DISCRETE
BLOCK II PSA
+28 V DC IMU OPERATE BUS B
+28 V DC IMU OPERATE BUS A
IMU
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% COM
BLOCK II PSA
ØA
ØB
COMMON
800 CPS, 28V, 5%
16
15
14
13
12
11
10
9
8

2900201 REV LTR S SH 4

S800501

1/2900201


SEE PCL IMU WHEEL LOADS
665
666
667
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
2608
2609
2610
192
193
194
561
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
2619
2620
2621
2616
497
498
547
PIPA LOOPS INHIBIT IND
PIPA LOOPS INHIBIT COMD
PIPA UPMODE INDICATION
2630
2617
2446
SEE CMS
SEE CMS
568
1611TL
1612TL
1674TL
1675TL
PIPA UPMODE COMD
PIPA SWITCHING PULSE HI
PIPA SWITCHING PULSE LO
PIPA INTERROGATE PULSE HI
PIPA INTERROGATE PULSE LO
2438
2434
2435
2431
2432
571
432
539
569
540
1577TL
1578TL
576
543
573LW
IMU CAGE INDICATION
IMU CAGE COMMAND
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
IMU CDU ZERO
GYRO TORQUE ENABLE HI
GYRO TORQUE ENABLE LO
OPT/RR CDU ZERO
OPT/RR ERROR CTR ENABLE
DISPLAY INERTIAL DATA
2806
2805
2809
2808
2815
2428
2429
2817
2818
2823
OIA BACKWALL
GDB
705
505
504
503
502
501
702
701
703
704
DC
614
615
616
662
663
664
672
673
623
624
670
490
491
486
487
844
845
841
842
835
479
480
833
832
827
BLOCK II USE ONLY
B
C
V
B HARNESS
22
23
21
24
25
800 CPS, 28V, 5%, ØA
800 CPS, 28V, 5%, ØB
800 CPS, 28V, 5%, COM
P11
B
C
V
f
Y
SEE TMC BLOWER PWR DISTRIBUTION
A HARNESS
J19
X42
Y26
X43
Y27
X44
Y28
X34
Y82
X32
Y80
LEM PSA
ØA
ØB
COMMON
800 CPS, 28V, 5%
+28V DC IMU OPERATE
P17
f
Y
B HARNESS
P4
X91
X92
X88
X89
A HARNESS
P13
19
20
18
35
P18
19
20
18
35
J19
B26
X1
C26
X3
B7
B8
C7
C8
PTA
+28V DC IMU OPERATE
HI
LO
PIPA SWITCHING PULSE
HI
LO
PIPA INTERROGATE PULSE
P4-283
P7-61
A HARNESS
J19
X60
PSA
IMU CAGE
IMU CAGE COMMAND
P4
Y46
Y47
Y48
A HARNESS
J1
113
612
512
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
ZERO IMU CDU
P4
X94
Y95
A HARNESS
P13
41
42
P18
41
42
B HARNESS
J19
G7
G8
HI
LO
PTA
GYRO TORQUE ENABLE
P4
Y50
Y49
Y51
A HARNESS
J1
312
312
312
CDU
ZERO RR CDU
ERROR CTR ENABLE RR
DISPLAY INERTIAL DATA
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	ELP MEM
B		REVISION STATUS CHANGED		7 JUL 65	MEM
C		REVISION STATUS CHANGED		8 JUL 65	MEM
D		REVISION STATUS CHANGED		9 JUL 65	ELP
E		REVISION STATUS CHANGED		31 AUG 65	ELP
F		REVISED PER TDRR 21899		SEP 65	ELP
G		REVISED PER TDRR 21900		2 SEP 65	ELP

REVISIONS 19254

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 11-MAY-65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

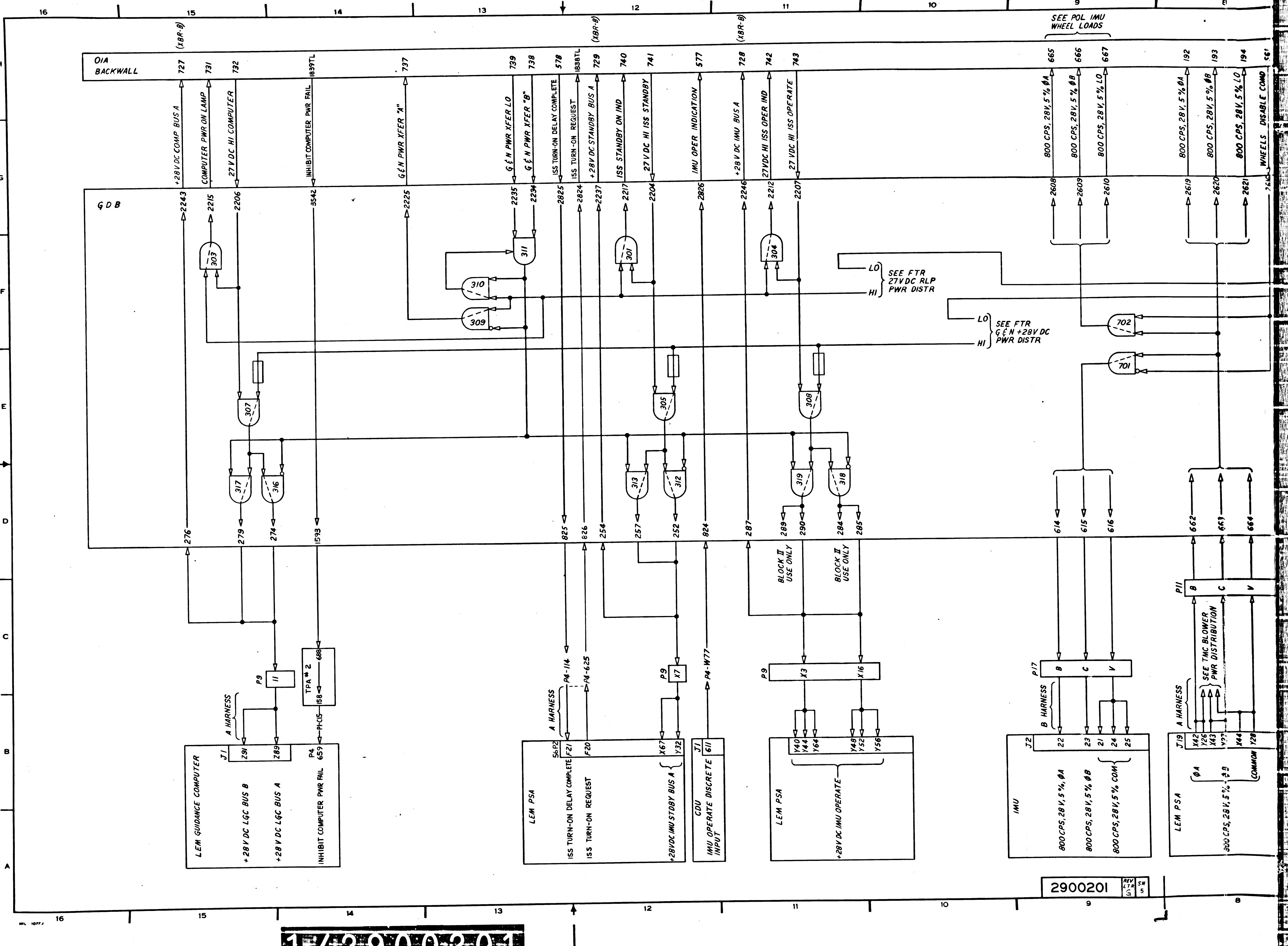
MECHANIZATION DIAGRAM
TEST CONTROL PANEL
(LEM)

CODE IDENT NO. 99974
SIZE J2
2900201
SCALE
SHEET 5 OF 5

2900201 REV G SH 5

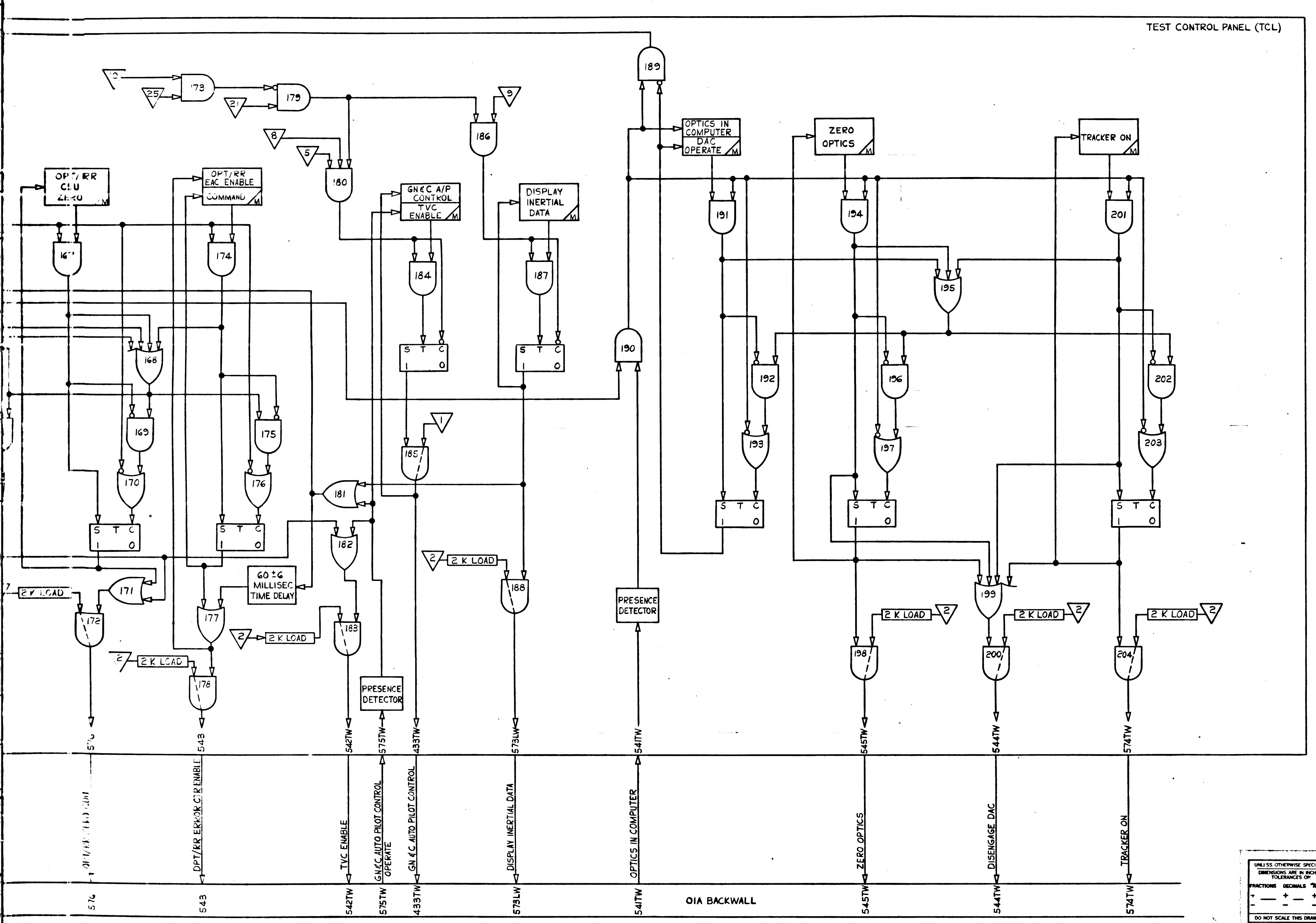
2900201 G

SHEET 2 OF 2
1050085


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
(XBR-8)
OIA BACKWALL
727
731
732
1839TL
737
739
738
578
1838TL
729
740
741
577
728
742
743
SEE POL IMU WHEEL LOADS
665
666
667
192
193
194
561
+28 V DC COMP BUS A
COMPUTER PWR ON LAMP
27 V DC HI COMPUTER
INHIBIT COMPUTER PWR FAIL
G & N PWR XFER "A"
G & N PWR XFER LO
G & N PWR XFER "B"
ISS TURN-ON DELAY COMPLETE
ISS TURN-ON REQUEST
+28 V DC STANDBY BUS A
ISS STANDBY ON IND
27 V DC HI ISS STANDBY
IMU OPER INDICATION
+28 V DC IMU BUS A
27 VDC HI ISS OPER IND
27 VDC HI ISS OPERATE
800 CPS, 5% ØA
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% LO
800 CPS, 28 V, 5% ØA
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% LO
WHEELS DISABLE COMD
GDB
2243
2215
2206
3542
2225
2235
2234
2825
2824
2237
2217
2204
2826
2246
2212
2207
2608
2609
2610
2619
2620
2621
2616
303
311
310
309
301
304
702
701
307
305
308
317
316
313
312
319
318
LO
HI
SEE FTR 27 V DC RLP PWR DISTR
LO
HI
SEE FTR G & N +28 V DC PWR DISTR
276
279
274
1593
825
826
254
257
252
824
287
289
290
284
285
614
615
616
662
663
664
BLOCK II USE ONLY
BLOCK II USE ONLY
P11
B
C
V
SEE TMC BLOWER PWR DISTRIBUTION
P9
11
TPA # 2
688
158
P1-C15
A HARNESS
J1
291
289
P4
659
LEM GUIDANCE COMPUTER
+28 V DC LGC BUS B
+28 V DC LGC BUS A
INHIBIT COMPUTER PWR FAIL
P4-114
P4-625
A HARNESS
56P2
F21
F20
LEM PSA
ISS TURN-ON DELAY COMPLETE
ISS TURN-ON REQUEST
P9
X7
X67
Y32
+28 VDC IMU STDBY BUS A
P4-W77
J1
611
CDU
IMU OPERATE DISCRETE INPUT
P9
X3
X16
Y40
Y44
Y64
Y48
Y52
Y56
LEM PSA
+28 V DC IMU OPERATE
P17
B
C
V
B HARNESS
J2
22
23
21
24
25
IMU
800 CPS, 28 V, 5% ØA
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% COM
A HARNESS
J19
X42
Y26
X43
Y27
X44
Y28
LEM PSA
ØA
ØB
COMMON
800 CPS, 28 V, 5%
2900201
REV LTR
G
SN
5

1/2900201

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	
B		REVISION STATUS CHANGED		7 JUL 65	
C		REVISION STATUS CHANGED		8 JUL 65	
D		REVISION STATUS CHANGED		9 JUL 65	
E		REVISION STATUS CHANGED		31 AUG 65	
F		REVISION STATUS CHANGED		1 SEP 65	
G		REVISION STATUS CHANGED		2 SEP 65	
H		REVISION STATUS CHANGED		4 JAN 66	


TEST CONTROL PANEL (TCL)
173
179
25
21
9
189
186
8
5
180
OPT/RR CDU ZERO
OPT/RR EAC ENABLE
COMMAND
GN&C A/P CONTROL
TVC ENABLE
DISPLAY INERTIAL DATA
OPTICS IN COMPUTER
DAC OPERATE
ZERO OPTICS
TRACKER ON
M
167
174
184
187
191
194
201
195
168
S T C
1 0
190
192
196
202
169
175
185
1
193
197
203
170
176
181
182
60 ± 6 MILLISEC TIME DELAY
171
172
177
183
178
188
199
198
200
204
2 K LOAD
2
PRESENCE DETECTOR
576
543
542TW
575TW
433TW
573LW
541TW
545TW
544TW
574TW
OPT/RR ERROR CTR ENABLE
TVC ENABLE
GN&C AUTO PILOT CONTROL OPERATE
GN&C AUTO PILOT CONTROL
DISPLAY INERTIAL DATA
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
OIA BACKWALL

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ ± ___ ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ___
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Schwalbe DATE 10 MAY 65
CHECKED 11 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM -
TEST CONTROL PANEL
(BLOCK II & LEM)

CODE IDENT NO 99974
SIZE J2
2900201
SCALE NONE
SHEET OF

2900201 H

2900201

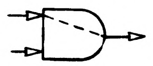
27 2900201

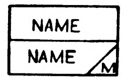
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS

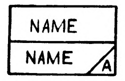
2900203 – TEMPERATURE MONITOR & CONTROL PANEL (TMC)
2900208 – POWER AND DUMMY LOAD PANEL–PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL, PSS)
2900223 – GIMBAL POSITION CONTROL PANEL (GPC)
2900207 – MONITOR PANEL (MPL)
2900209 – COMPUTER SIMULATOR INTERFACE (CMS)
2900206 – TEST SELECTOR PANEL (TES)
2900217 – SIGNAL SELECTOR AND MEASUREMENT
CROSSBAR–AC SIGNALS (XBR-A)
CROSSBAR–DC SIGNALS (XBR-B)
2900218 – OSCILLOGRAPH SIGNAL SELECTION
TO FIXED DC CHANNEL (RSS-B)
TO SWITCHABLE AC CHANNEL (RSS-C)
2900200 – GYRO CAGING PANEL (GCP)
2900210 – AC POWER PROTECTION PANEL AND POWER DISTRIBUTION (FTR)
RELAY AND LAMP POWER SUPPLY (RLP)
2900213 – GSE GROUNDING

4. NON STANDARD SYMBOLOGY

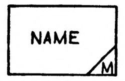

INDICATES "AND" GATE WITH SWITCHED SIGNAL



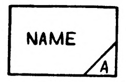
INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)



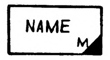
INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION)



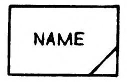
INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)



INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)



INDICATES UNLIGHTED PUSHBUTTON (MOMENTARY ACTION)



INDICATES INDICATOR LIGHT

5. T, W, AND L SUFFIXES ON INTERFACE NUMBERS DENOTE FUNCTIONAL USAGE OF THAT INTERFACE. INTERPRET AS FOLLOWS:

T – UNIQUE TO BLOCK II CONFIGURATION
W – UNIQUE TO BLOCK I SERIES 100 CONFIGURATION
L – UNIQUE TO LEM CONFIGURATION
TW, TL, OR LW – COMMON TO THE TWO INDICATED CONFIGURATIONS
NO SUFFIX – COMMON TO ALL THREE CONFIGURATIONS

6. ALL TIME DELAYS SHALL HAVE RESET TIMES OF 20 MS OR LESS.
7. SIGNAL REFERENCE:

1 = G & N + 28 VDC HI
2 = G & N + 28 VDC LO
3 = 27 VDC HI OIA ON
4 = 27 VDC RLP LO
5 = OPTICS POWER ON
6 = CGC/LGC POWER ON
7 = OSS LEVEL TEST

SIGNAL REFERENCE (CONT.)

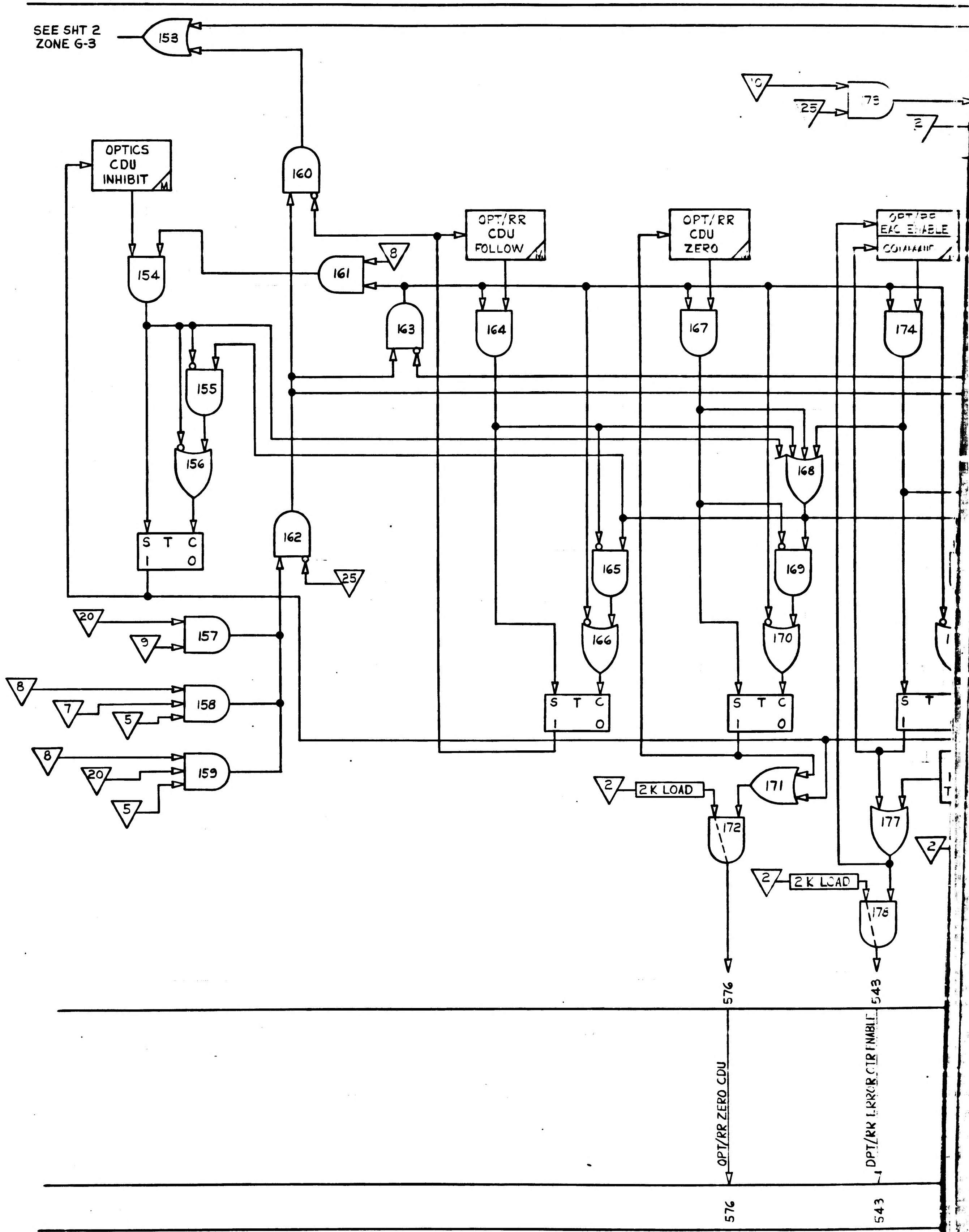
8 = BLOCK II TEST CONFIG
9 = LEM TEST CONFIG
10 = ISS LEVEL TEST
11 = ISS STANDBY
12 = GYRO TORQUING ENABLED
13 = PIPA LOOPS INHIBITED
14 = ISS LEVEL STANDBY
15 = ISS LEVEL OPERATE
16 = ISS OPERATE
17 = WHEELS STOPPED
18 = SELECT COARSE ALIGN
19 = ENABLE WHEELS OFF
20 = ISS LEVEL OPERATE + 90 SEC
21 = OPERATE + 90 SEC
22 = OSS LEVEL OPTICS POWER ON
23 = TURN ON–LOOPS CLOSED
24 = TURN ON–LOOPS OPEN
25 = MASTER RESET DEPRESSED

8. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK II SH 3 | SH 2 | SH 1
SH 4

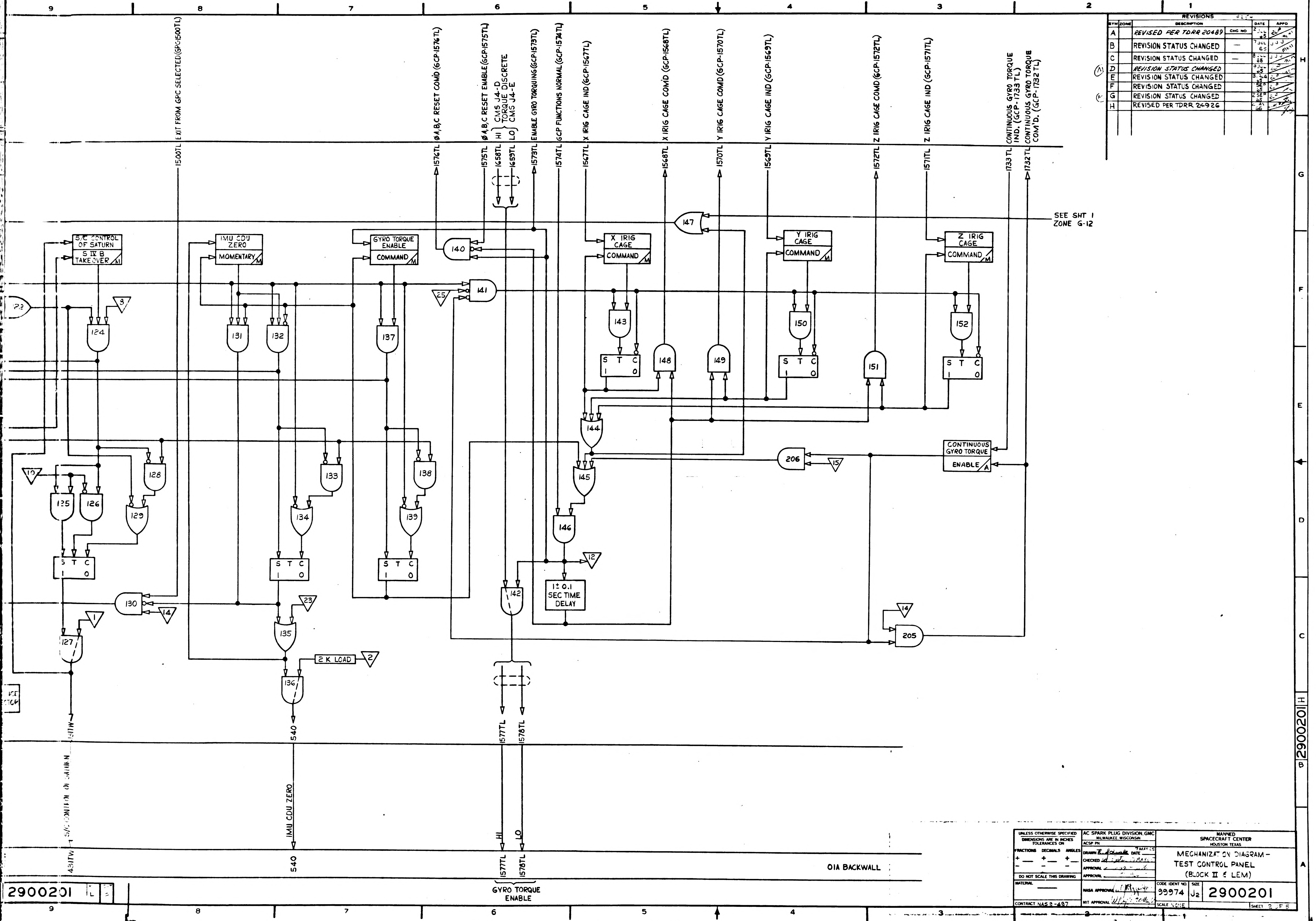
LEM SH 3 | SH 2 | SH 1
SH 5

9. *AS A DESIGN GOAL, THE INTERCONNECTIONS BETWEEN THE A/B COMPONENT AND THE GSE WILL BE MAINTAINED AS INTERFACE DEVICES.*


SEE SHT 2
ZONE G-3
153
10
25
73
2
OPTICS
CDU
INHIBIT
M
160
154
161
8
OPT/RR
CDU
FOLLOW
M
OPT/RR
CDU
ZERO
OPT/RR
EAC ENABLE
COMMAND
163
164
167
174
155
156
168
S T C
1 0
162
25
165
169
166
170
20
157
9
8
158
7
5
8
159
20
5
171
2
2K LOAD
172
177
2
2
2K LOAD
178
576
543
OPT/RR ZERO CDU
OPT/RR ERROR CTR ENABLE
576
543

2900201 RF. – SHT 1

1/2900201


9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
1500TL EXIT FROM GPC SELECTED (GP:1500TL)
1576TL ØA,B,C RESET COMD (GCP-1576TL)
1575TL ØA,B,C RESET ENABLE (GCP-1575TL)
1658TL HI CMS J4-D
TORQUE DISCRETE
1659TL LO CMS J4-E
1573TL ENABLE GYRO TORQUING (GCP-1573TL)
1574TL GCP FUNCTIONS NORMAL (GCP-1574TL)
1567TL X IRIG CAGE IND (GCP-1567TL)
1568TL X IRIG CAGE COMD (GCP-1568TL)
1570TL Y IRIG CAGE COMD (GCP-1570TL)
1569TL Y IRIG CAGE IND (GCP-1569TL)
1572TL Z IRIG CAGE COMD (GCP-1572TL)
1571TL Z IRIG CAGE IND (GCP-1571TL)
1733TL CONTINUOUS GYRO TORQUE IND. (GCP-1733TL)
1732TL CONTINUOUS GYRO TORQUE COM'D. (GCP-1732TL)
SEE SHT 1
ZONE G-12
147
S/C CONTROL OF SATURN
S IV B TAKEOVER M
IMU CDU ZERO
MOMENTARY M
GYRO TORQUE ENABLE
COMMAND M
140
141
X IRIG CAGE
COMMAND M
Y IRIG CAGE
COMMAND M
Z IRIG CAGE
COMMAND M
P3
8
25
124
131
132
137
143
148
149
150
151
152
S T C
1 0
144
CONTINUOUS GYRO TORQUE
ENABLE A
206
15
10
128
133
138
145
125
126
129
134
139
146
12
1± 0.1 SEC TIME DELAY
130
14
23
142
1
127
135
205
2 K LOAD
2
136
431TW
540
1577TL
1578TL
S/C CONTROL OF SATURN
IMU CDU ZERO
HI
LO
431TW
540
1577TL
1578TL
GYRO TORQUE ENABLE
OIA BACKWALL
2900201 L
2900201 H

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20489		2 JUL 65	
B		REVISION STATUS CHANGED	—	7 JUL 65	
C		REVISION STATUS CHANGED	—	8 JUL 65	
D		REVISION STATUS CHANGED		9 JUL 65	
E		REVISION STATUS CHANGED		3 AUG 65	
F		REVISION STATUS CHANGED		1 SEP 65	
G		REVISION STATUS CHANGED		2 SEP 65	
H		REVISED PER TDRR 24926		[illegible] 66	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ ± ___ ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ___
CONTRACT NAS 9-497

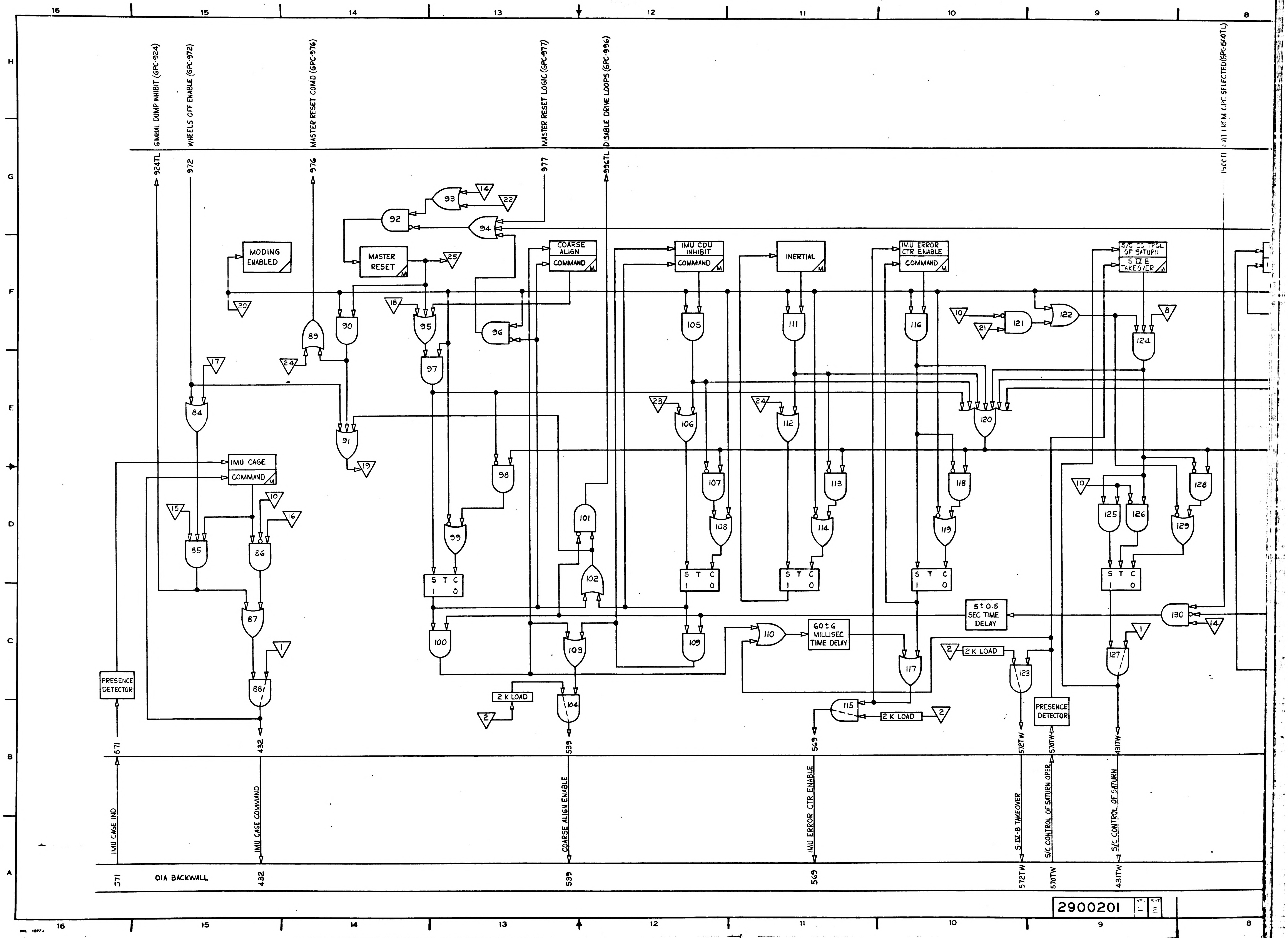
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Schwalk DATE 7 MAY 65
CHECKED 7 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

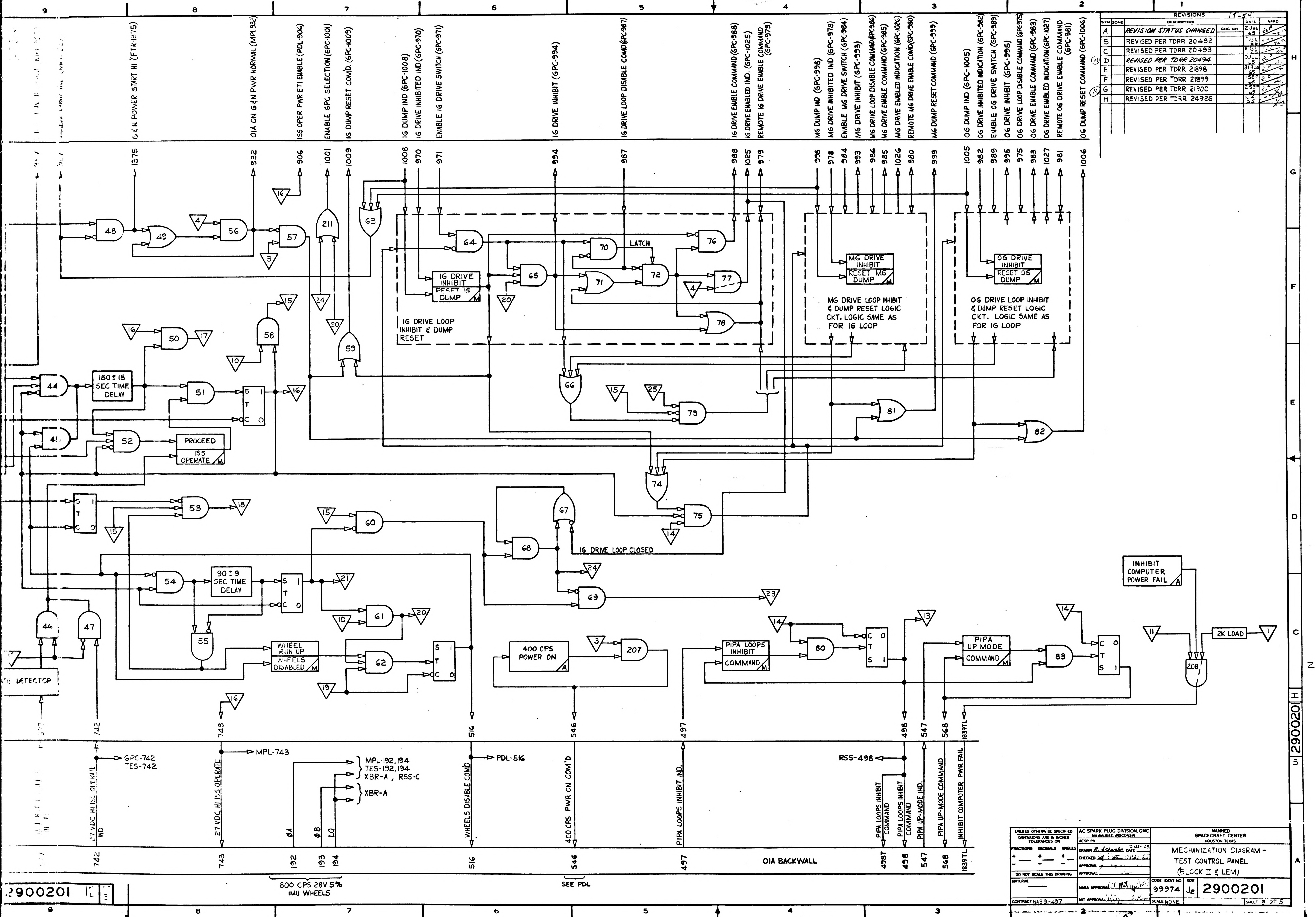
MECHANIZATION DIAGRAM –
TEST CONTROL PANEL
(BLOCK II & LEM)

CODE IDENT NO. 99974
SIZE J2
2900201
SCALE NONE
SHEET 2 OF 5

2/2900201


H
G
F
E
D
C
B
A
GIMBAL DUMP INHIBIT (GPC-924)
924TL
WHEELS OFF ENABLE (GPC-972)
MASTER RESET COMD (GPC-976)
MASTER RESET LOGIC (GPC-977)
DISABLE DRIVE LOOPS (GPC-996)
996TL
EXIT FROM GPC SELECTED (GPC-1500TL)
1500TL
MODING ENABLED
MASTER RESET
COARSE ALIGN
COMMAND
IMU CDU INHIBIT
COMMAND
INERTIAL
IMU ERROR CTR ENABLE
COMMAND
S/C CONTROL OF SATURN
S IV B TAKEOVER
IMU CAGE
COMMAND
M
S T C
1 0
PRESENCE DETECTOR
2 K LOAD
60 ± 6 MILLISEC TIME DELAY
5 ± 0.5 SEC TIME DELAY
572TW
570TW
431TW
IMU CAGE IND
IMU CAGE COMMAND
COARSE ALIGN ENABLE
IMU ERROR CTR ENABLE
S-IV-B TAKEOVER
S/C CONTROL OF SATURN OPER
S/C CONTROL OF SATURN
OIA BACKWALL
572TW
570TW
431TW
2900201
L

17 2900201



G & N POWER START HI (FTR-1375)
OIA ON G & N PWR NORMAL (MPL-932)
ISS OPER PWR ETI ENABLE (PDL-906)
ENABLE GPC SELECTION (GPC-1001)
IG DUMP RESET COMD. (GPC-1009)
IG DUMP IND (GPC-1008)
IG DRIVE INHIBITED IND (GPC-970)
ENABLE IG DRIVE SWITCH (GPC-971)
IG DRIVE INHIBIT (GPC-994)
IG DRIVE LOOP DISABLE COMD (GPC-987)
IG DRIVE ENABLE COMMAND (GPC-988)
IG DRIVE ENABLED IND. (GPC-1025)
REMOTE IG DRIVE ENABLE COMMAND (GPC-979)
MG DUMP IND (GPC-998)
MG DRIVE INHIBITED IND (GPC-978)
ENABLE MG DRIVE SWITCH (GPC-984)
MG DRIVE INHIBIT (GPC-993)
MG DRIVE LOOP DISABLE COMMAND (GPC-986)
MG DRIVE ENABLE COMMAND (GPC-985)
MG DRIVE ENABLED INDICATION (GPC-1026)
REMOTE MG DRIVE ENABLE COMD (GPC-980)
MG DUMP RESET COMMAND (GPC-999)
OG DUMP IND (GPC-1005)
OG DRIVE INHIBITED INDICATION (GPC-982)
ENABLE OG DRIVE SWITCH (GPC-989)
OG DRIVE INHIBIT (GPC-995)
OG DRIVE LOOP DISABLE COMMAND (GPC-975)
OG DRIVE ENABLE COMMAND (GPC-983)
OG DRIVE ENABLED INDICATION (GPC-1027)
REMOTE OG DRIVE ENABLE COMMAND (GPC-981)
OG DUMP RESET COMMAND (GPC-1006)
1375
932
906
1001
1009
1008
970
971
994
987
988
1025
979
998
978
984
993
986
985
1026
980
999
1005
982
989
995
975
983
1027
981
1006
LATCH
IG DRIVE INHIBIT
RESET IG DUMP
MG DRIVE INHIBIT
RESET MG DUMP
OG DRIVE INHIBIT
RESET OG DUMP
IG DRIVE LOOP INHIBIT & DUMP RESET
MG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
OG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
180 ± 18 SEC TIME DELAY
PROCEED
ISS OPERATE
90 ± 9 SEC TIME DELAY
IG DRIVE LOOP CLOSED
WHEEL RUN UP
WHEELS DISABLED
400 CPS POWER ON
PIPA LOOPS INHIBIT
COMMAND
PIPA UP MODE
COMMAND
INHIBIT COMPUTER POWER FAIL
2K LOAD
DETECTOR
742
743
516
546
497
498
547
568
1839TL
GPC-742
TES-742
MPL-743
MPL-192, 194
TES-192, 194
XBR-A, RSS-C
XBR-A
PDL-516
RSS-498
27 VDC HI ISS OPERATE IND
27 VDC HI ISS OPERATE
ØA
ØB
LO
WHEELS DISABLE COM'D
400 CPS PWR ON COM'D
PIPA LOOPS INHIBIT IND.
PIPA LOOPS INHIBIT COMMAND
PIPA LOOPS INHIBIT COMMAND
PIPA UP-MODE IND.
PIPA UP-MODE COMMAND
INHIBIT COMPUTER PWR FAIL
742
743
192
193
194
516
546
497
OIA BACKWALL
498T
498
547
568
1839TL
800 CPS 28V 5% IMU WHEELS
SEE PDL
2900201
27-2900201

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		*REVISION STATUS CHANGED*		2 JUL 65	
B		REVISED PER TDRR 20492		JUL 65	
C		REVISED PER TDRR 20493		8 JUL 65	
D		*REVISED PER TDRR 20494*		9 JUL 65	
E		REVISED PER TDRR 21898		31 AUG 65	
F		REVISED PER TDRR 21899		1 SEP 65	
G		REVISED PER TDRR 21900		2 SEP 65	
H		REVISED PER TDRR 24926		2 55	

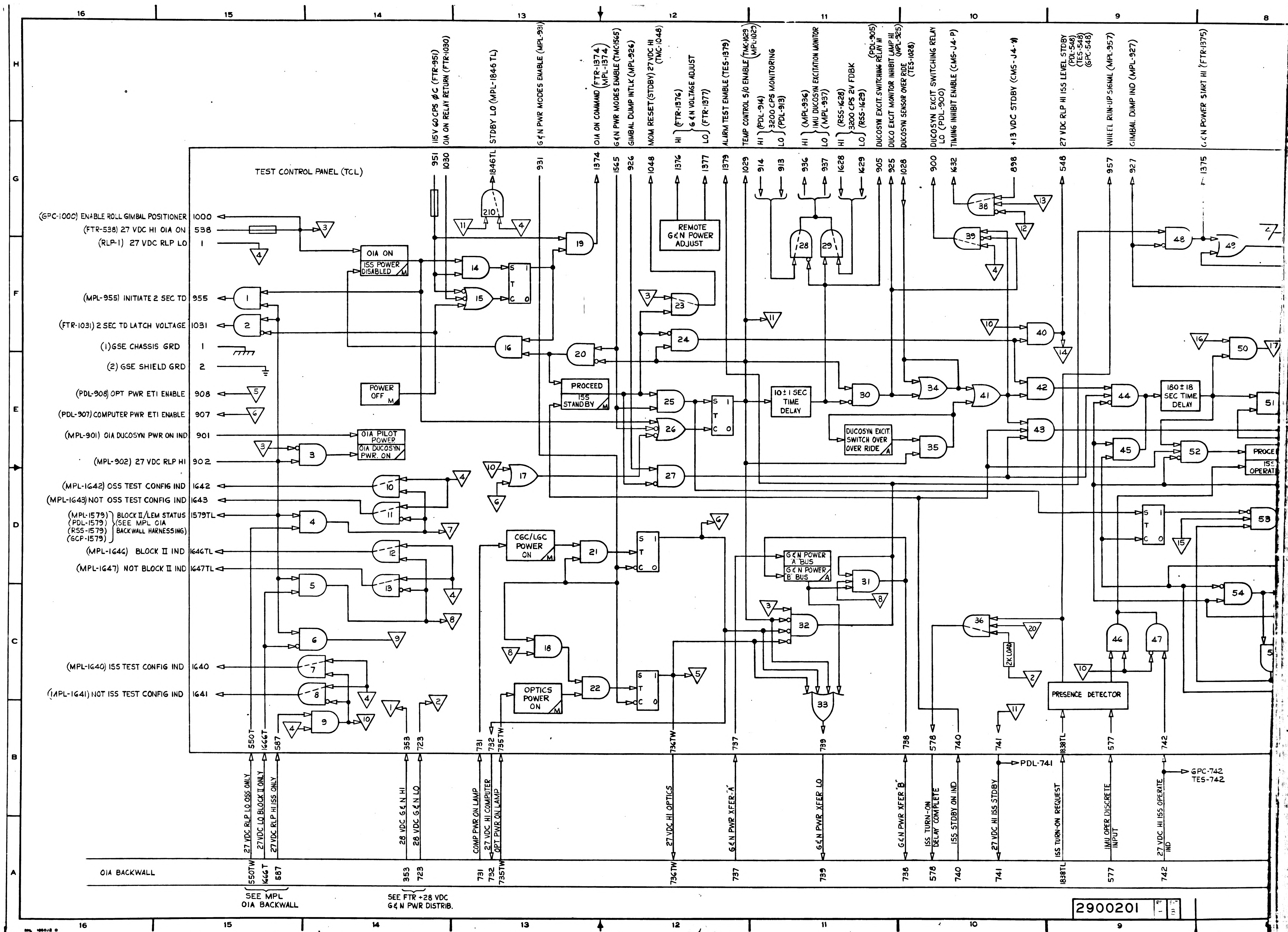
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Schwabe DATE 10 MAY 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
TEST CONTROL PANEL
(BLOCK II & LEM)

CODE IDENT NO. 99974
SIZE J2
2900201
SCALE NONE
SHEET 3 OF 5



16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
TEST CONTROL PANEL (TCL)
115V 400 CPS ØC (FTR-951)
OIA ON RELAY RETURN (FTR-1030)
STDBY LO (MPL-1846 TL)
G&N PWR MODES ENABLE (MPL-931)
OIA ON COMMAND (FTR-1374) (MPL-1374)
G&N PWR MODES ENABLE (TMC-1565)
GIMBAL DUMP INTLK (MPL-926)
MOM RESET (STDBY) 27 VDC HI (TMC-1048)
HI (FTR-1376) G&N VOLTAGE ADJUST LO (FTR-1377)
ALARM TEST ENABLE (TES-1379)
TEMP CONTROL S/O ENABLE (TMC-1029) (MPL-1029)
HI (PDL-914) 3200 CPS MONITORING LO (PDL-913)
HI (MPL-936) IMU DUCOSYN EXCITATION MONITOR LO (MPL-937)
HI (RSS-1628) 3200 CPS 2V FDBK LO (RSS-1629)
DUCOSYN EXCIT. SWITCHING RELAY HI (PDL-905)
DUCO EXCIT MONITOR INHIBIT LAMP HI (MPL-925)
DUCOSYN SENSOR OVER RIDE (TES-1028)
DUCOSYN EXCIT SWITCHING RELAY LO (PDL-900)
TIMING INHIBIT ENABLE (CMS-J4-P)
+13 VDC STDBY (CMS-J4-W)
27 VDC RLP HI ISS LEVEL STDBY (PDL-548) (TES-548) (GPC-548)
WHEEL RUN-UP SIGNAL (MPL-957)
GIMBAL DUMP IND (MPL-927)
G&N POWER START HI (FTR-1375)
951
1030
1846TL
931
1374
1565
926
1048
1376
1377
1379
1029
914
913
936
937
1628
1629
905
925
1028
900
1632
898
548
957
927
1375
(GPC-1000) ENABLE ROLL GIMBAL POSITIONER 1000
(FTR-538) 27 VDC HI OIA ON 538
(RLP-1) 27 VDC RLP LO 1
(MPL-955) INITIATE 2 SEC TD 955
(FTR-1031) 2 SEC TD LATCH VOLTAGE 1031
(1) GSE CHASSIS GRD 1
(2) GSE SHIELD GRD 2
(PDL-908) OPT PWR ETI ENABLE 908
(PDL-907) COMPUTER PWR ETI ENABLE 907
(MPL-901) OIA DUCOSYN PWR ON IND 901
(MPL-902) 27 VDC RLP HI 902
(MPL-1642) OSS TEST CONFIG IND 1642
(MPL-1643) NOT OSS TEST CONFIG IND 1643
(MPL-1579) (PDL-1579) (RSS-1579) (GCP-1579) BLOCK II/LEM STATUS (SEE MPL OIA BACKWALL HARNESSING) 1579TL
(MPL-1646) BLOCK II IND 1646TL
(MPL-1647) NOT BLOCK II IND 1647TL
(MPL-1640) ISS TEST CONFIG IND 1640
(MPL-1641) NOT ISS TEST CONFIG IND 1641
OIA ON
ISS POWER DISABLED M
POWER OFF M
OIA PILOT POWER
OIA DUCOSYN PWR. ON
REMOTE G&N POWER ADJUST
PROCEED
ISS STANDBY
10±1 SEC TIME DELAY
DUCOSYN EXCIT. SWITCH OVER OVER RIDE A
180±18 SEC TIME DELAY
PROCEED
ISS OPERATE
CGC/LGC POWER ON M
OPTICS POWER ON M
G&N POWER A BUS
G&N POWER B BUS A
2K LOAD
PRESENCE DETECTOR
S I T C O
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
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21
22
23
24
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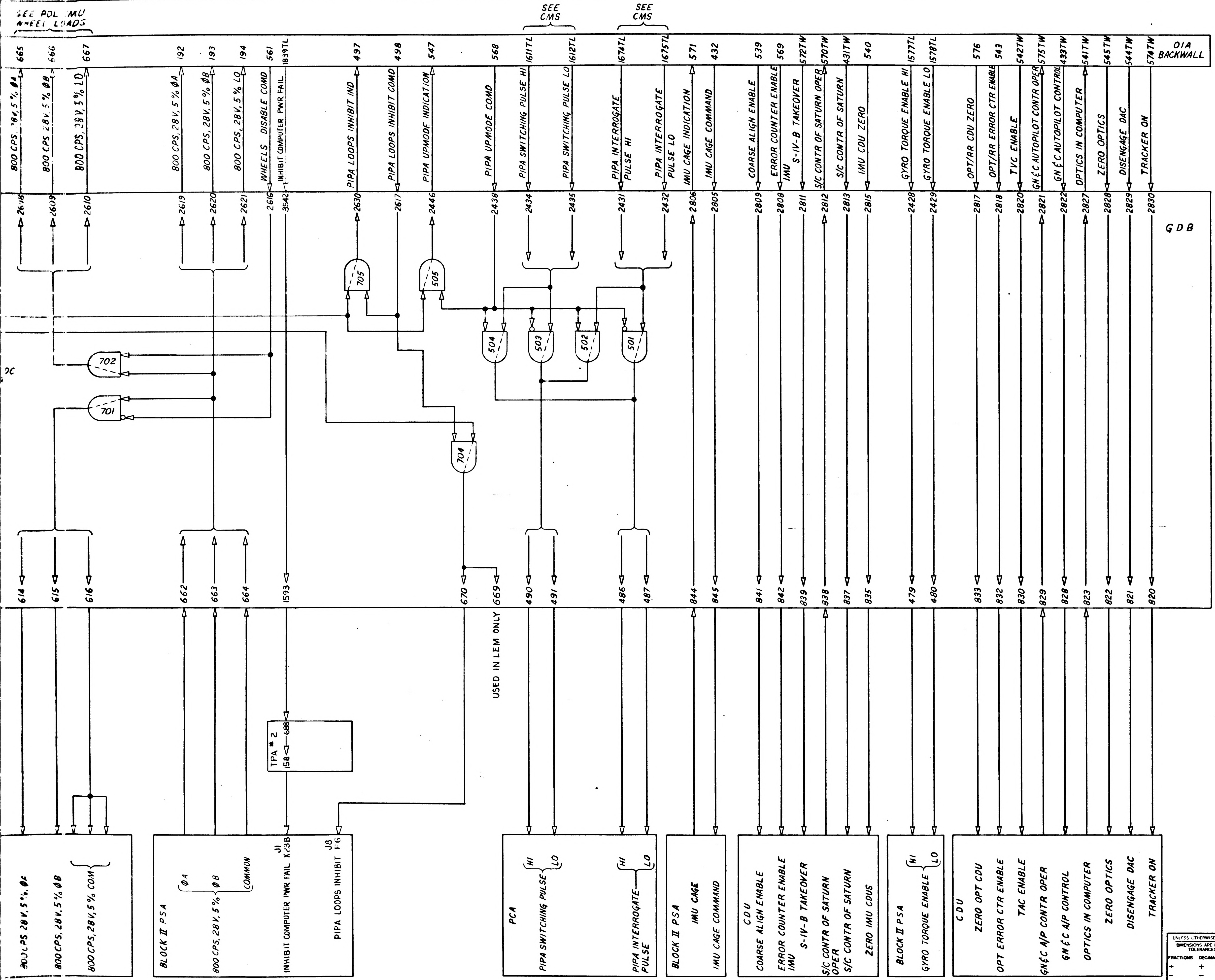
26
27
28
29
30
31
32
33
34
35
36
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
210
550TW
1666T
587
353
723
731
732
735TW
736TW
737
739
738
578
740
741
1838TL
577
742
27 VDC RLP LO OSS ONLY
27 VDC LO BLOCK II ONLY
27 VDC RLP HI ISS ONLY
28 VDC G&N HI
28 VDC G&N LO
COMP PWR ON LAMP
27 VDC HI COMPUTER
OPT PWR ON LAMP
27 VDC HI OPTICS
G&N PWR XFER "A"
G&N PWR XFER LO
G&N PWR XFER "B"
ISS TURN-ON DELAY COMPLETE
ISS STDBY ON IND
27 VDC HI ISS STDBY
PDL-741
ISS TURN-ON REQUEST
IMU OPER DISCRETE INPUT
27 VDC HI ISS OPERATE IND
GPC-742 TES-742
OIA BACKWALL
550TW 1666T 587
353 723
731 732 735TW
736TW
737
739
738
578
740
741
1838TL
577
742
SEE MPL OIA BACKWALL
SEE FTR +28 VDC G&N PWR DISTRIB.
2900201

1/2900201

SYM	ZONE	REVISIONS DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	
B		REVISION STATUS CHANGED		JUL 65	
C		REVISION STATUS CHANGED		8 JUL 65	
D		REVISION STATUS CHANGED		9 JUL 65	
E		REVISION STATUS CHANGED		31 AUG 65	
F		REVISED PER TDRR 21899		SEP 65	
G		REVISED PER TDRR 21900		2 SEP 65	
H		REVISED PER TDRR 24926		JAN 66	

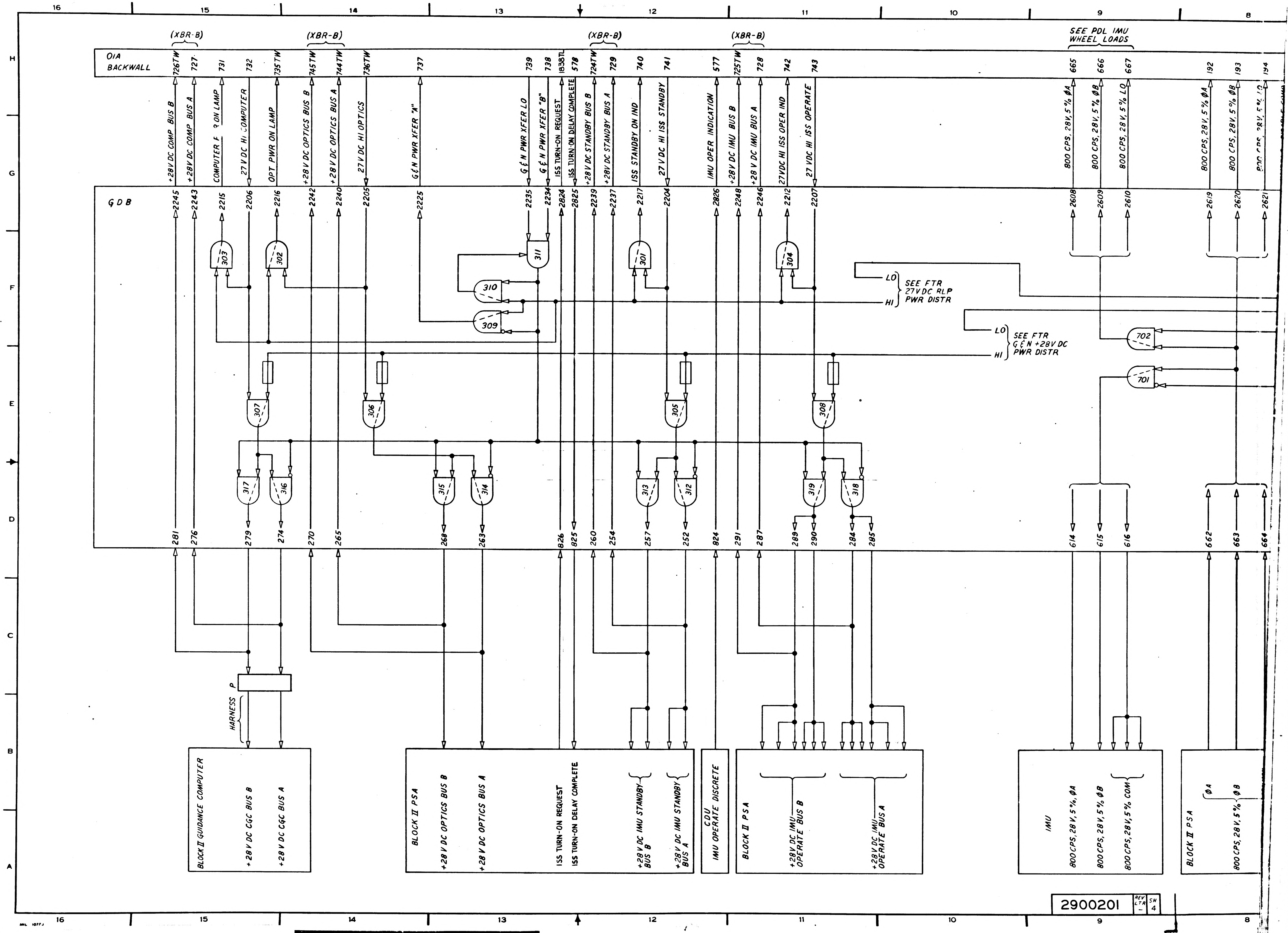

SEE PDL IMU
WHEEL LOADS
SEE CMS
SEE CMS
665
666
667
192
193
194
561
1839TL
497
498
547
568
1611TL
1612TL
1674TL
1675TL
571
432
539
569
572TW
570TW
431TW
540
1577TL
1578TL
576
543
542TW
575TW
433TW
541TW
545TW
544TW
574TW
OIA BACKWALL
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
INHIBIT COMPUTER PWR FAIL
PIPA LOOPS INHIBIT IND
PIPA LOOPS INHIBIT COMD
PIPA UPMODE INDICATION
PIPA UPMODE COMD
PIPA SWITCHING PULSE HI
PIPA SWITCHING PULSE LO
PIPA INTERROGATE PULSE HI
PIPA INTERROGATE PULSE LO
IMU CAGE INDICATION
IMU CAGE COMMAND
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
S-IV-B TAKEOVER
S/C CONTR OF SATURN OPER
S/C CONTR OF SATURN
IMU CDU ZERO
GYRO TORQUE ENABLE HI
GYRO TORQUE ENABLE LO
OPT/RR CDU ZERO
OPT/RR ERROR CTR ENABLE
TVC ENABLE
GN&C AUTOPILOT CONTR OPER
GN&C AUTOPILOT CONTROL
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
2618
2609
2610
2619
2620
2621
2616
3542
2630
2617
2446
2438
2434
2435
2431
2432
2806
2805
2809
2808
2811
2812
2813
2815
2428
2429
2817
2818
2820
2821
2822
2827
2828
2829
2830
GDB
705
505
504
503
502
501
702
701
704
DC
614
615
616
662
663
664
1593
670
669
490
491
486
487
844
845
841
842
839
838
837
835
479
480
833
832
830
829
828
823
822
821
820
USED IN LEM ONLY
TPA # 2
158
688
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% COM
BLOCK II PSA
ØA
ØB
COMMON
800 CPS, 28V, 5%
J1 X23B
INHIBIT COMPUTER PWR FAIL
J8 FG
PIPA LOOPS INHIBIT
PCA
HI
LO
PIPA SWITCHING PULSE
HI
LO
PIPA INTERROGATE PULSE
BLOCK II PSA
IMU CAGE
IMU CAGE COMMAND
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
S-IV-B TAKEOVER
S/C CONTR OF SATURN OPER
S/C CONTR OF SATURN
ZERO IMU CDUS
BLOCK II PSA
HI
LO
GYRO TORQUE ENABLE
CDU
ZERO OPT CDU
OPT ERROR CTR ENABLE
TAC ENABLE
GN&C A/P CONTR OPER
GN&C A/P CONTROL
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + + + − − −	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN Bendel DATE 2-MAY-65 CHECKED Ed Foster 17MAY65 APPROVAL J. Trago J.H. APPROVAL J. M. Watson	MECHANIZATION DIAGRAM TEST CONTROL PANEL (BLOCK II)
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 2900201
CONTRACT NAS 9-497	MIT APPROVAL	SCALE · SHEET 4 OF 5

2900201	REV LTR	SH
	-	4

2H

27/2900201


16
15
14
13
12
11
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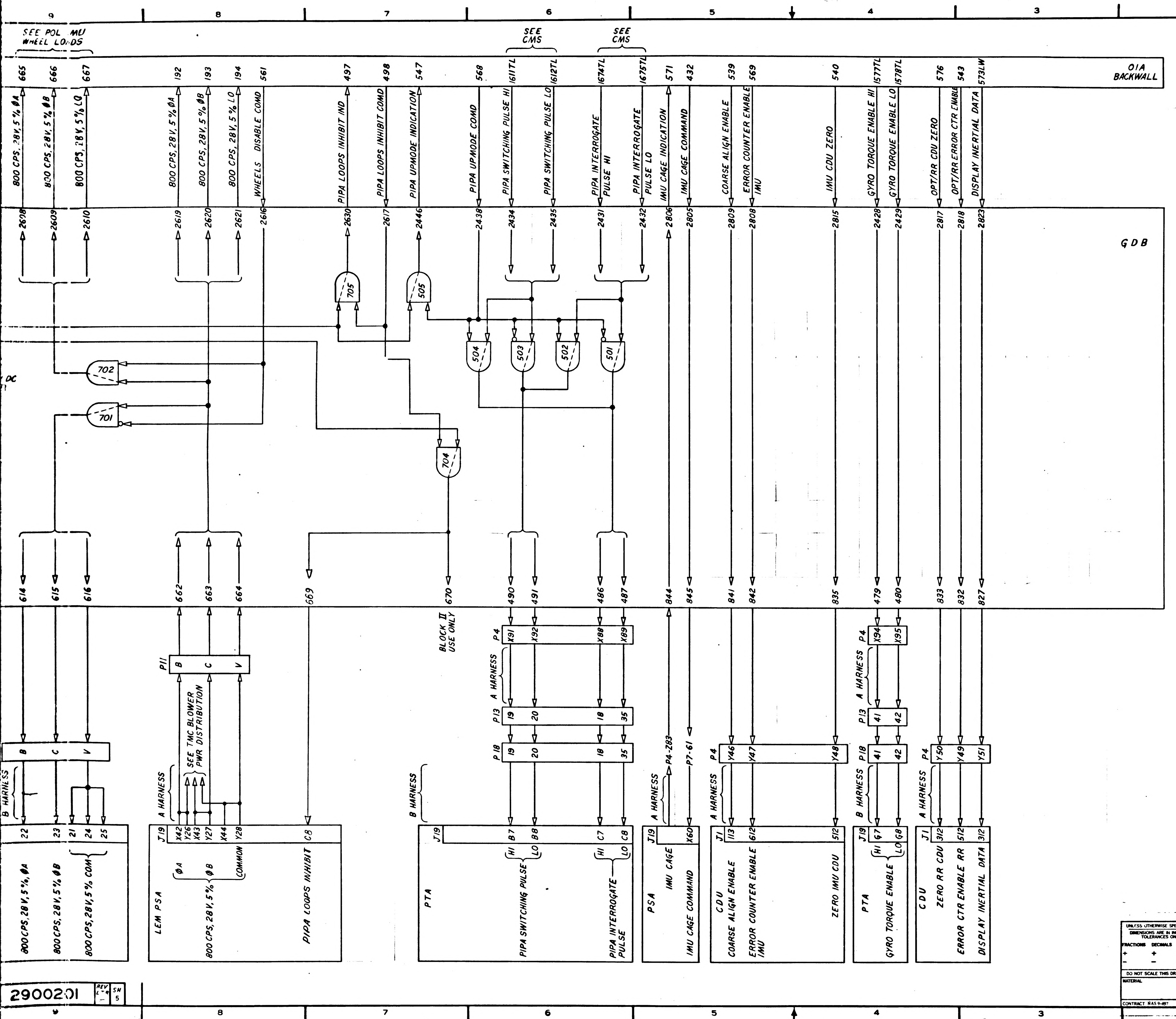
9
8
H
G
F
E
D
C
B
A
(XBR-B)
(XBR-B)
(XBR-B)
(XBR-B)
SEE PDL IMU WHEEL LOADS
OIA BACKWALL
726TW
727
731
732
735TW
745TW
744TW
736TW
737
739
738
1838TL
578
724TW
729
740
741
577
725TW
728
742
743
665
666
667
192
193
194
+28V DC COMP BUS B
+28V DC COMP BUS A
COMPUTER PWR ON LAMP
27 V DC HI COMPUTER
OPT PWR ON LAMP
+28V DC OPTICS BUS B
+28V DC OPTICS BUS A
27 V DC HI OPTICS
G&N PWR XFER "A"
G&N PWR XFER LO
G&N PWR XFER "B"
ISS TURN-ON REQUEST
ISS TURN-ON DELAY COMPLETE
+28V DC STANDBY BUS B
+28V DC STANDBY BUS A
ISS STANDBY ON IND
27V DC HI ISS STANDBY
IMU OPER INDICATION
+28V DC IMU BUS B
+28V DC IMU BUS A
27VDC HI ISS OPER IND
27 VDC HI ISS OPERATE
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
GDB
2245
2243
2215
2206
2216
2242
2240
2205
2225
2235
2234
2824
2825
2239
2237
2217
2204
2826
2248
2246
2212
2207
2608
2609
2610
2619
2620
2621
303
302
311
310
309
301
304
LO
HI
SEE FTR 27VDC RLP PWR DISTR
LO
HI
SEE FTR G&N +28V DC PWR DISTR
702
701
307
306
305
308
317
316
315
314
313
312
319
318
281
276
279
274
270
265
268
263
826
825
260
254
257
252
824
291
287
289
290
284
285
614
615
616
662
663
664
P
HARNESS
BLOCK II GUIDANCE COMPUTER
+28V DC CGC BUS B
+28V DC CGC BUS A
BLOCK II PSA
+28V DC OPTICS BUS B
+28V DC OPTICS BUS A
ISS TURN-ON REQUEST
ISS TURN-ON DELAY COMPLETE
+28V DC IMU STANDBY BUS B
+28V DC IMU STANDBY BUS A
CDU
IMU OPERATE DISCRETE
BLOCK II PSA
+28V DC IMU OPERATE BUS B
+28V DC IMU OPERATE BUS A
IMU
800CPS, 28V, 5% ØA
800CPS, 28V, 5% ØB
800CPS, 28V, 5% COM
BLOCK II PSA
ØA
ØB
800CPS, 28V, 5%

2900201	REV LTR –	SH 4

17/2900201

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	
B		REVISION STATUS CHANGED		7 JUL 65	
C		REVISION STATUS CHANGED		8 JUL 65	
D		REVISION STATUS CHANGED		9 JUL 65	
E		REVISION STATUS CHANGED		31 AUG 65	
F		REVISED PER TDRR 21699		1 SEP 65	
G		REVISED PER TDRR 21900		2 SEP 65	
H		REVISED PER TDRR 24926		4 JAN 66	



9
8
7
6
5
4
3
2
1
SEE POL IMU WHEEL LOADS
SEE CMS
SEE CMS
665
666
667
192
193
194
561
497
498
547
568
1611TL
1612TL
1674TL
1675TL
571
432
539
569
540
1577TL
1578TL
576
543
573LW
OIA BACKWALL
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
PIPA LOOPS INHIBIT IND
PIPA LOOPS INHIBIT COMD
PIPA UPMODE INDICATION
PIPA UPMODE COMD
PIPA SWITCHING PULSE HI
PIPA SWITCHING PULSE LO
PIPA INTERROGATE PULSE HI
PIPA INTERROGATE PULSE LO
IMU CAGE INDICATION
IMU CAGE COMMAND
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
IMU CDU ZERO
GYRO TORQUE ENABLE HI
GYRO TORQUE ENABLE LO
OPT/RR CDU ZERO
OPT/RR ERROR CTR ENABLE
DISPLAY INERTIAL DATA
2608
2609
2610
2619
2620
2621
2616
2630
2617
2446
2438
2434
2435
2431
2432
2806
2805
2809
2808
2815
2428
2429
2817
2818
2823
GDB
705
505
504
503
502
501
702
701
704
DC
614
615
616
662
663
664
669
670
490
491
486
487
844
845
841
842
835
479
480
833
832
827
BLOCK II USE ONLY
P4
X91
X92
X88
X89
P4
X94
X95
A HARNESS
A HARNESS
P11
B
C
V
SEE TMC BLOWER PWR DISTRIBUTION
P13
19
20
18
35
P13
41
42
P18
19
20
18
35
P4-283
P7-61
P4
Y46
Y47
Y48
P18
41
42
P4
Y50
Y49
Y51
B
C
V
B HARNESS
A HARNESS
B HARNESS
A HARNESS
A HARNESS
B HARNESS
A HARNESS
22
23
21
24
25
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% COM
J19
X42
Y26
X43
Y27
X44
Y28
C8
LEM PSA
ØA
ØB
COMMON
800 CPS, 28V, 5%
PIPA LOOPS INHIBIT
J19
B7
B8
C7
C8
PTA
HI
LO
PIPA SWITCHING PULSE
HI
LO
PIPA INTERROGATE PULSE
J19
X60
PSA
IMU CAGE
IMU CAGE COMMAND
J1
113
612
512
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
ZERO IMU CDU
J19
G7
G8
PTA
HI
LO
GYRO TORQUE ENABLE
J1
312
512
312
CDU
ZERO RR CDU
ERROR CTR ENABLE RR
DISPLAY INERTIAL DATA
H
G
F
E
D
C
B
A

2900201 REV L-R SH 5

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 11-MAY-65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

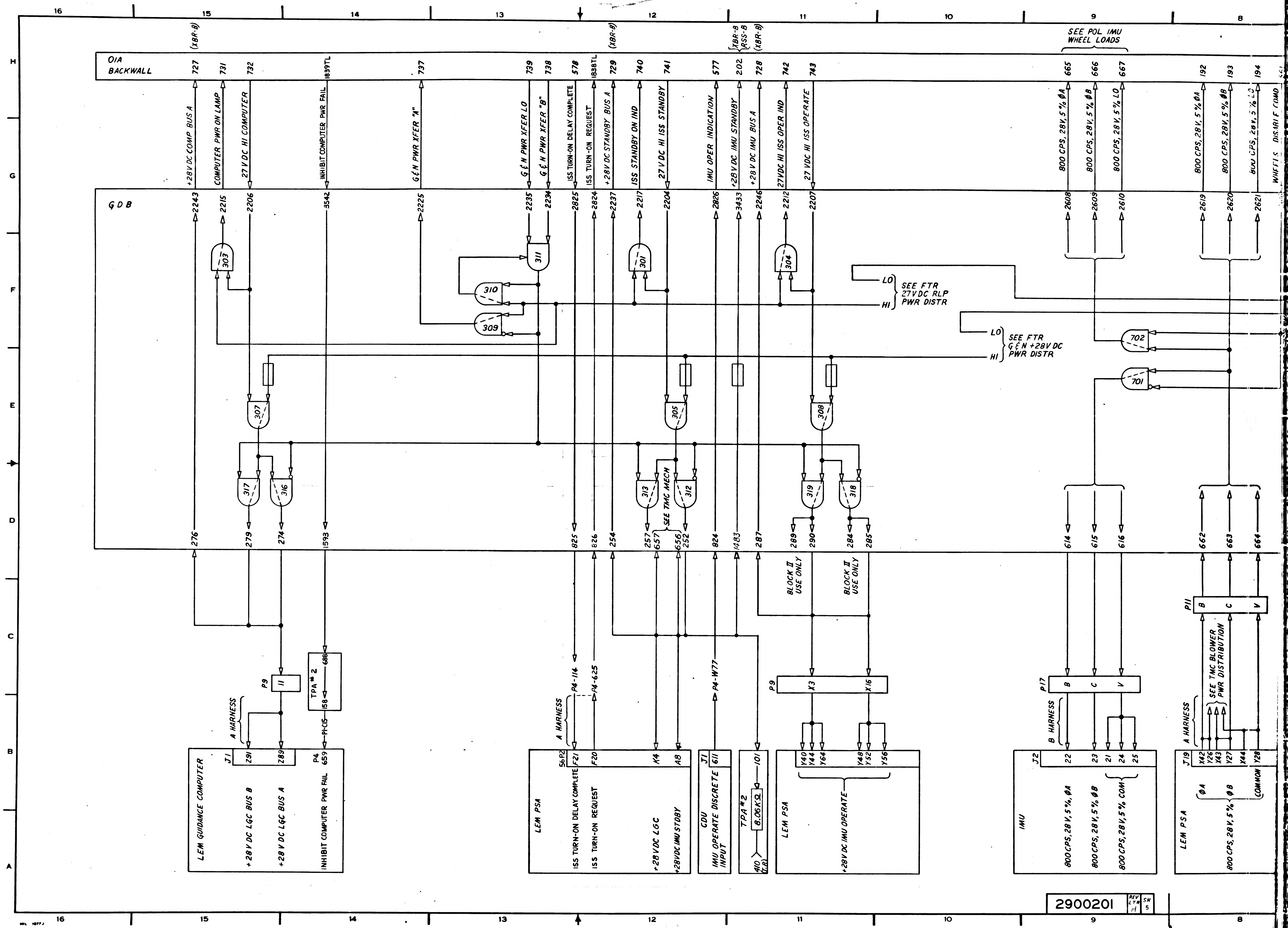
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
TEST CONTROL PANEL
(LEM)

CODE IDENT NO. 99974
SIZE J2
2900201
SCALE
SHEET 5 OF 5

2900201

27/2900201

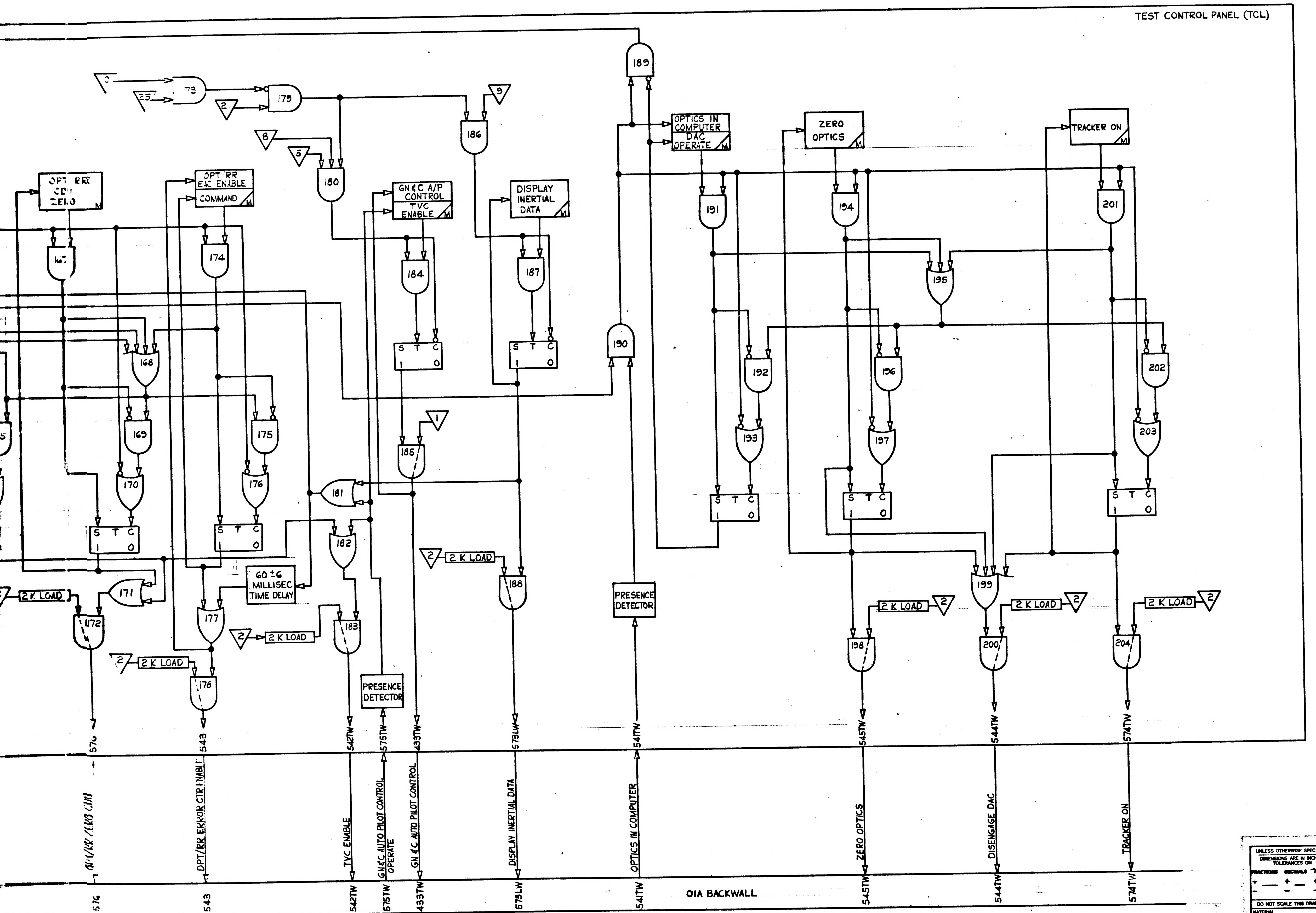


OIA BACKWALL
GDB
(XBR-B)
727 +28 V DC COMP BUS A 2243
731 COMPUTER PWR ON LAMP 2215
732 27 V DC HI COMPUTER 2206
1839TL INHIBIT COMPUTER PWR FAIL 3542
737 G & N PWR XFER "A" 2225
739 G & N PWR XFER LO 2235
738 G & N PWR XFER "B" 2234
578 ISS TURN-ON DELAY COMPLETE 2825
1838TL ISS TURN-ON REQUEST 2824
729 +28 V DC STANDBY BUS A 2237
740 ISS STANDBY ON IND 2217
741 27 V DC HI ISS STANDBY 2204
577 IMU OPER INDICATION 2826
202 +28 V DC IMU STANDBY 3433
728 +28 V DC IMU BUS A 2246
742 27VDC HI ISS OPER IND 2212
743 27 VDC HI ISS OPERATE 2207
XBR-B RSS-B
SEE POL IMU WHEEL LOADS
665 800 CPS, 28 V, 5% ØA 2608
666 800 CPS, 28 V, 5% ØB 2609
667 800 CPS, 28 V, 5% LO 2610
192 800 CPS, 28 V, 5% ØA 2619
193 800 CPS, 28 V, 5% ØB 2620
194 800 CPS, 28 V, 5% LO 2621
WHEELS DISABLE COMD
303 311 310 309 301 304 307 305 308 317 316 313 312 319 318 702 701
LO HI SEE FTR 27 VDC RLP PWR DISTR
LO HI SEE FTR G & N +28 V DC PWR DISTR
SEE TMC MECH
276 279 274 1593 825 826 254 257 657 656 252 824 1483 287 289 290 284 285 614 615 616 662 663 664
BLOCK II USE ONLY
BLOCK II USE ONLY
P9 11
TPA # 2 688 158
P1-C15
A HARNESS
P4-114 P4-625
P4-W77
P9 X3 X16
P17 B C V
B HARNESS
P11 B C V
SEE TMC BLOWER PWR DISTRIBUTION
A HARNESS
LEM GUIDANCE COMPUTER J1 Z91 Z89 P4 659
+28 V DC LGC BUS B
+28 V DC LGC BUS A
INHIBIT COMPUTER PWR FAIL
LEM PSA 56P2 F21 F20 K4 A8
ISS TURN-ON DELAY COMPLETE
ISS TURN-ON REQUEST
+28 VDC LGC
+28VDC IMU STDBY
CDU J1 611 IMU OPERATE DISCRETE INPUT
TPA # 2 101 8.06KΩ 410 (2.8)
LEM PSA Y40 Y44 Y64 Y48 Y52 Y56
+28V DC IMU OPERATE
IMU J2 22 23 21 24 25
800 CPS, 28 V, 5% ØA
800 CPS, 28 V, 5% ØB
800 CPS, 28 V, 5% COM
LEM PSA J19 X42 Y26 X43 Y27 X44 Y28
ØA ØB COMMON
800 CPS, 28 V, 5% ØB
16 15 14 13 12 11 10 9 8
H G F E D C B A

2900201 REV LTR H SH 5

1/29 00201

SYM	ZONE	REVISIONS DESCRIPTION	CHG NO	DATE	APPD


TEST CONTROL PANEL (TCL)
OPT'RR CDU ZERO
OPT'RR EXC ENABLE
COMMAND
GN&C A/P CONTROL
TVC ENABLE
DISPLAY INERTIAL DATA
OPTICS IN COMPUTER
DAC OPERATE
ZERO OPTICS
TRACKER ON
M
S T C
1 0
60 ± 6 MILLISEC TIME DELAY
PRESENCE DETECTOR
2 K LOAD
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
25
2
8
5
9
1
576
543
542TW
575TW
433TW
573LW
541TW
545TW
544TW
574TW
OPT/RR ZERO CDU
OPT/RR ERROR CTR ENABLE
TVC ENABLE
GN&C AUTO PILOT CONTROL OPERATE
GN & C AUTO PILOT CONTROL
DISPLAY INERTIAL DATA
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
OIA BACKWALL
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

2H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Schuck DATE 10 MAY 65
CHECKED Ed Foster 17 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

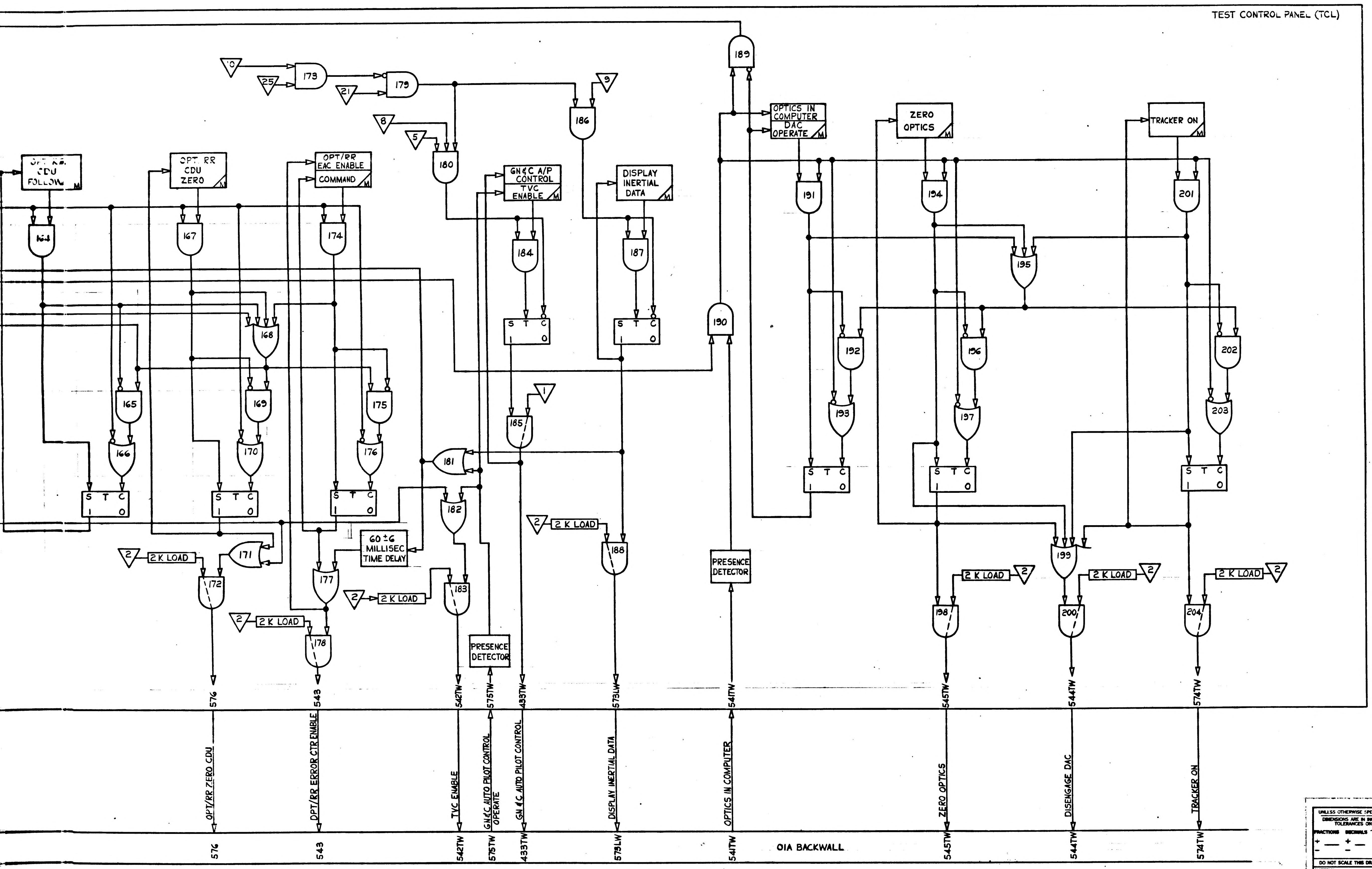
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
TEST CONTROL PANEL
(BLOCK II & LEM)

CODE IDENT NO. 99974
SIZE J2
2900201
SCALE NONE
SHEET 1 OF 5

2900201 RE. SHT 1

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD


TEST CONTROL PANEL (TCL)
OPT/RR CDU FOLLOW
OPT RR CDU ZERO
OPT/RR EAC ENABLE
COMMAND
GN&C A/P CONTROL
TVC ENABLE
DISPLAY INERTIAL DATA
OPTICS IN COMPUTER
DAC OPERATE
ZERO OPTICS
TRACKER ON
M
S T C
1 0
60 ± 6 MILLISEC TIME DELAY
2 K LOAD
PRESENCE DETECTOR
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
193
194
195
196
197
198
199
200
201
202
203
204
10
25
21
9
8
5
1
2
576
543
542TW
575TW
433TW
573LW
541TW
545TW
544TW
574TW
OPT/RR ZERO CDU
OPT/RR ERROR CTR ENABLE
TVC ENABLE
GN&C AUTO PILOT CONTROL OPERATE
GN & C AUTO PILOT CONTROL
DISPLAY INERTIAL DATA
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
OIA BACKWALL

2900201 REV SHT 1

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ ± ___ ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ___
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Schwabe DATE 13 MAY 64
CHECKED 17 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

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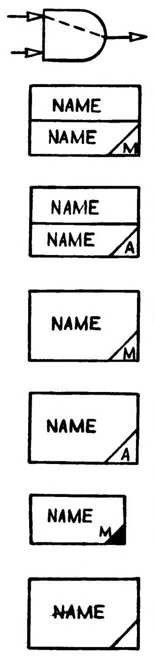
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
TEST CONTROL PANEL
(BLOCK II & LEM)

CODE IDENT NO. 99974
SIZE J2
2900201
SCALE NONE
SHEET 1 OF 4

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS
   - 2900203 – TEMPERATURE MONITOR & CONTROL PANEL (TMC)
   - 2900208 – POWER AND DUMMY LOAD PANEL-PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL, PSS)
   - 2900223 – GIMBAL POSITION CONTROL PANEL (GPC)
   - 2900207 – MONITOR PANEL (MPL)
   - 2900209 – COMPUTER SIMULATOR INTERFACE (CMS)
   - 2900206 – TEST SELECTOR PANEL (TES)
   - 2900217 – SIGNAL SELECTOR AND MEASUREMENT
     - CROSSBAR-AC SIGNALS (XBR-A)
     - CROSSBAR-DC SIGNALS (XBR-B)
   - 2900218 – OSCILLOGRAPH SIGNAL SELECTION
     - TO FIXED DC CHANNEL (RSS-B)
     - TO SWITCHABLE AC CHANNEL (RSS-C)
   - 2900200 – GYRO CAGING PANEL (GCP)
   - 2900210 – AC POWER PROTECTION PANEL AND POWER DISTRIBUTION (FTR)
     - RELAY AND LAMP POWER SUPPLY (RLP)
   - 2900213 – GSE GROUNDING
4. NON STANDARD SYMBOLOGY


NAME
NAME
M
NAME
NAME
A
NAME
M
NAME
A
NAME
M
NAME

INDICATES "AND" GATE WITH SWITCHED SIGNAL

INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)

INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION)

INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

INDICATES UNLIGHTED PUSHBUTTON (MOMENTARY ACTION)

INDICATES INDICATOR LIGHT

5. T, W, AND L SUFFIXES ON INTERFACE NUMBERS DENOTE FUNCTIONAL USAGE OF THAT INTERFACE. INTERPRET AS FOLLOWS:
   - T - UNIQUE TO BLOCK II CONFIGURATION
   - W - UNIQUE TO BLOCK I SERIES 100 CONFIGURATION
   - L - UNIQUE TO LEM CONFIGURATION
   - TW, TL, OR LW - COMMON TO THE TWO INDICATED CONFIGURATIONS
   - NO SUFFIX - COMMON TO ALL THREE CONFIGURATIONS
6. ALL TIME DELAYS SHALL HAVE RESET TIMES OF 20 MS OR LESS.
7. SIGNAL REFERENCE:

▽1 = G & N + 28 VDC HI
▽2 = G & N + 28 VDC LO
▽3 = 27 VDC HI OIA ON
▽4 = 27 VDC RLP LO
▽5 = OPTICS POWER ON
▽6 = CGC/LGC POWER ON
▽7 = OSS LEVEL TEST

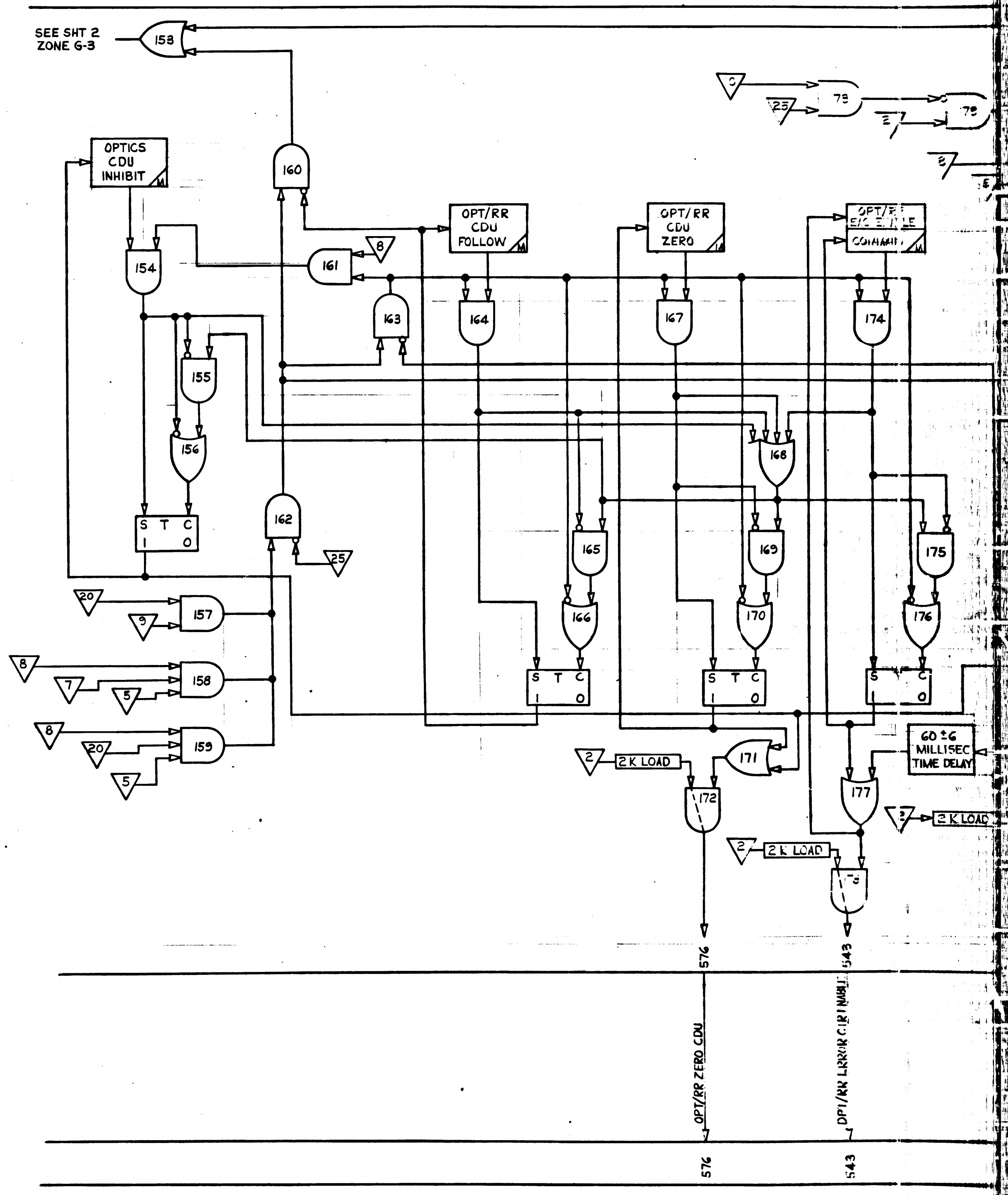
SIGNAL REFERENCE (CONT.)

▽8 = BLOCK II TEST CONFIG
▽9 = LEM TEST CONFIG
▽10 = ISS LEVEL TEST
▽11 = ISS STANDBY
▽12 = GYRO TORQUING ENABLED
▽13 = PIPA LOOPS INHIBITED
▽14 = ISS LEVEL STANDBY
▽15 = ISS LEVEL OPERATE
▽16 = ISS OPERATE
▽17 = WHEELS STOPPED
▽18 = SELECT COARSE ALIGN
▽19 = ENABLE WHEELS OFF
▽20 = ISS LEVEL OPERATE + 90 SEC
▽21 = OPERATE + 90 SEC
▽22 = OSS LEVEL OPTICS POWER ON
▽23 = TURN ON-LOOPS CLOSED
▽24 = TURN ON-LOOPS OPEN
▽25 = MASTER RESET DEPRESSED

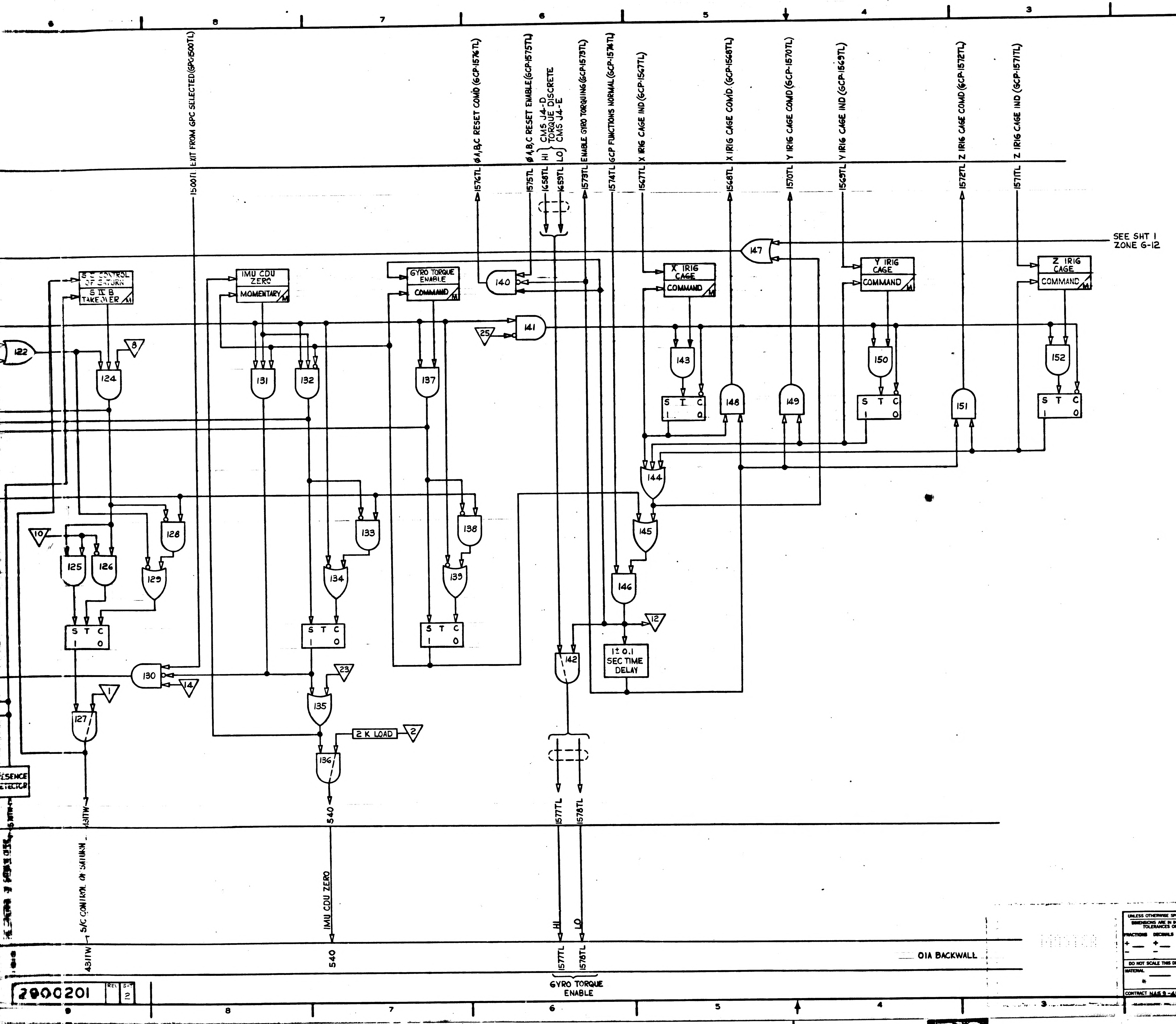
8. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK II	SH 3	SH 2	SH 1
		SH 4	
LEM	SH 3	SH 2	SH 1
		SH 5	

9. *AS A DESIGN GOAL, THE INTERCONNECTIONS BETWEEN THE A/B COMPONENT AND THE GSE WILL BE MAINTAINED AS INTERFACE DEVICES.*


SEE SHT 2
ZONE G-3
158
OPTICS
CDU
INHIBIT
M
160
154
161
8
163
OPT/RR
CDU
FOLLOW
M
164
OPT/RR
CDU
ZERO
M
167
OPT/RR
E/C ENABLE
COMMAND
M
174
79
79
25
155
156
168
S T C
1 0
162
25
165
169
175
20
9
157
166
170
176
8
7
5
158
8
20
5
159
S T C
1 0
S T C
1 0
S C
1 0
60 ±6
MILLISEC
TIME DELAY
2
2K LOAD
171
172
177
2
2K LOAD
2
2K LOAD
576
543
OPT/RR ZERO CDU
OPT/RR ERROR CTR INHIBIT
576
543

2900201 | REV | SHT 1


1500TL EXIT FROM GPC SELECTED (GPC-1500TL)
1576TL Ø A,B,C RESET COMD (GCP-1576TL)
1575TL Ø A,B,C RESET ENABLE (GCP-1575TL)
HI 1658TL CMS J4-D
TORQUE DISCRETE
LO 1659TL CMS J4-E
1573TL ENABLE GYRO TORQUING (GCP-1573TL)
1574TL GCP FUNCTIONS NORMAL (GCP-1574TL)
1567TL X IRIG CAGE IND (GCP-1567TL)
1568TL X IRIG CAGE COMD (GCP-1568TL)
1570TL Y IRIG CAGE COMD (GCP-1570TL)
1569TL Y IRIG CAGE IND (GCP-1569TL)
1572TL Z IRIG CAGE COMD (GCP-1572TL)
1571TL Z IRIG CAGE IND (GCP-1571TL)
SEE SHT 1
ZONE G-12
S/C CONTROL OF SATURN
S II B TAKEOVER
M
IMU CDU ZERO
MOMENTARY
M
GYRO TORQUE ENABLE
COMMAND
M
X IRIG CAGE
COMMAND
M
Y IRIG CAGE
COMMAND
M
Z IRIG CAGE
COMMAND
M
122
124
125
126
127
128
129
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
8
10
1
14
23
2
25
12
S T C
1 0
2 K LOAD
1 ± 0.1 SEC TIME DELAY
PRESENCE DETECTOR
431TW
540
1577TL
1578TL
S/C CONTROL OF SATURN
IMU CDU ZERO
HI
LO
431TW
540
1577TL
1578TL
GYRO TORQUE ENABLE
01A BACKWALL
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
2H

SYM	ZONE	REVISIONS DESCRIPTION	CHG NO	DATE	APPD

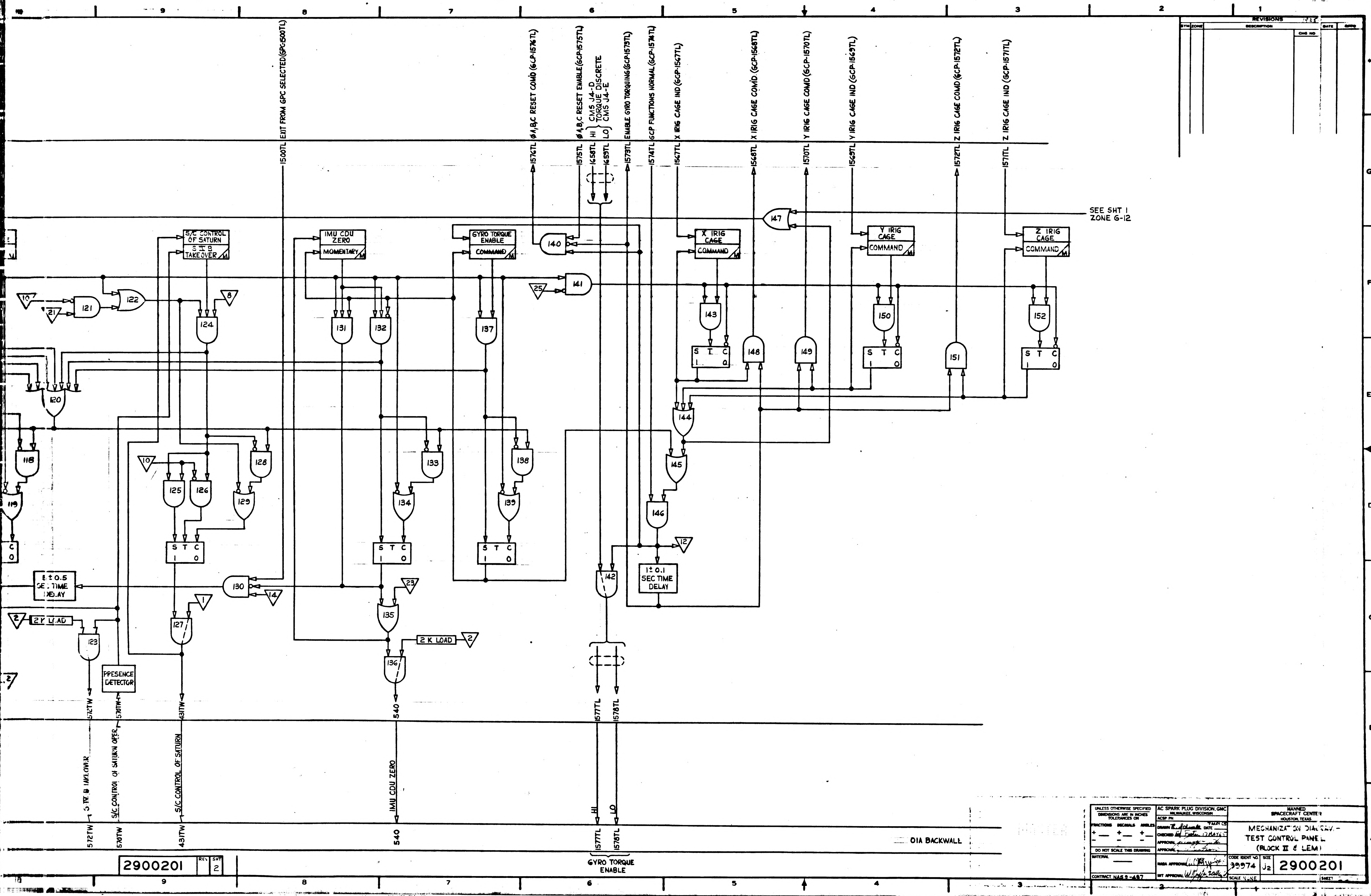
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ___
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Schwalk DATE 7 MAY 65
CHECKED Ed Foster 17 MAY 65
APPROVAL J. Truggo
APPROVAL
NASA APPROVAL
MIT APPROVAL W. Nyffe 20 May 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
TEST CONTROL PANEL
(BLOCK II & LEM)

CODE IDENT NO. 99974
SIZE J2
2900201
SCALE NONE
SHEET 2 OF 5


REVISIONS
SYM
ZONE
DESCRIPTION
CHG NO
DATE
APPD
1500TL EXIT FROM GPC SELECTED (GPC-1500TL)
1576TL ØA,B,C RESET COMD (GCP-1576TL)
1575TL ØA,B,C RESET ENABLE (GCP-1575TL)
1658TL HI CMS J4-D
TORQUE DISCRETE
1659TL LO CMS J4-E
1573TL ENABLE GYRO TORQUING (GCP-1573TL)
1574TL GCP FUNCTIONS NORMAL (GCP-1574TL)
1567TL X IRIG CAGE IND (GCP-1567TL)
1568TL X IRIG CAGE COMD (GCP-1568TL)
1570TL Y IRIG CAGE COMD (GCP-1570TL)
1569TL Y IRIG CAGE IND (GCP-1569TL)
1572TL Z IRIG CAGE COMD (GCP-1572TL)
1571TL Z IRIG CAGE IND (GCP-1571TL)
SEE SHT 1
ZONE G-12
S/C CONTROL OF SATURN
S IV B TAKEOVER
M
IMU CDU ZERO
MOMENTARY
GYRO TORQUE ENABLE
COMMAND
X IRIG CAGE
COMMAND
Y IRIG CAGE
COMMAND
Z IRIG CAGE
COMMAND
10
21
121
122
124
8
25
140
141
147
131
132
137
143
150
152
148
149
151
S T C
1 0
120
144
118
119
10
125
126
128
129
133
134
138
139
145
146
12
1 ± 0.1 SEC TIME DELAY
142
5 ± 0.5 SEC TIME DELAY
130
14
23
135
1
127
2
2 K LOAD
123
136
2 K LOAD
2
PRESENCE DETECTOR
572TW
570TW
431TW
540
1577TL
1578TL
S IV B TAKEOVER
S/C CONTROL OF SATURN OPER.
S/C CONTROL OF SATURN
IMU CDU ZERO
HI
LO
572TW
570TW
431TW
540
1577TL
1578TL
GYRO TORQUE ENABLE
01A BACKWALL
2900201
REV
SHT 2
10
9
8
7
6
5
4
3
2
1
G
F
E
D
C
B
A

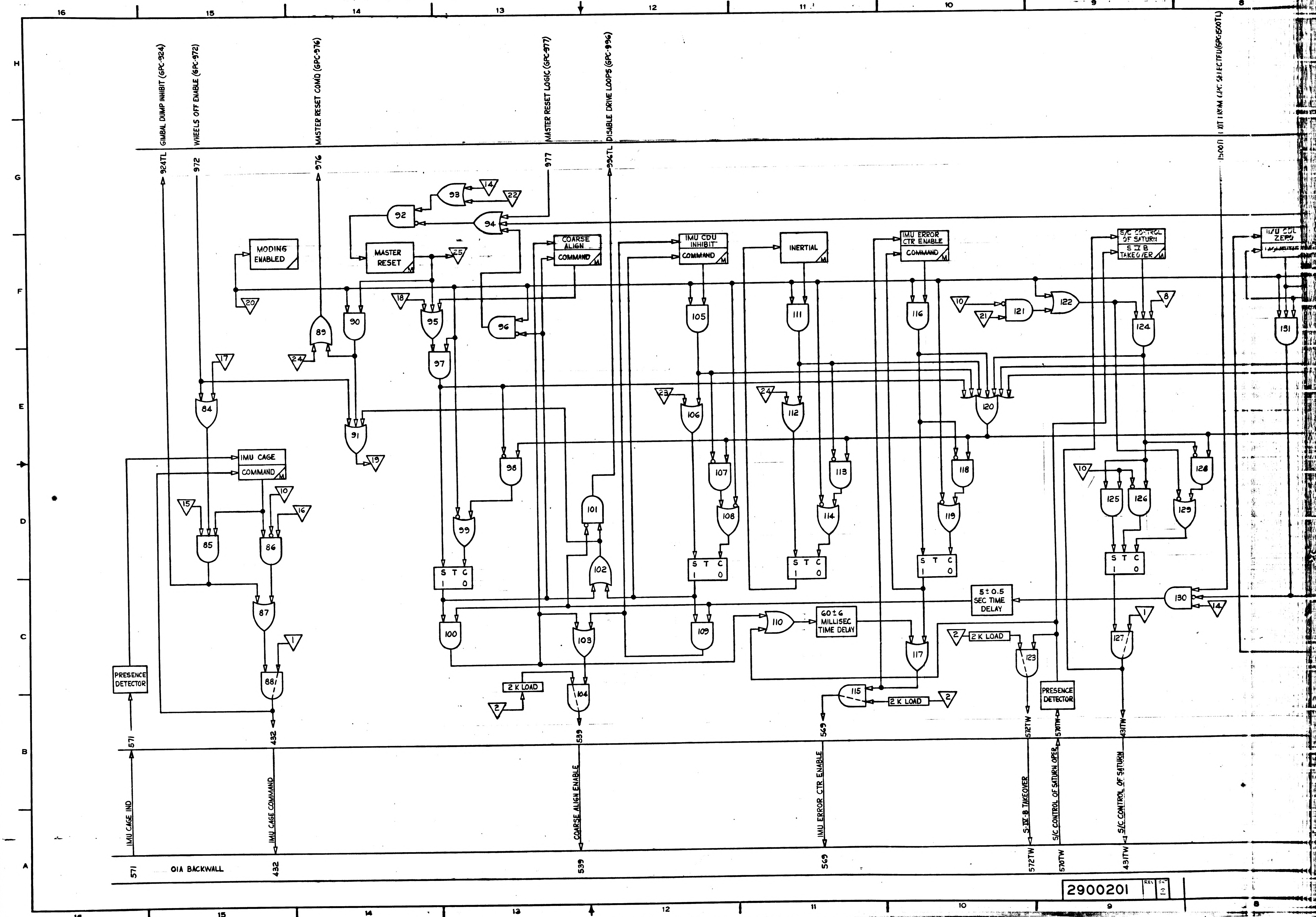
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Schwalb DATE 9 MAY 65
CHECKED Ed Foster 17 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

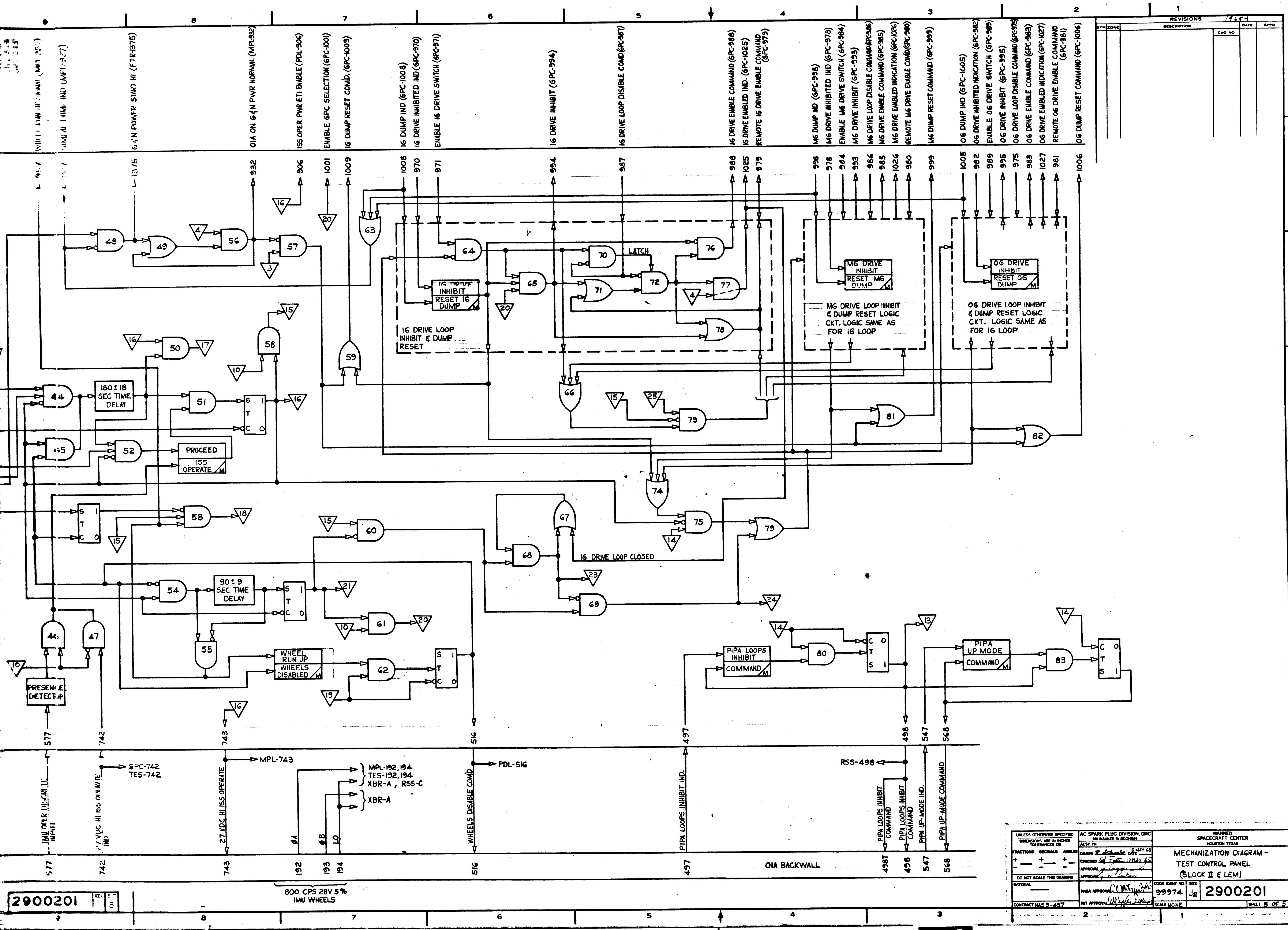
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
TEST CONTROL PANEL
(BLOCK II & LEM)

CODE IDENT NO.	SIZE	
39974	J2	2900201
SCALE NONE		SHEET

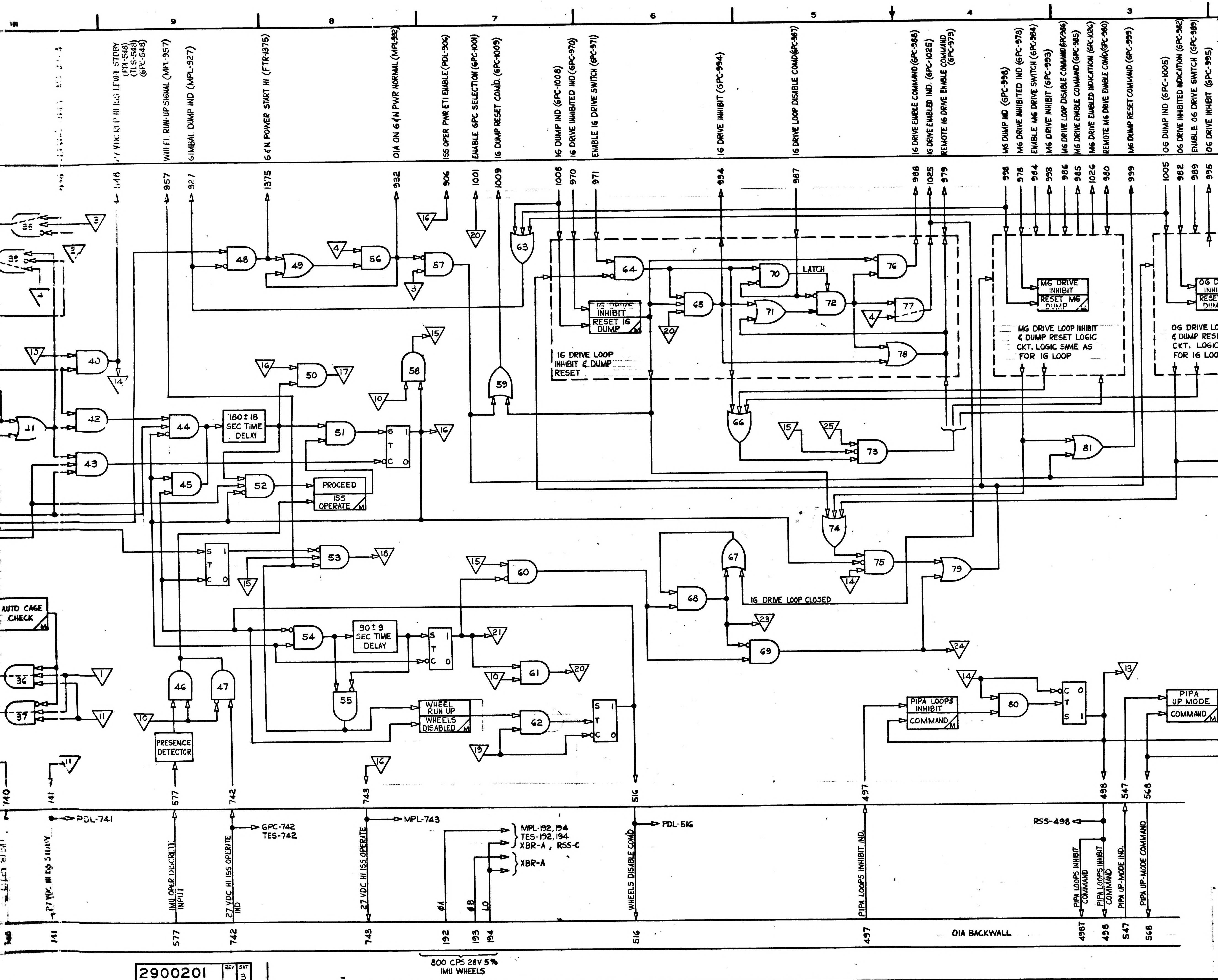

16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
GIMBAL DUMP INHIBIT (GPC-924)
924TL
WHEELS OFF ENABLE (GPC-972)
972
MASTER RESET COMD (GPC-976)
976
MASTER RESET LOGIC (GPC-977)
977
DISABLE DRIVE LOOPS (GPC-996)
996TL
MODING ENABLED
MASTER RESET
COARSE ALIGN
COMMAND
IMU CDU INHIBIT
COMMAND
INERTIAL
IMU ERROR CTR ENABLE
COMMAND
S/C CONTROL OF SATURN
S IVB TAKEOVER
IMU CAGE
COMMAND
M
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
113
114
115
116
117
118
119
120
121
122
123
124
125
126
127
128
129
130
131
S T C
1 0
60±6 MILLISEC TIME DELAY
5±0.5 SEC TIME DELAY
2 K LOAD
PRESENCE DETECTOR
571
IMU CAGE IND
432
IMU CAGE COMMAND
539
COARSE ALIGN ENABLE
569
IMU ERROR CTR ENABLE
572TW
S-IVB TAKEOVER
570TW
S/C CONTROL OF SATURN OPER
431TW
S/C CONTROL OF SATURN
01A BACKWALL

2900201


WHEEL RUN UP NORMAL (MPL-95?)
GIMBAL DUMP IND (MPL-927)
G&N POWER START HI (FTR-1375)
OIA ON G&N PWR NORMAL (MPL-932)
ISS OPER PWR ETI ENABLE (PDL-906)
ENABLE GPC SELECTION (GPC-1001)
IG DUMP RESET COMD. (GPC-1009)
IG DUMP IND (GPC-1008)
IG DRIVE INHIBITED IND (GPC-970)
ENABLE IG DRIVE SWITCH (GPC-971)
IG DRIVE INHIBIT (GPC-994)
IG DRIVE LOOP DISABLE COMD (GPC-987)
IG DRIVE ENABLE COMMAND (GPC-988)
IG DRIVE ENABLED IND. (GPC-1025)
REMOTE IG DRIVE ENABLE COMMAND (GPC-979)
MG DUMP IND (GPC-998)
MG DRIVE INHIBITED IND (GPC-978)
ENABLE MG DRIVE SWITCH (GPC-984)
MG DRIVE INHIBIT (GPC-993)
MG DRIVE LOOP DISABLE COMMAND (GPC-986)
MG DRIVE ENABLE COMMAND (GPC-985)
MG DRIVE ENABLED INDICATION (GPC-1026)
REMOTE MG DRIVE ENABLE COMD (GPC-980)
MG DUMP RESET COMMAND (GPC-999)
OG DUMP IND (GPC-1005)
OG DRIVE INHIBITED INDICATION (GPC-982)
ENABLE OG DRIVE SWITCH (GPC-989)
OG DRIVE INHIBIT (GPC-995)
OG DRIVE LOOP DISABLE COMMAND (GPC-975)
OG DRIVE ENABLE COMMAND (GPC-983)
OG DRIVE ENABLED INDICATION (GPC-1027)
REMOTE OG DRIVE ENABLE COMMAND (GPC-981)
OG DUMP RESET COMMAND (GPC-1006)
1375
932
906
1001
1009
1008
970
971
994
987
988
1025
979
998
978
984
993
986
985
1026
980
999
1005
982
989
995
975
983
1027
981
1006
180 ± 18 SEC TIME DELAY
PROCEED
ISS OPERATE
IG DRIVE INHIBIT
RESET IG DUMP
IG DRIVE LOOP INHIBIT & DUMP RESET
LATCH
MG DRIVE INHIBIT
RESET MG DUMP
MG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
OG DRIVE INHIBIT
RESET OG DUMP
OG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
IG DRIVE LOOP CLOSED
90 ± 9 SEC TIME DELAY
WHEEL RUN UP
WHEELS DISABLED
PRESENCE DETECTOR
PIPA LOOPS INHIBIT
COMMAND
PIPA UP MODE
COMMAND
577
742
743
516
497
498
547
568
IMU OPER DISCRETE INPUT
27 VDC HI ISS OPERATE IND
GPC-742
TES-742
MPL-743
27 VDC HI ISS OPERATE
MPL-192, 194
TES-192, 194
XBR-A, RSS-C
XBR-A
ØA
ØB
LO
PDL-516
WHEELS DISABLE COMD
PIPA LOOPS INHIBIT IND.
RSS-498
PIPA LOOPS INHIBIT COMMAND
PIPA LOOPS INHIBIT COMMAND
PIPA UP-MODE IND.
PIPA UP-MODE COMMAND
577
742
743
192
193
194
516
497
OIA BACKWALL
498T
498
547
568
800 CPS 28V 5%
IMU WHEELS
REVISIONS
SYM
ZONE
DESCRIPTION
CHG NO
DATE
APPD

2900201 REV SH 3

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
DO NOT SCALE THIS DRAWING	DRAWN R. Schwabe DATE 10 MAY 65 CHECKED Ed Foster 17 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM - TEST CONTROL PANEL (BLOCK II & LEM)
MATERIAL —	NASA APPROVAL MIT APPROVAL	CODE IDENT NO. 99974 SIZE J2 2900201
CONTRACT NAS 9-497		SCALE NONE SHEET 3 OF 5



27 VDC KEEP HI ISS LEVEL STDBY (PDL-548) (TES-548) (GPC-548)
WHEEL RUN-UP SIGNAL (MPL-957)
GIMBAL DUMP IND (MPL-927)
G & N POWER START HI (FTR-1375)
OIA ON G & N PWR NORMAL (MPL-932)
ISS OPER PWR ETI ENABLE (PDL-906)
ENABLE GPC SELECTION (GPC-1001)
IG DUMP RESET COMD. (GPC-1009)
IG DUMP IND (GPC-1008)
IG DRIVE INHIBITED IND (GPC-970)
ENABLE IG DRIVE SWITCH (GPC-971)
IG DRIVE INHIBIT (GPC-994)
IG DRIVE LOOP DISABLE COMD (GPC-987)
IG DRIVE ENABLE COMMAND (GPC-988)
IG DRIVE ENABLED IND. (GPC-1025)
REMOTE IG DRIVE ENABLE COMMAND (GPC-979)
MG DUMP IND (GPC-998)
MG DRIVE INHIBITED IND (GPC-978)
ENABLE MG DRIVE SWITCH (GPC-984)
MG DRIVE INHIBIT (GPC-993)
MG DRIVE LOOP DISABLE COMMAND (GPC-986)
MG DRIVE ENABLE COMMAND (GPC-985)
MG DRIVE ENABLED INDICATION (GPC-1026)
REMOTE MG DRIVE ENABLE COMD (GPC-980)
MG DUMP RESET COMMAND (GPC-999)
OG DUMP IND (GPC-1005)
OG DRIVE INHIBITED INDICATION (GPC-982)
ENABLE OG DRIVE SWITCH (GPC-989)
OG DRIVE INHIBIT (GPC-995)
OG DRIVE LOOP DISABLE COMMAND (GPC-975)
OG DRIVE ENABLE COMMAND (GPC-983)
OG DRIVE ENABLED INDICATION (GPC-1027)
REMOTE OG DRIVE ENABLE COMMAND (GPC-981)
OG DUMP RESET COMMAND (GPC-1006)
548 957 927 1375 932 906 1001 1009 1008 970 971 994 987 988 1025 979 998 978 984 993 986 985 1026 980 999 1005 982 989 995 975 983 1027 981 1006
35 36 37 38 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83
180 ± 18 SEC TIME DELAY
90 ± 9 SEC TIME DELAY
S T C 1 0
PROCEED ISS OPERATE M
AUTO CAGE CHECK M
WHEEL RUN UP WHEELS DISABLED M
PRESENCE DETECTOR
IG DRIVE INHIBIT RESET IG DUMP M
IG DRIVE LOOP INHIBIT & DUMP RESET
LATCH
MG DRIVE INHIBIT RESET MG DUMP M
MG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
OG DRIVE INHIBIT RESET OG DUMP M
OG DRIVE LOOP INHIBIT & DUMP RESET LOGIC CKT. LOGIC SAME AS FOR IG LOOP
IG DRIVE LOOP CLOSED
PIPA LOOPS INHIBIT COMMAND M
PIPA UP MODE COMMAND M
740 141 577 742 743 516 497 498 547 568
PDL-741
27 VDC HI ISS STDBY
IMU OPER DISCRETE INPUT
27 VDC HI ISS OPERATE IND
GPC-742
TES-742
27 VDC HI ISS OPERATE
MPL-743
MPL-192, 194
TES-192, 194
XBR-A , RSS-C
XBR-A
ØA ØB LO
192 193 194
800 CPS 28V 5% IMU WHEELS
WHEELS DISABLE COMD
PDL-516
PIPA LOOPS INHIBIT IND.
RSS-498
PIPA LOOPS INHIBIT COMMAND
PIPA UP-MODE IND.
PIPA UP-MODE COMMAND
498T 498 547 568
OIA BACKWALL
1 2 3 4 5 6 7 8 9 10
H G F E D C B A

2900201 | REV | SHT 3

REVISIONS				
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

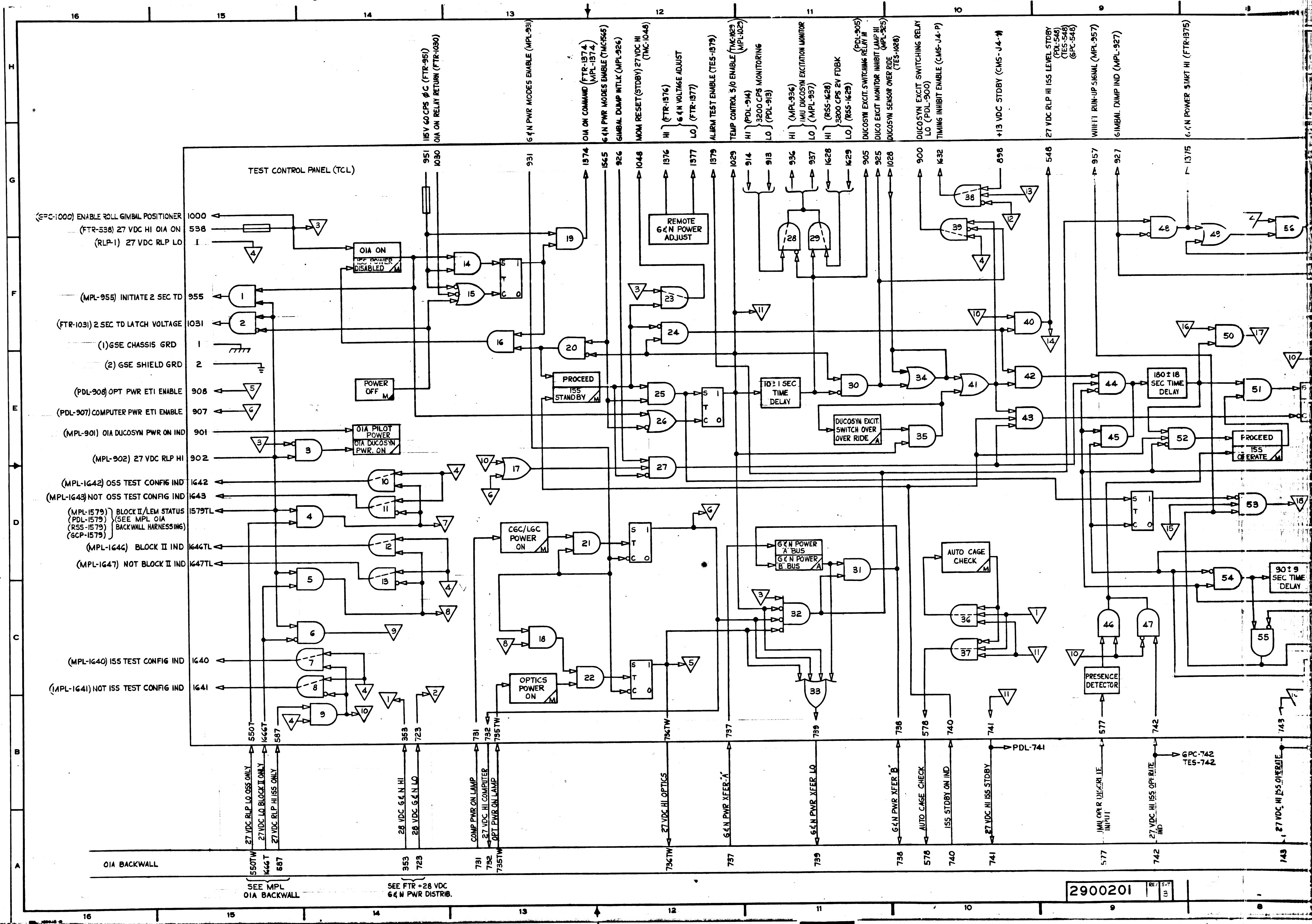
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Schwabe DATE 12 MAY 65
CHECKED Foster 17 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

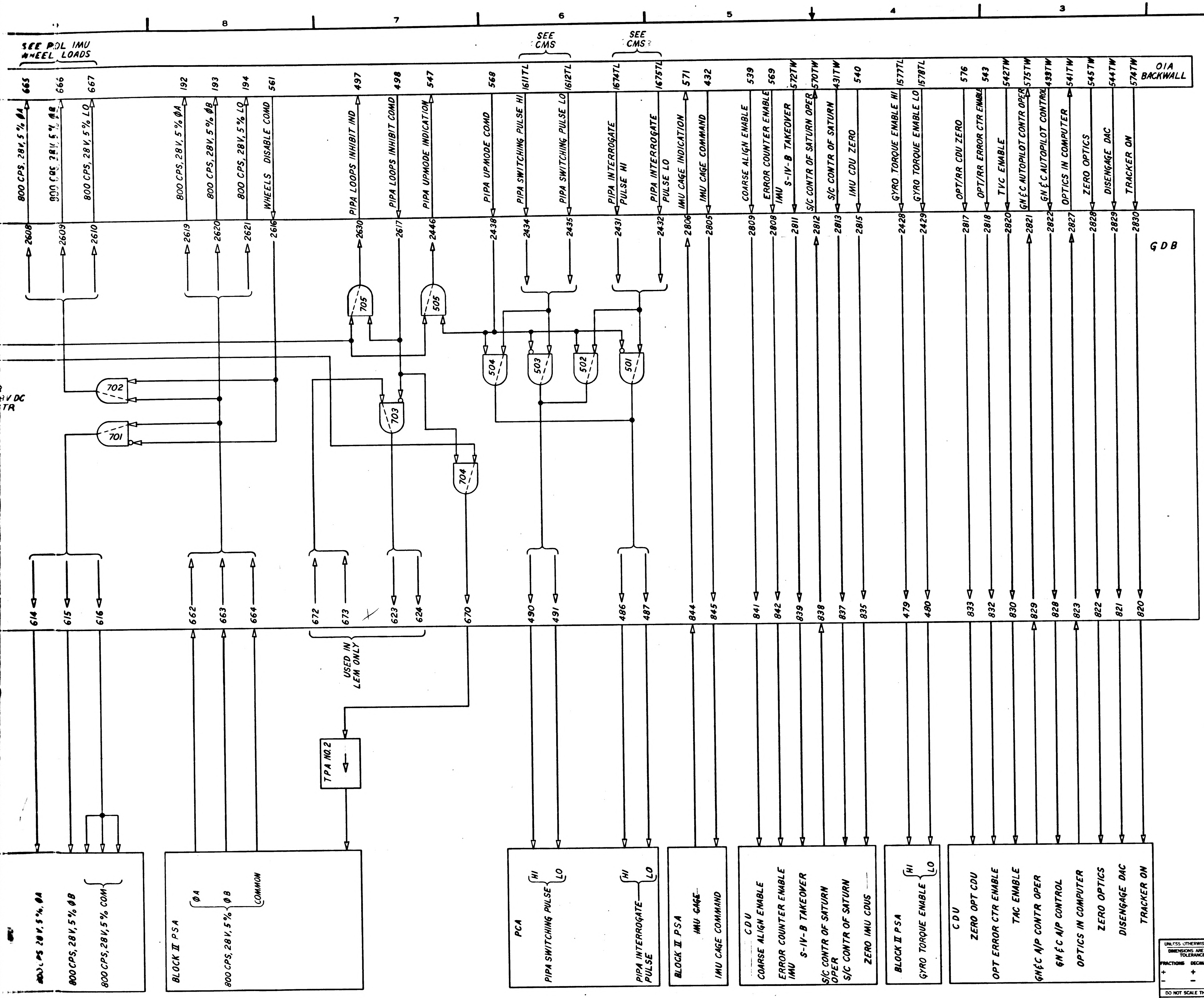
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
TEST CONTROL PANEL
(BLOCK II & LEV)

CODE IDENT NO. 99974
SIZE J2
2900201
SCALE NONE
SHEET


TEST CONTROL PANEL (TCL)
(GPC-1000) ENABLE ROLL GIMBAL POSITIONER 1000
(FTR-538) 27 VDC HI OIA ON 538
(RLP-1) 27 VDC RLP LO 1
(MPL-955) INITIATE 2 SEC TD 955
(FTR-1031) 2 SEC TD LATCH VOLTAGE 1031
(1) GSE CHASSIS GRD 1
(2) GSE SHIELD GRD 2
(PDL-908) OPT PWR ETI ENABLE 908
(PDL-907) COMPUTER PWR ETI ENABLE 907
(MPL-901) OIA DUCOSYN PWR ON IND 901
(MPL-902) 27 VDC RLP HI 902
(MPL-1642) OSS TEST CONFIG IND 1642
(MPL-1643) NOT OSS TEST CONFIG IND 1643
(MPL-1579) (PDL-1579) (RSS-1579) (GCP-1579) BLOCK II/LEM STATUS (SEE MPL OIA BACKWALL HARNESSING) 1579TL
(MPL-1646) BLOCK II IND 1646TL
(MPL-1647) NOT BLOCK II IND 1647TL
(MPL-1640) ISS TEST CONFIG IND 1640
(MPL-1641) NOT ISS TEST CONFIG IND 1641
115V 60 CPS ØC (FTR-951) 951
OIA ON RELAY RETURN (FTR-1030) 1030
G&N PWR MODES ENABLE (MPL-931) 931
OIA ON COMMAND (FTR-1374) (MPL-1374) 1374
G&N PWR MODES ENABLE (TMC-1565) 1565
GIMBAL DUMP INTLK (MPL-926) 926
MOM RESET (STDBY) 27 VDC HI (TMC-1048) 1048
HI (FTR-1376) 1376
G&N VOLTAGE ADJUST
LO (FTR-1377) 1377
ALARM TEST ENABLE (TES-1379) 1379
TEMP CONTROL S/O ENABLE (TMC-1029) (MPL-1029) 1029
HI (PDL-914) 914
3200 CPS MONITORING
LO (PDL-913) 913
HI (MPL-936) 936
IMU DUCOSYN EXCITATION MONITOR
LO (MPL-937) 937
HI (RSS-1628) 1628
3200 CPS 2V FDBK
LO (RSS-1629) 1629
DUCOSYN EXCIT. SWITCHING RELAY HI (PDL-905) 905
DUCO EXCIT MONITOR INHIBIT LAMP HI (MPL-925) 925
DUCOSYN SENSOR OVER RIDE (TES-1028) 1028
DUCOSYN EXCIT SWITCHING RELAY LO (PDL-900) 900
TIMING INHIBIT ENABLE (CMS-J4-P) 1632
+13 VDC STDBY (CMS-J4-N) 898
27 VDC RLP HI ISS LEVEL STDBY (PDL-548) (TES-548) (GPC-548) 548
WHITE RUN-UP SIGNAL (MPL-957) 957
GIMBAL DUMP IND (MPL-927) 927
G&N POWER START HI (FTR-1375) 1375
OIA ON ISS POWER DISABLED M
REMOTE G&N POWER ADJUST
POWER OFF M
PROCEED ISS STANDBY M
10 ± 1 SEC TIME DELAY
DUCOSYN EXCIT. SWITCH OVER OVER RIDE A
OIA PILOT POWER
OIA DUCOSYN PWR. ON
CGC/LGC POWER ON M
OPTICS POWER ON M
G&N POWER "A" BUS
G&N POWER "B" BUS A
AUTO CAGE CHECK M
PRESENCE DETECTOR
180 ± 18 SEC TIME DELAY
PROCEED ISS OPERATE M
90 ± 9 SEC TIME DELAY
S I T C O
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56
550T 1666T 587 353 723 731 732 735TW 736TW 737 739 738 578 740 741 577 742 743
→ PDL-741
→ GPC-742 TES-742
27 VDC RLP LO OSS TEST ONLY
27 VDC LO BLOCK II ONLY
27 VDC RLP HI ISS ONLY
28 VDC G&N HI
28 VDC G&N LO
COMP PWR ON LAMP
27 VDC HI COMPUTER
OPT PWR ON LAMP
27 VDC HI OPTICS
G&N PWR XFER "A"
G&N PWR XFER LO
G&N PWR XFER "B"
AUTO CAGE CHECK
ISS STDBY ON IND
27 VDC HI ISS STDBY
IMU OPER DISCRETE INPUT
27 VDC HI ISS OPERATE IND
27 VDC HI ISS OPERATE
OIA BACKWALL
550TW 1666T 587 353 723 731 732 735TW 736TW 737 739 738 578 740 741 577 742 743
SEE MPL OIA BACKWALL
SEE FTR +28 VDC G&N PWR DISTRIB.
2900201
16 15 14 13 12 11 10 9 8
H G F E D C B A

SYM	ZONE	REVISIONS DESCRIPTION	DATE	APPD
		CHG NO		


SEE PDL IMU WHEEL LOADS
SEE CMS
SEE CMS
OIA BACKWALL
GDB
665 800 CPS, 28V, 5% ØA 2608
666 800 CPS, 28V, 5% ØB 2609
667 800 CPS, 28V, 5% LO 2610
192 800 CPS, 28V, 5% ØA 2619
193 800 CPS, 28V, 5% ØB 2620
194 800 CPS, 28V, 5% LO 2621
561 WHEELS DISABLE COMD 2616
497 PIPA LOOPS INHIBIT IND 2630
498 PIPA LOOPS INHIBIT COMD 2617
547 PIPA UPMODE INDICATION 2446
568 PIPA UPMODE COMD 2438
1611TL PIPA SWITCHING PULSE HI 2434
1612TL PIPA SWITCHING PULSE LO 2435
1674TL PIPA INTERROGATE PULSE HI 2431
1675TL PIPA INTERROGATE PULSE LO 2432
571 IMU CAGE INDICATION 2806
432 IMU CAGE COMMAND 2805
539 COARSE ALIGN ENABLE 2809
569 ERROR COUNTER ENABLE IMU 2808
572TW S-IV-B TAKEOVER 2811
570TW S/C CONTR OF SATURN OPER 2812
431TW S/C CONTR OF SATURN 2813
540 IMU CDU ZERO 2815
1577TL GYRO TORQUE ENABLE HI 2428
1578TL GYRO TORQUE ENABLE LO 2429
576 OPT/RR CDU ZERO 2817
543 OPT/RR ERROR CTR ENABLE 2818
542TW TVC ENABLE 2820
575TW GN&C AUTOPILOT CONTR OPER 2821
439TW GN&C AUTOPILOT CONTROL 2822
541TW OPTICS IN COMPUTER 2827
545TW ZERO OPTICS 2828
544TW DISENGAGE DAC 2829
574TW TRACKER ON 2830
705
505
504
503
502
501
702
701
703
704
V DC
TR
614
615
616
662
663
664
672
673
623
624
670
490
491
486
487
844
845
841
842
839
838
837
835
479
480
833
832
830
829
828
823
822
821
820
USED IN LEM ONLY
TPA NO. 2
800 CPS 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% COM
BLOCK II PSA
ØA
ØB
COMMON
800 CPS, 28V, 5%
PCA
HI
LO
PIPA SWITCHING PULSE
HI
LO
PIPA INTERROGATE PULSE
BLOCK II PSA
~~IMU CAGE~~
IMU CAGE COMMAND
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
S-IV-B TAKEOVER
S/C CONTR OF SATURN OPER
S/C CONTR OF SATURN
ZERO IMU CDUS
BLOCK II PSA
HI
LO
GYRO TORQUE ENABLE
CDU
ZERO OPT CDU
OPT ERROR CTR ENABLE
TAC ENABLE
GN&C A/P CONTR OPER
GN&C A/P CONTROL
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
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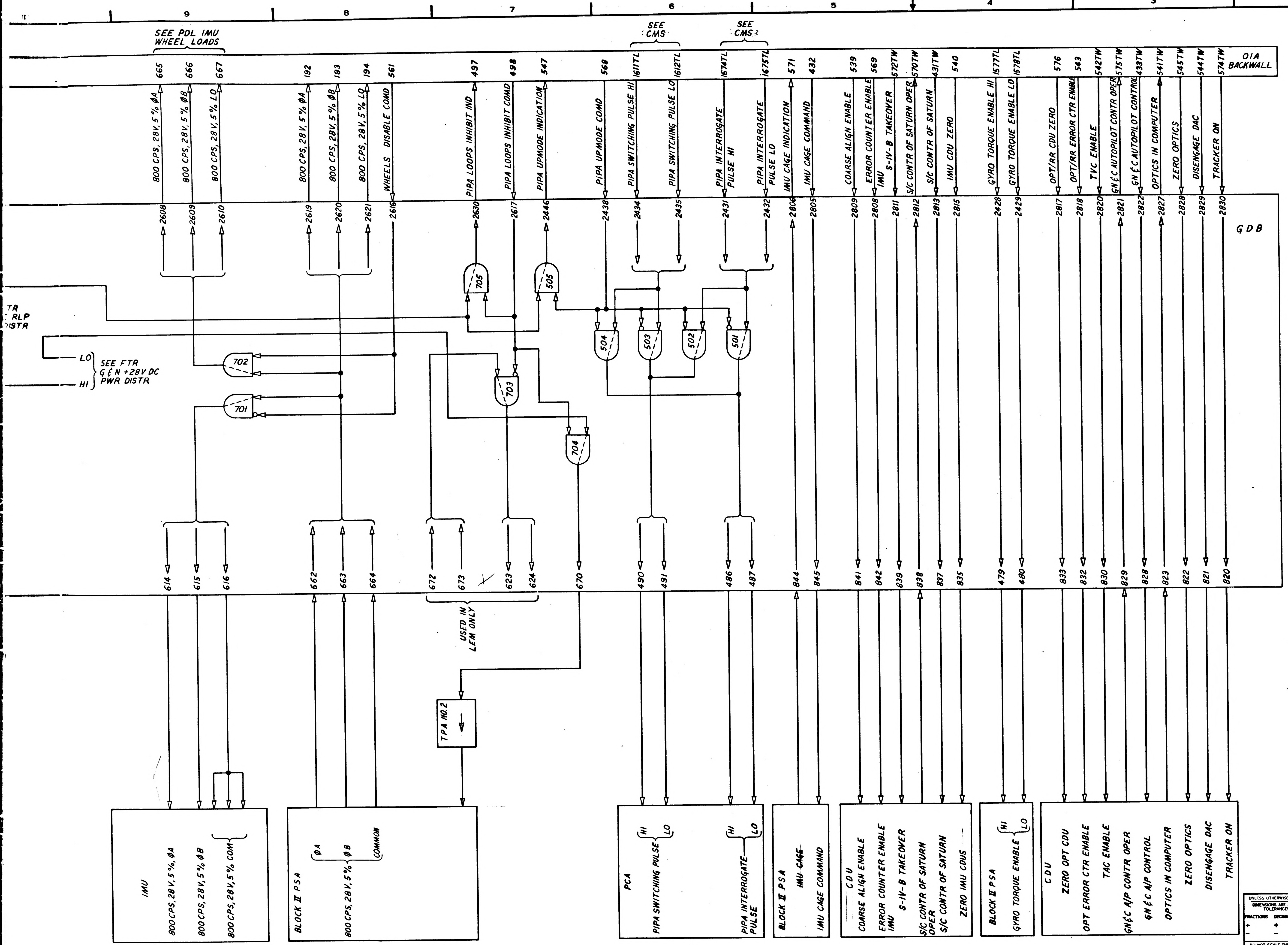
A

2H

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
FRACTIONS ± DECIMALS ± ANGLES ±	ACSP PN	MECHANIZATION DIAGRAM TEST CONTROL PANEL (BLOCK II)
	DRAWN Bendel DATE 12-MAY-65 CHECKED Ed Foster 17MAY65 APPROVAL J. Triggs J. H. APPROVAL J. McCreston	
DO NOT SCALE THIS DRAWING		
MATERIAL	NASA APPROVAL G.C. McIntyre MIT APPROVAL W Kupfer 20May65	CODE IDENT NO. 99974 · SIZE J2 · 2900201
CONTRACT NAS 9-497		SCALE · SHEET 4 OF 5


SEE PDL IMU WHEEL LOADS
SEE CMS
SEE CMS
OIA BACKWALL
665 666 667 192 193 194 561 497 498 547 568 1611TL 1612TL 1674TL 1675TL 571 432 539 569 572TW 570TW 431TW 540 1577TL 1578TL 576 543 542TW 575TW 433TW 541TW 545TW 544TW 574TW
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
PIPA LOOPS INHIBIT IND
PIPA LOOPS INHIBIT COMD
PIPA UPMODE INDICATION
PIPA UPMODE COMD
PIPA SWITCHING PULSE HI
PIPA SWITCHING PULSE LO
PIPA INTERROGATE PULSE HI
PIPA INTERROGATE PULSE LO
IMU CAGE INDICATION
IMU CAGE COMMAND
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
S-IV-B TAKEOVER
S/C CONTR OF SATURN OPER
S/C CONTR OF SATURN
IMU CDU ZERO
GYRO TORQUE ENABLE HI
GYRO TORQUE ENABLE LO
OPT/RR CDU ZERO
OPT/RR ERROR CTR ENABLE
TVC ENABLE
GN & C AUTOPILOT CONTR OPER
GN & C AUTOPILOT CONTROL
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
2608 2609 2610 2619 2620 2621 2616 2630 2617 2446 2438 2434 2435 2431 2432 2806 2805 2809 2808 2811 2812 2813 2815 2428 2429 2817 2818 2820 2821 2822 2827 2828 2829 2830
GDB
TR
RLP
DISTR
LO
HI
SEE FTR G & N +28V DC PWR DISTR
705 505 702 701 703 704 504 503 502 501
614 615 616 662 663 664 672 673 623 624 670 490 491 486 487 844 845 841 842 839 838 837 835 479 480 833 832 830 829 828 823 822 821 820
USED IN LEM ONLY
TPA NO. 2
IMU
800 CPS, 28 V, 5%, ØA
800 CPS, 28 V, 5%, ØB
800 CPS, 28 V, 5% COM
BLOCK II PSA
ØA
ØB
COMMON
800 CPS, 28 V, 5%
PCA
PIPA SWITCHING PULSE
HI
LO
PIPA INTERROGATE PULSE
HI
LO
BLOCK II PSA
~~IMU CAGE~~
IMU CAGE COMMAND
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
S-IV-B TAKEOVER
S/C CONTR OF SATURN OPER
S/C CONTR OF SATURN
ZERO IMU CDUS
BLOCK II PSA
HI
LO
GYRO TORQUE ENABLE
CDU
ZERO OPT CDU
OPT ERROR CTR ENABLE
TAC ENABLE
GN & C A/P CONTR OPER
GN & C A/P CONTROL
OPTICS IN COMPUTER
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
9 8 7 6 5 4 3 2 1
H G F E D C B A

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS + − ANGLES + −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

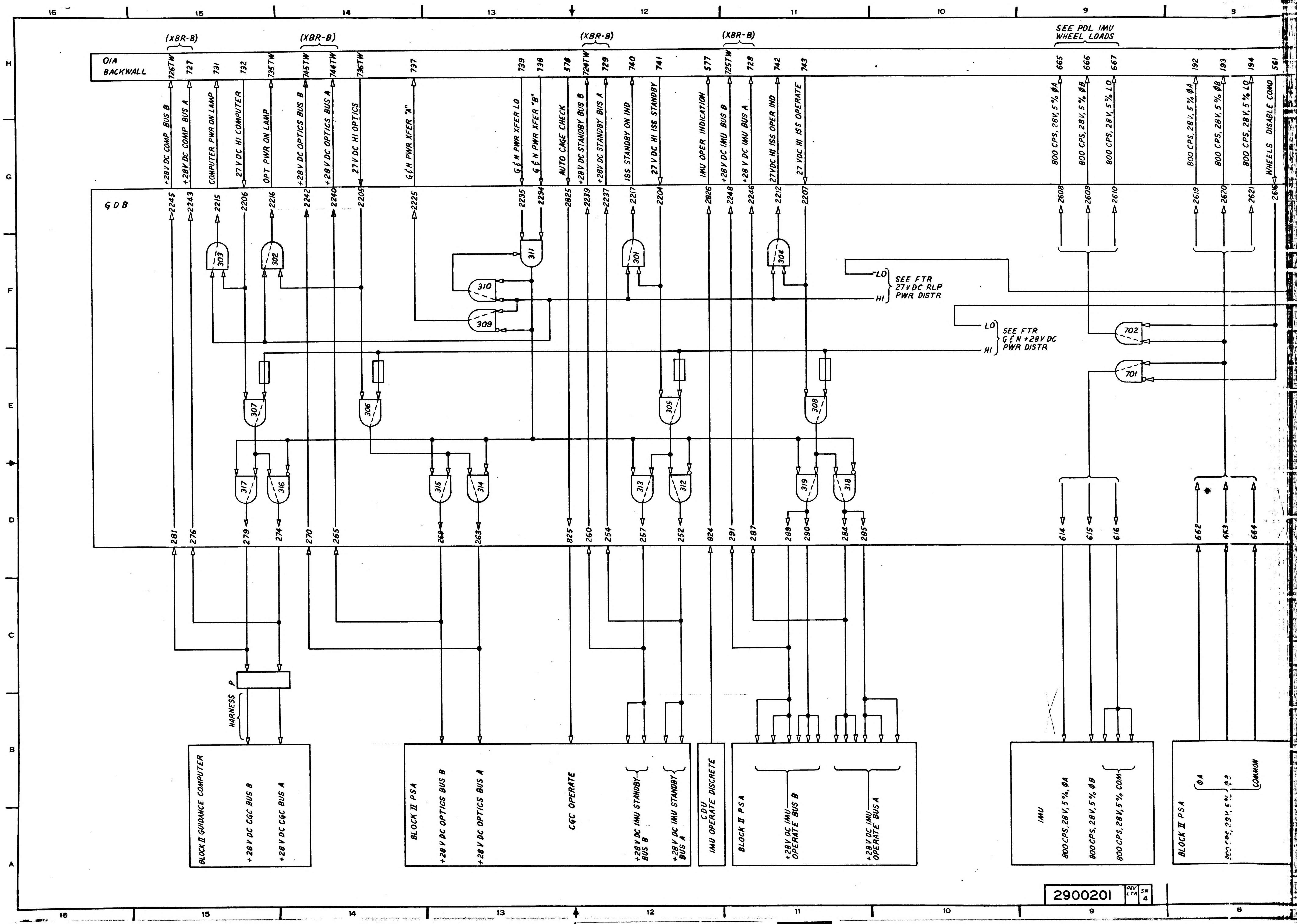
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bendel DATE 12-MAY-65
CHECKED Ed Foster 17MAY65
APPROVAL J. Triggs G.H.
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
TEST CONTROL PANEL
(BLOCK II)

CODE IDENT NO. 99974 SIZE J2 2900201
SCALE SHEET 4 OF

2900201	REV LTR	SH 4


16
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12
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9
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H
G
F
E
D
C
B
A
O/A BACKWALL
G D B
(XBR-B)
(XBR-B)
(XBR-B)
(XBR-B)
SEE PDL IMU WHEEL LOADS
726TW
727
731
732
735TW
745TW
744TW
736TW
737
739
738
578
724TW
729
740
741
577
725TW
728
742
743
665
666
667
192
193
194
561
+28V DC COMP BUS B
+28V DC COMP BUS A
COMPUTER PWR ON LAMP
27 V DC HI COMPUTER
OPT PWR ON LAMP
+28V DC OPTICS BUS B
+28 V DC OPTICS BUS A
27 V DC HI OPTICS
G & N PWR XFER "A"
G & N PWR XFER LO
G & N PWR XFER "B"
AUTO CAGE CHECK
+28V DC STANDBY BUS B
+28V DC STANDBY BUS A
ISS STANDBY ON IND
27 V DC HI ISS STANDBY
IMU OPER INDICATION
+28V DC IMU BUS B
+28 V DC IMU BUS A
27VDC HI ISS OPER IND
27 VDC HI ISS OPERATE
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
2245
2243
2215
2206
2216
2242
2240
2205
2225
2235
2234
2825
2239
2237
2217
2204
2826
2248
2246
2212
2207
2608
2609
2610
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2621
2616
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311
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301
304
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306
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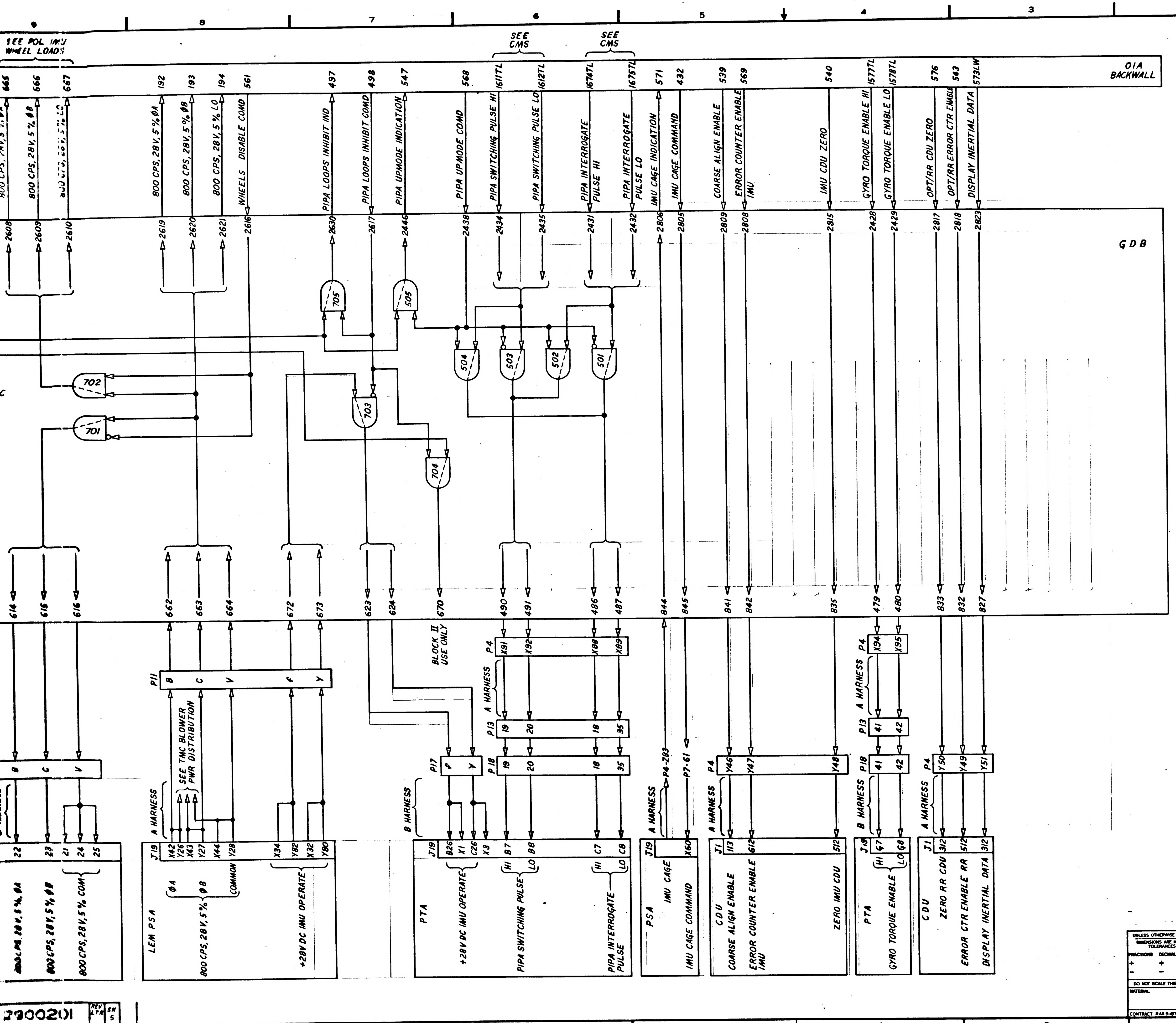
308
317
316
315
314
313
312
319
318
702
701
LO
HI
SEE FTR 27V DC RLP PWR DISTR
LO
HI
SEE FTR G & N +28V DC PWR DISTR
281
276
279
274
270
265
268
263
825
260
254
257
252
824
291
287
289
290
284
285
614
615
616
662
663
664
P
HARNESS
BLOCK II GUIDANCE COMPUTER
+28 V DC CGC BUS B
+28 V DC CGC BUS A
BLOCK II PSA
+28 V DC OPTICS BUS B
+28 V DC OPTICS BUS A
CGC OPERATE
+28 V DC IMU STANDBY BUS B
+28 V DC IMU STANDBY BUS A
CDU
IMU OPERATE DISCRETE
BLOCK II PSA
+28V DC IMU OPERATE BUS B
+28V DC IMU OPERATE BUS A
IMU
800CPS, 28V, 5% ØA
800CPS, 28V, 5% ØB
800CPS, 28V, 5% COM
BLOCK II PSA
ØA
800 CPS, 28 V, 5%
COMMON

2900201 REV LTR SH 4


SEE POL IMU WHEEL LOADS
OIA BACKWALL
GDB
SEE CMS
SEE CMS
665
666
667
192
193
194
561
497
498
547
568
1611TL
1612TL
1674TL
1675TL
571
432
539
569
540
1577TL
1578TL
576
543
573LW
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
PIPA LOOPS INHIBIT IND
PIPA LOOPS INHIBIT COMD
PIPA UPMODE INDICATION
PIPA UPMODE COMD
PIPA SWITCHING PULSE HI
PIPA SWITCHING PULSE LO
PIPA INTERROGATE PULSE HI
PIPA INTERROGATE PULSE LO
IMU CAGE INDICATION
IMU CAGE COMMAND
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
IMU CDU ZERO
GYRO TORQUE ENABLE HI
GYRO TORQUE ENABLE LO
OPT/RR CDU ZERO
OPT/RR ERROR CTR ENABLE
DISPLAY INERTIAL DATA
2608
2609
2610
2619
2620
2621
2616
2630
2617
2446
2438
2434
2435
2431
2432
2806
2805
2809
2808
2815
2428
2429
2817
2818
2823
705
505
702
701
703
504
503
502
501
704
614
615
616
662
663
664
672
673
623
624
670
490
491
486
487
844
845
841
842
835
479
480
833
832
827
BLOCK II USE ONLY
P11
B
C
V
F
Y
P4
X91
X92
X88
X89
A HARNESS
P13
19
20
18
35
P18
19
20
18
35
P17
P
Y
P4
X94
X95
A HARNESS
P13
41
42
P18
41
42
P4-283
P7-61
P4
X46
X47
X48
P4
Y50
Y49
Y51
B
C
V
SEE TMC BLOWER PWR DISTRIBUTION
A HARNESS
B HARNESS
A HARNESS
A HARNESS
B HARNESS
A HARNESS
22
23
21
24
25
J19
X42
Y26
X43
Y27
X44
Y28
X34
Y82
X32
Y80
J19
B26
X1
C26
X3
HI B7
LO B8
HI C7
LO C8
J19
X60
J1
113
612
512
J19
HI 67
LO 68
J1
312
512
312
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% COM
LEM PSA
ØA
ØB
800 CPS, 28V, 5%
COMMON
+28V DC IMU OPERATE
PTA
+28V DC IMU OPERATE
PIPA SWITCHING PULSE
HI
LO
PIPA INTERROGATE PULSE
HI
LO
PSA
IMU CAGE
IMU CAGE COMMAND
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
ZERO IMU CDU
PTA
GYRO TORQUE ENABLE
HI
LO
CDU
ZERO RR CDU
ERROR CTR ENABLE RR
DISPLAY INERTIAL DATA
2900201
REV LTR
SH 5
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
2H

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ + +
− − −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

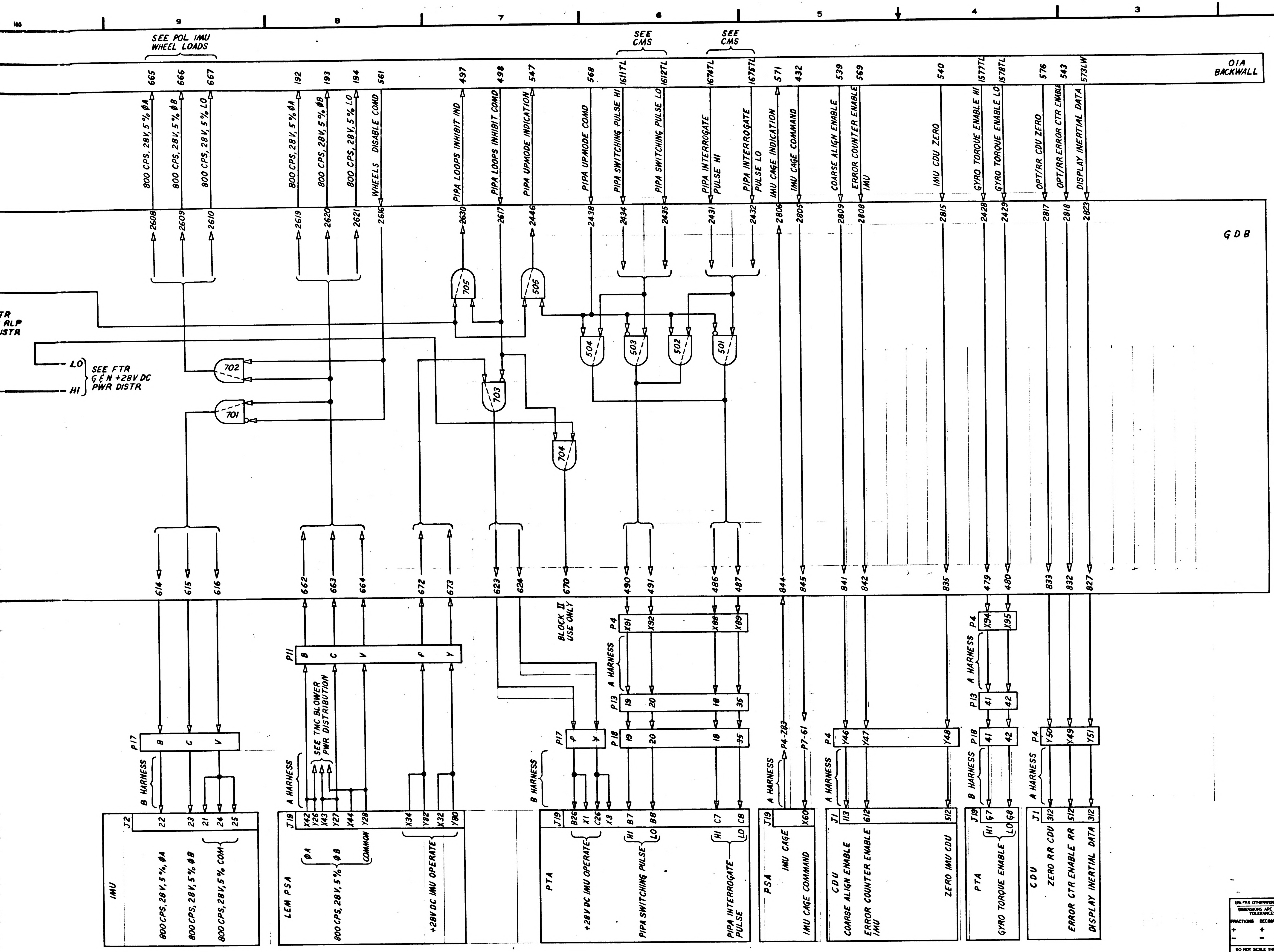
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Bender DATE 11-MAY-65
CHECKED A Foster 17 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
TEST CONTROL PANEL
(LEM)

CODE IDENT NO. 99974
SIZE J2
2900201
SCALE
SHEET 5 OF 5

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPD
		CHG NO		



SEE POL IMU WHEEL LOADS
SEE CMS
SEE CMS
OIA BACKWALL
665
666
667
192
193
194
561
497
498
547
568
1611TL
1612TL
1674TL
1675TL
571
432
539
569
540
1577TL
1578TL
576
543
573LW
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% LO
WHEELS DISABLE COMD
PIPA LOOPS INHIBIT IND
PIPA LOOPS INHIBIT COMD
PIPA UPMODE INDICATION
PIPA UPMODE COMD
PIPA SWITCHING PULSE HI
PIPA SWITCHING PULSE LO
PIPA INTERROGATE PULSE HI
PIPA INTERROGATE PULSE LO
IMU CAGE INDICATION
IMU CAGE COMMAND
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
IMU CDU ZERO
GYRO TORQUE ENABLE HI
GYRO TORQUE ENABLE LO
OPT/RR CDU ZERO
OPT/RR ERROR CTR ENABLE
DISPLAY INERTIAL DATA
2608
2609
2610
2619
2620
2621
2616
2630
2617
2446
2438
2434
2435
2431
2432
2806
2805
2809
2808
2815
2428
2429
2817
2818
2823
GDB
TR
RLP
ISTR
LO
HI
SEE FTR G & N +28V DC PWR DISTR
705
505
504
503
502
501
702
701
703
704
614
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662
663
664
672
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623
624
670
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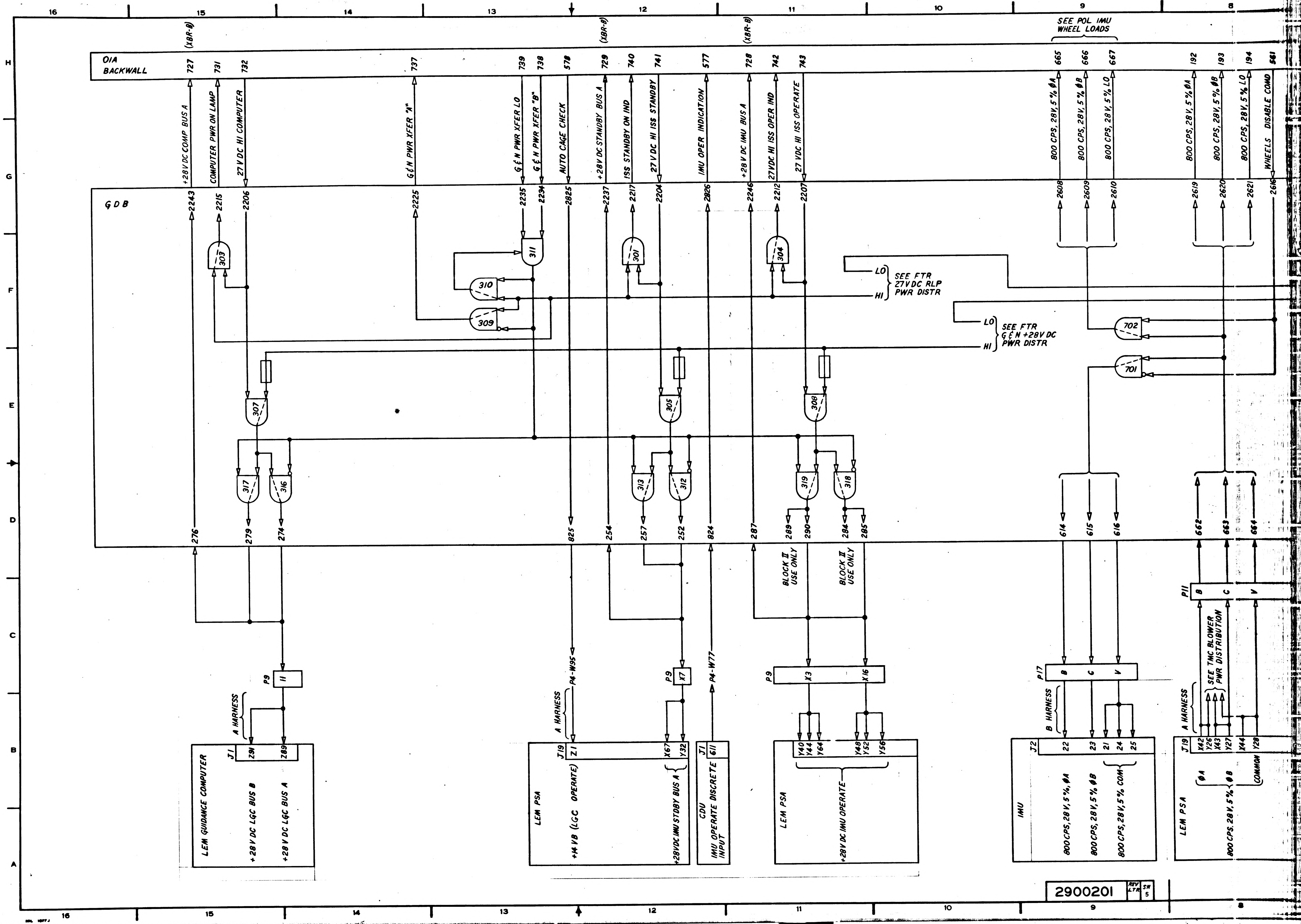
841
842
835
479
480
833
832
827
BLOCK II USE ONLY
P11
B
C
V
F
Y
SEE TMC BLOWER PWR DISTRIBUTION
A HARNESS
P4
X91
X92
X88
X89
A HARNESS
P13
19
20
18
35
P18
19
20
18
35
P17
B
C
V
B HARNESS
P17
F
Y
B HARNESS
P4-283
P7-61
A HARNESS
P4
Y46
Y47
Y48
A HARNESS
P4
Y94
Y95
A HARNESS
P13
41
42
P18
41
42
B HARNESS
P4
Y50
Y49
Y51
A HARNESS
J2
22
23
21
24
25
IMU
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% COM
J19
X42
Y26
X43
Y27
X44
Y28
X34
Y82
X32
Y80
ØA
ØB
COMMON
LEM PSA
800 CPS, 28V, 5% ØB
+28V DC IMU OPERATE
J19
B26
X1
C26
X3
PTA
+28V DC IMU OPERATE
J19
HI
B7
B8
LO
C7
C8
PIPA SWITCHING PULSE
PIPA INTERROGATE PULSE
J19
X60
PSA
IMU CAGE
IMU CAGE COMMAND
J1
113
612
512
CDU
COARSE ALIGN ENABLE
ERROR COUNTER ENABLE IMU
ZERO IMU CDU
J19
HI
67
LO
68
PTA
GYRO TORQUE ENABLE
J1
312
512
312
CDU
ZERO RR CDU
ERROR CTR ENABLE RR
DISPLAY INERTIAL DATA

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + + + − − −	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN Bender DATE 11-MAY-65 CHECKED APPROVAL APPROVAL	MECHANIZATION DIAGRAM TEST CONTROL PANEL (LEM)
DO NOT SCALE THIS DRAWING		
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 2900201
CONTRACT NAS 9-497	MIT APPROVAL	SCALE · SHEET

2900201	REV LTR	SH 5



OIA BACKWALL
GDB
(XBR-8)
727 +28V DC COMP BUS A
731 COMPUTER PWR ON LAMP
732 27 V DC HI COMPUTER
737 G&N PWR XFER "A"
739 G&N PWR XFER LO
738 G&N PWR XFER "B"
578 AUTO CAGE CHECK
729 +28V DC STANDBY BUS A
740 ISS STANDBY ON IND
741 27 V DC HI ISS STANDBY
577 IMU OPER INDICATION
728 +28 V DC IMU BUS A
742 27VDC HI ISS OPER IND
743 27 VDC HI ISS OPERATE
SEE POL IMU WHEEL LOADS
665 800 CPS, 28V, 5% ØA
666 800 CPS, 28V, 5% ØB
667 800 CPS, 28 V, 5% LO
192 800 CPS, 28 V, 5% ØA
193 800 CPS, 28V, 5% ØB
194 800 CPS, 28V, 5% LO
561 WHEELS DISABLE COMD
2243
2215
2206
2225
2235
2234
2825
2237
2217
2204
2826
2246
2212
2207
2608
2609
2610
2619
2620
2621
2616
303
311
310
309
301
304
307
305
308
317
316
313
312
319
318
702
701
LO
HI
SEE FTR 27 VDC RLP PWR DISTR
SEE FTR G&N +28V DC PWR DISTR
276
279
274
825
254
257
252
824
287
289
290
284
285
614
615
616
662
663
664
BLOCK II USE ONLY
BLOCK II USE ONLY
P11
B
C
V
SEE TMC BLOWER PWR DISTRIBUTION
P9
11
P4-W95
X7
P4-W77
X3
X16
P17
A HARNESS
B HARNESS
J1
Z91
Z89
LEM GUIDANCE COMPUTER
+28 V DC LGC BUS B
+28 V DC LGC BUS A
J19
Z1
X67
Y32
LEM PSA
+14 V B (LGC OPERATE)
+28VDC IMU STDBY BUS A
J1
611
GDU
IMU OPERATE DISCRETE INPUT
X40
X44
Y64
X48
Y52
Y56
LEM PSA
+28V DC IMU OPERATE
J2
22
23
21
24
25
IMU
800 CPS, 28V, 5% ØA
800 CPS, 28V, 5% ØB
800 CPS, 28V, 5% COM
X42
Y26
X43
Y27
X44
Y28
LEM PSA
ØA
800 CPS, 28V, 5% ØB
COMMON
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
2900201
REV LTR
SH 5

5800503

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. LOGIC SYMBOLS PER MIL-STD-806
3. REFERENCE MECHANIZATION DIAGRAMS

2900207	MONITOR PANEL
2900201	TEST CONTROL PANEL (BLOCK II AND LEM)

4. NONSTANDARD SYMBOLOGY

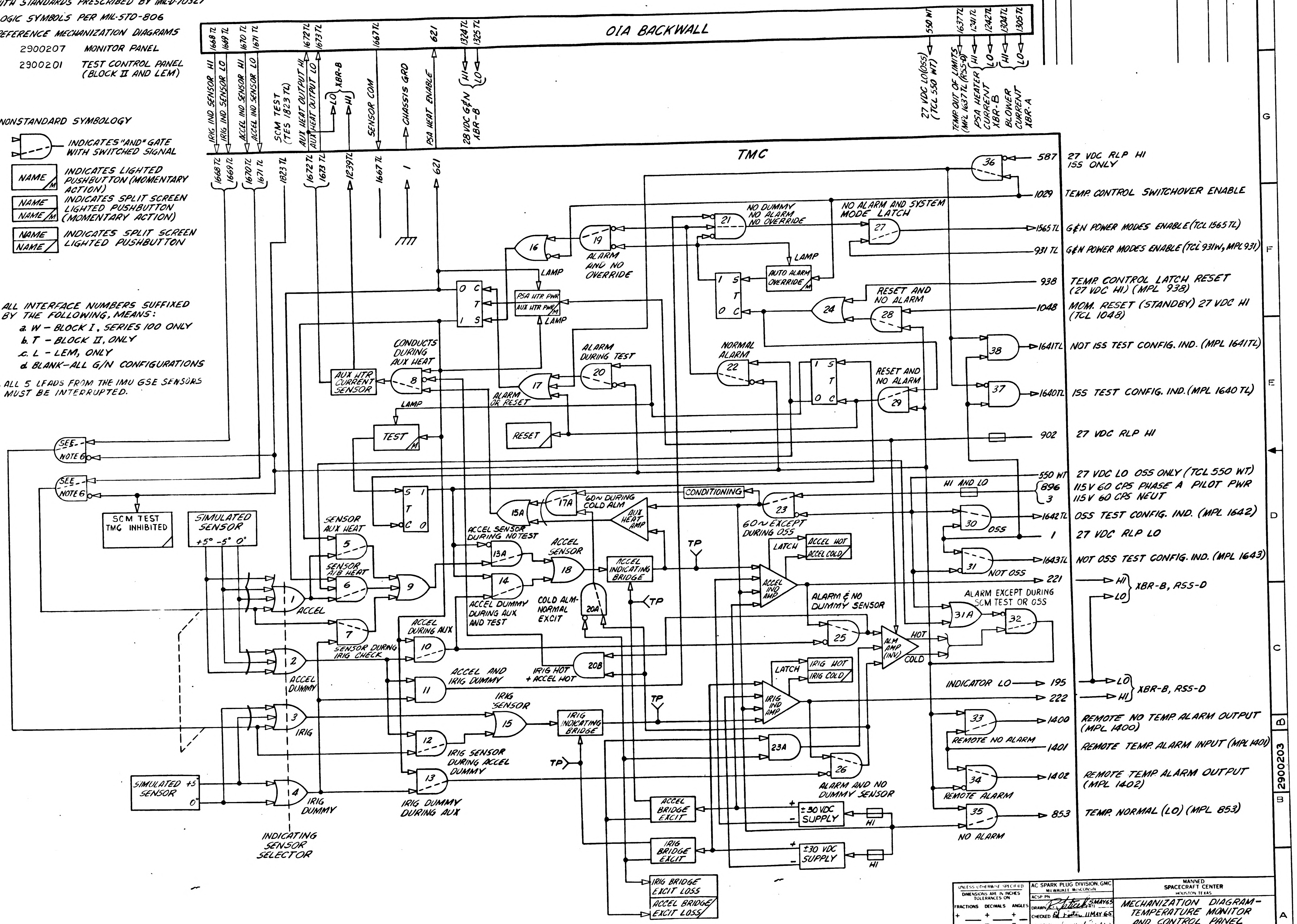
INDICATES "AND" GATE WITH SWITCHED SIGNAL

NAME / M — INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME / NAME / M — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME / NAME — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   - a. W – BLOCK I, SERIES 100 ONLY
   - b. T – BLOCK II, ONLY
   - c. L – LEM, ONLY
   - d. BLANK – ALL G/N CONFIGURATIONS
6. ALL 5 LEADS FROM THE IMU GSE SENSORS MUST BE INTERRUPTED.


OIA BACKWALL
1668 TL
1669 TL
1670 TL
1671 TL
1672 TL
1673 TL
1667 TL
621
1324 TL
1325 TL
550 WT
1637 TL
1241 TL
1242 TL
1304 TL
1305 TL
IRIG IND SENSOR HI
IRIG IND SENSOR LO
ACCEL IND SENSOR HI
ACCEL IND SENSOR LO
SCM TEST (TES 1823 TL)
AUX HEAT OUTPUT HI
AUX HEAT OUTPUT LO
LO
HI
XBR-B
SENSOR COM
CHASSIS GRD
PSA HEAT ENABLE
28 VDC G&N XBR-B
HI
LO
27 VDC LO (OSS) (TCL 550 WT)
TEMP. OUT OF LIMITS (MPL 1637 TL (RSS-D)
PSA HEATER CURRENT XBR-B
HI
LO
BLOWER CURRENT XBR-A
HI
LO
TMC
1668 TL
1669 TL
1670 TL
1671 TL
1823 TL
1672 TL
1673 TL
1239 TL
1667 TL
1
621
36
587
27 VDC RLP HI ISS ONLY
1029
TEMP. CONTROL SWITCHOVER ENABLE
NO DUMMY NO ALARM NO OVERRIDE
21
NO ALARM AND SYSTEM MODE LATCH
27
1565 TL
G&N POWER MODES ENABLE (TCL 1565 TL)
931 TL
G&N POWER MODES ENABLE (TCL 931W, MPL 931)
16
19
ALARM AND NO OVERRIDE
LAMP
AUTO ALARM OVERRIDE M
LAMP
I S T O C
938
TEMP. CONTROL LATCH RESET (27 VDC HI) (MPL 938)
RESET AND NO ALARM
24
28
1048
MOM. RESET (STANDBY) 27 VDC HI (TCL 1048)
O C T I S
PSA HTR PWR
AUX HTR PWR M
LAMP
38
1641 TL
NOT ISS TEST CONFIG. IND. (MPL 1641 TL)
37
1640 TL
ISS TEST CONFIG. IND. (MPL 1640 TL)
CONDUCTS DURING AUX HEAT
AUX HTR CURRENT SENSOR
8
ALARM DURING TEST
20
NORMAL ALARM
22
I S T O C
RESET AND NO ALARM
29
17
ALARM OR RESET
LAMP
TEST M
RESET
902
27 VDC RLP HI
SEE NOTE 6
SEE NOTE 6
550 WT
27 VDC LO OSS ONLY (TCL 550 WT)
HI AND LO
896
3
115 V 60 CPS PHASE A PILOT PWR
115 V 60 CPS NEUT
CONDITIONING
S I T C O
15A
17A
60 ~ DURING COLD ALM
AUX HEAT AMP
23
60 ~ EXCEPT DURING OSS
30
OSS
1642 TL
OSS TEST CONFIG. IND. (MPL 1642)
1
27 VDC RLP LO
SCM TEST TMG INHIBITED
SIMULATED SENSOR +5° -5° 0°
SENSOR AUX HEAT
5
ACCEL SENSOR DURING NO TEST
13A
ACCEL SENSOR
18
ACCEL INDICATING BRIDGE
TP
LATCH
ACCEL HOT
ACCEL COLD
31
NOT OSS
1643 TL
NOT OSS TEST CONFIG. IND. (MPL 1643)
221
HI
LO
XBR-B, RSS-D
SENSOR A/B HEAT
6
9
14
ACCEL DUMMY DURING AUX AND TEST
COLD ALM-NORMAL EXCIT
20A
TP
ACCEL IND AMP
ALARM & NO DUMMY SENSOR
ALARM EXCEPT DURING SCM TEST OR OSS
31A
32
1
ACCEL
7
SENSOR DURING IRIG CHECK
ACCEL DURING AUX
10
25
ALM AMP (INV)
HOT
COLD
2
ACCEL DUMMY
20B
IRIG HOT + ACCEL HOT
11
ACCEL AND IRIG DUMMY
INDICATOR LO
195
222
LO
HI
XBR-B, RSS-D
LATCH
IRIG HOT
IRIG COLD
TP
IRIG IND AMP
3
IRIG
IRIG SENSOR
15
IRIG INDICATING BRIDGE
33
1400
REMOTE NO TEMP. ALARM OUTPUT (MPL 1400)
REMOTE NO ALARM
1401
REMOTE TEMP. ALARM INPUT (MPL 1401)
12
IRIG SENSOR DURING ACCEL DUMMY
23A
TP
26
ALARM AND NO DUMMY SENSOR
34
1402
REMOTE TEMP ALARM OUTPUT (MPL 1402)
REMOTE ALARM
SIMULATED SENSOR +5 0°
4
IRIG DUMMY
13
IRIG DUMMY DURING AUX
ACCEL BRIDGE EXCIT
+ ±30 VDC SUPPLY −
HI
35
853
TEMP. NORMAL (LO) (MPL 853)
NO ALARM
INDICATING SENSOR SELECTOR
IRIG BRIDGE EXCIT
+ ±30 VDC SUPPLY −
HI
IRIG BRIDGE EXCIT LOSS
ACCEL BRIDGE EXCIT LOSS

REVISIONS TORR 21261

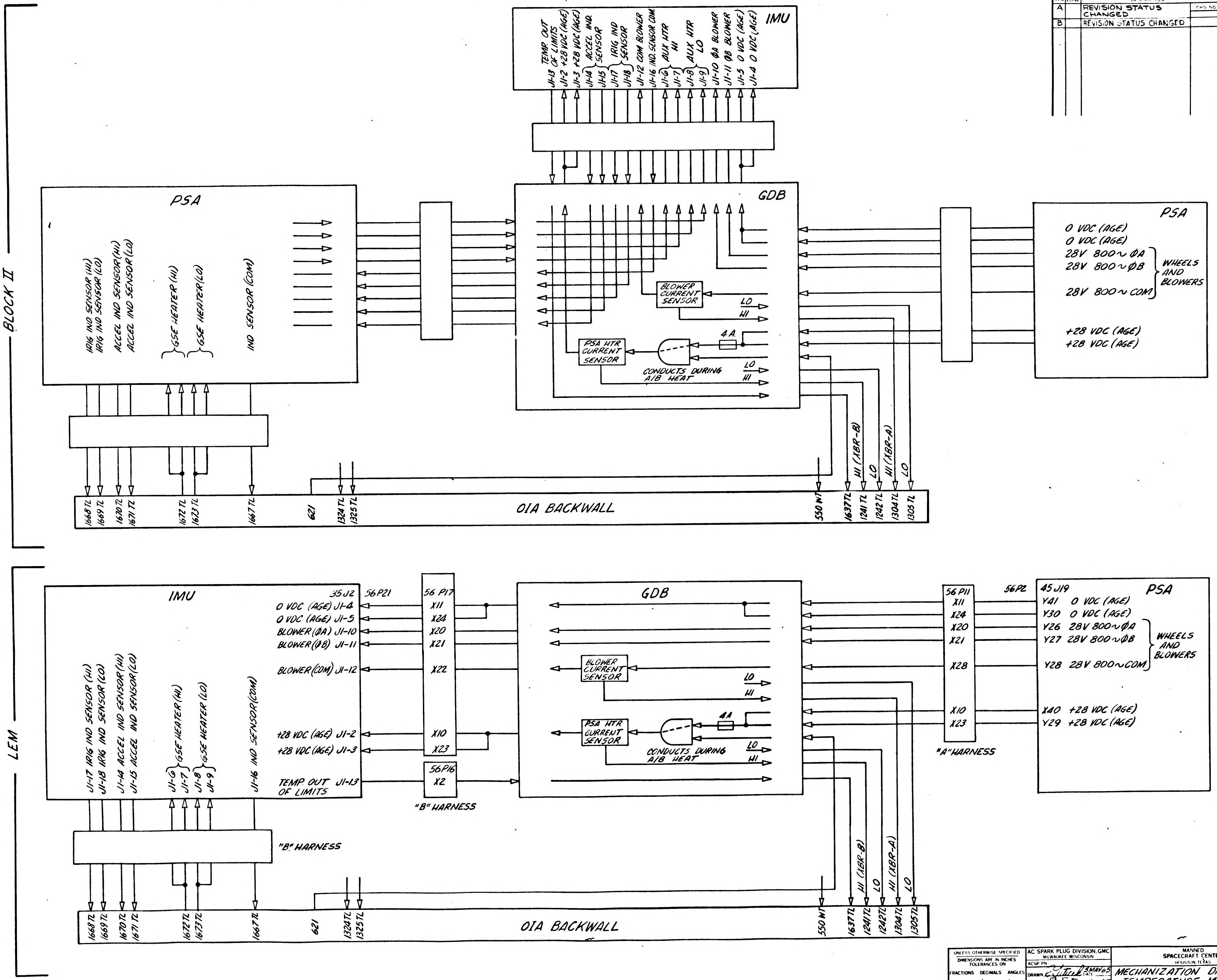
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.O. 60558		2 JUN 65	LGC
B		REVISED PER TDRR 21901		31 AUG 65	JWP

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
	ACSP PN	
	DRAWN R. Sitticek DATE 5 MAY 65	MECHANIZATION DIAGRAM – TEMPERATURE MONITOR AND CONTROL PANEL (BLOCK II AND LEM)
	CHECKED Ed Foster 11 MAY 65	
	APPROVAL	
DO NOT SCALE THIS DRAWING	APPROVAL	
MATERIAL	NASA APPROVAL	CODE IDENT NO 99974 · SIZE E · 2900203
CONTRACT NAS9-497	MIT APPROVAL	SCALE NONE · SHEET 1 OF 2

2900203

REVISIONS TDER 21261

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUN 65	LGC EF
B		REVISION STATUS CHANGED		1 SEP 65	WE ZAF



IMU
J1-13 TEMP. OUT OF LIMITS
J1-2 +28 VDC (AGE)
J1-3 +28 VDC (AGE)
J1-14 J1-15 ACCEL IND. SENSOR
J1-17 J1-18 IRIG IND SENSOR
J1-12 COM BLOWER
J1-16 IND. SENSOR COM.
J1-6 J1-7 AUX HTR HI
J1-8 J1-9 AUX HTR LO
J1-10 ØA BLOWER
J1-11 ØB BLOWER
J1-5 0 VDC (AGE)
J1-4 0 VDC (AGE)
BLOCK II
PSA
IRIG IND SENSOR (HI)
IRIG IND SENSOR (LO)
ACCEL IND SENSOR (HI)
ACCEL IND SENSOR (LO)
GSE HEATER (HI)
GSE HEATER (LO)
IND SENSOR (COM)
GDB
BLOWER CURRENT SENSOR
LO
HI
4A
PSA HTR CURRENT SENSOR
CONDUCTS DURING A/B HEAT
LO
HI
PSA
0 VDC (AGE)
0 VDC (AGE)
28V 800~ ØA
28V 800~ ØB
28V 800~ COM
WHEELS AND BLOWERS
+28 VDC (AGE)
+28 VDC (AGE)
HI (XBR-B)
LO
HI (XBR-A)
LO
1668TL
1669TL
1670TL
1671TL
1672TL
1673TL
1667TL
621
1324TL
1325TL
OIA BACKWALL
550WT
1637TL
1241TL
1242TL
1304TL
1305TL
LEM
IMU
35J2
56P21
0 VDC (AGE) J1-4
0 VDC (AGE) J1-5
BLOWER (ØA) J1-10
BLOWER (ØB) J1-11
BLOWER (COM) J1-12
+28 VDC (AGE) J1-2
+28 VDC (AGE) J1-3
TEMP OUT OF LIMITS J1-13
J1-17 IRIG IND SENSOR (HI)
J1-18 IRIG IND SENSOR (LO)
J1-14 ACCEL IND SENSOR (HI)
J1-15 ACCEL IND SENSOR (LO)
J1-6 J1-7 GSE HEATER (HI)
J1-8 J1-9 GSE HEATER (LO)
J1-16 IND SENSOR (COM)
56 P17
X11
X24
X20
X21
X22
X10
X23
56P16
X2
"B" HARNESS
GDB
BLOWER CURRENT SENSOR
LO
HI
4A
PSA HTR CURRENT SENSOR
CONDUCTS DURING A/B HEAT
LO
HI
56 P11
X11
X24
X20
X21
X28
X10
X23
"A" HARNESS
56P2
45 J19
PSA
Y41 0 VDC (AGE)
Y30 0 VDC (AGE)
Y26 28V 800~ØA
Y27 28V 800~ØB
Y28 28V 800~COM
WHEELS AND BLOWERS
X40 +28 VDC (AGE)
Y29 +28 VDC (AGE)
"B" HARNESS
HI (XBR-B)
LO
HI (XBR-A)
LO
1668TL
1669TL
1670TL
1671TL
1672TL
1673TL
1667TL
621
1324TL
1325TL
OIA BACKWALL
550WT
1637TL
1241TL
1242TL
1304TL
1305TL

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN R. Fitch 5MAY65
CHECKED Ed Foster 11MAY 65
APPROVAL 5-25-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM–
TEMPERATURE MONITOR
AND CONTROL PANEL
(BLOCK II AND LEM)

CODE IDENT NO 99974
SIZE E
2900203
SCALE NONE
SHEET 2 OF 2

SYM	ZONE	REVISIONS TDRR 21221 DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.O. 60558		2 JUN 65	LGC
B		REVISED PER TDRR 21901		31 AUG 65	JWP
C		REVISED PER TDRR 21902		1 SEP 65	JWP

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. LOGIC SYMBOLS PER MIL-STD-806
3. REFERENCE MECHANIZATION DIAGRAMS

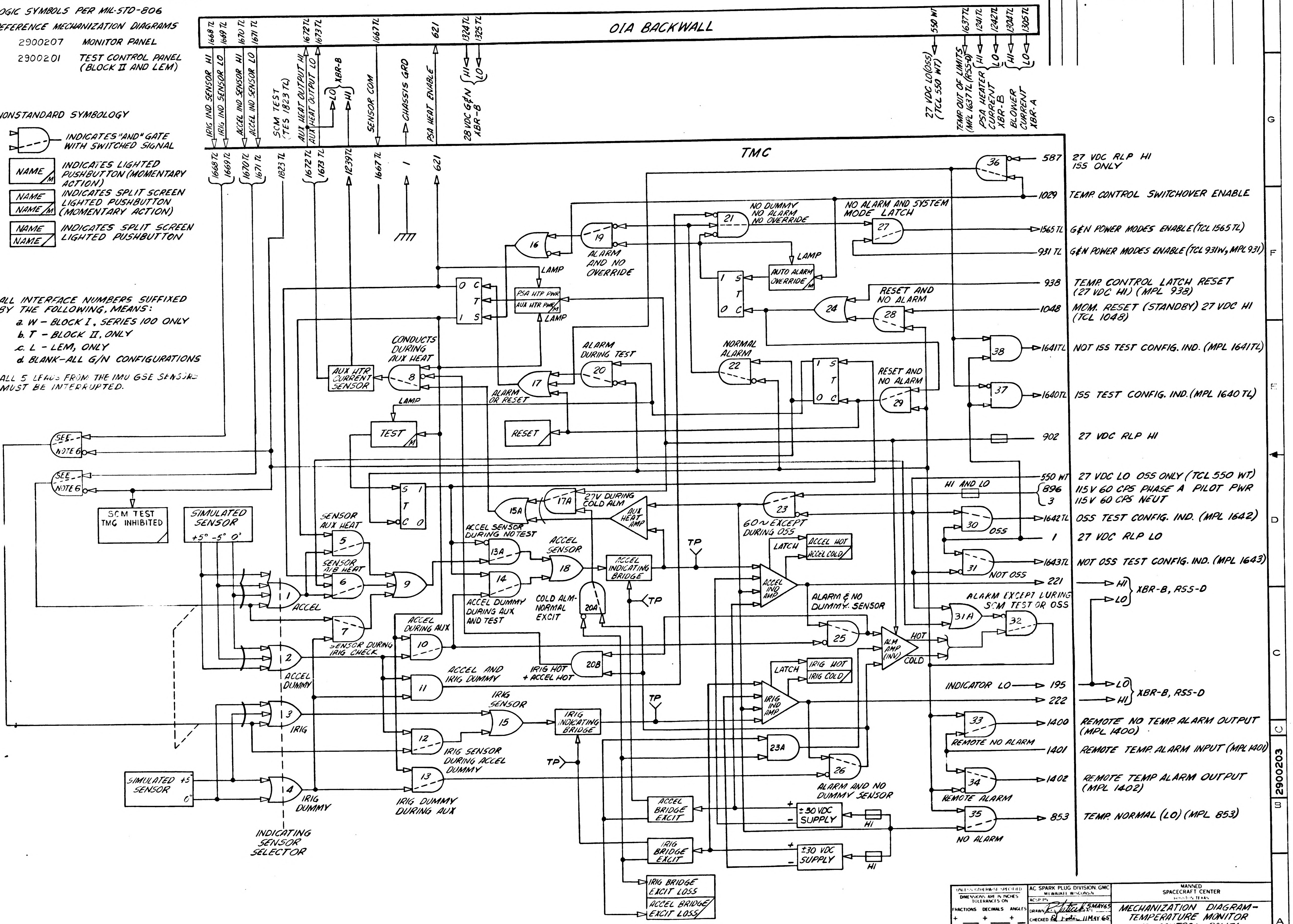
2900207	MONITOR PANEL
2900201	TEST CONTROL PANEL (BLOCK II AND LEM)

4. NONSTANDARD SYMBOLOGY

	INDICATES "AND" GATE WITH SWITCHED SIGNAL
NAME M	INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME NAME M	INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME NAME	INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   - a. W - BLOCK I, SERIES 100 ONLY
   - b. T - BLOCK II, ONLY
   - c. L - LEM, ONLY
   - d. BLANK-ALL G/N CONFIGURATIONS

6. ALL 5 LEADS FROM THE IMU GSE SENSORS MUST BE INTERRUPTED.

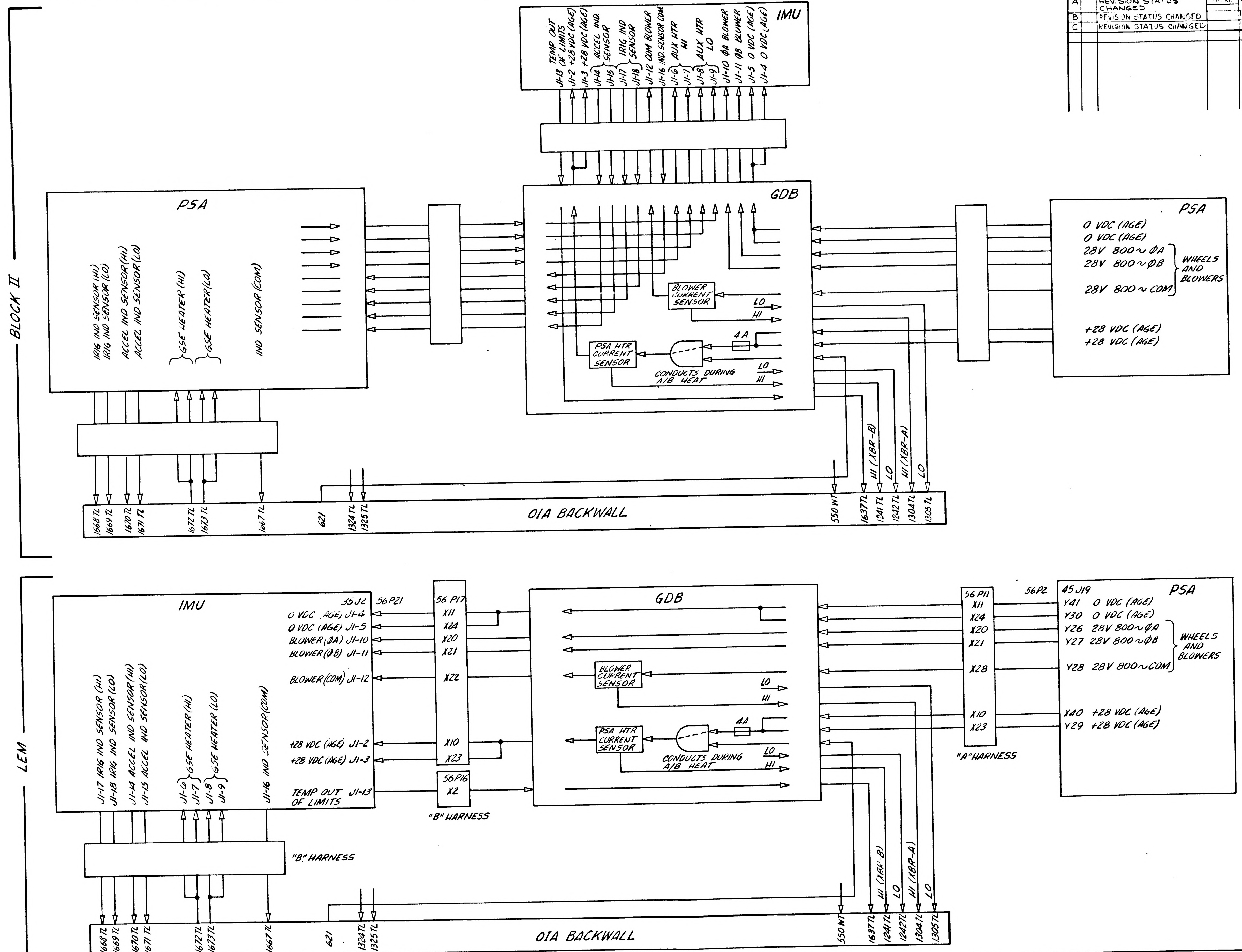

OIA BACKWALL
1668 TL
1669 TL
1670 TL
1671 TL
1672 TL
1673 TL
1667 TL
621
1324 TL
1325 TL
550 WT
1637 TL
1241 TL
1242 TL
1304 TL
1305 TL
IRIG IND. SENSOR HI
IRIG IND SENSOR LO
ACCEL IND SENSOR HI
ACCEL IND SENSOR LO
SCM TEST (TES 1823 TL)
AUX HEAT OUTPUT HI
AUX HEAT OUTPUT LO
LO
HI
XBR-B
SENSOR COM
CHASSIS GRD
PSA HEAT ENABLE
28 VDC G&N XBR-B
HI
LO
27 VDC LO (OSS) (TCL 550 WT)
TEMP OUT OF LIMITS (MPL 1637 TL (RSS-D)
HI
LO
PSA HEATER CURRENT XBR-B
HI
LO
BLOWER CURRENT XBR-A
TMC
1823 TL
1239 TL
1
SEE NOTE 6
SEE NOTE 6
SCM TEST TMC INHIBITED
SIMULATED SENSOR +5° -5° 0°
SIMULATED +5 SENSOR 0°
1 ACCEL
2 ACCEL DUMMY
3 IRIG
4 IRIG DUMMY
INDICATING SENSOR SELECTOR
SENSOR AUX HEAT
5
SENSOR A/B HEAT
6
7
SENSOR DURING IRIG CHECK
9
8
CONDUCTS DURING AUX HEAT
AUX HTR CURRENT SENSOR
LAMP
TEST M
S I
T
C O
O C
T
I S
PSA HTR PWR
AUX HTR PWR M
LAMP
LAMP
16
19
ALARM AND NO OVERRIDE
17
ALARM OR RESET
RESET
20
ALARM DURING TEST
15A
17A
27V DURING COLD ALM
AUX HEAT AMP
ACCEL SENSOR DURING NO TEST
13A
14
ACCEL DUMMY DURING AUX AND TEST
ACCEL SENSOR
18
ACCEL INDICATING BRIDGE
TP
COLD ALM-NORMAL EXCIT
20A
TP
10
ACCEL DURING AUX
11
ACCEL AND IRIG DUMMY
IRIG HOT + ACCEL HOT
20B
IRIG SENSOR
15
IRIG INDICATING BRIDGE
12
IRIG SENSOR DURING ACCEL DUMMY
13
IRIG DUMMY DURING AUX
TP
TP
21
NO DUMMY NO ALARM NO OVERRIDE
LAMP
AUTO ALARM OVERRIDE M
I S
T
O C
NO ALARM AND SYSTEM MODE LATCH
27
24
RESET AND NO ALARM
28
NORMAL ALARM
22
I S
T
O C
RESET AND NO ALARM
29
23
60~ EXCEPT DURING OSS
LATCH
ACCEL HOT
ACCEL COLD
ACCEL IND AMP
ALARM & NO DUMMY SENSOR
25
ALM AMP (INV)
HOT
COLD
LATCH
IRIG HOT
IRIG COLD
IRIG IND AMP
23A
26
ALARM AND NO DUMMY SENSOR
ACCEL BRIDGE EXCIT
IRIG BRIDGE EXCIT
+ ±30 VDC SUPPLY -
HI
+ ±30 VDC SUPPLY -
HI
IRIG BRIDGE EXCIT LOSS
ACCEL BRIDGE EXCIT LOSS
36
587 27 VDC RLP HI ISS ONLY
1029 TEMP. CONTROL SWITCHOVER ENABLE
1565 TL G&N POWER MODES ENABLE (TCL 1565 TL)
931 TL G&N POWER MODES ENABLE (TCL 931W, MPL 931)
938 TEMP. CONTROL LATCH RESET (27 VDC HI) (MPL 938)
1048 MOM. RESET (STANDBY) 27 VDC HI (TCL 1048)
38
1641TL NOT ISS TEST CONFIG. IND. (MPL 1641TL)
37
1640TL ISS TEST CONFIG. IND. (MPL 1640 TL)
902 27 VDC RLP HI
550 WT 27 VDC LO OSS ONLY (TCL 550 WT)
HI AND LO
896 115V 60 CPS PHASE A PILOT PWR
3 115V 60 CPS NEUT
30 OSS
1642 TL OSS TEST CONFIG. IND. (MPL 1642)
1 27 VDC RLP LO
31 NOT OSS
1643TL NOT OSS TEST CONFIG. IND. (MPL 1643)
221
HI
LO
XBR-B, RSS-D
ALARM EXCEPT DURING SCM TEST OR OSS
31A
32
INDICATOR LO 195
222
LO
HI
XBR-B, RSS-D
33
REMOTE NO ALARM
1400 REMOTE NO TEMP. ALARM OUTPUT (MPL 1400)
1401 REMOTE TEMP. ALARM INPUT (MPL 1401)
34
REMOTE ALARM
1402 REMOTE TEMP ALARM OUTPUT (MPL 1402)
35
NO ALARM
853 TEMP. NORMAL (LO) (MPL 853)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ___ ± ___ ± ___	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN R. Juticek DATE 5MAY65 CHECKED Ed Foster 11MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM- TEMPERATURE MONITOR AND CONTROL PANEL (BLOCK II AND LEM)
MATERIAL	NASA APPROVAL MIT APPROVAL	CODE IDENT NO 99974 SIZE E 2900203
CONTRACT NAS9-497		SCALE NONE SHEET 1 OF 2

2900203

REVISIONS TDCR 21261

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUN 65	LGC
B		REVISION STATUS CHANGED		1 SEP 65	JWP
C		REVISION STATUS CHANGED		1 SEP 65	JWP



BLOCK II
IMU
J1-13 TEMP OUT OF LIMITS
J1-2 +28 VDC (AGE)
J1-3 +28 VDC (AGE)
J1-14 ACCEL IND SENSOR
J1-15
J1-17 IRIG IND SENSOR
J1-18
J1-12 COM BLOWER
J1-16 IND SENSOR COM
J1-6 AUX HTR HI
J1-7
J1-8 AUX HTR LO
J1-9
J1-10 ØA BLOWER
J1-11 ØB BLOWER
J1-5 0 VDC (AGE)
J1-4 0 VDC (AGE)
PSA
IRIG IND SENSOR (HI)
IRIG IND SENSOR (LO)
ACCEL IND SENSOR (HI)
ACCEL IND SENSOR (LO)
GSE HEATER (HI)
GSE HEATER (LO)
IND SENSOR (COM)
GDB
BLOWER CURRENT SENSOR
LO
HI
PSA HTR CURRENT SENSOR
4A
CONDUCTS DURING A/B HEAT
LO
HI
PSA
0 VDC (AGE)
0 VDC (AGE)
28V 800~ØA
28V 800~ØB
28V 800~COM
WHEELS AND BLOWERS
+28 VDC (AGE)
+28 VDC (AGE)
HI (XBR-B)
LO
HI (XBR-A)
LO
1668 TL
1669 TL
1670 TL
1671 TL
1672 TL
1673 TL
1667 TL
621
1324 TL
1325 TL
OIA BACKWALL
550 WT
1637 TL
1241 TL
1242 TL
1304 TL
1305 TL
LEM
IMU
35J2
56P21
0 VDC (AGE) J1-4
0 VDC (AGE) J1-5
BLOWER (ØA) J1-10
BLOWER (ØB) J1-11
BLOWER (COM) J1-12
+28 VDC (AGE) J1-2
+28 VDC (AGE) J1-3
TEMP OUT OF LIMITS J1-13
J1-17 IRIG IND SENSOR (HI)
J1-18 IRIG IND SENSOR (LO)
J1-14 ACCEL IND SENSOR (HI)
J1-15 ACCEL IND SENSOR (LO)
J1-6
J1-7 GSE HEATER (HI)
J1-8
J1-9 GSE HEATER (LO)
J1-16 IND SENSOR (COM)
56 P17
X11
X24
X20
X21
X22
X10
X23
56P16
X2
"B" HARNESS
GDB
BLOWER CURRENT SENSOR
LO
HI
PSA HTR CURRENT SENSOR
4A
CONDUCTS DURING A/B HEAT
LO
HI
56 P11
X11
X24
X20
X21
X28
X10
X23
"A" HARNESS
56P2
45 J19
PSA
Y41 0 VDC (AGE)
Y30 0 VDC (AGE)
Y26 28V 800~ØA
Y27 28V 800~ØB
Y28 28V 800~COM
WHEELS AND BLOWERS
X40 +28 VDC (AGE)
Y29 +28 VDC (AGE)
"B" HARNESS
HI (XBR-B)
LO
HI (XBR-A)
LO
1668 TL
1669 TL
1670 TL
1671 TL
1672 TL
1673 TL
1667 TL
621
1324 TL
1325 TL
OIA BACKWALL
550 WT
1637 TL
1241 TL
1242 TL
1304 TL
1305 TL

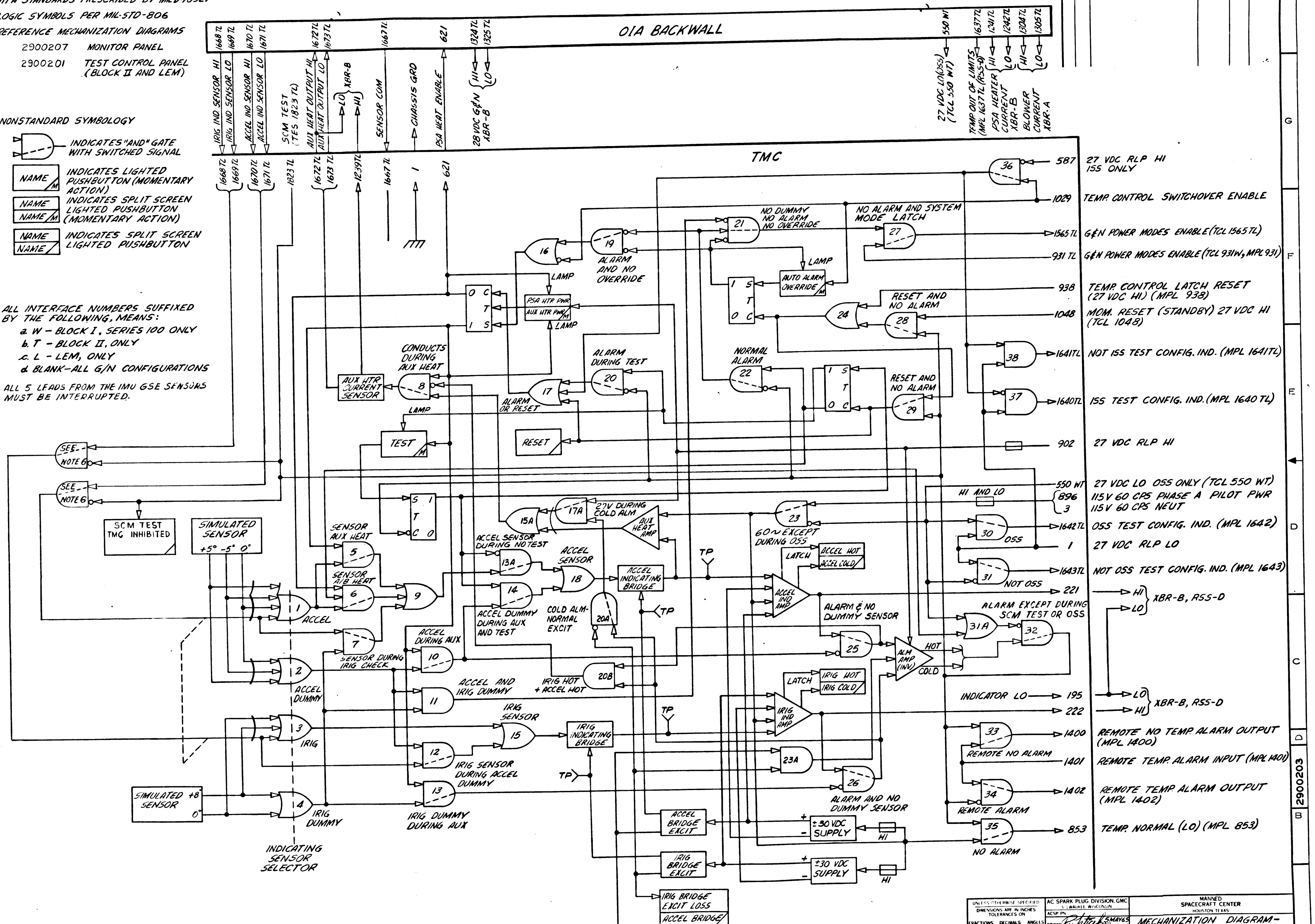
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___	ACSP PN	
DO NOT SCALE THIS DRAWING	DRAWN 5 MAY 65 CHECKED Ed Foster 11 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM-TEMPERATURE MONITOR AND CONTROL PANEL (BLOCK II AND LEM)
MATERIAL	NASA APPROVAL	CODE IDENT NO 99974 · SIZE E · 2900203
CONTRACT	MIT APPROVAL	SCALE NONE · SHEET 2 OF 2

2900203 C

5800503

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. LOGIC SYMBOLS PER MIL-STD-806
3. REFERENCE MECHANIZATION DIAGRAMS
   2900207 MONITOR PANEL
   2900201 TEST CONTROL PANEL (BLOCK II AND LEM)
4. NONSTANDARD SYMBOLOGY
   INDICATES "AND" GATE WITH SWITCHED SIGNAL
   NAME — INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
   NAME / NAME — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
   NAME / NAME — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   a. W - BLOCK I, SERIES 100 ONLY
   b. T - BLOCK II, ONLY
   c. L - LEM, ONLY
   d. BLANK-ALL G/N CONFIGURATIONS
6. ALL 5 LEADS FROM THE IMU GSE SENSORS MUST BE INTERRUPTED.

REVISIONS TDRR 21261					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.O. 60558		2 JUN 65	LGC
B		REVISED PER TDRR 21901		31 AUG 65	JWP
C		REVISED PER TDRR 21902		1 SEP 65	JWP
D		REVISED PER TDRR 21903		2 SEP 65	RLP



OIA BACKWALL
TMC
1668 TL
1669 TL
1670 TL
1671 TL
1672 TL
1673 TL
1667 TL
621
1324 TL
1325 TL
550 WT
1637 TL
1241 TL
1242 TL
1304 TL
1305 TL
IRIG IND SENSOR HI
IRIG IND SENSOR LO
ACCEL IND SENSOR HI
ACCEL IND SENSOR LO
SCM TEST (TES 1823 TL)
AUX HEAT OUTPUT HI
AUX HEAT OUTPUT LO
XBR-B
LO
HI
SENSOR COM
CHASSIS GRD
PSA HEAT ENABLE
28 VDC G&N XBR-B
27 VDC LO (OSS) (TCL 550 WT)
TEMP OUT OF LIMITS (MPL 1637 TL) (RSS-D)
PSA HEATER CURRENT XBR-B
BLOWER CURRENT XBR-A
1823 TL
1239 TL
1
587
1029
1565 TL
931 TL
938
1048
1641 TL
1640 TL
902
550 WT
896
3
1642 TL
1
1643 TL
221
195
222
1400
1401
1402
853
27 VDC RLP HI ISS ONLY
TEMP. CONTROL SWITCHOVER ENABLE
G&N POWER MODES ENABLE (TCL 1565 TL)
G&N POWER MODES ENABLE (TCL 931W, MPL 931)
TEMP. CONTROL LATCH RESET (27 VDC HI) (MPL 938)
MOM. RESET (STANDBY) 27 VDC HI (TCL 1048)
NOT ISS TEST CONFIG. IND. (MPL 1641TL)
ISS TEST CONFIG. IND. (MPL 1640 TL)
27 VDC RLP HI
27 VDC LO OSS ONLY (TCL 550 WT)
115 V 60 CPS PHASE A PILOT PWR
115 V 60 CPS NEUT
OSS TEST CONFIG. IND. (MPL 1642)
27 VDC RLP LO
NOT OSS TEST CONFIG. IND. (MPL 1643)
XBR-B, RSS-D
INDICATOR LO
REMOTE NO TEMP. ALARM OUTPUT (MPL 1400)
REMOTE TEMP. ALARM INPUT (MPL 1401)
REMOTE TEMP. ALARM OUTPUT (MPL 1402)
TEMP. NORMAL (LO) (MPL 853)
NO DUMMY NO ALARM NO OVERRIDE
NO ALARM AND SYSTEM MODE LATCH
ALARM AND NO OVERRIDE
LAMP
AUTO ALARM / OVERRIDE
PSA HTR PWR / AUX HTR PWR
RESET AND NO ALARM
NORMAL ALARM
ALARM DURING TEST
ALARM OR RESET
CONDUCTS DURING AUX HEAT
AUX HTR CURRENT SENSOR
TEST
RESET
SEE NOTE 6
SCM TEST TMC INHIBITED
SIMULATED SENSOR +5° -5° 0°
SENSOR AUX HEAT
SENSOR A/B HEAT
ACCEL
ACCEL DUMMY
IRIG
IRIG DUMMY
SENSOR DURING IRIG CHECK
ACCEL DURING AUX
ACCEL AND IRIG DUMMY
IRIG SENSOR
IRIG SENSOR DURING ACCEL DUMMY
IRIG DUMMY DURING AUX
SIMULATED SENSOR +8 0°
INDICATING SENSOR SELECTOR
27V DURING COLD ALM
AUX HEAT AMP
ACCEL SENSOR DURING NO TEST
ACCEL SENSOR
ACCEL DUMMY DURING AUX AND TEST
COLD ALM-NORMAL EXCIT
ACCEL INDICATING BRIDGE
IRIG INDICATING BRIDGE
IRIG HOT + ACCEL HOT
TP
60~ EXCEPT DURING OSS
LATCH
ACCEL HOT / ACCEL COLD
ACCEL IND AMP
ALARM & NO DUMMY SENSOR
ALM AMP (INV)
HOT
COLD
IRIG HOT / IRIG COLD
IRIG IND AMP
ALARM AND NO DUMMY SENSOR
ACCEL BRIDGE EXCIT
IRIG BRIDGE EXCIT
±30 VDC SUPPLY
HI
IRIG BRIDGE EXCIT LOSS
ACCEL BRIDGE EXCIT LOSS
HI AND LO
OSS
NOT OSS
ALARM EXCEPT DURING SCM TEST OR OSS
REMOTE NO ALARM
REMOTE ALARM
NO ALARM
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 15A 16 17 17A 18 19 20 20A 20B 21 22 23 23A 24 25 26 27 28 29 30 31 31A 32 33 34 35 36 37 38
S T C O I

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Saticek DATE 5MAY65
CHECKED Ed Foster 11MAY65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

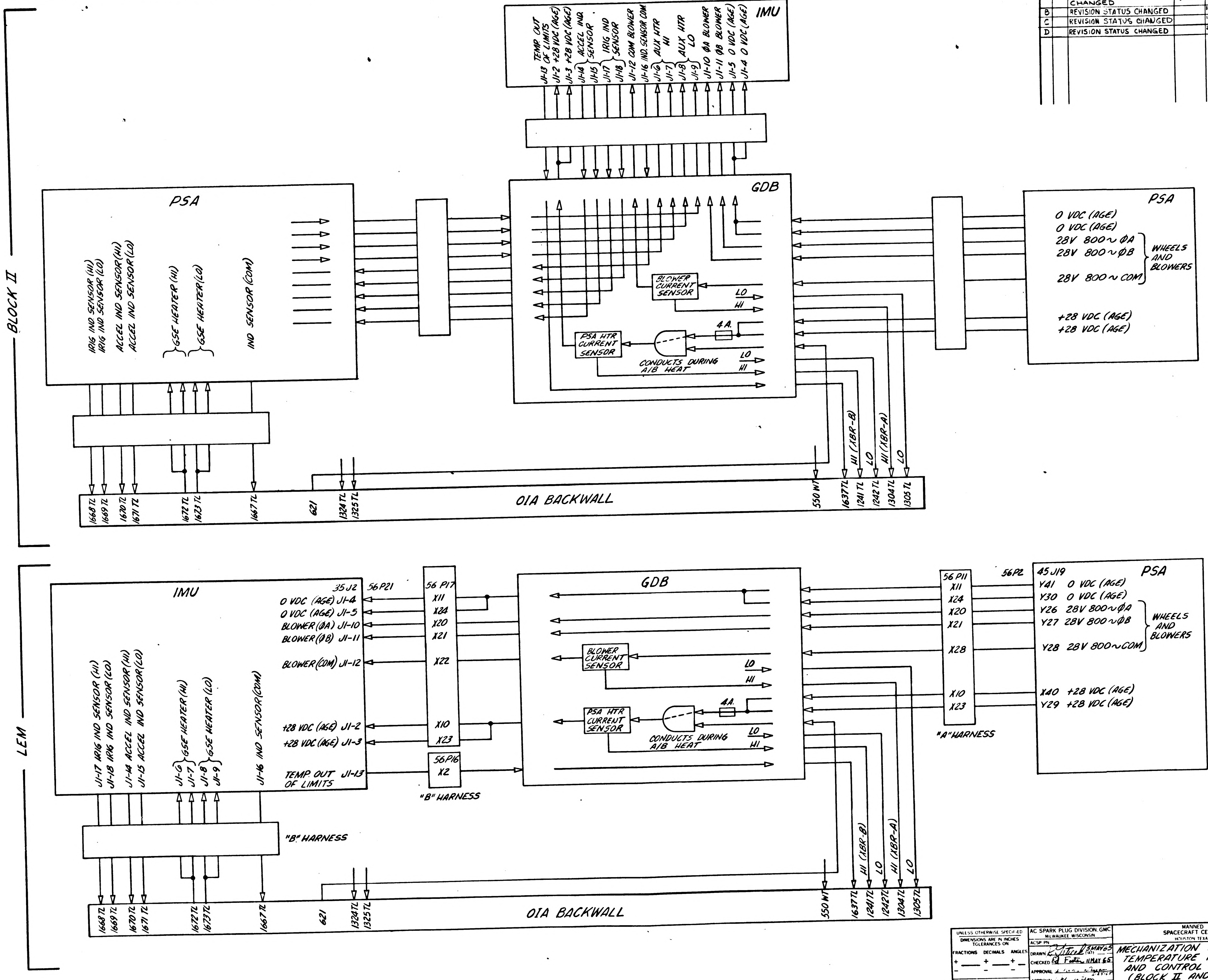
MECHANIZATION DIAGRAM - TEMPERATURE MONITOR AND CONTROL PANEL (BLOCK II AND LEM)

CODE IDENT NO 99974
SIZE E
2900203
SCALE NONE
SHEET 1 OF 2

2900203

REVISIONS TDCR 21261

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUN 65	LGC EF
B		REVISION STATUS CHANGED		1 SEP 65	JWP
C		REVISION STATUS CHANGED		1-SEP 65	JWP
D		REVISION STATUS CHANGED		2 SEP 65	RLP



IMU
J1-13 TEMP. OUT OF LIMITS
J1-2 +28 VDC (AGE)
J1-3 +28 VDC (AGE)
J1-14 J1-15 ACCEL IND. SENSOR
J1-17 J1-18 IRIG IND SENSOR
J1-12 COM BLOWER
J1-16 IND. SENSOR COM.
J1-6 J1-7 AUX HTR HI
J1-8 J1-9 AUX HTR LO
J1-10 ØA BLOWER
J1-11 ØB BLOWER
J1-5 0 VDC (AGE)
J1-4 0 VDC (AGE)
BLOCK II
PSA
IRIG IND SENSOR (HI)
IRIG IND SENSOR (LO)
ACCEL IND SENSOR (HI)
ACCEL IND SENSOR (LO)
GSE HEATER (HI)
GSE HEATER (LO)
IND SENSOR (COM)
GDB
BLOWER CURRENT SENSOR
LO
HI
4 A.
PSA HTR CURRENT SENSOR
CONDUCTS DURING A/B HEAT
LO
HI
PSA
0 VDC (AGE)
0 VDC (AGE)
28V 800~ØA
28V 800~ØB
28V 800~COM
WHEELS AND BLOWERS
+28 VDC (AGE)
+28 VDC (AGE)
HI (XBR-B)
LO
HI (XBR-A)
LO
1668 TL
1669 TL
1670 TL
1671 TL
1672 TL
1673 TL
1667 TL
621
1324 TL
1325 TL
OIA BACKWALL
550 WT
1637 TL
1241 TL
1242 TL
1304 TL
1305 TL
LEM
IMU
35 J2
56 P21
0 VDC (AGE) J1-4
0 VDC (AGE) J1-5
BLOWER (ØA) J1-10
BLOWER (ØB) J1-11
BLOWER (COM) J1-12
+28 VDC (AGE) J1-2
+28 VDC (AGE) J1-3
TEMP. OUT OF LIMITS J1-13
J1-17 IRIG IND SENSOR (HI)
J1-18 IRIG IND SENSOR (LO)
J1-14 ACCEL IND SENSOR (HI)
J1-15 ACCEL IND SENSOR (LO)
J1-6 J1-7 GSE HEATER (HI)
J1-8 J1-9 GSE HEATER (LO)
J1-16 IND SENSOR (COM)
56 P17
X11
X24
X20
X21
X22
X10
X23
56 P16
X2
"B" HARNESS
GDB
BLOWER CURRENT SENSOR
LO
HI
4A.
PSA HTR CURRENT SENSOR
CONDUCTS DURING A/B HEAT
LO
HI
56 P11
X11
X24
X20
X21
X28
X10
X23
"A" HARNESS
56 P2
45 J19
PSA
Y41 0 VDC (AGE)
Y30 0 VDC (AGE)
Y26 28V 800~ØA
Y27 28V 800~ØB
Y28 28V 800~COM
WHEELS AND BLOWERS
X40 +28 VDC (AGE)
Y29 +28 VDC (AGE)
"B" HARNESS
HI (XBR-B)
LO
HI (XBR-A)
LO
1668 TL
1669 TL
1670 TL
1671 TL
1672 TL
1673 TL
1667 TL
621
1324 TL
1325 TL
OIA BACKWALL
550 WT
1637 TL
1241 TL
1242 TL
1304 TL
1305 TL

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Fritsch DATE 3 MAY 65
CHECKED Ed Foster 11 MAY 65
APPROVAL 6-29-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

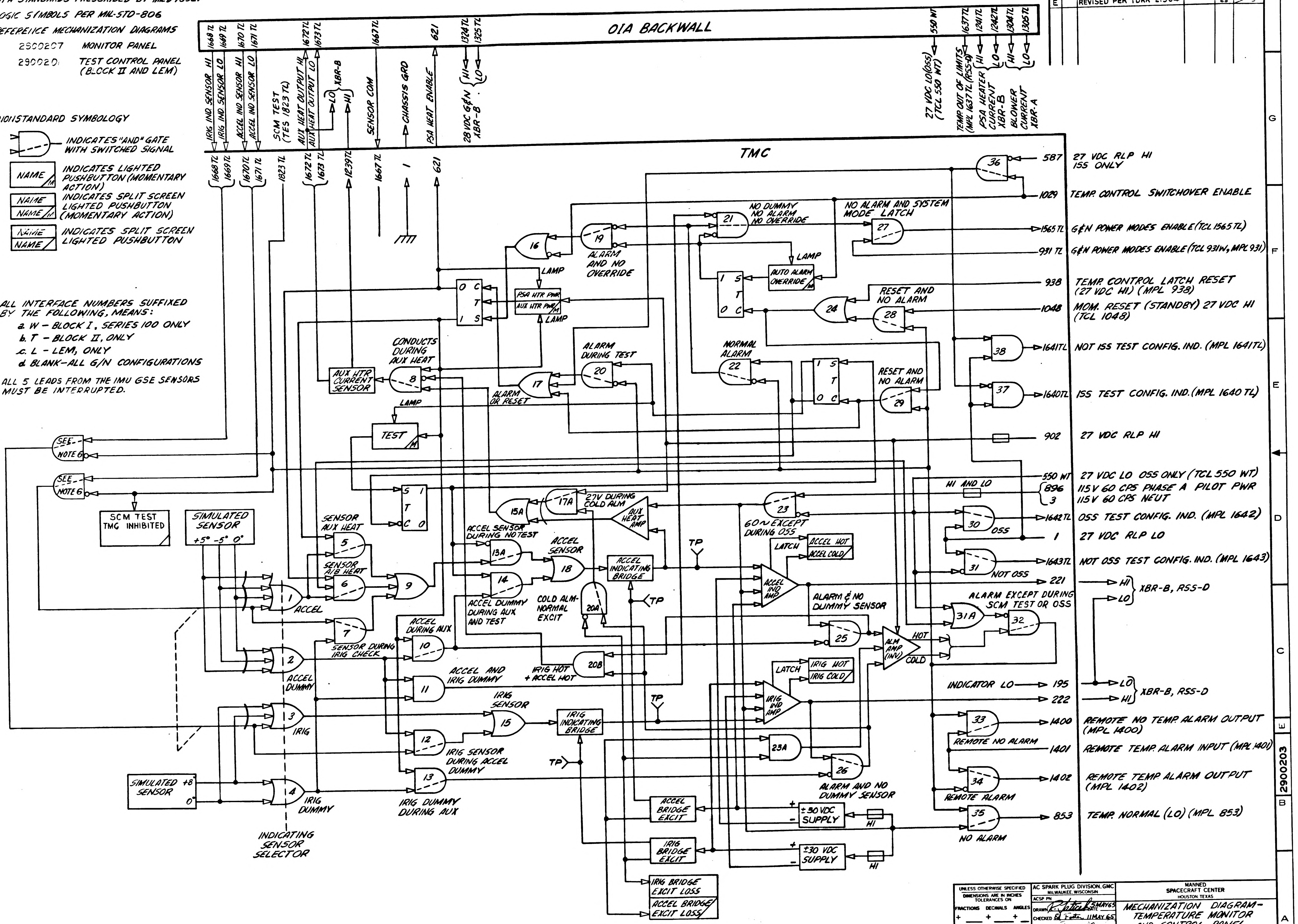
MECHANIZATION DIAGRAM-
TEMPERATURE MONITOR
AND CONTROL PANEL
(BLOCK II AND LEM)

CODE IDENT NO 99974
SIZE E
2900203
SCALE NONE
SHEET 2 OF 2

5800503

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. LOGIC SYMBOLS PER MIL-STD-806
3. REFERENCE MECHANIZATION DIAGRAMS
   2900207 MONITOR PANEL
   2900201 TEST CONTROL PANEL (BLOCK II AND LEM)
4. NONSTANDARD SYMBOLOGY
   INDICATES "AND" GATE WITH SWITCHED SIGNAL
   NAME M — INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
   NAME / NAME M — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
   NAME / NAME — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   a. W - BLOCK I, SERIES 100 ONLY
   b. T - BLOCK II, ONLY
   c. L - LEM, ONLY
   d. BLANK-ALL G/N CONFIGURATIONS
6. ALL 5 LEADS FROM THE IMU GSE SENSORS MUST BE INTERRUPTED.

REVISIONS TDRR 21261					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.O. 60538		2 JUN 65	LGC
B		REVISED PER TDRR 21901		31 AUG 65	JWP
C		REVISED PER TDRR 21902		1 SEP 65	JWP
D		REVISED PER TDRR 21903		2 SEP 65	
E		REVISED PER TDRR 21904		7 SEP 65	



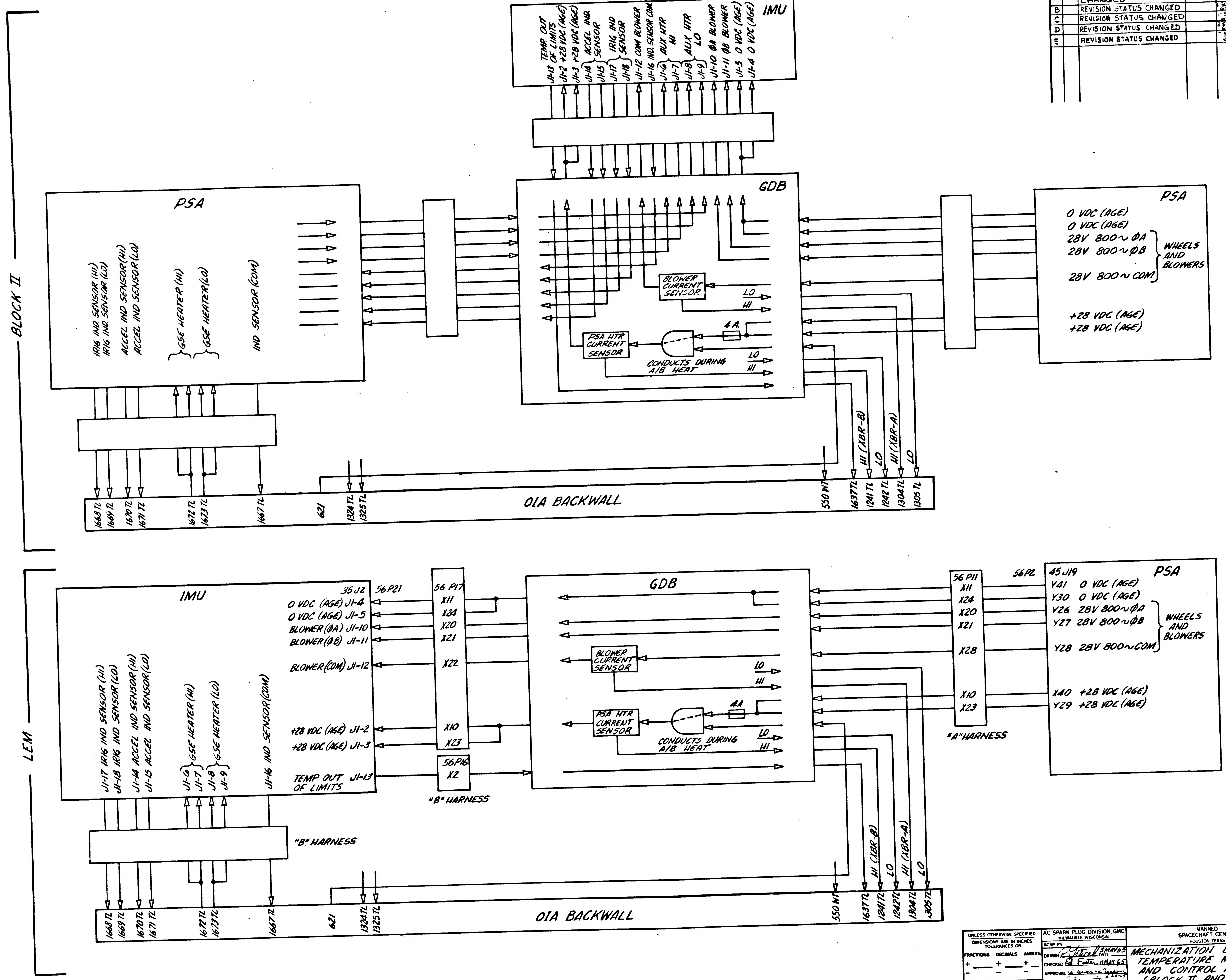
OIA BACKWALL
1668 TL
1669 TL
1670 TL
1671 TL
1672 TL
1673 TL
1667 TL
621
1324 TL
1325 TL
550 WT
1637 TL
1301 TL
1242 TL
1304 TL
1305 TL
IRIG IND SENSOR HI
IRIG IND SENSOR LO
ACCEL IND SENSOR HI
ACCEL IND SENSOR LO
SCM TEST (TES 1823 TL)
AUX HEAT OUTPUT HI
AUX HEAT OUTPUT LO
LO
HI
XBR-B
SENSOR COM
CHASSIS GRD
PSA HEAT ENABLE
28 VDC G&N XBR-B
HI
LO
27 VDC LO (OSS) (TCL 550 WT)
TEMP OUT OF LIMITS (MPL 1637 TL (RSS-D)
PSA HEATER CURRENT XBR-B
BLOWER CURRENT XBR-A
TMC
1823 TL
1239 TL
1
36
587
27 VDC RLP HI ISS ONLY
1029
TEMP. CONTROL SWITCHOVER ENABLE
NO DUMMY NO ALARM NO OVERRIDE
21
NO ALARM AND SYSTEM MODE LATCH
27
1565 TL
G&N POWER MODES ENABLE (TCL 1565 TL)
931 TL
G&N POWER MODES ENABLE (TCL 931W, MPL 931)
16
19
ALARM AND NO OVERRIDE
LAMP
AUTO ALARM OVERRIDE
938
TEMP. CONTROL LATCH RESET (27 VDC HI) (MPL 938)
O C T 1 S
PSA HTR PWR
AUX HTR PWR
RESET AND NO ALARM
24
28
1048
MOM. RESET (STANDBY) 27 VDC HI (TCL 1048)
CONDUCTS DURING AUX HEAT
AUX HTR CURRENT SENSOR
8
ALARM DURING TEST
20
17
ALARM OR RESET
NORMAL ALARM
22
RESET AND NO ALARM
29
38
1641 TL
NOT ISS TEST CONFIG. IND. (MPL 1641 TL)
37
1640 TL
ISS TEST CONFIG. IND. (MPL 1640 TL)
TEST
902
27 VDC RLP HI
SEE NOTE 6
SCM TEST TMG INHIBITED
SIMULATED SENSOR +5° -5° 0°
S T C 1 0
15A
17A
27V DURING COLD ALM
AUX HEAT AMP
23
60~ EXCEPT DURING OSS
550 WT
27 VDC LO OSS ONLY (TCL 550 WT)
HI AND LO
896
3
115 V 60 CPS PHASE A PILOT PWR
115 V 60 CPS NEUT
30
OSS
1642 TL
OSS TEST CONFIG. IND. (MPL 1642)
27 VDC RLP LO
SENSOR AUX HEAT
5
ACCEL SENSOR DURING NO TEST
13A
14
ACCEL SENSOR
18
ACCEL INDICATING BRIDGE
TP
LATCH
ACCEL HOT
ACCEL COLD
31
NOT OSS
1643 TL
NOT OSS TEST CONFIG. IND. (MPL 1643)
SENSOR A/B HEAT
6
9
1
ACCEL
ACCEL DUMMY DURING AUX AND TEST
COLD ALM-NORMAL EXCIT
20A
ACCEL AMP
ALARM & NO DUMMY SENSOR
221
HI
LO
XBR-B, RSS-D
ALARM EXCEPT DURING SCM TEST OR OSS
31A
32
7
SENSOR DURING IRIG CHECK
ACCEL DURING AUX
10
25
ALM AMP (INV)
HOT
COLD
2
ACCEL DUMMY
20B
IRIG HOT + ACCEL HOT
ACCEL AND IRIG DUMMY
11
IRIG HOT
IRIG COLD
IRIG IND AMP
INDICATOR LO
195
222
LO
HI
XBR-B, RSS-D
3
IRIG
IRIG SENSOR
15
IRIG INDICATING BRIDGE
33
1400
REMOTE NO TEMP. ALARM OUTPUT (MPL 1400)
REMOTE NO ALARM
1401
REMOTE TEMP. ALARM INPUT (MPL 1401)
12
IRIG SENSOR DURING ACCEL DUMMY
23A
26
34
1402
REMOTE TEMP. ALARM OUTPUT (MPL 1402)
REMOTE ALARM
SIMULATED SENSOR +8° 0°
4
IRIG DUMMY
13
IRIG DUMMY DURING AUX
ALARM AND NO DUMMY SENSOR
ACCEL BRIDGE EXCIT
±30 VDC SUPPLY
HI
35
853
TEMP. NORMAL (LO) (MPL 853)
NO ALARM
IRIG BRIDGE EXCIT
INDICATING SENSOR SELECTOR
IRIG BRIDGE EXCIT LOSS
ACCEL BRIDGE EXCIT LOSS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN R. Jatieck DATE 5 MAY 65 CHECKED Ed Foster 11 MAY 65 APPROVAL APPROVAL M. Watson 6-25-65	MECHANIZATION DIAGRAM - TEMPERATURE MONITOR AND CONTROL PANEL (BLOCK II AND LEM)
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 SIZE E 2900203
CONTRACT NAS9-497	MIT APPROVAL 27 Jul 65	SCALE NONE SHEET 1 OF 2

2900203

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUN 65	EF
B		REVISION STATUS CHANGED		1 SEP 65	JW
C		REVISION STATUS CHANGED		1-SEP 65	JWP
D		REVISION STATUS CHANGED		2 SEP 65	
E		REVISION STATUS CHANGED		SEP 65	

REVISIONS TDRR 21261


BLOCK II
IMU
J1-13 TEMP. OUT OF LIMITS
J1-2 +28 VDC (AGE)
J1-3 +28 VDC (AGE)
J1-14 J1-15 ACCEL IND. SENSOR
J1-17 J1-18 IRIG IND SENSOR
J1-12 COM BLOWER
J1-16 IND. SENSOR COM.
J1-6 J1-7 AUX HTR HI
J1-8 J1-9 AUX HTR LO
J1-10 ØA BLOWER
J1-11 ØB BLOWER
J1-5 0 VDC (AGE)
J1-4 0 VDC (AGE)
PSA
IRIG IND. SENSOR (HI)
IRIG IND. SENSOR (LO)
ACCEL IND SENSOR (HI)
ACCEL IND SENSOR (LO)
GSE HEATER (HI)
GSE HEATER (LO)
IND SENSOR (COM)
GDB
BLOWER CURRENT SENSOR
LO
HI
4A.
PSA HTR CURRENT SENSOR
CONDUCTS DURING A/B HEAT
LO
HI
PSA
0 VDC (AGE)
0 VDC (AGE)
28V 800~ØA
28V 800~ØB
28V 800~COM
WHEELS AND BLOWERS
+28 VDC (AGE)
+28 VDC (AGE)
OIA BACKWALL
1668TL
1669TL
1670TL
1671TL
1672TL
1673TL
1667TL
621
1324TL
1325TL
550WT
1637TL
1241TL
1242TL
1304TL
1305TL
HI (XBR-B)
LO
HI (XBR-A)
LO
LEM
IMU
35J2
56P21
0 VDC (AGE) J1-4
0 VDC (AGE) J1-5
BLOWER (ØA) J1-10
BLOWER (ØB) J1-11
BLOWER (COM) J1-12
+28 VDC (AGE) J1-2
+28 VDC (AGE) J1-3
TEMP. OUT OF LIMITS J1-13
J1-17 IRIG IND SENSOR (HI)
J1-18 IRIG IND SENSOR (LO)
J1-14 ACCEL IND SENSOR (HI)
J1-15 ACCEL IND SENSOR (LO)
J1-6 J1-7 GSE HEATER (HI)
J1-8 J1-9 GSE HEATER (LO)
J1-16 IND SENSOR (COM)
56 P17
X11
X24
X20
X21
X22
X10
X23
56P16
X2
"B" HARNESS
"B" HARNESS
GDB
BLOWER CURRENT SENSOR
LO
HI
4A.
PSA HTR CURRENT SENSOR
CONDUCTS DURING A/B HEAT
LO
HI
56 P11
X11
X24
X20
X21
X28
X10
X23
"A" HARNESS
56P2
PSA
45 J19
Y41 0 VDC (AGE)
Y30 0 VDC (AGE)
Y26 28V 800~ØA
Y27 28V 800~ØB
Y28 28V 800~COM
WHEELS AND BLOWERS
X40 +28 VDC (AGE)
Y29 +28 VDC (AGE)
OIA BACKWALL
1668TL
1669TL
1670TL
1671TL
1672TL
1673TL
1667TL
621
1324TL
1325TL
550WT
1637TL
1241TL
1242TL
1304TL
1305TL
HI (XBR-B)
LO
HI (XBR-A)
LO

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ ± ___ ± ___
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Tatice DATE 3 MAY 65
CHECKED Ed Foster 11 MAY 65
APPROVAL 6-23-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
TEMPERATURE MONITOR
AND CONTROL PANEL
(BLOCK II AND LEM)

CODE IDENT NO 99974
SIZE E
2900203
SCALE NONE
SHEET 2 OF 2

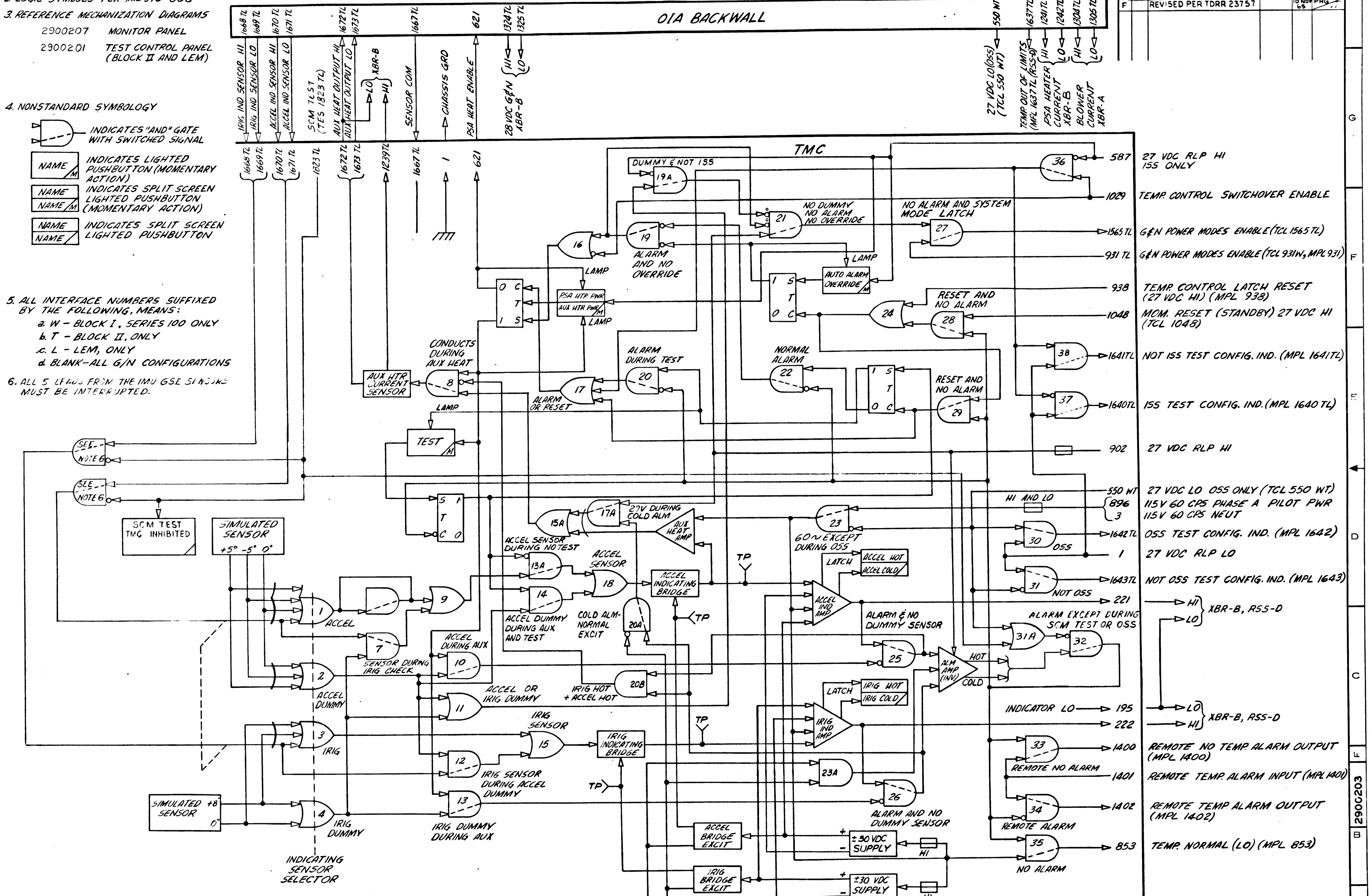
E 2900203

2900203

5800503

NOTES:
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. LOGIC SYMBOLS PER MIL-STD-806
3. REFERENCE MECHANIZATION DIAGRAMS
2900207 MONITOR PANEL
2900201 TEST CONTROL PANEL (BLOCK II AND LEM)
4. NONSTANDARD SYMBOLOGY
INDICATES "AND" GATE WITH SWITCHED SIGNAL
NAME/M INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME / NAME/M INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME / NAME INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
a. W - BLOCK I, SERIES 100 ONLY
b. T - BLOCK II, ONLY
c. L - LEM, ONLY
d. BLANK - ALL G/N CONFIGURATIONS
6. ALL 5 LEADS FROM THE IMU GSE SENSORS MUST BE INTERRUPTED.

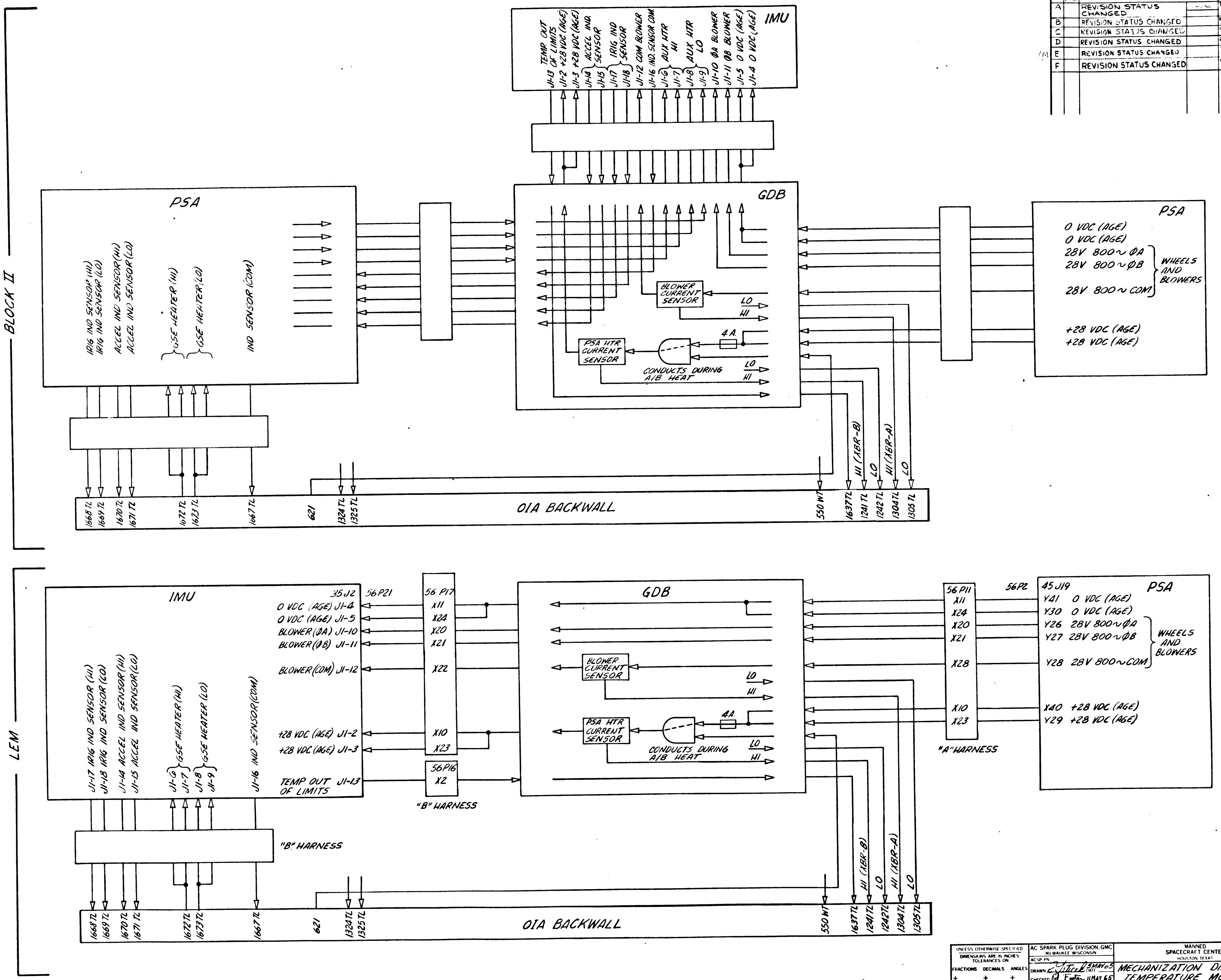
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
REVISIONS TDRR 21261					
A		REVISED PER D.O. 60558		2 JUN 65	LGC
B		REVISED PER TDRR 21901		31 AUG 65	JWP
C		REVISED PER TDRR 21902		1 SEP 65	JWP
D		REVISED PER TDRR 21903		2 SEP 65	RP
E		REVISED PER TDRR 21904		7 SEP 65	JJJ EF
F		REVISED PER TDRR 23757		10 NOV 65	PHG


O1A BACKWALL
1668 TL
1669 TL
1670 TL
1671 TL
1672 TL
1673 TL
1667 TL
621
1324 TL
1325 TL
550 WT
1637 TL
1241 TL
1242 TL
1304 TL
1305 TL
IRIG IND SENSOR HI
IRIG IND SENSOR LO
ACCEL IND SENSOR HI
ACCEL IND SENSOR LO
SCM TLST (TES 1823 TL)
AUX HEAT OUTPUT HI
AUX HEAT OUTPUT LO
LO
HI
XBR-B
SENSOR COM
CHASSIS GRD
PSA HEAT ENABLE
28 VDC G&N XBR-B
HI
LO
27 VDC LO (OSS) (TCL 550 WT)
TEMP OUT OF LIMITS (MPL 1637 TL (RSS-D))
PSA HEATER CURRENT XBR-B
BLOWER CURRENT XBR-A
TMC
1823 TL
1239 TL
DUMMY & NOT ISS
19A
NO DUMMY NO ALARM NO OVERRIDE
21
NO ALARM AND SYSTEM MODE LATCH
27
36
16
19
ALARM AND NO OVERRIDE
LAMP
AUTO ALARM OVERRIDE
PSA HTR PWR
AUX HTR PWR
S T C
O C T I S
24
RESET AND NO ALARM
28
CONDUCTS DURING AUX HEAT
AUX HTR CURRENT SENSOR
8
ALARM DURING TEST
20
17
ALARM OR RESET
NORMAL ALARM
22
RESET AND NO ALARM
29
38
37
TEST
SEE NOTE 6
SCM TEST TMC INHIBITED
SIMULATED SENSOR +5° -5° 0°
S F T C O
17A
15A
27V DURING COLD ALM
AUX HEAT AMP
HI AND LO
23
60~ EXCEPT DURING OSS
30
OSS
31
NOT OSS
ACCEL SENSOR DURING NO TEST
13A
14
ACCEL DUMMY DURING AUX AND TEST
ACCEL SENSOR
18
ACCEL INDICATING BRIDGE
TP
COLD ALM-NORMAL EXCIT
20A
LATCH
ACCEL HOT
ACCEL COLD
ACCEL IND AMP
ALARM & NO DUMMY SENSOR
ALARM EXCEPT DURING SCM TEST OR OSS
31A
32
1
ACCEL
9
7
SENSOR DURING IRIG CHECK
ACCEL DURING AUX
10
2
ACCEL DUMMY
ACCEL OR IRIG DUMMY
11
IRIG HOT + ACCEL HOT
20B
25
ALM AMP (INV)
HOT
COLD
IRIG HOT
IRIG COLD
IRIG IND AMP
3
IRIG
IRIG SENSOR
15
IRIG INDICATING BRIDGE
12
IRIG SENSOR DURING ACCEL DUMMY
23A
26
ALARM AND NO DUMMY SENSOR
SIMULATED SENSOR +8 0°
4
IRIG DUMMY
13
IRIG DUMMY DURING AUX
ACCEL BRIDGE EXCIT
±30 VDC SUPPLY
HI
IRIG BRIDGE EXCIT
IRIG BRIDGE EXCIT LOSS
ACCEL BRIDGE EXCIT LOSS
INDICATING SENSOR SELECTOR
33
REMOTE NO ALARM
34
REMOTE ALARM
35
NO ALARM
587 27 VDC RLP HI ISS ONLY
1029 TEMP. CONTROL SWITCHOVER ENABLE
1565 TL G&N POWER MODES ENABLE (TCL 1565 TL)
931 TL G&N POWER MODES ENABLE (TCL 931W, MPL 931)
938 TEMP. CONTROL LATCH RESET (27 VDC HI) (MPL 938)
1048 MOM. RESET (STANDBY) 27 VDC HI (TCL 1048)
1641 TL NOT ISS TEST CONFIG. IND. (MPL 1641 TL)
1640 TL ISS TEST CONFIG. IND. (MPL 1640 TL)
902 27 VDC RLP HI
550 WT 27 VDC LO OSS ONLY (TCL 550 WT)
896 115V 60 CPS PHASE A PILOT PWR
3 115V 60 CPS NEUT
1642 TL OSS TEST CONFIG. IND. (MPL 1642)
1 27 VDC RLP LO
1643 TL NOT OSS TEST CONFIG. IND. (MPL 1643)
221 HI LO XBR-B, RSS-D
INDICATOR LO 195
222 LO HI XBR-B, RSS-D
1400 REMOTE NO TEMP. ALARM OUTPUT (MPL 1400)
1401 REMOTE TEMP. ALARM INPUT (MPL 1401)
1402 REMOTE TEMP. ALARM OUTPUT (MPL 1402)
853 TEMP. NORMAL (LO) (MPL 853)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ___ ± ___ ± ___	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN R. Jatieck DATE 5 MAY 65 CHECKED Ed Foster 11 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM - TEMPERATURE MONITOR AND CONTROL PANEL (BLOCK II AND LEM)
MATERIAL	NASA APPROVAL	CODE IDENT NO 99974 / SIZE E / 2900203
CONTRACT NAS 9-497	MIT APPROVAL W. Kupfer 2 Jun 65	SCALE NONE / SHEET 1 OF 2

2900203

REVISIONS TDCR 21261					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUN 65	LGC EF
B		REVISION STATUS CHANGED		1 SEP 65	WP
C		REVISION STATUS CHANGED		1 SEP 65	WP
D		REVISION STATUS CHANGED		2 SEP 65	RLP
E		REVISION STATUS CHANGED		SEP 65	EF
F		REVISION STATUS CHANGED		10 NOV 65	PHG


BLOCK II
IMU
J1-13 TEMP. OUT OF LIMITS
J1-2 +28 VDC (AGE)
J1-3 +28 VDC (AGE)
J1-14 ACCEL IND. SENSOR
J1-15
J1-17 IRIG IND SENSOR
J1-18
J1-12 COM BLOWER
J1-16 IND. SENSOR COM.
J1-6 AUX HTR HI
J1-7
J1-8 AUX HTR LO
J1-9
J1-10 ØA BLOWER
J1-11 ØB BLOWER
J1-5 0 VDC (AGE)
J1-4 0 VDC (AGE)
PSA
IRIG IND SENSOR (HI)
IRIG IND SENSOR (LO)
ACCEL IND SENSOR (HI)
ACCEL IND SENSOR (LO)
GSE HEATER (HI)
GSE HEATER (LO)
IND SENSOR (COM)
GDB
BLOWER CURRENT SENSOR
LO
HI
4 A.
PSA HTR CURRENT SENSOR
CONDUCTS DURING A/B HEAT
LO
HI
PSA
0 VDC (AGE)
0 VDC (AGE)
28V 800~ØA
28V 800~ØB
28V 800~COM
WHEELS AND BLOWERS
+28 VDC (AGE)
+28 VDC (AGE)
HI (XBR-B)
LO
HI (XBR-A)
LO
1668 TL
1669 TL
1670 TL
1671 TL
1672 TL
1673 TL
1667 TL
621
1324 TL
1325 TL
OIA BACKWALL
550 WT
1637 TL
1241 TL
1242 TL
1304 TL
1305 TL
LEM
IMU
35 J2
56 P21
0 VDC (AGE) J1-4
0 VDC (AGE) J1-5
BLOWER (ØA) J1-10
BLOWER (ØB) J1-11
BLOWER (COM) J1-12
+28 VDC (AGE) J1-2
+28 VDC (AGE) J1-3
TEMP. OUT OF LIMITS J1-13
J1-17 IRIG IND SENSOR (HI)
J1-18 IRIG IND SENSOR (LO)
J1-14 ACCEL IND SENSOR (HI)
J1-15 ACCEL IND SENSOR (LO)
J1-6
J1-7 GSE HEATER (HI)
J1-8
J1-9 GSE HEATER (LO)
J1-16 IND SENSOR (COM)
56 P17
X11
X24
X20
X21
X22
X10
X23
56P16
X2
"B" HARNESS
"B" HARNESS
GDB
BLOWER CURRENT SENSOR
LO
HI
4A.
PSA HTR CURRENT SENSOR
CONDUCTS DURING A/B HEAT
LO
HI
56 P11
X11
X24
X20
X21
X28
X10
X23
"A" HARNESS
56P2
45 J19
PSA
Y41 0 VDC (AGE)
Y30 0 VDC (AGE)
Y26 28V 800~ØA
Y27 28V 800~ØB
Y28 28V 800~COM
WHEELS AND BLOWERS
X40 +28 VDC (AGE)
Y29 +28 VDC (AGE)
HI (XBR-B)
LO
HI (XBR-A)
LO
1668 TL
1669 TL
1670 TL
1671 TL
1672 TL
1673 TL
1667 TL
621
1324 TL
1325 TL
OIA BACKWALL
550 WT
1637 TL
1241 TL
1242 TL
1304 TL
1305 TL

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ____ ± ____ ± ____
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN DATE 5 MAY 65
CHECKED Ed Foster 11 MAY 65
APPROVAL 6-25-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

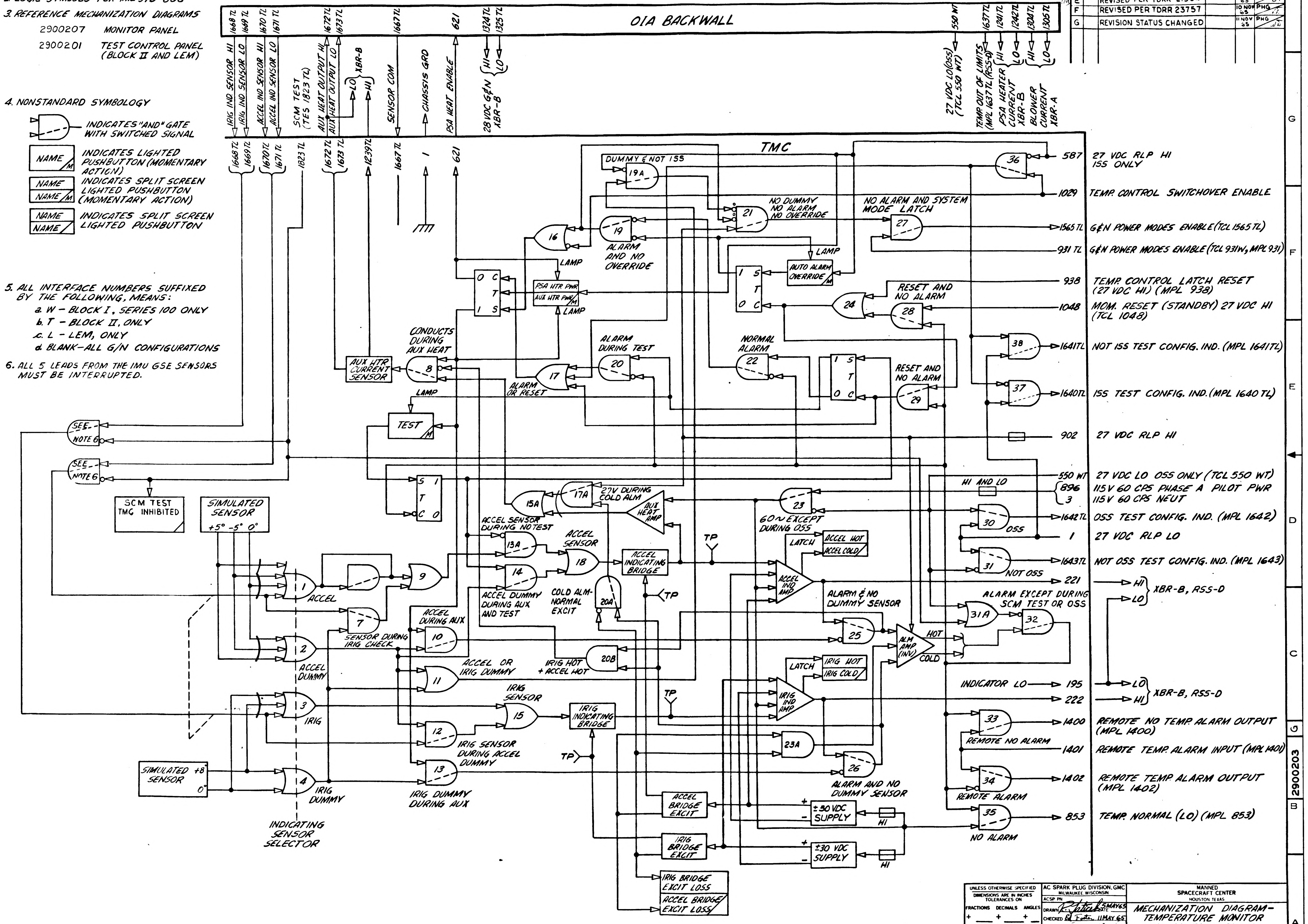
MECHANIZATION DIAGRAM–
TEMPERATURE MONITOR
AND CONTROL PANEL
(BLOCK II AND LEM)

CODE IDENT NO 99974
SIZE E
2900203
SCALE NONE
SHEET 2 OF 2

2900203 F

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. LOGIC SYMBOLS PER MIL-STD-806
3. REFERENCE MECHANIZATION DIAGRAMS
   - 2900207 MONITOR PANEL
   - 2900201 TEST CONTROL PANEL (BLOCK II AND LEM)
4. NONSTANDARD SYMBOLOGY
   - INDICATES "AND" GATE WITH SWITCHED SIGNAL
   - NAME/M INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
   - NAME / NAME/M INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
   - NAME / NAME INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   - a. W - BLOCK I, SERIES 100 ONLY
   - b. T - BLOCK II, ONLY
   - c. L - LEM, ONLY
   - d. BLANK - ALL G/N CONFIGURATIONS
6. ALL 5 LEADS FROM THE IMU GSE SENSORS MUST BE INTERRUPTED.



OIA BACKWALL
1668TL 1669TL 1670TL 1671TL 1672TL 1673TL 1667TL 621 1324TL 1325TL
550WT 1637TL 1241TL 1242TL 1304TL 1305TL
IRIG IND SENSOR HI
IRIG IND SENSOR LO
ACCEL IND SENSOR HI
ACCEL IND SENSOR LO
SCM TEST (TES 1823TL)
AUX HEAT OUTPUT HI
AUX HEAT OUTPUT LO
XBR-B
LO
HI
SENSOR COM
CHASSIS GRD
PSA HEAT ENABLE
28 VDC G&N XBR-B
HI
LO
27 VDC LO (OSS) (TCL 550 WT)
TEMP OUT OF LIMITS (MPL 1637TL (RSS-D)
PSA HEATER CURRENT XBR-B
BLOWER CURRENT XBR-A
TMC
1668TL 1669TL 1670TL 1671TL 1823TL 1672TL 1673TL 1239TL 1667TL 1 621
DUMMY & NOT ISS
19A
NO DUMMY
NO ALARM
NO OVERRIDE
21
NO ALARM AND SYSTEM MODE LATCH
27
36
587
27 VDC RLP HI ISS ONLY
1029
TEMP. CONTROL SWITCHOVER ENABLE
1565TL
G&N POWER MODES ENABLE (TCL 1565TL)
931TL
G&N POWER MODES ENABLE (TCL 931W, MPL 931)
16
19
ALARM AND NO OVERRIDE
LAMP
O C T I S
PSA HTR PWR
AUX HTR PWR/M
LAMP
I S T O C
AUTO ALARM OVERRIDE/M
LAMP
938
TEMP. CONTROL LATCH RESET (27 VDC HI) (MPL 938)
RESET AND NO ALARM
24
28
1048
MOM. RESET (STANDBY) 27 VDC HI (TCL 1048)
38
1641TL
NOT ISS TEST CONFIG. IND. (MPL 1641TL)
CONDUCTS DURING AUX HEAT
ALARM DURING TEST
NORMAL ALARM
I S T O C
RESET AND NO ALARM
AUX HTR CURRENT SENSOR
8
20
22
29
37
1640TL
ISS TEST CONFIG. IND. (MPL 1640TL)
17
ALARM OR RESET
LAMP
TEST/M
902
27 VDC RLP HI
SEE NOTE 6
SEE NOTE 6
SCM TEST TMG INHIBITED
S I T C O
15A
17A
27V DURING COLD ALM
AUX HEAT AMP
550WT
27 VDC LO OSS ONLY (TCL 550 WT)
HI AND LO
896
115V 60 CPS PHASE A PILOT PWR
3
115V 60 CPS NEUT
23
60~ EXCEPT DURING OSS
1642TL
OSS TEST CONFIG. IND. (MPL 1642)
30
OSS
1
27 VDC RLP LO
SIMULATED SENSOR +5° -5° 0°
ACCEL SENSOR DURING NO TEST
13A
ACCEL SENSOR
18
ACCEL INDICATING BRIDGE
TP
LATCH
ACCEL HOT
ACCEL COLD
ACCEL IND AMP
31
NOT OSS
1643TL
NOT OSS TEST CONFIG. IND. (MPL 1643)
221
HI
LO
XBR-B, RSS-D
1
ACCEL
9
14
ACCEL DUMMY DURING AUX AND TEST
COLD ALM-NORMAL EXCIT
20A
TP
ALARM & NO DUMMY SENSOR
ALARM EXCEPT DURING SCM TEST OR OSS
31A
32
7
SENSOR DURING IRIG CHECK
10
ACCEL DURING AUX
25
ALM AMP (INV)
HOT
COLD
2
ACCEL DUMMY
11
ACCEL OR IRIG DUMMY
IRIG HOT + ACCEL HOT
20B
LATCH
IRIG HOT
IRIG COLD
IRIG IND AMP
TP
INDICATOR LO
195
222
LO
HI
XBR-B, RSS-D
3
IRIG
IRIG SENSOR
15
IRIG INDICATING BRIDGE
33
1400
REMOTE NO TEMP. ALARM OUTPUT (MPL 1400)
REMOTE NO ALARM
12
IRIG SENSOR DURING ACCEL DUMMY
23A
1401
REMOTE TEMP. ALARM INPUT (MPL 1401)
SIMULATED +8° SENSOR 0°
4
IRIG DUMMY
13
IRIG DUMMY DURING AUX
TP
26
ALARM AND NO DUMMY SENSOR
34
1402
REMOTE TEMP ALARM OUTPUT (MPL 1402)
REMOTE ALARM
ACCEL BRIDGE EXCIT
+ ±30 VDC SUPPLY -
HI
35
853
TEMP. NORMAL (LO) (MPL 853)
NO ALARM
INDICATING SENSOR SELECTOR
IRIG BRIDGE EXCIT
+ ±30 VDC SUPPLY -
HI
IRIG BRIDGE EXCIT LOSS
ACCEL BRIDGE EXCIT LOSS

REVISIONS TDRR 21261

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.O. 60558		2 JUN 65	LGC
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C		REVISED PER TDRR 21902		1 SEP 65	JWP
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E		REVISED PER TDRR 21904		7 SEP 65	JJJ EF
F		REVISED PER TDRR 23757		10 NOV 65	PHG
G		REVISION STATUS CHANGED		11 NOV 65	PHG

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

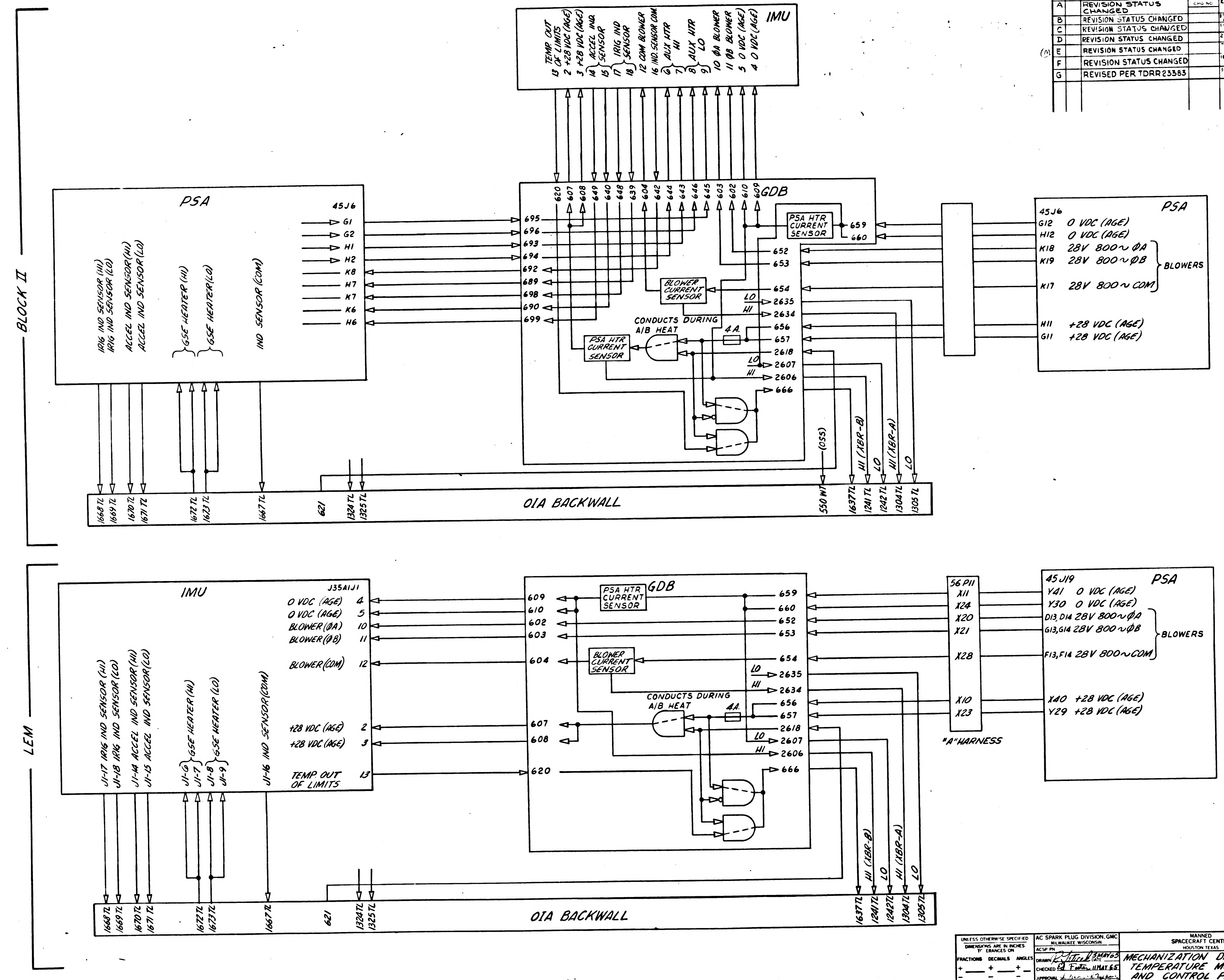
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Fatick DATE 5MAY65
CHECKED Ed Foster 11MAY 65
APPROVAL
APPROVAL M. Watson 6-25-65
NASA APPROVAL
MIT APPROVAL 27 July 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
TEMPERATURE MONITOR
AND CONTROL PANEL
(BLOCK II AND LEM)

CODE IDENT NO 99974 SIZE E 2900203
SCALE NONE SHEET 1 OF 2

REVISIONS TDRR 21261					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUN 65	LGC EF
B		REVISION STATUS CHANGED		1 SEP 65	JWP
C		REVISION STATUS CHANGED		1-SEP 65	JWP
D		REVISION STATUS CHANGED		2 SEP 65	RLP
E		REVISION STATUS CHANGED		7 SEP 65	EF
F		REVISION STATUS CHANGED		10 NOV 65	PHG
G		REVISED PER TDRR 23383		11 NOV 65	PHG



BLOCK II
IMU
13 TEMP. OUT OF LIMITS
2 +28 VDC (AGE)
3 +28 VDC (AGE)
14 15 ACCEL IND. SENSOR
17 18 IRIG IND SENSOR
12 COM BLOWER
16 IND. SENSOR COM.
6 7 AUX HTR HI
8 9 AUX HTR LO
10 ØA BLOWER
11 ØB BLOWER
5 0 VDC (AGE)
4 0 VDC (AGE)
GDB
620 607 608 649 640 648 639 604 642 644 643 646 645 603 602 610 609
PSA
45J6
G1 G2 H1 H2 K8 H7 K7 K6 H6
IRIG IND. SENSOR (HI)
IRIG IND. SENSOR (LO)
ACCEL IND SENSOR (HI)
ACCEL IND SENSOR (LO)
GSE HEATER (HI)
GSE HEATER (LO)
IND SENSOR (COM)
695 696 693 694 692 689 698 690 699
PSA HTR CURRENT SENSOR
659 660
652 653
BLOWER CURRENT SENSOR
654
LO 2635
HI 2634
CONDUCTS DURING A/B HEAT
4A.
656 657 2618
LO 2607
HI 2606
666
PSA
45J6
G12 0 VDC (AGE)
H12 0 VDC (AGE)
K18 28V 800~ ØA
K19 28V 800~ ØB
K17 28V 800~ COM
BLOWERS
H11 +28 VDC (AGE)
G11 +28 VDC (AGE)
(OSS)
HI (XBR-B)
LO
HI (XBR-A)
LO
OIA BACKWALL
1668TL 1669TL 1670TL 1671TL 1672TL 1673TL 1667TL 621 1324TL 1325TL 550 WT 1637TL 1241TL 1242TL 1304TL 1305TL
LEM
IMU
J35A1J1
0 VDC (AGE) 4
0 VDC (AGE) 5
BLOWER (ØA) 10
BLOWER (ØB) 11
BLOWER (COM) 12
+28 VDC (AGE) 2
+28 VDC (AGE) 3
TEMP. OUT OF LIMITS 13
J1-17 IRIG IND SENSOR (HI)
J1-18 IRIG IND SENSOR (LO)
J1-14 ACCEL IND SENSOR (HI)
J1-15 ACCEL IND SENSOR (LO)
J1-6 J1-7 GSE HEATER (HI)
J1-8 J1-9 GSE HEATER (LO)
J1-16 IND SENSOR (COM)
GDB
609 610 602 603 604 607 608 620
PSA HTR CURRENT SENSOR
BLOWER CURRENT SENSOR
CONDUCTS DURING A/B HEAT
4A.
659 660 652 653 654
LO 2635
HI 2634
656 657 2618
LO 2607
HI 2606
666
56P11
X11 X24 X20 X21 X28 X10 X23
"A" HARNESS
PSA
45J19
Y41 0 VDC (AGE)
Y30 0 VDC (AGE)
D13, D14 28V 800~ ØA
G13, G14 28V 800~ ØB
F13, F14 28V 800~ COM
BLOWERS
X40 +28 VDC (AGE)
Y29 +28 VDC (AGE)
HI (XBR-B)
LO
HI (XBR-A)
LO
OIA BACKWALL
1668TL 1669TL 1670TL 1671TL 1672TL 1673TL 1667TL 621 1324TL 1325TL 1637TL 1241TL 1242TL 1304TL 1305TL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
	ACSP PN	
	DRAWN R. Stitcel DATE 3 MAY 65 CHECKED Ed Foster 11 MAY 65 APPROVAL 6-25-65 APPROVAL	MECHANIZATION DIAGRAM- TEMPERATURE MONITOR AND CONTROL PANEL (BLOCK II AND LEM)
DO NOT SCALE THIS DRAWING		
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE E · 2900203
CONTRACT	MIT APPROVAL	SCALE NONE · SHEET 2 OF 2

580503

SYM	ZONE	DESCRIPTION		DATE	APPD
		REVISIONS TCRC 2.26.			
A		REVISED PER D.O. 60538	CHG NO.	2 JUN 65	LGC / CF

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. LOGIC SYMBOLS PER MIL-STD-806
3. REFERENCE MECHANIZATION DIAGRAMS

   2900207 MONITOR PANEL

   2900201 TEST CONTROL PANEL (BLOCK II AND LEM)

4. NONSTANDARD SYMBOLOGY

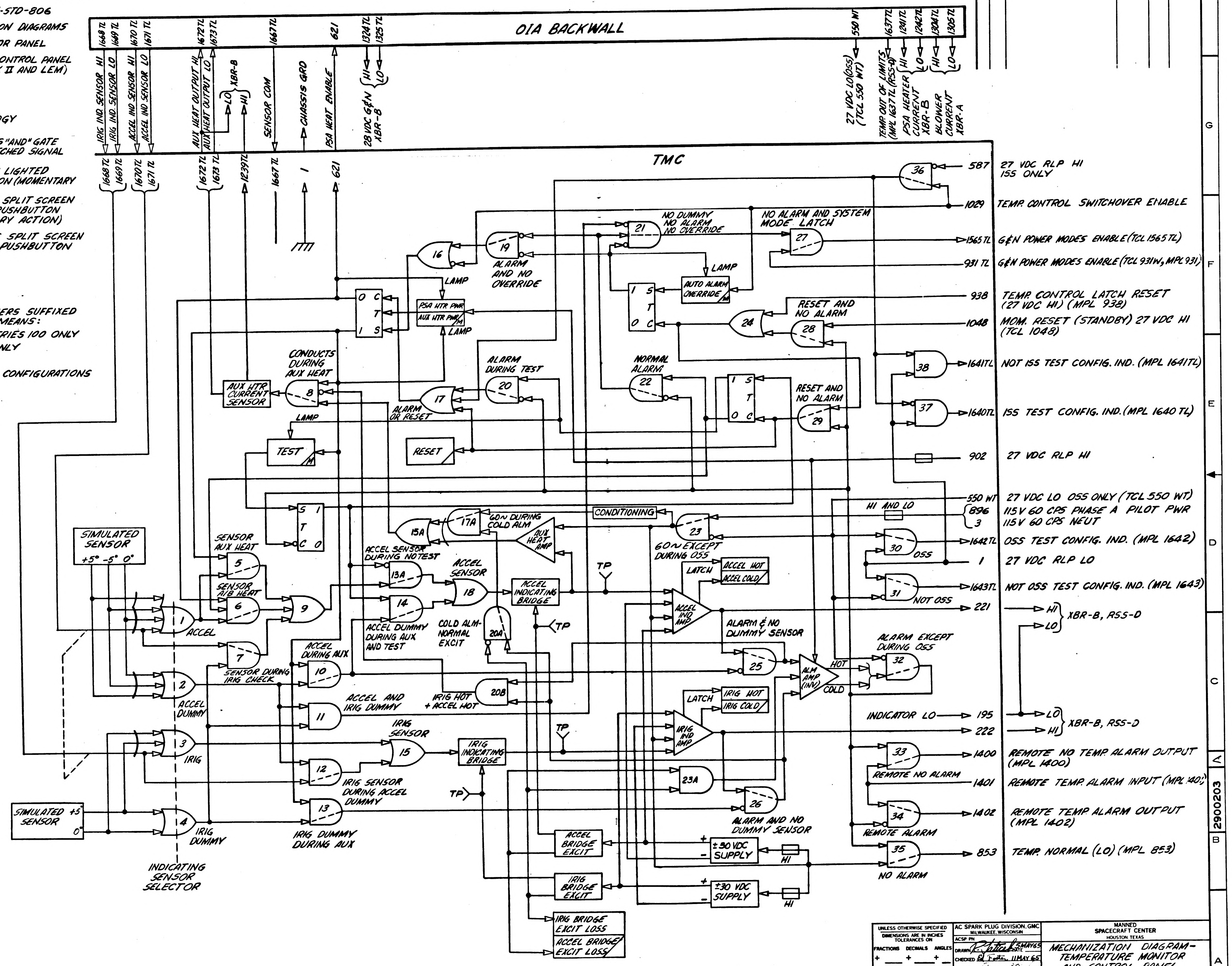
   INDICATES "AND" GATE WITH SWITCHED SIGNAL

   NAME — INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

   NAME / NAME — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)

   NAME / NAME — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   - a. W - BLOCK I, SERIES 100 ONLY
   - b. T - BLOCK II, ONLY
   - c. L - LEM, ONLY
   - d. BLANK-ALL G/N CONFIGURATIONS

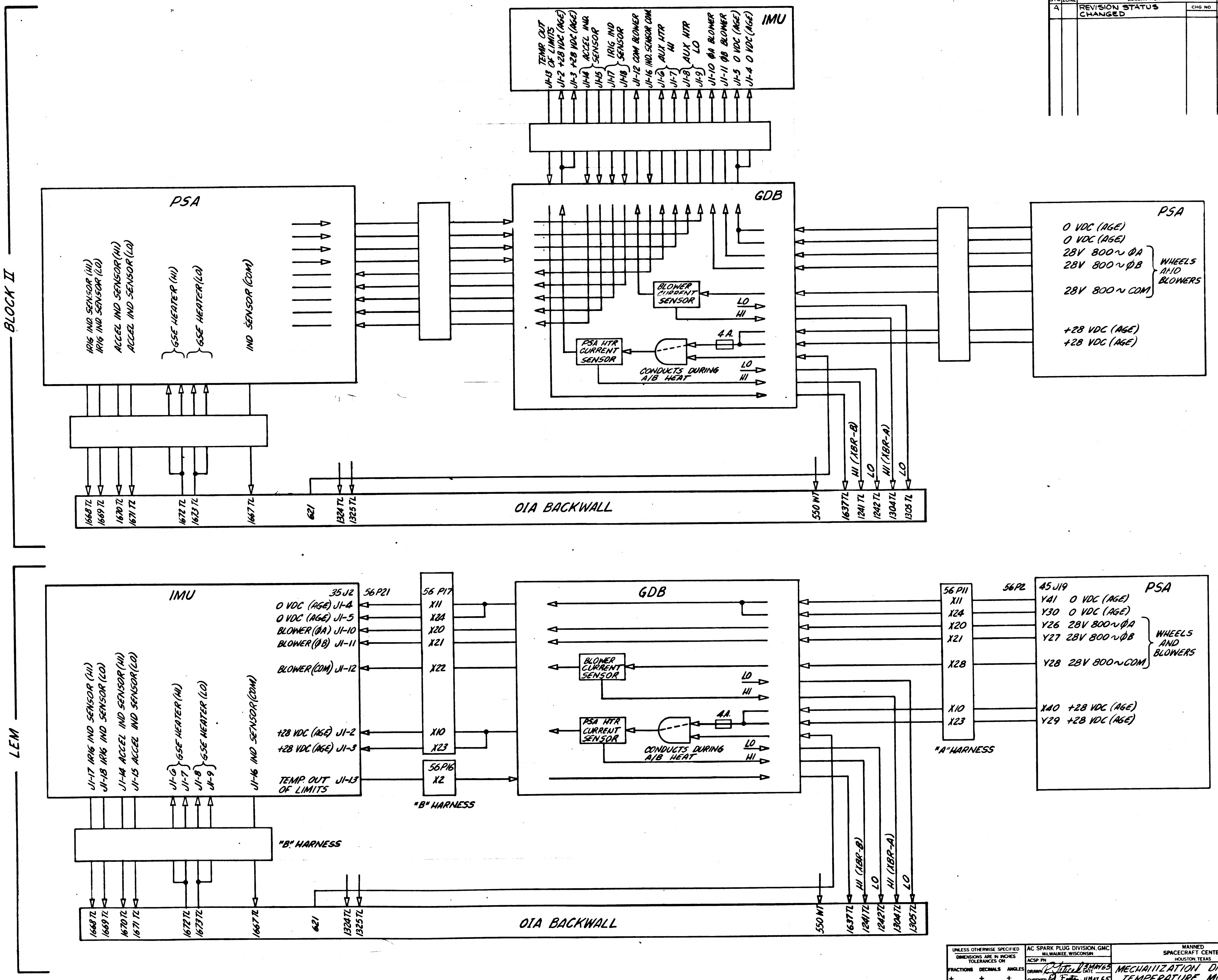


OIA BACKWALL
1668TL 1669TL 1670TL 1671TL 1672TL 1673TL 1667TL 621 1324TL 1325TL
550WT 1637TL 1241TL 1242TL 1304TL 1305TL
IRIG IND. SENSOR HI
IRIG IND. SENSOR LO
ACCEL IND SENSOR HI
ACCEL IND SENSOR LO
AUX HEAT OUTPUT HI
AUX HEAT OUTPUT LO
LO HI XBR-B
SENSOR COM
CHASSIS GRD
PSA HEAT ENABLE
28 VDC G&N HI LO XBR-B
27 VDC LO(OSS) (TCL 550 WT)
TEMP OUT OF LIMITS (MPL 1637 TL (RSS-D)
PSA HEATER CURRENT XBR-B HI LO
BLOWER CURRENT XBR-A HI LO
TMC
1668TL 1669TL 1670TL 1671TL 1672TL 1673TL 1239TL 1667TL 1 621
587 27 VDC RLP HI ISS ONLY
1029 TEMP. CONTROL SWITCHOVER ENABLE
1565TL G&N POWER MODES ENABLE (TCL 1565TL)
931TL G&N POWER MODES ENABLE (TCL 931W, MPL 931)
938 TEMP. CONTROL LATCH RESET (27 VDC HI) (MPL 938)
1048 MOM. RESET (STANDBY) 27 VDC HI (TCL 1048)
1641TL NOT ISS TEST CONFIG. IND. (MPL 1641TL)
1640TL ISS TEST CONFIG. IND. (MPL 1640 TL)
902 27 VDC RLP HI
550 WT 27 VDC LO OSS ONLY (TCL 550 WT)
896 115V 60 CPS PHASE A PILOT PWR
3 115V 60 CPS NEUT
1642TL OSS TEST CONFIG. IND. (MPL 1642)
1 27 VDC RLP LO
1643TL NOT OSS TEST CONFIG. IND. (MPL 1643)
221 HI LO XBR-B, RSS-D
INDICATOR LO 195
222 LO HI XBR-B, RSS-D
1400 REMOTE NO TEMP. ALARM OUTPUT (MPL 1400)
1401 REMOTE TEMP. ALARM INPUT (MPL 1401)
1402 REMOTE TEMP. ALARM OUTPUT (MPL 1402)
853 TEMP. NORMAL (LO) (MPL 853)
36
NO DUMMY NO ALARM NO OVERRIDE 21
NO ALARM AND SYSTEM MODE LATCH 27
19 ALARM AND NO OVERRIDE
16
LAMP
AUTO ALARM OVERRIDE
S T O C
O C T 1 S
PSA HTR PWR / AUX HTR PWR
LAMP
24
RESET AND NO ALARM 28
CONDUCTS DURING AUX HEAT 8
AUX HTR CURRENT SENSOR
ALARM DURING TEST 20
17 ALARM OR RESET
NORMAL ALARM 22
1 S T O C
RESET AND NO ALARM 29
38
37
LAMP
TEST
RESET
S 1 T C O
15A
17A
60~ DURING COLD ALM
AUX HEAT AMP
CONDITIONING
HI AND LO
23
60~ EXCEPT DURING OSS
30 OSS
31 NOT OSS
LATCH ACCEL HOT ACCEL COLD
SIMULATED SENSOR +5° -5° 0°
SENSOR AUX HEAT 5
SENSOR A/B HEAT 6
9
1 ACCEL
7 SENSOR DURING IRIG CHECK
ACCEL SENSOR DURING NO TEST 13A
14 ACCEL DUMMY DURING AUX AND TEST
ACCEL SENSOR 18
ACCEL INDICATING BRIDGE
TP
COLD ALM-NORMAL EXCIT 20A
TP
ACCEL IND AMP
ALARM & NO DUMMY SENSOR 25
ALARM EXCEPT DURING OSS 32
HOT ALM AMP (INV) COLD
2 ACCEL DUMMY
ACCEL DURING AUX 10
ACCEL AND IRIG DUMMY 11
IRIG HOT + ACCEL HOT 20B
TP
LATCH IRIG HOT IRIG COLD
IRIG IND AMP
3 IRIG
IRIG SENSOR 15
IRIG INDICATING BRIDGE
12 IRIG SENSOR DURING ACCEL DUMMY
13 IRIG DUMMY DURING AUX
TP
23A
26 ALARM AND NO DUMMY SENSOR
33 REMOTE NO ALARM
34 REMOTE ALARM
35 NO ALARM
SIMULATED +5 SENSOR 0°
4 IRIG DUMMY
INDICATING SENSOR SELECTOR
ACCEL BRIDGE EXCIT
±30 VDC SUPPLY + - HI
IRIG BRIDGE EXCIT
±30 VDC SUPPLY + - HI
IRIG BRIDGE EXCIT LOSS
ACCEL BRIDGE EXCIT LOSS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ___ ± ___ ± ___	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN R. Fatica 5MAY65 DATE CHECKED E. Foster 11MAY65 APPROVAL APPROVAL J. M. Watson 6-25-65	MECHANIZATION DIAGRAM- TEMPERATURE MONITOR AND CONTROL PANEL (BLOCK II AND LEM)
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 SIZE E 2900203
CONTRACT NAS9-497	MIT APPROVAL 27 Jul 65	SCALE NONE SHEET 1 OF 2

2900203

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		REVISION STATUS CHANGED		2 JUN 65	LGC EF



BLOCK II
IMU
J1-13 TEMP. OUT OF LIMITS
J1-2 +28 VDC (AGE)
J1-3 +28 VDC (AGE)
J1-14 J1-15 ACCEL IND. SENSOR
J1-17 J1-18 IRIG IND SENSOR
J1-12 COM BLOWER
J1-16 IND. SENSOR COM.
J1-6 J1-7 AUX HTR HI
J1-8 J1-9 AUX HTR LO
J1-10 ØA BLOWER
J1-11 ØB BLOWER
J1-5 0 VDC (AGE)
J1-4 0 VDC (AGE)
PSA
IRIG IND SENSOR (HI)
IRIG IND SENSOR (LO)
ACCEL IND SENSOR (HI)
ACCEL IND SENSOR (LO)
GSE HEATER (HI)
GSE HEATER (LO)
IND SENSOR (COM)
GDB
BLOWER CURRENT SENSOR
LO
HI
PSA HTR CURRENT SENSOR
4A.
CONDUCTS DURING A/B HEAT
LO
HI
PSA
0 VDC (AGE)
0 VDC (AGE)
28V 800~ØA
28V 800~ØB
28V 800~COM
WHEELS AND BLOWERS
+28 VDC (AGE)
+28 VDC (AGE)
HI (XBR-B)
LO
HI (XBR-A)
LO
1668 TL
1669 TL
1670 TL
1671 TL
1672 TL
1673 TL
1667 TL
621
1324 TL
1325 TL
OIA BACKWALL
550 WT
1637 TL
1241 TL
1242 TL
1304 TL
1305 TL
LEM
IMU
35 J2
56 P21
0 VDC (AGE) J1-4
0 VDC (AGE) J1-5
BLOWER (ØA) J1-10
BLOWER (ØB) J1-11
BLOWER (COM) J1-12
+28 VDC (AGE) J1-2
+28 VDC (AGE) J1-3
TEMP. OUT OF LIMITS J1-13
J1-17 IRIG IND SENSOR (HI)
J1-18 IRIG IND SENSOR (LO)
J1-14 ACCEL IND SENSOR (HI)
J1-15 ACCEL IND SENSOR (LO)
J1-6 J1-7 GSE HEATER (HI)
J1-8 J1-9 GSE HEATER (LO)
J1-16 IND SENSOR (COM)
56 P17
X11
X24
X20
X21
X22
X10
X23
56 P16
X2
"B" HARNESS
"B" HARNESS
GDB
BLOWER CURRENT SENSOR
LO
HI
PSA HTR CURRENT SENSOR
4A.
CONDUCTS DURING A/B HEAT
LO
HI
56 P11
X11
X24
X20
X21
X28
X10
X23
"A" HARNESS
56 P2
45 J19
PSA
Y41 0 VDC (AGE)
Y30 0 VDC (AGE)
Y26 28V 800~ØA
Y27 28V 800~ØB
Y28 28V 800~COM
WHEELS AND BLOWERS
X40 +28 VDC (AGE)
Y29 +28 VDC (AGE)
HI (XBR-B)
LO
HI (XBR-A)
LO
1668 TL
1669 TL
1670 TL
1671 TL
1672 TL
1673 TL
1667 TL
621
1324 TL
1325 TL
OIA BACKWALL
550 WT
1637 TL
1241 TL
1242 TL
1304 TL
1305 TL

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ ± ___ ± ___
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

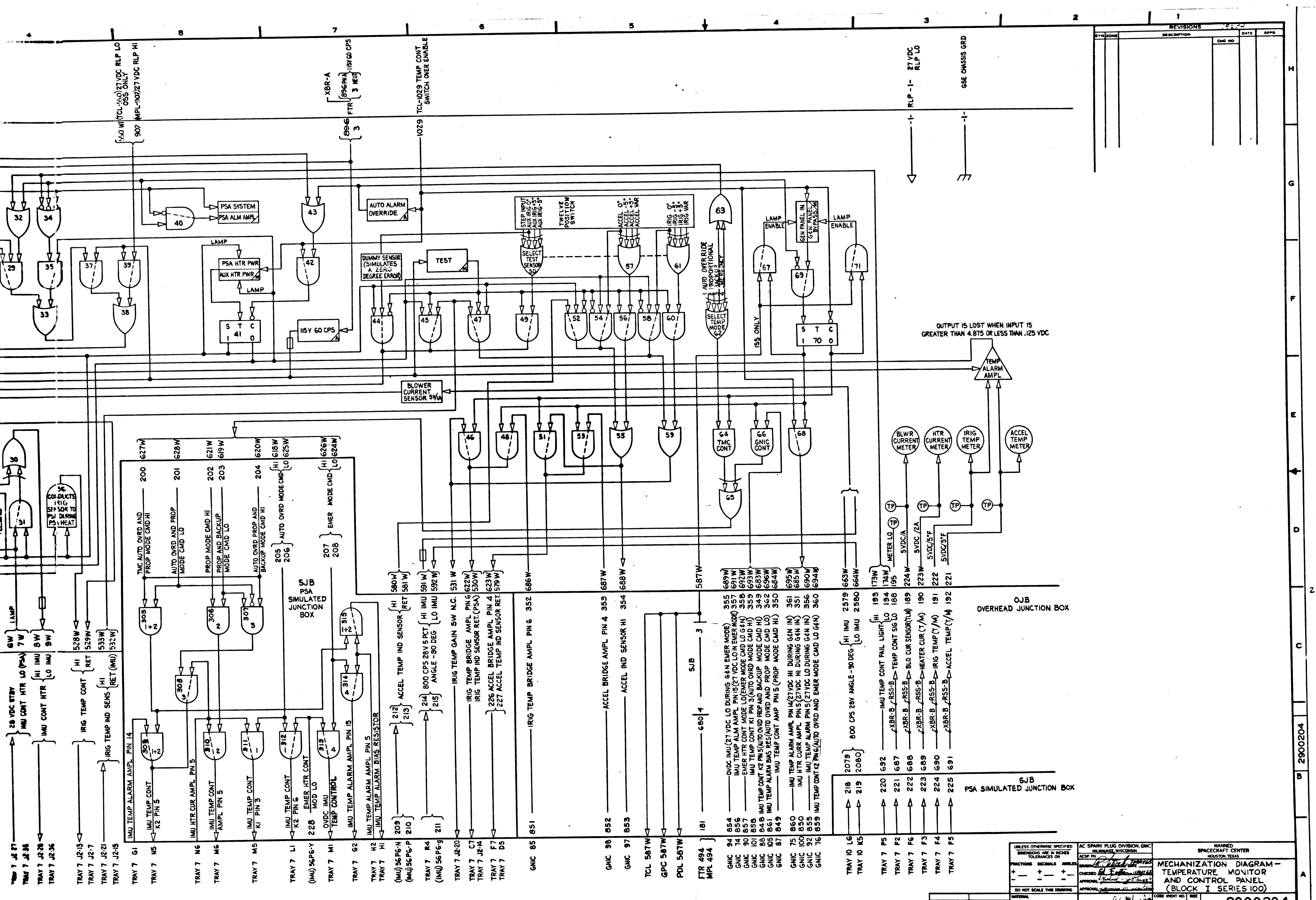
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Getticel DATE 3 MAY 65
CHECKED Ed Foster 11 MAY 65
APPROVAL 6-25-65
APPROVAL M. Watson
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM—
TEMPERATURE MONITOR
AND CONTROL PANEL
(BLOCK II AND LEM)

CODE IDENT NO 99974
SIZE E
2900203
SCALE NONE
SHEET 2 OF 2

2900203 A



TCL-550 27 VDC RLP LO OSS ONLY
MPL-107 27 VDC RLP HI
XBR-A 896 PIN FTR 115V 60 CPS
TCL-1029 TEMP CONT SWITCH OVER ENABLE
RLP-1- 27 VDC RLP LO
GSE CHASSIS GRD
PSA SYSTEM
PSA ALM AMPL
AUTO ALARM OVERRIDE
PSA HTR PWR
AUX HTR PWR
LAMP
DUMMY SENSOR (SIMULATES A ZERO DEGREE ERROR)
TEST
STEP INPUT AUX IRIG +5° AUX IRIG -5°
TWELVE POSITION SWITCH
SELECT TEST SENSOR 50
ACCEL 0° ACCEL +5° ACCEL -5° ACCEL VAR
IRIG 0° IRIG -5° IRIG +5° IRIG VAR
AUTO OVER RIDE PROPORTIONAL BACKUP
SELECT TEMP MODE 62
G&N PANEL IN G&N PANEL BY PASS
LAMP ENABLE
ISS ONLY
115V 60 CPS
BLOWER CURRENT SENSOR 5V/1A
OUTPUT IS LOST WHEN INPUT IS GREATER THAN 4.875 OR LESS THAN .125 VDC
TEMP ALARM AMPL
BLWR CURRENT METER
HTR CURRENT METER
IRIG TEMP METER
ACCEL TEMP METER
TP
64 TMC CONT
66 GNIC CONT
CONDUCTS IRIG SENSOR TO PSA DURING PSA HEAT
SJB PSA SIMULATED JUNCTION BOX
OJB OVERHEAD JUNCTION BOX
SJB PSA SIMULATED JUNCTION BOX
TMC AUTO OVRD AND PROP MODE CMD HI
AUTO OVRD AND PROP MODE CMD LO
PROP MODE CMD HI
PROP AND BACKUP MODE CMD LO
AUTO OVRD PROP AND BACKUP MODE CMD HI
AUTO OVRD MODE CMD
EMER MODE CMD
IMU TEMP ALARM AMPL PIN 14
IMU TEMP CONT K2 PIN 5
IMU HTR CUR AMPL PIN 5
IMU TEMP CONT AMPL PIN 5
IMU TEMP CONT K1 PIN 3
IMU TEMP CONT K2 PIN 6
EMER HTR CONT MOD LO
OVDC IMU TEMP CONTROL
IMU TEMP ALARM AMPL PIN 15
IMU TEMP ALARM AMPL PIN 5
IMU TEMP ALARM BIAS RESISTOR
ACCEL TEMP IND SENSOR
800 CPS 28V 5 PCT ANGLE -90 DEG
IRIG TEMP GAIN SW N.C.
IRIG TEMP BRIDGE AMPL PIN 6
IRIG TEMP IND SENSOR RET. (PSA)
ACCEL BRIDGE AMPL PIN 4
ACCEL TEMP IND SENSOR RET
IRIG TEMP BRIDGE AMPL PIN 6
ACCEL BRIDGE AMPL PIN 4
ACCEL IND SENSOR HI
SJB
0VDC IMU (27 VDC LO DURING G&N EMER MODE)
IMU TEMP ALM AMPL PIN 15 (27 VDC LO IN EMER MODE)
EMER HTR CONT MODE LO (EMER MODE CMD LO G&N)
IMU TEMP CONT K1 PIN 3 (AUTO OVRD MODE CMD HI)
IMU TEMP CONT K2 PIN 5 (AUTO OVRD PROP AND BACKUP MODE CMD HI)
IMU TEMP ALARM BIAS RES (AUTO OVRD AND PROP MODE CMD LO)
IMU TEMP CONT AMP PIN 5 (PROP MODE CMD HI)
IMU TEMP ALARM AMPL PIN 14 (27 VDC HI DURING G&N IN)
IMU HTR CURR AMPL PIN 5 (27 VDC HI DURING G&N IN)
IMU TEMP ALARM AMPL PIN 5 (27 VDC HI DURING G&N IN)
IMU TEMP CONT K2 PIN 6 (AUTO OVRD AND EMER MODE CMD LO G&N)
800 CPS 28V ANGLE -90 DEG
HI IMU LO IMU
IMU TEMP CONT FAIL LIGHT
TEMP CONT SIG LO
BLO CUR SENSOR (T/M)
HEATER CUR (T/M)
IRIG TEMP (T/M)
ACCEL TEMP (T/M)
XBR-B RSS-B
METER LO
5VDC/A
5VDC/2A
5VDC/5°F
28 VDC STBY
IMU CONT HTR LO (PSA)
IMU CONT HTR
IRIG TEMP CONT
IRIG TEMP IND SENS
TRAY 7
GNIC
TCL 587W
GPC 587W
PDL 587W
FTR 494
MPL 494
TRAY 10 L6
TRAY 10 K5
TRAY 7 P5
TRAY 7 F2
TRAY 7 F6
TRAY 7 F3
TRAY 7 F4
TRAY 7 F5
2900204
2H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

NEXT ASSY	USED ON
APPLICATION	

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Strick DATE 7 MAY 65
CHECKED Ed Foster 11 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

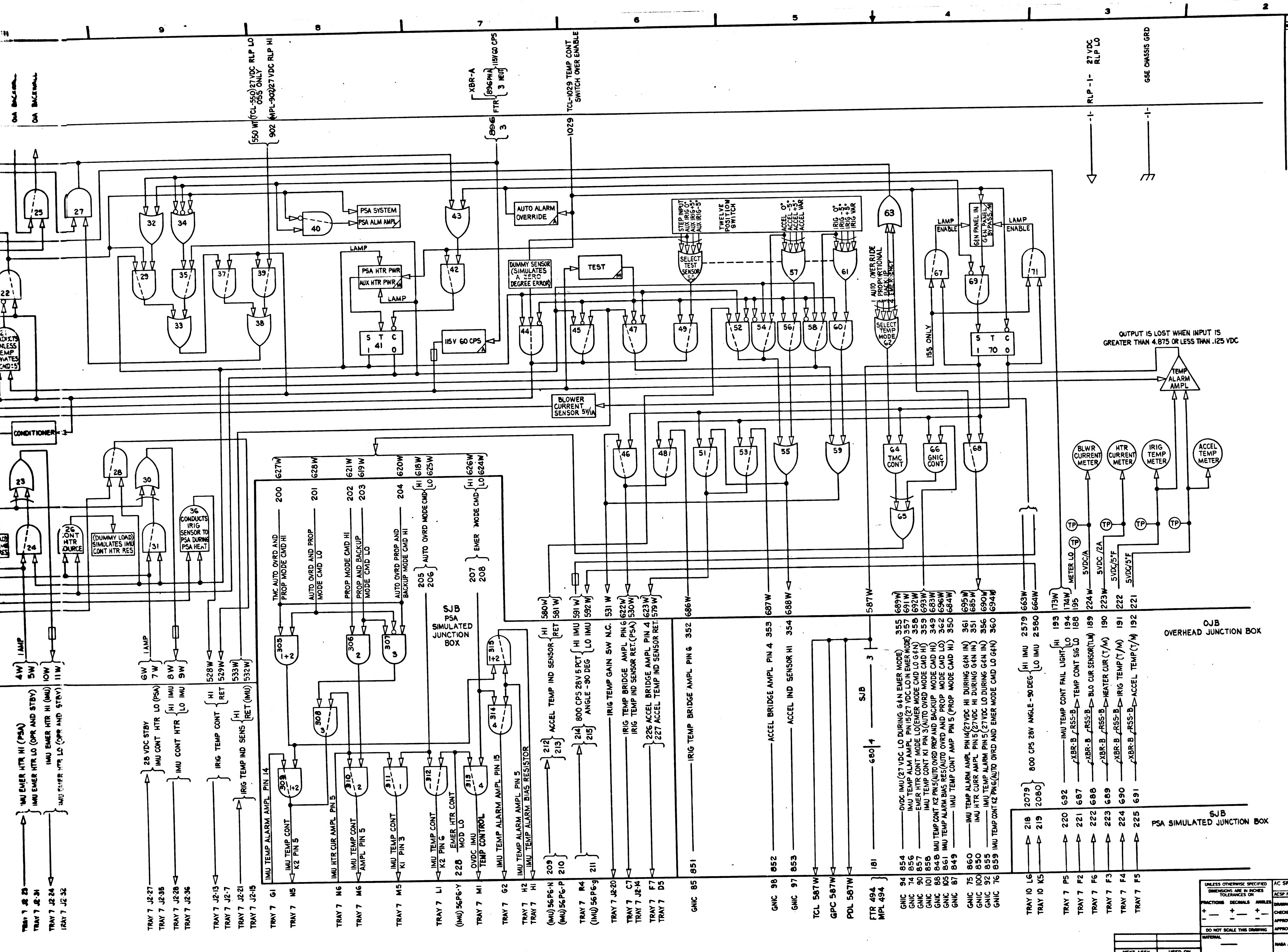
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM— TEMPERATURE MONITOR AND CONTROL PANEL (BLOCK I SERIES 100)

CODE IDENT NO. 99974
SIZE J2
2900204
SCALE —
SHEET 1 OF 1

REVISIONS
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPD
		CHG NO		



OIA BACKWALL
OIA BACKWALL
550 WT (TCL-550) 27 VDC RLP LO 055 ONLY
902 (MPL-902) 27 VDC RLP HI
XBR-A
896 FTR 896 PH A 115V 60 CPS
3 3 NEUT
1029 TCL-1029 TEMP CONT SWITCH OVER ENABLE
RLP -1- 27 VDC RLP LO
-1- GSE CHASSIS GRD
25
27
32
34
40
PSA SYSTEM
PSA ALM AMPL
43
AUTO ALARM OVERRIDE
22
21 CONDUCTS UNLESS TEMP DEVIATES CMD ±5°
29
35
37
39
33
38
LAMP
PSA HTR PWR
AUX HTR PWR
LAMP
S T C 41 1 0
42
115V 60 CPS
DUMMY SENSOR (SIMULATES A ZERO DEGREE ERROR)
TEST
STEP INPUT AUX IRIG 0° AUX IRIG +5° AUX IRIG -5°
TWELVE POSITION SWITCH
ACCEL 0° ACCEL -5° ACCEL +5° ACCEL VAR
IRIG 0° IRIG -5° IRIG +5° IRIG VAR
SELECT TEST SENSOR 50
57
61
63
1 AUTO OVERRIDE 2 PROPORTIONAL 3 BACK UP 4 EMERGENCY
SELECT TEMP MODE 62
LAMP ENABLE
G&N PANEL IN
G&N PANEL BYPASS
LAMP ENABLE
67
69
71
S T C 70 1 0
ISS ONLY
44
45
47
49
52
54
56
58
60
OUTPUT IS LOST WHEN INPUT IS GREATER THAN 4.875 OR LESS THAN .125 VDC
TEMP ALARM AMPL
BLOWER CURRENT SENSOR 5V/1A
CONDITIONER
23
24
26 CONT HTR SOURCE
28
(DUMMY LOAD) SIMULATES IMU CONT HTR RES
30
31
36 CONDUCTS IRIG SENSOR TO PSA DURING PSA HEAT
46
48
51
53
55
59
64 TMC CONT
66 GNIC CONT
68
65
BLWR CURRENT METER
HTR CURRENT METER
IRIG TEMP METER
ACCEL TEMP METER
TP
METER LO
5VDC/A
5VDC/2A
5VDC/5°F
5VDC/5°F
627W 628W 621W 619W 620W 618W 625W 626W 624W
200 TMC AUTO OVRD AND PROP MODE CMD HI
201 AUTO OVRD AND PROP MODE CMD LO
202 PROP MODE CMD HI
203 PROP AND BACKUP MODE CMD LO
204 AUTO OVRD PROP AND BACKUP MODE CMD HI
HI LO AUTO OVRD MODE CMD 205 206
HI LO EMER MODE CMD 207 208
SJB PSA SIMULATED JUNCTION BOX
305 1+2
306 2
307 3
308 3
315 1+2
314 4
309 1+2
310 2
311 1
312
313 4
1 AMP
4W 5W 10W 11W
6W 7W 8W 9W
528W 529W 533W 532W
1 AMP
IMU EMER HTR HI (PSA)
IMU EMER HTR LO (OPR AND STBY)
IMU EMER HTR HI (IMU)
IMU EMER HTR LO (OPR AND STBY)
28 VDC STBY
IMU CONT HTR LO (PSA)
IMU CONT HTR HI IMU LO IMU
IRIG TEMP CONT HI RET
IRIG TEMP IND SENS HI RET (IMU)
IMU TEMP ALARM AMPL PIN 14
IMU TEMP CONT K2 PIN 5
IMU HTR CUR AMPL PIN 5
IMU TEMP CONT AMPL PIN 5
IMU TEMP CONT K1 PIN 3
IMU TEMP CONT K2 PIN 6
228 EMER HTR CONT MOD LO
OVDC IMU TEMP CONTROL
IMU TEMP ALARM AMPL PIN 15
IMU TEMP ALARM AMPL PIN 5
IMU TEMP ALARM BIAS RESISTOR
TRAY 7 J2-23
TRAY 7 J2-31
TRAY 7 J2-24
TRAY 7 J2-32
TRAY 7 J2-27
TRAY 7 J2-35
TRAY 7 J2-28
TRAY 7 J2-36
TRAY 7 J2-13
TRAY 7 J2-7
TRAY 7 J2-21
TRAY 7 J2-15
TRAY 7 G1
TRAY 7 N5
TRAY 7 N6
TRAY 7 M6
TRAY 7 M5
TRAY 7 L1
(IMU) 56P6-Y
TRAY 7 M1
TRAY 7 G2
TRAY 7 H2
TRAY 7 H1
580W 581W HI RET 212 213 ACCEL TEMP IND SENSOR
(IMU) 56P6-N 209
(IMU) 56P6-P 210
591W 592W HI IMU LO IMU 214 215 800 CPS 28V 5 PCT ANGLE -90 DEG
TRAY 7 R4
(IMU) 56P6-g 211
531 W IRIG TEMP GAIN SW N.C.
TRAY 7 J2-20
622W 530W IRIG TEMP BRIDGE AMPL PIN 6 IRIG TEMP IND SENSOR RET. (PSA)
TRAY 7 C7
TRAY 7 J2-14
623W 579W 226 ACCEL BRIDGE AMPL PIN 4 227 ACCEL TEMP IND SENSOR RET.
TRAY 7 F7
TRAY 7 D5
686W 352 IRIG TEMP BRIDGE AMPL PIN 6 851 GNIC 85
687W 353 ACCEL BRIDGE AMPL PIN 4 852 GNIC 98
688W 354 ACCEL IND SENSOR HI 853 GNIC 97
587W SJB 3 4 680 181
TCL 587W
GPC 587W
PDL 587W
FTR 494
MPL 494
689W 355 OVDC IMU (27 VDC LO DURING G&N EMER MODE) 854 GNIC 94
691W 357 IMU TEMP ALM AMPL PIN 15 (27 VDC LO IN EMER MODE) 856 GNIC 74
692W 358 EMER HTR CONT MODE LO (EMER MODE CMD LO G&N) 857 GNIC 90
693W 359 IMU TEMP CONT K1 PIN 3 (AUTO OVRD MODE CMD HI) 858 GNIC 101
683W 349 IMU TEMP CONT K2 PIN 5 (AUTO OVRD PROP AND BACKUP MODE CMD HI) 848 GNIC 88
696W 362 IMU TEMP ALARM BIAS RES (AUTO OVRD AND PROP MODE CMD LO) 861 GNIC 105
684W 350 IMU TEMP CONT AMP PIN 5 (PROP MODE CMD HI) 849 GNIC 87
695W 361 IMU TEMP ALARM AMPL PIN 14 (27 VDC HI DURING G&N IN) 860 GNIC 75
685W 351 IMU HTR CURR AMPL PIN 5 (27 VDC HI DURING G&N IN) 850 GNIC 100
690W 356 IMU TEMP ALARM PIN 5 (27 VDC LO DURING G&N IN) 855 GNIC 92
694W 360 IMU TEMP CONT K2 PIN 6 (AUTO OVRD AND EMER MODE CMD LO G&N) 859 GNIC 76
663W 2579 HI IMU 800 CPS 28V ANGLE -90 DEG 2079 218 TRAY 10 L6
664W 2580 LO IMU 2080 219 TRAY 10 K5
173W 193 HI IMU TEMP CONT FAIL LIGHT 692 220 TRAY 7 P5
174W 194 LO
195 188 TEMP CONT SIG LO XBR-B RSS-B 687 221 TRAY 7 F2
224W 189 BLO CUR SENSOR (TLM) XBR-B RSS-B 688 222 TRAY 7 F6
223W 190 HEATER CUR (T/M) XBR-B RSS-B 689 223 TRAY 7 F3
222 191 IRIG TEMP (T/M) XBR-B RSS-B 690 224 TRAY 7 F4
221 192 ACCEL TEMP (T/M) XBR-B RSS-B 691 225 TRAY 7 F5
OJB OVERHEAD JUNCTION BOX
SJB PSA SIMULATED JUNCTION BOX
9 8 7 6 5 4 3 2 1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN
	ACSP PN
	DRAWN R. Wick DATE 7 MAY 65
	CHECKED Ed Foster 11 MAY 65
	APPROVAL
DO NOT SCALE THIS DRAWING	APPROVAL
MATERIAL —	NASA APPROVAL
CONTRACT NAS 9-497	MIT APPROVAL

NEXT ASSY	USED ON
APPLICATION	

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
TEMPERATURE MONITOR
AND CONTROL PANEL
(BLOCK II SERIES 200)

CODE IDENT NO.	SIZE	
99974	J2	2900204
SCALE —		SHEET

2900204

E-2

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS PER MIL-STD-806
3. REFERENCE MECHANIZATION DIAGRAMS:

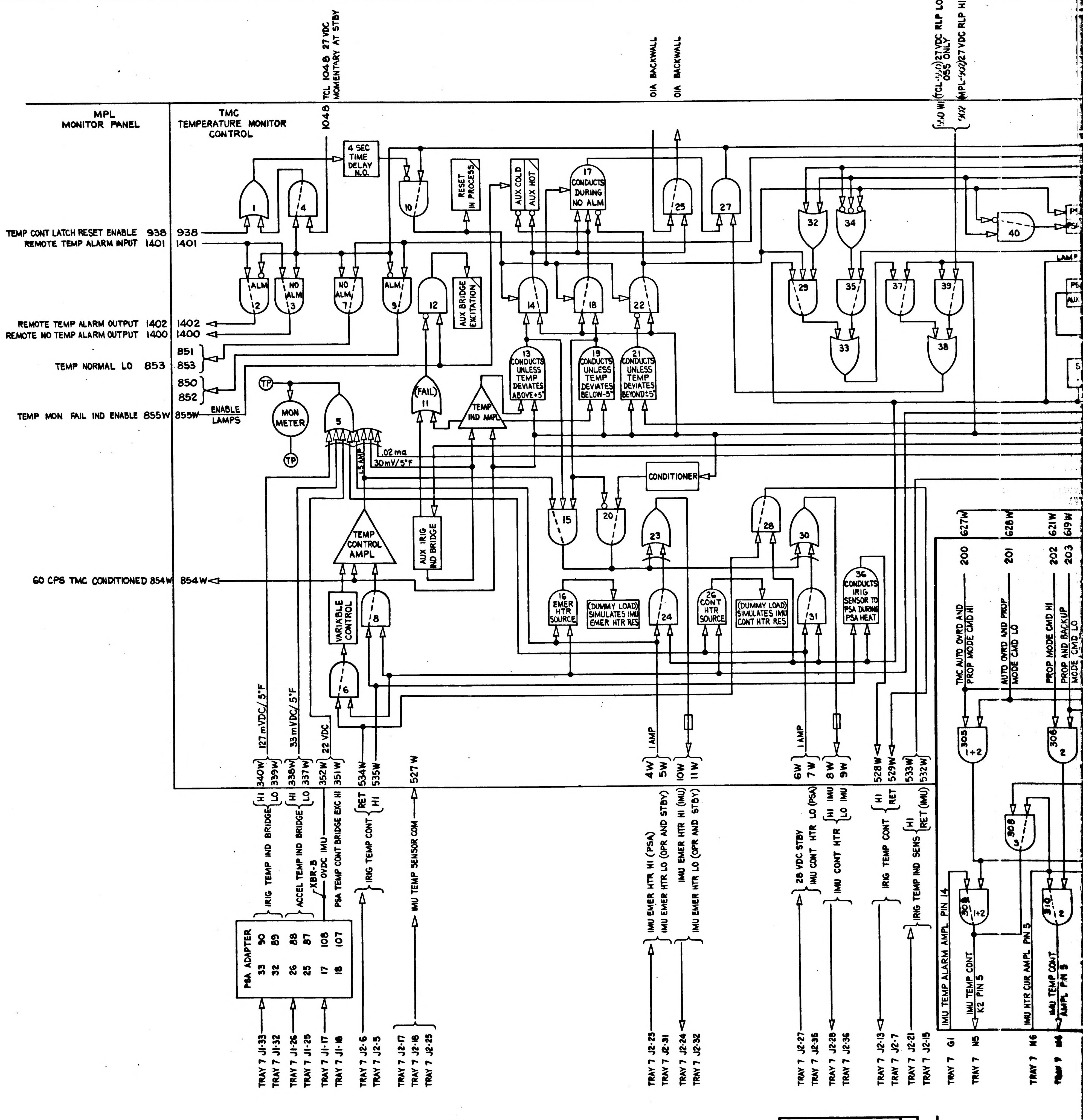
	AC POWER PROTECTION PANEL AND POWER DISTRIBUTION (FTR)
	RELAY AND LAMP POWER SUPPLY (RLP)
2900207	MONITOR PANEL (MPL)
	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900217	SIGNAL SELECTION AND MEASUREMENT
	XBR-B CROSSBAR-DC SIGNALS
2900218	OSCILLOGRAPH SIGNAL
	RSS-B TO FIXED DC CHANNEL
2900215	MEASUREMENT REFERENCE POWER SUPPLY
	RSS OSCILLOGRAPH SIGNAL SELECTOR
	GSE GROUNDING (BLOCK I SERIES 100)

4. NONSTANDARD SYMBOLOGY

	INDICATES "AND" GATE WITH SWITCHED SIGNAL
NAME M	INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
NAME	INDICATES INDICATOR LIGHT
NAME NAME	INDICATES SPLIT SCREEN INDICATOR LIGHT
NAME NAME M	INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME NAME A	INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION)

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEANS:

W	BLOCK I SERIES 100 ONLY
T	BLOCK II ONLY
L	LEM ONLY
BLANK	ALL G/N CONFIGURATIONS



MPL MONITOR PANEL
TMC TEMPERATURE MONITOR CONTROL
TEMP CONT LATCH RESET ENABLE 938
REMOTE TEMP ALARM INPUT 1401
REMOTE TEMP ALARM OUTPUT 1402
REMOTE NO TEMP ALARM OUTPUT 1400
TEMP NORMAL LO 853
851
850
852
TEMP MON FAIL IND ENABLE 855W
ENABLE LAMPS
60 CPS TMC CONDITIONED 854W
1048 TCL 1048 27 VDC MOMENTARY AT STBY
4 SEC TIME DELAY N.O.
RESET IN PROCESS
AUX COLD
AUX HOT
17 CONDUCTS DURING NO ALM
OIA BACKWALL
OIA BACKWALL
ALM
NO ALM
AUX BRIDGE EXCITATION
13 CONDUCTS UNLESS TEMP DEVIATES ABOVE +5°
19 CONDUCTS UNLESS TEMP DEVIATES BELOW -5°
21 CONDUCTS UNLESS TEMP DEVIATES BEYOND ±5°
TP
MON METER
FAIL
TEMP IND AMPL
1.5 AMP
.02 ma
30mV/5°F
CONDITIONER
TEMP CONTROL AMPL
AUX IRIG IND BRIDGE
VARIABLE CONTROL
16 EMER HTR SOURCE
(DUMMY LOAD) SIMULATES IMU EMER HTR RES
26 CONT HTR SOURCE
(DUMMY LOAD) SIMULATES IMU CONT HTR RES
36 CONDUCTS IRIG SENSOR TO PSA DURING PSA HEAT
127 mVDC/5°F
33 mVDC/5°F
22 VDC
1 AMP
1 AMP
340W 339W 338W 337W 352W 351W 534W 535W 527W
4W 5W 10W 11W
6W 7W 8W 9W
528W 529W 533W 532W
IRIG TEMP IND BRIDGE HI LO
ACCEL TEMP IND BRIDGE HI LO
XBR-B
0VDC IMU
PSA TEMP CONT BRIDGE EXC HI
IRIG TEMP CONT RET HI
IMU TEMP SENSOR COM
IMU EMER HTR HI (PSA)
IMU EMER HTR LO (OPR AND STBY)
IMU EMER HTR HI (IMU)
IMU EMER HTR LO (OPR AND STBY)
28 VDC STBY
IMU CONT HTR LO (PSA)
IMU CONT HTR HI IMU LO IMU
IRIG TEMP CONT HI RET
IRIG TEMP IND SENS HI RET (IMU)
PSA ADAPTER
33 90 32 89 26 88 25 87 17 108 18 107
TRAY 7 J1-33
TRAY 7 J1-32
TRAY 7 J1-26
TRAY 7 J1-25
TRAY 7 J1-17
TRAY 7 J1-18
TRAY 7 J2-6
TRAY 7 J2-5
TRAY 7 J2-17
TRAY 7 J2-18
TRAY 7 J2-25
TRAY 7 J2-23
TRAY 7 J2-31
TRAY 7 J2-24
TRAY 7 J2-32
TRAY 7 J2-27
TRAY 7 J2-35
TRAY 7 J2-28
TRAY 7 J2-36
TRAY 7 J2-13
TRAY 7 J2-7
TRAY 7 J2-21
TRAY 7 J2-15
TRAY 7 G1
TRAY 7 N5
TRAY 7 N6
TRAY 9
(TCL-510) 27 VDC RLP LO OSS ONLY
(MPL-901) 27 VDC RLP HI
627W 628W 621W 619W
200 201 202 203
TMC AUTO OVRD AND PROP MODE CMD HI
AUTO OVRD AND PROP MODE CMD LO
PROP MODE CMD HI
PROP AND BACKUP MODE CMD LO
IMU TEMP ALARM AMPL PIN 14
IMU TEMP CONT K2 PIN 5
IMU HTR CUR AMPL PIN 5
IMU TEMP CONT AMPL PIN 5
305 ÷2
306 ÷2
308 ÷2
309 ÷2
310 ÷2
40
LAMP
16 15 14 13 12 11 10 9 8
H G F E D C B A

2900204

S800502

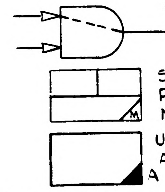
REVISIONS 19254					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		① REVISED PER TDRR 21040		27 JUL 65	JHP RWH

NOTES:

1.- INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-STD-70327.

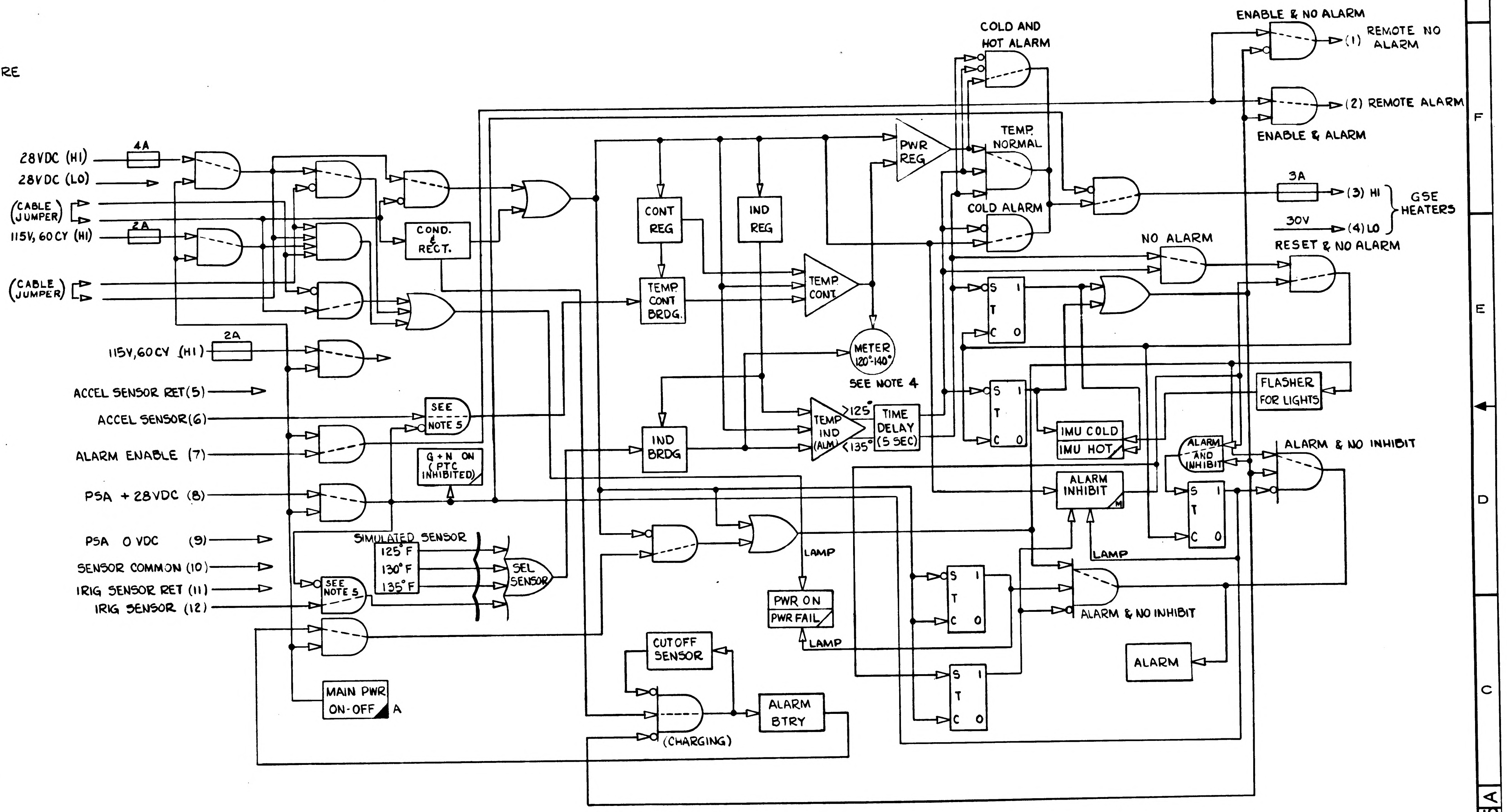
2.- LOGIC SYMBOLS PER MIL-STD-806.

3.- NON-STANDARD SYMBOLOGY:


"AND" GATE WITH SWITCHED SIGNAL
SPLIT-SCREEN LIGHTED PUSHBUTTON, MOMENTARY ACTION
M
UNLIGHTED, ALTERNATE ACTION SWITCH
A

4.- THIS METER SERVES TWO FUNCTIONS; NORMALLY INDICATES TEMP., BUT CAN BE USED TO MEASURE HEATER CUR. VIA SUITABLE CIRCUITRY.

5.-"AND" GATES ARE SHOWN IN "HI" LINE. ALL 5 SENSOR LINES MUST BE INTERRUPTED WHEN PSA 28VDC IS PRESENT.


28VDC (HI)
28VDC (LO)
4A
(CABLE JUMPER)
115V, 60CY (HI)
2A
(CABLE JUMPER)
115V, 60CY (HI)
2A
ACCEL SENSOR RET (5)
ACCEL SENSOR (6)
ALARM ENABLE (7)
PSA +28VDC (8)
PSA 0 VDC (9)
SENSOR COMMON (10)
IRIG SENSOR RET (11)
IRIG SENSOR (12)
COND. & RECT.
SEE NOTE 5
G+N ON (PTC INHIBITED)
SIMULATED SENSOR
125°F
130°F
135°F
SEL SENSOR
SEE NOTE 5
MAIN PWR ON-OFF
A
CONT REG
IND REG
TEMP CONT BRDG.
TEMP CONT
METER 120°-140°
SEE NOTE 4
IND BRDG
TEMP IND (ALM)
125°
135°
TIME DELAY (5 SEC)
PWR REG
COLD AND HOT ALARM
TEMP. NORMAL
COLD ALARM
ENABLE & NO ALARM
(1) REMOTE NO ALARM
(2) REMOTE ALARM
ENABLE & ALARM
3A
(3) HI
30V
(4) LO
GSE HEATERS
NO ALARM
RESET & NO ALARM
S I T C O
FLASHER FOR LIGHTS
IMU COLD
IMU HOT
ALARM AND INHIBIT
ALARM & NO INHIBIT
ALARM INHIBIT
M
LAMP
PWR ON
PWR FAIL
LAMP
LAMP
ALARM & NO INHIBIT
ALARM
CUTOFF SENSOR
ALARM BTRY
(CHARGING)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± __ DECIMALS ± __ ANGLES ± __	AC SPARK PLUG DIVISION. GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS		
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN Frazle DATE 30 APR 65 CHECKED Ed Foster 4MAY 65 APPROVAL R. Kuehne APPROVAL J. M. Watson	MECHANIZATION DIAGRAM-PORTABLE TEMPERATURE CONTROLLER (BLOCK II-LEM)		
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974	SIZE E	2900205
CONTRACT NAS 9-497	MIT APPROVAL	SCALE ~		SHEET OF

2900205 A

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		① REVISED PER TDRR 21040		27 JUL 65	J-D RWH
B		① REVISED PER TDRR 21153		1 AUG 65	SRA

NOTES :

1.- INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-STD-70327.

2.- LOGIC SYMBOLS PER MIL-STD-806.

3.- NON-STANDARD SYMBOLOGY :

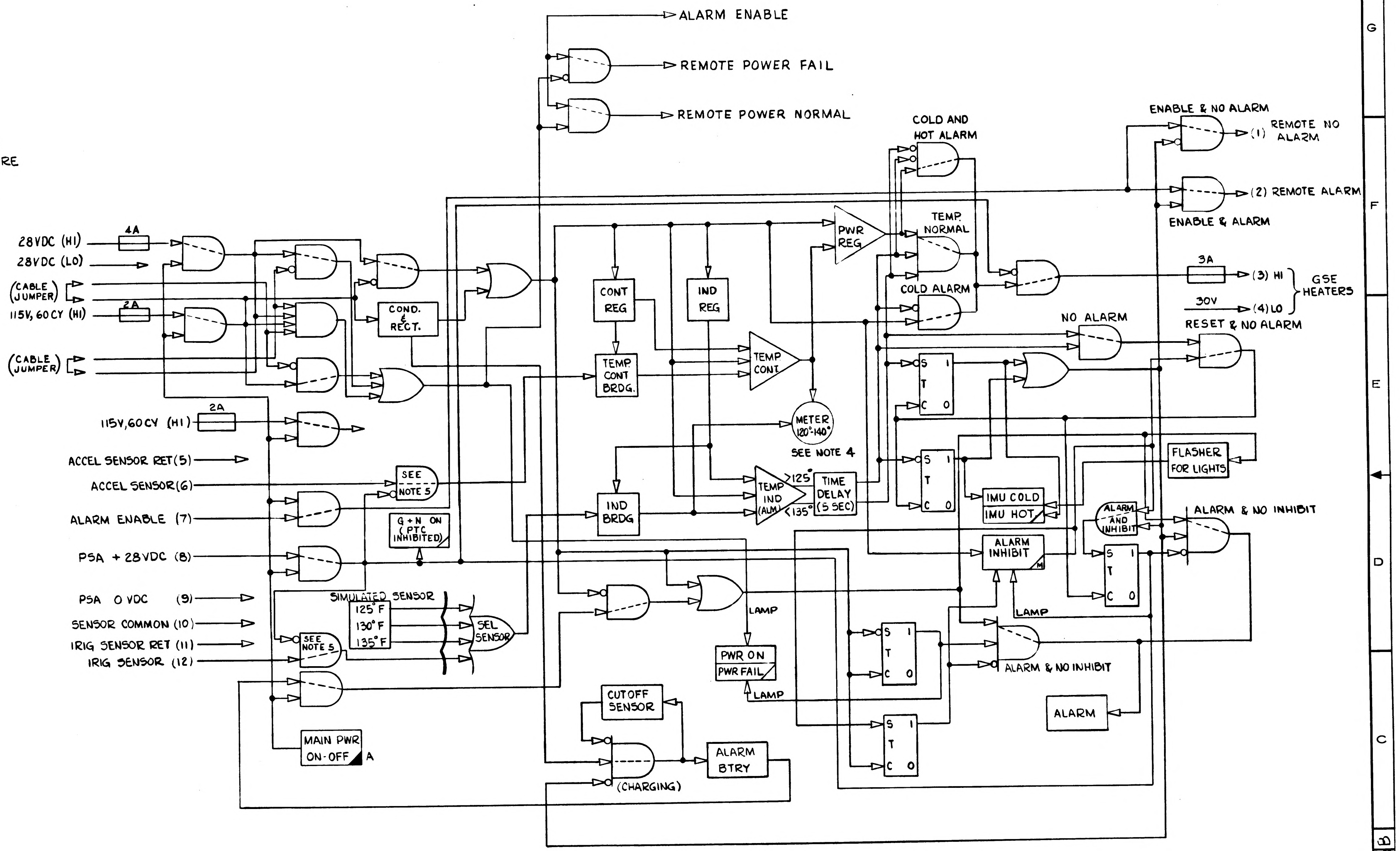
"AND" GATE WITH SWITCHED SIGNAL

SPLIT-SCREEN LIGHTED PUSHBUTTON, MOMENTARY ACTION

UNLIGHTED, ALTERNATE ACTION SWITCH

4.- THIS METER SERVES TWO FUNCTIONS; NORMALLY INDICATES TEMP., BUT CAN BE USED TO MEASURE HEATER CUR. VIA SUITABLE CIRCUITRY.

5.- "AND" GATES ARE SHOWN IN "HI" LINE. ALL 5 SENSOR LINES MUST BE INTERRUPTED WHEN PSA 28VDC IS PRESENT.


ALARM ENABLE
REMOTE POWER FAIL
REMOTE POWER NORMAL
COLD AND HOT ALARM
ENABLE & NO ALARM
(1) REMOTE NO ALARM
(2) REMOTE ALARM
ENABLE & ALARM
28VDC (HI)
28VDC (LO)
4A
(CABLE JUMPER)
2A
115V, 60CY (HI)
COND. & RECT.
CONT REG
IND REG
PWR REG
TEMP. NORMAL
COLD ALARM
3A
(3) HI
30V
(4) LO
GSE HEATERS
NO ALARM
RESET & NO ALARM
TEMP CONT BRDG.
TEMP CONT
(CABLE JUMPER)
2A
115V, 60CY (H1)
METER 120°-140°
SEE NOTE 4
ACCEL SENSOR RET (5)
ACCEL SENSOR (6)
SEE NOTE 5
ALARM ENABLE (7)
G + N ON (PTC INHIBITED)
IND BRDG
TEMP IND (ALM)
>125°
<135°
TIME DELAY (5 SEC)
S 1 T C 0
IMU COLD
IMU HOT
FLASHER FOR LIGHTS
ALARM AND INHIBIT
ALARM & NO INHIBIT
ALARM INHIBIT
M
PSA + 28VDC (8)
PSA 0 VDC (9)
SENSOR COMMON (10)
IRIG SENSOR RET (11)
IRIG SENSOR (12)
SIMULATED SENSOR
125° F
130° F
135° F
SEL SENSOR
SEE NOTE 5
LAMP
PWR ON
PWR FAIL
LAMP
LAMP
ALARM & NO INHIBIT
ALARM
CUTOFF SENSOR
ALARM BTRY
(CHARGING)
MAIN PWR ON-OFF
A

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Tisch DATE 30 APR 65
CHECKED Ed Foster 4 MAY 65
APPROVAL
APPROVAL J M Watson
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-PORTABLE TEMPERATURE CONTROLLER (BLOCK II-LEM)

CODE IDENT NO 99974
SIZE E
2900205
SCALE ~
SHEET 1 OF 1

2900205 B

2900205
SH 1 of 1

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		① REVISED PER TDRR 21040		27 JUL 65	JHP RWH
B		① REVISED PER TDRR 21153		11 AUG 65	SRA
C		REVISED PER TDRR 24925		4 JAN 66	PHG

NOTES:

1.- INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-STD-70327.

2.- LOGIC SYMBOLS PER MIL-STD-806.

3.- NON-STANDARD SYMBOLOGY:

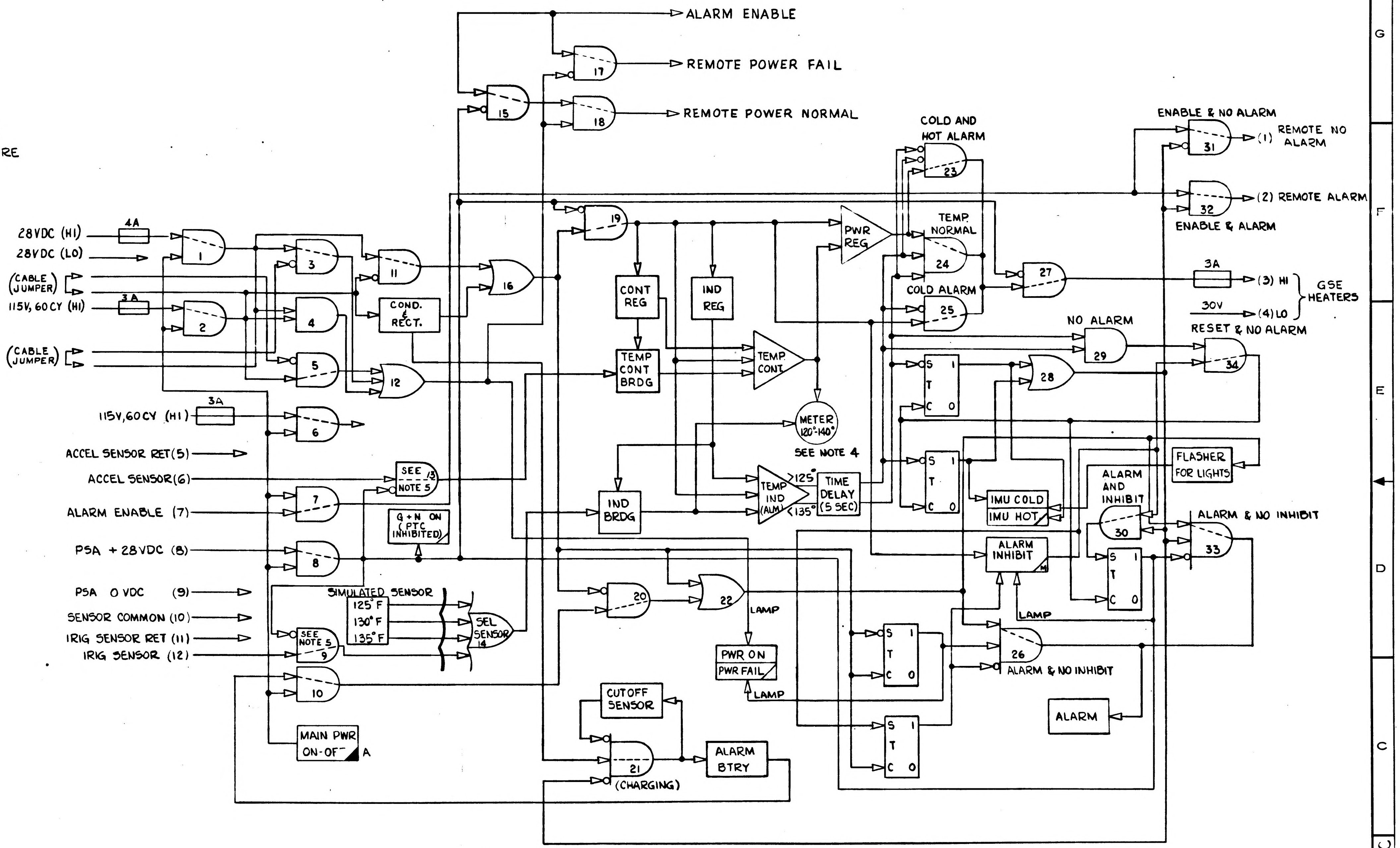
"AND" GATE WITH SWITCHED SIGNAL

SPLIT-SCREEN LIGHTED PUSHBUTTON, MOMENTARY ACTION

UNLIGHTED, ALTERNATE ACTION SWITCH

4.- THIS METER SERVES TWO FUNCTIONS; NORMALLY INDICATES TEMP., BUT CAN BE USED TO MEASURE HEATER CUR. VIA SUITABLE CIRCUITRY.

5.- "AND" GATES ARE SHOWN IN "HI" LINE. ALL 5 SENSOR LINES MUST BE INTERRUPTED WHEN PSA 28VDC IS PRESENT.


ALARM ENABLE
REMOTE POWER FAIL
REMOTE POWER NORMAL
15
17
18
COLD AND HOT ALARM
23
ENABLE & NO ALARM
31
(1) REMOTE NO ALARM
32
(2) REMOTE ALARM
ENABLE & ALARM
28VDC (HI)
28VDC (LO)
4A
(CABLE JUMPER)
115V, 60CY (HI)
3A
1
2
3
4
5
11
COND. & RECT.
16
12
19
CONT REG
IND REG
PWR REG
TEMP. NORMAL
24
COLD ALARM
25
27
3A
(3) HI
30V
(4) LO
GSE HEATERS
TEMP CONT BRDG
TEMP CONT
NO ALARM
29
RESET & NO ALARM
34
S
T
C
1
0
28
METER (120°-140°)
SEE NOTE 4
115V, 60CY (HI)
6
ACCEL SENSOR RET (5)
ACCEL SENSOR (6)
SEE NOTE 5
13
ALARM ENABLE (7)
7
Q + N ON (PTC INHIBITED)
IND BRDG
TEMP IND (ALM)
125°
135°
TIME DELAY (5 SEC)
IMU COLD
IMU HOT
ALARM AND INHIBIT
30
FLASHER FOR LIGHTS
ALARM & NO INHIBIT
33
PSA +28VDC (8)
8
ALARM INHIBIT
PSA 0 VDC (9)
SENSOR COMMON (10)
IRIG SENSOR RET (11)
IRIG SENSOR (12)
SIMULATED SENSOR
125°F
130°F
135°F
SEL SENSOR 14
SEE NOTE 5
9
10
20
22
LAMP
PWR ON
PWR FAIL
LAMP
26
ALARM & NO INHIBIT
LAMP
ALARM
MAIN PWR ON-OFF
A
CUTOFF SENSOR
21
(CHARGING)
ALARM BTRY

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS		
DO NOT SCALE THIS DRAWING	DRAWN DATE 30 APR 65 CHECKED Ed Foster 4 MAY 65 APPROVAL APPROVAL J M Watson	MECHANIZATION DIAGRAM-PORTABLE TEMPERATURE CONTROLLER (BLOCK II-LEM)		
MATERIAL ———	NASA APPROVAL	CODE IDENT NO 99974	SIZE E	2900205
CONTRACT NAS 9-497	MIT APPROVAL	SCALE ~		SHEET 1 OF 1

2900205 C

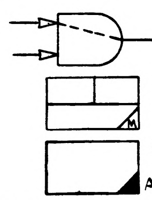
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.

NOTES :

1.- INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-STD-70327.

2.- LOGIC SYMBOLS PER MIL-STD-806.

3.- NON-STANDARD SYMBOLOGY :

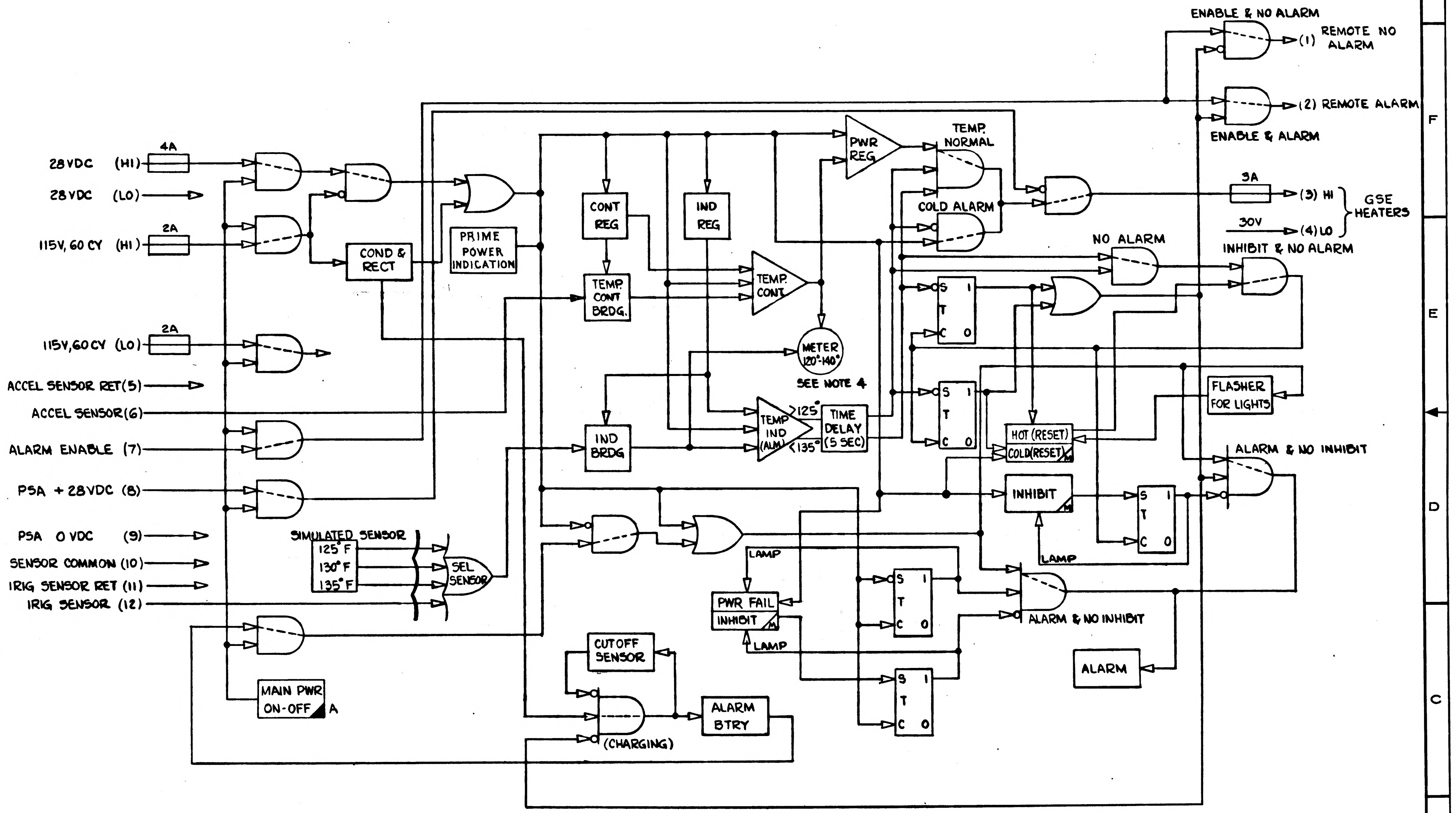


" AND" GATE WITH SWITCHED SIGNAL

SPLIT-SCREEN LIGHTED PUSHBUTTON, MOMENTARY ACTION

UNLIGHTED, ALTERNATE ACTION SWITCH

4.- THIS METER SERVES TWO FUNCTIONS, NORMALLY INDICATES TEMP., BUT IS USED TO MEASURE HEATER CUR. VIA SUITABLE CIRCUITRY.



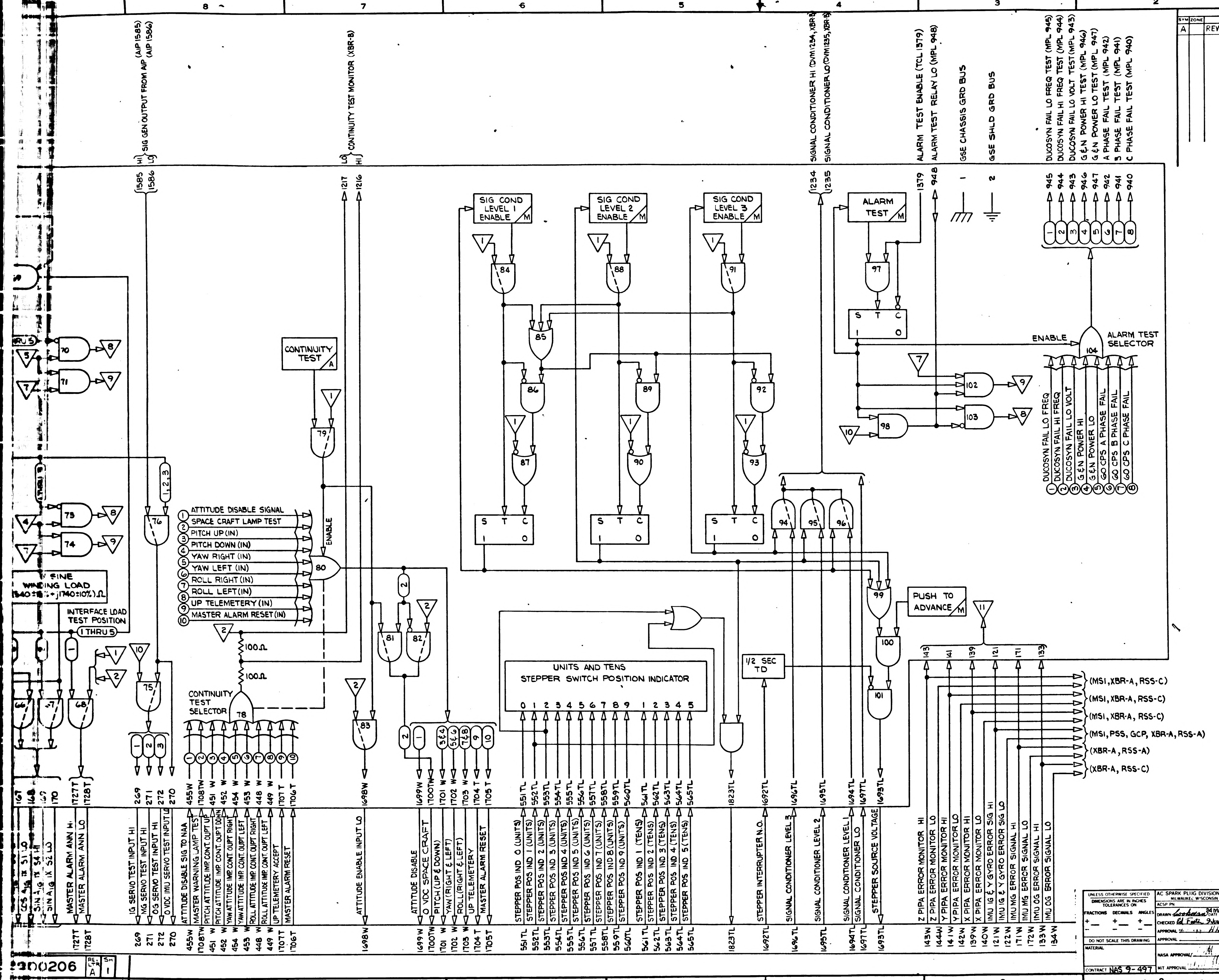
28VDC (HI)
4A
28VDC (LO)
115V, 60 CY (HI)
2A
115V, 60 CY (LO)
2A
ACCEL SENSOR RET(5)
ACCEL SENSOR(6)
ALARM ENABLE (7)
PSA +28VDC (8)
PSA 0 VDC (9)
SENSOR COMMON (10)
IRIG SENSOR RET (11)
IRIG SENSOR (12)
SIMULATED SENSOR
125° F
130° F
135° F
SEL SENSOR
MAIN PWR ON-OFF
A
COND & RECT
PRIME POWER INDICATION
CONT REG
IND REG
TEMP. CONT BRDG.
TEMP. CONT
IND BRDG
TEMP IND (ALM)
>125°
<135°
TIME DELAY (5 SEC)
METER 120°-140°
SEE NOTE 4
PWR REG
TEMP. NORMAL
COLD ALARM
S I T C O
NO ALARM
INHIBIT & NO ALARM
HOT (RESET)
COLD(RESET)
M
INHIBIT
M
LAMP
FLASHER FOR LIGHTS
ALARM & NO INHIBIT
PWR FAIL
INHIBIT
M
LAMP
LAMP
ALARM & NO INHIBIT
ALARM
CUTOFF SENSOR
ALARM BTRY
(CHARGING)
ENABLE & NO ALARM
(1) REMOTE NO ALARM
(2) REMOTE ALARM
ENABLE & ALARM
3A
(3) HI
30V
(4) LO
GSE HEATERS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
FRACTIONS + — − DECIMALS + — − ANGLES + — −	ACSP PN	
DO NOT SCALE THIS DRAWING	DRAWN Oesel DATE 30 APR 65 CHECKED Ed Foster 4 MAY 65 APPROVAL R. Kukral APPROVAL J. M. Watson	MECHANIZATION DIAGRAM-PORTABLE TEMPERATURE CONTROLLER (BLOCK II-LEM)
MATERIAL —	NASA APPROVAL R. C. Metz 5 May MIT APPROVAL W. Kupfer 20 May 65	CODE IDENT NO. 99974 · SIZE E · 2900205
CONTRACT NAS 9-497		SCALE ~ · SHEET 1 OF 1

2900205

1H

REVISIONS 604ff					
SYM	ZONE	DESCRIPTION		DATE	APPD
A		REVISED PER TDRR 21905	CHG NO	1 SEP 65	AU



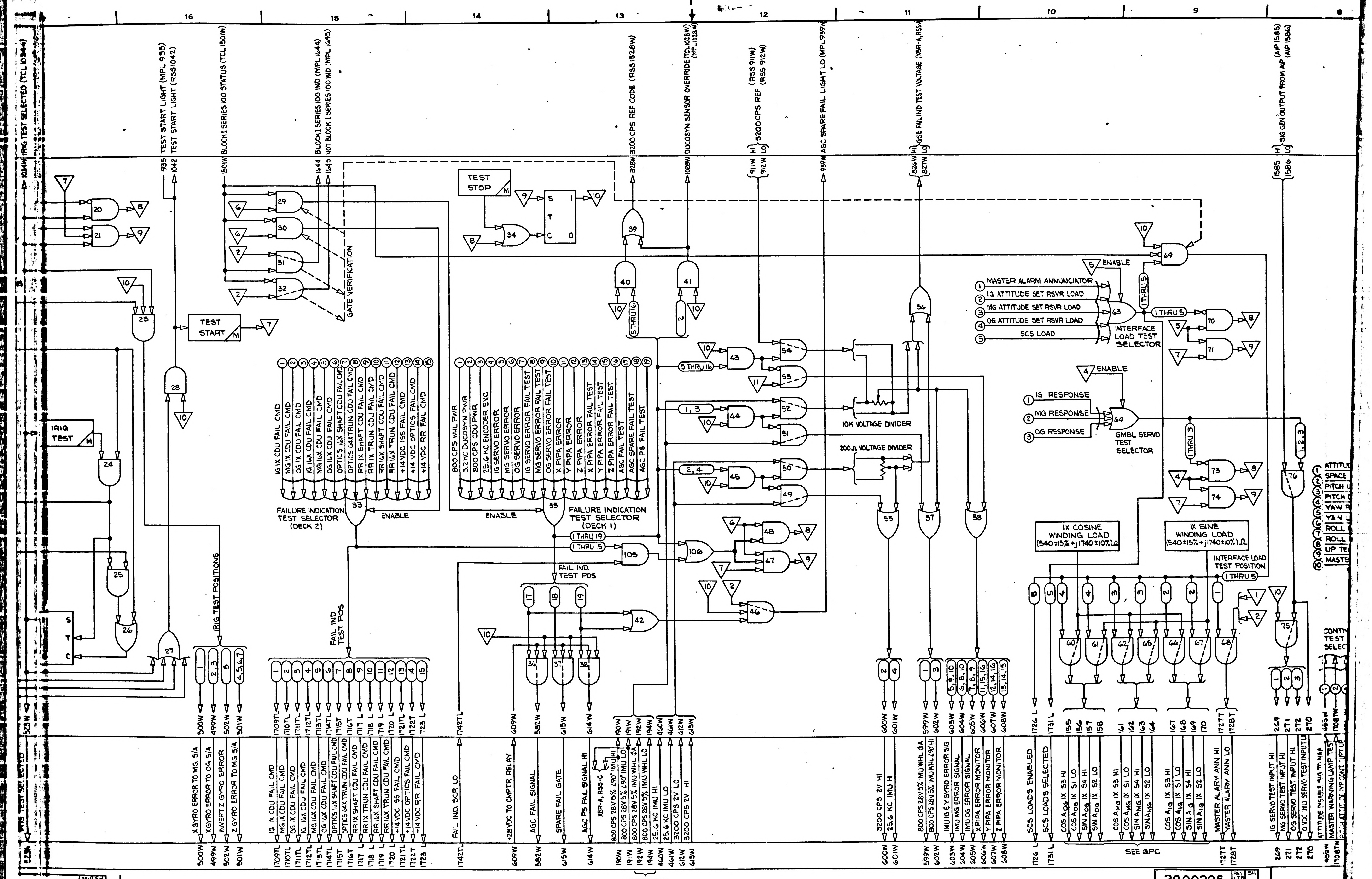
SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
HI LO
1585 1586
CONTINUITY TEST MONITOR (XBR-B)
LO HI
1217 1216
SIGNAL CONDITIONER HI (DVM1234, XBR-B)
SIGNAL CONDITIONER LO (DVM1235, XBR-B)
1234 1235
ALARM TEST ENABLE (TCL 1379)
ALARM TEST RELAY LO (MPL 948)
1379 948
GSE CHASSIS GRD BUS
1
GSE SHLD GRD BUS
2
DUCOSYN FAIL LO FREQ TEST (MPL 945)
DUCOSYN FAIL HI FREQ TEST (MPL 944)
DUCOSYN FAIL LO VOLT TEST (MPL 943)
G & N POWER HI TEST (MPL 946)
G & N POWER LO TEST (MPL 947)
A PHASE FAIL TEST (MPL 942)
B PHASE FAIL TEST (MPL 941)
C PHASE FAIL TEST (MPL 940)
945 944 943 946 947 942 941 940
SIG COND LEVEL 1 ENABLE M
SIG COND LEVEL 2 ENABLE M
SIG COND LEVEL 3 ENABLE M
ALARM TEST M
84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104
S T C
1 0
ENABLE
ALARM TEST SELECTOR
① DUCOSYN FAIL LO FREQ
② DUCOSYN FAIL HI FREQ
③ DUCOSYN FAIL LO VOLT
④ G & N POWER HI
⑤ G & N POWER LO
⑥ 60 CPS A PHASE FAIL
⑦ 60 CPS B PHASE FAIL
⑧ 60 CPS C PHASE FAIL
CONTINUITY TEST A
79 80 81 82 83
ENABLE
① ATTITUDE DISABLE SIGNAL
② SPACE CRAFT LAMP TEST
③ PITCH UP (IN)
④ PITCH DOWN (IN)
⑤ YAW RIGHT (IN)
⑥ YAW LEFT (IN)
⑦ ROLL RIGHT (IN)
⑧ ROLL LEFT (IN)
⑨ UP TELEMETRY (IN)
⑩ MASTER ALARM RESET (IN)
100Ω
100Ω
CONTINUITY TEST SELECTOR
78
THRU 5
70 71 73 74 75 76 66 67 68
1, 2, 3
1 THRU 5
SINE WINDING LOAD (340±10% + j1740±10%)Ω
INTERFACE LOAD TEST POSITION
1 THRU 5
PUSH TO ADVANCE M
1/2 SEC TD
UNITS AND TENS STEPPER SWITCH POSITION INDICATOR
0 1 2 3 4 5 6 7 8 9 1 2 3 4 5
143 141 139 121 171 133
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, PSS, GCP, XBR-A, RSS-A)
(XBR-A, RSS-A)
(XBR-A, RSS-C)
167 168 169 170
COS A1G 1X S1 LO
SIN A1G 1X S4 HI
SIN A1G 1X S2 LO
1727T 1728T
MASTER ALARM ANN HI
MASTER ALARM ANN LO
269 271 272 270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
455W 1708TW 451 W 452 W 454 W 453 W 448 W 449 W 1707T 1706T
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUPT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
UP TELEMETRY ACCEPT
MASTER ALARM RESET
1698W
ATTITUDE ENABLE INPUT LO
1699W 1700TW 1701 W 1702 W 1703 W 1704 T 1705 T
3 & 4 5 & 6 7 & 8 9 10
ATTITUDE DISABLE
0 VDC SPACE CRAFT
PITCH (UP & DOWN)
YAW (RIGHT & LEFT)
ROLL (RIGHT & LEFT)
UP TELEMETRY
MASTER ALARM RESET
551TL 552TL 553TL 554TL 555TL 556TL 557TL 558TL 559TL 560TL 561TL 562TL 563TL 564TL 565TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
1823TL
1692TL
STEPPER INTERRUPTER N.O.
1696TL
SIGNAL CONDITIONER LEVEL 3
1695TL
SIGNAL CONDITIONER LEVEL 2
1694TL 1697TL
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
1693TL
STEPPER SOURCE VOLTAGE
143W 144W 141W 142W 139W 140W 121W 122W 171W 172W 133W 134W
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIG HI
IMU IG & Y GYRO ERROR SIG LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO

4H

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + − DECIMALS + − ANGLES + −	AC SPARK PLUG DIVISION. GMC MILWAUKEE, WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Cookman DATE 24 MAY 65 CHECKED Ed Foster 9 JUN 65 APPROVAL H Hinkson APPROVAL	MECHANIZATION DIAGRAM- TEST SELECTOR (BLOCK I SERIES 100, BLOCK II & LEM)
MATERIAL	NASA APPROVAL	CODE IDENT NO 99974 SIZE J3 2900206
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — SHEET 1 OF 4

2900206 REV LTR A SH 1

3/2900206


16
15
14
13
12
11
10
9
1034W IRIG TEST SELECTED (TCL 1034W)
935 TEST START LIGHT (MPL 935)
1042 TEST START LIGHT (RSS1042)
1501W BLOCK I SERIES 100 STATUS (TCL 1501W)
1644 BLOCK I SERIES 100 IND (MPL 1644)
1645 NOT BLOCK I SERIES 100 IND (MPL 1645)
1328W 3200 CPS REF CODE (RSS1328W)
1028W DUCOSYN SENSOR OVERRIDE (TCL 1028W) (MPL 1028W)
911W HI 912W LO 3200 CPS REF (RSS 911W) (RSS 912W)
939W AGC SPARE FAIL LIGHT LO (MPL 939W)
826W HI 827W LO GSE FAIL IND TEST VOLTAGE (XBR-A, RSS-A)
1585 HI 1586 LO SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
TEST STOP
S T C I O
TEST START
IRIG TEST
GATE VERIFICATION
IG IX CDU FAIL CMD
MG IX CDU FAIL CMD
OG IX CDU FAIL CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
RR IX SHAFT CDU FAIL CMD
RR IX TRUN CDU FAIL CMD
RR 16X SHAFT CDU FAIL CMD
RR 16X TRUN CDU FAIL CMD
+14 VDC ISS FAIL CMD
+14 VDC OPTICS FAIL CMD
+14 VDC RR FAIL CMD
FAILURE INDICATION TEST SELECTOR (DECK 2)
ENABLE
800 CPS WHL PWR
3.2 KC DUCOSYN PWR
800 CPS CDU PWR
25.6 KC ENCODER EXC
IG SERVO ERROR
MG SERVO ERROR
OG SERVO ERROR
IG SERVO ERROR FAIL TEST
MG SERVO ERROR FAIL TEST
OG SERVO ERROR FAIL TEST
X PIPA ERROR
Y PIPA ERROR
Z PIPA ERROR
X PIPA ERROR FAIL TEST
Y PIPA ERROR FAIL TEST
Z PIPA ERROR FAIL TEST
AGC FAIL TEST
AGC SPARE FAIL TEST
AGC PS FAIL TEST
FAILURE INDICATION TEST SELECTOR (DECK 1)
1 THRU 19
1 THRU 15
5 THRU 16
FAIL IND. TEST POS
FAIL IND TEST POS
IRIG TEST POSITIONS
10K VOLTAGE DIVIDER
200Ω VOLTAGE DIVIDER
MASTER ALARM ANNUNCIATOR
IG ATTITUDE SET RSVR LOAD
MG ATTITUDE SET RSVR LOAD
OG ATTITUDE SET RSVR LOAD
SCS LOAD
INTERFACE LOAD TEST SELECTOR
1 THRU 5
IG RESPONSE
MG RESPONSE
OG RESPONSE
GMBL SERVO TEST SELECTOR
1 THRU 3
IX COSINE WINDING LOAD (540±15%+j1740±10%)Ω
IX SINE WINDING LOAD (540±15%+j1740±10%)Ω
INTERFACE LOAD TEST POSITION
ATTITU
SPACE
PITCH
PITCH
YAW
YAW
ROLL
ROLL
UP TE
MASTE
CONTI TEST SELEC
500W X GYRO ERROR TO MG S/A
499W X GYRO ERROR TO OG S/A
502W INVERT Z GYRO ERROR
501W Z GYRO ERROR TO MG S/A
1709TL IG IX CDU FAIL CMD
1710TL MG IX CDU FAIL CMD
1711TL OG IX CDU FAIL CMD
1712TL IG 16X CDU FAIL CMD
1713TL MG 16X CDU FAIL CMD
1714TL OG 16X CDU FAIL CMD
1715T OPTICS 16X SHAFT CDU FAIL CMD
1716T OPTICS 64X TRUN CDU FAIL CMD
1717 L RR IX SHAFT CDU FAIL CMD
1718 L RR IX TRUN CDU FAIL CMD
1719 L RR 16X SHAFT CDU FAIL CMD
1720 L RR 16X TRUN CDU FAIL CMD
1721TL +14 VDC ISS FAIL CMD
1722T +14 VDC OPTICS FAIL CMD
1723 L +14 VDC RR FAIL CMD
1742TL FAIL IND. SCR LO
609W +28 VDC TO CMPTR RELAY
582W AGC FAIL SIGNAL
615W SPARE FAIL GATE
614W AGC PS FAIL SIGNAL HI
XBR-A, RSS-C
190W 800 CPS 28V 5% ∠90° IMU HI
191W 800 CPS 28V 5% ∠90° IMU LO
192W 800 CPS 28V 5% IMU WHL ØA
194W 800 CPS 28V 5% IMU WHL ØA
460W 25.6 KC IMU HI
461W 25.6 KC IMU LO
612W 3200 CPS 2V LO
613W 3200 CPS 2V HI
SEE TCL 01A BACKWALL
600W 3200 CPS 2V HI
601W 25.6 KC IMU HI
599W 800 CPS 28V 5% IMU WHL ØA
602W 800 CPS 28V 5% IMU WHL ∠90 HI
603W IMU IG & Y GYRO ERROR SIG
604W IMU MG ERROR SIGNAL
605W IMU OG ERROR SIGNAL
606W X PIPA ERROR MONITOR
607W Y PIPA ERROR MONITOR
608W Z PIPA ERROR MONITOR
1726 L SCS LOADS ENABLED
1731 L SCS LOADS SELECTED
155 COS A$_{OG}$ IX S3 HI
156 COS A$_{OG}$ IX S1 LO
157 SIN A$_{OG}$ IX S4 HI
158 SIN A$_{OG}$ IX S2 LO
161 COS A$_{MG}$ IX S3 HI
162 COS A$_{MG}$ IX S1 LO
163 SIN A$_{MG}$ IX S4 HI
164 SIN A$_{MG}$ IX S2 LO
167 COS A$_{IG}$ IX S3 HI
168 COS A$_{IG}$ IX S1 LO
169 SIN A$_{IG}$ IX S4 HI
170 SIN A$_{IG}$ IX S2 LO
SEE GPC
1727T MASTER ALARM ANN HI
1728T MASTER ALARM ANN LO
269 IG SERVO TEST INPUT HI
271 MG SERVO TEST INPUT HI
272 OG SERVO TEST INPUT HI
270 0 VDC IMU SERVO TEST INPUT LO
ATTITUDE DISABLE
1108TW MASTER WARNING LAMP TEST
523W
2900206 REV LTR A SH 1
272900206

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM)

2900210 RLP	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RELAY & LAMP POWER SUPPLY
2900208 PSS	POWER & DUMMY LOAD-PRIMARY SIGNAL SELECTOR (PDL) PRIMARY SIGNAL SELECTOR
2900223	GIMBAL POSITION CONTROL (GPC)
2900207	MONITOR PANEL (MPL)
2900202	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
2900217 XBR-A XBR-B DVM	SIGNAL SELECTION & MEASUREMENT CROSSBAR - AC SIGNALS CROSSBAR - DC SIGNALS DIGITAL VOLTMETER
2900218 RSS-A RSS-B RSS-C RSS-D	OSCILLOGRAPH SIGNAL SELECTION TO FIXED AC CHANNEL TO FIXED DC CHANNEL TO SWITCHABLE AC CHANNEL TO SWITCHABLE DC CHANNEL
2900215 RSS	MEASUREMENT REFERENCE POWER SUPPLIES OSCILLOGRAPH SIGNAL SELECTOR
2900211	AUXILIARY INPUT-OUTPUT & CALIBRATION (AIP)
2900212 MSI	PIPA & IRIG MONITORING PHASE SHIFT PANEL
2900200	GYRO CAGING PANEL (GCP)

4. NONSTANDARD SYMBOLS

INDICATES "AND" GATE WITH SWITCHED SIGNAL

INDICATES EXCLUSIVE "OR" GATE WITH SWITCH POSITIONS 1 & 2

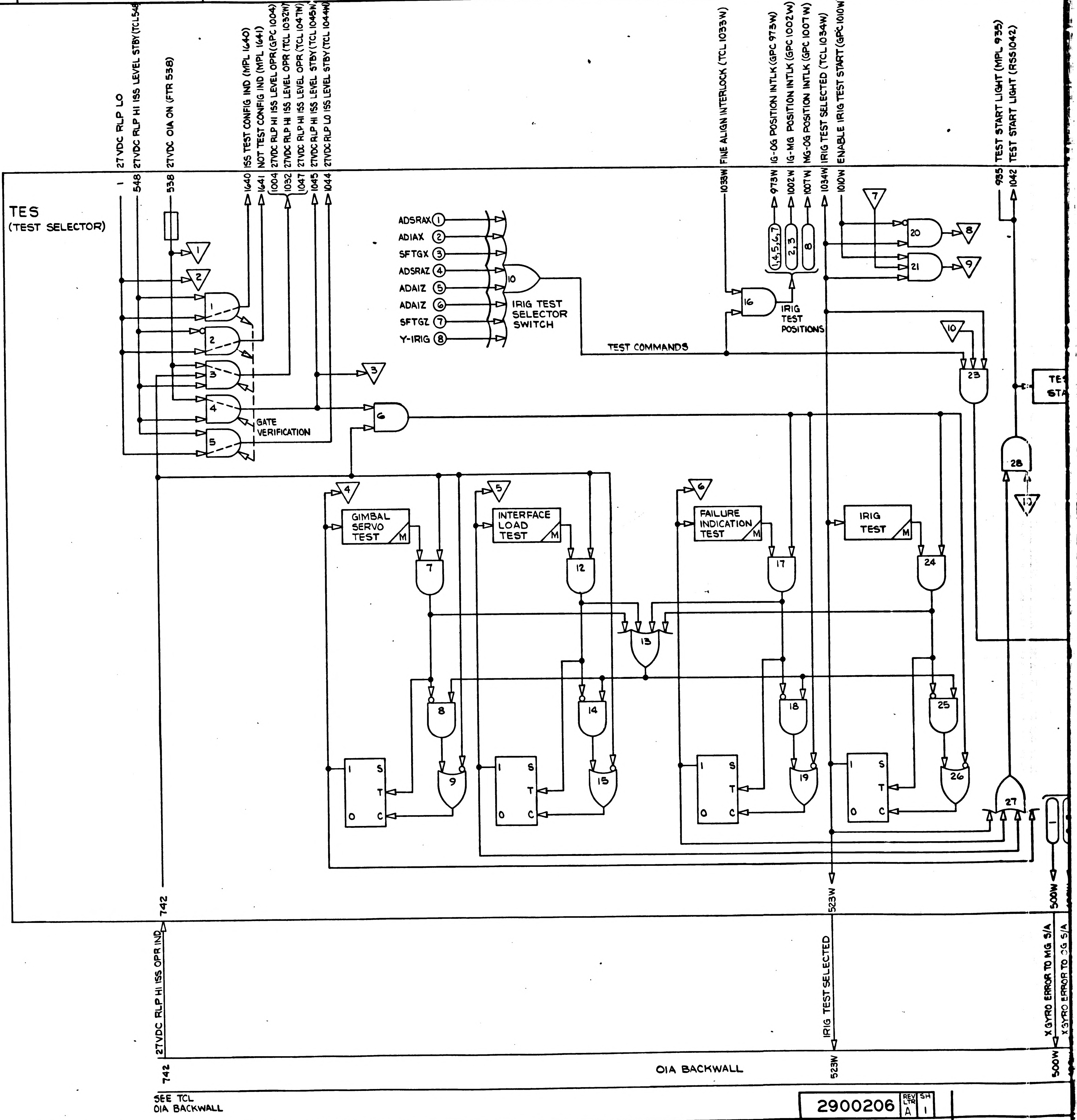
INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G&N CONFIGURATIONS
   - E. TW, TL, OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

6. SIGNAL REFERENCE

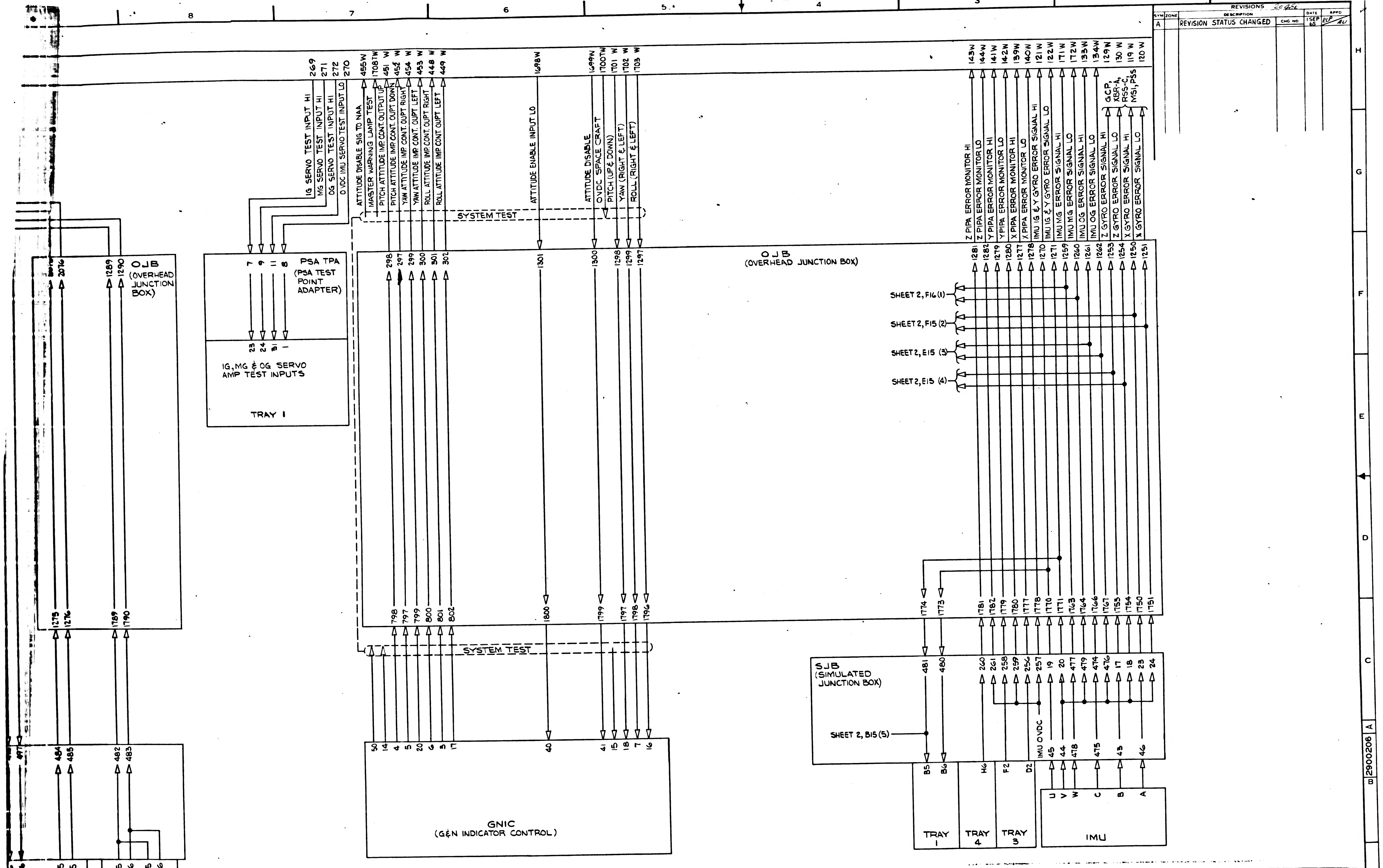
1	27 VDC OIA ON
2	27 VDC RLP LO
3	27 VDC ISS LEVEL STANDBY
4	GIMBAL SERVO TEST SELECTED
5	INTERFACE LOAD TEST SELECTED
6	FAILURE INDICATION TEST SELECTED
7	TEST START, BUTTON DEPRESSED
8	CLEAR
9	SET
10	TEST STARTED
11	IMU ERROR SIGNALS


27 VDC RLP LO
1
27VDC RLP HI ISS LEVEL STBY (TCL548)
548
27VDC OIA ON (FTR 538)
538
ISS TEST CONFIG IND (MPL 1640)
1640
NOT TEST CONFIG IND (MPL 1641)
1641
27VDC RLP HI ISS LEVEL OPR (GPC 1004)
1004
27VDC RLP HI ISS LEVEL OPR (TCL 1032W)
1032
27VDC RLP HI ISS LEVEL OPR (TCL 1047W)
1047
27VDC RLP HI ISS LEVEL STBY (TCL 1045W)
1045
27VDC RLP LO ISS LEVEL STBY (TCL 1044W)
1044
FINE ALIGN INTERLOCK (TCL 1033W)
1033W
IG-OG POSITION INTLK (GPC 973W)
973W
IG-MG POSITION INTLK (GPC 1002W)
1002W
MG-OG POSITION INTLK (GPC 1007W)
1007W
IRIG TEST SELECTED (TCL 1034W)
1034W
ENABLE IRIG TEST START (GPC 1010W)
1010W
TEST START LIGHT (MPL 935)
935
TEST START LIGHT (RSS1042)
1042
TES
(TEST SELECTOR)
1
2
3
4
5
GATE VERIFICATION
6
ADSRAX ①
ADIAX ②
SFTGX ③
ADSRAZ ④
ADAIZ ⑤
ADAIZ ⑥
SFTGZ ⑦
Y-IRIG ⑧
10
IRIG TEST SELECTOR SWITCH
TEST COMMANDS
16
IRIG TEST POSITIONS
1,4,5,6,7
2,3
8
7
20
21
8
9
10
23
TES STA
28
13
4
GIMBAL SERVO TEST M
5
INTERFACE LOAD TEST M
6
FAILURE INDICATION TEST M
IRIG TEST M
7
12
17
24
13
8
14
18
25
1 S T O C
9
15
19
26
27
742
27VDC RLP HI ISS OPR IND
742
523W
IRIG TEST SELECTED
523W
500W
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
500W
OIA BACKWALL
SEE TCL
OIA BACKWALL

2900206 REV LTR A SH 1

MIL FORM 1080 J3

1/2900206


8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
455W
1708W
451 W
452 W
454 W
453 W
448 W
449 W
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUTPUT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
1698W
ATTITUDE ENABLE INPUT LO
1699W
1700W
1701 W
1702 W
1703 W
ATTITUDE DISABLE
OVDC SPACE CRAFT
PITCH (UP & DOWN)
YAW (RIGHT & LEFT)
ROLL (RIGHT & LEFT)
SYSTEM TEST
143W
144W
141W
142W
139W
140W
121 W
122 W
171 W
172 W
133W
134W
129W
130 W
119 W
120 W
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIGNAL HI
IMU IG & Y GYRO ERROR SIGNAL LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
Z GYRO ERROR SIGNAL HI
Z GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
X GYRO ERROR SIGNAL LO
G.C.P.,
KSR-A,
RSS-C,
MSI, PSS
OJB
(OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1789
1790
PSA TPA
(PSA TEST POINT ADAPTER)
7
9
11
8
23
24
31
1
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
OJB
(OVERHEAD JUNCTION BOX)
298
297
299
300
301
302
1301
1300
1298
1299
1297
1281
1282
1279
1280
1277
1278
1270
1271
1259
1260
1261
1262
1253
1254
1250
1251
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (3)
SHEET 2, E15 (4)
798
797
799
800
801
802
1800
1799
1797
1798
1796
1774
1773
1781
1782
1779
1780
1777
1778
1770
1771
1763
1764
1766
1767
1753
1754
1750
1751
SYSTEM TEST
SJB
(SIMULATED JUNCTION BOX)
481
480
260
261
258
259
256
257
19
20
477
479
474
476
17
18
23
24
SHEET 2, B15 (5)
IMU OVDC
45
44
478
475
43
46
B5
B6
H6
F2
D2
U
V
W
C
B
A
TRAY 1
TRAY 4
TRAY 3
IMU
50
14
4
5
20
6
3
17
40
41
15
18
7
16
GNIC
(G&N INDICATOR CONTROL)
484
485
482
483
N5
P5
G5
G6
H5
H6
TRAY 10
2900206
A
B

REVISIONS 2c 456					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		1 SEP 65	RLP AU

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ — + — + —
– – –
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Cochran DATE 26 MAY 65
CHECKED Ed Foster 9 JUN 65
APPROVAL H. Mulhern
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

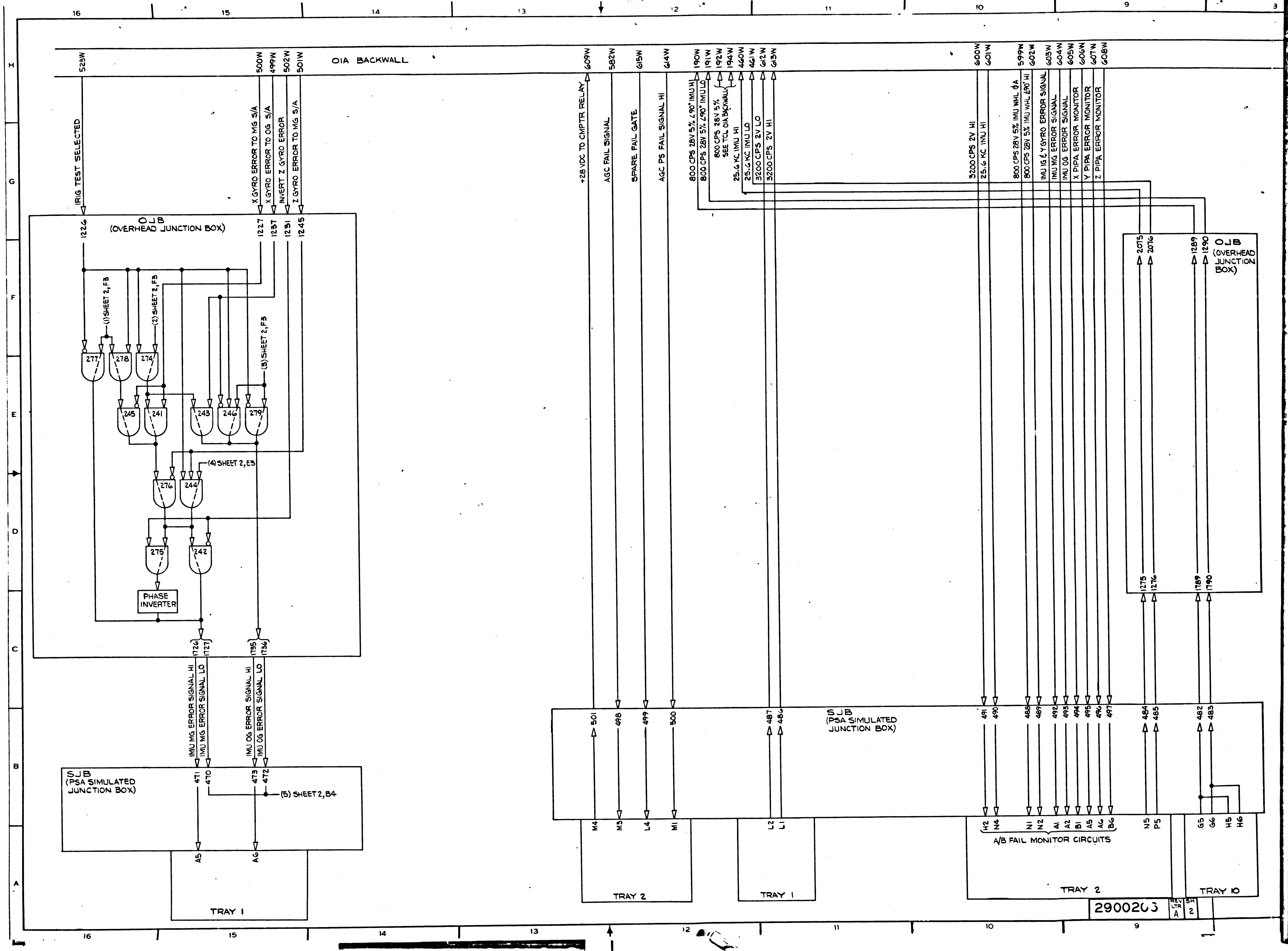
MECHANIZATION DIAGRAM -
TEST SELECTOR
(BLOCK I SERIES 100)

CODE IDENT NO 99974
SIZE J_2
2900206
SCALE —
SHEET 2 OF 4

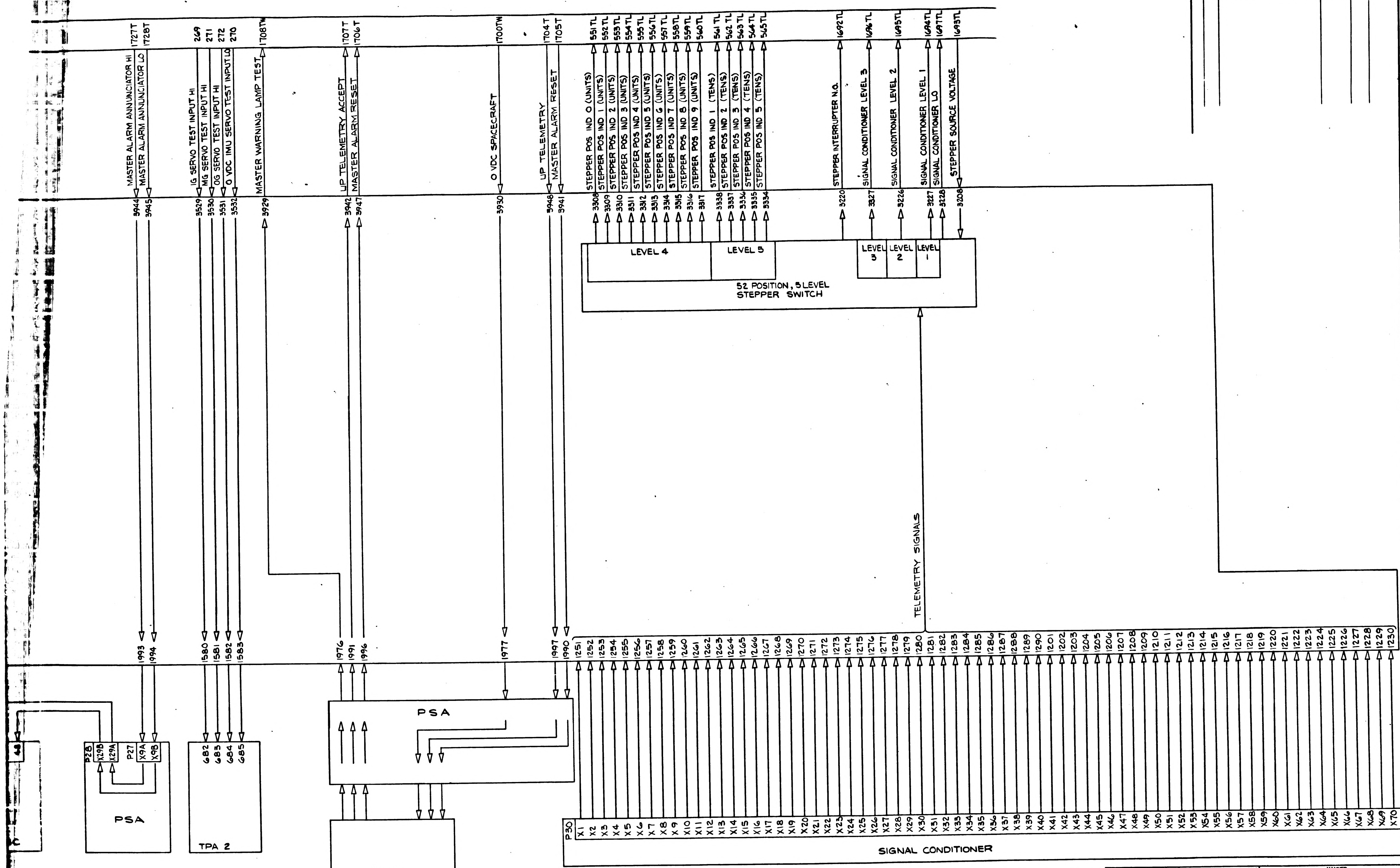
	REV LTR	SH
900206	A	2

3H

2/2900206


OIA BACKWALL
523W
IRIG TEST SELECTED
500W
499W
502W
501W
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
OJB
(OVERHEAD JUNCTION BOX)
1226
1227
1237
1231
1245
(1) SHEET 2, F3
(2) SHEET 2, F3
(3) SHEET 2, F3
(4) SHEET 2, E3
277
278
274
245
241
243
246
279
276
244
275
242
PHASE INVERTER
1726
1727
1735
1736
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
SJB
(PSA SIMULATED JUNCTION BOX)
471
470
473
472
(5) SHEET 2, B4
A5
A6
TRAY 1
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5%
SEE TCL OIA BACKWALL
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ΦA
800 CPS 28V 5% IMU WHL ∠90° HI
IMU IG & Y GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
2075
2076
1289
1290
OJB
(OVERHEAD JUNCTION BOX)
1275
1276
1789
1790
SJB
(PSA SIMULATED JUNCTION BOX)
501
498
499
500
487
486
491
490
488
489
492
493
494
495
496
497
484
485
482
483
M4
M3
L4
M1
TRAY 2
L2
L1
TRAY 1
H2
N4
N1
N2
A1
A2
B1
A5
A6
B6
N5
P5
G5
G6
H5
H6
A/B FAIL MONITOR CIRCUITS
TRAY 2
TRAY 10
2900206
REV LTR A
SH 2
16
15
14
13
12
11
10
9
H
G
F
E
D
C
B
A

1729002 06


1727T
1728T
269
271
272
270
1708TW
1707T
1706T
1700TW
1704T
1705T
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
561TL
562TL
563TL
564TL
565TL
1692TL
1696TL
1695TL
1694TL
1697TL
1693TL
MASTER ALARM ANNUNCIATOR HI
MASTER ALARM ANNUNCIATOR LO
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
MASTER WARNING LAMP TEST
UP TELEMETRY ACCEPT
MASTER ALARM RESET
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3944
3945
3529
3530
3531
3532
3929
3942
3947
3930
3948
3941
3308
3309
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3327
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3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
TELEMETRY SIGNALS
1993
1994
1580
1581
1582
1583
1976
1991
1996
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1997
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1230
4B
C
P28
X29B
X29A
P27
X9A
X9B
PSA
682
683
684
685
TPA 2
PSA
GNIC
P30
X1
X2
X3
X4
X5
X6
X7
X8
X9
X10
X11
X12
X13
X14
X15
X16
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X61
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X64
X65
X66
X67
X68
X69
X70
SIGNAL CONDITIONER
8
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H
G
F
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D
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B
A

REVISIONS 20486

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	AU

3H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+	+	+
-	-	-

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN Lookman DATE 3 JUN 65
CHECKED Ed Foster 9 JUN 65
APPROVAL H Hodson
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
TEST SELECTOR
(BLOCK II)

CODE IDENT NO 99974 SIZE J_2 2900206

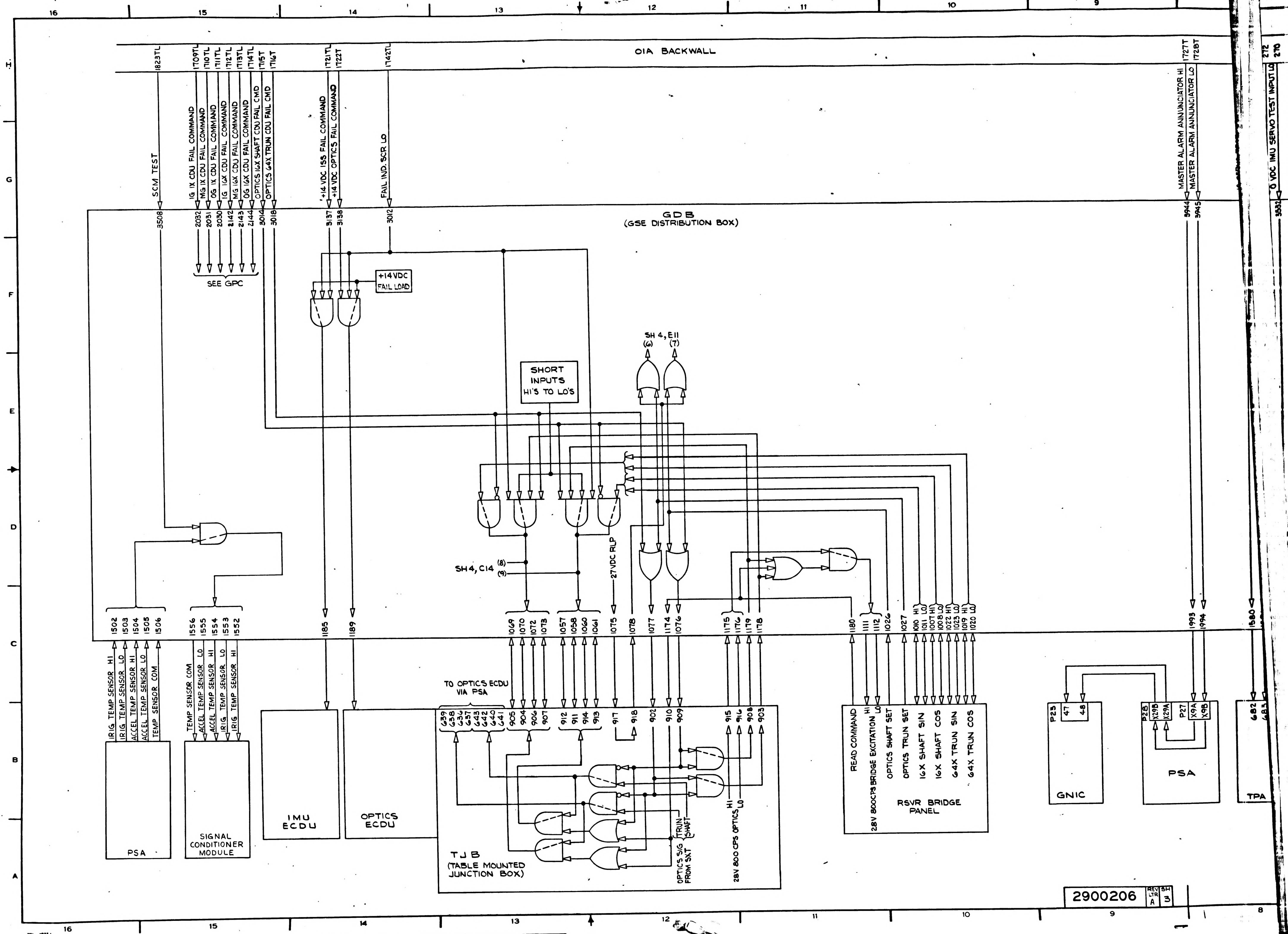
SCALE

SHEET 3 OF 4

2900206 A

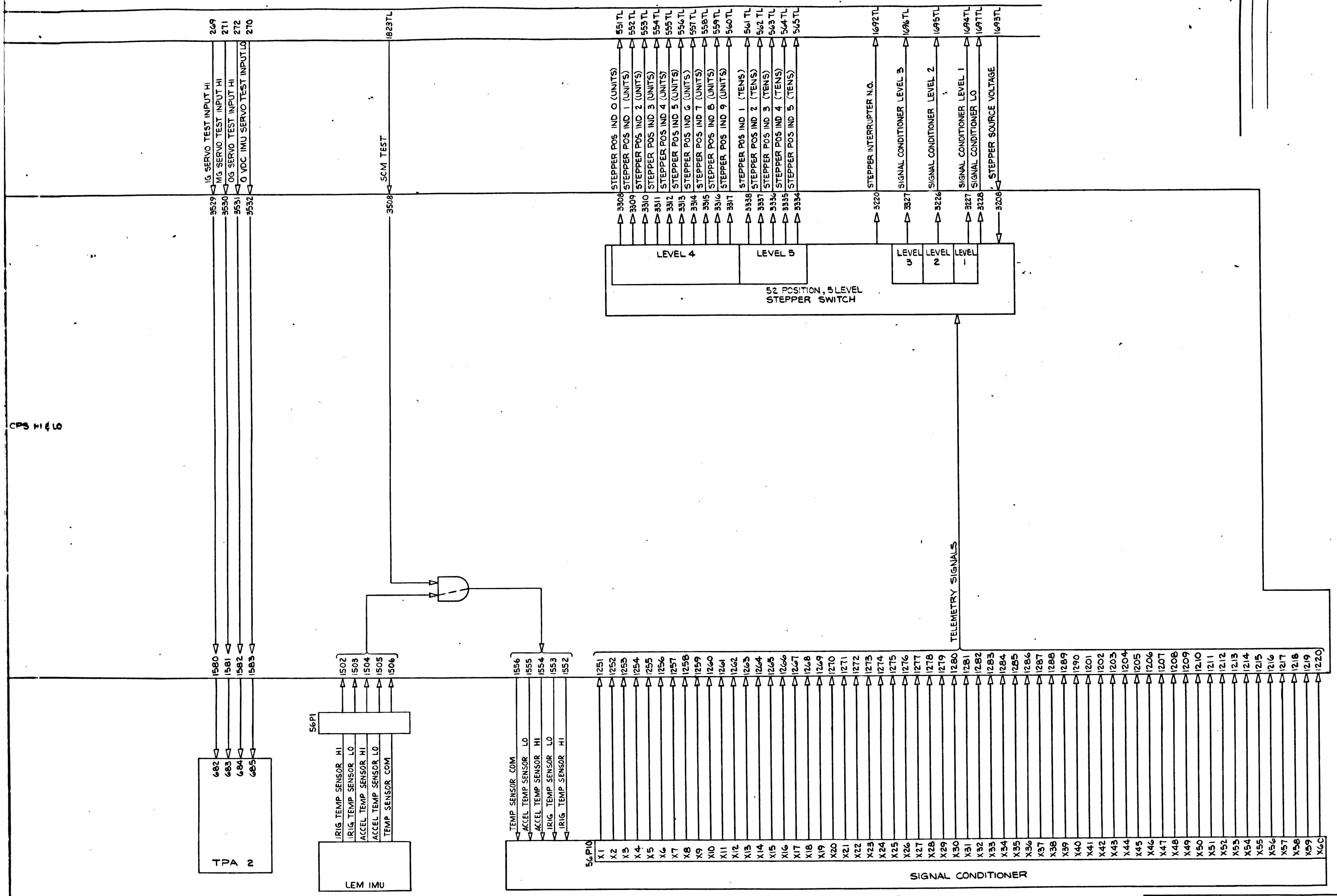
2900206 REV. LTR A SH 3

2/2900206


OIA BACKWALL
1823TL
SCM TEST
3508
1709TL 1710TL 1711TL 1712TL 1713TL 1714TL 1715T 1716T
IG 1X CDU FAIL COMMAND
MG 1X CDU FAIL COMMAND
OG 1X CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
2032 2031 2030 2142 2143 2144 3014 3018
SEE GPC
1721TL 1722T
+14 VDC ISS FAIL COMMAND
+14 VDC OPTICS FAIL COMMAND
3137 3138
1742TL
FAIL IND. SCR LO
3012
+14VDC FAIL LOAD
GDB
(GSE DISTRIBUTION BOX)
1727T 1728T
MASTER ALARM ANNUNCIATOR HI
MASTER ALARM ANNUNCIATOR LO
5944 5945
0 VDC IMU SERVO TEST INPUT LO
272 270
3532
SHORT INPUTS HI'S TO LO'S
SH 4, E11
(6) (7)
SH4, C14
(8) (9)
27VDC RLP
1502 1503 1504 1505 1506
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
PSA
1556 1555 1554 1553 1552
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
SIGNAL CONDITIONER MODULE
1185
IMU ECDU
1189
OPTICS ECDU
1069 1070 1072 1073 1057 1058 1060 1061 1075 1078 1077 1174 1076 1175 1176 1179 1178
TO OPTICS ECDU VIA PSA
639 638 636 637 643 642 640 641
905 904 906 907 912 911 914 913 917 918 902 910 909 915 916 908 903
OPTICS SIG FROM SXT
TRUN SHAFT
28V 800 CPS OPTICS
HI LO
TJB
(TABLE MOUNTED JUNCTION BOX)
1180 1111 1112 1026 1027 1010 1011 1007 1008 1022 1023 1019 1020
HI LO HI LO HI LO HI LO
READ COMMAND
28V 800CPS BRIDGE EXCITATION HI LO
OPTICS SHAFT SET
OPTICS TRUN SET
16X SHAFT SIN
16X SHAFT COS
64X TRUN SIN
64X TRUN COS
RSVR BRIDGE PANEL
P23
47 48
GNIC
P28 X29B X29A
P27 X9A X9B
PSA
1993 1994
1580
682 683
TPA
16 15 14 13 12 11 10 9 8
H G F E D C B A
3H
2900206
REV LTR A
SH 3

1/2900206

SYM	ZONE	REVISIONS 20486 DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	RLP AU



269 271 272 270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
3529 3530 3531 3532
1823TL
SCM TEST
3508
551TL 552TL 553TL 554TL 555TL 556TL 557TL 558TL 559TL 560TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
3308 3309 3310 3311 3312 3313 3314 3315 3316 3317
561TL 562TL 563TL 564TL 565TL
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
3338 3337 3336 3335 3334
1692TL
STEPPER INTERRUPTER N.O.
3220
1696TL
SIGNAL CONDITIONER LEVEL 3
3327
1695TL
SIGNAL CONDITIONER LEVEL 2
3226
1694TL 1697TL
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
3227 3228
1693TL
STEPPER SOURCE VOLTAGE
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL
STEPPER SWITCH
CPS HI & LO
TELEMETRY SIGNALS
1580 1581 1582 1583
682 683 684 685
TPA 2
1502 1503 1504 1505 1506
56P1
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
LEM IMU
1556 1555 1554 1553 1552
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220
56P10
X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21 X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38 X39 X40 X41 X42 X43 X44 X45 X46 X47 X48 X49 X50 X51 X52 X53 X54 X55 X56 X57 X58 X59 X6C
SIGNAL CONDITIONER
9 8 7 6 5 4 3 2 1
H G F E D C B A

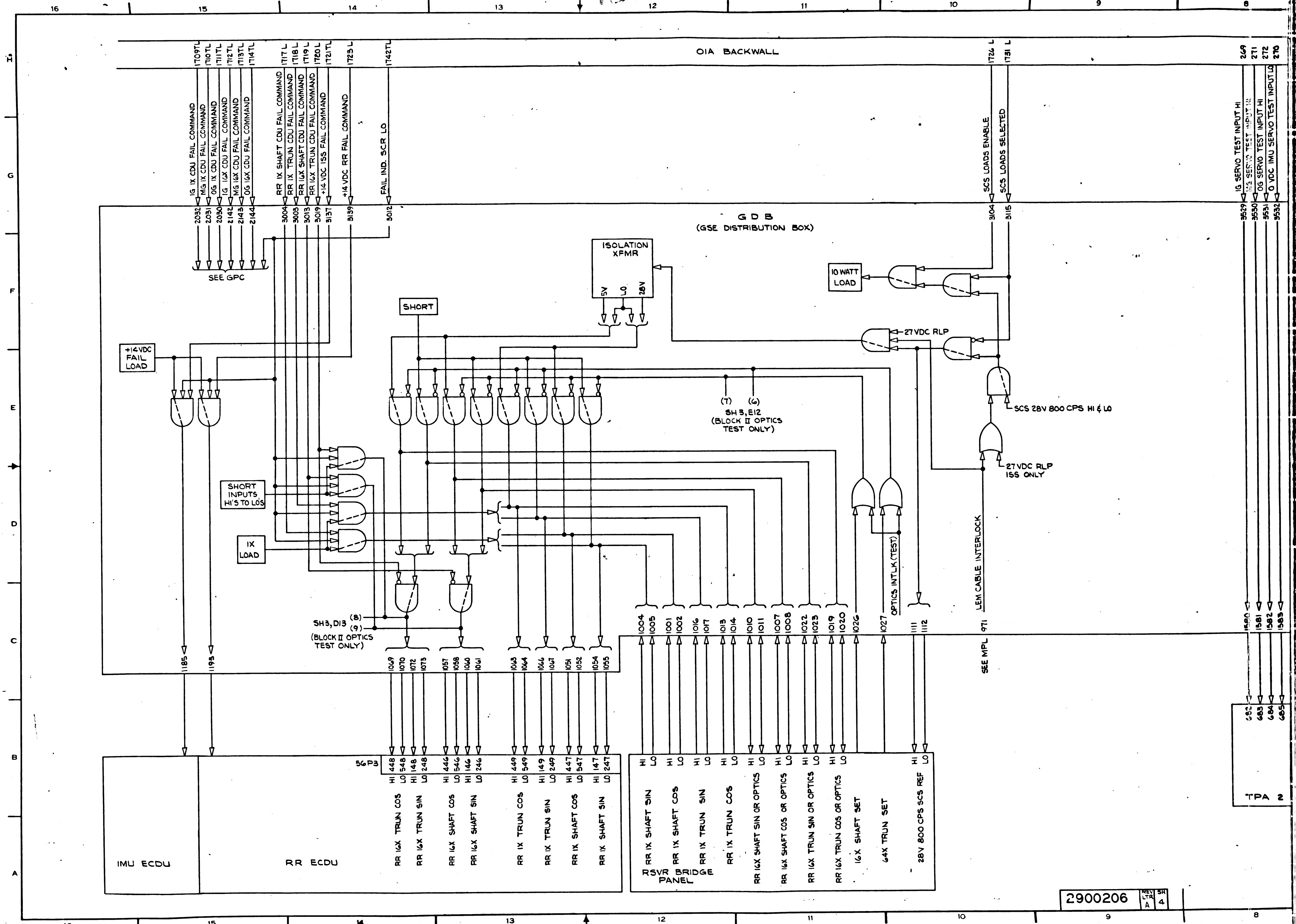
3H

2900206 A

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN Lookman DATE 7 JUN 65 CHECKED Ed Foster 9 JUN 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM- TEST SELECTOR (LEM)
DO NOT SCALE THIS DRAWING		
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974 · SIZE J_2 · 2900206
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — · SHEET 4 OF 4

29C0206 REV LTR A SH 4

2-/2900206



16
15
14
13
12
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8
H
G
F
E
D
C
B
A
OIA BACKWALL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1717TL
1718L
1719L
1720L
1721TL
1723L
1742TL
1726L
1731L
269
271
272
270
IG 1X CDU FAIL COMMAND
MG 1X CDU FAIL COMMAND
OG 1X CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
RR 1X SHAFT CDU FAIL COMMAND
RR 1X TRUN CDU FAIL COMMAND
RR 16X SHAFT CDU FAIL COMMAND
RR 16X TRUN CDU FAIL COMMAND
+14 VDC ISS FAIL COMMAND
+14 VDC RR FAIL COMMAND
FAIL IND. SCR LO
SCS LOADS ENABLE
SCS LOADS SELECTED
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
2032
2031
2030
2142
2143
2144
3004
3005
3013
3019
3137
3139
3012
3104
3115
3529
3530
3531
3532
GDB
(GSE DISTRIBUTION BOX)
SEE GPC
ISOLATION XFMR
5V
LO
28V
SHORT
+14 VDC FAIL LOAD
10 WATT LOAD
27 VDC RLP
SCS 28V 800 CPS HI & LO
27 VDC RLP ISS ONLY
(7)
(6)
SH 3, E12
(BLOCK II OPTICS TEST ONLY)
SHORT INPUTS HI'S TO LO'S
1X LOAD
SH3, D13
(8)
(9)
(BLOCK II OPTICS TEST ONLY)
OPTICS INTLK (TEST)
LEM CABLE INTERLOCK
SEE MPL
971
1004
1005
1001
1002
1016
1017
1013
1014
1010
1011
1007
1008
1022
1023
1019
1020
1026
1027
1111
1112
1580
1581
1582
1583
1185
1193
1069
1070
1072
1073
1057
1058
1060
1061
1063
1064
1066
1067
1051
1052
1054
1055
56P3
448
548
148
248
446
546
146
246
449
549
149
249
447
547
147
247
HI
LO
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
RR 1X TRUN COS
RR 1X TRUN SIN
RR 1X SHAFT COS
RR 1X SHAFT SIN
IMU ECDU
RR ECDU
RR 1X SHAFT SIN
RR 1X SHAFT COS
RR 1X TRUN SIN
RR 1X TRUN COS
RR 16X SHAFT SIN OR OPTICS
RR 16X SHAFT COS OR OPTICS
RR 16X TRUN SIN OR OPTICS
RR 16X TRUN COS OR OPTICS
16X SHAFT SET
64X TRUN SET
28V 800 CPS SCS REF
RSVR BRIDGE PANEL
682
683
684
685
TPA 2

2900206 REV LTR A SH 4

34

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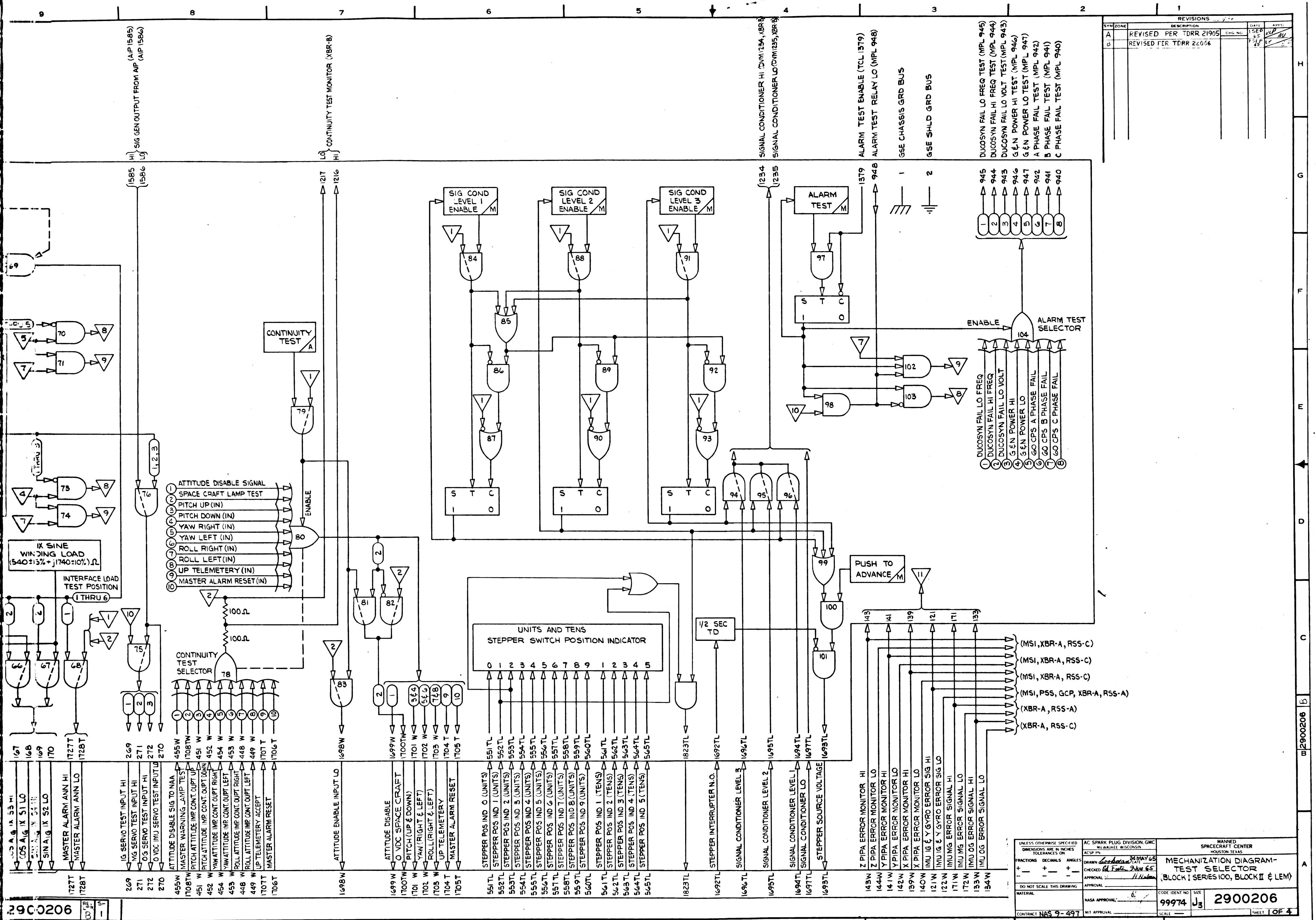
9
8
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3
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1
H
G
F
E
D
C
B
A
HI SIG GEN OUTPUT FROM AIP (AIP 1585)
LO (AIP 1586)
1585
1586
LO CONTINUITY TEST MONITOR (XBR-B)
HI
1217
1216
SIGNAL CONDITIONER HI (DVM1234, XBR-B)
SIGNAL CONDITIONER LO (DVM1235, XBR-B)
1234
1235
ALARM TEST ENABLE (TCL 1379)
ALARM TEST RELAY LO (MPL 948)
1379
948
GSE CHASSIS GRD BUS
GSE SHLD GRD BUS
1
2
DUCOSYN FAIL LO FREQ TEST (MPL 945)
DUCOSYN FAIL HI FREQ TEST (MPL 944)
DUCOSYN FAIL LO VOLT TEST (MPL 943)
G&N POWER HI TEST (MPL 946)
G&N POWER LO TEST (MPL 947)
A PHASE FAIL TEST (MPL 942)
B PHASE FAIL TEST (MPL 941)
C PHASE FAIL TEST (MPL 940)
945
944
943
946
947
942
941
940
SIG COND LEVEL 1 ENABLE M
SIG COND LEVEL 2 ENABLE M
SIG COND LEVEL 3 ENABLE M
ALARM TEST M
CONTINUITY TEST A
PUSH TO ADVANCE M
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
69
70
71
73
74
75
76
78
79
80
81
82
83
66
67
68
S T C
1 0
ENABLE
ALARM TEST SELECTOR
DUCOSYN FAIL LO FREQ
DUCOSYN FAIL HI FREQ
DUCOSYN FAIL LO VOLT
G&N POWER HI
G&N POWER LO
400 CPS A PHASE FAIL
400 CPS B PHASE FAIL
400 CPS C PHASE FAIL
① ATTITUDE DISABLE SIGNAL
② SPACE CRAFT LAMP TEST
③ PITCH UP (IN)
④ PITCH DOWN (IN)
⑤ YAW RIGHT (IN)
⑥ YAW LEFT (IN)
⑦ ROLL RIGHT (IN)
⑧ ROLL LEFT (IN)
⑨ UP TELEMETRY (IN)
⑩ MASTER ALARM RESET (IN)
ENABLE
100Ω
100Ω
CONTINUITY TEST SELECTOR
1X SINE WINDING LOAD (540±15%+j1740±10%)Ω
INTERFACE LOAD TEST POSITION
1 THRU 6
1, 2, 3
1 THRU 3
UNITS AND TENS STEPPER SWITCH POSITION INDICATOR
0 1 2 3 4 5 6 7 8 9 1 2 3 4 5
1/2 SEC TD
3&4
5&6
7&8
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, PSS, GCP, XBR-A, RSS-A)
(XBR-A, RSS-A)
(XBR-A, RSS-C)
143
141
139
121
171
133
167 168 169 170
1727T 1728T
269 271 272 270
455W 1708TW 451 W 452 W 454 W 453 W 448 W 449 W 1707 T 1706 T
1698W
1699W 1700TW 1701 W 1702 W 1703 W 1704 T 1705 T
551TL 552TL 553TL 554TL 555TL 556TL 557TL 558TL 559TL 560TL
561TL 562TL 563TL 564TL 565TL
1823TL
1692TL 1696TL 1695TL 1694TL 1697TL 1693TL
COS A_IG 1X S3 HI
COS A_IG 1X S1 LO
SIN A_IG 1X S4 HI
SIN A_IG 1X S2 LO
MASTER ALARM ANN HI
MASTER ALARM ANN LO
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUPT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
UP TELEMETERY ACCEPT
MASTER ALARM RESET
ATTITUDE ENABLE INPUT LO
ATTITUDE DISABLE
0 VDC SPACE CRAFT
PITCH (UP & DOWN)
YAW (RIGHT & LEFT)
ROLL (RIGHT & LEFT)
UP TELEMETERY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIG HI
IMU IG & Y GYRO ERROR SIG LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
143W 144W 141W 142W 139W 140W 121W 122W 171W 172W 133W 134W
2900206 B

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	RLP AU
B		REVISED PER TDRR 22006		7 SEP 65	LY

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Cookman DATE 24 MAY 65
CHECKED Ed Foster 9 JUN 65
APPROVAL H Hudson
APPROVAL
NASA APPROVAL
MIT APPROVAL

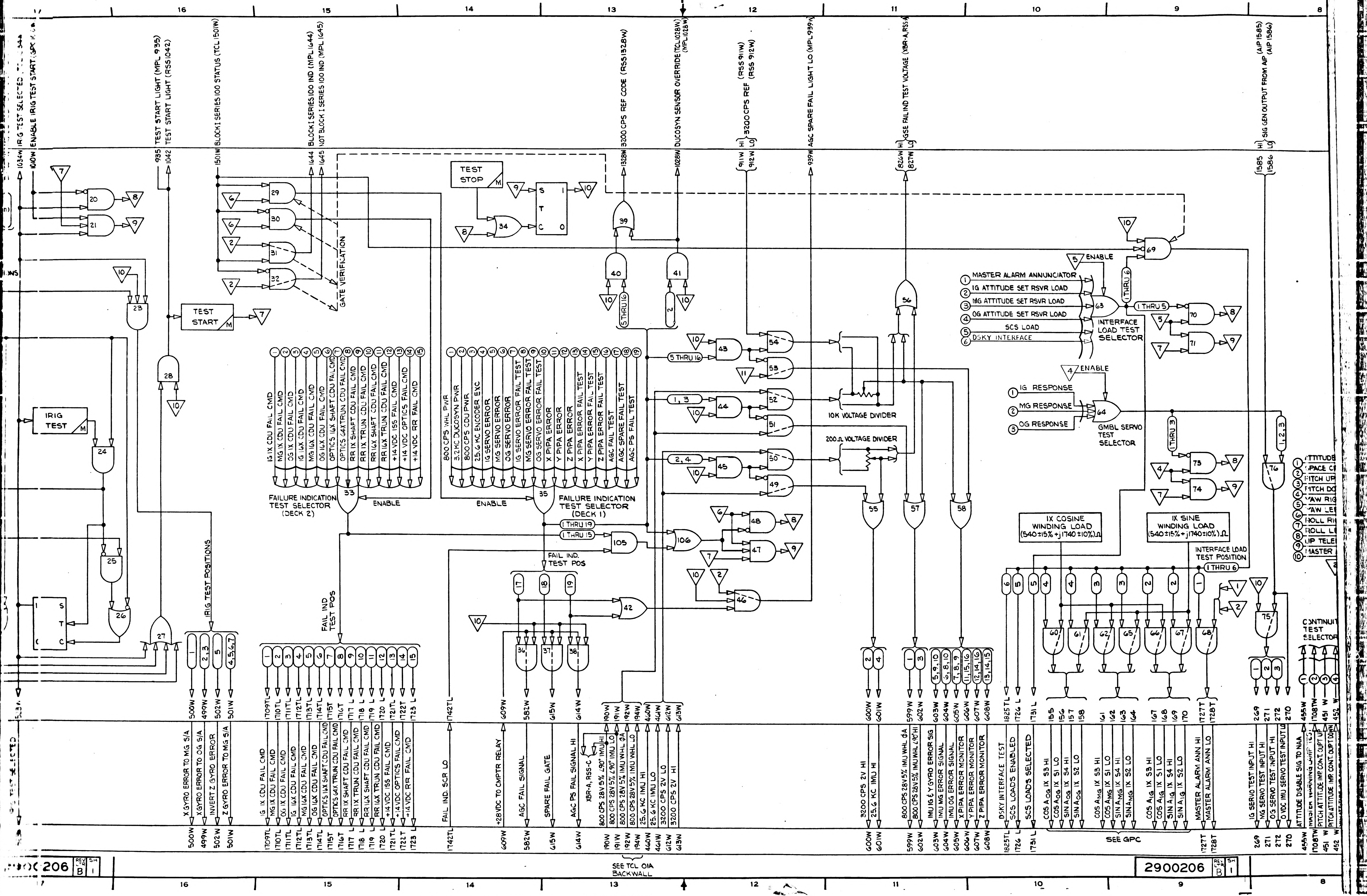
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM-
TEST SELECTOR
(BLOCK I SERIES 100, BLOCK II & LEM)

CODE IDENT NO 99974
SIZE J3
2900206
SCALE —
SHEET 1 OF 4

2900206 REV B SH 1

3/2900206



16
15
14
13
12
11
10
9
8
1034W IRIG TEST SELECTED
1010W ENABLE IRIG TEST START
935 TEST START LIGHT (MPL 935)
1042 TEST START LIGHT (RSS1042)
1501W BLOCK I SERIES 100 STATUS (TCL 1501W)
1644 BLOCK I SERIES 100 IND (MPL 1644)
1645 NOT BLOCK I SERIES 100 IND (MPL 1645)
1328W 3200 CPS REF CODE (RSS1328W)
1028W DUCOSYN SENSOR OVERRIDE (TCL 1028W) (MPL 1028W)
911W HI 912W LO 3200 CPS REF (RSS 911W) (RSS 912W)
939W AGC SPARE FAIL LIGHT LO (MPL 939W)
826W HI 827W LO GSE FAIL IND TEST VOLTAGE (XBR-A, RSS-A)
1585 HI 1586 LO SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
TEST STOP
S T C 1 0
TEST START
IRIG TEST
GATE VERIFICATION
20
21
23
24
25
26
27
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31
32
33
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35
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37
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41
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54
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57
58
60
61
62
63
64
65
66
67
68
69
70
71
73
74
75
76
105
106
5 THRU 16
1 THRU 19
1 THRU 15
1 THRU 5
1 THRU 6
IG 1X CDU FAIL CMD
MG 1X CDU FAIL CMD
OG 1X CDU FAIL CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
RR 1X SHAFT CDU FAIL CMD
RR 1X TRUN CDU FAIL CMD
RR 16X SHAFT CDU FAIL CMD
RR 16X TRUN CDU FAIL CMD
+14 VDC ISS FAIL CMD
+14 VDC OPTICS FAIL CMD
+14 VDC RR FAIL CMD
FAILURE INDICATION TEST SELECTOR (DECK 2)
ENABLE
800 CPS WHL PWR
3.2 KC DUCOSYN PWR
800 CPS CDU PWR
25.6 KC ENCODER EXC
IG SERVO ERROR
MG SERVO ERROR
OG SERVO ERROR
IG SERVO ERROR FAIL TEST
MG SERVO ERROR FAIL TEST
OG SERVO ERROR FAIL TEST
X PIPA ERROR
Y PIPA ERROR
Z PIPA ERROR
X PIPA ERROR FAIL TEST
Y PIPA ERROR FAIL TEST
Z PIPA ERROR FAIL TEST
AGC FAIL TEST
AGC SPARE FAIL TEST
AGC PS FAIL TEST
FAILURE INDICATION TEST SELECTOR (DECK 1)
FAIL IND. TEST POS
FAIL IND TEST POS
IRIG TEST POSITIONS
10K VOLTAGE DIVIDER
200 Ω VOLTAGE DIVIDER
MASTER ALARM ANNUNCIATOR
IG ATTITUDE SET RSVR LOAD
MG ATTITUDE SET RSVR LOAD
OG ATTITUDE SET RSVR LOAD
SCS LOAD
DSKY INTERFACE
ENABLE
INTERFACE LOAD TEST SELECTOR
IG RESPONSE
MG RESPONSE
OG RESPONSE
GMBL SERVO TEST SELECTOR
1X COSINE WINDING LOAD (540±15% + j1740±10%) Ω
1X SINE WINDING LOAD (540±15% + j1740±10%) Ω
INTERFACE LOAD TEST POSITION
ATTITUDE
SPACE CR
PITCH UP
PITCH DO
YAW RIG
YAW LE
ROLL RI
ROLL LE
UP TELE
MASTER
CONTINUITY TEST SELECTOR
500W X GYRO ERROR TO MG S/A
499W X GYRO ERROR TO OG S/A
502W INVERT Z GYRO ERROR
501W Z GYRO ERROR TO MG S/A
1709TL IG 1X CDU FAIL CMD
1710TL MG 1X CDU FAIL CMD
1711TL OG 1X CDU FAIL CMD
1712TL IG 16X CDU FAIL CMD
1713TL MG 16X CDU FAIL CMD
1714TL OG 16X CDU FAIL CMD
1715T OPTICS 16X SHAFT CDU FAIL CMD
1716T OPTICS 64X TRUN CDU FAIL CMD
1717L RR 1X SHAFT CDU FAIL CMD
1718L RR 1X TRUN CDU FAIL CMD
1719L RR 16X SHAFT CDU FAIL CMD
1720L RR 16X TRUN CDU FAIL CMD
1721TL +14 VDC ISS FAIL CMD
1722T +14 VDC OPTICS FAIL CMD
1723L +14 VDC RR FAIL CMD
1742TL FAIL IND. SCR LO
609W +28VDC TO CMPTR RELAY
582W AGC FAIL SIGNAL
615W SPARE FAIL GATE
614W AGC PS FAIL SIGNAL HI
XBR-A, RSS-C
190W 800 CPS 28V 5% ∠90° IMU HI
191W 800 CPS 28V 5% IMU WHL ØA
192W 800 CPS 28V 5% ∠90° IMU WHL LO
194W 25.6 KC IMU HI
460W 25.6 KC IMU LO
461W 3200 CPS 2V LO
612W 3200 CPS 2V LO
613W 3200 CPS 2V HI
SEE TCL 01A BACKWALL
600W 3200 CPS 2V HI
601W 25.6 KC IMU HI
599W 800 CPS 28V 5% IMU WHL ØA
602W 800 CPS 28V 5% IMU WHL ∠90° HI
603W IMU IG & GYRO ERROR SIG
604W IMU MG ERROR SIGNAL
605W IMU OG ERROR SIGNAL
606W X PIPA ERROR MONITOR
607W Y PIPA ERROR MONITOR
608W Z PIPA ERROR MONITOR
1825TL DSKY INTERFACE TEST
1726L SCS LOADS ENABLED
1731L SCS LOADS SELECTED
155 COS A OG 1X S3 HI
156 COS A OG 1X S1 LO
157 SIN A OG 1X S4 HI
158 SIN A OG 1X S2 LO
161 COS A MG 1X S3 HI
162 COS A MG 1X S1 LO
163 SIN A MG 1X S4 HI
164 SIN A MG 1X S2 LO
167 COS A IG 1X S3 HI
168 COS A IG 1X S1 LO
169 SIN A IG 1X S4 HI
170 SIN A IG 1X S2 LO
SEE GPC
1727T MASTER ALARM ANN HI
1728T MASTER ALARM ANN LO
269 IG SERVO TEST INPUT HI
271 MG SERVO TEST INPUT HI
272 OG SERVO TEST INPUT HI
270 0 VDC IMU SERVO TEST INPUT LO
455W ATTITUDE DISABLE SIG TO NAA
1708TW MASTER WARNING LIGHT TEST
451W PITCH ATTITUDE IMP. CONT. OUPT UP
452W PITCH ATTITUDE IMP. CONT. OUPT DOWN
2900206 REV B SH 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM)

2900210 RLP	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RELAY & LAMP POWER SUPPLY
2900208 PSS	POWER & DUMMY LOAD - PRIMARY SIGNAL SELECTOR (PDL) PRIMARY SIGNAL SELECTOR
2900223	GIMBAL POSITION CONTROL (GPC)
2900207	MONITOR PANEL (MPL)
2900202	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
2900217 XBR-A XBR-B DVM	SIGNAL SELECTION & MEASUREMENT CROSSBAR - AC SIGNALS CROSSBAR - DC SIGNALS DIGITAL VOLTMETER
2900218 RSS-A RSS-B RSS-C RSS-D	OSCILLOGRAPH SIGNAL SELECTION TO FIXED AC CHANNEL TO FIXED DC CHANNEL TO SWITCHABLE AC CHANNEL TO SWITCHABLE DC CHANNEL
2900215 RSS	MEASUREMENT REFERENCE POWER SUPPLIES OSCILLOGRAPH SIGNAL SELECTOR
2900211	AUXILIARY INPUT-OUTPUT & CALIBRATION (AIP)
2900212 MSI	PIPA & IRIG MONITORING PHASE SHIFT PANEL
2900200	GYRO CAGING PANEL (GCP)

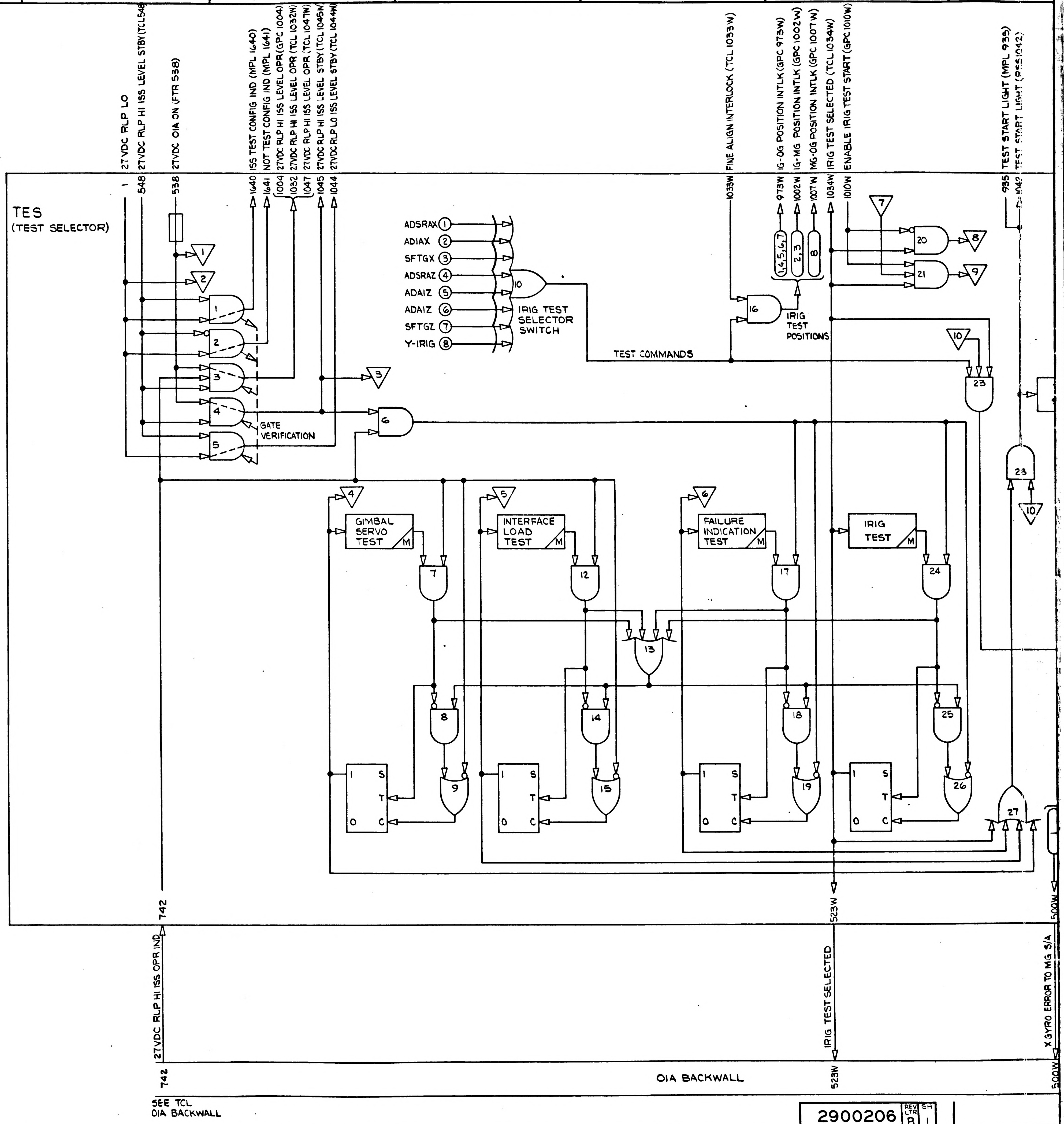
4. NONSTANDARD SYMBOLS

⊐D-	INDICATES "AND" GATE WITH SWITCHED SIGNAL
①② ⊐D-	INDICATES EXCLUSIVE "OR" GATE WITH SWITCH POSITIONS 1 & 2
NAME / M	INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME / A	INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G&N CONFIGURATIONS
   - E. TW, TL, OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

6. SIGNAL REFERENCE

1	27 VDC OIA ON
2	27 VDC RLP LO
3	27 VDC ISS LEVEL STANDBY
4	GIMBAL SERVO TEST SELECTED
5	INTERFACE LOAD TEST SELECTED
6	FAILURE INDICATION TEST SELECTED
7	TEST START, BUTTON DEPRESSED
8	CLEAR
9	SET
10	TEST STARTED
11	IMU ERROR SIGNALS



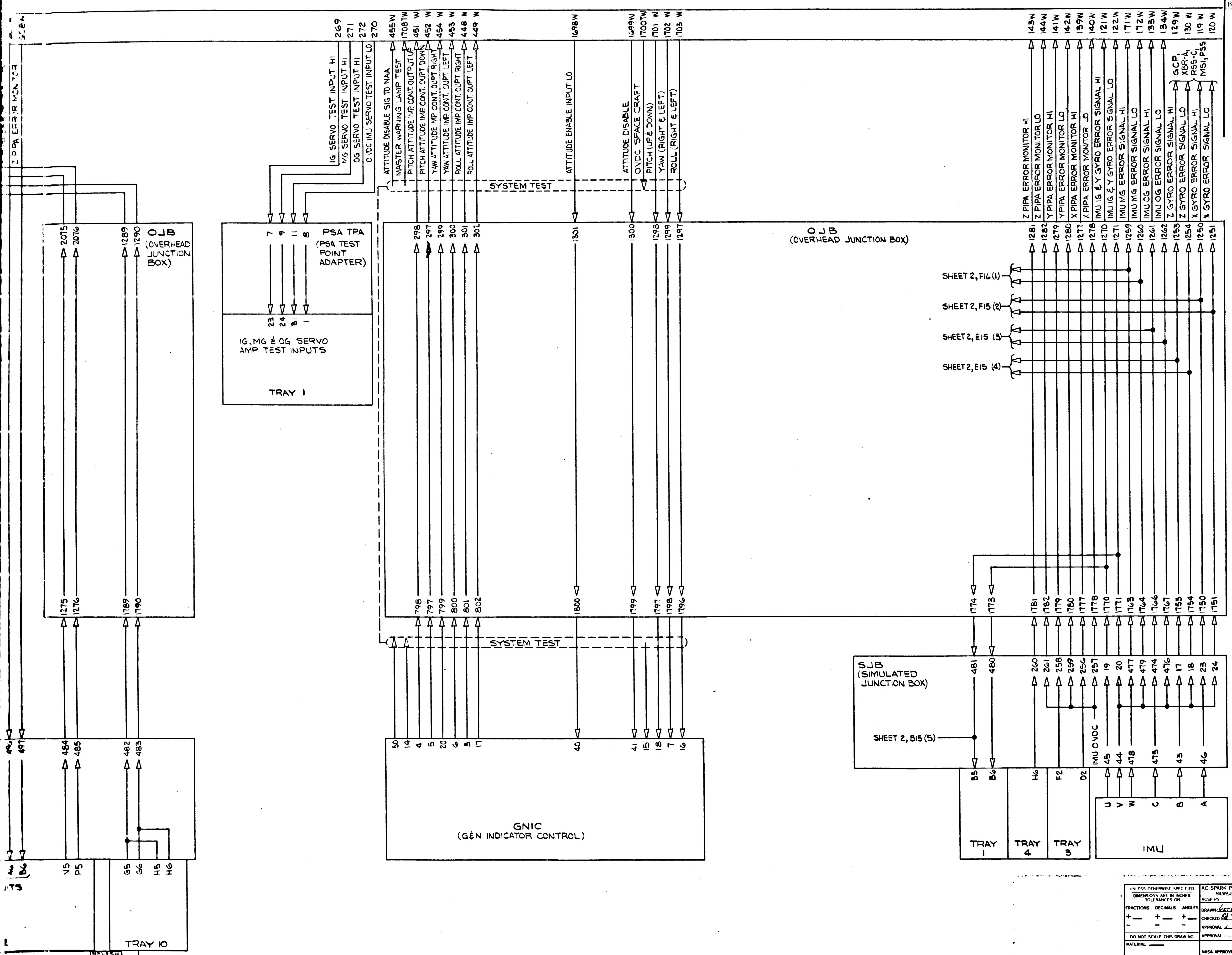
27 VDC RLP LO
1
27VDC RLP HI ISS LEVEL STBY (TCL548)
548
27VDC OIA ON (FTR 538)
538
ISS TEST CONFIG IND (MPL 1640)
1640
NOT TEST CONFIG IND (MPL 1641)
1641
27VDC RLP HI ISS LEVEL OPR (GPC 1004)
1004
27VDC RLP HI ISS LEVEL OPR (TCL 1032W)
1032
27VDC RLP HI ISS LEVEL OPR (TCL 1047W)
1047
27VDC RLP HI ISS LEVEL STBY (TCL 1045W)
1045
27VDC RLP LO ISS LEVEL STBY (TCL 1044W)
1044
FINE ALIGN INTERLOCK (TCL 1033W)
1033W
IG-OG POSITION INTLK (GPC 973W)
973W
IG-MG POSITION INTLK (GPC 1002W)
1002W
MG-OG POSITION INTLK (GPC 1007W)
1007W
IRIG TEST SELECTED (TCL 1034W)
1034W
ENABLE IRIG TEST START (GPC 1010W)
1010W
TEST START LIGHT (MPL 935)
935
TEST START LIGHT (RSS1042)
1042
TES
(TEST SELECTOR)
GATE VERIFICATION
ADSRAX ①
ADIAX ②
SFTGX ③
ADSRAZ ④
ADAIZ ⑤
ADAIZ ⑥
SFTGZ ⑦
Y-IRIG ⑧
IRIG TEST SELECTOR SWITCH
TEST COMMANDS
4,5,6,7
2,3
8
IRIG TEST POSITIONS
GIMBAL SERVO TEST M
INTERFACE LOAD TEST M
FAILURE INDICATION TEST M
IRIG TEST M
1 S T 0 C
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
23
24
25
26
27
28
742
27VDC RLP HI ISS OPR IND
523W
IRIG TEST SELECTED
500W
X GYRO ERROR TO MG S/A
OIA BACKWALL
SEE TCL
OIA BACKWALL

2900206	REV LTR B	SH 1

MIL FORM 1050 J3

1/2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		1 SEP 65	RLP AU
B		REVISION STATUS CHANGED		7 SEP 65	LK E+



PIPA ERROR MONITOR
2075
2076
1289
1290
OJB (OVERHEAD JUNCTION BOX)
1275
1276
1789
1790
496
497
484
485
482
483
B6
N5
P5
G5
G6
H5
H6
TRAY 10
269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
7
9
11
8
PSA TPA (PSA TEST POINT ADAPTER)
23
24
31
–
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
455W
1708TW
451 W
452 W
454 W
453 W
448 W
449 W
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUTPUT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
1698W
ATTITUDE ENABLE INPUT LO
1699W
1700TW
1701 W
1702 W
1703 W
ATTITUDE DISABLE
OVDC SPACE CRAFT
PITCH (UP & DOWN)
YAW (RIGHT & LEFT)
ROLL (RIGHT & LEFT)
SYSTEM TEST
298
297
299
300
301
302
1301
1300
1298
1299
1297
OJB (OVERHEAD JUNCTION BOX)
798
797
800
801
802
1800
1799
1797
1798
1796
SYSTEM TEST
50
14
4
5
20
6
3
17
40
41
15
18
7
16
GNIC (G&N INDICATOR CONTROL)
143W
144W
141W
142W
139W
140W
121 W
122 W
171 W
172W
133W
134W
129 W
130 W
119 W
120 W
GCP, XBR-A, RSS-C, MSI, PSS
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIGNAL HI
IMU IG & Y GYRO ERROR SIGNAL LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
Z GYRO ERROR SIGNAL HI
Z GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
X GYRO ERROR SIGNAL LO
1281
1282
1279
1280
1277
1278
1270
1271
1259
1260
1261
1262
1253
1254
1250
1251
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (3)
SHEET 2, E15 (4)
1774
1773
1781
1782
1779
1780
1777
1778
1770
1771
1763
1764
1766
1767
1753
1754
1750
1751
SJB (SIMULATED JUNCTION BOX)
481
480
260
261
258
259
256
257
19
20
477
479
474
476
17
18
23
24
SHEET 2, B15 (5)
IMU OVDC
45
44
478
475
43
46
B5
B6
H6
F2
D2
TRAY 1
TRAY 4
TRAY 3
U
V
W
C
B
A
IMU

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + — – DECIMALS + — – ANGLES + — –	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
	ACSP PN	
	DRAWN Corkran DATE 26 MAY 65 CHECKED Ed Foster 9 JUN 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK I SERIES 100)
DO NOT SCALE THIS DRAWING		
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974 SIZE J_2 2900206
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — SHEET 2 OF 4

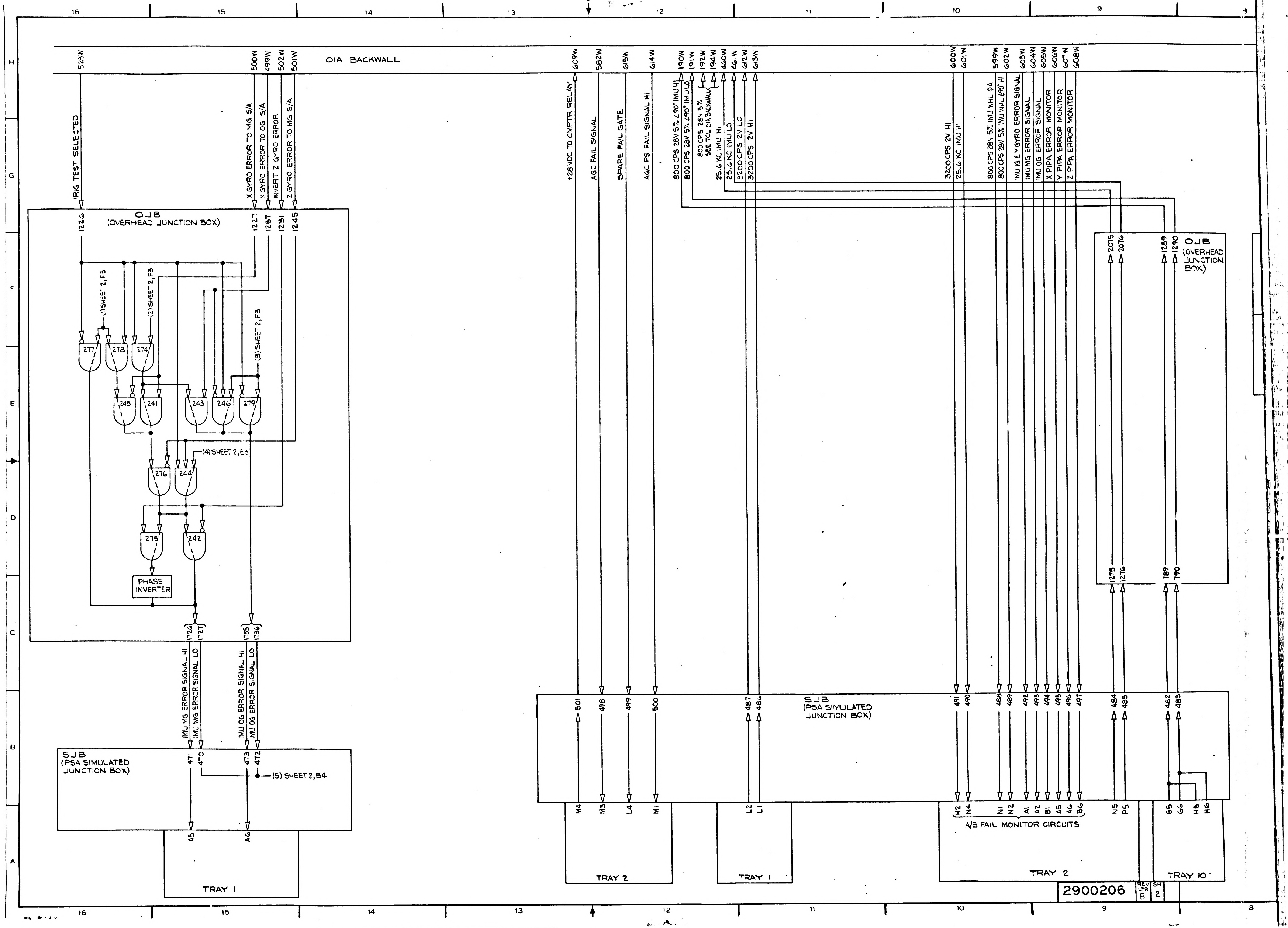
290C206 REV LTR B SH 2

2900206 B

3+'

2/2900206

2900206
SH 2 OF 4


OIA BACKWALL
523W
500W
499W
502W
501W
IRIG TEST SELECTED
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
OJB
(OVERHEAD JUNCTION BOX)
1226
1227
1237
1231
1245
(1) SHEET 2, F3
(2) SHEET 2, F3
(3) SHEET 2, F3
(4) SHEET 2, E3
277
278
274
245
241
243
246
279
276
244
275
242
PHASE INVERTER
1726
1727
1735
1736
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
SJB
(PSA SIMULATED JUNCTION BOX)
471
470
473
472
(5) SHEET 2, B4
A5
A6
TRAY 1
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5%
SEE TCL OIA BACKWALL
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ΦA
800 CPS 28V 5% IMU WHL ∠90° HI
IMU IG & Y GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
OJB
(OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
189
190
SJB
(PSA SIMULATED JUNCTION BOX)
501
498
499
500
487
486
491
490
488
489
492
493
494
495
496
497
484
485
482
483
M4
M3
L4
M1
TRAY 2
L2
L1
TRAY 1
H2
N4
N1
N2
A1
A2
B1
A5
A6
B6
N5
P5
A/B FAIL MONITOR CIRCUITS
TRAY 2
G5
G6
H5
H6
TRAY 10
16
15
14
13
12
11
10
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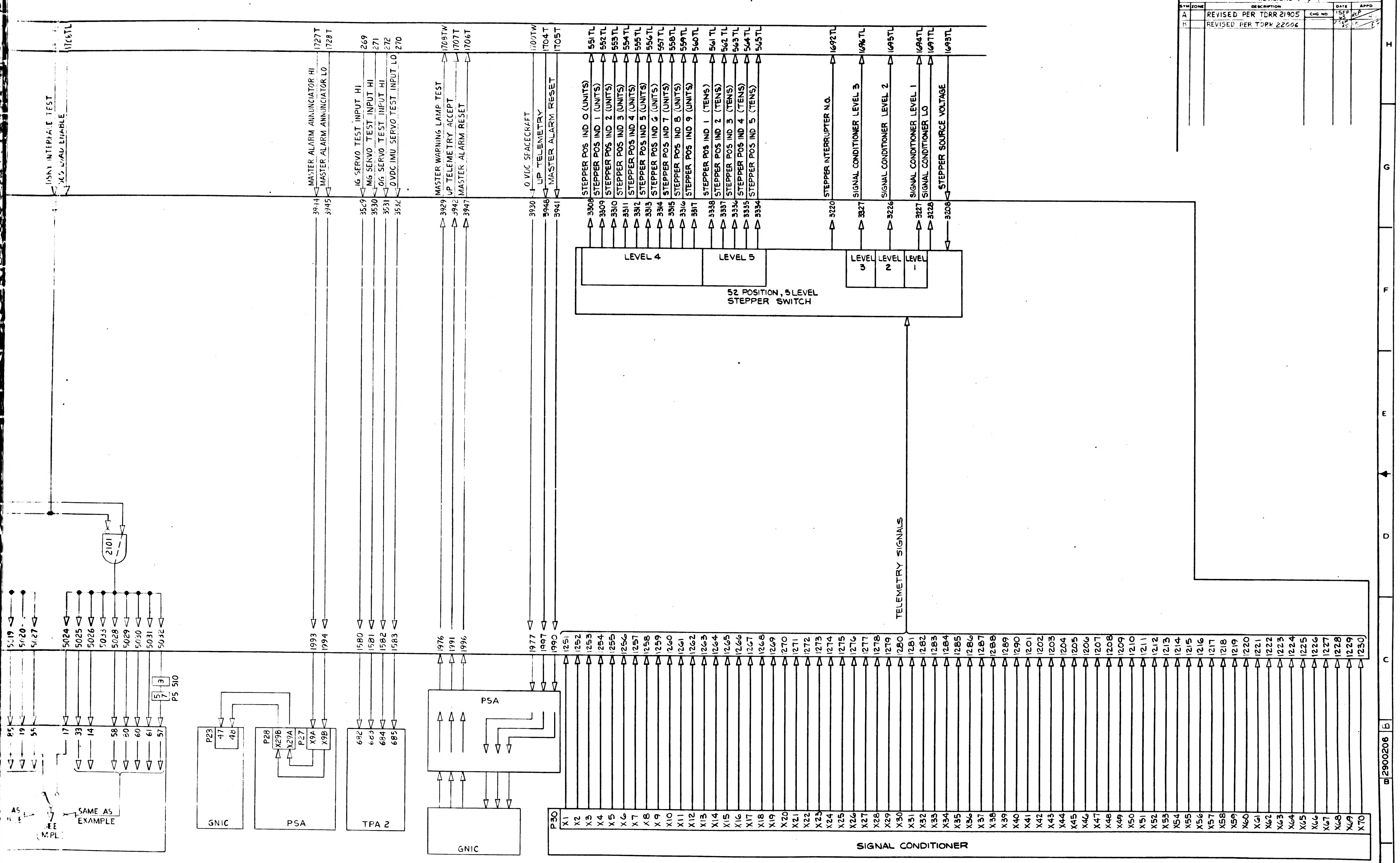
H
G
F
E
D
C
B
A
2900206
REV LTR
B
SH
2

1/2900206


DSKY INTERFACE TEST
1765TL
SCS LOAD ENABLE
MASTER ALARM ANNUNCIATOR HI
MASTER ALARM ANNUNCIATOR LO
1727T
1728T
3944
3945
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0VDC IMU SERVO TEST INPUT LO
269
271
272
270
3529
3530
3531
3532
MASTER WARNING LAMP TEST
UP TELEMETRY ACCEPT
MASTER ALARM RESET
1708TW
1707T
1706T
3929
3942
3947
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
1700TW
1704T
1705T
3930
3946
3941
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
561TL
562TL
563TL
564TL
565TL
3338
3337
3336
3335
3334
STEPPER INTERRUPTER N.O.
1692TL
3220
SIGNAL CONDITIONER LEVEL 3
1696TL
3327
SIGNAL CONDITIONER LEVEL 2
1695TL
3226
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
1694TL
1697TL
3227
3228
STEPPER SOURCE VOLTAGE
1693TL
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
TELEMETRY SIGNALS
2101
5019
5020
5027
5024
5025
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5033
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5032
85
19
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17
33
14
58
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60
61
57
3
5 7
P5 510
AS
SEE
MPL
SAME AS EXAMPLE
P23
47
48
GNIC
P28
X29B
X29A
P27
X9A
X9B
PSA
1993
1994
1580
1581
1582
1583
682
683
684
685
TPA 2
1976
1991
1996
PSA
GNIC
1977
1997
1990
1251
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X1
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X58
X59
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X61
X62
X63
X64
X65
X66
X67
X68
X69
X70
SIGNAL CONDITIONER
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
B
2900206
B

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	RLP
B		REVISED PER TDRR 22006		7 SEP 65	LK

3H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ + +
- - -
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Cookman DATE 3 JUN 65
CHECKED Ed Foster 9 JUN 65
APPROVAL H Hodgson
APPROVAL
NASA APPROVAL
MIT APPROVAL

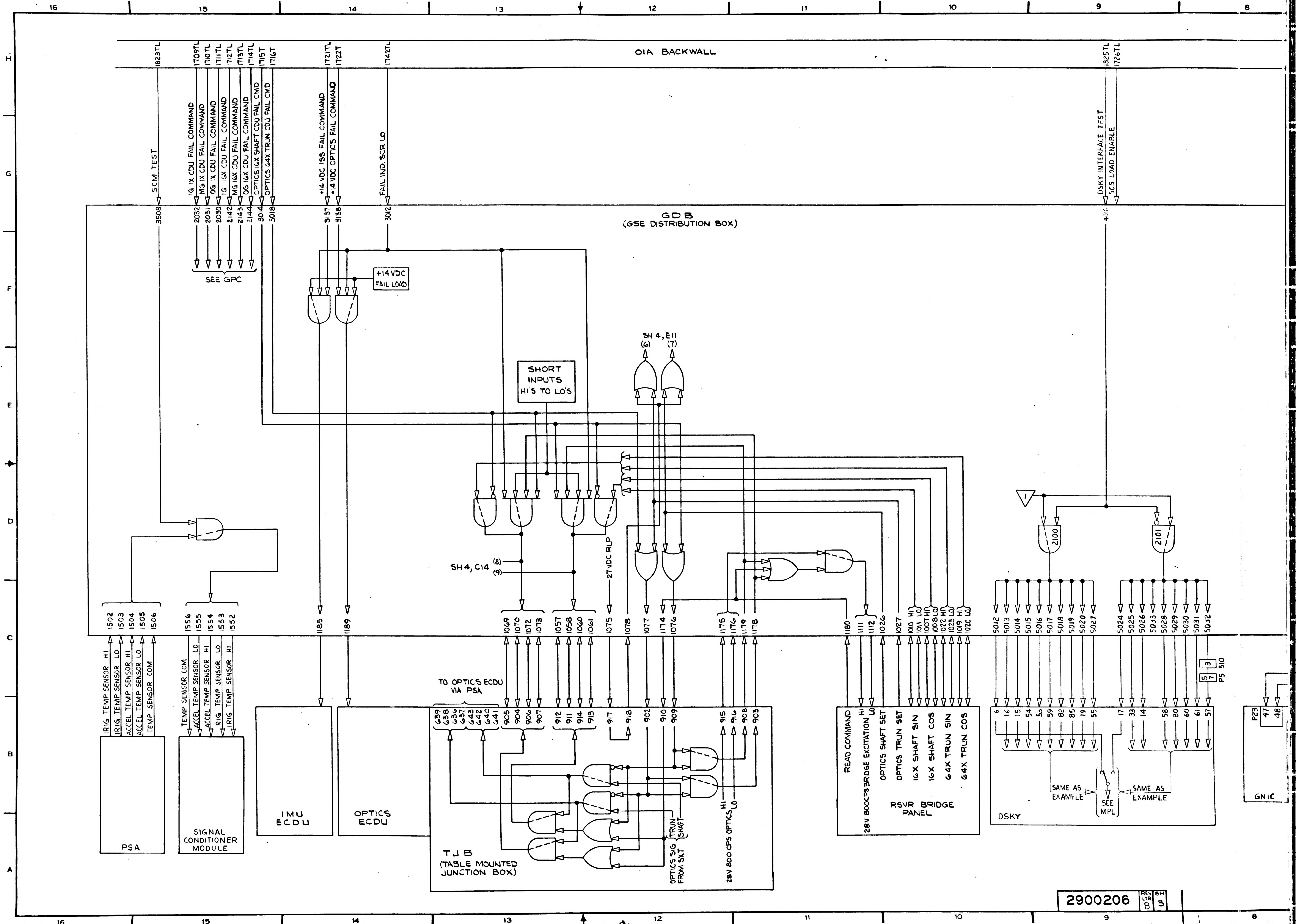
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
TEST SELECTOR
(BLOCK II)

CODE IDENT NO 99974
SIZE J_2
2900206
SCALE
SHEET 3 OF 4

2900206 REV LTR B SH 3

2729002 06



16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1823TL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715T
1716T
1721TL
1722T
1742TL
1825TL
1726TL
SCM TEST
IG 1X CDU FAIL COMMAND
MG 1X CDU FAIL COMMAND
OG 1X CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
+14 VDC ISS FAIL COMMAND
+14 VDC OPTICS FAIL COMMAND
FAIL IND. SCR LO
DSKY INTERFACE TEST
SCS LOAD ENABLE
GDB
(GSE DISTRIBUTION BOX)
3508
2032
2031
2030
2142
2143
2144
3014
3018
3137
3138
3012
4016
SEE GPC
+14 VDC FAIL LOAD
SHORT INPUTS HI'S TO LO'S
SH 4, E11
(6)
(7)
SH4, C14
(8)
(9)
27VDC RLP
1
2100
2101
1502
1503
1504
1505
1506
1556
1555
1554
1553
1552
1185
1189
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1077
1174
1076
1175
1176
1179
1178
1180
1111 HI
1112 LO
1026
1027
1010 HI
1011 LO
1007 HI
1008 LO
1022 HI
1023 LO
1019 HI
1020 LO
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
5024
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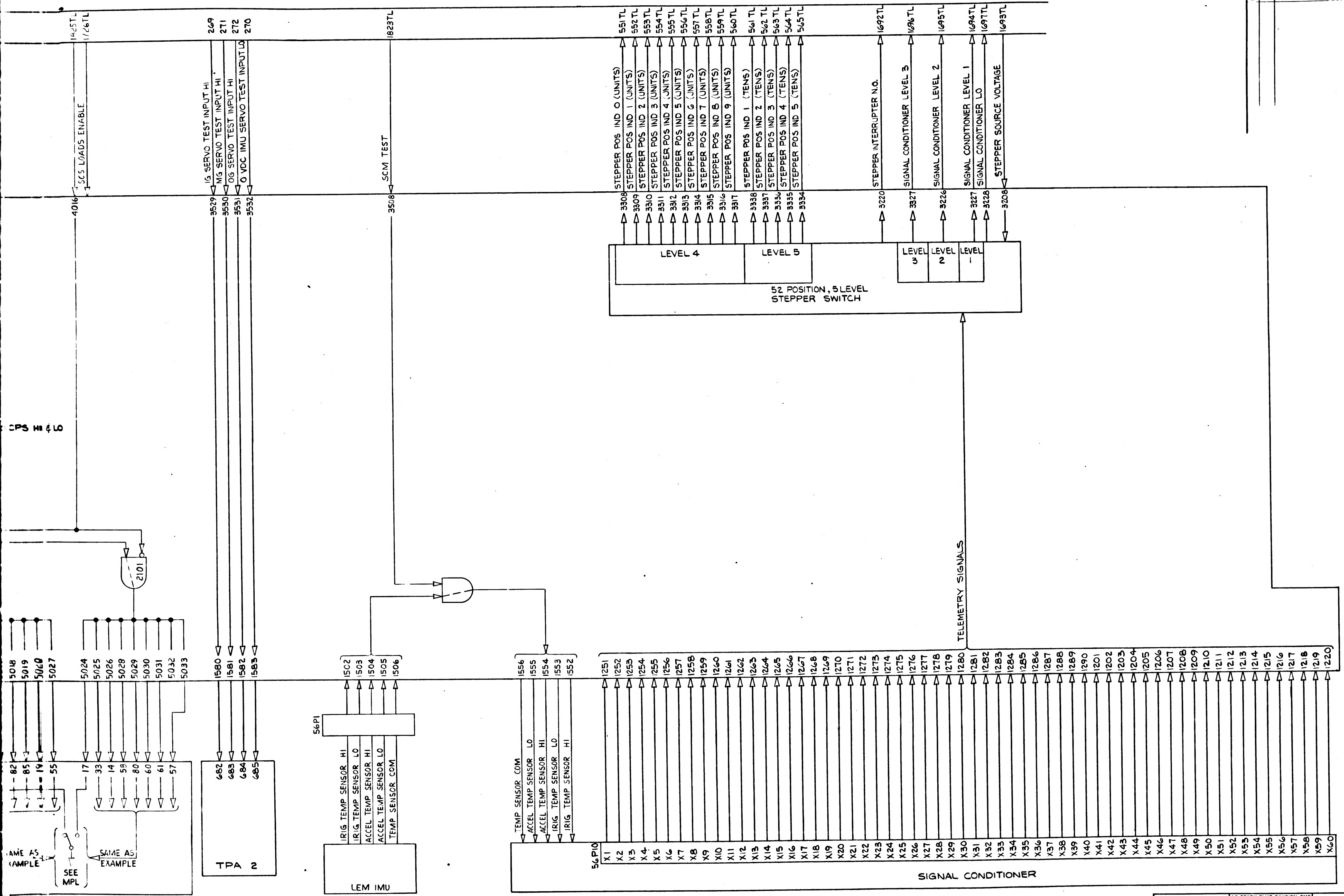
5029
5030
5031
5032
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
PSA
SIGNAL CONDITIONER MODULE
IMU ECDU
OPTICS ECDU
TO OPTICS ECDU VIA PSA
639
638
636
637
643
642
640
641
905
904
906
907
912
911
914
913
917
918
902
910
909
915
916
908
903
HI
LO
TRUN
SHAFT
OPTICS SIG FROM SXT
28V 800 CPS OPTICS
TJB
(TABLE MOUNTED JUNCTION BOX)
READ COMMAND
28V 800CPS BRIDGE EXCITATION HI LO
OPTICS SHAFT SET
OPTICS TRUN SET
16X SHAFT SIN
16X SHAFT COS
64X TRUN SIN
64X TRUN COS
RSVR BRIDGE PANEL
6
16
15
54
53
59
82
85
19
55
17
33
14
58
80
60
61
57
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
DSKY
3
3
5
7
P5 510
P23
47
48
GNIC

2900206 REV B SH 3

1/2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	RLP AU
b		REVISED PER TDRR 22006		7 SEP 65	EF


1925TL
1126TL
SCS LOADS ENABLE
4016
269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
O VDC IMU SERVO TEST INPUT LO
3529
3530
3531
3532
1823TL
SCM TEST
3508
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
561TL
562TL
563TL
564TL
565TL
1692TL
1696TL
1695TL
1694TL
1697TL
1693TL
STEPPER POS IND O (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3338
3337
3336
3335
3334
3220
3327
3226
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
CPS HI & LO
TELEMETRY SIGNALS
2101
5018
5019
5020
5027
5024
5025
5026
5028
5029
5030
5031
5032
5033
82
85
19
55
17
33
14
58
80
60
61
57
AME AS
AMPLE
SEE MPL
SAME AS EXAMPLE
1580
1581
1582
1583
682
683
684
685
TPA 2
1502
1503
1504
1505
1506
56P1
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
LEM IMU
1556
1555
1554
1553
1552
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220
56P10
X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21 X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38 X39 X40 X41 X42 X43 X44 X45 X46 X47 X48 X49 X50 X51 X52 X53 X54 X55 X56 X57 X58 X59 X60
SIGNAL CONDITIONER

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Lookman DATE 7 JUN 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

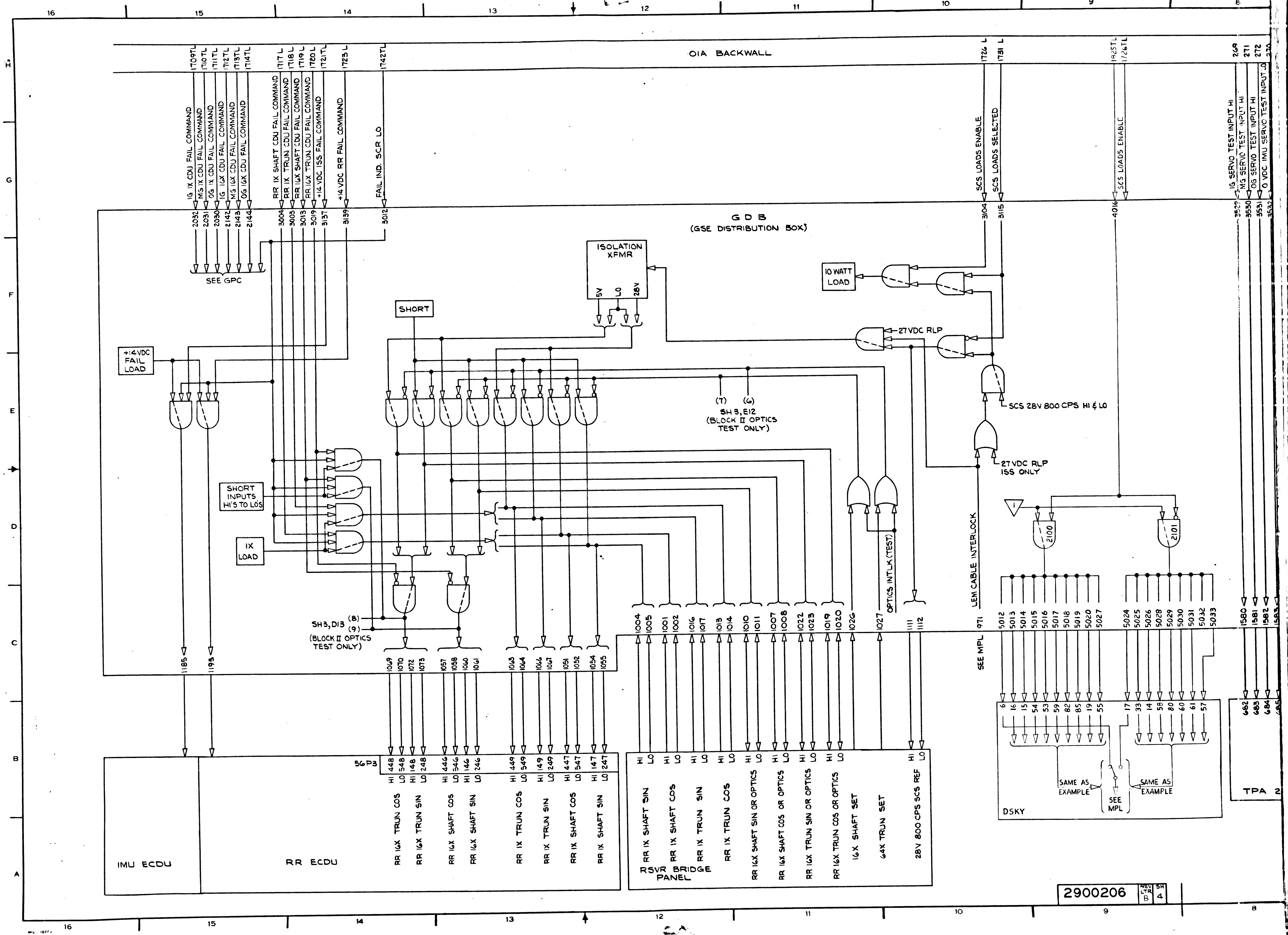
MANNED SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM-
TEST SELECTOR
(LEM)

CODE IDENT NO 99974
SIZE J_2
2900206
SCALE —
SHEET 4 OF 4

S.00508

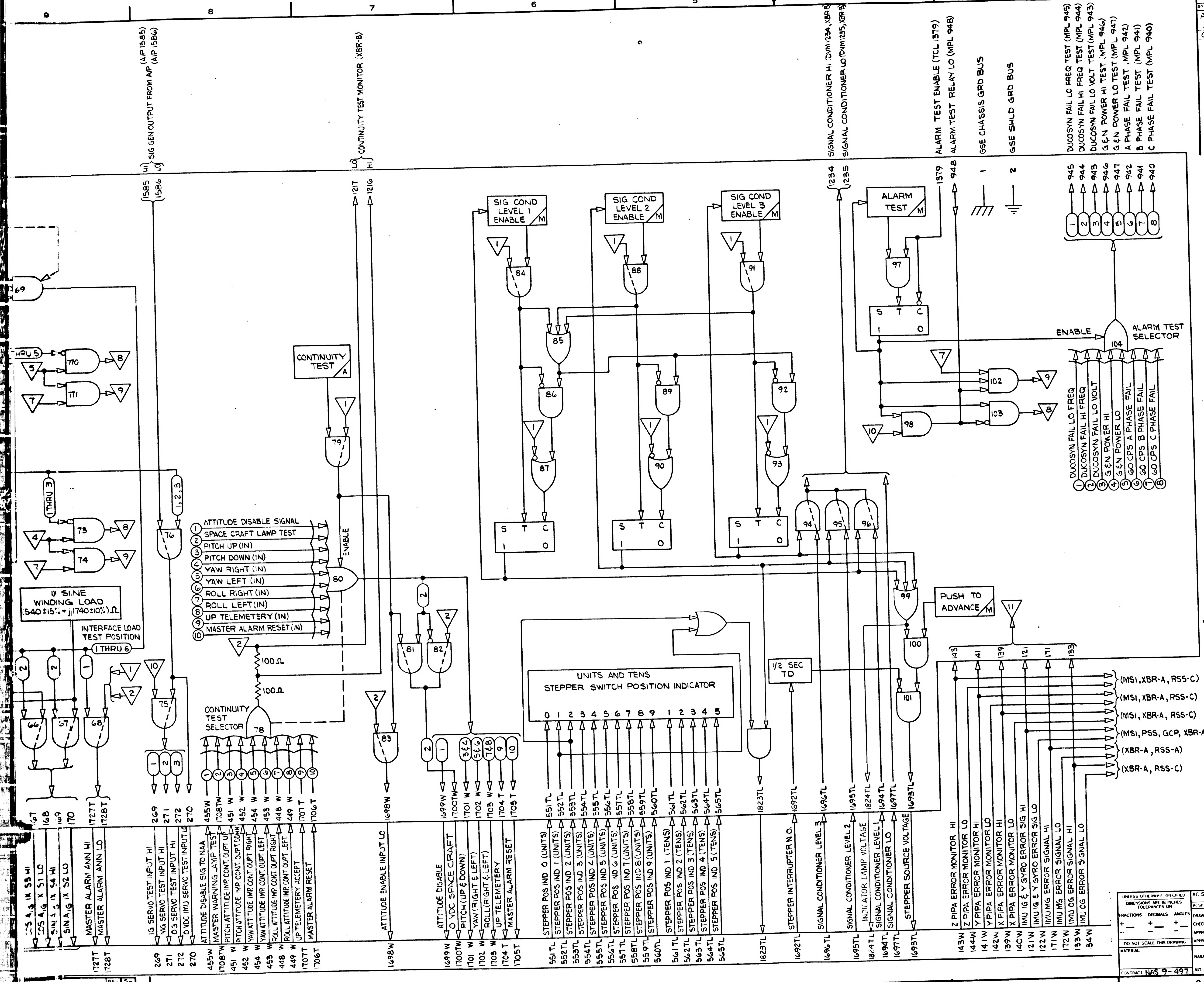
34



16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1717L
1718L
1719L
1720L
1721TL
1723L
1742TL
1726L
1731L
1725TL
1726TL
269
271
272
270
IG IX CDU FAIL COMMAND
MG IX CDU FAIL COMMAND
OG IX CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
RR IX SHAFT CDU FAIL COMMAND
RR IX TRUN CDU FAIL COMMAND
RR 16X SHAFT CDU FAIL COMMAND
RR 16X TRUN CDU FAIL COMMAND
+14 VDC ISS FAIL COMMAND
+14 VDC RR FAIL COMMAND
FAIL IND. SCR LO
SCS LOADS ENABLE
SCS LOADS SELECTED
SCS LOADS ENABLE
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
2032
2031
2030
2142
2143
2144
3004
3003
3013
3019
3131
3139
3012
3104
3115
4016
3529
3530
3531
3532
G D B
(GSE DISTRIBUTION BOX)
SEE GPC
ISOLATION XFMR
5V
LO
28V
10 WATT LOAD
27VDC RLP
SHORT
+14VDC FAIL LOAD
(7)
(6)
SH 3, E12
(BLOCK II OPTICS TEST ONLY)
SCS 28V 800 CPS HI & LO
27VDC RLP ISS ONLY
SHORT INPUTS HI'S TO LO'S
IX LOAD
1
2100
2101
LEM CABLE INTERLOCK
OPTICS INTLK (TEST)
SH3, D13
(8)
(9)
(BLOCK II OPTICS TEST ONLY)
1185
1193
1069
1070
1072
1073
1057
1058
1060
1061
1063
1064
1066
1067
1051
1052
1054
1055
1004
1005
1001
1002
1016
1017
1013
1014
1010
1011
1007
1008
1022
1023
1019
1020
1026
1027
1111
1112
SEE MPL
971
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
5024
5025
5026
5028
5029
5030
5031
5032
5033
1580
1581
1582
1583
6
16
15
54
53
59
82
85
19
55
17
33
14
58
80
60
61
57
682
683
684
685
56P3
448
548
148
248
446
546
146
246
449
549
149
249
447
547
147
247
HI
LO
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
RR IX TRUN COS
RR IX TRUN SIN
RR IX SHAFT COS
RR IX SHAFT SIN
IMU ECDU
RR ECDU
RR IX SHAFT SIN
RR IX SHAFT COS
RR IX TRUN SIN
RR IX TRUN COS
RR 16X SHAFT SIN OR OPTICS
RR 16X SHAFT COS OR OPTICS
RR 16X TRUN SIN OR OPTICS
RR 16X TRUN COS OR OPTICS
16X SHAFT SET
64X TRUN SET
28V 800 CPS SCS REF
RSVR BRIDGE PANEL
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
DSKY
TPA 2
2900206
REV LTR B
SH 4

1/2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	RLP AU
		REVISED PER TDRR 2[illegible]		7 SEP 65	LP
C		REVISED PER TDRR 22004		9 SEP 65	LP JMC



HI SIG GEN OUTPUT FROM AIP (AIP 1585)
LO (AIP 1586)
1585
1586
LO CONTINUITY TEST MONITOR (XBR-B)
HI
1217
1216
SIGNAL CONDITIONER HI (DVM1234, XBR-B)
SIGNAL CONDITIONER LO (DVM1235, XBR-B)
1234
1235
ALARM TEST ENABLE (TCL 1379)
ALARM TEST RELAY LO (MPL 948)
1379
948
GSE CHASSIS GRD BUS
1
GSE SHLD GRD BUS
2
DUCOSYN FAIL LO FREQ TEST (MPL 945)
DUCOSYN FAIL HI FREQ TEST (MPL 944)
DUCOSYN FAIL LO VOLT TEST (MPL 943)
G&N POWER HI TEST (MPL 946)
G&N POWER LO TEST (MPL 947)
A PHASE FAIL TEST (MPL 942)
B PHASE FAIL TEST (MPL 941)
C PHASE FAIL TEST (MPL 940)
945
944
943
946
947
942
941
940
SIG COND LEVEL 1 ENABLE M
SIG COND LEVEL 2 ENABLE M
SIG COND LEVEL 3 ENABLE M
ALARM TEST M
84
88
91
97
85
86
89
92
87
90
93
94
95
96
S T C 1 0
ENABLE
ALARM TEST SELECTOR
104
102
103
98
1
2
3
4
5
6
7
8
9
10
11
DUCOSYN FAIL LO FREQ
DUCOSYN FAIL HI FREQ
DUCOSYN FAIL LO VOLT
G&N POWER HI
G&N POWER LO
60 CPS A PHASE FAIL
60 CPS B PHASE FAIL
60 CPS C PHASE FAIL
69
THRU 5
770
771
THRU 3
1,2,3
73
74
76
CONTINUITY TEST A
79
80
ENABLE
ATTITUDE DISABLE SIGNAL
SPACE CRAFT LAMP TEST
PITCH UP (IN)
PITCH DOWN (IN)
YAW RIGHT (IN)
YAW LEFT (IN)
ROLL RIGHT (IN)
ROLL LEFT (IN)
UP TELEMETRY (IN)
MASTER ALARM RESET (IN)
1Y SINE WINDING LOAD (540±15% + j1740±10%) Ω
INTERFACE LOAD TEST POSITION
1 THRU 6
66
67
68
75
100Ω
100Ω
CONTINUITY TEST SELECTOR
78
81
82
83
3&4
5&6
7&8
99
PUSH TO ADVANCE M
100
101
1/2 SEC TD
UNITS AND TENS STEPPER SWITCH POSITION INDICATOR
0 1 2 3 4 5 6 7 8 9 1 2 3 4 5
143
141
139
121
171
133
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, PSS, GCP, XBR-A, RSS-A)
(XBR-A, RSS-A)
(XBR-A, RSS-C)
167 COS A_IG 1X 53 HI
168 COS A_IG X 51 LO
169 SIN A_IG 1X 54 HI
170 SIN A_IG 1X 52 LO
1727T MASTER ALARM ANN HI
1728T MASTER ALARM ANN LO
269 IG SERVO TEST INPUT HI
271 MG SERVO TEST INPUT HI
272 OG SERVO TEST INPUT HI
270 0 VDC IMU SERVO TEST INPUT LO
455W ATTITUDE DISABLE SIG TO NAA
1708TW MASTER WARNING AMP TEST
451 W PITCH ATTITUDE IMP. CONT. OUPT UP
452 W PITCH ATTITUDE IMP. CONT. OUPT DOWN
454 W YAW ATTITUDE IMP. CONT. OUPT RIGHT
453 W YAW ATTITUDE IMP. CONT. OUPT LEFT
448 W ROLL ATTITUDE IMP. CONT. OUPT RIGHT
449 W ROLL ATTITUDE IMP. CONT. OUPT LEFT
1707T UP TELEMETERY ACCEPT
1706T MASTER ALARM RESET
1698W ATTITUDE ENABLE INPUT LO
1699W ATTITUDE DISABLE
1700TW 0 VDC SPACE CRAFT
1701 W PITCH (UP & DOWN)
1702 W YAW (RIGHT & LEFT)
1703 W ROLL (RIGHT & LEFT)
1704 T UP TELEMETERY
1705 T MASTER ALARM RESET
551TL STEPPER POS IND 0 (UNITS)
552TL STEPPER POS IND 1 (UNITS)
553TL STEPPER POS IND 2 (UNITS)
554TL STEPPER POS IND 3 (UNITS)
555TL STEPPER POS IND 4 (UNITS)
556TL STEPPER POS IND 5 (UNITS)
557TL STEPPER POS IND 6 (UNITS)
558TL STEPPER POS IND 7 (UNITS)
559TL STEPPER POS IND 8 (UNITS)
560TL STEPPER POS IND 9 (UNITS)
561TL STEPPER POS IND 1 (TENS)
562TL STEPPER POS IND 2 (TENS)
563TL STEPPER POS IND 3 (TENS)
564TL STEPPER POS IND 4 (TENS)
565TL STEPPER POS IND 5 (TENS)
1823TL
1692TL STEPPER INTERRUPTER N.O.
1696TL SIGNAL CONDITIONER LEVEL 3
1695TL SIGNAL CONDITIONER LEVEL 2
1824TL INDICATOR LAMP VOLTAGE
1694TL SIGNAL CONDITIONER LEVEL 1
1697TL SIGNAL CONDITIONER LO
1693TL STEPPER SOURCE VOLTAGE
143W Z PIPA ERROR MONITOR HI
144W Z PIPA ERROR MONITOR LO
141W Y PIPA ERROR MONITOR HI
142W Y PIPA ERROR MONITOR LO
139W X PIPA ERROR MONITOR HI
140W X PIPA ERROR MONITOR LO
121W IMU IG & Y GYRO ERROR SIG HI
122W IMU IG & Y GYRO ERROR SIG LO
171W IMU MG ERROR SIGNAL HI
172W IMU MG ERROR SIGNAL LO
133W IMU OG ERROR SIGNAL HI
134W IMU OG ERROR SIGNAL LO

4+1

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Cookman DATE 24 MAY 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

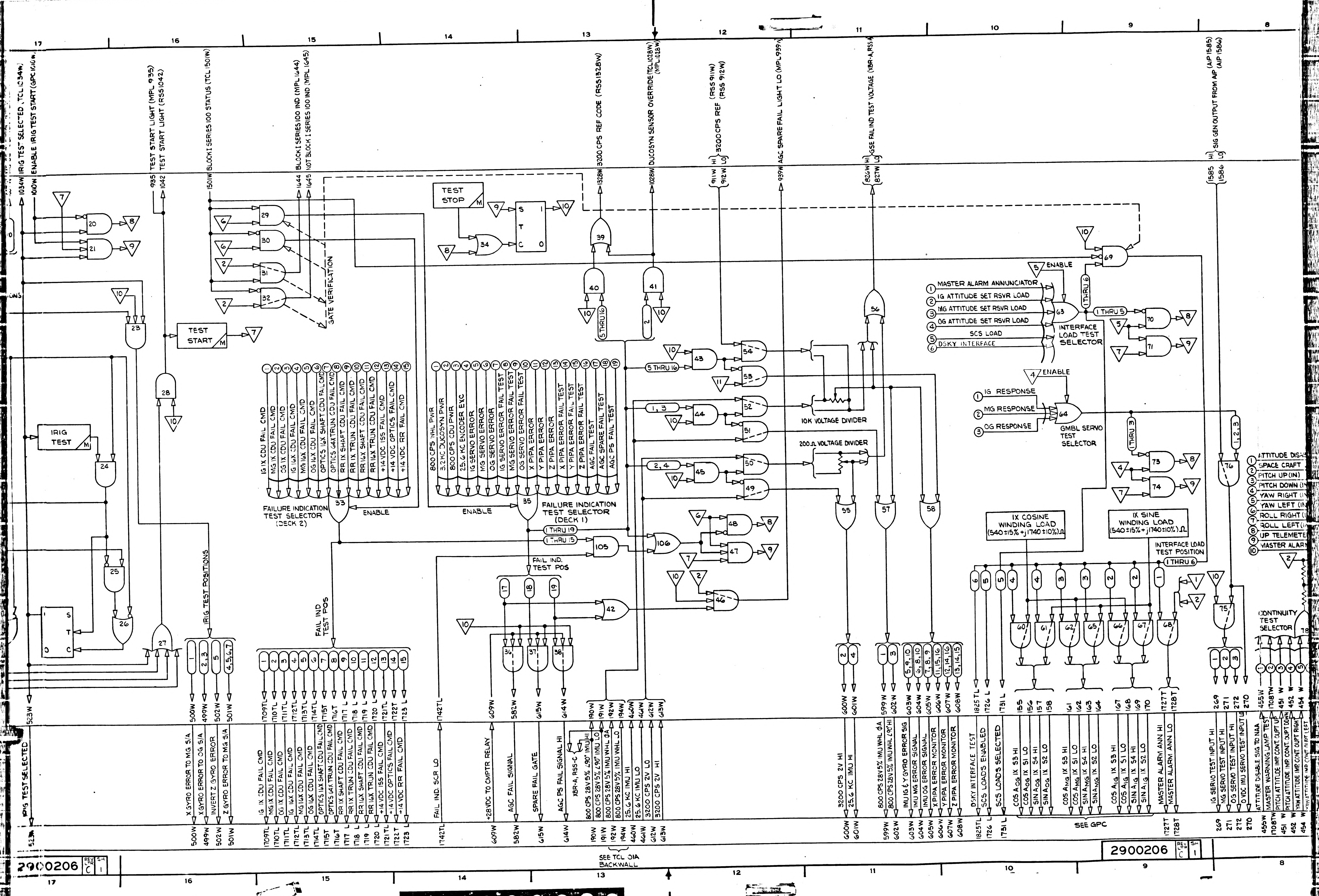
MECHANIZATION DIAGRAM- TEST SELECTOR (BLOCK I SERIES 100, BLOCK II & LEM)

CODE IDENT NO 99974
SIZE J3
2900206
SCALE —
SHEET 1 OF 4

2900206 REV C SH 1

2900206 C

3/2900206


17
16
15
14
13
12
11
10
9
8
1034W IRIG TEST SELECTED (TCL 1034W)
1010W ENABLE IRIG TEST START (GPC 1010W)
935 TEST START LIGHT (MPL 935)
1042 TEST START LIGHT (RSS 1042)
1501W BLOCK I SERIES 100 STATUS (TCL 1501W)
1644 BLOCK I SERIES 100 IND (MPL 1644)
1645 NOT BLOCK I SERIES 100 IND (MPL 1645)
1328W 3200 CPS REF CODE (RSS 1328W)
1028W DUCOSYN SENSOR OVERRIDE (TCL 1028W) (MPL 1028W)
911W HI 912W LO 3200 CPS REF (RSS 911W) (RSS 912W)
939W AGC SPARE FAIL LIGHT LO (MPL 939W)
826W HI 827W LO GSE FAIL IND TEST VOLTAGE (XBR-A, RSS-A)
1585 HI 1586 LO SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
TEST STOP
TEST START
IRIG TEST
S T C
S I T O C
GATE VERIFICATION
ENABLE
FAILURE INDICATION TEST SELECTOR (DECK 2)
FAILURE INDICATION TEST SELECTOR (DECK 1)
IG 1X CDU FAIL CMD
MG 1X CDU FAIL CMD
OG 1X CDU FAIL CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
RR 1X SHAFT CDU FAIL CMD
RR 1X TRUN CDU FAIL CMD
RR 16X SHAFT CDU FAIL CMD
RR 16X TRUN CDU FAIL CMD
+14 VDC ISS FAIL CMD
+14 VDC OPTICS FAIL CMD
+14 VDC RR FAIL CMD
800 CPS WHL PWR
3.2 KC DUCOSYN PWR
800 CPS CDU PWR
25.6 KC ENCODER EXC
IG SERVO ERROR
MG SERVO ERROR
OG SERVO ERROR
IG SERVO ERROR FAIL TEST
MG SERVO ERROR FAIL TEST
OG SERVO ERROR FAIL TEST
X PIPA ERROR
Y PIPA ERROR
Z PIPA ERROR
X PIPA ERROR FAIL TEST
Y PIPA ERROR FAIL TEST
Z PIPA ERROR FAIL TEST
AGC FAIL TEST
AGC SPARE FAIL TEST
AGC PS FAIL TEST
1 THRU 19
1 THRU 15
5 THRU 16
1, 3
2, 4
FAIL IND. TEST POS
FAIL IND TEST POS
IRIG TEST POSITIONS
10K VOLTAGE DIVIDER
200 Ω VOLTAGE DIVIDER
MASTER ALARM ANNUNCIATOR
IG ATTITUDE SET RSVR LOAD
MG ATTITUDE SET RSVR LOAD
OG ATTITUDE SET RSVR LOAD
SCS LOAD
DSKY INTERFACE
INTERFACE LOAD TEST SELECTOR
1 THRU 6
1 THRU 5
IG RESPONSE
MG RESPONSE
OG RESPONSE
GMBL SERVO TEST SELECTOR
1 THRU 3
1, 2, 3
ATTITUDE DIS
SPACE CRAFT
PITCH UP (IN)
PITCH DOWN (IN
YAW RIGHT (IN
YAW LEFT (IN
ROLL RIGHT (
ROLL LEFT (I
UP TELEMETE
MASTER ALAR
1X COSINE WINDING LOAD (540±15%+j1740±10%)Ω
1X SINE WINDING LOAD (540±15%+j1740±10%)Ω
INTERFACE LOAD TEST POSITION
CONTINUITY TEST SELECTOR
20 21 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 60 61 62 63 64 65 66 67 68 69 70 71 73 74 75 76 78 105 106
523W IRIG TEST SELECTED
500W X GYRO ERROR TO MG S/A
499W X GYRO ERROR TO OG S/A
502W INVERT Z GYRO ERROR
501W Z GYRO ERROR TO MG S/A
1709TL IG 1X CDU FAIL CMD
1710TL MG 1X CDU FAIL CMD
1711TL OG 1X CDU FAIL CMD
1712TL IG 16X CDU FAIL CMD
1713TL MG 16X CDU FAIL CMD
1714TL OG 16X CDU FAIL CMD
1715T OPTICS 16X SHAFT CDU FAIL CMD
1716T OPTICS 64X TRUN CDU FAIL CMD
1717 L RR 1X SHAFT CDU FAIL CMD
1718 L RR 1X TRUN CDU FAIL CMD
1719 L RR 16X SHAFT CDU FAIL CMD
1720 L RR 16X TRUN CDU FAIL CMD
1721TL +14 VDC ISS FAIL CMD
1722T +14 VDC OPTICS FAIL CMD
1723 L +14 VDC RR FAIL CMD
1742TL FAIL IND. SCR LO
609W +28 VDC TO CMPTR RELAY
582W AGC FAIL SIGNAL
615W SPARE FAIL GATE
614W AGC PS FAIL SIGNAL HI
XBR-A, RSS-C
190W 800 CPS 28V 5% ∠90° IMU HI
191W 800 CPS 28V 5% ∠90° IMU LO
192W 800 CPS 28V 5% IMU WHL ØA
194W 800 CPS 28V 5% IMU WHL ØB LO
460W 25.6 KC IMU HI
461W 25.6 KC IMU LO
612W 3200 CPS 2V LO
613W 3200 CPS 2V HI
SEE TCL 01A BACKWALL
600W 3200 CPS 2V HI
601W 25.6 KC IMU HI
599W 800 CPS 28V 5% IMU WHL ØA
602W 800 CPS 28V 5% IMU WHL ∠90° ØA
603W IMU IG & Y GYRO ERROR SIG
604W IMU MG ERROR SIGNAL
605W IMU OG ERROR SIGNAL
606W X PIPA ERROR MONITOR
607W Y PIPA ERROR MONITOR
608W Z PIPA ERROR MONITOR
5, 9, 10
6, 8, 10
7, 8, 9
11, 15, 16
12, 14, 16
13, 14, 15
1825TL DSKY INTERFACE TEST
1726 L SCS LOADS ENABLED
1731 L SCS LOADS SELECTED
155 COS A OG 1X S3 HI
156 COS A OG 1X S1 LO
157 SIN A OG 1X S4 HI
158 SIN A OG 1X S2 LO
161 COS A MG 1X S3 HI
162 COS A MG 1X S1 LO
163 SIN A MG 1X S4 HI
164 SIN A MG 1X S2 LO
167 COS A IG 1X S3 HI
168 COS A IG 1X S1 LO
169 SIN A IG 1X S4 HI
170 SIN A IG 1X S2 LO
SEE GPC
1727T MASTER ALARM ANN HI
1728T MASTER ALARM ANN LO
269 IG SERVO TEST INPUT HI
271 MG SERVO TEST INPUT HI
272 OG SERVO TEST INPUT HI
270 O VDC IMU SERVO TEST INPUT LO
455W ATTITUDE DISABLE SIG TO NAA
1108TW MASTER WARNING LAMP TEST
451 W PITCH ATTITUDE IMP CONT. OUPT UP
452 W PITCH ATTITUDE IMP CONT. OUPT DOWN
453 W YAW ATTITUDE IMP CONT. OUPT RIGHT
454 W YAW ATTITUDE IMP CONT. OUPT LEFT
2900206 REV C SH 1

2/2900206

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM)

2900210 RLP	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RELAY & LAMP POWER SUPPLY
2900208 PSS	POWER & DUMMY LOAD-PRIMARY SIGNAL SELECTOR (PDL) PRIMARY SIGNAL SELECTOR
2900223	GIMBAL POSITION CONTROL (GPC)
2900207	MONITOR PANEL (MPL)
2900202	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
2900217 XBR-A XBR-B DVM	SIGNAL SELECTION & MEASUREMENT CROSSBAR - AC SIGNALS CROSSBAR - DC SIGNALS DIGITAL VOLTMETER
2900218 RSS-A RSS-B RSS-C RSS-D	OSCILLOGRAPH SIGNAL SELECTION TO FIXED AC CHANNEL TO FIXED DC CHANNEL TO SWITCHABLE AC CHANNEL TO SWITCHABLE DC CHANNEL
2900215 RSS	MEASUREMENT REFERENCE POWER SUPPLIES OSCILLOGRAPH SIGNAL SELECTOR
2900211	AUXILIARY INPUT-OUTPUT & CALIBRATION (AIP)
2900212 MSI	PIPA & IRIG MONITORING PHASE SHIFT PANEL
2900200	GYRO CAGING PANEL (GCP)

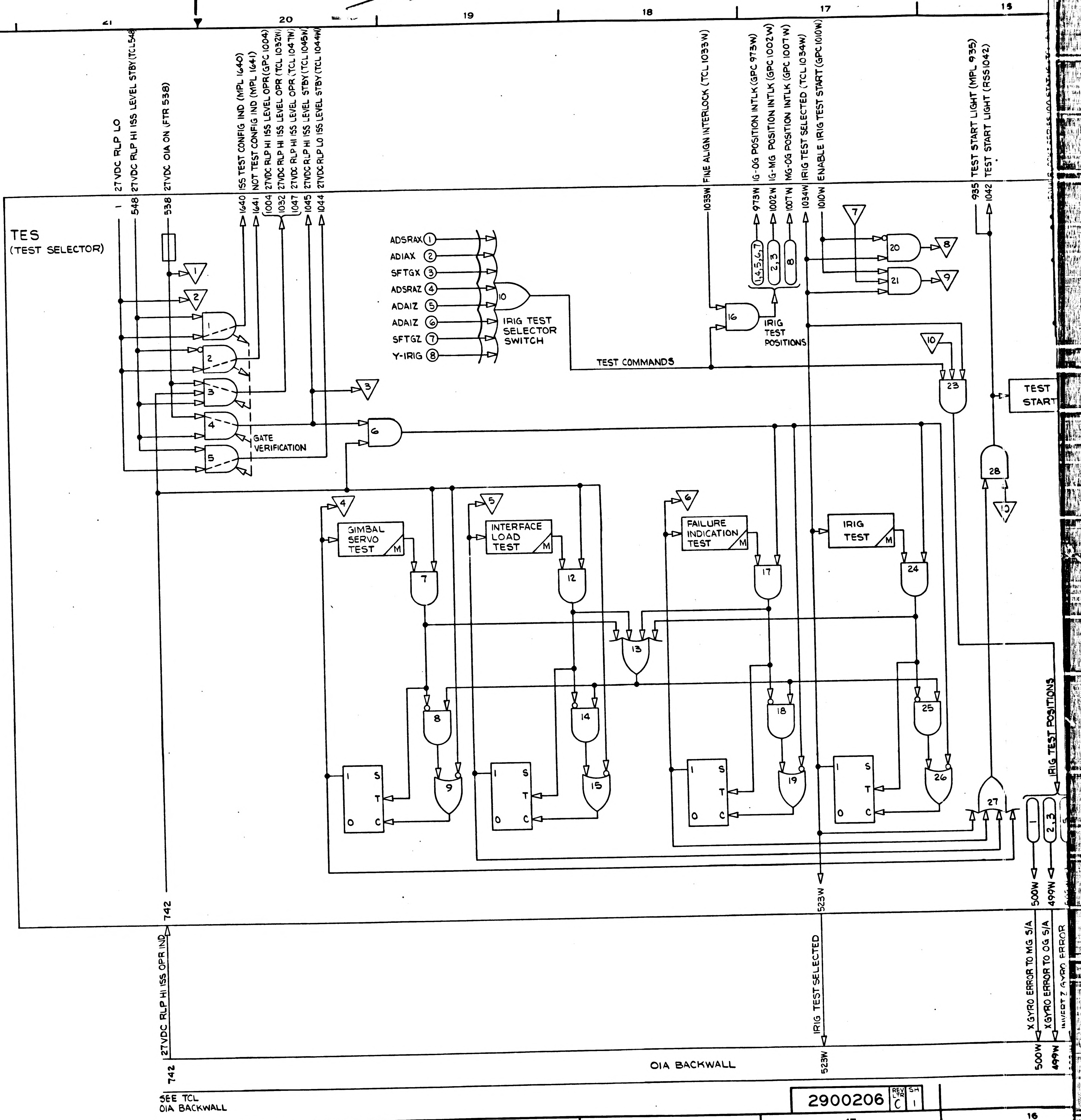
4. NONSTANDARD SYMBOLS

- INDICATES "AND" GATE WITH SWITCHED SIGNAL
- ① ② INDICATES EXCLUSIVE "OR" GATE WITH SWITCH POSITIONS 1 & 2
- NAME M — INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
- NAME A — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   A. W - BLOCK I SERIES 100 ONLY
   B. T - BLOCK II ONLY
   C. L - LEM ONLY
   D. BLANK - ALL G&N CONFIGURATIONS
   E. TW, TL, OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

6. SIGNAL REFERENCE

1 27 VDC OIA ON
2 27 VDC RLP LO
3 27 VDC ISS LEVEL STANDBY
4 GIMBAL SERVO TEST SELECTED
5 INTERFACE LOAD TEST SELECTED
6 FAILURE INDICATION TEST SELECTED
7 TEST START, BUTTON DEPRESSED
8 CLEAR
9 SET
10 TEST STARTED
11 IMU ERROR SIGNALS



21
20
19
18
17
16
TES
(TEST SELECTOR)
1 27 VDC RLP LO
548 27VDC RLP HI ISS LEVEL STBY (TCL548
538 27VDC OIA ON (FTR 538)
1640 ISS TEST CONFIG IND (MPL 1640)
1641 NOT TEST CONFIG IND (MPL 1641)
1004 27VDC RLP HI ISS LEVEL OPR (GPC 1004)
1032 27VDC RLP HI ISS LEVEL OPR (TCL 1032W)
1047 27VDC RLP HI ISS LEVEL OPR (TCL 1047W)
1045 27VDC RLP HI ISS LEVEL STBY (TCL 1045W)
1044 27VDC RLP LO ISS LEVEL STBY (TCL 1044W)
1033W FINE ALIGN INTERLOCK (TCL 1033W)
973W IG-OG POSITION INTLK (GPC 973W)
1002W IG-MG POSITION INTLK (GPC 1002W)
1007W MG-OG POSITION INTLK (GPC 1007W)
1034W IRIG TEST SELECTED (TCL 1034W)
1010W ENABLE IRIG TEST START (GPC 1010W)
935 TEST START LIGHT (MPL 935)
1042 TEST START LIGHT (RSS1042)
GATE VERIFICATION
ADSRAX 1
ADIAX 2
SFTGX 3
ADSRAZ 4
ADAIZ 5
ADAIZ 6
SFTGZ 7
Y-IRIG 8
IRIG TEST SELECTOR SWITCH
TEST COMMANDS
1,4,5,6,7
2,3
8
IRIG TEST POSITIONS
TEST START
GIMBAL SERVO TEST M
INTERFACE LOAD TEST M
FAILURE INDICATION TEST M
IRIG TEST M
1 S T 0 C
IRIG TEST POSITIONS
1
2,3
742
27VDC RLP HI ISS OPR IND
523W
IRIG TEST SELECTED
500W X GYRO ERROR TO MG S/A
499W X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
OIA BACKWALL
SEE TCL OIA BACKWALL

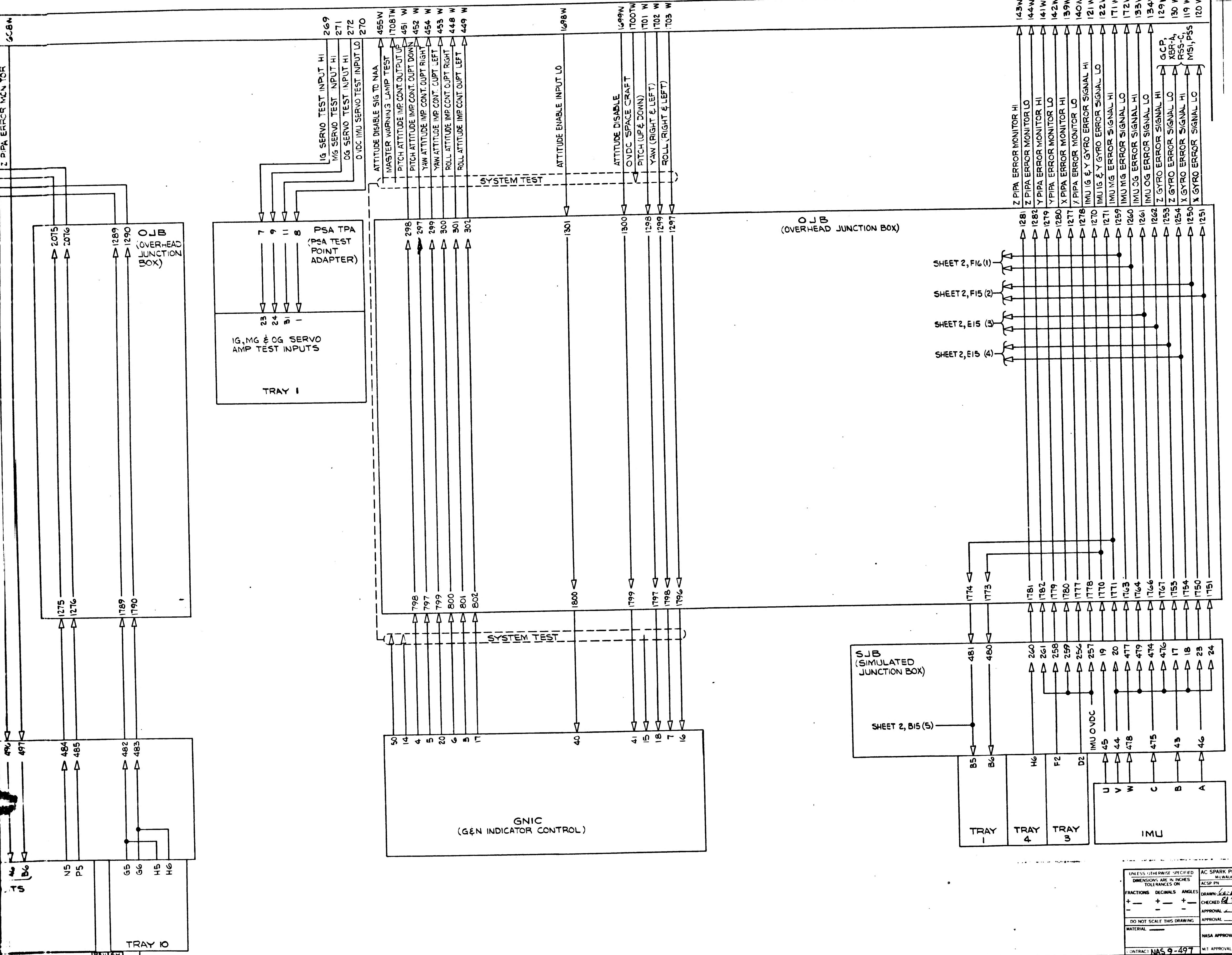
2900206 REV LTR C SH 1

MIL FORM 1050 J3

1/2900206

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		1 SEP 65	RLP AV
B		REVISION STATUS CHANGED		7 SEP 65	LK
C		REVISION STATUS CHANGED		9 SEP 65	LK JRC



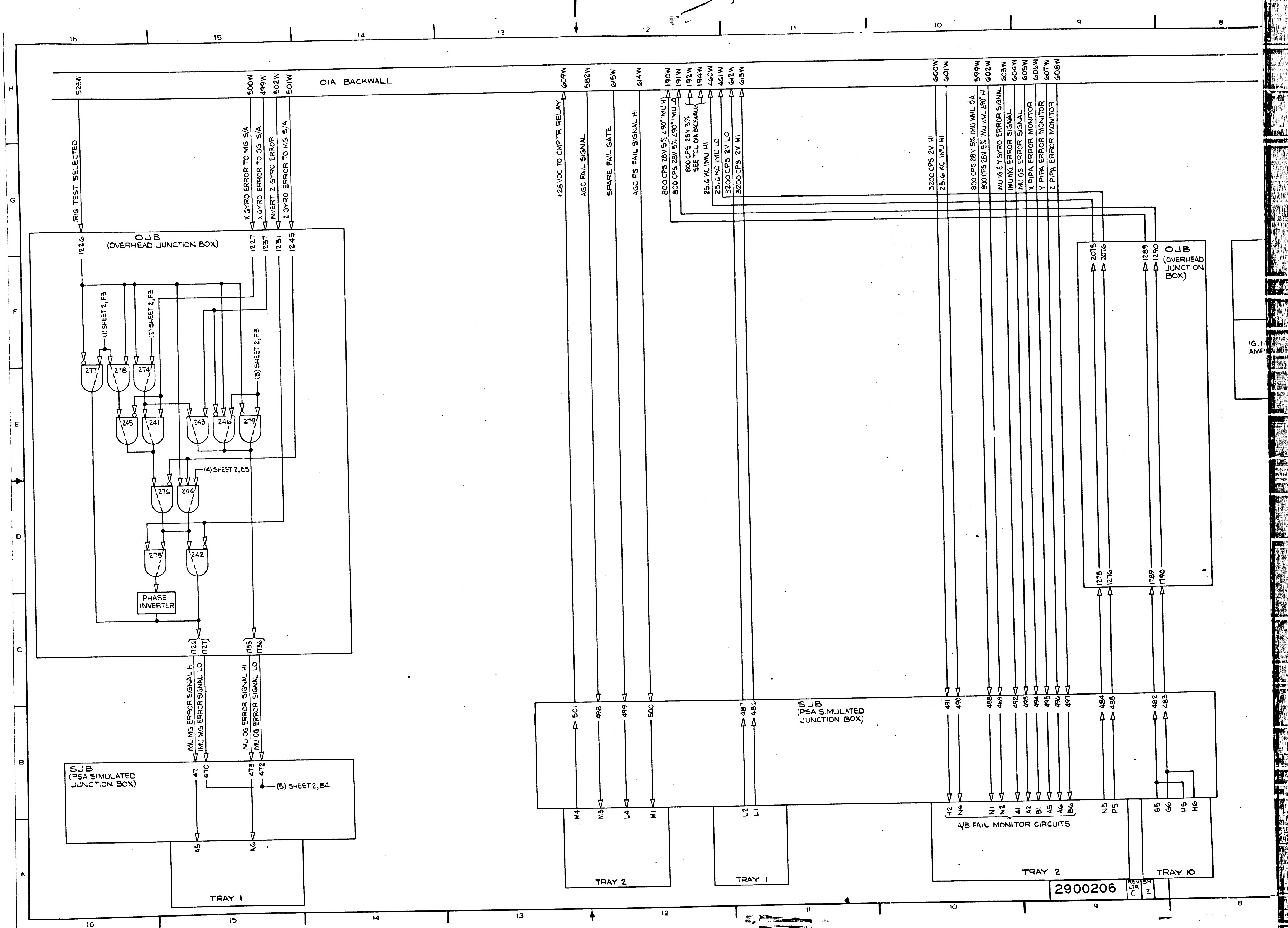
Z PIPA ERROR MONITOR
1268W
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
269
271
272
270
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUTPUT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
455W
1708TW
451 W
452 W
454 W
453 W
448 W
449 W
ATTITUDE ENABLE INPUT LO
1698W
ATTITUDE DISABLE
0VDC SPACE CRAFT
PITCH (UP & DOWN)
YAW (RIGHT & LEFT)
ROLL (RIGHT & LEFT)
1699W
1700TW
1701 W
1702 W
1703 W
SYSTEM TEST
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIGNAL HI
IMU IG & Y GYRO ERROR SIGNAL LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
Z GYRO ERROR SIGNAL HI
Z GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
X GYRO ERROR SIGNAL LO
143W
144W
141W
142W
139W
140W
121W
122W
171W
172W
133W
134W
129W
130 W
119 W
120 W
GCP, XBR-A, RSS-C, MSI, PSS
OJB (OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1789
1790
PSA TPA (PSA TEST POINT ADAPTER)
7
9
11
8
23
24
31
1
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
OJB
(OVERHEAD JUNCTION BOX)
298
297
299
300
301
302
1301
1300
1298
1299
1297
798
797
799
800
801
802
1800
1799
1797
1798
1796
1281
1282
1279
1280
1277
1278
1270
1271
1259
1260
1261
1262
1253
1254
1250
1251
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (3)
SHEET 2, E15 (4)
1774
1773
1781
1782
1779
1780
1777
1778
1770
1771
1763
1764
1766
1767
1753
1754
1750
1751
SJB
(SIMULATED JUNCTION BOX)
481
480
260
261
258
259
256
257
19
20
477
479
474
476
17
18
23
24
SHEET 2, B15 (5)
IMU 0VDC
45
44
478
475
43
46
B5
B6
H6
F2
D2
TRAY 1
TRAY 4
TRAY 3
U
V
W
C
B
A
IMU
50
14
4
5
20
6
3
17
40
41
15
18
7
16
GNIC
(G&N INDICATOR CONTROL)
496
497
484
485
482
483
B6
N5
P5
G5
G6
H5
H6
TS
TRAY 10

3H

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + — + — + — − − −	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
	ACSP PN	
	DRAWN Cochran DATE 26 MAY 65 CHECKED Ed Foster 9 JUN 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK I SERIES 100)
DO NOT SCALE THIS DRAWING		
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974 SIZE J2 2900206
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — SHEET 2 OF 4

2900206 REV LTR C SH 2

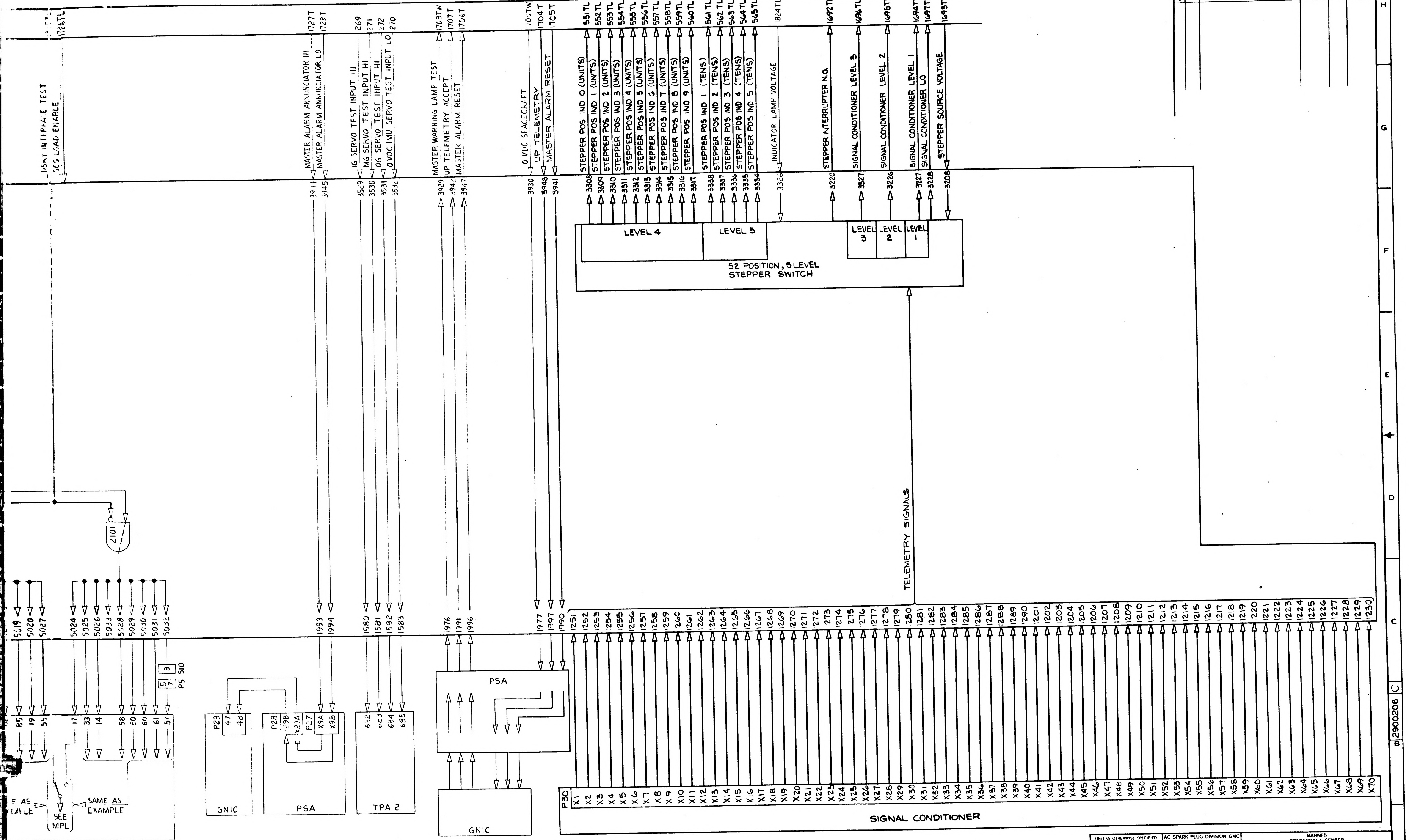
2/2900206


OIA BACKWALL
523W
500W
499W
502W
501W
IRIG TEST SELECTED
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
OJB (OVERHEAD JUNCTION BOX)
1226
1227
1237
1231
1245
(1) SHEET 2, F3
(2) SHEET 2, F3
(3) SHEET 2, F3
277
278
274
245
241
243
246
279
(4) SHEET 2, E3
276
244
275
242
PHASE INVERTER
1726
1727
1735
1736
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
SJB (PSA SIMULATED JUNCTION BOX)
471
470
473
472
(5) SHEET 2, B4
A5
A6
TRAY 1
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5% SEE TCL OIA BACKWALL
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ϕA
800 CPS 28V 5% IMU WHL ∠90° HI
IMU IG & Y GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
OJB (OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1789
1790
IG, I
AMP
SJB (PSA SIMULATED JUNCTION BOX)
501
498
499
500
487
486
491
490
488
489
492
493
494
495
496
497
484
485
482
483
M4
M3
L4
M1
TRAY 2
L2
L1
TRAY 1
H2
N4
N1
N2
A1
A2
B1
A5
A6
B6
N5
P5
G5
G6
H5
H6
A/B FAIL MONITOR CIRCUITS
TRAY 2
TRAY 10
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

2900206 REV C SH 2

1/2900206

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1SEP 65	RLP
B		REVISED PER TDRR 22006		65	
C		REVISED PER TDRR 22004		SEP 65	LK

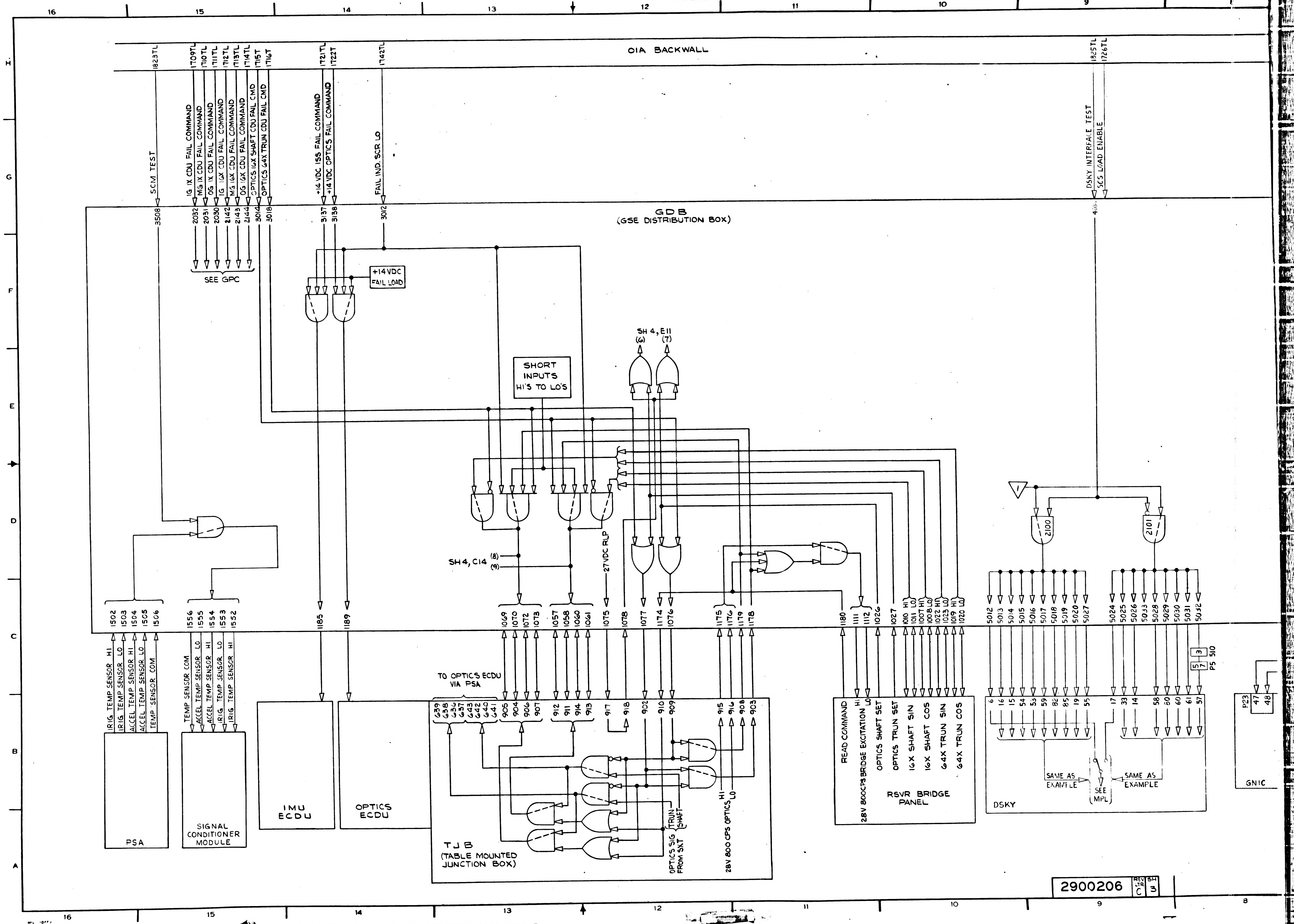

DSKY INTERFACE TEST
CS LOAD ENABLE
MASTER ALARM ANNUNCIATOR HI
MASTER ALARM ANNUNCIATOR LO
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
OVDC IMU SERVO TEST INPUT LO
MASTER WARNING LAMP TEST
UP TELEMETRY ACCEPT
MASTER ALARM RESET
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LAMP VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
1727T 1728T 269 271 272 270 1763TW 1707T 1706T 1703TW 1704T 1705T
551TL 552TL 553TL 554TL 555TL 556TL 557TL 558TL 559TL 560TL 561TL 562TL 563TL 564TL 565TL 1824TL 1692TL 1696TL 1695TL 1694TL 1697TL 1693TL
3914 3945 3529 3530 3531 3532 3929 3942 3947 3930 3948 3941
3308 3309 3310 3311 3312 3313 3314 3315 3316 3317 3338 3337 3336 3335 3334 3326 3220 3327 3226 3127 3128 3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL
STEPPER SWITCH
TELEMETRY SIGNALS
2101
5019 5020 5027 5024 5025 5026 5033 5028 5029 5030 5031 5032
1993 1994 1580 1581 1582 1583 1976 1991 1996 1977 1997 1990
1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220 1221 1222 1223 1224 1225 1226 1227 1228 1229 1230
5 7 3 PS 510
85 19 55 17 33 14 58 80 60 61 57
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
P23 47 48
GNIC
P28 X96 X27A P27 X9A X9B
PSA
682 683 684 685
TPA 2
PSA
GNIC
P30 X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21 X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38 X39 X40 X41 X42 X43 X44 X45 X46 X47 X48 X49 X50 X51 X52 X53 X54 X55 X56 X57 X58 X59 X60 X61 X62 X63 X64 X65 X66 X67 X68 X69 X70
SIGNAL CONDITIONER
9 8 7 6 5 4 3 2 1
H G F E D C B A

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN	
MATERIAL	DRAWN Lookman DATE 3 JUN 65 CHECKED Ed Foster 9 JUN 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM- TEST SELECTOR (BLOCK II)
	NASA APPROVAL MIT APPROVAL	CODE IDENT NO 99974 · SIZE J2 · 2900206
CONTRACT NAS9-497		SCALE · SHEET 3 OF 4

2900206 REV C SH 3

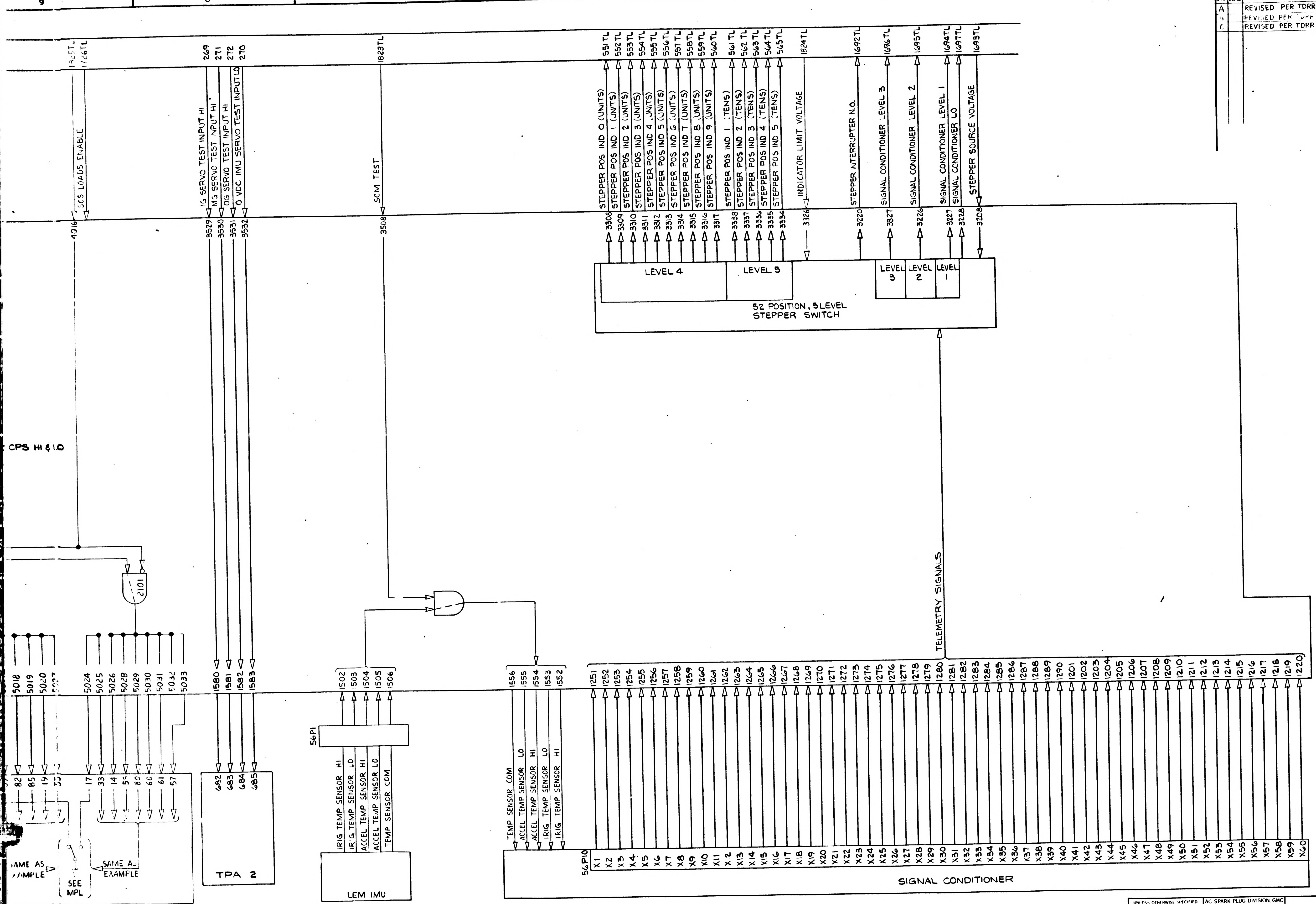
3N

2/72900206


OIA BACKWALL
1823TL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715T
1716T
1721TL
1722T
1742TL
1825TL
1826TL
SCM TEST
IG IX CDU FAIL COMMAND
MG IX CDU FAIL COMMAND
OG IX CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
+14 VDC ISS FAIL COMMAND
+14 VDC OPTICS FAIL COMMAND
FAIL IND. SCR LO
DSKY INTERFACE TEST
SCS LOAD ENABLE
GDB
(GSE DISTRIBUTION BOX)
3508
2032
2031
2030
2142
2143
2144
3014
3018
3137
3138
3012
SEE GPC
+14 VDC FAIL LOAD
SHORT INPUTS HI'S TO LO'S
SH 4, E11
(6)
(7)
SH 4, C14
(8)
(9)
27VDC RLP
2100
2101
1502
1503
1504
1505
1506
1556
1555
1554
1553
1552
1185
1189
1069
1070
1072
1073
1057
1058
1060
1061
1075
1078
1077
1174
1076
1175
1176
1179
1178
1180
1111
1112
1026
1027
1010 HI
1011 LO
1007 HI
1008 LO
1022 HI
1023 LO
1019 HI
1020 LO
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
5024
5025
5026
5033
5028
5029
5030
5031
5032
3
5
7
P5 510
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
PSA
SIGNAL CONDITIONER MODULE
IMU ECDU
OPTICS ECDU
TO OPTICS ECDU VIA PSA
639
638
636
637
643
642
640
641
905
904
906
907
912
911
914
913
917
918
902
910
909
915
916
908
903
OPTICS SIG FROM SXT
TRUN
SHAFT
28V 800 CPS OPTICS
HI
LO
TJB
(TABLE MOUNTED JUNCTION BOX)
READ COMMAND
28V 800CPS BRIDGE EXCITATION
HI
LO
OPTICS SHAFT SET
OPTICS TRUN SET
16X SHAFT SIN
16X SHAFT COS
64X TRUN SIN
64X TRUN COS
RSVR BRIDGE PANEL
6
16
15
54
53
59
82
85
19
55
17
33
14
58
60
60
61
57
SAME AS EXAMPLE
SAME AS EXAMPLE
SEE MPL
DSKY
P23
47
48
GNIC
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
2900206
REV LTR C
SH 3

1/2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	RLP AU
B		REVISED PER TDRR 22006			EI
C		REVISED PER TDRR 22004		1 SEP 65	LK JHC


1125TL-1126TL
SCS LOADS ENABLE
4016
269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
3529
3530
3531
3532
1823TL
SCM TEST
3508
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
561TL
562TL
563TL
564TL
565TL
1824TL
1692TL
1696TL
1695TL
1694TL
1697TL
1693TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LIMIT VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3338
3337
3336
3335
3334
3326
3220
3327
3226
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL
STEPPER SWITCH
CPS HI & LO
2101
TELEMETRY SIGNALS
5018
5019
5020
5027
5024
5025
5026
5028
5029
5030
5031
5032
5033
82
85
19
55
17
33
14
55
80
60
61
57
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
1580
1581
1582
1583
682
683
684
685
TPA 2
1502
1503
1504
1505
1506
56P1
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
LEM IMU
1556
1555
1554
1553
1552
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
56P10
1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220
X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21 X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38 X39 X40 X41 X42 X43 X44 X45 X46 X47 X48 X49 X50 X51 X52 X53 X54 X55 X56 X57 X58 X59 X60
SIGNAL CONDITIONER

34

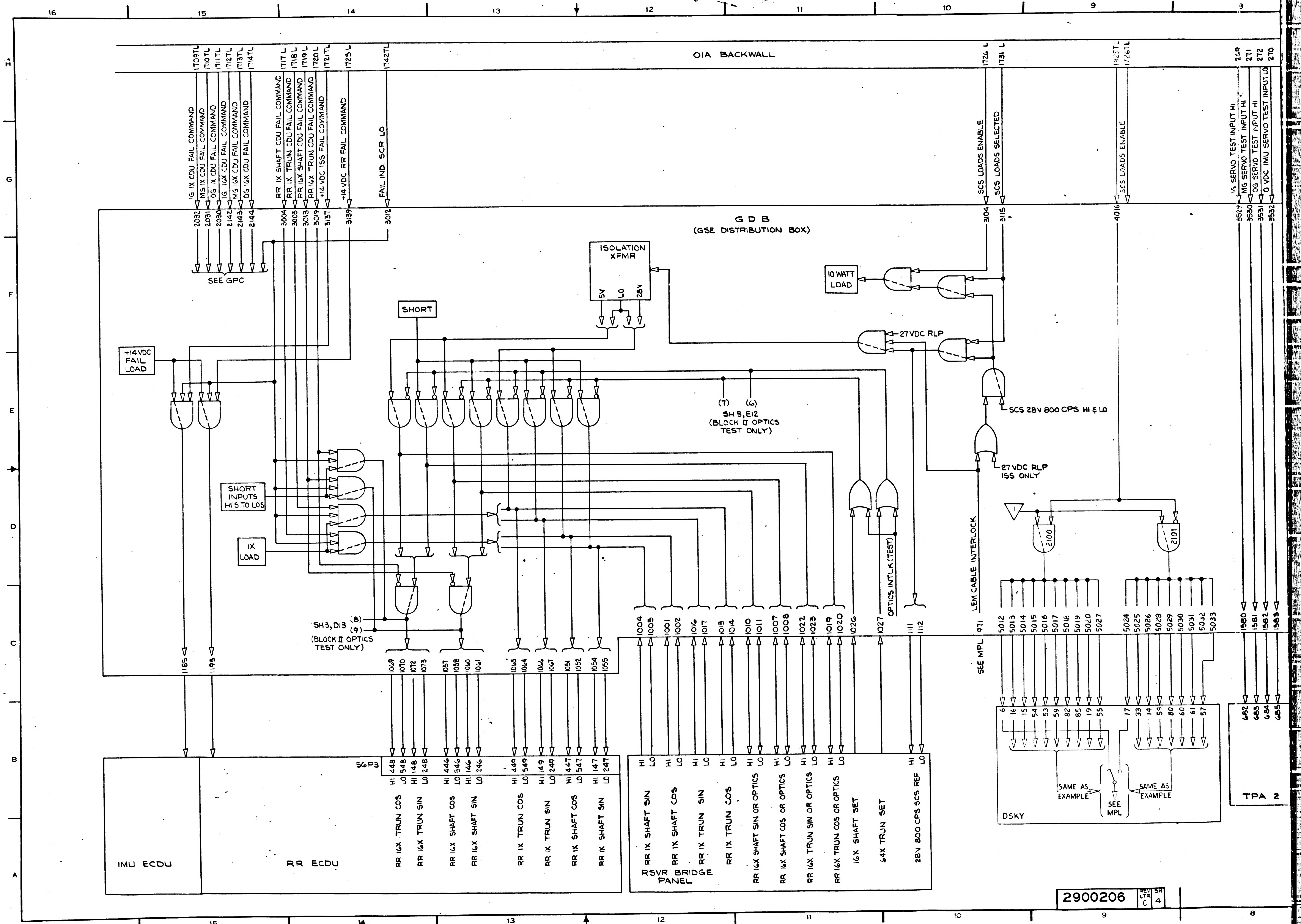
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± —— DECIMALS ± —— ANGLES ± ——
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Lookman DATE 7 JUN 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

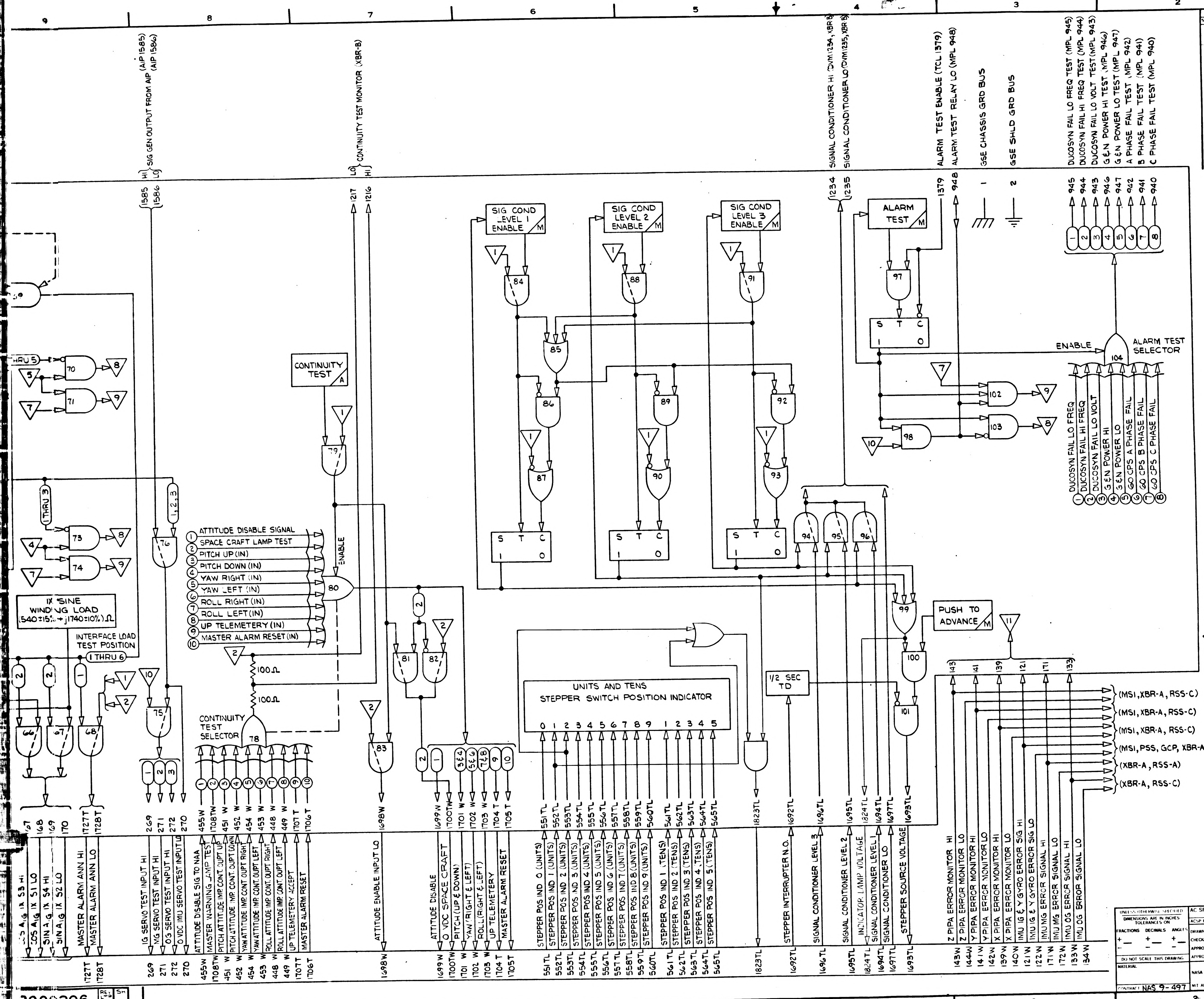
MECHANIZATION DIAGRAM-
TEST SELECTOR
(LEM)

CODE IDENT NO 99974 SIZE J2 2900206
SCALE —— SHEET 4 OF 4


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1717 L
1718 L
1719 L
1720 L
1721TL
1723 L
1742TL
1726 L
1731 L
1725T
1726TL
269
271
272
270
IG IX CDU FAIL COMMAND
MG IX CDU FAIL COMMAND
OG IX CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
RR IX SHAFT CDU FAIL COMMAND
RR IX TRUN CDU FAIL COMMAND
RR 16X SHAFT CDU FAIL COMMAND
RR 16X TRUN CDU FAIL COMMAND
+14 VDC ISS FAIL COMMAND
+14 VDC RR FAIL COMMAND
FAIL IND. SCR LO
SCS LOADS ENABLE
SCS LOADS SELECTED
SCS LOADS ENABLE
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
2032
2031
2030
2142
2143
2144
3006
3005
3013
3019
3137
3139
3012
3104
3115
4016
3529
3530
3531
3532
GDB
(GSE DISTRIBUTION BOX)
SEE GPC
ISOLATION XFMR
5V
LO
28V
10 WATT LOAD
27VDC RLP
SHORT
+14VDC FAIL LOAD
(7)
(6)
SH 3, E12
(BLOCK II OPTICS TEST ONLY)
SCS 28V 800 CPS HI & LO
27VDC RLP ISS ONLY
SHORT INPUTS HI'S TO LOS
IX LOAD
1
2100
2101
LEM CABLE INTERLOCK
OPTICS INTLK (TEST)
SH3, D13
(8)
(9)
(BLOCK II OPTICS TEST ONLY)
1185
1193
1069
1070
1072
1073
1057
1058
1060
1061
1063
1064
1066
1067
1051
1052
1054
1055
1004
1005
1001
1002
1016
1017
1013
1014
1010
1011
1007
1008
1022
1023
1019
1020
1026
1027
1111
1112
971
SEE MPL
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
5024
5025
5026
5028
5029
5030
5031
5032
5033
1580
1581
1582
1583
56P3
448
548
148
248
446
546
146
246
449
549
149
249
447
547
147
247
HI
LO
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
RR IX TRUN COS
RR IX TRUN SIN
RR IX SHAFT COS
RR IX SHAFT SIN
IMU ECDU
RR ECDU
RR IX SHAFT SIN
RR IX SHAFT COS
RR IX TRUN SIN
RR IX TRUN COS
RR 16X SHAFT SIN OR OPTICS
RR 16X SHAFT COS OR OPTICS
RR 16X TRUN SIN OR OPTICS
RR 16X TRUN COS OR OPTICS
16X SHAFT SET
64X TRUN SET
28V 800 CPS SCS REF
RSVR BRIDGE PANEL
6
16
15
54
53
59
82
85
19
55
17
33
14
59
80
60
61
57
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
DSKY
682
683
684
685
TPA 2
2900206
REV LTR C
SH 4

321

SYM	ZONE	DESCRIPTION		DATE	APPR
A		REVISED PER TDRR 21965		65	AU
		REVISED PER TDRR 2[illegible]			
C		REVISED PER TDRR [illegible]004			
D		REVISED PER TDRR 2[illegible]005		10	AU



SIG GEN OUTPUT FROM AIP HI (AIP 1585) LO (AIP 1586)
1585 1586
CONTINUITY TEST MONITOR (XBR-B) LO HI
1217 1216
SIGNAL CONDITIONER HI (DVM 1234, XBR-B)
SIGNAL CONDITIONER LO (DVM 1235, XBR-B)
1234 1235
ALARM TEST ENABLE (TCL 1379)
ALARM TEST RELAY LO (MPL 948)
GSE CHASSIS GRD BUS
GSE SHLD GRD BUS
1379 948 1 2
DUCOSYN FAIL LO FREQ TEST (MPL 945)
DUCOSYN FAIL HI FREQ TEST (MPL 944)
DUCOSYN FAIL LO VOLT TEST (MPL 943)
G & N POWER HI TEST (MPL 946)
G & N POWER LO TEST (MPL 947)
A PHASE FAIL TEST (MPL 942)
B PHASE FAIL TEST (MPL 941)
C PHASE FAIL TEST (MPL 940)
945 944 943 946 947 942 941 940
SIG COND LEVEL 1 ENABLE M
SIG COND LEVEL 2 ENABLE M
SIG COND LEVEL 3 ENABLE M
ALARM TEST M
84 88 91 97 85 86 87 89 90 92 93 94 95 96 99 100 101
S T C 1 0
ENABLE
ALARM TEST SELECTOR
104
102 103 98
DUCOSYN FAIL LO FREQ
DUCOSYN FAIL HI FREQ
DUCOSYN FAIL LO VOLT
G & N POWER HI
G & N POWER LO
60 CPS A PHASE FAIL
60 CPS B PHASE FAIL
60 CPS C PHASE FAIL
THRU 5
70 71 73 74
THRU 3
1,2,3
76
IX SINE WINDING LOAD (540±15% + j1740±10%) Ω
INTERFACE LOAD TEST POSITION
1 THRU 6
CONTINUITY TEST A
79
ENABLE
ATTITUDE DISABLE SIGNAL
SPACE CRAFT LAMP TEST
PITCH UP (IN)
PITCH DOWN (IN)
YAW RIGHT (IN)
YAW LEFT (IN)
ROLL RIGHT (IN)
ROLL LEFT (IN)
UP TELEMETERY (IN)
MASTER ALARM RESET (IN)
80
100Ω
100Ω
CONTINUITY TEST SELECTOR
78
81 82 83
3&4 5&6 7&8 9 10
66 67 68 75
PUSH TO ADVANCE M
1/2 SEC TD
UNITS AND TENS STEPPER SWITCH POSITION INDICATOR
0 1 2 3 4 5 6 7 8 9 1 2 3 4 5
143 141 139 121 171 133
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, PSS, GCP, XBR-A, RSS-A)
(XBR-A, RSS-A)
(XBR-A, RSS-C)
167 168 169 170
COS A_{IG} IX S3 HI
COS A_{IG} IX S1 LO
SIN A_{IG} IX S4 HI
SIN A_{IG} IX S2 LO
1727T MASTER ALARM ANN HI
1728T MASTER ALARM ANN LO
269 IG SERVO TEST INPUT HI
271 MG SERVO TEST INPUT HI
272 OG SERVO TEST INPUT HI
270 0 VDC IMU SERVO TEST INPUT LO
455W ATTITUDE DISABLE SIG TO NAA
1708TW MASTER WARNING LAMP TEST
451 W PITCH ATTITUDE IMP. CONT. OUPT UP
452 W PITCH ATTITUDE IMP. CONT. OUPT DOWN
454 W YAW ATTITUDE IMP. CONT OUPT RIGHT
453 W YAW ATTITUDE IMP. CONT. OUPT LEFT
448 W ROLL ATTITUDE IMP. CONT. OUPT RIGHT
449 W ROLL ATTITUDE IMP. CONT. OUPT LEFT
1707 T UP TELEMETERY ACCEPT
1706 T MASTER ALARM RESET
1698W ATTITUDE ENABLE INPUT LO
1699W ATTITUDE DISABLE
1700TW 0 VDC SPACE CRAFT
1701 W PITCH (UP & DOWN)
1702 W YAW (RIGHT & LEFT)
1703 W ROLL (RIGHT & LEFT)
1704 T UP TELEMETERY
1705 T MASTER ALARM RESET
551TL STEPPER POS IND 0 (UNITS)
552TL STEPPER POS IND 1 (UNITS)
553TL STEPPER POS IND 2 (UNITS)
554TL STEPPER POS IND 3 (UNITS)
555TL STEPPER POS IND 4 (UNITS)
556TL STEPPER POS IND 5 (UNITS)
557TL STEPPER POS IND 6 (UNITS)
558TL STEPPER POS IND 7 (UNITS)
559TL STEPPER POS IND 8 (UNITS)
560TL STEPPER POS IND 9 (UNITS)
561TL STEPPER POS IND 1 (TENS)
562TL STEPPER POS IND 2 (TENS)
563TL STEPPER POS IND 3 (TENS)
564TL STEPPER POS IND 4 (TENS)
565TL STEPPER POS IND 5 (TENS)
1823TL
1692TL STEPPER INTERRUPTER N.O.
1696TL SIGNAL CONDITIONER LEVEL 3
1695TL SIGNAL CONDITIONER LEVEL 2
1824TL INDICATOR LAMP VOLTAGE
1694TL SIGNAL CONDITIONER LEVEL 1
1697TL SIGNAL CONDITIONER LO
1693TL STEPPER SOURCE VOLTAGE
143W Z PIPA ERROR MONITOR HI
144W Z PIPA ERROR MONITOR LO
141W Y PIPA ERROR MONITOR HI
142W Y PIPA ERROR MONITOR LO
139W X PIPA ERROR MONITOR HI
140W X PIPA ERROR MONITOR LO
121W IMU IG & Y GYRO ERROR SIG HI
122W IMU IG & Y GYRO ERROR SIG LO
171W IMU MG ERROR SIGNAL HI
172W IMU MG ERROR SIGNAL LO
133W IMU OG ERROR SIGNAL HI
134W IMU OG ERROR SIGNAL LO
9 8 7 6 5 4 3 2 1
H G F E D C B A

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Cookman DATE 24 MAY 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

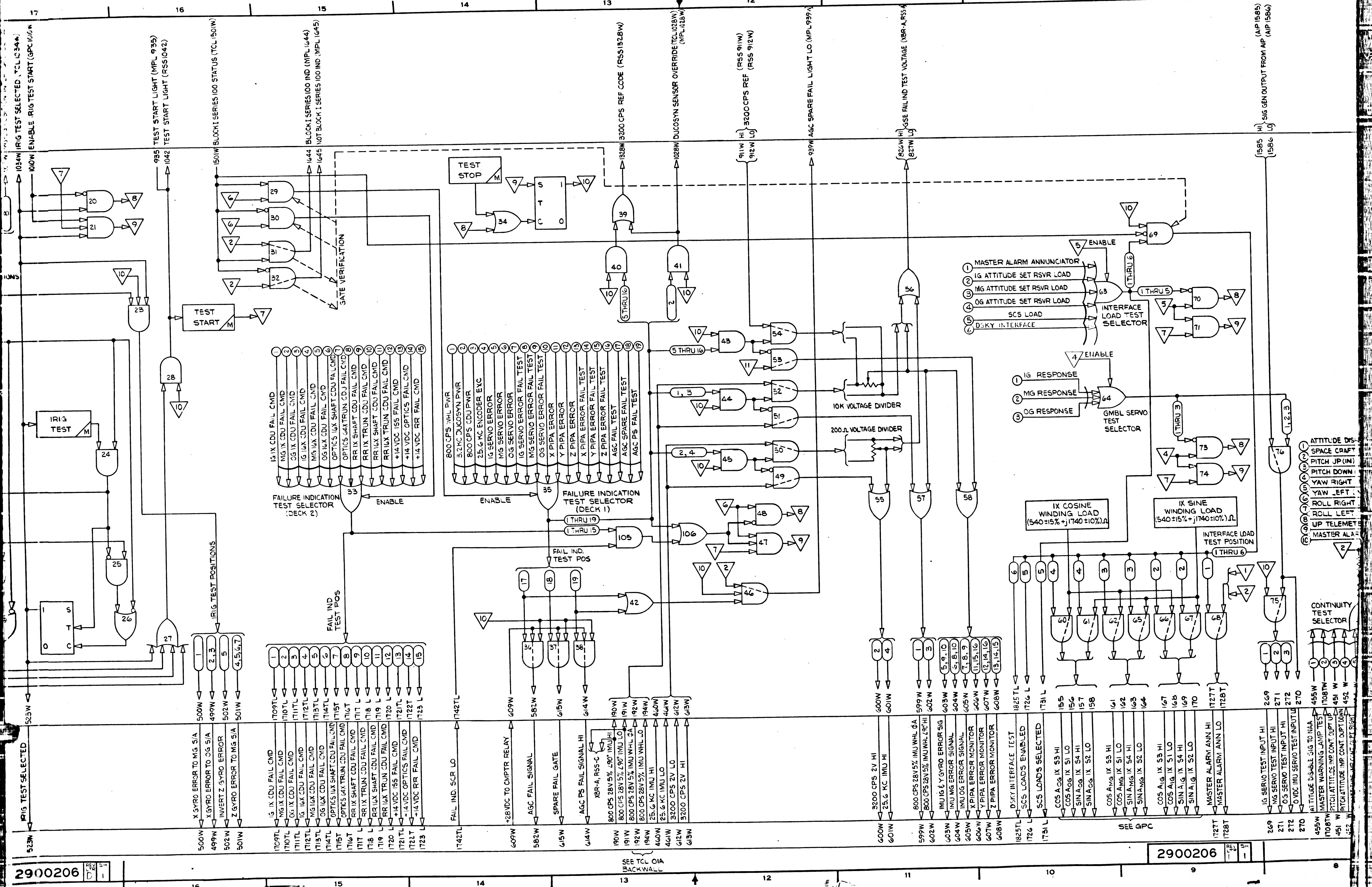
MANNED SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM-
TEST SELECTOR
(BLOCK I SERIES 100, BLOCK II & LEM)

CODE IDENT NO 99974
SIZE J3
2900206
SCALE —
SHEET 1 OF 4

2900206 REV — SH 1

3/2900206


17
16
15
14
13
12
11
10
9
8
1034W IRIG TEST SELECTED (TCL 1034W)
1010W ENABLE IRIG TEST START (GPC 1010W)
935 TEST START LIGHT (MPL 935)
1042 TEST START LIGHT (RSS 1042)
1501W BLOCK I SERIES 100 STATUS (TCL 1501W)
1644 BLOCK I SERIES 100 IND (MPL 1644)
1645 NOT BLOCK I SERIES 100 IND (MPL 1645)
1328W 3200 CPS REF CODE (RSS 1328W)
1028W DUCOSYN SENSOR OVERRIDE (TCL 1028W) (MPL 1028W)
911W HI 912W LO 3200 CPS REF (RSS 911W) (RSS 912W)
939W AGC SPARE FAIL LIGHT LO (MPL 939W)
826W HI 827W LO GSE FAIL IND TEST VOLTAGE (X8R-A, RSS-)
1585 HI 1586 LO SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
TEST STOP
TEST START
IRIG TEST
GATE VERIFICATION
S T C 0
S T C 1 0
ENABLE
FAILURE INDICATION TEST SELECTOR (DECK 2)
FAILURE INDICATION TEST SELECTOR (DECK 1)
FAIL IND. TEST POS
FAIL IND TEST POS
IRIG TEST POSITIONS
IG 1X CDU FAIL CMD
MG 1X CDU FAIL CMD
OG 1X CDU FAIL CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
RR 1X SHAFT CDU FAIL CMD
RR 1X TRUN CDU FAIL CMD
RR 16X SHAFT CDU FAIL CMD
RR 16X TRUN CDU FAIL CMD
+14 VDC ISS FAIL CMD
+14 VDC OPTICS FAIL CMD
+14 VDC RR FAIL CMD
800 CPS WHL PWR
3.2 KC DUCOSYN PWR
800 CPS CDU PWR
25.6 KC ENCODER EXC
IG SERVO ERROR
MG SERVO ERROR
OG SERVO ERROR
IG SERVO ERROR FAIL TEST
MG SERVO ERROR FAIL TEST
OG SERVO ERROR FAIL TEST
X PIPA ERROR
Y PIPA ERROR
Z PIPA ERROR
X PIPA ERROR FAIL TEST
Y PIPA ERROR FAIL TEST
Z PIPA ERROR FAIL TEST
AGC FAIL TEST
AGC SPARE FAIL TEST
AGC PS FAIL TEST
5 THRU 16
1 THRU 19
1 THRU 15
1, 3
2, 4
10K VOLTAGE DIVIDER
200Ω VOLTAGE DIVIDER
MASTER ALARM ANNUNCIATOR
IG ATTITUDE SET RSVR LOAD
MG ATTITUDE SET RSVR LOAD
OG ATTITUDE SET RSVR LOAD
SCS LOAD
DSKY INTERFACE
INTERFACE LOAD TEST SELECTOR
1 THRU 6
1 THRU 5
IG RESPONSE
MG RESPONSE
OG RESPONSE
GMBL SERVO TEST SELECTOR
1 THRU 3
1, 2, 3
1X COSINE WINDING LOAD (540±15%+j1740±10%)Ω
1X SINE WINDING LOAD (540±15%+j1740±10%)Ω
INTERFACE LOAD TEST POSITION
CONTINUITY TEST SELECTOR
ATTITUDE DIS-
SPACE CRAFT
PITCH UP (IN)
PITCH DOWN
YAW RIGHT
YAW LEFT
ROLL RIGHT
ROLL LEFT
UP TELEMETE
MASTER ALA
523W IRIG TEST SELECTED
500W X GYRO ERROR TO MG S/A
499W X GYRO ERROR TO OG S/A
502W INVERT Z GYRO ERROR
501W Z GYRO ERROR TO MG S/A
1709TL IG 1X CDU FAIL CMD
1710TL MG 1X CDU FAIL CMD
1711TL OG 1X CDU FAIL CMD
1712TL IG 16X CDU FAIL CMD
1713TL MG 16X CDU FAIL CMD
1714TL OG 16X CDU FAIL CMD
1715T OPTICS 16X SHAFT CDU FAIL CMD
1716T OPTICS 64X TRUN CDU FAIL CMD
1717 L RR 1X SHAFT CDU FAIL CMD
1718 L RR 1X TRUN CDU FAIL CMD
1719 L RR 16X SHAFT CDU FAIL CMD
1720 L RR 16X TRUN CDU FAIL CMD
1721TL +14 VDC ISS FAIL CMD
1722T +14 VDC OPTICS FAIL CMD
1723 L +14 VDC RR FAIL CMD
1742TL FAIL IND. SCR LO
609W +28 VDC TO CMPTR RELAY
582W AGC FAIL SIGNAL
615W SPARE FAIL GATE
614W AGC PS FAIL SIGNAL HI
X8R-A, RSS-C
190W 800 CPS 28V 5% ∠90° IMU HI
191W 800 CPS 28V 5% ∠90° IMU LO
192W 800 CPS 28V 5% IMU WHL ØA
194W 800 CPS 28V 5% IMU WHL ØA LO
460W 25.6 KC IMU HI
461W 25.6 KC IMU LO
612W 3200 CPS 2V LO
613W 3200 CPS 2V HI
SEE TCL 01A BACKWALL
600W 3200 CPS 2V HI
601W 25.6 KC IMU HI
599W 800 CPS 28V 5% IMU WHL ØA
602W 800 CPS 28V 5% IMU WHL ∠90° ØA
603W IMU IG & Y GYRO ERROR SIG
604W IMU MG ERROR SIGNAL
605W IMU OG ERROR SIGNAL
606W X PIPA ERROR MONITOR
607W Y PIPA ERROR MONITOR
608W Z PIPA ERROR MONITOR
1825TL DSKY INTERFACE TEST
1726 L SCS LOADS ENABLED
1731 L SCS LOADS SELECTED
155 COS A_OG 1X S3 HI
156 COS A_OG 1X S1 LO
157 SIN A_OG 1X S4 HI
158 SIN A_OG 1X S2 LO
161 COS A_MG 1X S3 HI
162 COS A_MG 1X S1 LO
163 SIN A_MG 1X S4 HI
164 SIN A_MG 1X S2 LO
167 COS A_IG 1X S3 HI
168 COS A_IG 1X S1 LO
169 SIN A_IG 1X S4 HI
170 SIN A_IG 1X S2 LO
SEE GPC
1727T MASTER ALARM ANN HI
1728T MASTER ALARM ANN LO
269 IG SERVO TEST INPUT HI
271 MG SERVO TEST INPUT HI
272 OG SERVO TEST INPUT HI
270 0VDC IMU SERVO TEST INPUT LO
455W ATTITUDE DISABLE SIG TO NAA
1708TW MASTER WARNING LAMP TEST
451 W PITCH ATTITUDE IMP CONT OUPT UP
452 W PITCH ATTITUDE IMP CONT OUPT DOWN
2900206 REV D SH 1
2900206 REV D SH 1

2/2900206

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM)

2900210 AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR)
RLP RELAY & LAMP POWER SUPPLY

2900208 POWER & DUMMY LOAD-PRIMARY SIGNAL SELECTOR (PDL)
PSS PRIMARY SIGNAL SELECTOR

2900223 GIMBAL POSITION CONTROL (GPC)

2900207 MONITOR PANEL (MPL)

2900202 TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)

2900201 TEST CONTROL PANEL (BLOCK II & LEM) (TCL)

2900217 SIGNAL SELECTION & MEASUREMENT
XBR-A CROSSBAR-AC SIGNALS
XBR-B CROSSBAR-DC SIGNALS
DVM DIGITAL VOLTMETER

2900218 OSCILLOGRAPH SIGNAL SELECTION
RSS-A TO FIXED AC CHANNEL
RSS-B TO FIXED DC CHANNEL
RSS-C TO SWITCHABLE AC CHANNEL
RSS-D TO SWITCHABLE DC CHANNEL

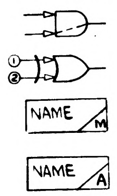
2900215 MEASUREMENT REFERENCE POWER SUPPLIES
RSS OSCILLOGRAPH SIGNAL SELECTOR

2900211 AUXILIARY INPUT-OUTPUT & CALIBRATION (AIP)

2900212 PIPA & IRIG MONITORING
MSI PHASE SHIFT PANEL

2900200 GYRO CAGING PANEL (GCP)

4. NONSTANDARD SYMBOLS



①
②
NAME M
NAME A

INDICATES "AND" GATE WITH SWITCHED SIGNAL

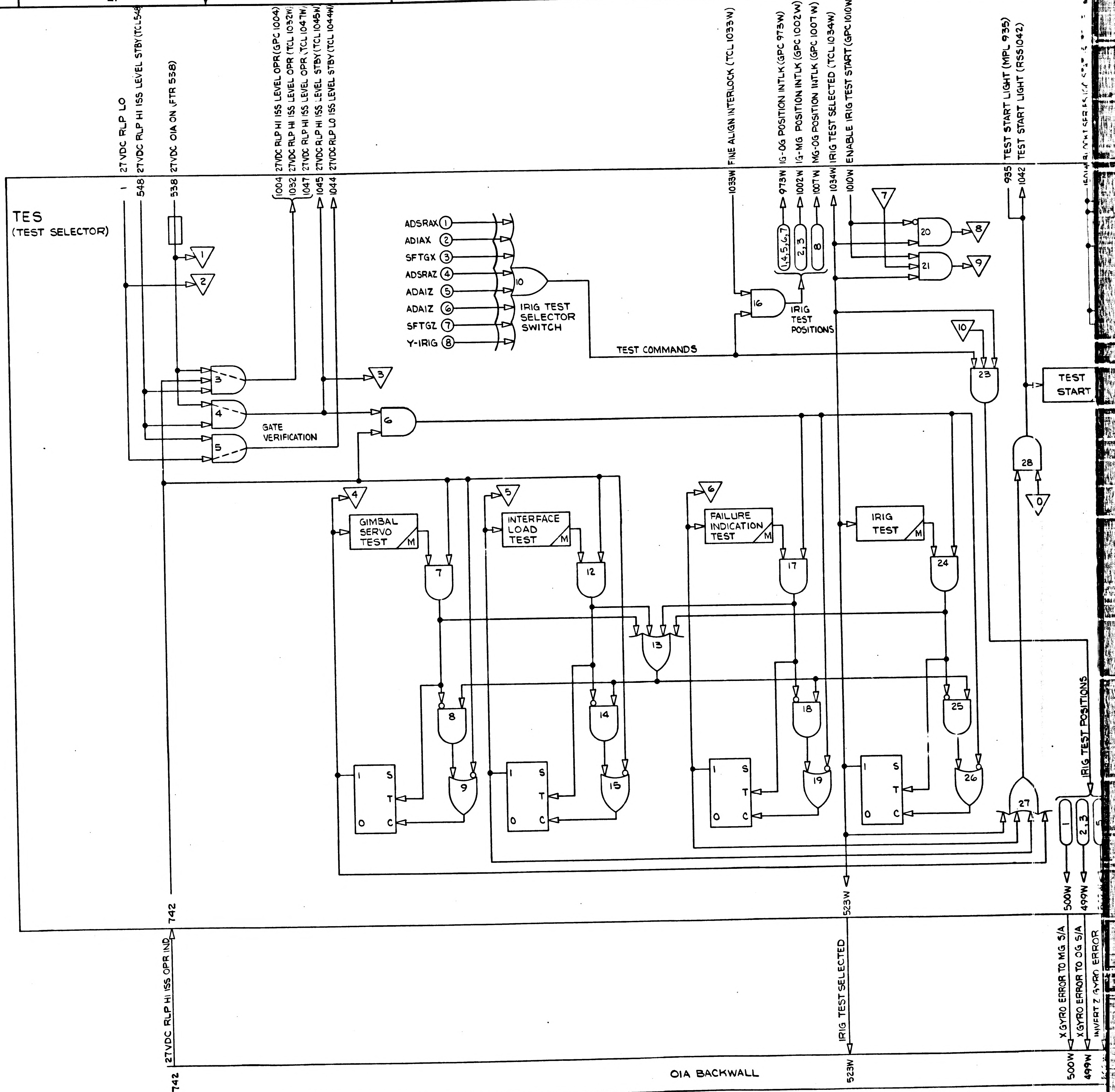
INDICATES EXCLUSIVE "OR" GATE WITH SWITCH POSITIONS 1&2

INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
A. W - BLOCK I SERIES 100 ONLY
B. T - BLOCK II ONLY
C. L - LEM ONLY
D. BLANK - ALL G&N CONFIGURATIONS
E. TW, TL, OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

6. SIGNAL REFERENCE
1 27 VDC OIA ON
2 27 VDC RLP LO
3 27 VDC ISS LEVEL STANDBY
4 GIMBAL SERVO TEST SELECTED
5 INTERFACE LOAD TEST SELECTED
6 FAILURE INDICATION TEST SELECTED
7 TEST START, BUTTON DEPRESSED
8 CLEAR
9 SET
10 TEST STARTED
11 IMU ERROR SIGNALS



27 VDC RLP LO
1
27VDC RLP HI ISS LEVEL STBY (TCL548)
548
27VDC OIA ON (FTR 538)
538
27VDC RLP HI ISS LEVEL OPR (GPC 1004)
1004
27VDC RLP HI ISS LEVEL OPR (TCL 1032W)
1032
27VDC RLP HI ISS LEVEL OPR (TCL 1047W)
1047
27VDC RLP HI ISS LEVEL STBY (TCL 1045W)
1045
27VDC RLP LO ISS LEVEL STBY (TCL 1044W)
1044
FINE ALIGN INTERLOCK (TCL 1033W)
1033W
IG-OG POSITION INTLK (GPC 973W)
973W
IG-MG POSITION INTLK (GPC 1002W)
1002W
MG-OG POSITION INTLK (GPC 1007W)
1007W
IRIG TEST SELECTED (TCL 1034W)
1034W
ENABLE IRIG TEST START (GPC 1010W)
1010W
TEST START LIGHT (MPL 935)
935
TEST START LIGHT (RSS1042)
1042
TES
(TEST SELECTOR)
ADSRAX ①
ADIAX ②
SFTGX ③
ADSRAZ ④
ADAIZ ⑤
ADAIZ ⑥
SFTGZ ⑦
Y-IRIG ⑧
IRIG TEST SELECTOR SWITCH
TEST COMMANDS
IRIG TEST POSITIONS
1,4,5,6,7
2,3
8
GATE VERIFICATION
TEST START
GIMBAL SERVO TEST M
INTERFACE LOAD TEST M
FAILURE INDICATION TEST M
IRIG TEST M
1 S T 0 C
IRIG TEST POSITIONS
1
2,3
5
742
27VDC RLP HI ISS OPR IND
523W
IRIG TEST SELECTED
500W
X GYRO ERROR TO MG S/A
499W
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
OIA BACKWALL

SEE TCL
OIA BACKWALL

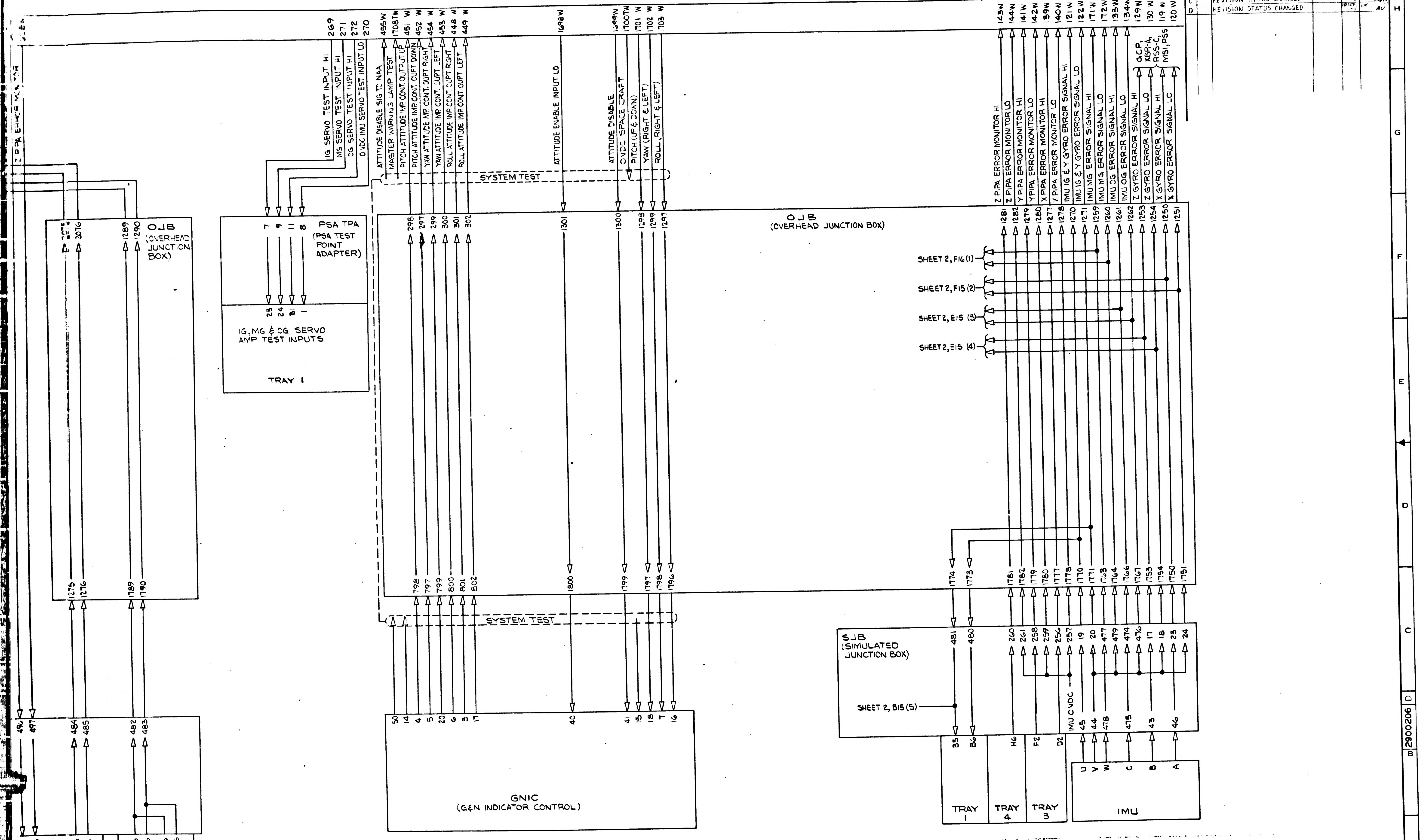
2900206 REV LTR D SH 1

MIL FORM 1050 J3

1-2900206

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		1 SEP 65	RLP AU
B		REVISION STATUS CHANGED		7 SEP 65	LK 6+
C		REVISION STATUS CHANGED		7 SEP 65	LK JAC
D		REVISION STATUS CHANGED		10 SEP 65	LK AU

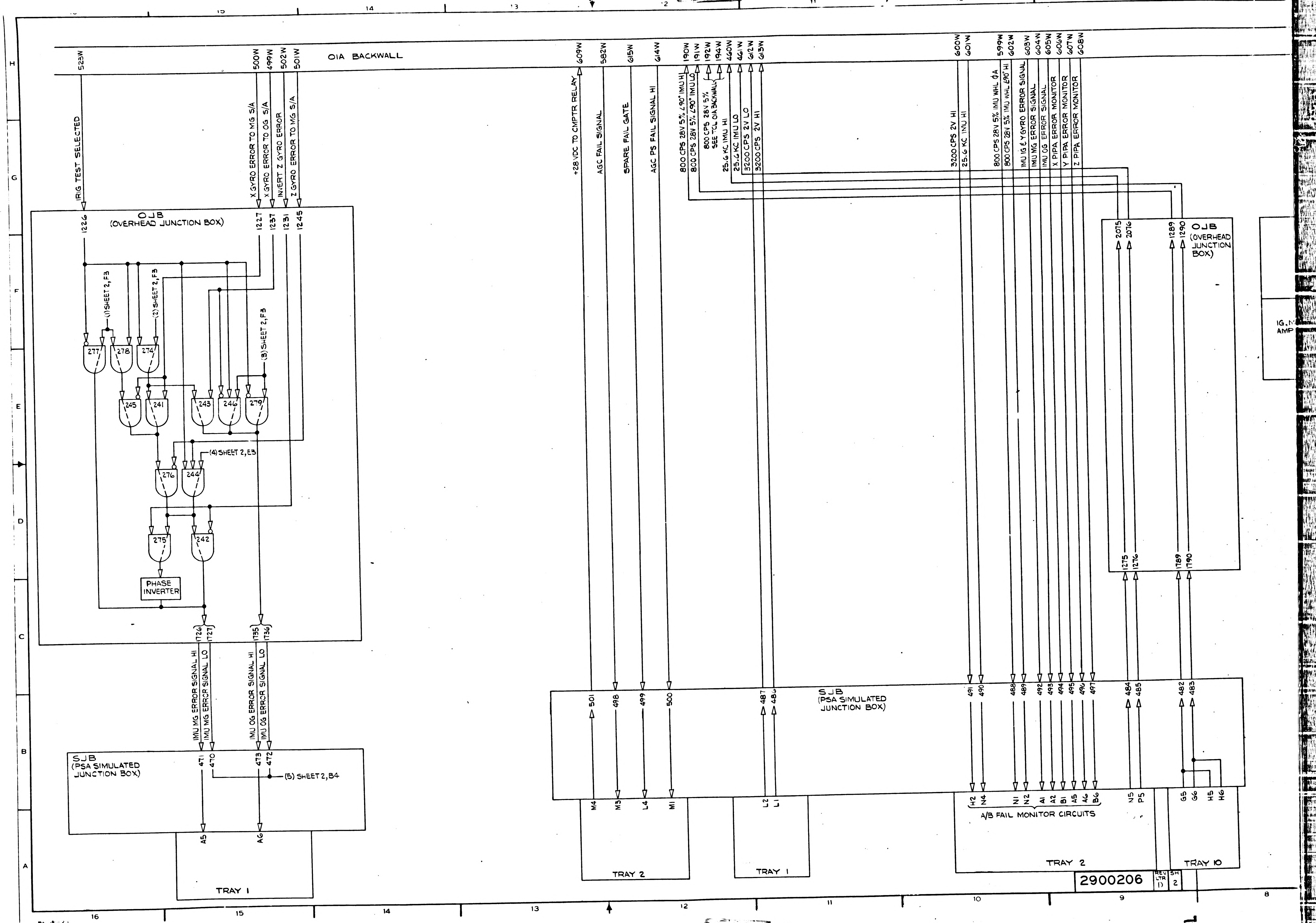


Z PIPA ERROR MONITOR
269 IG SERVO TEST INPUT HI
271 MG SERVO TEST INPUT HI
272 OG SERVO TEST INPUT HI
270 0 VDC IMU SERVO TEST INPUT LO
455W ATTITUDE DISABLE SIG TO NAA
1708TW MASTER WARNING LAMP TEST
451 W PITCH ATTITUDE IMP. CONT. OUTPUT UP
452 W PITCH ATTITUDE IMP. CONT. OUTPUT DOWN
454 W YAW ATTITUDE IMP. CONT. OUPT RIGHT
453 W YAW ATTITUDE IMP. CONT. OUPT LEFT
448 W ROLL ATTITUDE IMP. CONT. OUPT RIGHT
449 W ROLL ATTITUDE IMP. CONT. OUPT LEFT
1698W ATTITUDE ENABLE INPUT LO
1699W ATTITUDE DISABLE
1700TW 0 VDC SPACE CRAFT
1701 W PITCH (UP & DOWN)
1702 W YAW (RIGHT & LEFT)
1703 W ROLL (RIGHT & LEFT)
SYSTEM TEST
143W Z PIPA ERROR MONITOR HI
144W Z PIPA ERROR MONITOR LO
141W Y PIPA ERROR MONITOR HI
142W Y PIPA ERROR MONITOR LO
139W X PIPA ERROR MONITOR HI
140W X PIPA ERROR MONITOR LO
121 W IMU IG & Y GYRO ERROR SIGNAL HI
122 W IMU IG & Y GYRO ERROR SIGNAL LO
171 W IMU MG ERROR SIGNAL HI
172 W IMU MG ERROR SIGNAL LO
135 W IMU OG ERROR SIGNAL HI
134 W IMU OG ERROR SIGNAL LO
129 W Z GYRO ERROR SIGNAL HI
130 W Z GYRO ERROR SIGNAL LO
119 W X GYRO ERROR SIGNAL HI
120 W X GYRO ERROR SIGNAL LO
GCP, XBR-A, RSS-C, MSI, PSS
OJB (OVERHEAD JUNCTION BOX)
2075 2076 1289 1290
1275 1276 1789 1790
PSA TPA (PSA TEST POINT ADAPTER)
7 9 11 8
23 24 31 –
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
OJB (OVERHEAD JUNCTION BOX)
298 297 299 300 301 302 1301 1300 1298 1299 1297
798 797 799 800 801 802 1800 1799 1797 1798 1796
1281 1282 1279 1280 1277 1278 1270 1271 1259 1260 1261 1262 1253 1254 1250 1251
1774 1773 1781 1782 1779 1780 1777 1778 1770 1771 1763 1764 1766 1767 1753 1755 1750 1751
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (3)
SHEET 2, E15 (4)
SYSTEM TEST
SJB (SIMULATED JUNCTION BOX)
481 480 260 261 258 259 256 257 19 20 477 479 474 476 17 18 23 24
SHEET 2, B15 (5)
IMU 0 VDC
45 44 478 475 43 46
B5 B6 H6 F2 D2
TRAY 1
TRAY 4
TRAY 3
U V W C B A
IMU
50 14 4 5 20 6 3 17 40 41 15 18 7 16
GNIC (G&N INDICATOR CONTROL)
496 497 484 485 482 483
A6 B6 N5 P5 G5 G6 H5 H6
TRAY 10
2900206 REV LTR D SH 2
ITS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
DO NOT SCALE THIS DRAWING	DRAWN DATE CHECKED Ed Foster 9 JUN 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK I SERIES 100)
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974 SIZE J2 2900206
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — SHEET 2 OF 4

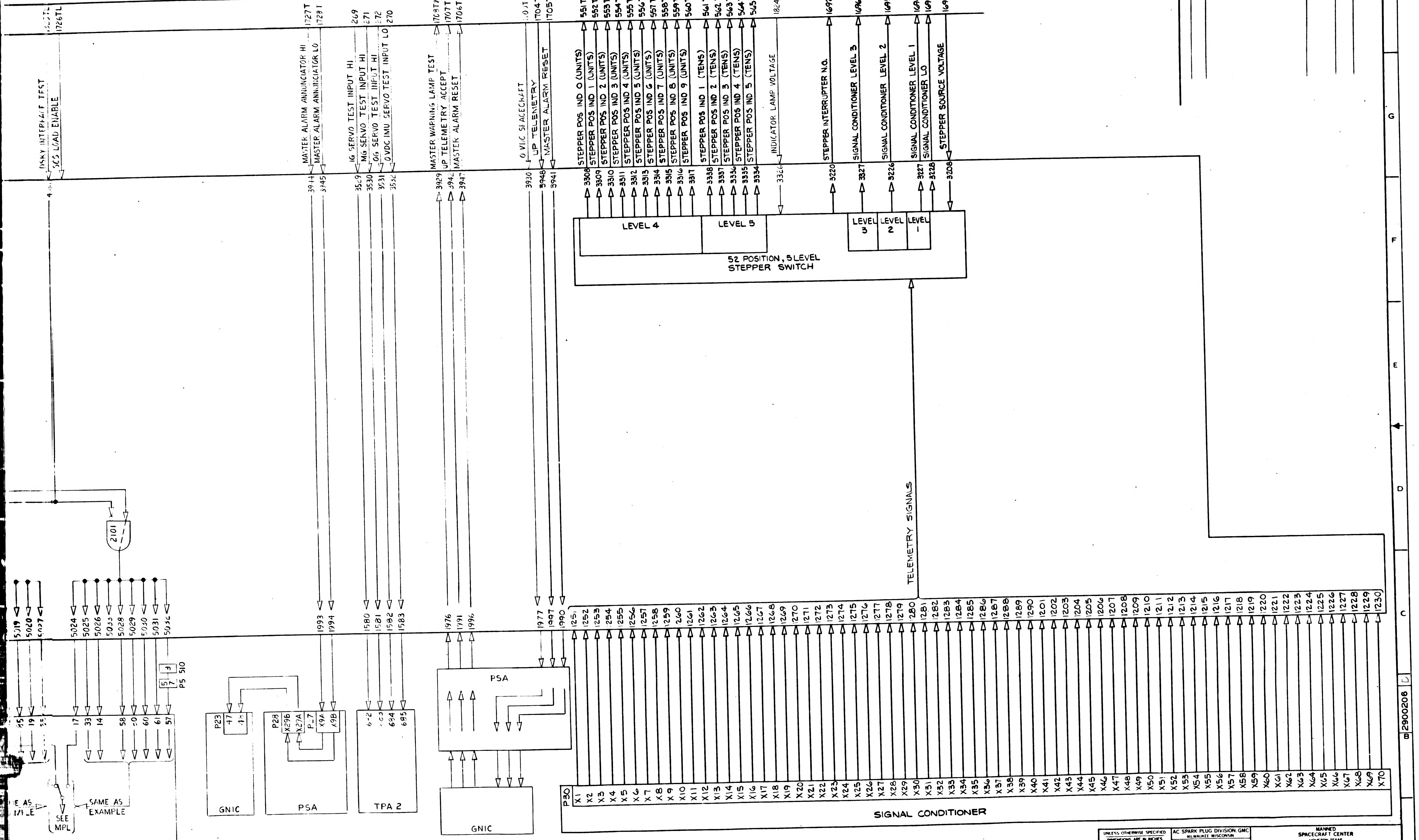
3H

SE0050
SH 2 OF 4


OIA BACKWALL
523W
500W
499W
502W
501W
IRIG TEST SELECTED
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
OJB
(OVERHEAD JUNCTION BOX)
1226
1227
1237
1231
1245
(1) SHEET 2, F3
(2) SHEET 2, F3
(3) SHEET 2, F3
(4) SHEET 2, E3
277
278
274
245
241
243
246
279
276
244
275
242
PHASE INVERTER
1726
1727
1735
1736
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
SJB
(PSA SIMULATED JUNCTION BOX)
471
470
473
472
(5) SHEET 2, B4
A5
A6
TRAY 1
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5% SEE TCL OIA BACKWALL
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ϕA
800 CPS 28V 5% IMU WHL ∠90° HI
IMU IG & Y GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
OJB
(OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1789
1790
IG.M AMP
SJB
(PSA SIMULATED JUNCTION BOX)
501
498
499
500
487
486
491
490
488
489
492
493
494
495
496
497
484
485
482
483
M4
M3
L4
M1
L2
L1
H2
N4
N1
N2
A1
A2
B1
A5
A6
B6
N5
P5
G5
G6
H5
H6
A/B FAIL MONITOR CIRCUITS
TRAY 2
TRAY 1
TRAY 2
TRAY 10
2900206
REV LTR D
SH 2
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

1/2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	RLP
B		REVISED PER TDRR 22036			
C		REVISED PER TDRR 22004			
D		REVISION STATUS CHANGED			


DSKY INTERFACE TEST
SCS LOAD ENABLE
1726TL
MASTER ALARM ANNUNCIATOR HI
MASTER ALARM ANNUNCIATOR LO
1727T
1728T
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
MASTER WARNING LAMP TEST
UP TELEMETRY ACCEPT
MASTER ALARM RESET
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LAMP VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL
STEPPER SWITCH
TELEMETRY SIGNALS
2101
P5 510
SEE MPL
SAME AS EXAMPLE
P23
GNIC
P28
X29B
X29A
X9A
X9B
PSA
TPA 2
PSA
GNIC
P30
SIGNAL CONDITIONER

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN

ACSP PN

DRAWN Cookman DATE 3 JUN 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

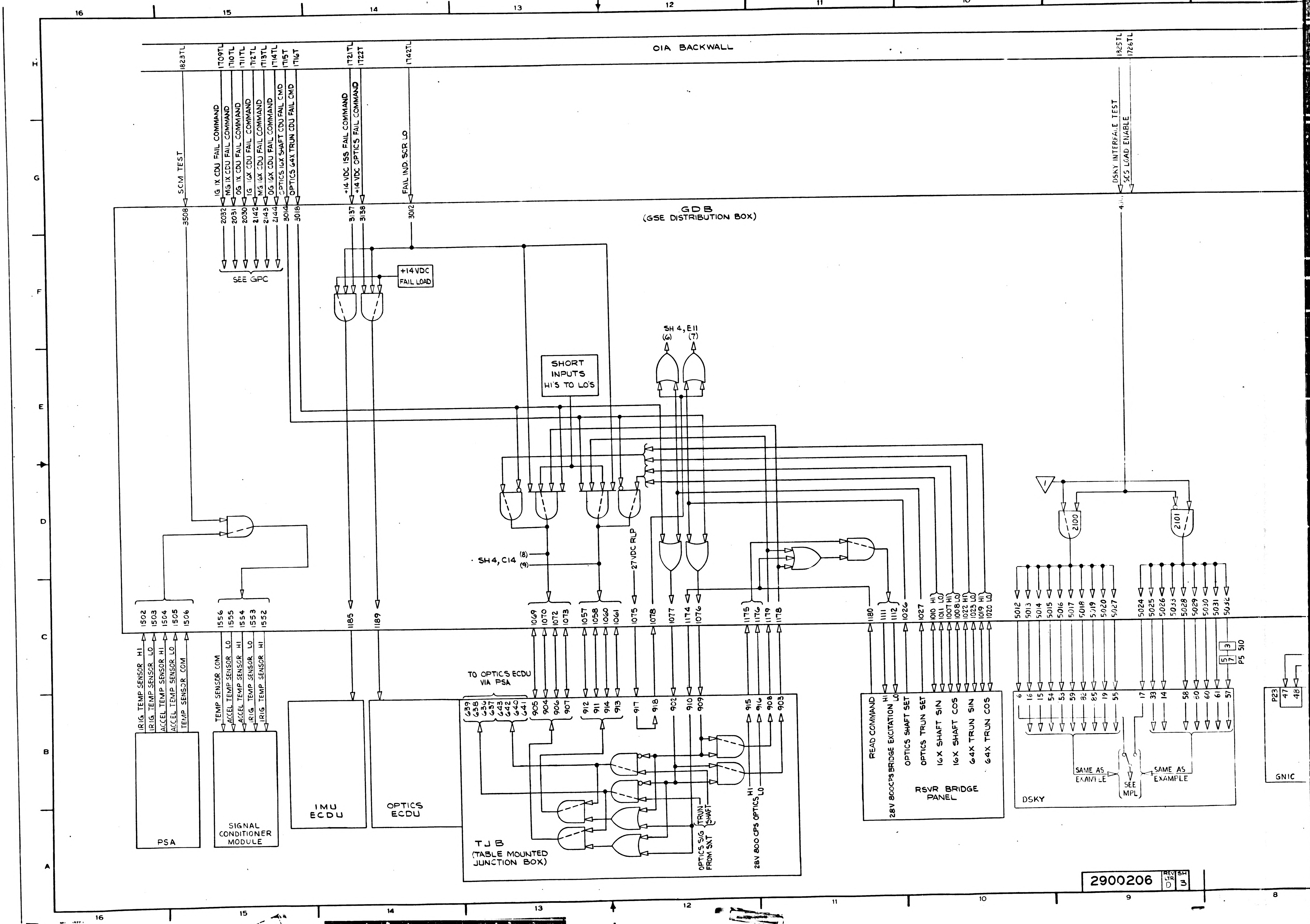
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
TEST SELECTOR
(BLOCK II)

CODE IDENT NO 99974 SIZE J2 2900206

SCALE SHEET 3 OF 4

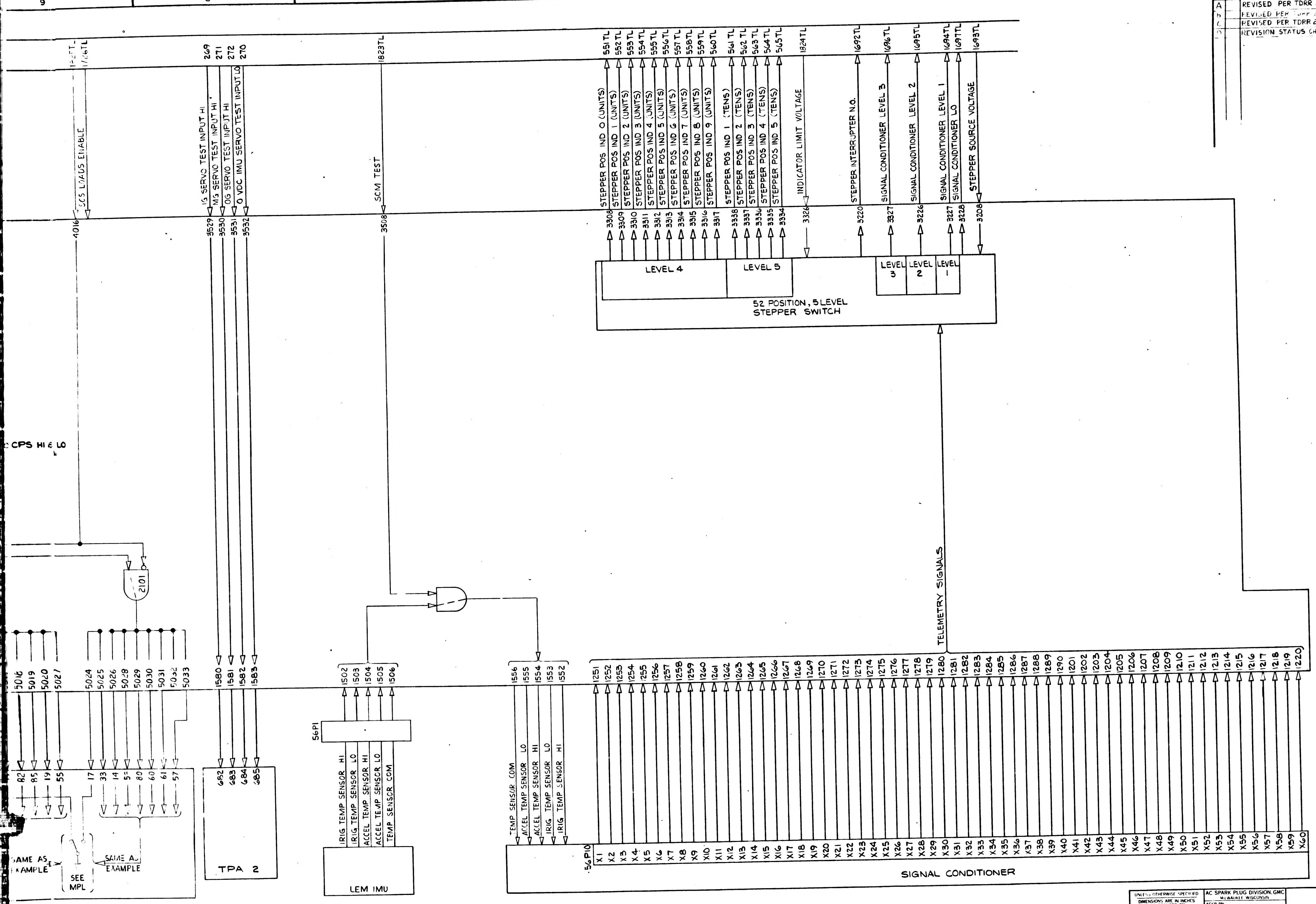
34


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1823TL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715T
1716T
1721TL
1722T
1742TL
1825TL
1726TL
SCM TEST
IG IX CDU FAIL COMMAND
MG IX CDU FAIL COMMAND
OG IX CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
+14 VDC ISS FAIL COMMAND
+14 VDC OPTICS FAIL COMMAND
FAIL IND. SCR LO
DSKY INTERFACE TEST
SCS LOAD ENABLE
GDB
(GSE DISTRIBUTION BOX)
3508
2032
2031
2030
2142
2143
2144
3014
3018
3137
3138
3012
SEE GPC
+14 VDC
FAIL LOAD
SH 4, E11
(6)
(7)
SHORT
INPUTS
HI'S TO LO'S
SH4, C14
(8)
(9)
27 VDC RLP
1
2100
2101
1502
1503
1504
1505
1506
1556
1555
1554
1553
1552
1185
1189
1069
1070
1072
1073
1057
1058
1060
1061
1075
1078
1077
1174
1076
1175
1176
1179
1178
1180
1111
1112
1026
1027
1010 HI
1011 LO
1007 HI
1008 LO
1022 HI
1023 LO
1019 HI
1020 LO
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
5024
5025
5026
5033
5028
5029
5030
5031
5032
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
PSA
SIGNAL
CONDITIONER
MODULE
IMU
ECDU
OPTICS
ECDU
TO OPTICS ECDU
VIA PSA
639
638
636
637
643
642
640
641
905
904
906
907
912
911
914
913
917
918
902
910
909
915
916
908
903
TRUN
SHAFT
OPTICS SIG
FROM SXT
HI
LO
28V 800 CPS OPTICS
TJB
(TABLE MOUNTED
JUNCTION BOX)
READ COMMAND
28V 800CPS BRIDGE EXCITATION HI
LO
OPTICS SHAFT SET
OPTICS TRUN SET
16X SHAFT SIN
16X SHAFT COS
64X TRUN SIN
64X TRUN COS
RSVR BRIDGE
PANEL
3
5
7
P5 510
6
16
15
54
53
59
82
85
19
55
17
33
14
58
80
60
61
57
SAME AS
EXAMPLE
SEE
MPL
SAME AS
EXAMPLE
DSKY
P23
47
48
GNIC
2900206

2900206 REV LTR D SH 3

172900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	RLP AU
B		REVISED PER TDRR [illegible]			
C		REVISED PER TDRR 22004		SEP 65	LK
D		REVISION STATUS CHANGED		10 SEP	AU



CCS LOADS ENABLE
4016
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
269
271
272
270
3529
3530
3531
3532
SCM TEST
1823TL
3508
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
561TL
562TL
563TL
564TL
565TL
1824TL
1692TL
1696TL
1695TL
1694TL
1697TL
1693TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LIMIT VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3338
3337
3336
3335
3334
3326
3220
3327
3226
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL
STEPPER SWITCH
CPS HI & LO
2101
TELEMETRY SIGNALS
5016
5019
5020
5027
5024
5025
5026
5028
5029
5030
5031
5032
5033
82
85
19
55
17
33
14
5
80
60
61
57
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
1580
1581
1582
1583
682
683
684
685
TPA 2
1502
1503
1504
1505
1506
56P1
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
LEM IMU
1556
1555
1554
1553
1552
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
1251
1252
1253
1254
1255
1256
1257
1258
1259
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1261
1262
1263
1264
1265
1266
1267
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1207
1208
1209
1210
1211
1212
1213
1214
1215
1216
1217
1218
1219
1220
56P10
X1
X2
X3
X4
X5
X6
X7
X8
X9
X10
X11
X12
X13
X14
X15
X16
X17
X18
X19
X20
X21
X22
X23
X24
X25
X26
X27
X28
X29
X30
X31
X32
X33
X34
X35
X36
X37
X38
X39
X40
X41
X42
X43
X44
X45
X46
X47
X48
X49
X50
X51
X52
X53
X54
X55
X56
X57
X58
X59
X60
SIGNAL CONDITIONER

34

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

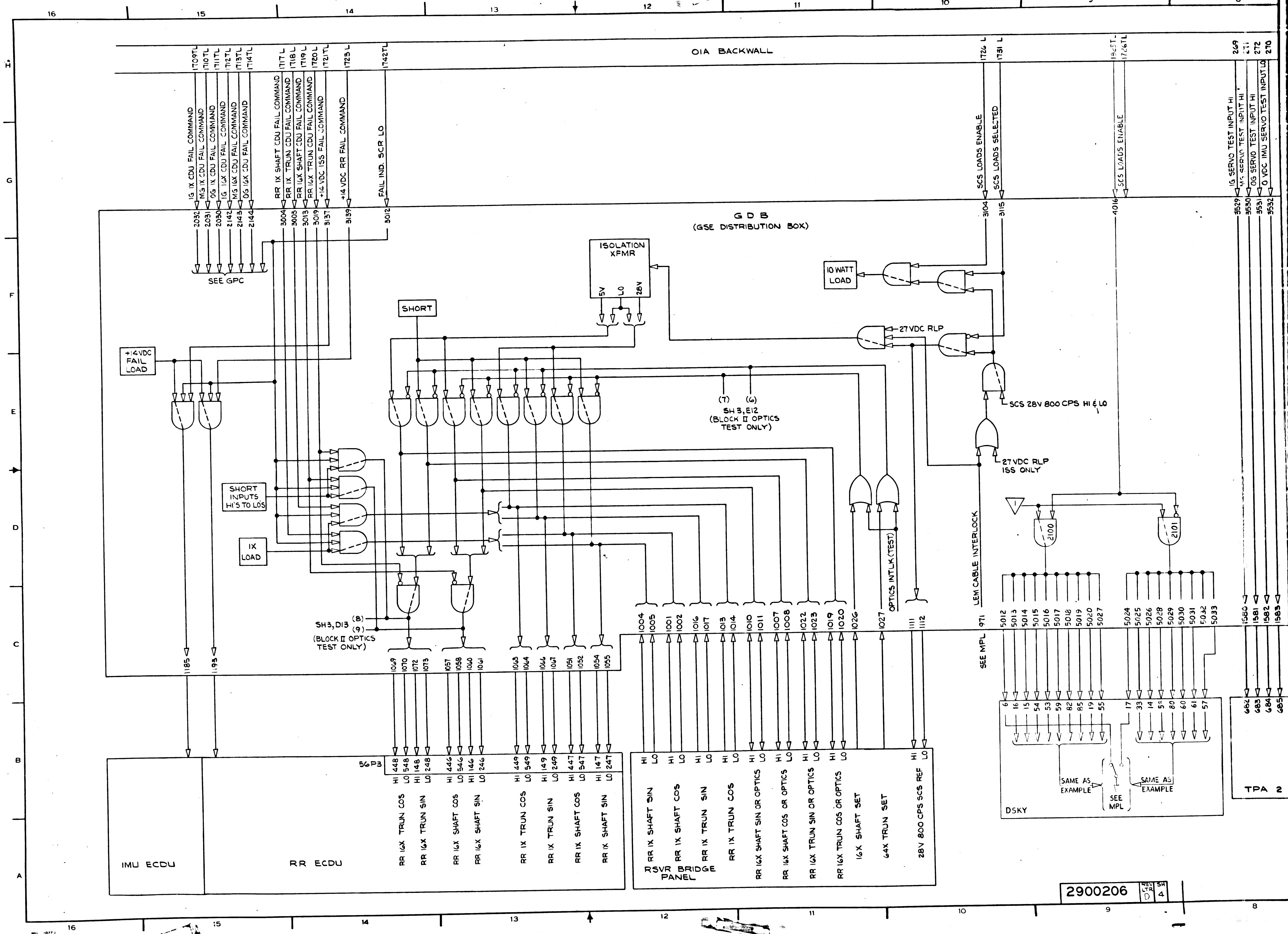
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Lookman DATE 7 JUN 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM-TEST SELECTOR (LEM)

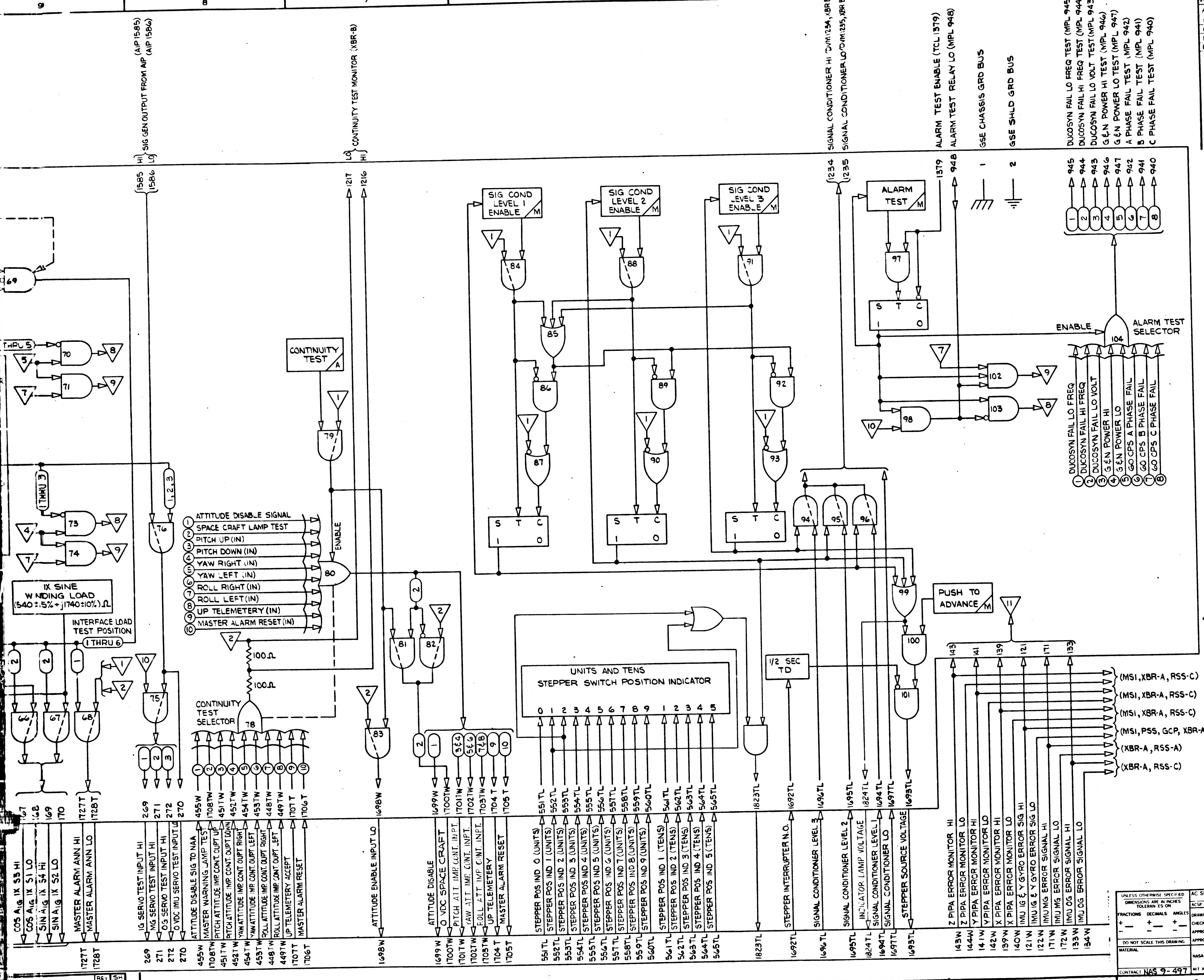
CODE IDENT NO 99974 SIZE J2 2900206
SCALE — SHEET 4 OF 4

2900206 REV D SH 4


OIA BACKWALL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1717 L
1718 L
1719 L
1720 L
1721TL
1723 L
1742TL
IG IX CDU FAIL COMMAND
MG IX CDU FAIL COMMAND
OG IX CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
RR IX SHAFT CDU FAIL COMMAND
RR IX TRUN CDU FAIL COMMAND
RR 16X SHAFT CDU FAIL COMMAND
RR 16X TRUN CDU FAIL COMMAND
+14 VDC ISS FAIL COMMAND
+14 VDC RR FAIL COMMAND
FAIL IND. SCR LO
2032
2031
2030
2142
2143
2144
3004
3003
3013
3019
3137
3139
3012
SEE GPC
1726 L
1731 L
SCS LOADS ENABLE
SCS LOADS SELECTED
3104
3115
1825TL
1726TL
SCS LOADS ENABLE
4016
269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
3529
3530
3531
3532
GDB
(GSE DISTRIBUTION BOX)
ISOLATION XFMR
5V
LO
28V
10 WATT LOAD
27VDC RLP
SHORT
+14VDC FAIL LOAD
(7) (6)
SH 3, E12
(BLOCK II OPTICS TEST ONLY)
SCS 28V 800 CPS HI & LO
27VDC RLP
ISS ONLY
SHORT INPUTS HI'S TO LO'S
IX LOAD
SH3, D13 (8) (9)
(BLOCK II OPTICS TEST ONLY)
OPTICS INTLK (TEST)
LEM CABLE INTERLOCK
SEE MPL
971
2100
2101
1185
1193
1069
1070
1072
1073
1057
1058
1060
1061
1063
1064
1066
1067
1051
1052
1054
1055
1004
1005
1001
1002
1016
1017
1013
1014
1010
1011
1007
1008
1022
1023
1019
1020
1026
1027
1111
1112
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
5024
5025
5026
5028
5029
5030
5031
5032
5033
1580
1581
1582
1583
6
16
15
54
53
59
82
85
19
55
17
33
14
5
80
60
61
57
SAME AS EXAMPLE
SAME AS EXAMPLE
SEE MPL
DSKY
682
683
684
685
TPA 2
56P3
448
548
148
248
446
546
146
246
449
549
149
249
447
547
147
247
HI
LO
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
RR IX TRUN COS
RR IX TRUN SIN
RR IX SHAFT COS
RR IX SHAFT SIN
IMU ECDU
RR ECDU
RR IX SHAFT SIN
RR IX SHAFT COS
RR IX TRUN SIN
RR IX TRUN COS
RR 16X SHAFT SIN OR OPTICS
RR 16X SHAFT COS OR OPTICS
RR 16X TRUN SIN OR OPTICS
RR 16X TRUN COS OR OPTICS
16X SHAFT SET
64X TRUN SET
28V 800 CPS SCS REF
RSVR BRIDGE PANEL
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
2900206
REV LTR D
SH 4

1/2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPR
A		REVISED PER TDRR 21905		1 SEP 65	AU
B		REVISED PER TDRR 22006		7 SEP 65	
C		REVISED PER TDRR 22004		8 SEP 65	
D		REVISED PER TDRR 22005		10	AU
E		REVISED PER TDRR 22002		3 SEP 65	


9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
SIG GEN OUTPUT FROM AIP (AIP1585) HI
(AIP1586) LO
1585
1586
CONTINUITY TEST MONITOR (XBR-B) LO HI
1217
1216
SIGNAL CONDITIONER HI (DVM 1234, XBR-B)
SIGNAL CONDITIONER LO (DVM 1235, XBR-B)
1234
1235
ALARM TEST ENABLE (TCL 1379)
ALARM TEST RELAY LO (MPL 948)
1379
948
GSE CHASSIS GRD BUS
1
GSE SHLD GRD BUS
2
DUCOSYN FAIL LO FREQ TEST (MPL 945)
DUCOSYN FAIL HI FREQ TEST (MPL 944)
DUCOSYN FAIL LO VOLT TEST (MPL 943)
G&N POWER HI TEST (MPL 946)
G&N POWER LO TEST (MPL 947)
A PHASE FAIL TEST (MPL 942)
B PHASE FAIL TEST (MPL 941)
C PHASE FAIL TEST (MPL 940)
945 944 943 946 947 942 941 940
SIG COND LEVEL 1 ENABLE M
SIG COND LEVEL 2 ENABLE M
SIG COND LEVEL 3 ENABLE M
ALARM TEST M
CONTINUITY TEST A
PUSH TO ADVANCE M
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
69
70
71
73
74
75
76
78
79
80
81
82
83
66
67
68
S T C
1 0
ENABLE
ALARM TEST SELECTOR
DUCOSYN FAIL LO FREQ
DUCOSYN FAIL HI FREQ
DUCOSYN FAIL LO VOLT
G&N POWER HI
G&N POWER LO
60 CPS A PHASE FAIL
60 CPS B PHASE FAIL
60 CPS C PHASE FAIL
THRU 5
1 THRU 3
1,2,3
IX SINE WINDING LOAD (540±5%+j1740±10%)Ω
INTERFACE LOAD TEST POSITION
1 THRU 6
ATTITUDE DISABLE SIGNAL
① SPACE CRAFT LAMP TEST
② PITCH UP (IN)
③ PITCH DOWN (IN)
④ YAW RIGHT (IN)
⑤ YAW LEFT (IN)
⑥ ROLL RIGHT (IN)
⑦ ROLL LEFT (IN)
⑧ UP TELEMETERY (IN)
⑨ MASTER ALARM RESET (IN)
⑩
100Ω
100Ω
CONTINUITY TEST SELECTOR
3&4
5&6
UNITS AND TENS STEPPER SWITCH POSITION INDICATOR
0 1 2 3 4 5 6 7 8 9 1 2 3 4 5
1/2 SEC TD
143 141 139 121 171 133
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, PSS, GCP, XBR-A, RSS-A)
(XBR-A, RSS-A)
(XBR-A, RSS-C)
167 COS A IG IX S3 HI
168 COS A IG IX S1 LO
169 SIN A IG IX S4 HI
170 SIN A IG IX S2 LO
1727T MASTER ALARM ANN HI
1728T MASTER ALARM ANN LO
269 IG SERVO TEST INPUT HI
271 MG SERVO TEST INPUT HI
272 OG SERVO TEST INPUT HI
270 0 VDC IMU SERVO TEST INPUT
455W ATTITUDE DISABLE SIG TO NAA
1108TW MASTER WARNING LAMP TEST
451TW PITCH ATTITUDE IMP. CONT. OUPT UP
452TW PITCH ATTITUDE IMP. CONT. OUPT DOWN
454TW YAW ATTITUDE IMP. CONT. OUPT RIGHT
453TW YAW ATTITUDE IMP. CONT. OUPT LEFT
448TW ROLL ATTITUDE IMP. CONT. OUPT RIGHT
449TW ROLL ATTITUDE IMP. CONT. OUPT LEFT
1707T UP TELEMETERY ACCEPT
1706T MASTER ALARM RESET
1698W ATTITUDE ENABLE INPUT LO
1699W ATTITUDE DISABLE
1700TW 0 VDC SPACE CRAFT
1701TW PITCH ATT. IMP. CNT. INPT.
1702TW YAW ATT. IMP. CNT. INPT.
1703TW ROLL ATT. IMP. CNT. INPT.
1704T UP TELEMETERY
1705T MASTER ALARM RESET
551TL STEPPER POS IND 0 (UNITS)
552TL STEPPER POS IND 1 (UNITS)
553TL STEPPER POS IND 2 (UNITS)
554TL STEPPER POS IND 3 (UNITS)
555TL STEPPER POS IND 4 (UNITS)
556TL STEPPER POS IND 5 (UNITS)
557TL STEPPER POS IND 6 (UNITS)
558TL STEPPER POS IND 7 (UNITS)
559TL STEPPER POS IND 8 (UNITS)
560TL STEPPER POS IND 9 (UNITS)
561TL STEPPER POS IND 1 (TENS)
562TL STEPPER POS IND 2 (TENS)
563TL STEPPER POS IND 3 (TENS)
564TL STEPPER POS IND 4 (TENS)
565TL STEPPER POS IND 5 (TENS)
1823TL
1692TL STEPPER INTERRUPTER N.O.
1696TL SIGNAL CONDITIONER LEVEL 3
1695TL SIGNAL CONDITIONER LEVEL 2
1824TL INDICATOR LAMP VOLTAGE
1694TL SIGNAL CONDITIONER LEVEL 1
1697TL SIGNAL CONDITIONER LO
1693TL STEPPER SOURCE VOLTAGE
143W Z PIPA ERROR MONITOR HI
144W Z PIPA ERROR MONITOR LO
141W Y PIPA ERROR MONITOR HI
142W Y PIPA ERROR MONITOR LO
139W X PIPA ERROR MONITOR HI
140W X PIPA ERROR MONITOR LO
121W IMU IG & Y GYRO ERROR SIG HI
122W IMU IG & Y GYRO ERROR SIG LO
171W IMU MG ERROR SIGNAL HI
172W IMU MG ERROR SIGNAL LO
133W IMU OG ERROR SIGNAL HI
134W IMU OG ERROR SIGNAL LO

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Cookman DATE 24 MAY 65
CHECKED Ed Foster 9 JUN 65
APPROVAL H Hinkson
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-TEST SELECTOR (BLOCK I SERIES 100, BLOCK II & LEM)

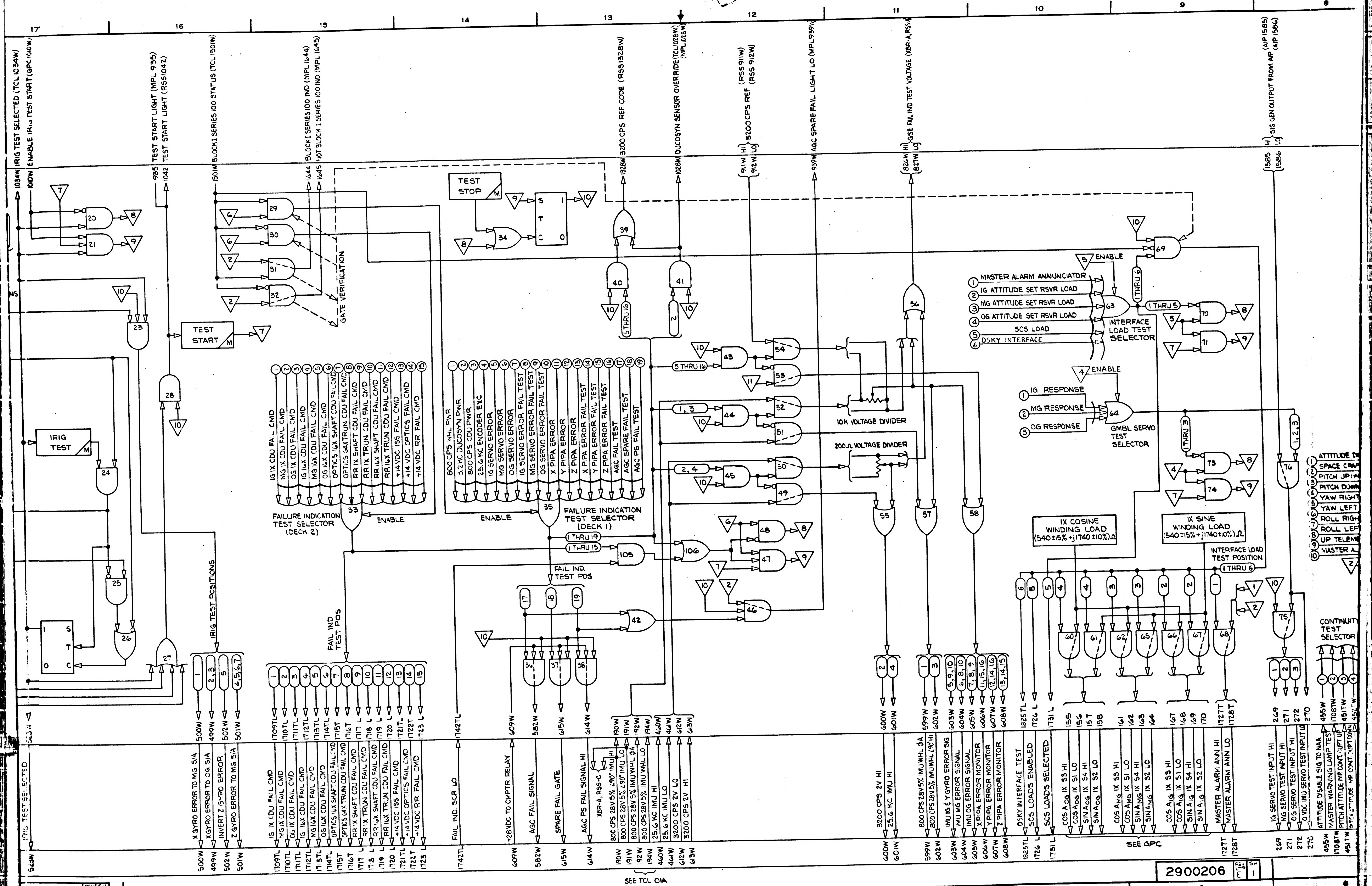
CODE IDENT NO 99974
SIZE J3
2900206
SCALE —
SHEET 1 OF 4

2900206 REV E SH 1

2900206 E

4H

3/2900206



17
16
15
14
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8
IRIG TEST SELECTED (TCL 1034W)
ENABLE IRIG TEST START (GPC 1010W)
1034W
1010W
TEST START LIGHT (MPL 935)
TEST START LIGHT (RSS1042)
935
1042
BLOCK I SERIES 100 STATUS (TCL 1501W)
1501W
BLOCK I SERIES 100 IND (MPL 1644)
NOT BLOCK I SERIES 100 IND (MPL 1645)
1644
1645
3200 CPS REF CODE (RSS1328W)
1328W
DUCOSYN SENSOR OVERRIDE (TCL1028W) (MPL1028W)
1028W
3200CPS REF HI (RSS 911W) LO (RSS 912W)
911W
912W
AGC SPARE FAIL LIGHT LO (MPL939W)
939W
GSE FAIL IND TEST VOLTAGE HI LO (XBR-A, RSS-A)
826W
827W
SIG GEN OUTPUT FROM AIP HI (AIP 1585) LO (AIP 1586)
1585
1586
TEST STOP M
S
T
C
1
0
TEST START M
IRIG TEST M
GATE VERIFICATION
NS
FAILURE INDICATION TEST SELECTOR (DECK 2)
ENABLE
IG 1X CDU FAIL CMD
MG 1X CDU FAIL CMD
OG 1X CDU FAIL CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
RR 1X SHAFT CDU FAIL CMD
RR 1X TRUN CDU FAIL CMD
RR 16X SHAFT CDU FAIL CMD
RR 16X TRUN CDU FAIL CMD
+14 VDC ISS FAIL CMD
+14 VDC OPTICS FAIL CMD
+14 VDC RR FAIL CMD
FAILURE INDICATION TEST SELECTOR (DECK 1)
800 CPS WHL PWR
3.2 KC DUCOSYN PWR
800 CPS CDU PWR
25.6 KC ENCODER EXC
IG SERVO ERROR
MG SERVO ERROR
OG SERVO ERROR
IG SERVO ERROR FAIL TEST
MG SERVO ERROR FAIL TEST
OG SERVO ERROR FAIL TEST
X PIPA ERROR
Y PIPA ERROR
Z PIPA ERROR
X PIPA ERROR FAIL TEST
Y PIPA ERROR FAIL TEST
Z PIPA ERROR FAIL TEST
AGC FAIL TEST
AGC SPARE FAIL TEST
AGC PS FAIL TEST
1 THRU 19
1 THRU 15
5 THRU 16
1, 3
2, 4
FAIL IND. TEST POS
IRIG TEST POSITIONS
1
2, 3
5
4, 5, 6, 7
FAIL IND TEST POS
10K VOLTAGE DIVIDER
200 Ω VOLTAGE DIVIDER
MASTER ALARM ANNUNCIATOR
IG ATTITUDE SET RSVR LOAD
MG ATTITUDE SET RSVR LOAD
OG ATTITUDE SET RSVR LOAD
SCS LOAD
DSKY INTERFACE
INTERFACE LOAD TEST SELECTOR
ENABLE
1 THRU 6
1 THRU 5
IG RESPONSE
MG RESPONSE
OG RESPONSE
GMBL SERVO TEST SELECTOR
1 THRU 3
1, 2, 3
1X COSINE WINDING LOAD (540 ±15% + j1740 ±10%) Ω
1X SINE WINDING LOAD (540 ±15% + j1740 ±10%) Ω
INTERFACE LOAD TEST POSITION
CONTINUITY TEST SELECTOR
ATTITUDE D
SPACE CRA
PITCH UP (IN
PITCH DOWN
YAW RIGHT
YAW LEFT
ROLL RIGH
ROLL LEF
UP TELEM
MASTER A
5, 9, 10
6, 8, 10
7, 8, 9
11, 15, 16
12, 14, 16
13, 14, 15
20
21
23
24
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26
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56
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61
62
63
64
65
66
67
68
69
70
71
73
74
75
76
105
106
523W
IRIG TEST SELECTED
500W
X GYRO ERROR TO MG S/A
499W
X GYRO ERROR TO OG S/A
502W
INVERT Z GYRO ERROR
501W
Z GYRO ERROR TO MG S/A
1709TL
IG 1X CDU FAIL CMD
1710TL
MG 1X CDU FAIL CMD
1711TL
OG 1X CDU FAIL CMD
1712TL
IG 16X CDU FAIL CMD
1713TL
MG 16X CDU FAIL CMD
1714TL
OG 16X CDU FAIL CMD
1715T
OPTICS 16X SHAFT CDU FAIL CMD
1716T
OPTICS 64X TRUN CDU FAIL CMD
1717 L
RR 1X SHAFT CDU FAIL CMD
1718 L
RR 1X TRUN CDU FAIL CMD
1719 L
RR 16X SHAFT CDU FAIL CMD
1720 L
RR 16X TRUN CDU FAIL CMD
1721TL
+14 VDC ISS FAIL CMD
1722T
+14 VDC OPTICS FAIL CMD
1723 L
+14 VDC RR FAIL CMD
1742TL
FAIL IND. SCR LO
609W
+28VDC TO CMPTR RELAY
582W
AGC FAIL SIGNAL
615W
SPARE FAIL GATE
614W
AGC PS FAIL SIGNAL HI
XBR-A, RSS-C
190W
800 CPS 28V 5% ∠90° IMU HI
191W
800 CPS 28V 5% ∠90° IMU LO
192W
800 CPS 28V 5% IMU WHL ØA
194W
800 CPS 28V 5% IMU WHL LO
460W
25.6 KC IMU HI
461W
25.6 KC IMU LO
612W
3200 CPS 2V LO
613W
3200 CPS 2V HI
SEE TCL 01A BACKWALL
600W
3200 CPS 2V HI
601W
25.6 KC IMU HI
599W
800 CPS 28V 5% IMU WHL ØA
602W
800 CPS 28V 5% IMU WHL ∠90° HI
603W
IMU IG & Y GYRO ERROR SIG
604W
IMU MG ERROR SIGNAL
605W
IMU OG ERROR SIGNAL
606W
X PIPA ERROR MONITOR
607W
Y PIPA ERROR MONITOR
608W
Z PIPA ERROR MONITOR
1825TL
DSKY INTERFACE TEST
1726 L
SCS LOADS ENABLED
1731 L
SCS LOADS SELECTED
155
COS A_OG 1X S3 HI
156
COS A_OG 1X S1 LO
157
SIN A_OG 1X S4 HI
158
SIN A_OG 1X S2 LO
161
COS A_MG 1X S3 HI
162
COS A_MG 1X S1 LO
163
SIN A_MG 1X S4 HI
164
SIN A_MG 1X S2 LO
167
COS A_IG 1X S3 HI
168
COS A_IG 1X S1 LO
169
SIN A_IG 1X S4 HI
170
SIN A_IG 1X S2 LO
SEE GPC
1727T
MASTER ALARM ANN HI
1728T
MASTER ALARM ANN LO
269
IG SERVO TEST INPUT HI
271
MG SERVO TEST INPUT HI
272
OG SERVO TEST INPUT HI
270
0 VDC IMU SERVO TEST INPUT LO
455W
ATTITUDE DISABLE SIG TO NAA
1708TW
MASTER WARNING LAMP TEST
451TW
PITCH ATTITUDE IMP. CONT. OUPT UP
452TW
PITCH ATTITUDE IMP. CONT. OUPT DOWN

2900206 REV LTR E SH 1

2900206 REV LTR E SH 1

272900206

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM)

2900210 RLP	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RELAY & LAMP POWER SUPPLY
2900208 PSS	POWER & DUMMY LOAD-PRIMARY SIGNAL SELECTOR (PDL) PRIMARY SIGNAL SELECTOR
2900223	GIMBAL POSITION CONTROL (GPC)
2900207	MONITOR PANEL (MPL)
2900202	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
2900217 XBR-A XBR-B DVM	SIGNAL SELECTION & MEASUREMENT CROSSBAR - AC SIGNALS CROSSBAR - DC SIGNALS DIGITAL VOLTMETER
2900218 RSS-A RSS-B RSS-C RSS-D	OSCILLOGRAPH SIGNAL SELECTION TO FIXED AC CHANNEL TO FIXED DC CHANNEL TO SWITCHABLE AC CHANNEL TO SWITCHABLE DC CHANNEL
2900215 RSS	MEASUREMENT REFERENCE POWER SUPPLIES OSCILLOGRAPH SIGNAL SELECTOR
2900211	AUXILIARY INPUT-OUTPUT & CALIBRATION (AIP)
2900212 MSI	PIPA & IRIG MONITORING PHASE SHIFT PANEL
2900200	GYRO CAGING PANEL (GCP)

4. NONSTANDARD SYMBOLS

INDICATES "AND" GATE WITH SWITCHED SIGNAL

INDICATES EXCLUSIVE "OR" GATE WITH SWITCH POSITIONS 1 & 2

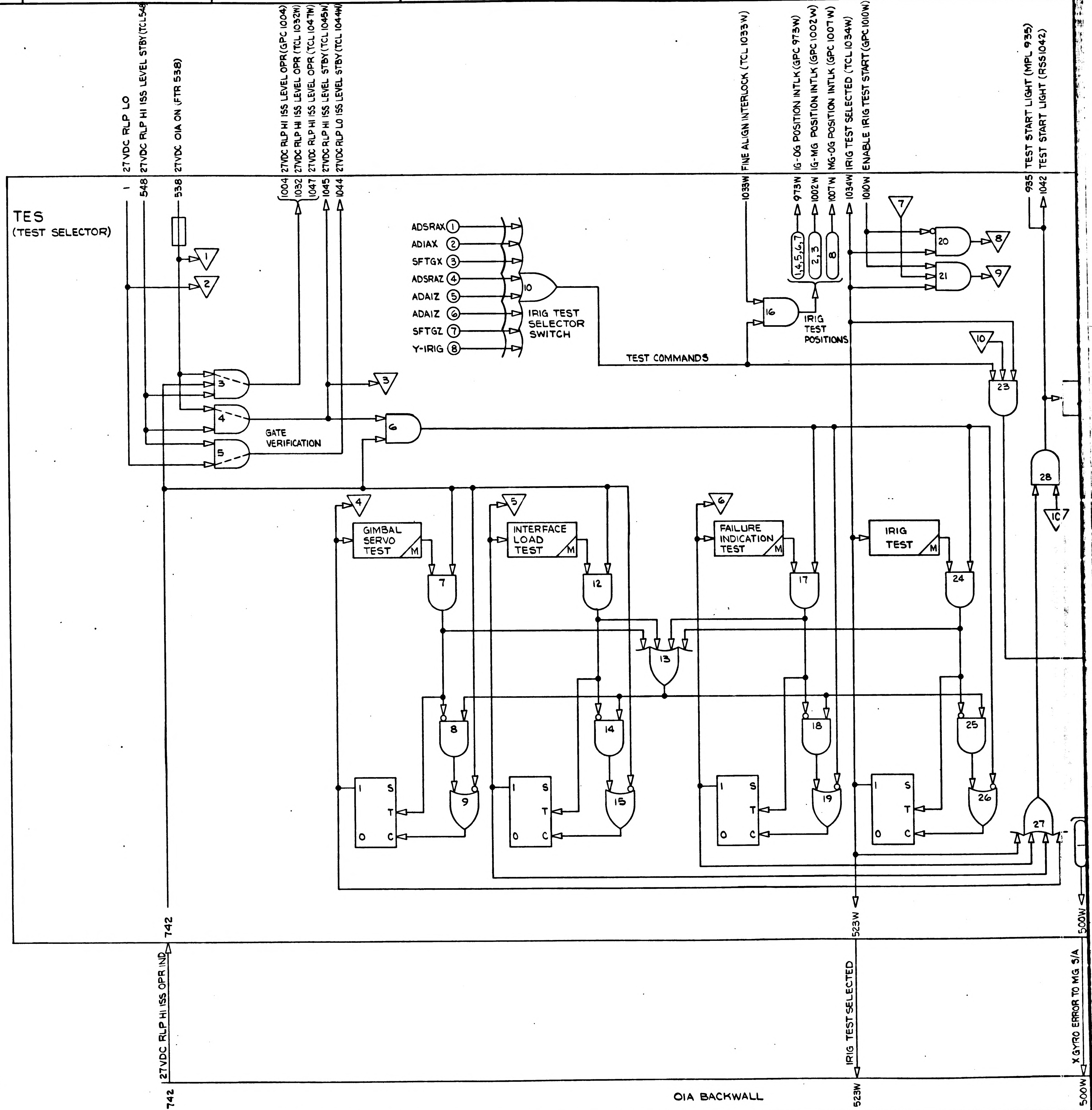
NAME M — INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME A — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G&N CONFIGURATIONS
   - E. TW, TL, OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

6. SIGNAL REFERENCE

- ▽1 27 VDC OIA ON
- ▽2 27 VDC RLP LO
- ▽3 27 VDC ISS LEVEL STANDBY
- ▽4 GIMBAL SERVO TEST SELECTED
- ▽5 INTERFACE LOAD TEST SELECTED
- ▽6 FAILURE INDICATION TEST SELECTED
- ▽7 TEST START, BUTTON DEPRESSED
- ▽8 CLEAR
- ▽9 SET
- ▽10 TEST STARTED
- ▽11 IMU ERROR SIGNALS



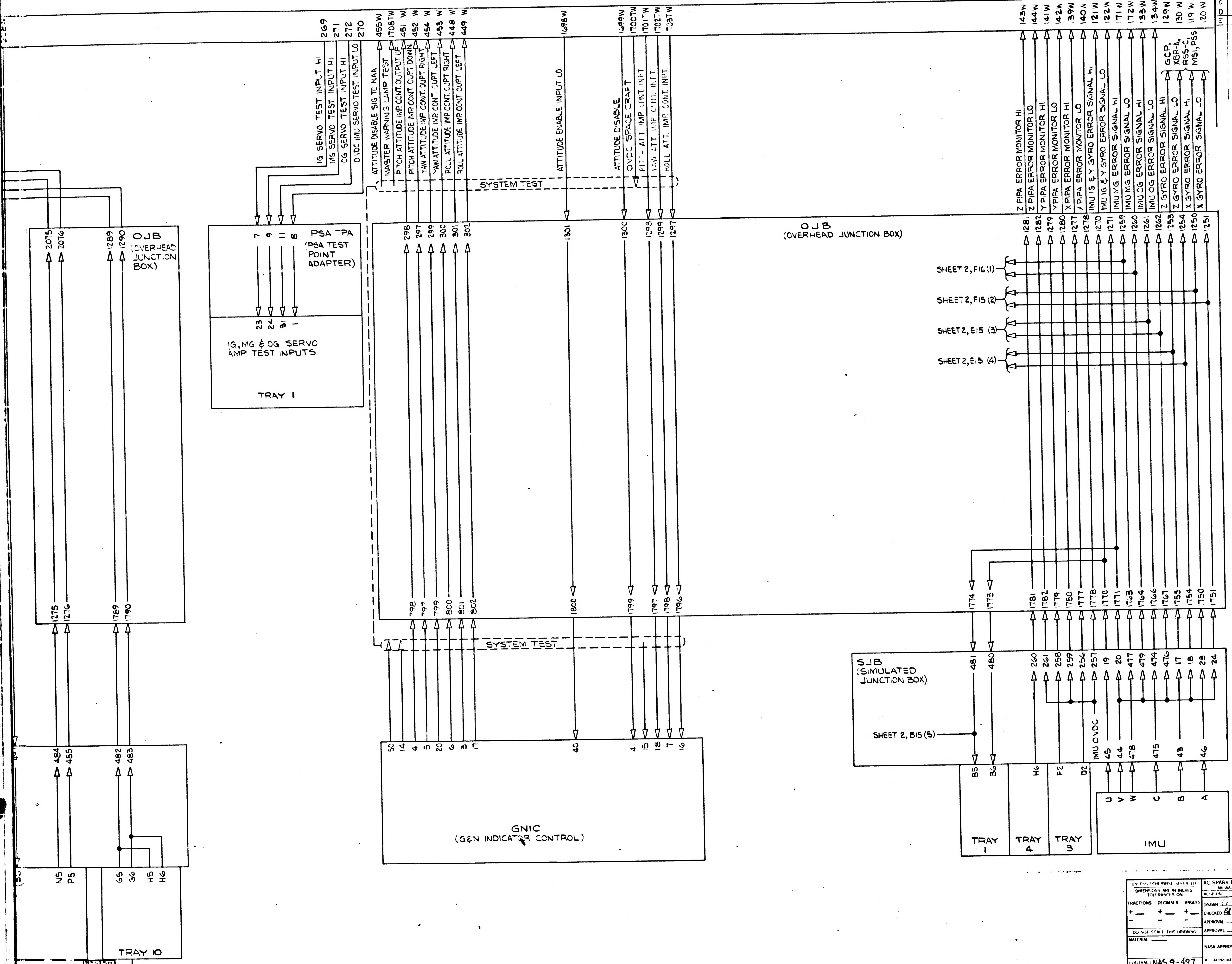
1 27VDC RLP LO
548 27VDC RLP HI ISS LEVEL STBY (TCL 548)
538 27VDC OIA ON (FTR 538)
1004 27VDC RLP HI ISS LEVEL OPR (GPC 1004)
1032 27VDC RLP HI ISS LEVEL OPR (TCL 1032W)
1047 27VDC RLP HI ISS LEVEL OPR (TCL 1047W)
1045 27VDC RLP HI ISS LEVEL STBY (TCL 1045W)
1044 27VDC RLP LO ISS LEVEL STBY (TCL 1044W)
1033W FINE ALIGN INTERLOCK (TCL 1033W)
973W IG-OG POSITION INTLK (GPC 973W)
1002W IG-MG POSITION INTLK (GPC 1002W)
1007W MG-OG POSITION INTLK (GPC 1007W)
1034W IRIG TEST SELECTED (TCL 1034W)
1010W ENABLE IRIG TEST START (GPC 1010W)
935 TEST START LIGHT (MPL 935)
1042 TEST START LIGHT (RSS 1042)
TES
(TEST SELECTOR)
ADSRAX ①
ADIAX ②
SFTGX ③
ADSRAZ ④
ADAIZ ⑤
ADAIZ ⑥
SFTGZ ⑦
Y-IRIG ⑧
IRIG TEST SELECTOR SWITCH
1,4,5,6,7
2,3
8
IRIG TEST POSITIONS
TEST COMMANDS
GATE VERIFICATION
GIMBAL SERVO TEST M
INTERFACE LOAD TEST M
FAILURE INDICATION TEST M
IRIG TEST M
S
T
C
O
1
742
27VDC RLP HI ISS OPR IND
742
523W
IRIG TEST SELECTED
523W
500W
X GYRO ERROR TO MG S/A
500W
OIA BACKWALL

SEE TCL
OIA BACKWALL

2900206 REV LTR E SH 1

MIL FORM 1050 J3

1/2900206



269 IG SERVO TEST INPUT HI
271 MG SERVO TEST INPUT HI
272 OG SERVO TEST INPUT HI
270 OVDC IMU SERVO TEST INPUT LO
455W ATTITUDE DISABLE SIG TO NAA
1708TW MASTER WARNING LAMP TEST
451 W PITCH ATTITUDE IMP. CONT. OUTPUT UP
452 W PITCH ATTITUDE IMP. CONT. OUPT DOWN
454 W YAW ATTITUDE IMP. CONT. OUPT RIGHT
453 W YAW ATTITUDE IMP. CONT. OUPT LEFT
448 W ROLL ATTITUDE IMP. CONT. OUPT RIGHT
449 W ROLL ATTITUDE IMP. CONT. OUPT LEFT
1698W ATTITUDE ENABLE INPUT LO
1699W ATTITUDE DISABLE
1700TW OVDC SPACE CRAFT
1701TW PITCH ATT. IMP. CONT. INPT
1702TW YAW ATT. IMP. CONT. INPT
1703TW ROLL ATT. IMP. CONT. INPT
143W Z PIPA ERROR MONITOR HI
144W Z PIPA ERROR MONITOR LO
141W Y PIPA ERROR MONITOR HI
142W Y PIPA ERROR MONITOR LO
139W X PIPA ERROR MONITOR HI
140W X PIPA ERROR MONITOR LO
121W IMU IG & Y GYRO ERROR SIGNAL HI
122W IMU IG & Y GYRO ERROR SIGNAL LO
171W IMU MG ERROR SIGNAL HI
172W IMU MG ERROR SIGNAL LO
133W IMU OG ERROR SIGNAL HI
134W IMU OG ERROR SIGNAL LO
129W Z GYRO ERROR SIGNAL HI
130W Z GYRO ERROR SIGNAL LO
119W X GYRO ERROR SIGNAL HI
120W X GYRO ERROR SIGNAL LO
GCP, XBR-A, RSS-C, MSI, PSS
SYSTEM TEST
OJB (OVERHEAD JUNCTION BOX)
2075 2076 1289 1290
1275 1276 1789 1790
484 485 482 483
N5 P5 G5 G6 H5 H6
TRAY 10
PSA TPA (PSA TEST POINT ADAPTER)
7 9 11 8
23 24 31 —
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
OJB (OVERHEAD JUNCTION BOX)
298 297 299 300 301 302 1301 1300 1298 1299 1297
798 797 799 800 801 802 1800 1799 1797 1798 1796
1281 1282 1279 1280 1277 1278 1270 1271 1259 1260 1261 1262 1253 1254 1250 1251
1774 1773 1781 1782 1779 1780 1777 1778 1770 1771 1763 1764 1766 1767 1755 1754 1750 1751
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (3)
SHEET 2, E15 (4)
GNIC (G&N INDICATOR CONTROL)
50 14 4 5 20 6 3 17 40 41 15 18 7 16
SJB (SIMULATED JUNCTION BOX)
481 480 260 261 258 259 256 257 19 20 477 479 474 476 17 18 23 24
SHEET 2, B15 (5)
IMU OVDC 45 44 478 475 43 46
B5 B6 H6 F2 D2
TRAY 1
TRAY 4
TRAY 3
U V W C B A
IMU

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		1 SEP 65	RLP
B		REVISION STATUS CHANGED			
C		REVISION STATUS CHANGED		7 SEP	
D		REVISION STATUS CHANGED		10	
E		REVISED PER TDPR 22002			

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

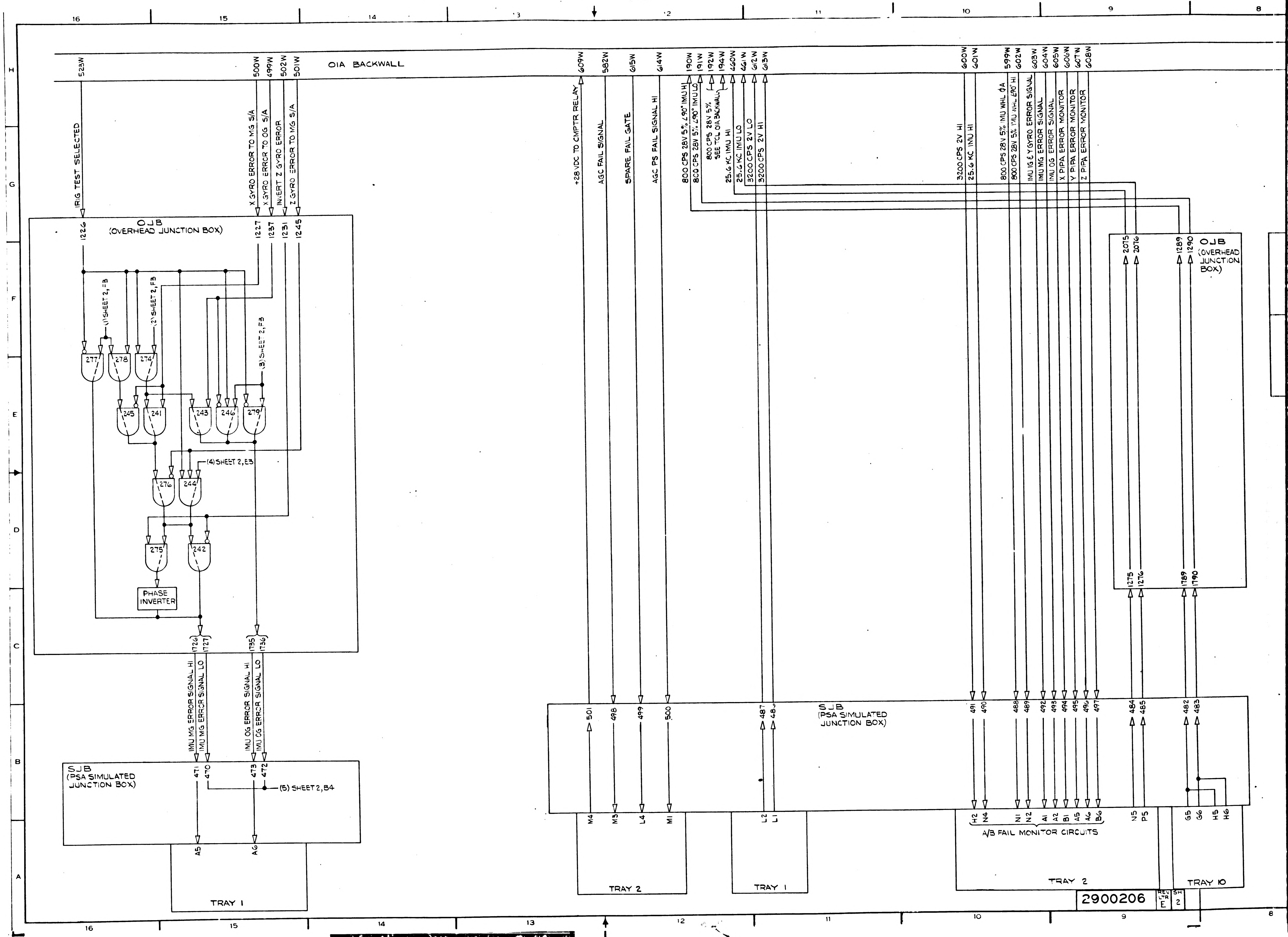
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
TEST SELECTOR
(BLOCK I SERIES 100)

CODE IDENT NO 99974
SIZE J2
2900206
SCALE —
SHEET 2 OF 4

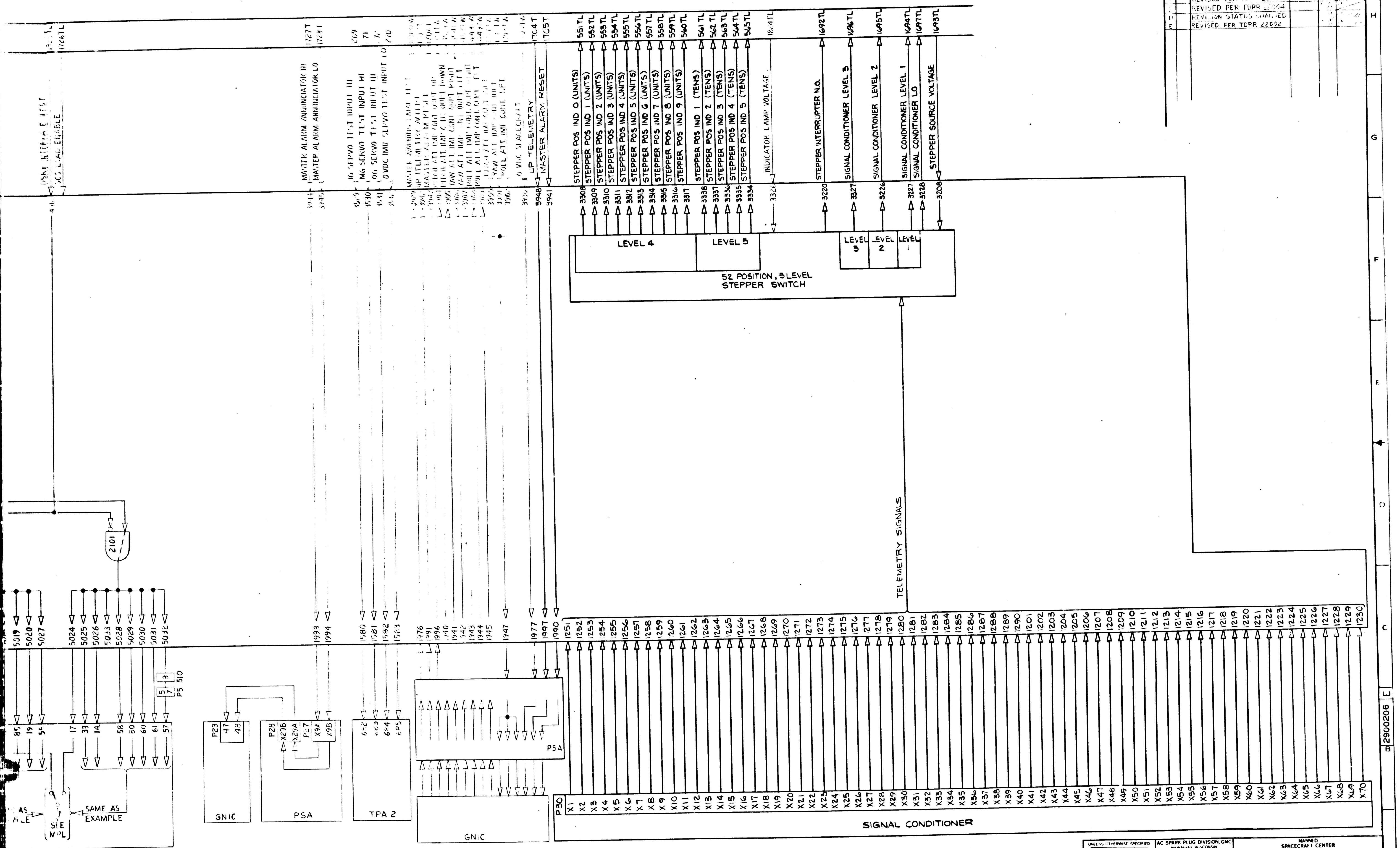
00 06 REV LTR E SH 2

2900206 E


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
523W
500W
499W
502W
501W
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
IRIG TEST SELECTED
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5%
SEE TCL OIA BACKWALL
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ΦA
800 CPS 28V 5% IMU WHL ∠90° HI
IMU IG & Y GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
OJB
(OVERHEAD JUNCTION BOX)
1226
1227
1237
1231
1245
(1) SHEET 2, F3
(2) SHEET 2, F3
(3) SHEET 2, F3
(4) SHEET 2, E3
277
278
274
245
241
243
246
279
276
244
275
242
PHASE INVERTER
1726
1727
1735
1736
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
SJB
(PSA SIMULATED JUNCTION BOX)
471
470
473
472
(5) SHEET 2, B4
A5
A6
TRAY 1
OJB
(OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1789
1790
SJB
(PSA SIMULATED JUNCTION BOX)
501
498
499
500
487
486
491
490
488
489
492
493
494
495
496
497
484
485
482
483
M4
M3
L4
M1
L2
L1
H2
N4
N1
N2
A1
A2
B1
A5
A6
B6
N5
P5
G5
G6
H5
H6
A/B FAIL MONITOR CIRCUITS
TRAY 2
TRAY 1
TRAY 2
TRAY 10
2900206
REV LTR E
SH 2

1/2900206

SYM	ZONE	REVISIONS DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	KLP
B		REVISED PER TDRR 22006			
C		REVISED PER TDRR 22004			
D		REVISION STATUS CHANGED			
E		REVISED PER TDRR 22002			



MASTER ALARM ANNUNCIATOR HI
MASTER ALARM ANNUNCIATOR LO
UP TELEMETRY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LAMP VOLTAGE
STEPPER INTERRUPTER NO.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
1704T
1705T
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
561TL
562TL
563TL
564TL
565TL
1692TL
1696TL
1695TL
1694TL
1691TL
1693TL
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
TELEMETRY SIGNALS
2101
PS 510
P23
P28
GNIC
PSA
TPA 2
SAME AS EXAMPLE
P30
X1 … X70
SIGNAL CONDITIONER
1251 … 1230

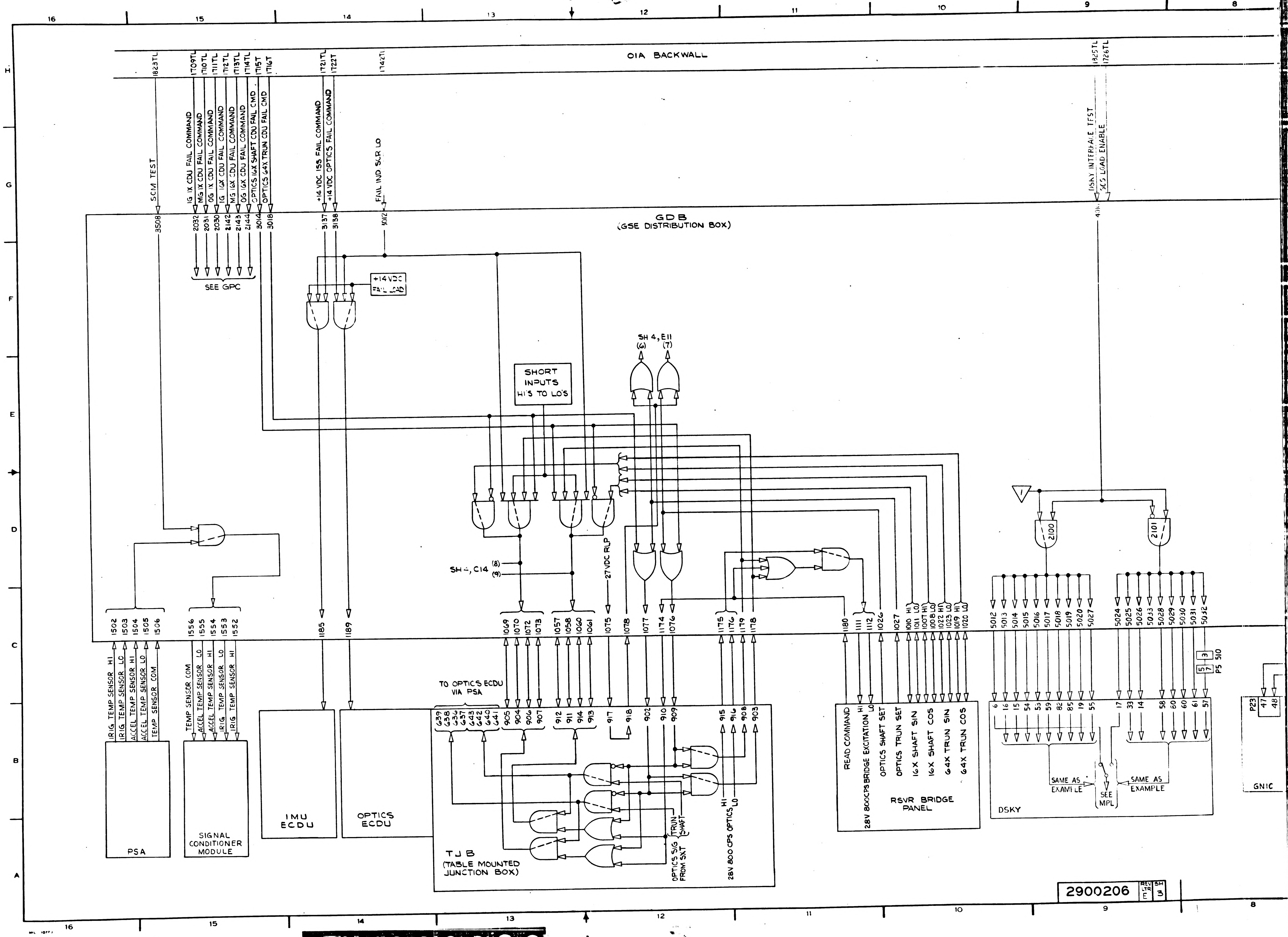
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Lookman DATE 3 JUN 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

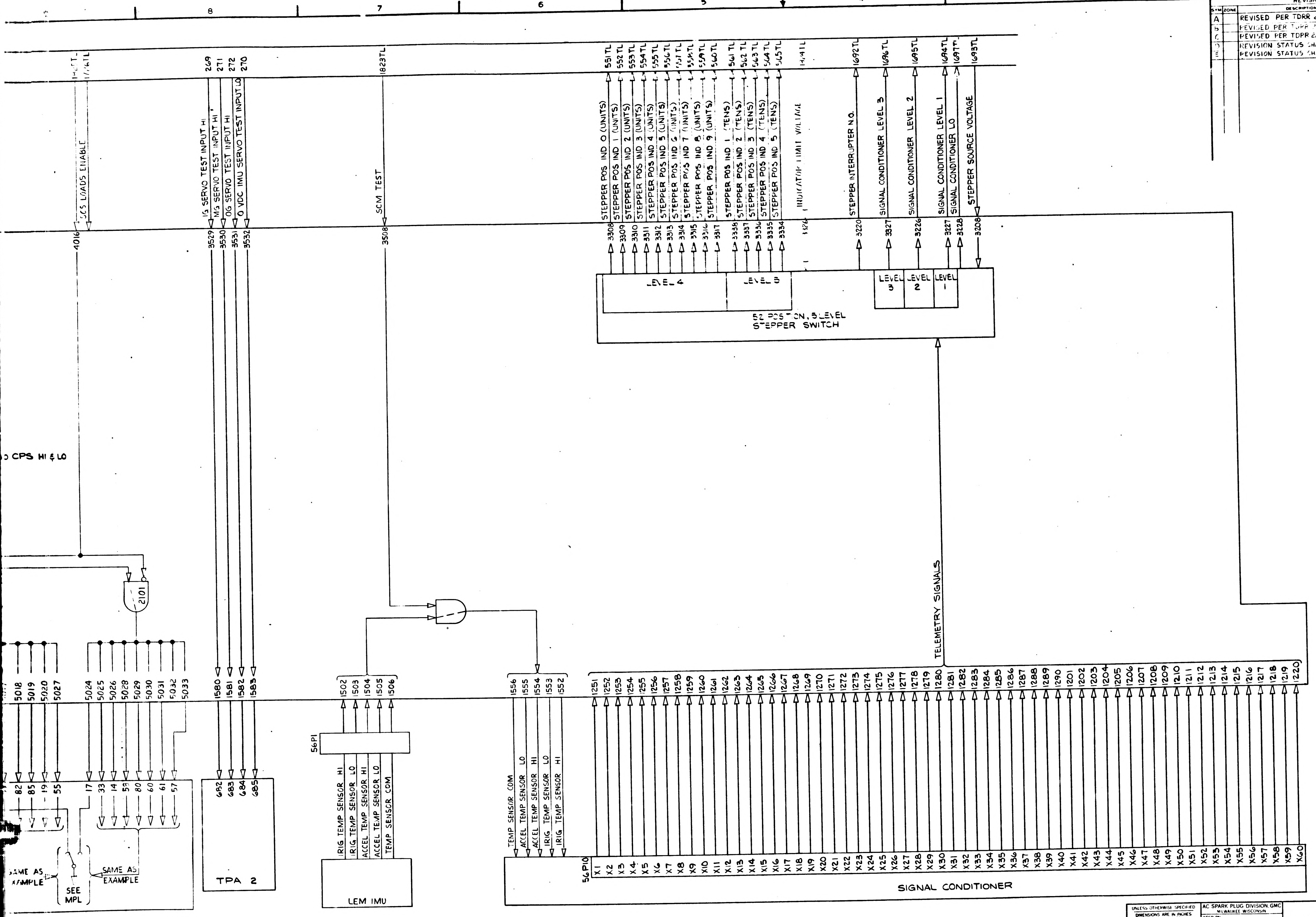
MECHANIZATION DIAGRAM-
TEST SELECTOR
(BLOCK II)

CODE IDENT NO 99974
SIZE J_2
2900206
SCALE
SHEET 3 OF 4


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1823TL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715T
1716T
1721TL
1722T
1742TL
1325TL
1726TL
SCM TEST
IG 1X CDU FAIL COMMAND
MG 1X CDU FAIL COMMAND
OG 1X CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
+14 VDC ISS FAIL COMMAND
+14 VDC OPTICS FAIL COMMAND
FAIL IND SCR LO
DSKY INTERFACE TEST
SCS LOAD ENABLE
GDB
(GSE DISTRIBUTION BOX)
3508
2032
2031
2030
2142
2143
2144
3014
3018
3137
3138
3012
4016
SEE GPC
+14 VDC
FAIL LOAD
SHORT
INPUTS
HI'S TO LO'S
SH 4, E11
(6)
(7)
SH 4, C14
(8)
(9)
27 VDC RLP
2100
2101
1502
1503
1504
1505
1506
1556
1555
1554
1553
1552
1185
1189
1069
1070
1072
1073
1057
1058
1060
1061
1075
1078
1077
1174
1076
1175
1176
1179
1178
1180
1111
1112
1026
1027
1010 HI
1011 LO
1007 HI
1008 LO
1022 HI
1023 LO
1019 HI
1020 LO
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
5024
5025
5026
5033
5028
5029
5030
5031
5032
3
5
7
P5 510
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
PSA
SIGNAL
CONDITIONER
MODULE
IMU
ECDU
OPTICS
ECDU
TO OPTICS ECDU
VIA PSA
639
638
636
637
643
642
640
641
905
904
906
907
912
911
914
913
917
918
902
910
909
915
916
908
903
TRUN
SHAFT
OPTICS SIG
FROM SXT
HI
LO
28V 800 CPS OPTICS
TJB
(TABLE MOUNTED
JUNCTION BOX)
READ COMMAND
HI
LO
28V 800CPS BRIDGE EXCITATION
OPTICS SHAFT SET
OPTICS TRUN SET
16X SHAFT SIN
16X SHAFT COS
64X TRUN SIN
64X TRUN COS
RSVR BRIDGE
PANEL
6
16
15
54
53
59
82
85
19
55
17
33
14
58
60
60
61
57
SAME AS
EXAMPLE
SEE
MPL
SAME AS
EXAMPLE
DSKY
P23
47
48
GNIC
2900206
REV LTR
E
SH
3

1 2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	RLP AU
B		REVISED PER TDPR 22006		9 SEP	
C		REVISED PER TDPR 22004		7 SEP 65	LK
D		REVISION STATUS CHANGED		10 SEP	LK AU
E		REVISION STATUS CHANGED		13 SEP 65	LK



1448TL
1776TL
SCS LOADS ENABLE
4016
269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
3529
3530
3531
3532
1823TL
SCM TEST
3508
551TL 552TL 553TL 554TL 555TL 556TL 557TL 558TL 559TL 560TL
561TL 562TL 563TL 564TL 565TL
1441TL
1692TL 1696TL 1695TL 1694TL 1697TL 1693TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LIMIT VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3308 3309 3310 3311 3312 3313 3314 3315 3316 3317
3338 3337 3336 3335 3334
3326
3220 3327 3226 3227 3228 3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL
STEPPER SWITCH
CPS HI & LO
2101
TELEMETRY SIGNALS
5018 5019 5020 5027
5024 5025 5026 5028 5029 5030 5031 5032 5033
82 85 19 55
17 33 14 53 80 60 61 57
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
1580 1581 1582 1583
682 683 684 685
TPA 2
1502 1503 1504 1505 1506
56P1
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
LEM IMU
1556 1555 1554 1553 1552
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220
56P10
X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21 X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38 X39 X40 X41 X42 X43 X44 X45 X46 X47 X48 X49 X50 X51 X52 X53 X54 X55 X56 X57 X58 X59 X60
SIGNAL CONDITIONER
8 7 6 5 4 3 2 1
H G F E D C B A

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Lookman DATE 7 JUN 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

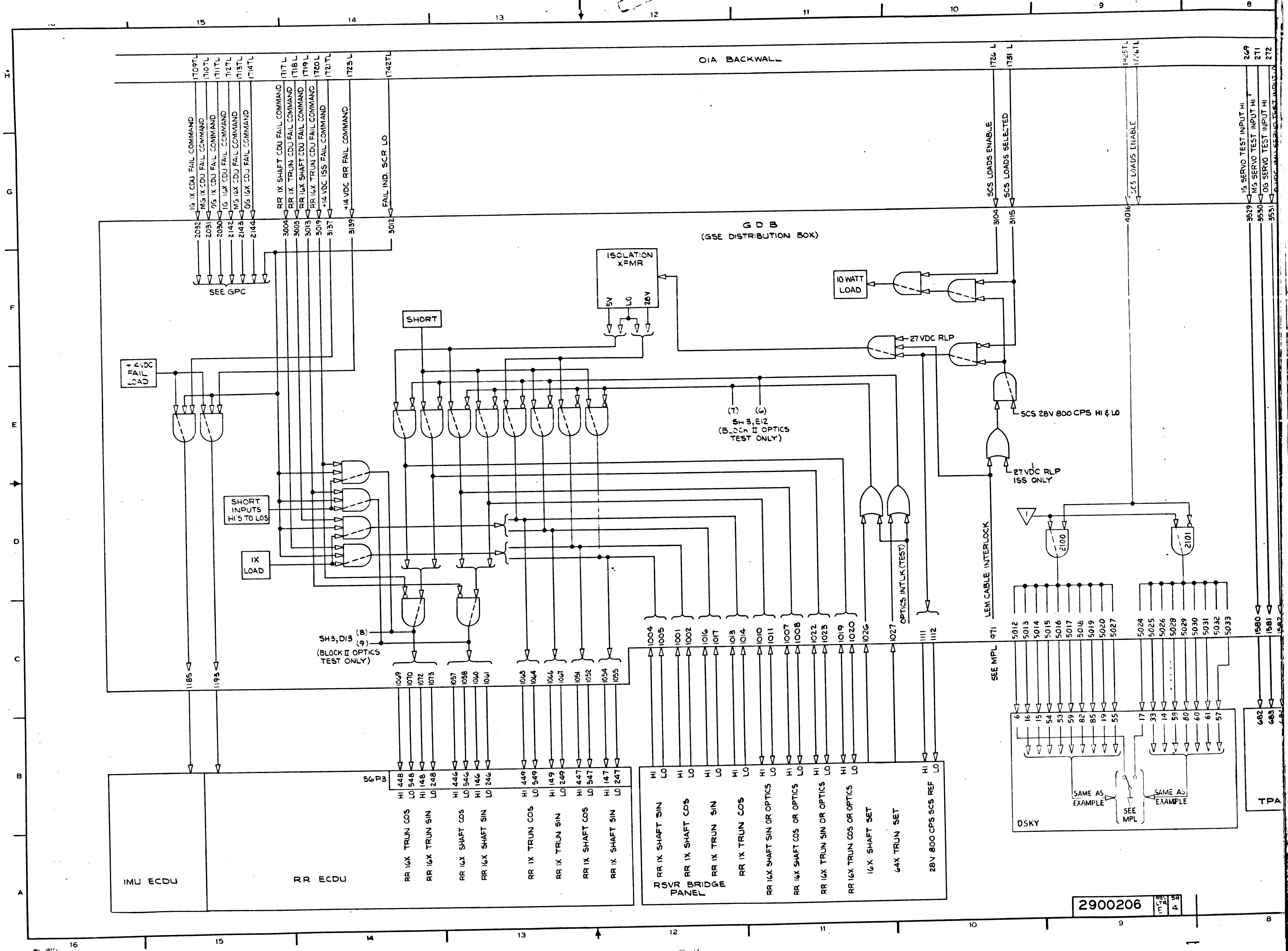
MECHANIZATION DIAGRAM-
TEST SELECTOR
(LEM)

CODE IDENT NO 99974 SIZE J_2 2900206
SCALE — SHEET 4 OF 4

2900206 REV E SH 4

34

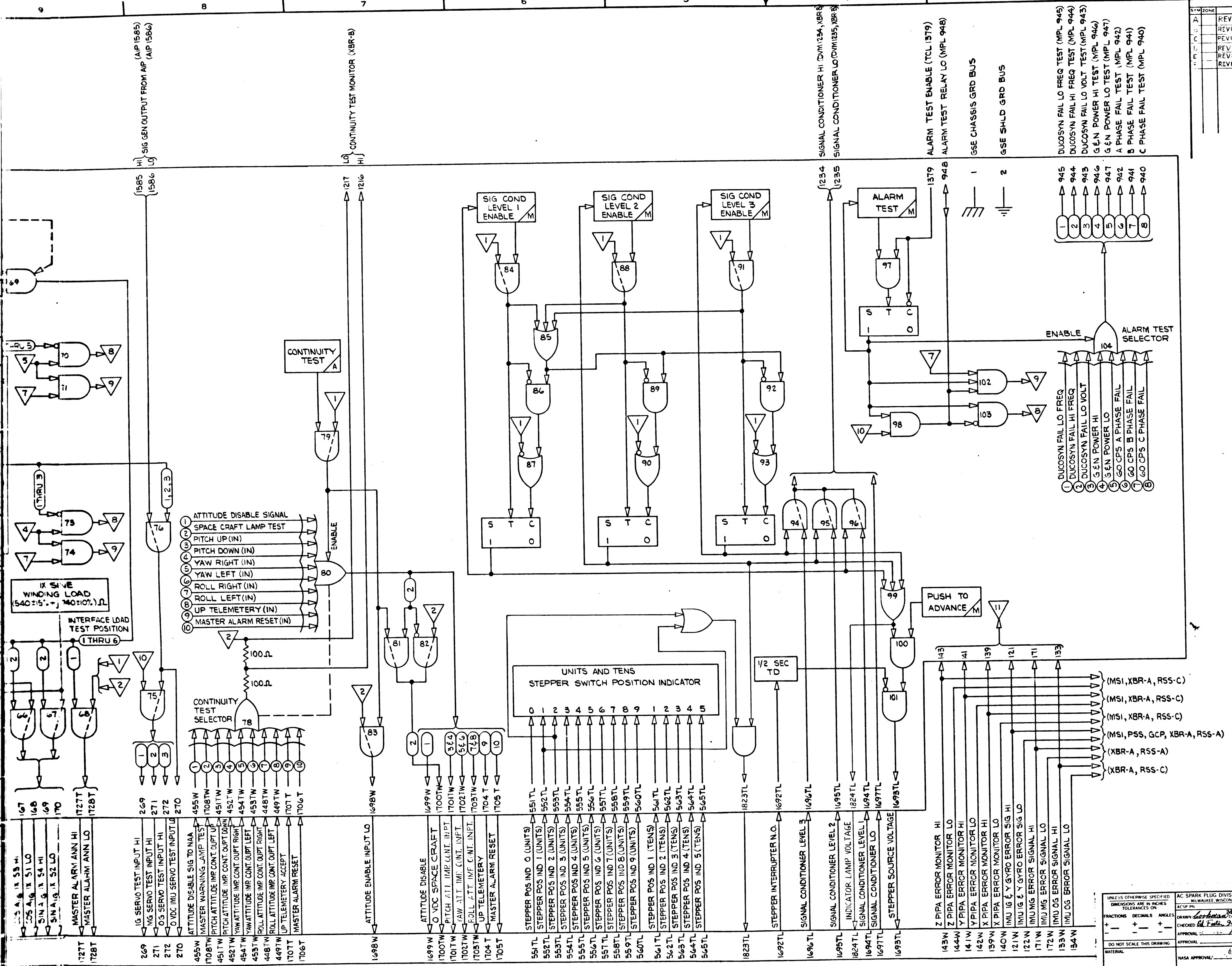
2/2900206


OIA BACKWALL
GDB
(GSE DISTRIBUTION BOX)
1709TL 1710TL 1711TL 1712TL 1713TL 1714TL
1717L 1718L 1719L 1720L 1721TL 1723L 1742TL
IG IX CDU FAIL COMMAND
MG IX CDU FAIL COMMAND
OG IX CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
RR IX SHAFT CDU FAIL COMMAND
RR IX TRUN CDU FAIL COMMAND
RR 16X SHAFT CDU FAIL COMMAND
RR 16X TRUN CDU FAIL COMMAND
+14 VDC ISS FAIL COMMAND
+14 VDC RR FAIL COMMAND
FAIL IND. SCR LO
2032 2031 2030 2142 2143 2144 3004 3005 3013 3019 3137 3139 3012
SEE GPC
1726 L 1731 L
SCS LOADS ENABLE
SCS LOADS SELECTED
3104 3115
1725TL 1716TL
SCS LOADS ENABLE
4016
269 271 272
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
3529 3530 3531
ISOLATION XFMR
5V LO 28V
10 WATT LOAD
27VDC RLP
SCS 28V 800 CPS HI & LO
27VDC RLP ISS ONLY
SHORT
+4VDC FAIL LOAD
(7) (6)
SH 3, E12
(BLOCK II OPTICS TEST ONLY)
SHORT INPUTS HI'S TO LOS
IX LOAD
SH3, D13 (8) (9)
(BLOCK II OPTICS TEST ONLY)
LEM CABLE INTERLOCK
OPTICS INTLK (TEST)
SEE MPL
1
2100 2101
1185 1193
1069 1070 1072 1073 1057 1058 1060 1061 1063 1064 1066 1067 1051 1052 1054 1055
1004 1005 1001 1002 1016 1017 1013 1014 1010 1011 1007 1008 1022 1023 1019 1020 1026 1027 1111 1112 971
5012 5013 5014 5015 5016 5017 5018 5019 5020 5027
5024 5025 5026 5028 5029 5030 5031 5032 5033
1580 1581 1582
56P3
448 548 148 248 446 546 146 246 449 549 149 249 447 547 147 247
HI LO
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
RR IX TRUN COS
RR IX TRUN SIN
RR IX SHAFT COS
RR IX SHAFT SIN
IMU ECDU
RR ECDU
RR IX SHAFT SIN
RR IX SHAFT COS
RR IX TRUN SIN
RR IX TRUN COS
RR 16X SHAFT SIN OR OPTICS
RR 16X SHAFT COS OR OPTICS
RR 16X TRUN SIN OR OPTICS
RR 16X TRUN COS OR OPTICS
16X SHAFT SET
64X TRUN SET
28V 800 CPS SCS REF
RSVR BRIDGE PANEL
6 16 15 54 53 59 82 85 19 55
17 33 14 58 80 60 61 57
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
DSKY
682 683
TPA
16 15 14 13 12 11 10 9 8
A B C D E F G H

2900206 REV SH 4

1/-2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	RLP AU
B		REVISED PER TDRR 22006		7 SEP 65	LK
C		REVISED PER TDRR 22004		9 SEP 65	LK
D		REVISED PER TDRR 22005		10	AU
E		REVISED PER TDRR 22002		3 SEP 65	LK
F		REVISED PER TDRR 22003		16 SEP 65	LK


SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
HI LO
1585 1586
CONTINUITY TEST MONITOR (XBR-B)
LO HI
1217 1216
SIGNAL CONDITIONER HI (DVM 1234, XBR-B)
SIGNAL CONDITIONER LO (DVM 1235, XBR-B)
1234 1235
ALARM TEST ENABLE (TCL 1379)
ALARM TEST RELAY LO (MPL 948)
1379 948
GSE CHASSIS GRD BUS
GSE SHLD GRD BUS
1 2
DUCOSYN FAIL LO FREQ TEST (MPL 945)
DUCOSYN FAIL HI FREQ TEST (MPL 944)
DUCOSYN FAIL LO VOLT TEST (MPL 943)
G & N POWER HI TEST (MPL 946)
G & N POWER LO TEST (MPL 947)
A PHASE FAIL TEST (MPL 942)
B PHASE FAIL TEST (MPL 941)
C PHASE FAIL TEST (MPL 940)
945 944 943 946 947 942 941 940
SIG COND LEVEL 1 ENABLE M
SIG COND LEVEL 2 ENABLE M
SIG COND LEVEL 3 ENABLE M
ALARM TEST M
84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104
S T C 1 0
ENABLE
ALARM TEST SELECTOR
DUCOSYN FAIL LO FREQ
DUCOSYN FAIL HI FREQ
DUCOSYN FAIL LO VOLT
G & N POWER HI
G & N POWER LO
60 CPS A PHASE FAIL
60 CPS B PHASE FAIL
60 CPS C PHASE FAIL
CONTINUITY TEST A
79 80 81 82 83
ENABLE
ATTITUDE DISABLE SIGNAL
① SPACE CRAFT LAMP TEST
② PITCH UP (IN)
③ PITCH DOWN (IN)
④ YAW RIGHT (IN)
⑤ YAW LEFT (IN)
⑥ ROLL RIGHT (IN)
⑦ ROLL LEFT (IN)
⑧ UP TELEMETRY (IN)
⑨ MASTER ALARM RESET (IN)
100Ω
100Ω
CONTINUITY TEST SELECTOR
78
PUSH TO ADVANCE M
1/2 SEC TD
UNITS AND TENS STEPPER SWITCH POSITION INDICATOR
0 1 2 3 4 5 6 7 8 9 1 2 3 4 5
69 70 71 73 74 75 76 66 67 68
1 THRU 5
1 THRU 3
1,2,3
IX SINE WINDING LOAD (540±15% + j 140±10%) Ω
INTERFACE LOAD TEST POSITION
1 THRU 6
3&4 5&6 7&8
143 141 139 121 171 133
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, PSS, GCP, XBR-A, RSS-A)
(XBR-A, RSS-A)
(XBR-A, RSS-C)
167 168 169 170 1727T 1728T
COS A IG IX 53 HI
COS A IG IX 51 LO
SIN A IG IX 54 HI
SIN A IG IX 52 LO
MASTER ALARM ANN HI
MASTER ALARM ANN LO
269 271 272 270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
455W 1708TW 451TW 452TW 454TW 453TW 448TW 449TW 1707T 1706T
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUPT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
UP TELEMETERY ACCEPT
MASTER ALARM RESET
1698W
ATTITUDE ENABLE INPUT LO
1699W 1700TW 1701TW 1702TW 1703TW 1704T 1705T
ATTITUDE DISABLE
0 VDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
UP TELEMETERY
MASTER ALARM RESET
551TL 552TL 553TL 554TL 555TL 556TL 557TL 558TL 559TL 560TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
561TL 562TL 563TL 564TL 565TL
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
1823TL
1692TL
STEPPER INTERRUPTER N.O.
1696TL
SIGNAL CONDITIONER LEVEL 3
1695TL
SIGNAL CONDITIONER LEVEL 2
1824TL
INDICATOR LAMP VOLTAGE
1694TL
SIGNAL CONDITIONER LEVEL 1
1697TL
SIGNAL CONDITIONER LO
1693TL
STEPPER SOURCE VOLTAGE
143W 144W 141W 142W 139W 140W 121W 122W 171W 172W 133W 134W
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIG HI
IMU IG & Y GYRO ERROR SIG LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
9 8 7 6 5 4 3 2 1
H G F E D C B A

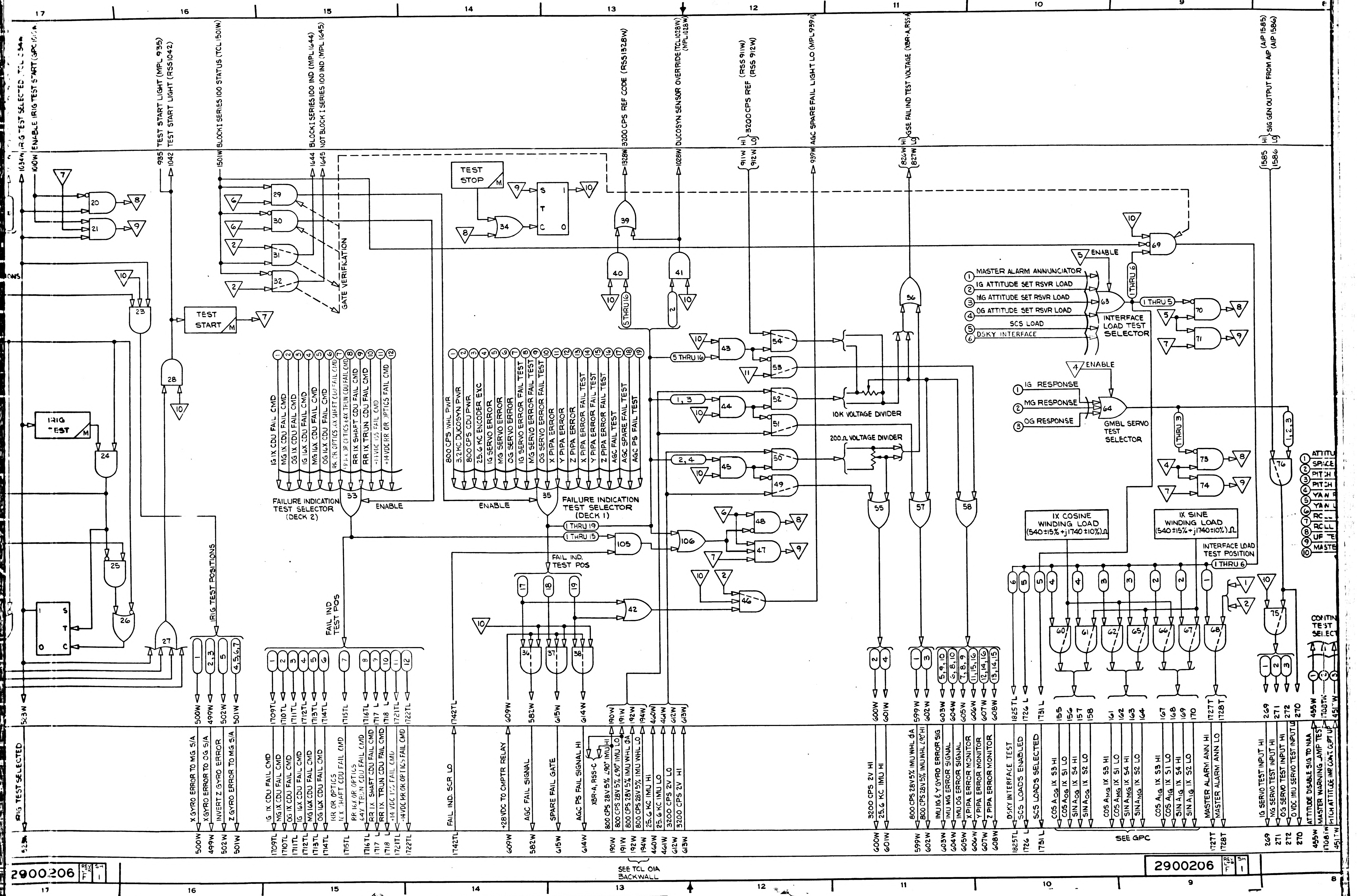
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Cookman DATE 24 MAY 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
TEST SELECTOR
(BLOCK I SERIES 100, BLOCK II & LEM)

CODE IDENT NO 99974
SIZE J3
2900206
SCALE —
SHEET 1 OF 4


17
16
15
14
13
12
11
10
9
1034W IRIG TEST SELECTED (TCL 1034W)
1010W ENABLE IRIG TEST START (GPC 1010W)
935 TEST START LIGHT (MPL 935)
1042 TEST START LIGHT (RSS1042)
1501W BLOCK I SERIES 100 STATUS (TCL 1501W)
1644 BLOCK I SERIES 100 IND (MPL 1644)
1645 NOT BLOCK I SERIES 100 IND (MPL 1645)
1328W 3200 CPS REF CODE (RSS1328W)
1028W DUCOSYN SENSOR OVERRIDE (TCL1028W) (MPL1028W)
911W HI 912W LO 3200 CPS REF (RSS 911W) (RSS 912W)
939W AGC SPARE FAIL LIGHT LO (MPL 939)
826W HI 827W LO GSE FAIL IND TEST VOLTAGE (XBR-A, RSS-A)
1585 HI 1586 LO SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
TEST STOP
M
TEST START
M
IRIG TEST
M
S
T
C
I
O
GATE VERIFICATION
1 IG 1X CDU FAIL CMD
2 MG 1X CDU FAIL CMD
3 OG 1X CDU FAIL CMD
4 IG 16X CDU FAIL CMD
5 MG 16X CDU FAIL CMD
6 OG 16X CDU FAIL CMD
7 RR OR OPTICS 16X SHAFT CDU FAIL CMD
8 RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
9 RR 1X SHAFT CDU FAIL CMD
10 RR 1X TRUN CDU FAIL CMD
11 +14VDC ISS FAIL CMD
12 -14VDC RR OR OPTICS FAIL CMD
FAILURE INDICATION TEST SELECTOR (DECK 2)
ENABLE
1 800 CPS WHL PWR
2 3.2 KC DUCOSYN PWR
3 800 CPS CDU PWR
4 25.6 KC ENCODER EXC
5 IG SERVO ERROR
6 MG SERVO ERROR
7 OG SERVO ERROR
8 IG SERVO ERROR FAIL TEST
9 MG SERVO ERROR FAIL TEST
10 OG SERVO ERROR FAIL TEST
11 X PIPA ERROR
12 Y PIPA ERROR
13 Z PIPA ERROR
14 X PIPA ERROR FAIL TEST
15 Y PIPA ERROR FAIL TEST
16 Z PIPA ERROR FAIL TEST
17 AGC FAIL TEST
18 AGC SPARE FAIL TEST
19 AGC PS FAIL TEST
FAILURE INDICATION TEST SELECTOR (DECK 1)
ENABLE
1 THRU 19
1 THRU 15
FAIL IND. TEST POS
FAIL IND TEST POS
IRIG TEST POSITIONS
1
2,3
5
4,5,6,7
5 THRU 16
1, 3
2, 4
1 THRU 16
10K VOLTAGE DIVIDER
200Ω VOLTAGE DIVIDER
① MASTER ALARM ANNUNCIATOR
② IG ATTITUDE SET RSVR LOAD
③ MG ATTITUDE SET RSVR LOAD
④ OG ATTITUDE SET RSVR LOAD
⑤ SCS LOAD
⑥ DSKY INTERFACE
ENABLE
INTERFACE LOAD TEST SELECTOR
1 THRU 6
1 THRU 5
① IG RESPONSE
② MG RESPONSE
③ OG RESPONSE
ENABLE
GMBL SERVO TEST SELECTOR
1 THRU 3
1, 2, 3
1X COSINE WINDING LOAD (540±15%+j1740±10%)Ω
1X SINE WINDING LOAD (540±15%+j1740±10%)Ω
INTERFACE LOAD TEST POSITION
1 THRU 6
① ATTITU
② SPACE
③ PITCH
④ PITCH
⑤ YAW
⑥ YAW
⑦ ROLL
⑧ ROLL
⑨ UP
⑩ MASTE
CONTIN TEST SELEC
20
21
23
24
25
26
27
28
29
30
31
32
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74
75
76
105
106
523W IRIG TEST SELECTED
500W X GYRO ERROR TO MG S/A
499W X GYRO ERROR TO OG S/A
502W INVERT Z GYRO ERROR
501W Z GYRO ERROR TO MG S/A
1709TL IG 1X CDU FAIL CMD
1710TL MG 1X CDU FAIL CMD
1711TL OG 1X CDU FAIL CMD
1712TL IG 16X CDU FAIL CMD
1713TL MG 16X CDU FAIL CMD
1714TL OG 16X CDU FAIL CMD
1715TL RR OR OPTICS 16X SHAFT CDU FAIL CMD
1716TL RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
1717 L RR 1X SHAFT CDU FAIL CMD
1718 L RR 1X TRUN CDU FAIL CMD
1721TL +14 VDC ISS FAIL CMD
1722TL -14VDC RR OR OPTICS FAIL CMD
1742TL FAIL IND. SCR LO
609W +28VDC TO CMPTR RELAY
582W AGC FAIL SIGNAL
615W SPARE FAIL GATE
614W AGC PS FAIL SIGNAL HI
XBR-A, RSS-C
190W 800 CPS 28V 5% ∠90° IMU HI
191W 800 CPS 28V 5% ∠90° IMU LO
192W 800 CPS 28V 5% IMU WHL ØA
194W 800 CPS 28V 5% IMU WHL LO
460W 25.6 KC IMU HI
461W 25.6 KC IMU LO
612W 3200 CPS 2V LO
613W 3200 CPS 2V HI
SEE TCL 01A BACKWALL
600W 3200 CPS 2V HI
601W 25.6 KC IMU HI
599W 800 CPS 28V 5% IMU WHL ØA
602W 800 CPS 28V 5% IMU WHL ∠90° HI
603W IMU IG & Y GYRO ERROR SIG
604W IMU MG ERROR SIGNAL
605W IMU OG ERROR SIGNAL
606W X PIPA ERROR MONITOR
607W Y PIPA ERROR MONITOR
608W Z PIPA ERROR MONITOR
5, 9, 10
6, 8, 10
7, 8, 9
11, 15, 16
12, 14, 16
13, 14, 15
1825TL DSKY INTERFACE TEST
1726 L SCS LOADS ENABLED
1731 L SCS LOADS SELECTED
155 COS A_{OG} 1X S3 HI
156 COS A_{OG} 1X S1 LO
157 SIN A_{OG} 1X S4 HI
158 SIN A_{OG} 1X S2 LO
161 COS A_{MG} 1X S3 HI
162 COS A_{MG} 1X S1 LO
163 SIN A_{MG} 1X S4 HI
164 SIN A_{MG} 1X S2 LO
167 COS A_{IG} 1X S3 HI
168 COS A_{IG} 1X S1 LO
169 SIN A_{IG} 1X S4 HI
170 SIN A_{IG} 1X S2 LO
SEE GPC
1727T MASTER ALARM ANN HI
1728T MASTER ALARM ANN LO
269 IG SERVO TEST INPUT HI
271 MG SERVO TEST INPUT HI
272 OG SERVO TEST INPUT HI
270 0 VDC IMU SERVO TEST INPUT LO
455W ATTITUDE DISABLE SIG TO NAA
1108TW MASTER WARNING AMP TEST
451TW PITCH ATTITUDE IMP. CONT. OUPT UP
2900206 REV F SH 1
2900206 REV F SH 1
8

27/2900206

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM)

2900210 RLP	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RELAY & LAMP POWER SUPPLY
2900208 PSS	POWER & DUMMY LOAD-PRIMARY SIGNAL SELECTOR (PDL) PRIMARY SIGNAL SELECTOR
2900223	GIMBAL POSITION CONTROL (GPC)
2900207	MONITOR PANEL (MPL)
2900202	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
2900217 XBR-A XBR-B DVM	SIGNAL SELECTION & MEASUREMENT CROSSBAR - AC SIGNALS CROSSBAR - DC SIGNALS DIGITAL VOLTMETER
2900218 RSS-A RSS-B RSS-C RSS-D	OSCILLOGRAPH SIGNAL SELECTION TO FIXED AC CHANNEL TO FIXED DC CHANNEL TO SWITCHABLE AC CHANNEL TO SWITCHABLE DC CHANNEL
2900215 RSS	MEASUREMENT REFERENCE POWER SUPPLIES OSCILLOGRAPH SIGNAL SELECTOR
2900211	AUXILIARY INPUT-OUTPUT & CALIBRATION (AIP)
2900212 MSI	PIPA & IRIG MONITORING PHASE SHIFT PANEL
2900200	GYRO CAGING PANEL (GCP)

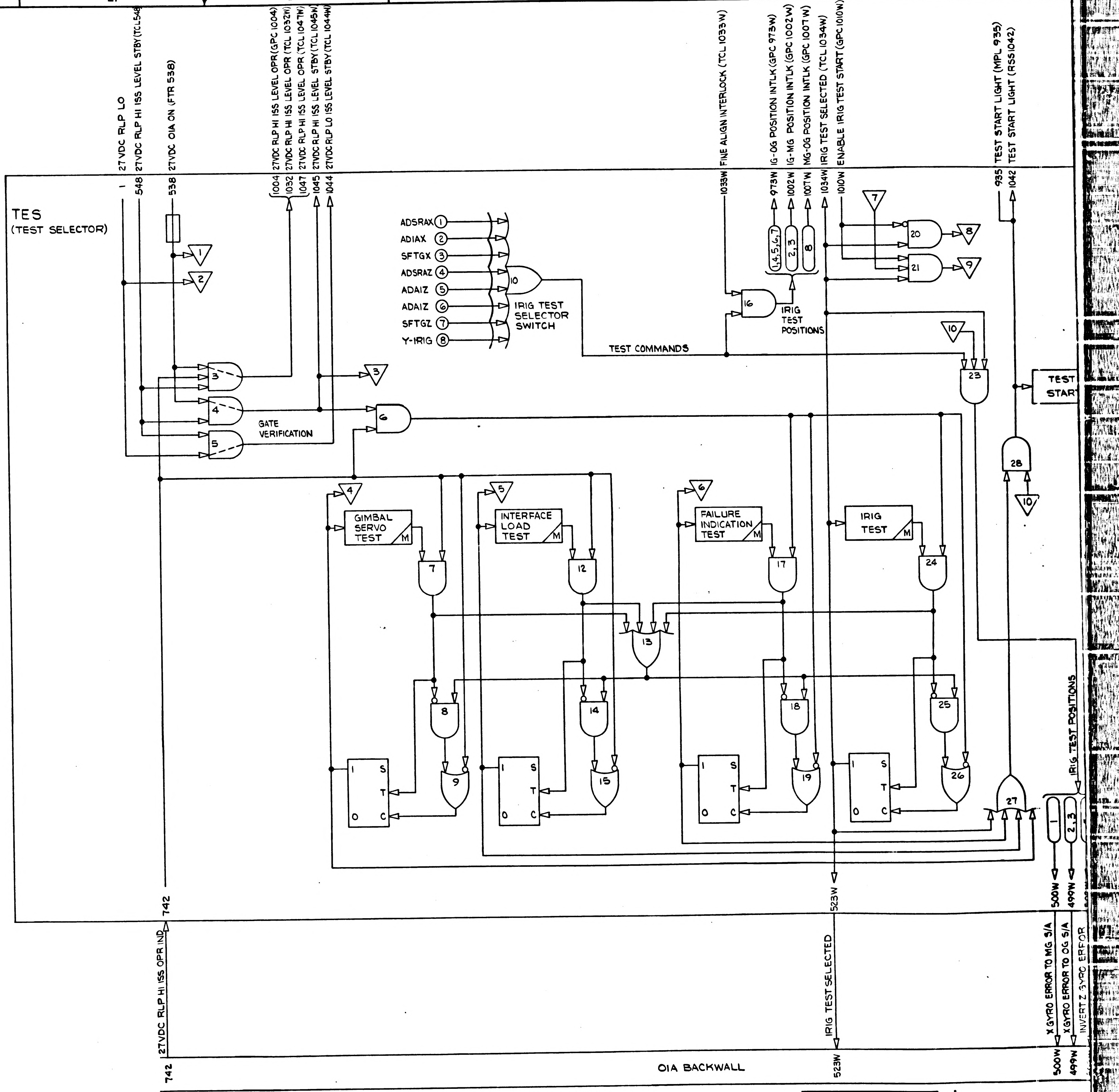
4. NONSTANDARD SYMBOLS

	INDICATES "AND" GATE WITH SWITCHED SIGNAL
① ②	INDICATES EXCLUSIVE "OR" GATE WITH SWITCH POSITIONS 1 & 2
NAME M	INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G&N CONFIGURATIONS
   - E. TW, TL, OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

6. SIGNAL REFERENCE

1	27 VDC OIA ON
2	27 VDC RLP LO
3	27 VDC ISS LEVEL STANDBY
4	GIMBAL SERVO TEST SELECTED
5	INTERFACE LOAD TEST SELECTED
6	FAILURE INDICATION TEST SELECTED
7	TEST START, BUTTON DEPRESSED
8	CLEAR
9	SET
10	TEST STARTED
11	IMU ERROR SIGNALS


TES
(TEST SELECTOR)
1 27VDC RLP LO
548 27VDC RLP HI ISS LEVEL STBY (TCL 548)
538 27VDC OIA ON (FTR 538)
1004 27VDC RLP HI ISS LEVEL OPR (GPC 1004)
1032 27VDC RLP HI ISS LEVEL OPR (TCL 1032W)
1047 27VDC RLP HI ISS LEVEL OPR (TCL 1047W)
1045 27VDC RLP HI ISS LEVEL STBY (TCL 1045W)
1044 27VDC RLP LO ISS LEVEL STBY (TCL 1044W)
1033W FINE ALIGN INTERLOCK (TCL 1033W)
973W IG-OG POSITION INTLK (GPC 973W)
1002W IG-MG POSITION INTLK (GPC 1002W)
1007W MG-OG POSITION INTLK (GPC 1007W)
1034W IRIG TEST SELECTED (TCL 1034W)
1010W ENABLE IRIG TEST START (GPC 1010W)
935 TEST START LIGHT (MPL 935)
1042 TEST START LIGHT (RSS1042)
ADSRAX ①
ADIAX ②
SFTGX ③
ADSRAZ ④
ADAIZ ⑤
ADAIZ ⑥
SFTGZ ⑦
Y-IRIG ⑧
IRIG TEST SELECTOR SWITCH
1,4,5,6,7
2,3
8
IRIG TEST POSITIONS
TEST COMMANDS
GATE VERIFICATION
GIMBAL SERVO TEST M
INTERFACE LOAD TEST M
FAILURE INDICATION TEST M
IRIG TEST M
TEST START
IRIG TEST POSITIONS
1
2,3
S T C O
742
27VDC RLP HI ISS OPR IND
523W
IRIG TEST SELECTED
500W
X GYRO ERROR TO MG S/A
499W
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
OIA BACKWALL
24
23
22
21
20
19
18
17
16

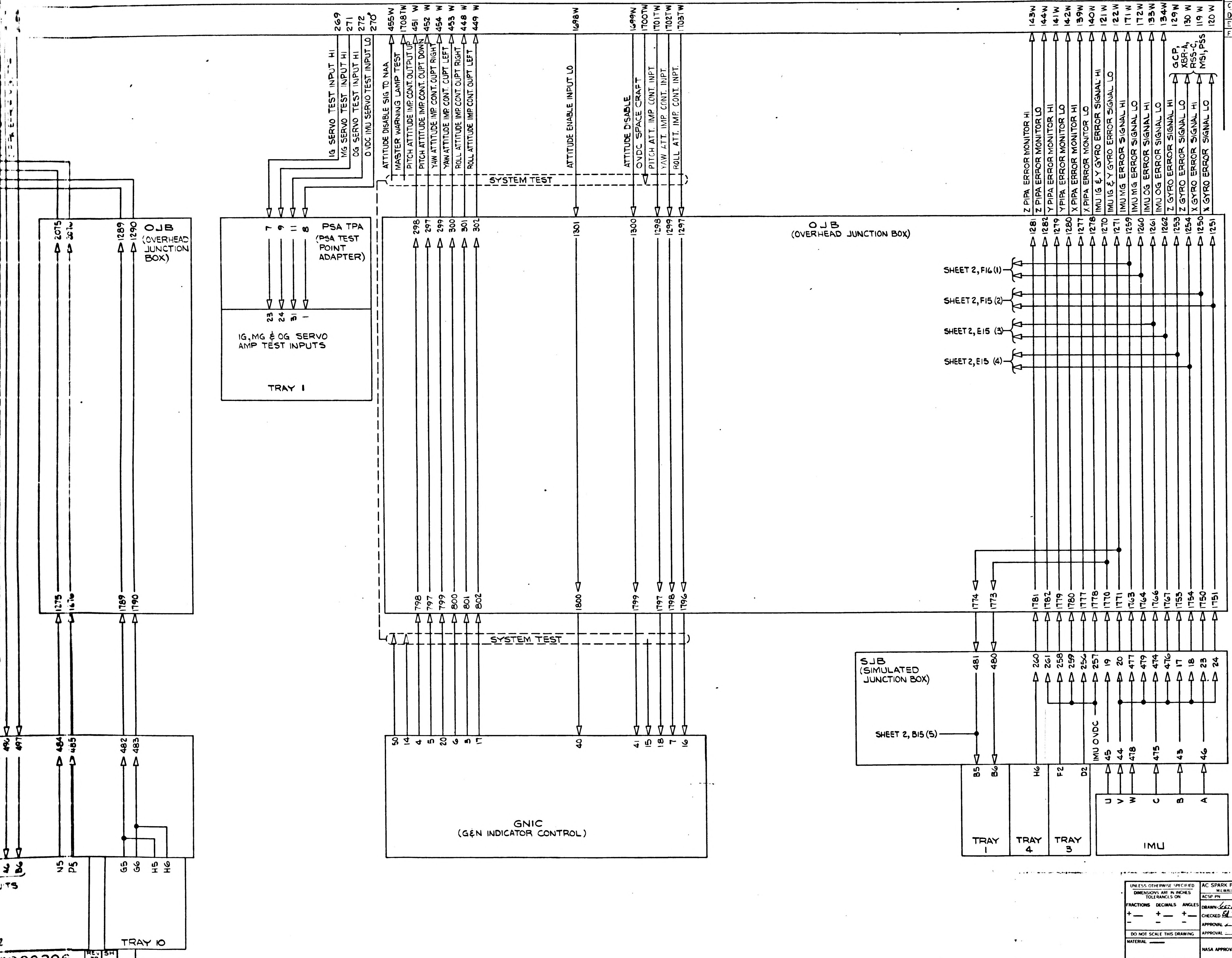
SEE TCL
OIA BACKWALL

2900206 REV LTR F SH 1

MIL FORM 1050 J3

1/2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		1 SEP 65	RLP AU
B		REVISION STATUS CHANGED		7 SEP 65	LK
C		REVISION STATUS CHANGED		7 SEP 65	LK JRC
D		REVISION STATUS CHANGED		10 SEP 65	LK AU
E		REVISED PER TDPR 22002		13 SEP 65	LK
F		REVISION STATUS CHANGED		6 SEP 65	LK



IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
269
271
272
270
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUTPUT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
455W
1708TW
451 W
452 W
454 W
453 W
448 W
449 W
ATTITUDE ENABLE INPUT LO
1698W
ATTITUDE DISABLE
OVDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
1699W
1700TW
1701TW
1702TW
1703TW
SYSTEM TEST
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIGNAL HI
IMU IG & Y GYRO ERROR SIGNAL LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
Z GYRO ERROR SIGNAL HI
Z GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
X GYRO ERROR SIGNAL LO
143W
144W
141W
142W
139W
140W
121W
122W
171W
172W
133W
134W
129W
130 W
119 W
120 W
GCP, XBR-A, RSS-C, MSI, PSS
OJB (OVERHEAD JUNCTION BOX)
2075
2676
1289
1290
1275
1676
1789
1790
PSA TPA (PSA TEST POINT ADAPTER)
7
9
11
8
23
24
31
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
OJB (OVERHEAD JUNCTION BOX)
298
297
299
300
301
302
1301
1300
1298
1299
1297
1281
1282
1279
1280
1277
1278
1270
1271
1259
1260
1261
1262
1253
1254
1250
1251
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (3)
SHEET 2, E15 (4)
798
797
799
800
801
802
1800
1799
1797
1798
1796
1774
1773
1781
1782
1779
1780
1777
1778
1770
1771
1763
1764
1766
1767
1753
1754
1750
1751
SYSTEM TEST
496
497
484
485
482
483
50
14
4
5
20
6
3
17
40
41
15
18
7
16
GNIC (G&N INDICATOR CONTROL)
SJB (SIMULATED JUNCTION BOX)
481
480
260
261
258
259
256
257
19
20
477
479
474
476
17
18
23
24
SHEET 2, B15 (5)
IMU OVDC
45
44
478
475
43
46
B5
B6
H6
F2
D2
TRAY 1
TRAY 4
TRAY 3
U
V
W
C
B
A
IMU
N5
P5
G5
G6
H5
H6
TRAY 10
2900206
REV LTR F
SH 2
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

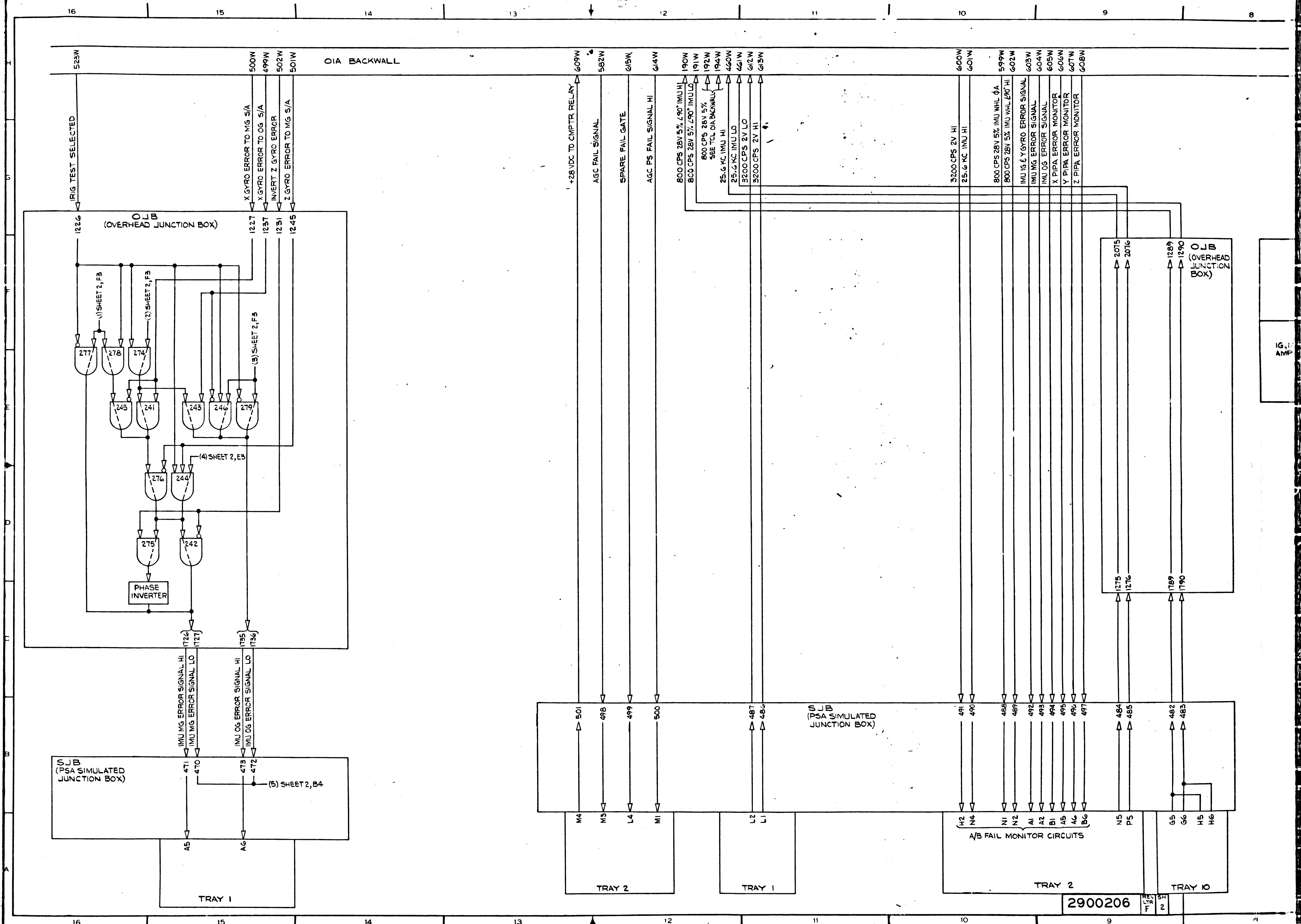
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Cochrane DATE 26 MAY 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK I SERIES 100)

CODE IDENT NO 99974
SIZE J_2
2900206
SCALE —
SHEET 2 OF 4

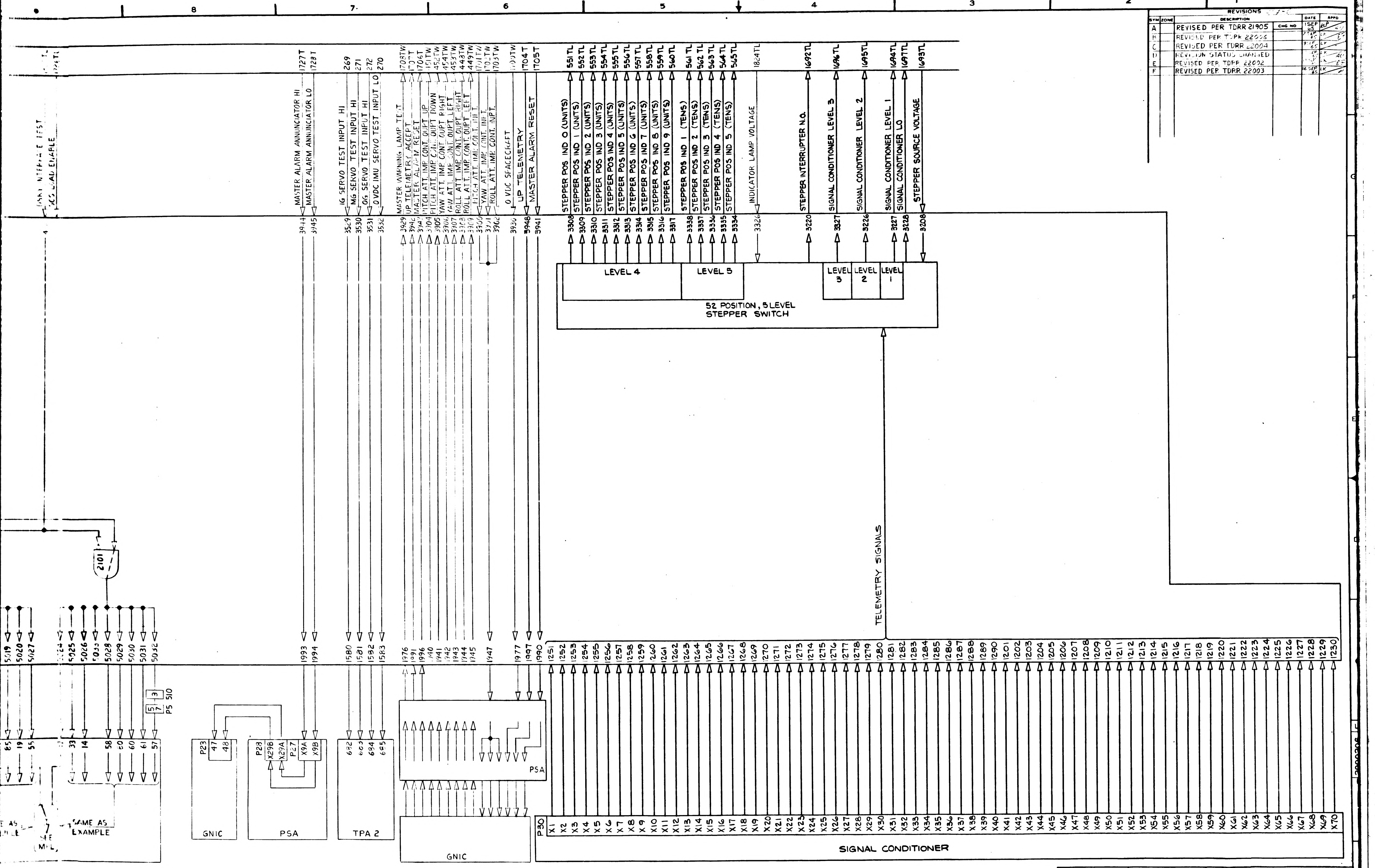
2/2900206


OIA BACKWALL
523W
500W
499W
502W
501W
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
IRIG TEST SELECTED
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5% SEE TCL OIA BACKWALL
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ØA
800 CPS 28V 5% IMU WHL ∠90 HI
IMU IG & Y GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
OJB (OVERHEAD JUNCTION BOX)
1226
1227
1237
1231
1245
(1) SHEET 2, F3
(2) SHEET 2, F3
(3) SHEET 2, F3
(4) SHEET 2, E3
277
278
274
245
241
243
246
279
276
244
275
242
PHASE INVERTER
1726
1727
1735
1736
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
SJB (PSA SIMULATED JUNCTION BOX)
471
470
473
472
(5) SHEET 2, B4
A5
A6
TRAY 1
OJB (OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1789
1790
SJB (PSA SIMULATED JUNCTION BOX)
501
498
499
500
487
486
491
490
488
489
492
493
494
495
496
497
484
485
482
483
M4
M3
L4
M1
TRAY 2
L2
L1
TRAY 1
H2
N4
N1
N2
A1
A2
B1
A5
A6
B6
N5
P5
A/B FAIL MONITOR CIRCUITS
TRAY 2
G5
G6
H5
H6
TRAY 10
IG, AMP
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
REV LTR F
SH 2

2900206

1/2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1SEP 65	RLP AU
B		REVISED PER TDRR 22006		7 SEP 65	LK EF
C		REVISED PER TDRR 22004		9 SEP 65	LK
D		REVISION STATUS CHANGED		SEP 65	LK AU
E		REVISED PER TDRR 22002		[illegible]	LK EF
F		REVISED PER TDRR 22003		16 SEP 65	LK



8
7
6
5
4
3
2
1
MASTER ALARM ANNUNCIATOR HI
MASTER ALARM ANNUNCIATOR LO
1727T
1728T
3944
3945
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
269
271
272
270
3529
3530
3531
3532
MASTER WARNING LAMP TEST
UP TELEMETRY ACCEPT
MASTER ALARM RESET
PITCH ATT. IMP. CONT. OUPT. UP
PITCH ATT. IMP. CONT. OUPT. DOWN
YAW ATT. IMP. CONT. OUPT. RIGHT
YAW ATT. IMP. CONT. OUPT. LEFT
ROLL ATT. IMP. CONT. OUPT. RIGHT
ROLL ATT. IMP. CONT. OUPT. LEFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
1708TW
1707T
1706T
451TW
452TW
454TW
453TW
448TW
449TW
1701TW
1702TW
1703TW
3929
3942
3947
3904
3905
3906
3907
3908
3909
3900
3901
3902
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
1700TW
1704T
1705T
3930
3948
3941
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
561TL
562TL
563TL
564TL
565TL
3338
3337
3336
3335
3334
INDICATOR LAMP VOLTAGE
1824TL
3326
STEPPER INTERRUPTER N.O.
1692TL
3220
SIGNAL CONDITIONER LEVEL 3
1696TL
3327
SIGNAL CONDITIONER LEVEL 2
1695TL
3226
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
1694TL
1697TL
3227
3228
STEPPER SOURCE VOLTAGE
1693TL
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL
STEPPER SWITCH
TELEMETRY SIGNALS
2101
5019
5020
5027
5024
5025
5026
5033
5028
5029
5030
5031
5032
P5 510
5 7
3
85
19
55
33
14
58
60
60
61
57
SAME AS EXAMPLE
SEE (MPL)
1993
1994
P23
47
48
GNIC
P28
X29B
X29A
P27
X9A
X9B
PSA
1580
1581
1582
1583
682
683
684
685
TPA 2
1976
1991
1996
1940
1941
1942
1943
1944
1945
1947
1977
1997
1990
PSA
GNIC
1251
1252
1253
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1228
1229
1230
P30
X1
X2
X3
X4
X5
X6
X7
X8
X9
X10
X11
X12
X13
X14
X15
X16
X17
X18
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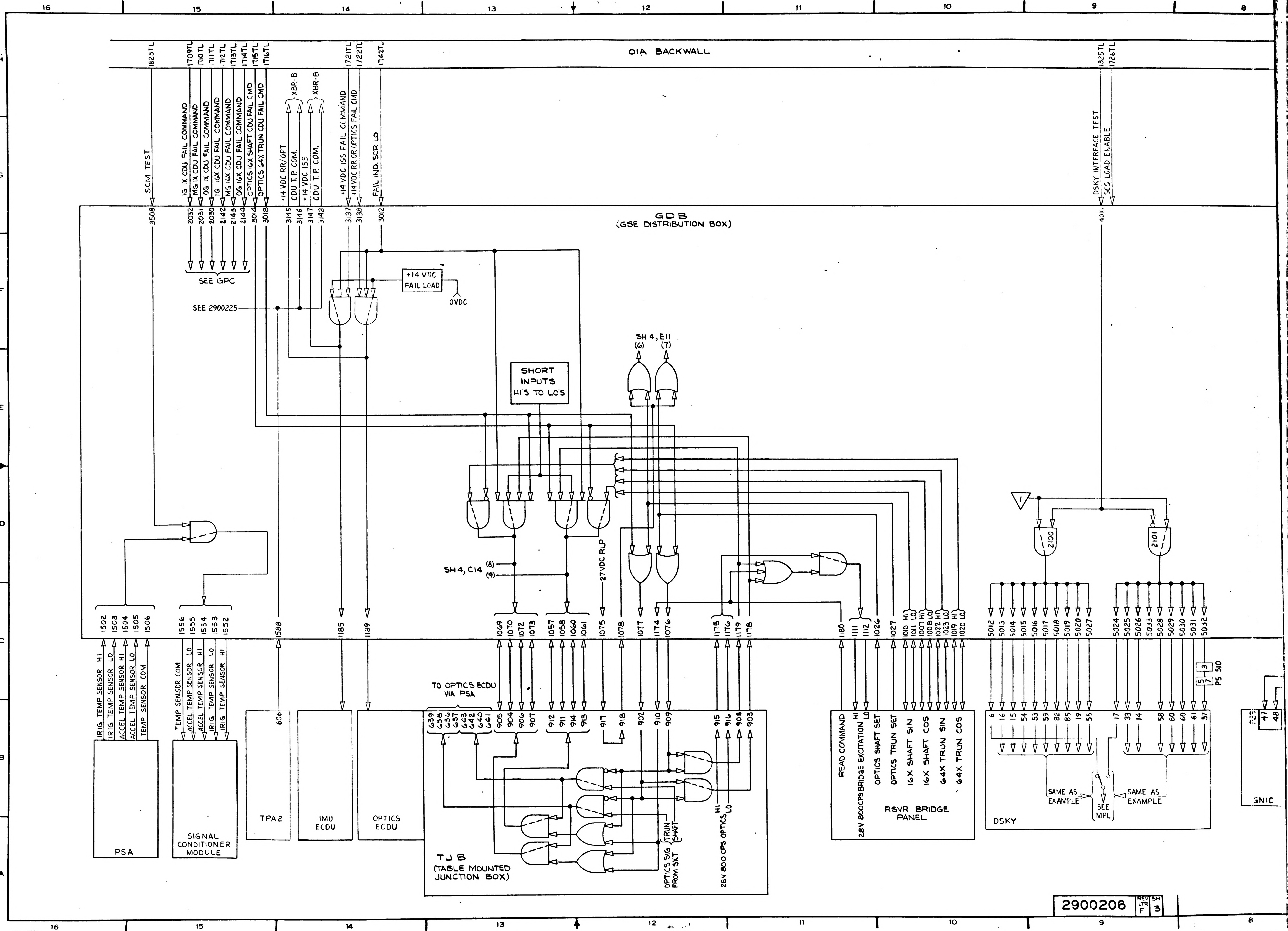
X57
X58
X59
X60
X61
X62
X63
X64
X65
X66
X67
X68
X69
X70
SIGNAL CONDITIONER

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + + + − − −	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN Cookman DATE 3 JUN 65 CHECKED Ed Foster 9 JUN 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM- TEST SELECTOR (BLOCK II)
DO NOT SCALE THIS DRAWING		
MATERIAL	NASA APPROVAL	CODE IDENT NO 99974 SIZE J_2 2900206
CONTRACT NAS 9-497	MIT APPROVAL	SCALE SHEET 3 OF 4

2900206 REV LTR F SH 3


16
15
14
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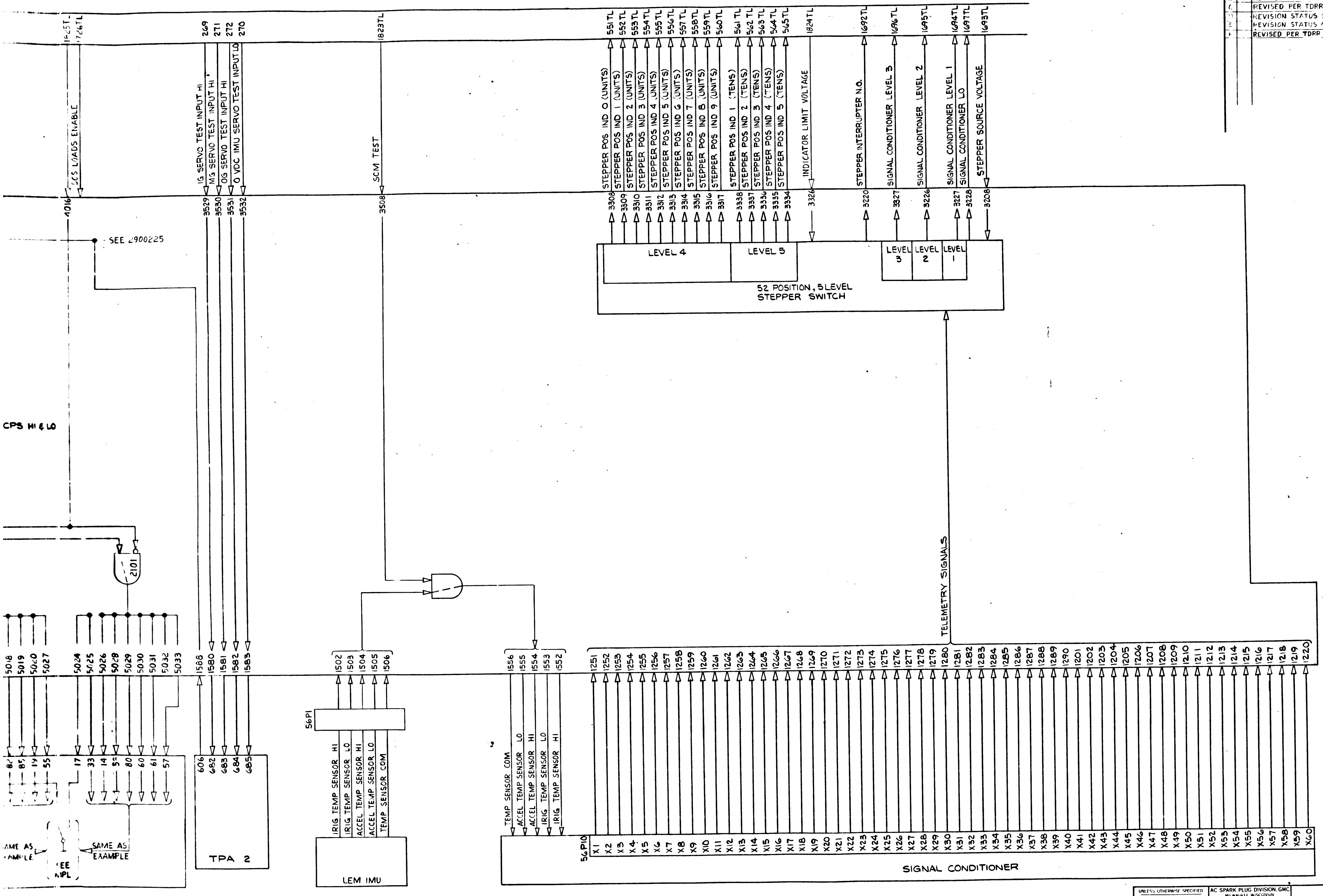
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1823TL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1721TL
1722TL
1742TL
1825TL
1726TL
SCM TEST
IG IX CDU FAIL COMMAND
MG IX CDU FAIL COMMAND
OG IX CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
+14 VDC RR/OPT
CDU T.P. COM.
+14 VDC ISS
CDU T.P. COM.
XBR-B
XBR-B
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
DSKY INTERFACE TEST
SCS LOAD ENABLE
3508
2032
2031
2030
2142
2143
2144
3014
3018
3145
3146
3147
3148
3137
3138
3012
4011
GDB
(GSE DISTRIBUTION BOX)
SEE GPC
SEE 2900225
+14 VDC
FAIL LOAD
OVDC
SH 4, E11
(6)
(7)
SHORT INPUTS HI'S TO LO'S
SH 4, C14
(8)
(9)
27VDC RLP
2100
2101
1502
1503
1504
1505
1506
1556
1555
1554
1553
1552
1588
1185
1189
1069
1070
1072
1073
1057
1058
1060
1061
1075
1078
1077
1174
1076
1175
1176
1179
1178
1180
1111
1112
1026
1027
1010 HI
1011 LO
1007 HI
1008 LO
1022 HI
1023 LO
1019 HI
1020 LO
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
5024
5025
5026
5033
5028
5029
5030
5031
5032
3
5
7
P5 510
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
TEMP SENSOR COM
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
PSA
SIGNAL CONDITIONER MODULE
606
TPA2
IMU ECDU
OPTICS ECDU
TO OPTICS ECDU VIA PSA
639
638
636
637
643
642
640
641
905
904
906
907
912
911
914
913
917
918
902
910
909
915
916
908
903
TJB
(TABLE MOUNTED JUNCTION BOX)
OPTICS SIG FROM SXT
TRUN
SHAFT
28V 800 CPS OPTICS
HI
LO
READ COMMAND
28V 800CPS BRIDGE EXCITATION
HI
LO
OPTICS SHAFT SET
OPTICS TRUN SET
16X SHAFT SIN
16X SHAFT COS
64X TRUN SIN
64X TRUN COS
RSVR BRIDGE PANEL
6
16
15
54
53
59
82
85
19
55
17
33
14
58
80
60
61
57
SAME AS EXAMPLE
SAME AS EXAMPLE
SEE MPL
DSKY
1
47
48
SNIC
2900206
REV LTR F
SH 3

1/2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	RLP AU
B		REVISED PER TDRR 22006		7 SEP 65	LK EF
C		REVISED PER TDRR 22004		9 SEP 65	LK
D		REVISION STATUS CHANGED		10 SEP 65	LK AU
E		REVISION STATUS CHANGED		13 SEP 65	LK EF
F		REVISED PER TDRR 22003		16 SEP 65	LK


1425T-
1726TL
SCS LOADS ENABLE
4016
SEE 2900225
269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
3529
3530
3531
3532
1823TL
SCM TEST
3508
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
561TL
562TL
563TL
564TL
565TL
1824TL
1692TL
1696TL
1695TL
1694TL
1697TL
1693TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LIMIT VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3338
3337
3336
3335
3334
3326
3220
3327
3226
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL
STEPPER SWITCH
TELEMETRY SIGNALS
: CPS HI & LO
2101
5018
5019
5020
5027
5024
5025
5026
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5031
5032
5033
82
85
19
55
17
33
14
58
80
60
61
57
SAME AS EXAMPLE
SEE EXAMPLE
SAME AS EXAMPLE
1588
1580
1581
1582
1583
606
682
683
684
685
TPA 2
1502
1503
1504
1505
1506
56P1
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
LEM IMU
1556
1555
1554
1553
1552
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
1251
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X54
X55
X56
X57
X58
X59
X60
SIGNAL CONDITIONER

3H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION. GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Lookman DATE 7 JUN 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

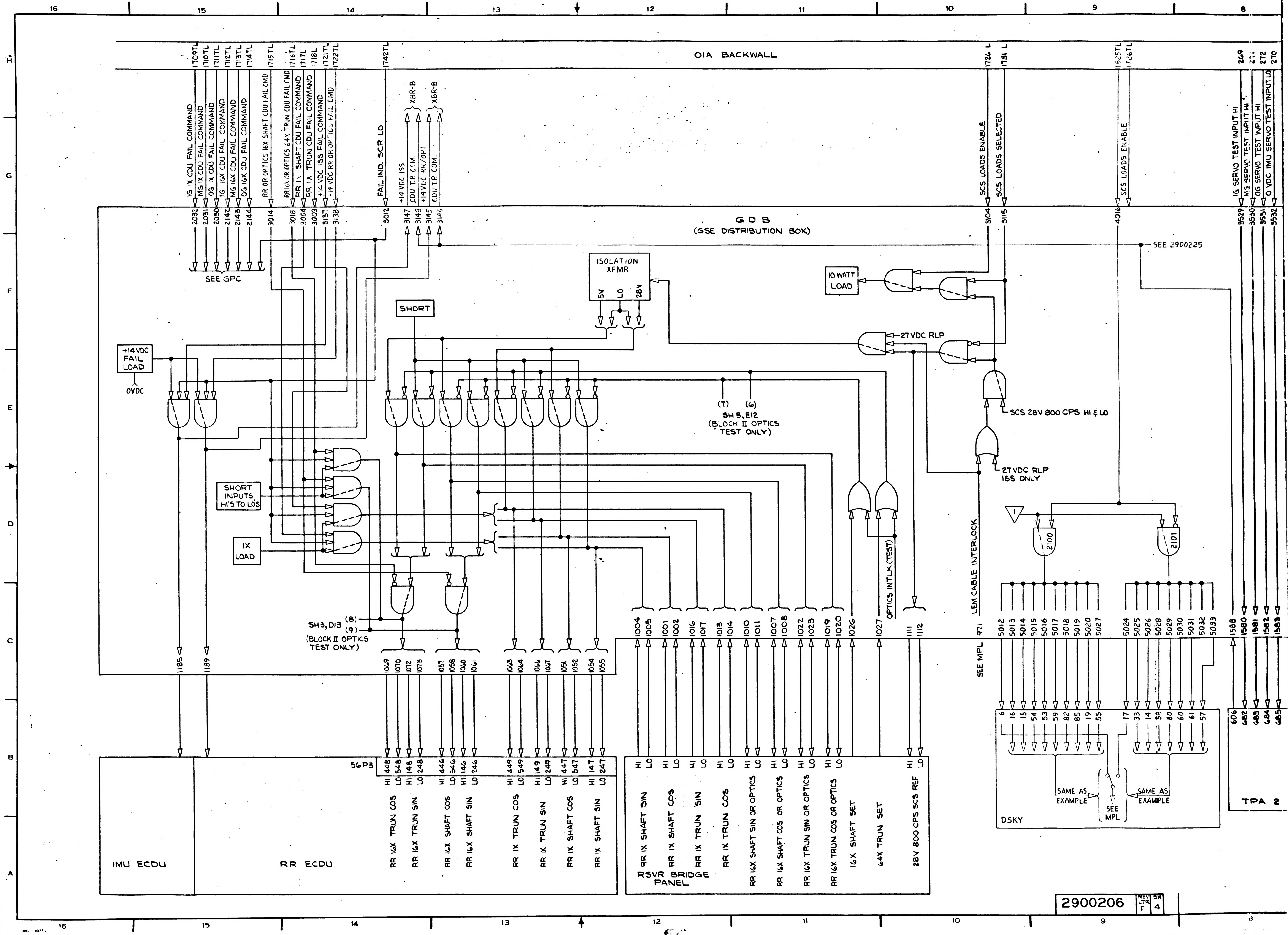
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-TEST SELECTOR (LEM)

CODE IDENT NO 99974
SIZE J_2
2900206
SCALE —
SHEET 4 OF 4

2900206	REV F	SH 4

2/2900206

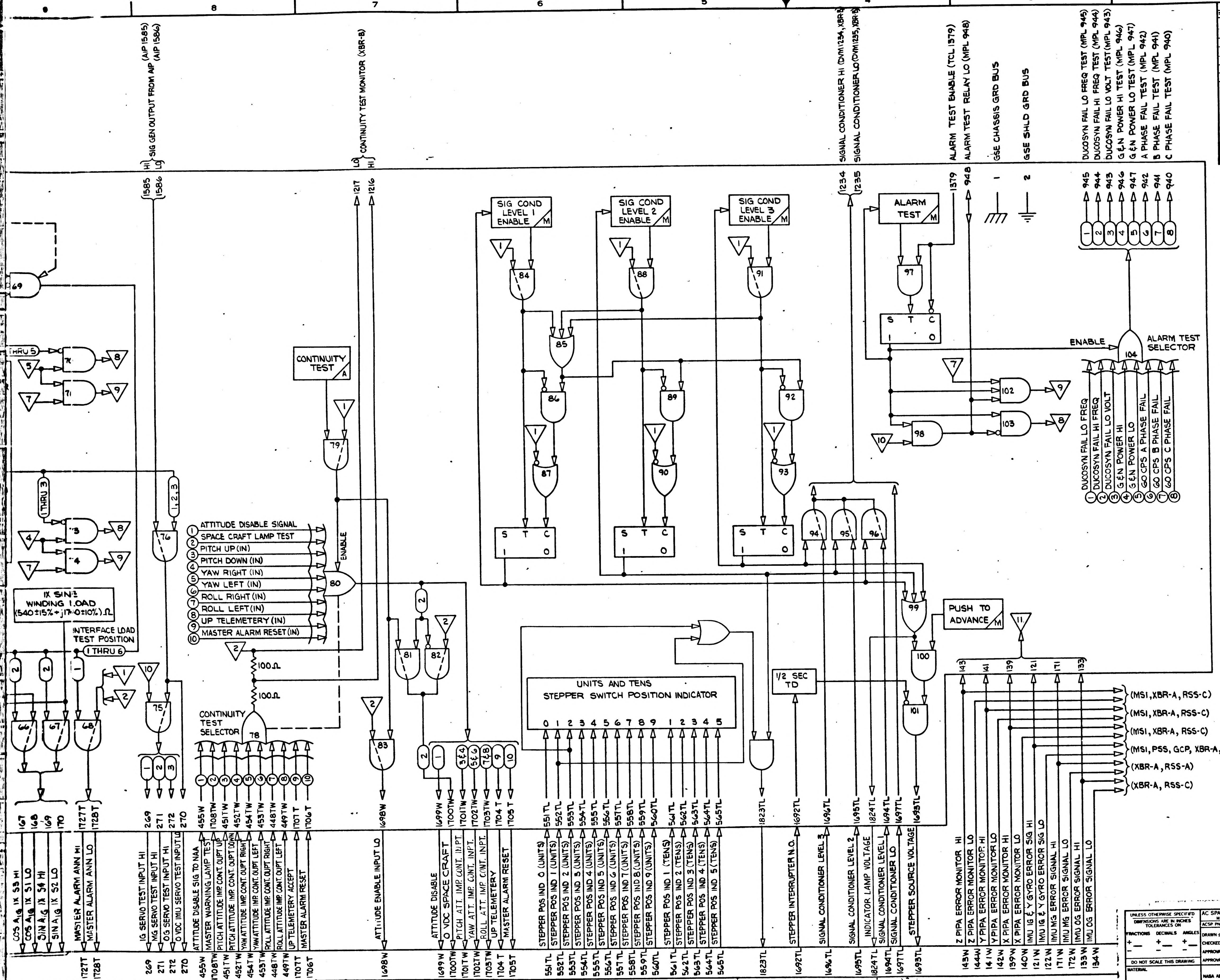

16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1717L
1718L
1721TL
1722TL
1742TL
1726 L
1731 L
1925TL
1726TL
269
271
272
270
IG IX CDU FAIL COMMAND
MG IX CDU FAIL COMMAND
OG IX CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
RR OR OPTICS 16X SHAFT CDU FAIL CMD
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
RR IX SHAFT CDU FAIL COMMAND
RR IX TRUN CDU FAIL COMMAND
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
+14 VDC ISS
CDU T.P. COM.
+14 VDC RR/OPT
CDU T.P. COM.
XBR-B
XBR-B
SCS LOADS ENABLE
SCS LOADS SELECTED
SCS LOADS ENABLE
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
2032
2031
2030
2142
2143
2144
3014
3018
3004
3003
3137
3138
3012
3147
3148
3145
3146
3104
3115
4016
3529
3530
3531
3532
G D B
(GSE DISTRIBUTION BOX)
SEE GPC
SEE 2900225
ISOLATION XFMR
5V
LO
28V
10 WATT LOAD
27 VDC RLP
SHORT
+14 VDC FAIL LOAD
0VDC
(7)
(6)
SH 3, E12
(BLOCK II OPTICS TEST ONLY)
SCS 28V 800 CPS HI & LO
27 VDC RLP ISS ONLY
SHORT INPUTS HI'S TO LO'S
IX LOAD
2100
2101
LEM CABLE INTERLOCK
OPTICS INTLK (TEST)
SH3, D13
(8)
(9)
(BLOCK II OPTICS TEST ONLY)
1185
1189
1069
1070
1072
1073
1057
1058
1060
1061
1063
1064
1066
1067
1051
1052
1054
1055
1004
1005
1001
1002
1016
1017
1013
1014
1010
1011
1007
1008
1022
1023
1019
1020
1026
1027
1111
1112
971
SEE MPL
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
5024
5025
5026
5028
5029
5030
5031
5032
5033
1588
1580
1581
1582
1583
56P3
448
548
148
248
446
546
146
246
449
549
149
249
447
547
147
247
HI
LO
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
RR IX TRUN COS
RR IX TRUN SIN
RR IX SHAFT COS
RR IX SHAFT SIN
IMU ECDU
RR ECDU
RR IX SHAFT SIN
RR IX SHAFT COS
RR IX TRUN SIN
RR IX TRUN COS
RR 16X SHAFT SIN OR OPTICS
RR 16X SHAFT COS OR OPTICS
RR 16X TRUN SIN OR OPTICS
RR 16X TRUN COS OR OPTICS
16X SHAFT SET
64X TRUN SET
28V 800 CPS SCS REF
RSVR BRIDGE PANEL
6
16
15
54
53
59
82
85
19
55
17
33
14
58
80
60
61
57
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
DSKY
606
682
683
684
685
TPA 2

2900206 REV LTR F SH 4

1/2900206

REVISIONS 20486

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	RLP AU
B		REVISED PER TDRR 22006		7 SEP 65	LK EF
C		REVISED PER TDRR 22004		9 SEP 65	LK JHC
D		REVISED PER TDRR 22005		10 SEP 65	LK AU
E		REVISED PER TDRR 22002		13 SEP 65	LK EF
F		REVISED PER TDRR 22003		16 SEP 65	LK
G		REVISED PER TDRR 22001		21 SEP 65	LK



SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
HI LO 1585 1586
CONTINUITY TEST MONITOR (XBR-B)
LO HI 1217 1216
SIGNAL CONDITIONER HI (DVM 1234, XBR-B)
SIGNAL CONDITIONER LO (DVM 1235, XBR-B)
1234 1235
ALARM TEST ENABLE (TCL 1379)
ALARM TEST RELAY LO (MPL 948)
1379 948
GSE CHASSIS GRD BUS
GSE SHLD GRD BUS
1 2
DUCOSYN FAIL LO FREQ TEST (MPL 945)
DUCOSYN FAIL HI FREQ TEST (MPL 944)
DUCOSYN FAIL LO VOLT TEST (MPL 943)
G&N POWER HI TEST (MPL 946)
G&N POWER LO TEST (MPL 947)
A PHASE FAIL TEST (MPL 942)
B PHASE FAIL TEST (MPL 941)
C PHASE FAIL TEST (MPL 940)
945 944 943 946 947 942 941 940
SIG COND LEVEL 1 ENABLE M
SIG COND LEVEL 2 ENABLE M
SIG COND LEVEL 3 ENABLE M
ALARM TEST M
S T C 1 0
84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104
ENABLE
ALARM TEST SELECTOR
DUCOSYN FAIL LO FREQ
DUCOSYN FAIL HI FREQ
DUCOSYN FAIL LO VOLT
G&N POWER HI
G&N POWER LO
60 CPS A PHASE FAIL
60 CPS B PHASE FAIL
60 CPS C PHASE FAIL
69
THRU 5
70 71 72 73 74
CONTINUITY TEST A
79
THRU 3
ATTITUDE DISABLE SIGNAL
① SPACE CRAFT LAMP TEST
② PITCH UP (IN)
③ PITCH DOWN (IN)
④ YAW RIGHT (IN)
⑤ YAW LEFT (IN)
⑥ ROLL RIGHT (IN)
⑦ ROLL LEFT (IN)
⑧ UP TELEMETERY (IN)
⑨ MASTER ALARM RESET (IN)
⑩
80
ENABLE
1,2,3
76
1X SIN 3 WINDING LOAD (540±15%+j17.0±10%)Ω
INTERFACE LOAD TEST POSITION
1 THRU 6
66 67 68
75
100Ω
100Ω
CONTINUITY TEST SELECTOR
78
81 82 83
3&4 5&6 7&8 9 10
PUSH TO ADVANCE M
1/2 SEC TD
UNITS AND TENS STEPPER SWITCH POSITION INDICATOR
0 1 2 3 4 5 6 7 8 9 1 2 3 4 5
143 141 139 121 171 133
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, PSS, GCP, XBR-A, RSS-A)
(XBR-A, RSS-A)
(XBR-A, RSS-C)
167 168 169 170
1727T 1728T
269 271 272 270
455W 1708TW 451TW 452TW 454TW 453TW 448TW 449TW 1707T 1706T
1698W
1699W 1700TW 1701TW 1702TW 1703TW 1704T 1705T
551TL 552TL 553TL 554TL 555TL 556TL 557TL 558TL 559TL 560TL 561TL 562TL 563TL 564TL 565TL
1823TL 1692TL 1696TL 1695TL 1824TL 1694TL 1697TL 1693TL
COS A 1G 1X S3 HI
COS A 1G 1X S1 LO
SIN A 1G 1X S4 HI
SIN A 1G 1X S2 LO
MASTER ALARM ANN HI
MASTER ALARM ANN LO
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUPT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
UP TELEMETERY ACCEPT
MASTER ALARM RESET
ATTITUDE ENABLE INPUT LO
ATTITUDE DISABLE
0 VDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
UP TELEMETERY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
INDICATOR LAMP VOLTAGE
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIG HI
IMU IG & Y GYRO ERROR SIG LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
143W 144W 141W 142W 139W 140W 121W 122W 171W 172W 133W 134W

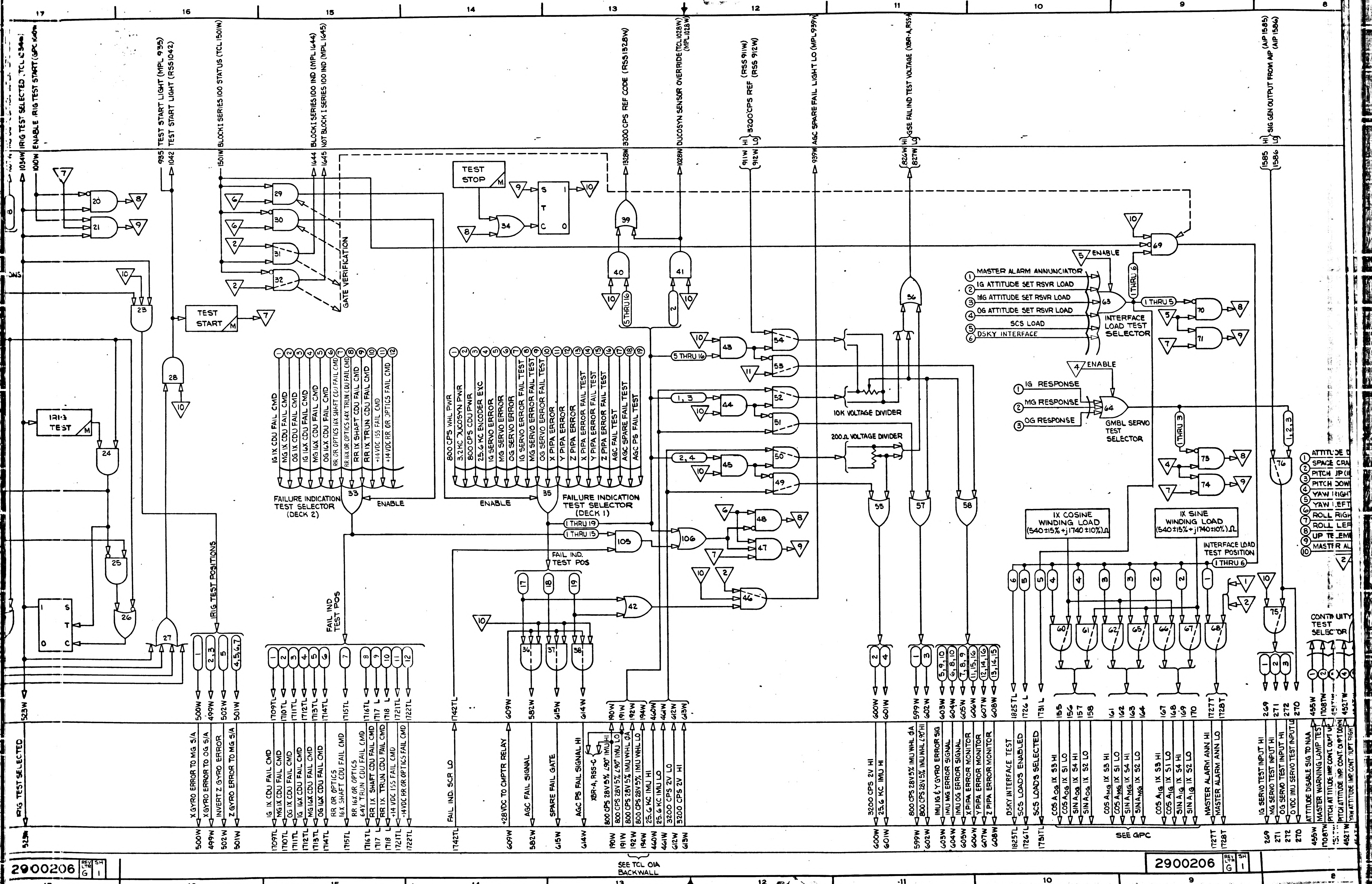
44

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
FRACTIONS ± DECIMALS ± ANGLES ±	ACSP PN DRAWN Cookman DATE 24 MAY 65 CHECKED Ed Foster 9 JUN 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM- TEST SELECTOR (BLOCK I SERIES 100, BLOCK II & LEM)
DO NOT SCALE THIS DRAWING MATERIAL	NASA APPROVAL MIT APPROVAL	CODE IDENT NO. 99974 SIZE J3 2900206
CONTRACT NAS 9-497		SCALE — SHEET OF 4

2900206 REV G SH 1

2900206 G

3/2900206


17
16
15
14
13
12
11
10
9
8
IRIG TEST SELECTED, TCL C340
ENABLE IRIG TEST START (GPC K40)
TEST START LIGHT (MPL 935)
TEST START LIGHT (RSS1042)
BLOCK I SERIES 100 STATUS (TCL 1501W)
BLOCK I SERIES 100 IND (MPL 1644)
NOT BLOCK I SERIES 100 IND (MPL 1645)
3200 CPS REF CODE (RSS1328W)
DUCOSYN SENSOR OVERRIDE (TCL 1028W) (MPL 1028W)
3200 CPS REF (RSS 911W) (RSS 912W)
AGC SPARE FAIL LIGHT LO (MPL 939W)
GSE FAIL IND TEST VOLTAGE (XBR-A, RSS-A)
SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
1034W
1010W
935
1042
1501W
1644
1645
1328W
1028W
911W HI
912W LO
939W
826W HI
827W LO
1585 HI
1586 LO
TEST STOP
S
T
C
1
0
GATE VERIFICATION
TEST START
IRIG TEST
FAILURE INDICATION TEST SELECTOR (DECK 2)
ENABLE
FAILURE INDICATION TEST SELECTOR (DECK 1)
IG 1X CDU FAIL CMD
MG 1X CDU FAIL CMD
OG 1X CDU FAIL CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
RR OR OPTICS 16X SHAFT CDU FAIL CMD
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
RR 1X SHAFT CDU FAIL CMD
RR 1X TRUN CDU FAIL CMD
+14 VDC 155 FAIL CMD
+14 VDC RR OR OPTICS FAIL CMD
800 CPS WHL PWR
3.2KC DUCOSYN PWR
800 CPS PWR
25.6 KC ENCODER EXC
IG SERVO ERROR
MG SERVO ERROR
OG SERVO ERROR
IG SERVO ERROR FAIL TEST
MG SERVO ERROR FAIL TEST
OG SERVO ERROR FAIL TEST
X PIPA ERROR
Y PIPA ERROR
Z PIPA ERROR
X PIPA ERROR FAIL TEST
Y PIPA ERROR FAIL TEST
Z PIPA ERROR FAIL TEST
AGC FAIL TEST
AGC SPARE FAIL TEST
AGC PS FAIL TEST
1 THRU 19
1 THRU 15
FAIL IND. TEST POS
FAIL IND TEST POS
IRIG TEST POSITIONS
5 THRU 16
1, 3
2, 4
10K VOLTAGE DIVIDER
200Ω VOLTAGE DIVIDER
MASTER ALARM ANNUNCIATOR
IG ATTITUDE SET RSVR LOAD
MG ATTITUDE SET RSVR LOAD
OG ATTITUDE SET RSVR LOAD
SCS LOAD
DSKY INTERFACE
ENABLE
INTERFACE LOAD TEST SELECTOR
1 THRU 6
1 THRU 5
IG RESPONSE
MG RESPONSE
OG RESPONSE
GMBL SERVO TEST SELECTOR
1 THRU 3
1,2,3
1X COSINE WINDING LOAD (540±15%+j1740±10%)Ω
1X SINE WINDING LOAD (540±15%+j1740±10%)Ω
INTERFACE LOAD TEST POSITION
ATTITUDE
SPACE CRA
PITCH UP
PITCH DOWN
YAW RIGHT
YAW LEFT
ROLL RIGHT
ROLL LEFT
UP TELEM
MASTER AL
CONTINUITY TEST SELECTOR
523W
500W
499W
502W
501W
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1717L
1718L
1721TL
1722TL
1742TL
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
1825TL
1726L
1731L
155
156
157
158
161
162
163
164
167
168
169
170
1727T
1728T
269
271
272
270
455W
1108TW
452TW
IRIG TEST SELECTED
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
IG 1X CDU FAIL CMD
MG 1X CDU FAIL CMD
OG 1X CDU FAIL CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
RR OR OPTICS 16X SHAFT CDU FAIL CMD
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
RR 1X SHAFT CDU FAIL CMD
RR 1X TRUN CDU FAIL CMD
+14 VDC 155 FAIL CMD
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
XBR-A, RSS-C
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5% IMU WHL ØA
800 CPS 28V 5% IMU WHL LO
25.6 KC IMU HI
3200 CPS 2V LO
3200 CPS 2V HI
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ØA
800 CPS 28V 5% IMU WHL ∠90°HI
IMU IG & Y GYRO ERROR SIG
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
DSKY INTERFACE TEST
SCS LOADS ENABLED
SCS LOADS SELECTED
COS A_OG 1X S3 HI
COS A_OG 1X S1 LO
SIN A_OG 1X S4 HI
SIN A_OG 1X S2 LO
COS A_MG 1X S3 HI
COS A_MG 1X S1 LO
SIN A_MG 1X S4 HI
SIN A_MG 1X S2 LO
COS A_IG 1X S3 HI
COS A_IG 1X S1 LO
SIN A_IG 1X S4 HI
SIN A_IG 1X S2 LO
MASTER ALARM ANN HI
MASTER ALARM ANN LO
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUPT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
SEE GPC
SEE TCL 01A BACKWALL

2900206 REV LTR G SH 1

2900206 REV LTR G SH 1

2/2900206

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM)

2900210	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR)
RLP	RELAY & LAMP POWER SUPPLY
2900208	POWER & DUMMY LOAD-PRIMARY SIGNAL SELECTOR (PDL)
PSS	PRIMARY SIGNAL SELECTOR
2900223	GIMBAL POSITION CONTROL (GPC)
2900207	MONITOR PANEL (MPL)
2900202	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
2900217	SIGNAL SELECTION & MEASUREMENT
XBR-A	CROSSBAR - AC SIGNALS
XBR-B	CROSSBAR - DC SIGNALS
DVM	DIGITAL VOLTMETER
2900218	OSCILLOGRAPH SIGNAL SELECTION
RSS-A	TO FIXED AC CHANNEL
RSS-B	TO FIXED DC CHANNEL
RSS-C	TO SWITCHABLE AC CHANNEL
RSS-D	TO SWITCHABLE DC CHANNEL
2900215	MEASUREMENT REFERENCE POWER SUPPLIES
RSS	OSCILLOGRAPH SIGNAL SELECTOR
2900211	AUXILIARY INPUT-OUTPUT & CALIBRATION (AIP)
2900212	PIPA & IRIG MONITORING
MSI	PHASE SHIFT PANEL
2900200	GYRO CAGING PANEL (GCP)

4. NONSTANDARD SYMBOLS

INDICATES "AND" GATE WITH SWITCHED SIGNAL

① ② INDICATES EXCLUSIVE "OR" GATE WITH SWITCH POSITIONS 1&2

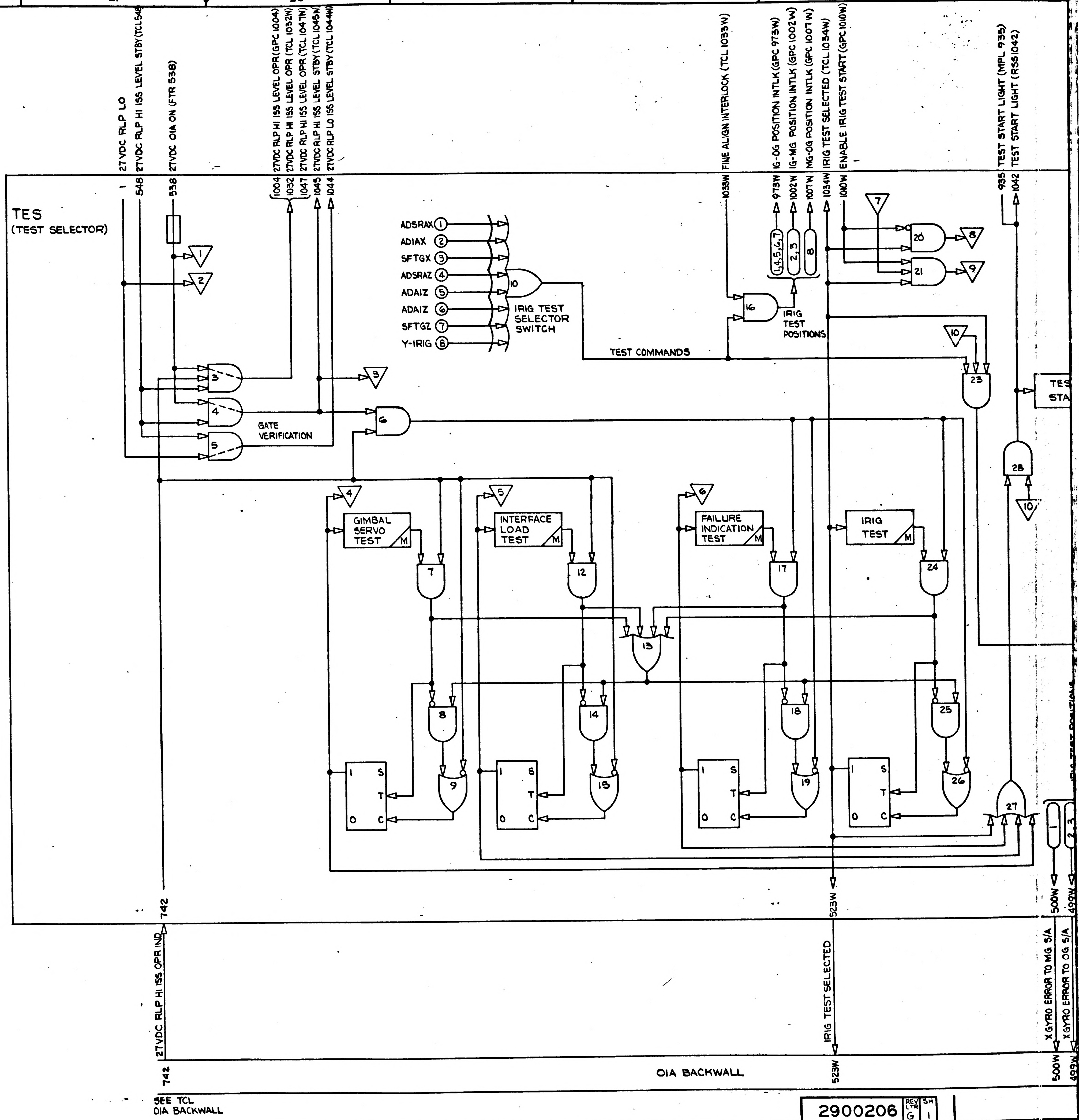
NAME M — INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME A — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
A. W- BLOCK I SERIES 100 ONLY
B. T- BLOCK II ONLY
C. L- LEM ONLY
D. BLANK- ALL G&N CONFIGURATIONS
E. TW, TL, OR WL- USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

6. SIGNAL REFERENCE

1 27 VDC OIA ON
2 27 VDC RLP LO
3 27 VDC ISS LEVEL STANDBY
4 GIMBAL SERVO TEST SELECTED
5 INTERFACE LOAD TEST SELECTED
6 FAILURE INDICATION TEST SELECTED
7 TEST START, BUTTON DEPRESSED
8 CLEAR
9 SET
10 TEST STARTED
11 IMU ERROR SIGNALS



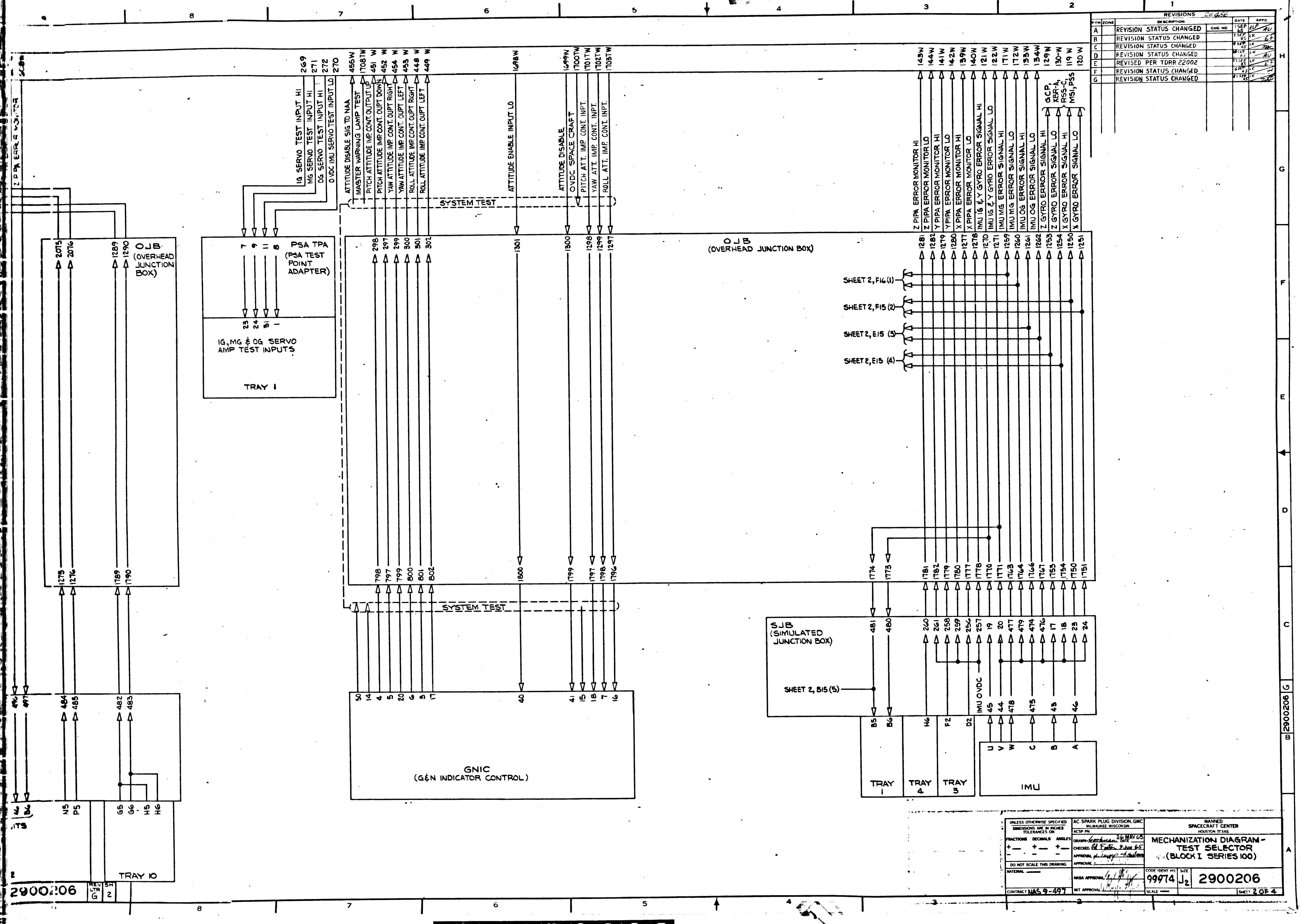
24
23
22
21
20
19
18
17
16
H
G
F
E
D
C
B
A
TES
(TEST SELECTOR)
1 27 VDC RLP LO
548 27VDC RLP HI ISS LEVEL STBY (TCL 548)
538 27VDC OIA ON (FTR 538)
1004 27VDC RLP HI ISS LEVEL OPR (GPC 1004)
1032 27VDC RLP HI ISS LEVEL OPR (TCL 1032W)
1047 27VDC RLP HI ISS LEVEL OPR (TCL 1047W)
1045 27VDC RLP HI ISS LEVEL STBY (TCL 1045W)
1044 27VDC RLP LO ISS LEVEL STBY (TCL 1044W)
1033W FINE ALIGN INTERLOCK (TCL 1033W)
973W IG-OG POSITION INTLK (GPC 973W)
1002W IG-MG POSITION INTLK (GPC 1002W)
1007W MG-OG POSITION INTLK (GPC 1007W)
1034W IRIG TEST SELECTED (TCL 1034W)
1010W ENABLE IRIG TEST START (GPC 1010W)
935 TEST START LIGHT (MPL 935)
1042 TEST START LIGHT (RSS1042)
ADSRAX ①
ADIAX ②
SFTGX ③
ADSRAZ ④
ADAIZ ⑤
ADAIZ ⑥
SFTGZ ⑦
Y-IRIG ⑧
IRIG TEST SELECTOR SWITCH
1,4,5,6,7
2,3
8
IRIG TEST POSITIONS
TEST COMMANDS
GATE VERIFICATION
GIMBAL SERVO TEST M
INTERFACE LOAD TEST M
FAILURE INDICATION TEST M
IRIG TEST M
TES STA
1 S T O C
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28
742
523W
500W
499W
27VDC RLP HI ISS OPR IND
IRIG TEST SELECTED
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
OIA BACKWALL

SEE TCL
OIA BACKWALL

	REV LTR	SH
2900206	G	1

MIL FORM 1050 J3

1/2900206


269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
455W
1708TW
451 W
452 W
454 W
453 W
448 W
449 W
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUTPUT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
1698W
ATTITUDE ENABLE INPUT LO
1699W
1700TW
1701TW
1702TW
1703TW
ATTITUDE DISABLE
OVDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
SYSTEM TEST
143W
144W
141W
142W
139W
140W
121W
122W
171W
172W
133W
134W
129W
130-W
119 W
120 W
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIGNAL HI
IMU IG & Y GYRO ERROR SIGNAL LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
Z GYRO ERROR SIGNAL HI
Z GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
X GYRO ERROR SIGNAL LO
GCP, XBR-A, RSS-C, MSI, PSS
Z PIPA ERROR MONITOR
2075
2076
1289
1290
OJB (OVERHEAD JUNCTION BOX)
7 9 11 8
PSA TPA (PSA TEST POINT ADAPTER)
23 24 31 —
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
298 297 299 300 301 302
1301
1300
1298 1299 1297
OJB (OVERHEAD JUNCTION BOX)
1281 1282 1279 1280 1277 1278 1270 1271 1259 1260 1261 1262 1253 1254 1250 1251
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (3)
SHEET 2, E15 (4)
1275
1276
1789
1790
798 797 799 800 801 802
1800
1799
1797 1798 1796
1774 1773
1781 1782 1779 1780 1777 1778 1770 1771 1763 1764 1766 1767 1753 1754 1750 1751
SYSTEM TEST
SJB (SIMULATED JUNCTION BOX)
481 480
260 261 258 259 256 257 19 20 477 479 474 476 17 18 23 24
SHEET 2, B15 (5)
IMU OVDC
45 44 478 475 43 46
B5 B6
H6
F2
D2
TRAY 1
TRAY 4
TRAY 3
U V W C B A
IMU
484 485
482 483
N5 P5
G5 G6 H5 H6
TRAY 10
50 14 4 5 20 6 3 17
40
41 15 18 7 16
GNIC (G&N INDICATOR CONTROL)
8 7 6 5 4 3 2 1
H G F E D C B A
2900206 G
3H

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		1 SEP 65	RLP AU
B		REVISION STATUS CHANGED		7 SEP 65	LK EF
C		REVISION STATUS CHANGED		9 SEP 65	LK JAC
D		REVISION STATUS CHANGED		10 SEP 65	LK AU
E		REVISED PER TDRR 22002		13 SEP 65	LK EF
F		REVISION STATUS CHANGED		16 SEP 65	LK
G		REVISION STATUS CHANGED		21 SEP 65	LK

REVISIONS 20486

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Cochran DATE 26 MAY 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

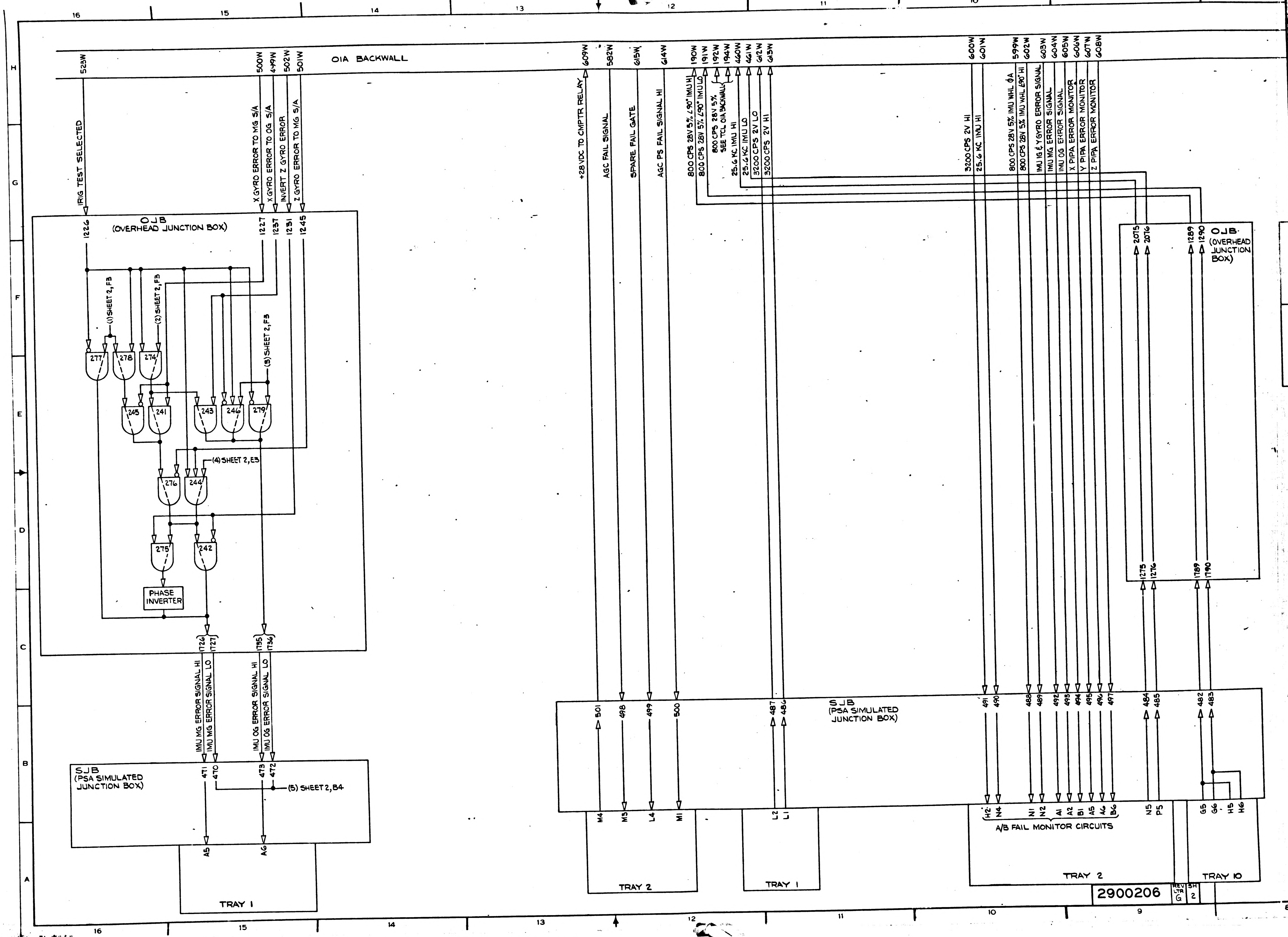
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK I SERIES 100)

CODE IDENT NO. 99974
SIZE J2
2900206
SCALE —
SHEET 2 OF 4

2900206	REV LTR	SH
	G	2

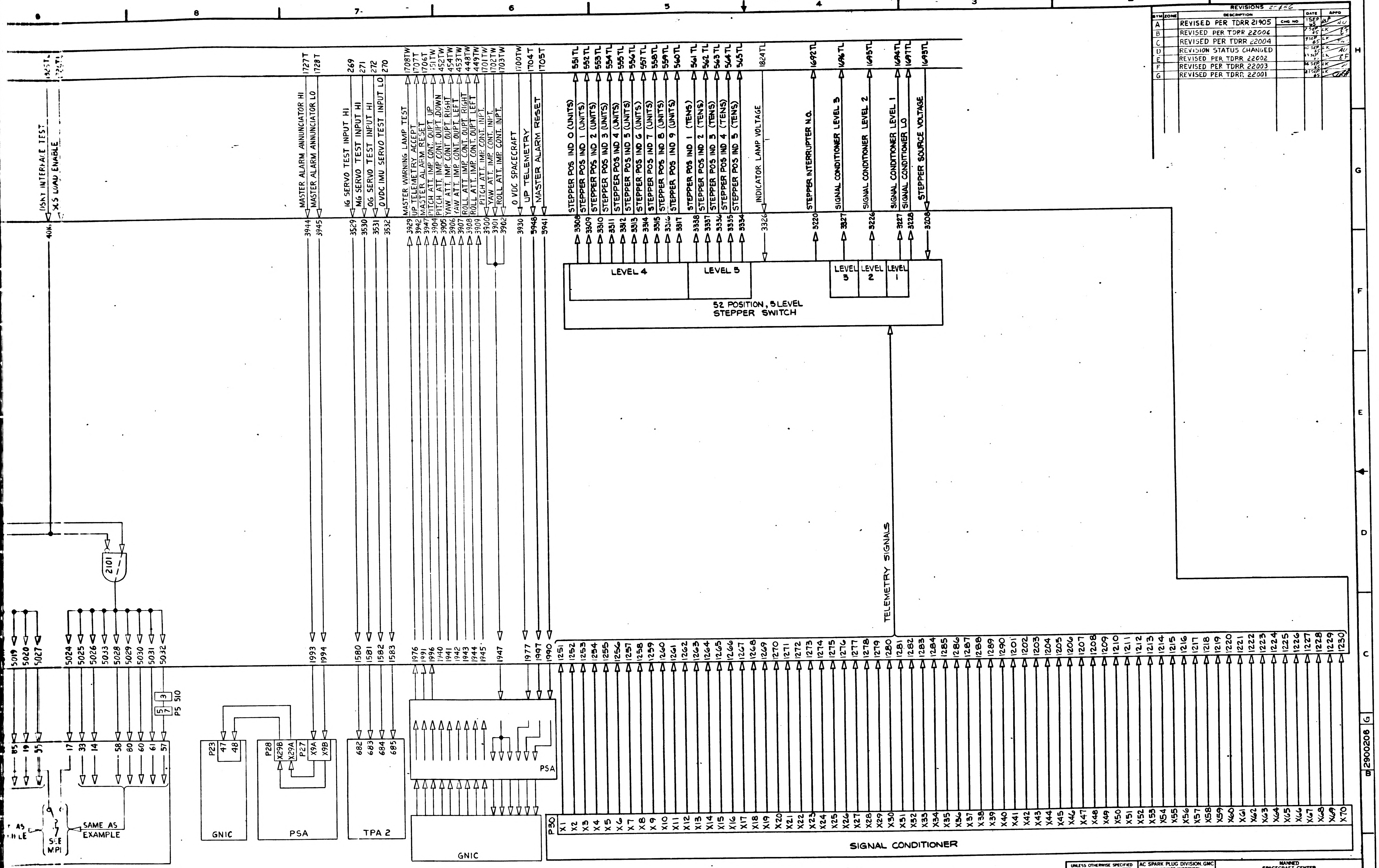
2/2900206


OIA BACKWALL
523W
IRIG TEST SELECTED
500W
499W
502W
501W
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
OJB
(OVERHEAD JUNCTION BOX)
1226
1227
1237
1231
1245
(1) SHEET 2, F3
(2) SHEET 2, F3
(3) SHEET 2, F3
(4) SHEET 2, E3
277
278
274
245
241
243
246
279
276
244
275
242
PHASE INVERTER
1726
1727
1735
1736
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
SJB
(PSA SIMULATED JUNCTION BOX)
471
470
473
472
(5) SHEET 2, B4
A5
A6
TRAY 1
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5% SEE TCL OIA BACKWALL
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ΦA
800 CPS 28V 5% IMU WHL ∠90° HI
IMU IG & Y GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
OJB
(OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1789
1790
SJB
(PSA SIMULATED JUNCTION BOX)
501
498
499
500
487
486
491
490
488
489
492
493
494
495
496
497
484
485
482
483
M4
M3
L4
M1
L2
L1
H2
N4
N1
N2
A1
A2
B1
A5
A6
B6
N5
P5
G5
G6
H5
H6
A/B FAIL MONITOR CIRCUITS
TRAY 2
TRAY 1
TRAY 2
TRAY 10
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

2900206 REV LTR G SH 2

1/2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
		REVISIONS 2-4-56			
A		REVISED PER TDRR 21905		1 SEP 65	RLP AU
B		REVISED PER TDRR 22006		7 SEP 65	LK EF
C		REVISED PER TDRR 22004		9 SEP 65	LK
D		REVISION STATUS CHANGED		10 SEP 65	LK AU
E		REVISED PER TDRR 22002		13 SEP 65	LK EF
F		REVISED PER TDRR 22003		16 SEP 65	LK
G		REVISED PER TDRR 22001		21 SEP 65	LK


8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
1325TL
1326TL
DSKY INTERFACE TEST
XS LOAD ENABLE
40K
1727T
1728T
MASTER ALARM ANNUNCIATOR HI
MASTER ALARM ANNUNCIATOR LO
3944
3945
269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
3529
3530
3531
3532
1708TW
1707T
1706T
451TW
452TW
454TW
453TW
448TW
449TW
1701TW
1702TW
1703TW
MASTER WARNING LAMP TEST
UP TELEMETRY ACCEPT
MASTER ALARM RESET
PITCH ATT. IMP. CONT. OUPT. UP
PITCH ATT. IMP. CONT. OUPT. DOWN
YAW ATT. IMP. CONT. OUPT. RIGHT
YAW ATT. IMP. CONT. OUPT. LEFT
ROLL ATT. IMP. CONT. OUPT. RIGHT
ROLL ATT. IMP. CONT. OUPT. LEFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
3929
3942
3947
3904
3905
3906
3907
3908
3909
3900
3901
3902
1700TW
1704T
1705T
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
3930
3948
3941
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
561TL
562TL
563TL
564TL
565TL
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
3338
3337
3336
3335
3334
1824TL
INDICATOR LAMP VOLTAGE
3326
1692TL
STEPPER INTERRUPTER N.O.
3220
1696TL
SIGNAL CONDITIONER LEVEL 3
3227
1695TL
SIGNAL CONDITIONER LEVEL 2
3226
1694TL
1697TL
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
3227
3228
1693TL
STEPPER SOURCE VOLTAGE
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
TELEMETRY SIGNALS
2101
5019
5020
5027
5024
5025
5026
5033
5028
5029
5030
5031
5032
85
19
55
17
33
14
58
80
60
61
57
3
5
7
PS 510
AS
LE
SEE MPI
SAME AS EXAMPLE
1993
1994
P23
47
48
GNIC
P28
X29B
X29A
P27
X9A
X9B
PSA
1580
1581
1582
1583
682
683
684
685
TPA 2
1976
1991
1996
1940
1941
1942
1943
1944
1945
1947
1977
1997
1990
PSA
GNIC
1251
1252
1253
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1228
1229
1230
P30
X1
X2
X3
X4
X5
X6
X7
X8
X9
X10
X11
X12
X13
X14
X15
X16
X17
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X56
X57
X58
X59
X60
X61
X62
X63
X64
X65
X66
X67
X68
X69
X70
SIGNAL CONDITIONER
2900206 G

3H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS + − DECIMALS + − ANGLES + −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Eckman DATE 3 JUN 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

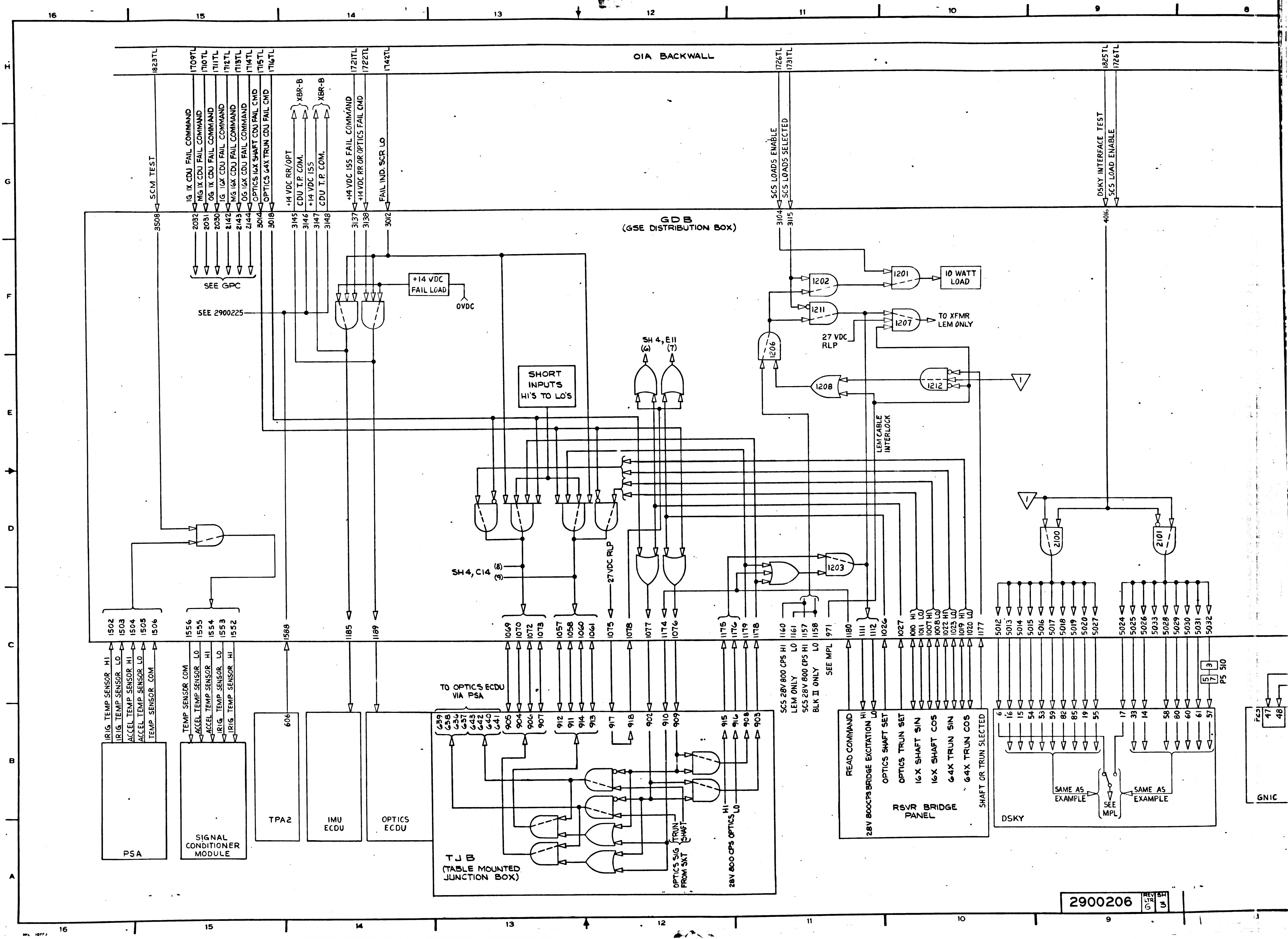
MECHANIZATION DIAGRAM-
TEST SELECTOR
(BLOCK II)

CODE IDENT NO.	SIZE	
99974	J_2	2900206
SCALE		SHEET 3 OF 4

2900206 REV LTR G SH 3

2/2900206

3H


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1823TL
SCM TEST
3508
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
IG IX CDU FAIL COMMAND
MG IX CDU FAIL COMMAND
OG IX CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
2032
2031
2030
2142
2143
2144
3014
3018
SEE GPC
XBR-B
XBR-B
+14 VDC RR/OPT
CDU T.P. COM.
+14 VDC ISS
CDU T.P. COM.
3145
3146
3147
3148
1721TL
1722TL
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
3137
3138
1742TL
FAIL IND. SCR LO
3012
+14 VDC FAIL LOAD
OVDC
SEE 2900225
GDB
(GSE DISTRIBUTION BOX)
1726TL
1731TL
SCS LOADS ENABLE
SCS LOADS SELECTED
3104
3115
1201
1202
1211
1207
1206
1208
1212
10 WATT LOAD
TO XFMR LEM ONLY
27 VDC RLP
LEM CABLE INTERLOCK
1
1825TL
1726TL
DSKY INTERFACE TEST
SCS LOAD ENABLE
4016
SHORT INPUTS HI'S TO LO'S
SH 4, E11
(6)
(7)
SH4, C14
(8)
(9)
27VDC RLP
1203
1
2100
2101
1502
1503
1504
1505
1506
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
PSA
1556
1555
1554
1553
1552
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
SIGNAL CONDITIONER MODULE
1588
606
TPA2
1185
IMU ECDU
1189
OPTICS ECDU
TO OPTICS ECDU VIA PSA
639
638
636
637
643
642
640
641
1069
1070
1072
1073
905
904
906
907
1057
1058
1060
1061
912
911
914
913
1075
917
1078
918
1077
902
1174
910
1076
909
TRUN
SHAFT
OPTICS SIG FROM SXT
TJB
(TABLE MOUNTED JUNCTION BOX)
1175
1176
1179
1178
915
916
908
903
HI
LO
28V 800 CPS OPTICS
1160
1161
1157
1158
SCS 28V 800 CPS HI
LEM ONLY LO
SCS 28V 800 CPS HI
BLK II ONLY LO
971
SEE MPL
1180
1111
1112
1026
1027
1010 HI
1011 LO
1007 HI
1008 LO
1022 HI
1023 LO
1019 HI
1020 LO
1177
READ COMMAND
28V 800CPS BRIDGE EXCITATION HI LO
OPTICS SHAFT SET
OPTICS TRUN SET
16X SHAFT SIN
16X SHAFT COS
64X TRUN SIN
64X TRUN COS
SHAFT OR TRUN SLECTED
RSVR BRIDGE PANEL
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
6
16
15
54
53
59
82
85
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5024
5025
5026
5033
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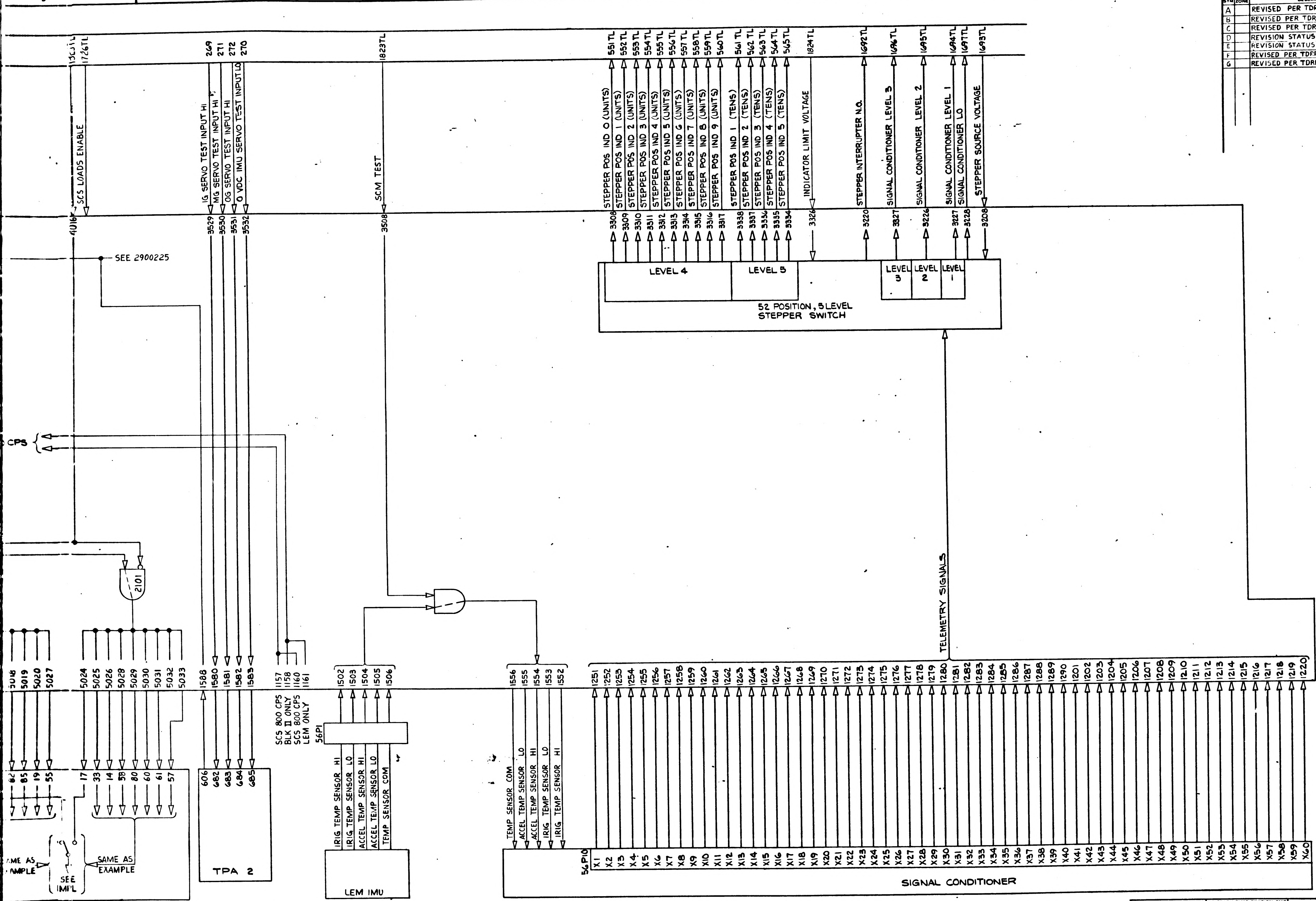
5029
5030
5031
5032
17
33
14
58
80
60
61
57
3
5
7
P5 510
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
DSKY
PC5
47
48
GNIC

2900206 REV LTR G SH 3

1-/2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
		REVISIONS 20486			
A		REVISED PER TDRR 21905		1 SEP 65	RLP AU
B		REVISED PER TDRR 22006		7 SEP 65	LK EF
C		REVISED PER TDRR 22004		9 SEP 65	LK JAC
D		REVISION STATUS CHANGED		10 SEP 65	LK AU
E		REVISION STATUS CHANGED		13 SEP 65	LK EF
F		REVISED PER TDRR 22003		16 SEP 65	LK
G		REVISED PER TDRR 22001		21 SEP 65	LK



1531L
1726TL
SCS LOADS ENABLE
4016
SEE 2900225
269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
3529
3530
3531
3532
1823TL
SCM TEST
3508
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
561TL
562TL
563TL
564TL
565TL
1824TL
1692TL
1696TL
1695TL
1694TL
1691TL
1693TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LIMIT VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3338
3337
3336
3335
3334
3326
3220
3327
3226
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL
STEPPER SWITCH
CPS
2101
TELEMETRY SIGNALS
5018
5019
5020
5027
5024
5025
5026
5028
5029
5030
5031
5032
5033
1588
1580
1581
1582
1583
1157
1158
1160
1161
SCS 800 CPS
BLK II ONLY
SCS 800 CPS
LEM ONLY
1502
1503
1504
1505
1506
56P1
1556
1555
1554
1553
1552
1251
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1256
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1214
1215
1216
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1218
1219
1220
82
85
19
55
17
33
14
58
80
60
61
57
SAME AS EXAMPLE
SEE IMPL
SAME AS EXAMPLE
606
682
683
684
685
TPA 2
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
LEM IMU
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
56P10
X1
X2
X3
X4
X5
X6
X7
X8
X9
X10
X11
X12
X13
X14
X15
X16
X17
X18
X19
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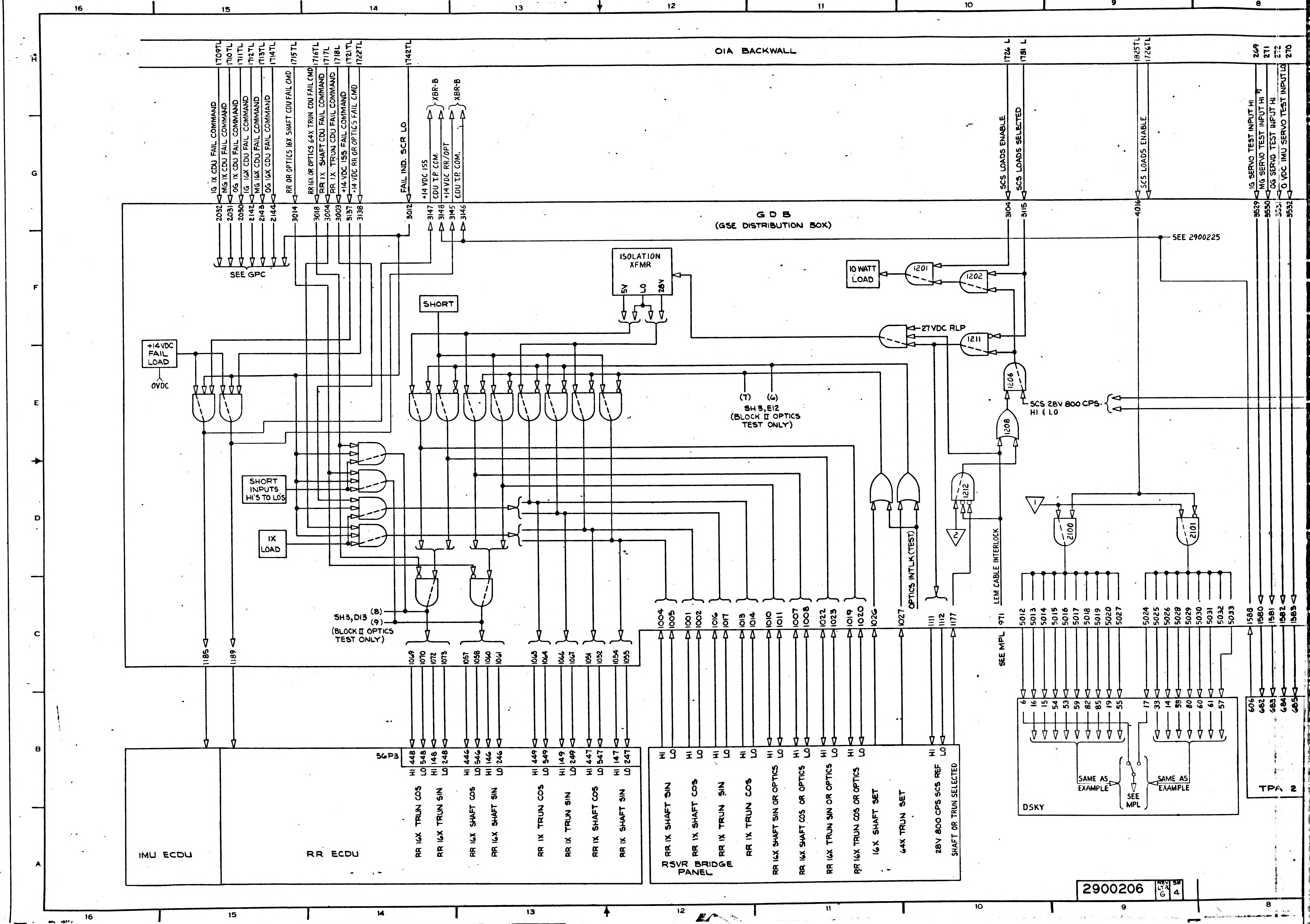
X33
X34
X35
X36
X37
X38
X39
X40
X41
X42
X43
X44
X45
X46
X47
X48
X49
X50
X51
X52
X53
X54
X55
X56
X57
X58
X59
X60
SIGNAL CONDITIONER

34

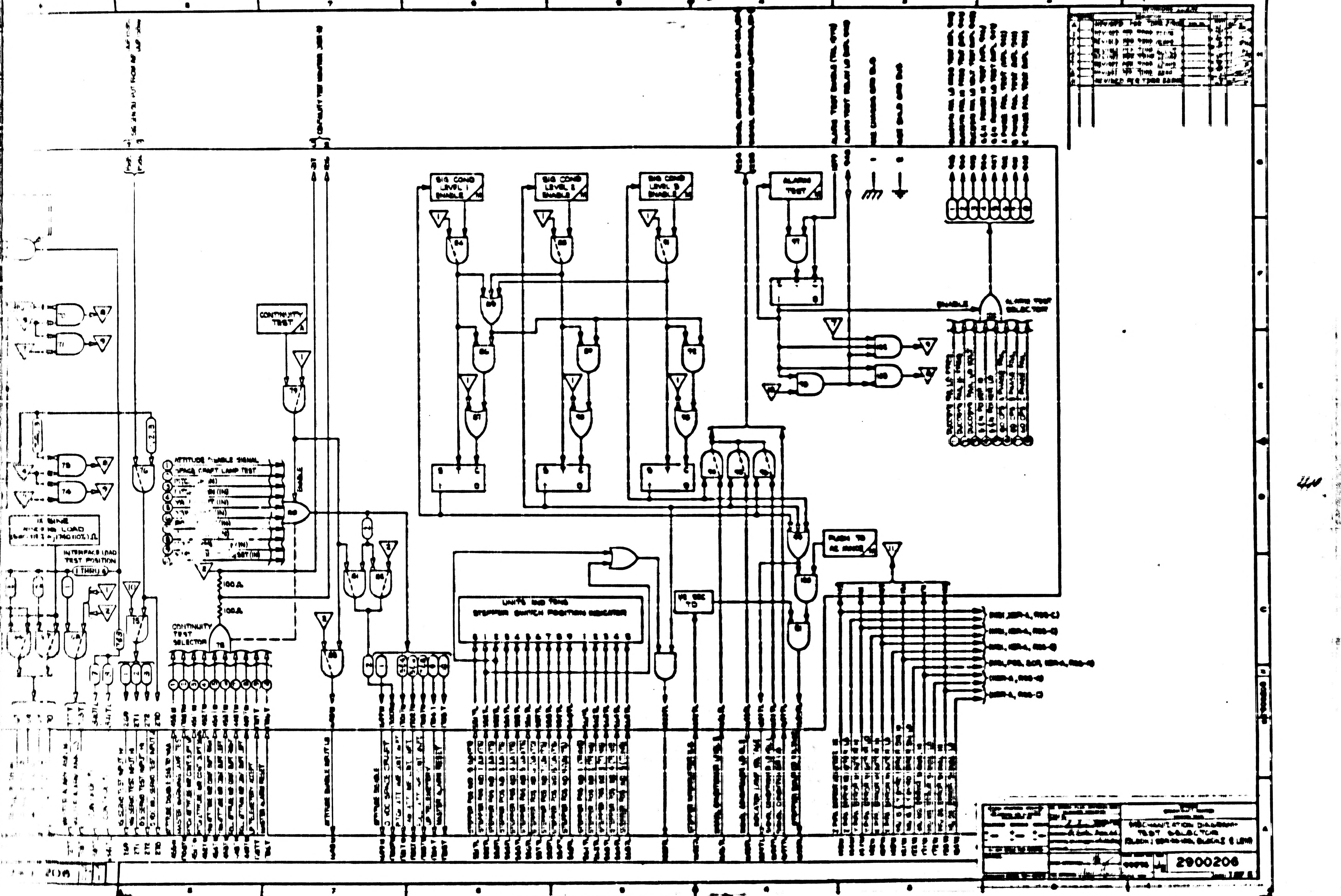
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN Lockman DATE 7 JUN 65 CHECKED Ed Foster 9 JUN 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM- TEST SELECTOR (LEM)
DO NOT SCALE THIS DRAWING		
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 2900206
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — · SHEET 4 OF 4

2900205 REV G SH 4

2-/2900206


OIA BACKWALL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1717L
1718L
1721TL
1722TL
1742TL
1724 L
1731 L
1825TL
1726TL
IG IX CDU FAIL COMMAND
MG IX CDU FAIL COMMAND
OG IX CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
RR OR OPTICS 16X SHAFT CDU FAIL CMD
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
RR IX SHAFT CDU FAIL COMMAND
RR IX TRUN CDU FAIL COMMAND
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
+14 VDC ISS
CDU T.P. COM.
+14 VDC RR/OPT
CDU T.P. COM.
XBR-B
XBR-B
SCS LOADS ENABLE
SCS LOADS SELECTED
SCS LOADS ENABLE
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
G D B
(GSE DISTRIBUTION BOX)
SEE 2900225
SEE GPC
ISOLATION XFMR
5V
LO
28V
10 WATT LOAD
1201
1202
1211
1206
1208
1212
2100
2101
27VDC RLP
SCS 28V 800 CPS HI & LO
SHORT
+14VDC FAIL LOAD
0VDC
SHORT INPUTS HI'S TO LO'S
IX LOAD
(7)
(6)
SH 3, E12 (BLOCK II OPTICS TEST ONLY)
SH3, D13 (8) (9) (BLOCK II OPTICS TEST ONLY)
OPTICS INTLK (TEST)
LEM CABLE INTERLOCK
SEE MPL
SEE MPL
SAME AS EXAMPLE
SAME AS EXAMPLE
DSKY
TPA 2
56P3
IMU ECDU
RR ECDU
RSVR BRIDGE PANEL
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
RR IX TRUN COS
RR IX TRUN SIN
RR IX SHAFT COS
RR IX SHAFT SIN
RR IX SHAFT SIN
RR IX SHAFT COS
RR IX TRUN SIN
RR IX TRUN COS
RR 16X SHAFT SIN OR OPTICS
RR 16X SHAFT COS OR OPTICS
RR 16X TRUN SIN OR OPTICS
RR 16X TRUN COS OR OPTICS
16X SHAFT SET
64X TRUN SET
28V 800 CPS SCS REF
SHAFT OR TRUN SELECTED
2900206
REV G
SH 4
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

1/2900206


SIG COND LEVEL 1 ENABLE
SIG COND LEVEL 2 ENABLE
SIG COND LEVEL 3 ENABLE
ALARM TEST
ENABLE
ALARM TEST SELECTOR
CONTINUITY TEST
CONTINUITY TEST SELECTOR
ATTITUDE ENABLE SIGNAL
SPACE CRAFT LAMP TEST
ENABLE
1K SINE
LOAD
INTERFACE LOAD TEST POSITION
(1 THRU 6)
100Ω
100Ω
UNITS AND TENS
STEPPER SWITCH POSITION INDICATOR
PUSH TO AC RANGE
1/2 SEC TD

MECHANIZATION DIAGRAM
TEST SELECTOR

2900206

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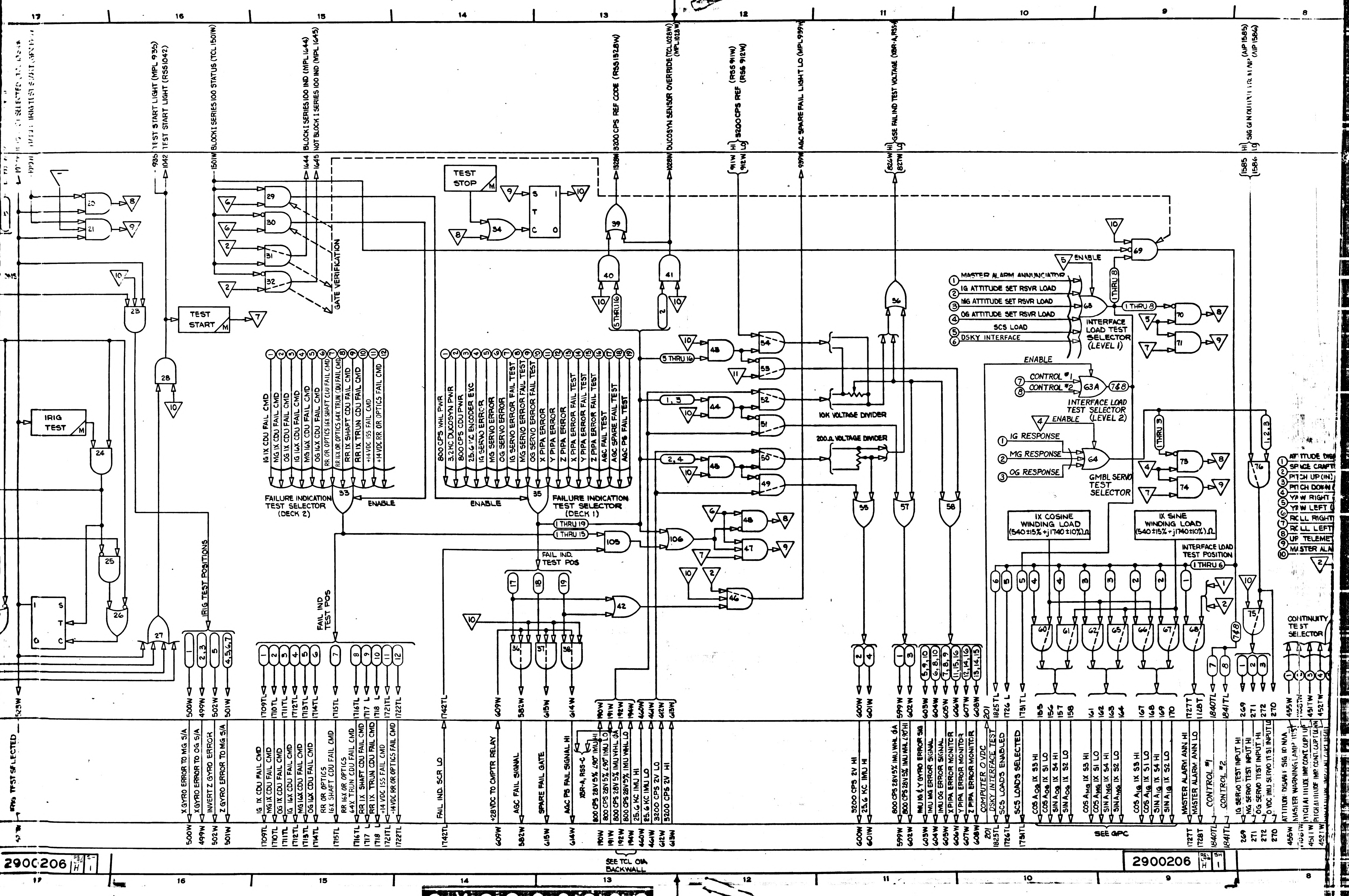

17
16
15
14
13
12
11
10
9
8
TEST START LIGHT (MPL 935)
TEST START LIGHT (RSS1042)
BLOCK I SERIES 100 STATUS (TCL 1501W)
BLOCK I SERIES 100 IND (MPL 1644)
NOT BLOCK I SERIES 100 IND (MPL 1645)
3200 CPS REF CODE (RSS1528W)
DUCOSYN SENSOR OVERRIDE (TCL 1028W) (MPL 1028W)
3200 CPS REF (RSS 911W) (RSS 912W)
AGC SPARE FAIL LIGHT LO (MPL 959W)
GSE FAIL IND TEST VOLTAGE (XBR-A, RSS-C)
SIG GEN OUTPUT TO INP (AIP 1585) (AIP 1586)
TEST STOP
TEST START
IRIG TEST
GATE VERIFICATION
IRIG TEST POSITIONS
FAIL IND TEST POS
FAILURE INDICATION TEST SELECTOR (DECK 2)
FAILURE INDICATION TEST SELECTOR (DECK 1)
ENABLE
IG 1X CDU FAIL CMD
MG 1X CDU FAIL CMD
OG 1X CDU FAIL CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
RR 16X OR OPTICS 16X SHAFT CDU FAIL CMD
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
RR 1X SHAFT CDU FAIL CMD
RR 1X TRUN CDU FAIL CMD
+14 VDC 155 FAIL CMD
+14 VDC RR OR OPTICS FAIL CMD
800 CPS WHL PWR
3.2KC DUCOSYN PWR
800 CPS CDU PWR
25.6 KC ENCODER EXC
IG SERVO ERROR
MG SERVO ERROR
OG SERVO ERROR
IG SERVO ERROR FAIL TEST
MG SERVO ERROR FAIL TEST
OG SERVO ERROR FAIL TEST
X PIPA ERROR
Y PIPA ERROR
Z PIPA ERROR
X PIPA ERROR FAIL TEST
Y PIPA ERROR FAIL TEST
Z PIPA ERROR FAIL TEST
AGC FAIL TEST
AGC SPARE FAIL TEST
AGC PS FAIL TEST
1 THRU 19
1 THRU 15
5 THRU 16
10K VOLTAGE DIVIDER
200Ω VOLTAGE DIVIDER
MASTER ALARM ANNUNCIATOR
IG ATTITUDE SET RSVR LOAD
MG ATTITUDE SET RSVR LOAD
OG ATTITUDE SET RSVR LOAD
SCS LOAD
DSKY INTERFACE
INTERFACE LOAD TEST SELECTOR (LEVEL 1)
CONTROL #1
CONTROL #2
INTERFACE LOAD TEST SELECTOR (LEVEL 2)
IG RESPONSE
MG RESPONSE
OG RESPONSE
GMBL SERVO TEST SELECTOR
1X COSINE WINDING LOAD (540±15%+j1740±10%)Ω
1X SINE WINDING LOAD (540±15%+j1740±10%)Ω
INTERFACE LOAD TEST POSITION
1 THRU 6
1 THRU 8
CONTINUITY TEST SELECTOR
ATTITUDE DIS
SPACE CRAFT
PITCH UP (IN)
PITCH DOWN
YAW RIGHT
YAW LEFT
ROLL RIGHT
ROLL LEFT
UP TELEMET
MASTER ALA
IRIG TEST SELECTED
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
FAIL IND. SCR LO
+28VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
XBR-A, RSS-C
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5% IMU WHL ØA
800 CPS 28V 5% IMU WHL LO
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ØA
800 CPS 28V 5% IMU WHL ∠90°
IMU MG & Y GYRO ERROR SIG
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
COMPUTER 0 VDC
DSKY INTERFACE TEST
SCS LOADS ENABLED
SCS LOADS SELECTED
COS A0g 1X S3 HI
COS A0g 1X S1 LO
SIN A0g 1X S4 HI
SIN A0g 1X S2 LO
COS AMG 1X S3 HI
COS AMG 1X S1 LO
SIN AMG 1X S4 HI
SIN AMG 1X S2 LO
COS AIg 1X S3 HI
COS AIg 1X S1 LO
SIN AIg 1X S4 HI
SIN AIg 1X S2 LO
MASTER ALARM ANN HI
MASTER ALARM ANN LO
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO 11 S1 INPUT LO
SEE GPC
SEE TCL 01A BACKWALL
500W
499W
502W
501W
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1717TL
1718TL
1721TL
1722TL
1742TL
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
201
1825TL
1726TL
1731TL
155
156
157
158
161
162
163
164
167
168
169
170
1727T
1728T
1840TL
1841TL
269
271
272
270
455W
451TW
452TW

2900206 H 1

2900206 H 1

2/2900206

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM)

2900210 RLP	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RELAY & LAMP POWER SUPPLY
2900208 PSS	POWER & DUMMY LOAD-PRIMARY SIGNAL SELECTOR (PDL) PRIMARY SIGNAL SELECTOR
2900223	GIMBAL POSITION CONTROL (GPC)
2900207	MONITOR PANEL (MPL)
2900202	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
2900217 XBR-A XBR-B DVM	SIGNAL SELECTION & MEASUREMENT CROSSBAR - AC SIGNALS CROSSBAR - DC SIGNALS DIGITAL VOLTMETER
2900218 RSS-A RSS-B RSS-C RSS-D	OSCILLOGRAPH SIGNAL SELECTION TO FIXED AC CHANNEL TO FIXED DC CHANNEL TO SWITCHABLE AC CHANNEL TO SWITCHABLE DC CHANNEL
2900215 RSS	MEASUREMENT REFERENCE POWER SUPPLIES OSCILLOGRAPH SIGNAL SELECTOR
2900211	AUXILIARY INPUT-OUTPUT & CALIBRATION (AIP)
2900212 MSI	PIPA & IRIG MONITORING PHASE SHIFT PANEL
2900200	GYRO CAGING PANEL (GCP)

4. NONSTANDARD SYMBOLS

INDICATES "AND" GATE WITH SWITCHED SIGNAL

① ② INDICATES EXCLUSIVE "OR" GATE WITH SWITCH POSITIONS 1 & 2

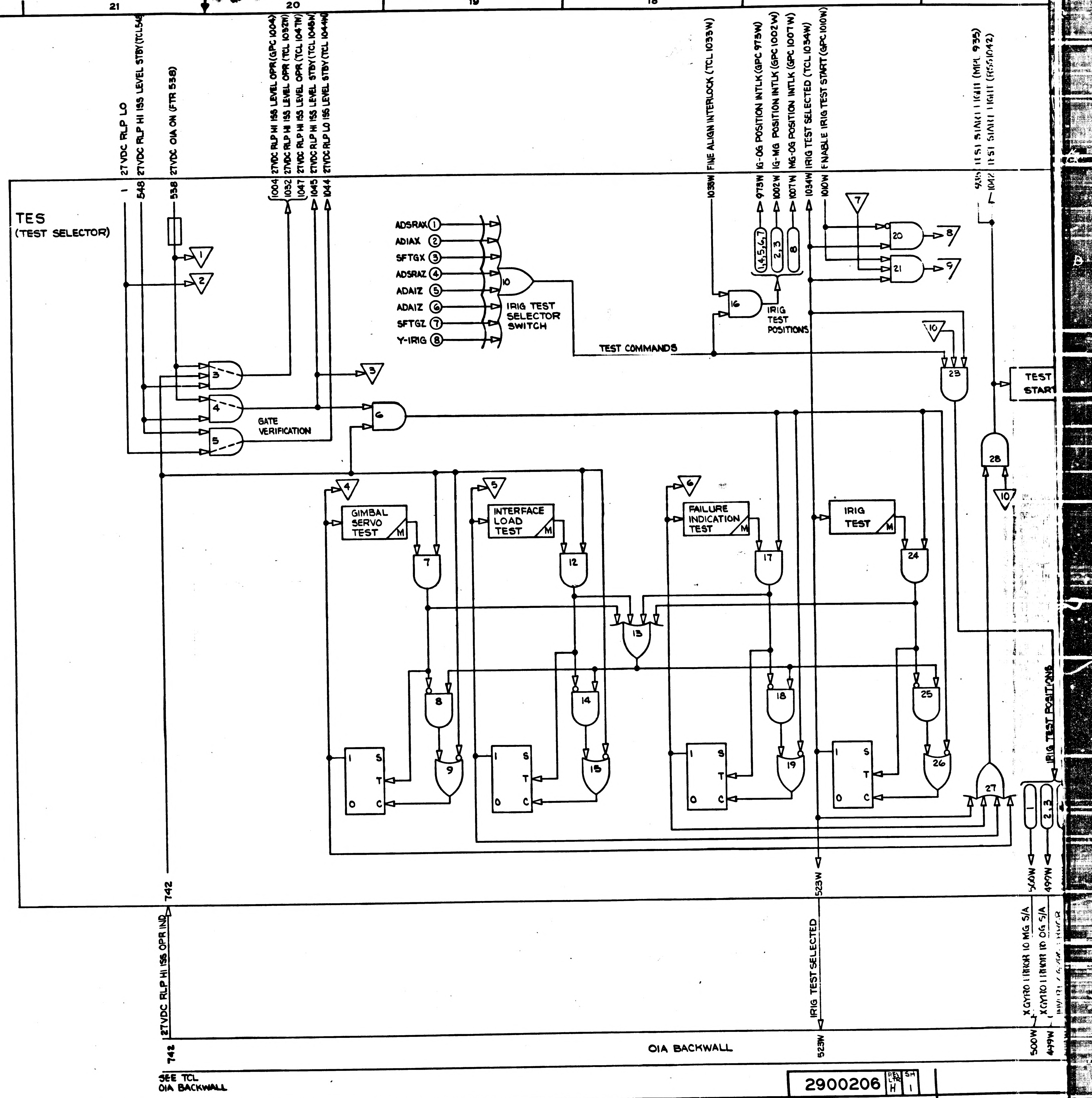
NAME M — INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME A — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
- A. W - BLOCK I SERIES 100 ONLY
- B. T - BLOCK II ONLY
- C. L - LEM ONLY
- D. BLANK - ALL G&N CONFIGURATIONS
- E. TW, TL, OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

6. SIGNAL REFERENCE

1	27 VDC OIA ON
2	27 VDC RLP LO
3	27 VDC ISS LEVEL STANDBY
4	GIMBAL SERVO TEST SELECTED
5	INTERFACE LOAD TEST SELECTED
6	FAILURE INDICATION TEST SELECTED
7	TEST START, BUTTON DEPRESSED
8	CLEAR
9	SET
10	TEST STARTED
11	IMU ERROR SIGNALS


TES
(TEST SELECTOR)
1 27 VDC RLP LO
548 27VDC RLP HI ISS LEVEL STBY (TCL548
538 27VDC OIA ON (FTR 538)
1004 27VDC RLP HI ISS LEVEL OPR (GPC 1004)
1032 27VDC RLP HI ISS LEVEL OPR (TCL 1032W)
1047 27VDC RLP HI ISS LEVEL OPR (TCL 1047W)
1045 27VDC RLP HI ISS LEVEL STBY (TCL 1045W)
1044 27VDC RLP LO ISS LEVEL STBY (TCL 1044W)
1033W FINE ALIGN INTERLOCK (TCL 1033W)
973W IG-OG POSITION INTLK (GPC 973W)
1002W IG-MG POSITION INTLK (GPC 1002W)
1007W MG-OG POSITION INTLK (GPC 1007W)
1034W IRIG TEST SELECTED (TCL 1034W)
1010W ENABLE IRIG TEST START (GPC 1010W)
935 TEST START LIGHT (MPL 935)
1042 TEST START LIGHT (RSS 1042)
ADSRAX ①
ADIAX ②
SFTGX ③
ADSRAZ ④
ADAIZ ⑤
ADAIZ ⑥
SFTGZ ⑦
Y-IRIG ⑧
IRIG TEST SELECTOR SWITCH
1,4,5,6,7
2,3
8
IRIG TEST POSITIONS
TEST COMMANDS
GATE VERIFICATION
TEST START
GIMBAL SERVO TEST M
INTERFACE LOAD TEST M
FAILURE INDICATION TEST M
IRIG TEST M
S T C
IRIG TEST POSITIONS
1
2,3
742 27VDC RLP HI ISS OPR IND
523W IRIG TEST SELECTED
500W X GYRO ERROR 10 MG S/A
499W X GYRO ERROR 10 OG S/A
OIA BACKWALL
SEE TCL
OIA BACKWALL

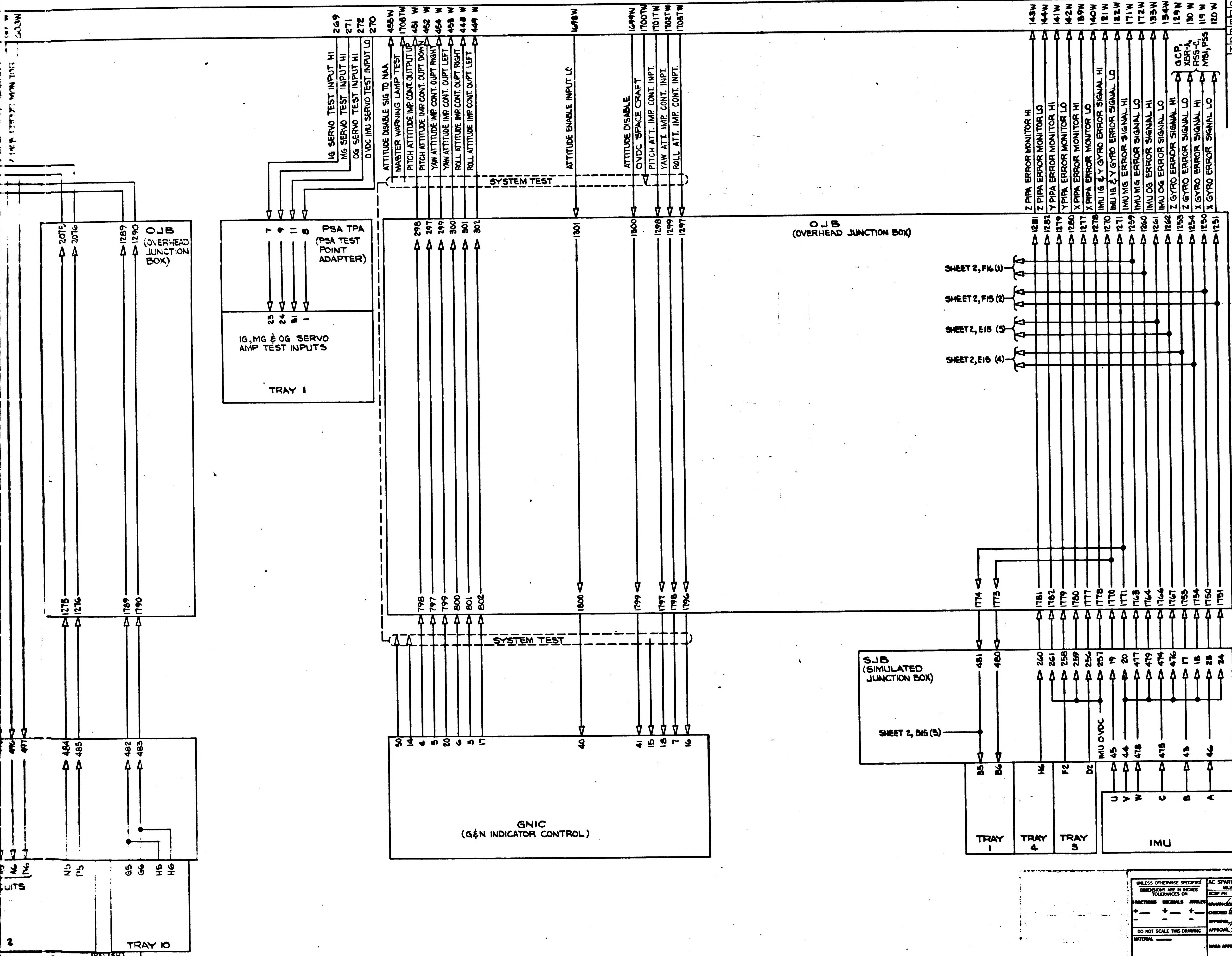
2900206 REV LTR H SH 1

MIL FORM 1050 J3

1/2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		1 SEP 65	RLP AU
B		REVISION STATUS CHANGED		7 SEP 65	LK
C		REVISION STATUS CHANGED		9 SEP 65	LK JRC
D		REVISION STATUS CHANGED		10 SEP 65	LK AU
E		REVISED PER TDRR 22002		13 SEP 65	LK
F		REVISION STATUS CHANGED		16 SEP 65	LK
G		REVISION STATUS CHANGED		21 SEP 65	LK
H		REVISION STATUS CHANGED		27 SEP 65	

REVISIONS 20486



303W
269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
455W
1708TW
451 W
452 W
454 W
453 W
448 W
449 W
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUTPUT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
1698W
ATTITUDE ENABLE INPUT LO
1699W
1700TW
1701TW
1702TW
1703TW
ATTITUDE DISABLE
OVDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
SYSTEM TEST
143W
144W
141W
142W
139W
140W
121W
122W
171W
172W
133W
134W
129W
130W
119W
120W
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIGNAL HI
IMU IG & Y GYRO ERROR SIGNAL LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
Z GYRO ERROR SIGNAL HI
Z GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
X GYRO ERROR SIGNAL LO
GCP, XBR-A, RSS-C, MSI, PSS
OJB (OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1789
1790
PSA TPA (PSA TEST POINT ADAPTER)
7
9
11
8
23
24
31
1
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
OJB (OVERHEAD JUNCTION BOX)
298
297
299
300
301
302
1301
1800
1298
1299
1297
1281
1282
1279
1280
1277
1278
1270
1271
1259
1260
1261
1262
1253
1254
1250
1251
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (3)
SHEET 2, E15 (4)
798
797
799
800
801
802
1800
1799
1797
1798
1796
1774
1773
1781
1782
1779
1780
1777
1778
1770
1771
1763
1764
1766
1767
1755
1754
1750
1751
SJB (SIMULATED JUNCTION BOX)
481
480
260
261
258
259
256
257
19
20
477
479
474
476
17
18
23
24
SHEET 2, B15 (5)
IMU OVDC
45
44
478
475
43
46
B5
B6
H6
F2
D2
U
V
W
C
B
A
TRAY 1
TRAY 4
TRAY 3
IMU
50
14
4
5
20
6
3
17
40
41
15
18
7
16
GNIC (G&N INDICATOR CONTROL)
484
485
482
483
N5
P5
G5
G6
H5
H6
UITS
2
TRAY 10

2900206 | REV LTR L | SH 2

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 26 MAY 65
CHECKED Ed Foster 9 Jun 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

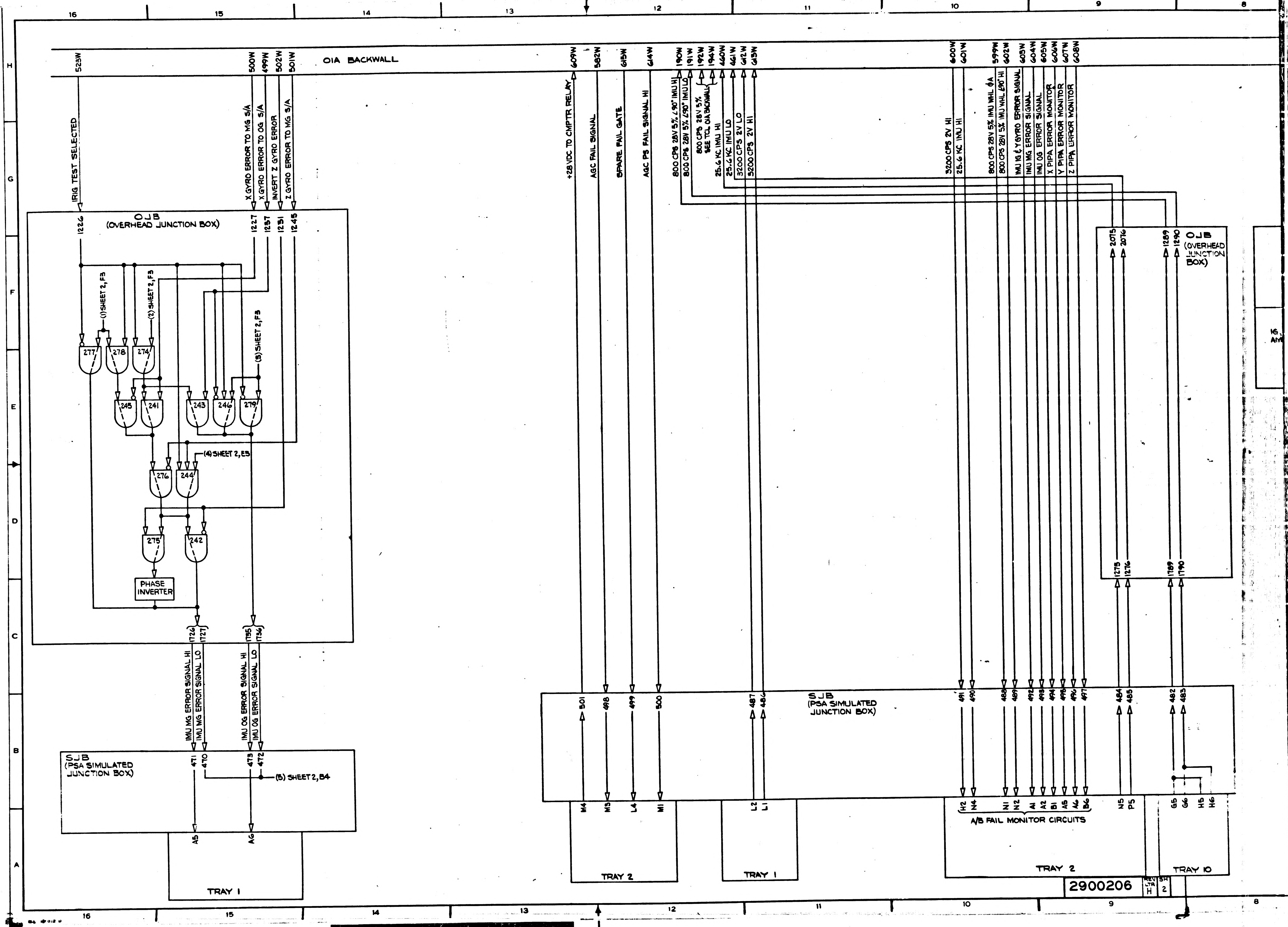
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
TEST SELECTOR
(BLOCK I SERIES 100)

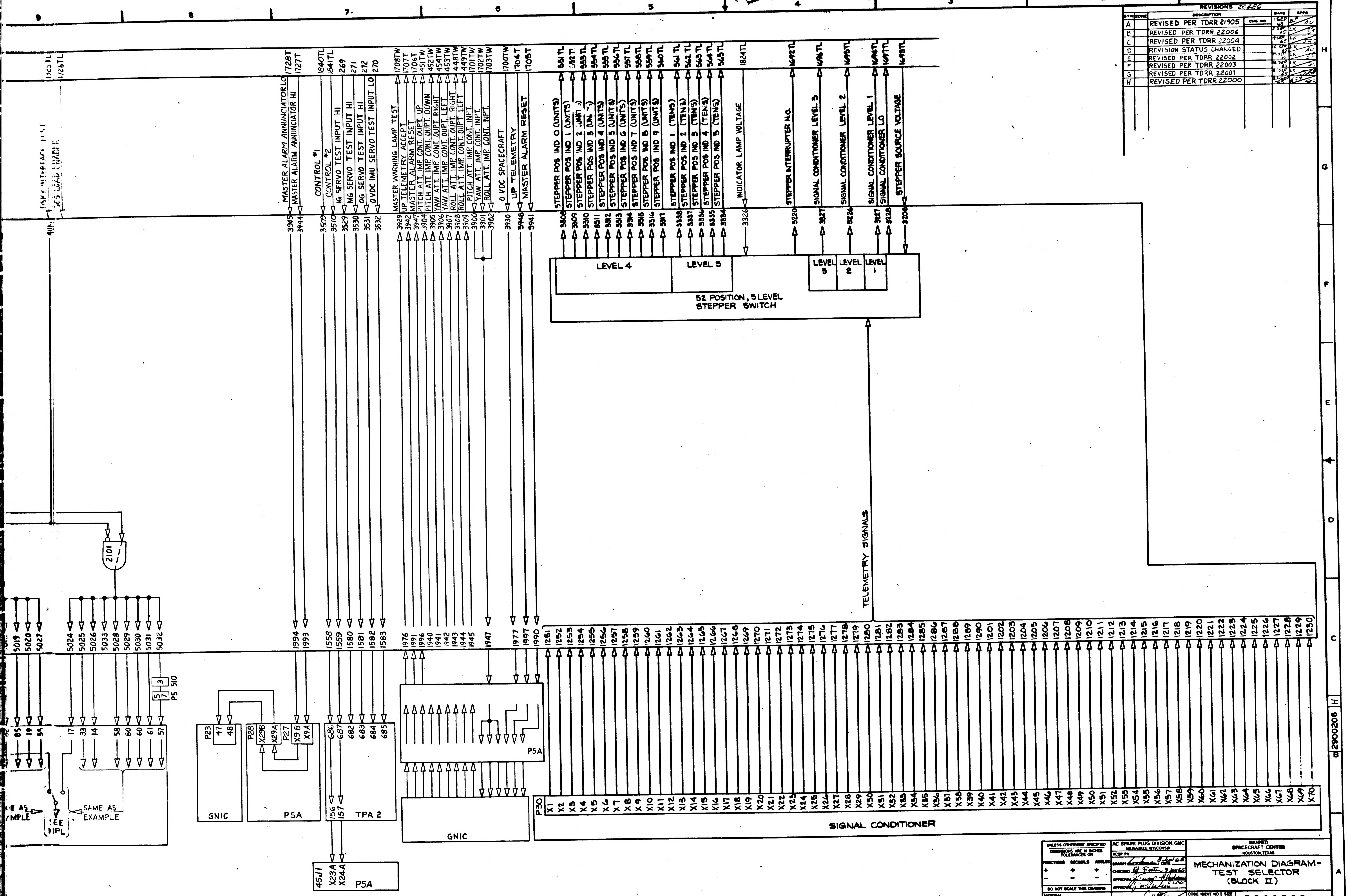
CODE IDENT NO. 99974
SIZE J_2
2900206
SCALE —
SHEET 2 OF 4

3H

2729002 06


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
523W
500W
499W
502W
501W
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
IRIG TEST SELECTED
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5% SEE TCL OIA BACKWALL
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ϕA
800 CPS 28V 5% IMU WHL ∠90° HI
IMU IG & Y GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
OJB
(OVERHEAD JUNCTION BOX)
1226
1227
1257
1251
1245
(1) SHEET 2, F3
(2) SHEET 2, F3
(3) SHEET 2, F3
(4) SHEET 2, E5
277
278
274
245
241
243
246
279
276
244
275
242
PHASE INVERTER
1724
1727
1735
1736
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
SJB
(PSA SIMULATED JUNCTION BOX)
471
470
473
472
(5) SHEET 2, B4
A5
A6
TRAY 1
OJB
(OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1789
1790
SJB
(PSA SIMULATED JUNCTION BOX)
501
498
499
500
487
486
491
490
488
489
492
493
494
495
496
497
484
485
482
483
M4
M3
L4
M1
TRAY 2
L2
L1
TRAY 1
H2
N4
N1
N2
A1
A2
B1
A5
A6
B6
A/B FAIL MONITOR CIRCUITS
N5
P5
TRAY 2
G5
G6
H5
H6
TRAY 10
16,
AN
2900206
REV LTR H
SH 2

1/2900206


MASTER ALARM ANNUNCIATOR LO
MASTER ALARM ANNUNCIATOR HI
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
MASTER WARNING LAMP TEST
UP TELEMETRY ACCEPT
MASTER ALARM RESET
PITCH ATT. IMP. CONT. OUPT. UP
PITCH ATT. IMP. CONT. OUPT. DOWN
YAW ATT. IMP. CONT. OUPT. RIGHT
YAW ATT. IMP. CONT. OUPT. LEFT
ROLL ATT. IMP. CONT. OUPT. RIGHT
ROLL ATT. IMP. CONT. OUPT. LEFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LAMP VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
1728T 1727T 1840TL 1841TL 269 271 272 270
1708TW 1707T 1706T 451TW 452TW 454TW 453TW 448TW 449TW 1701TW 1702TW 1703TW
1700TW 1704T 1705T
551TL 552TL 553TL 554TL 555TL 556TL 557TL 558TL 559TL 560TL 561TL 562TL 563TL 564TL 565TL
1824TL 1692TL 1696TL 1695TL 1694TL 1697TL 1693TL
1125TL 1126TL
DSKY INTERFACE TEST
IG SERVO LOAD ENABLE
3945 3944 3509 3510 3529 3530 3531 3532
3929 3942 3947 3904 3905 3906 3907 3908 3909 3900 3901 3902
3930 3948 3941
3308 3309 3310 3311 3312 3313 3314 3315 3316 3317 3338 3337 3336 3335 3334
3326 3220 3327 3226 3227 3228 3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL
STEPPER SWITCH
TELEMETRY SIGNALS
2101
5019 5020 5027
5024 5025 5026 5033 5028 5029 5030 5031 5032
85 19 55
17 33 14 58 80 60 61 57
3 5 7 P5 510
SAME AS EXAMPLE
SEE MPL
P23 47 48
GNIC
P28 X29B X29A P27 X9B X9A
PSA
1994 1993
1558 1559 1580 1581 1582 1583
686 687 682 683 684 685
156 157
TPA 2
45J1 X23A X24A
PSA
1976 1991 1996 1941 1942 1943 1944 1945
1947
1977 1987 1990
PSA
GNIC
1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220 1221 1222 1223 1224 1225 1226 1227 1228 1229 1230
P30
X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21 X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38 X39 X40 X41 X42 X43 X44 X45 X46 X47 X48 X49 X50 X51 X52 X53 X54 X55 X56 X57 X58 X59 X60 X61 X62 X63 X64 X65 X66 X67 X68 X69 X70
SIGNAL CONDITIONER
9 8 7 6 5 4 3 2 1
H G F E D C B A

REVISIONS 20486

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	AU
B		REVISED PER TDRR 22006		7 SEP 65	LK
C		REVISED PER TDRR 22004		9 SEP 65	LK
D		REVISION STATUS CHANGED		10 SEP 65	LK AU
E		REVISED PER TDRR 22002		13 SEP 65	LK
F		REVISED PER TDRR 22003		16 SEP 65	LK
G		REVISED PER TDRR 22001		21 SEP 65	LK
H		REVISED PER TDRR 22000		27 SEP 65	

3H

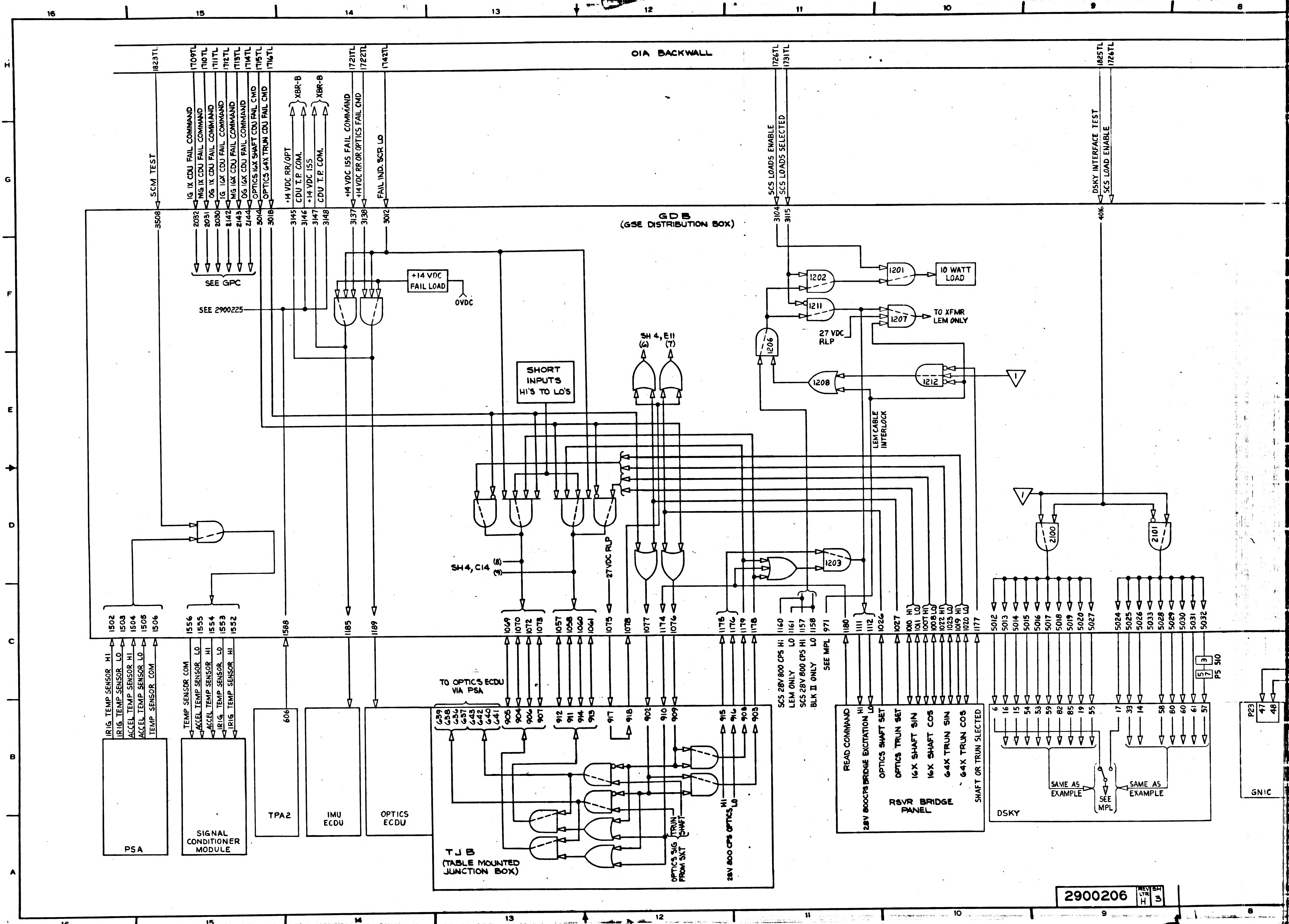
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 3 Jun 65
CHECKED Ed Foster 9 Jun 65
APPROVAL
APPROVAL 6-25-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
TEST SELECTOR
(BLOCK II)

CODE IDENT NO. 99974
SIZE J_2
2900206
SCALE
SHEET 3 OF 4

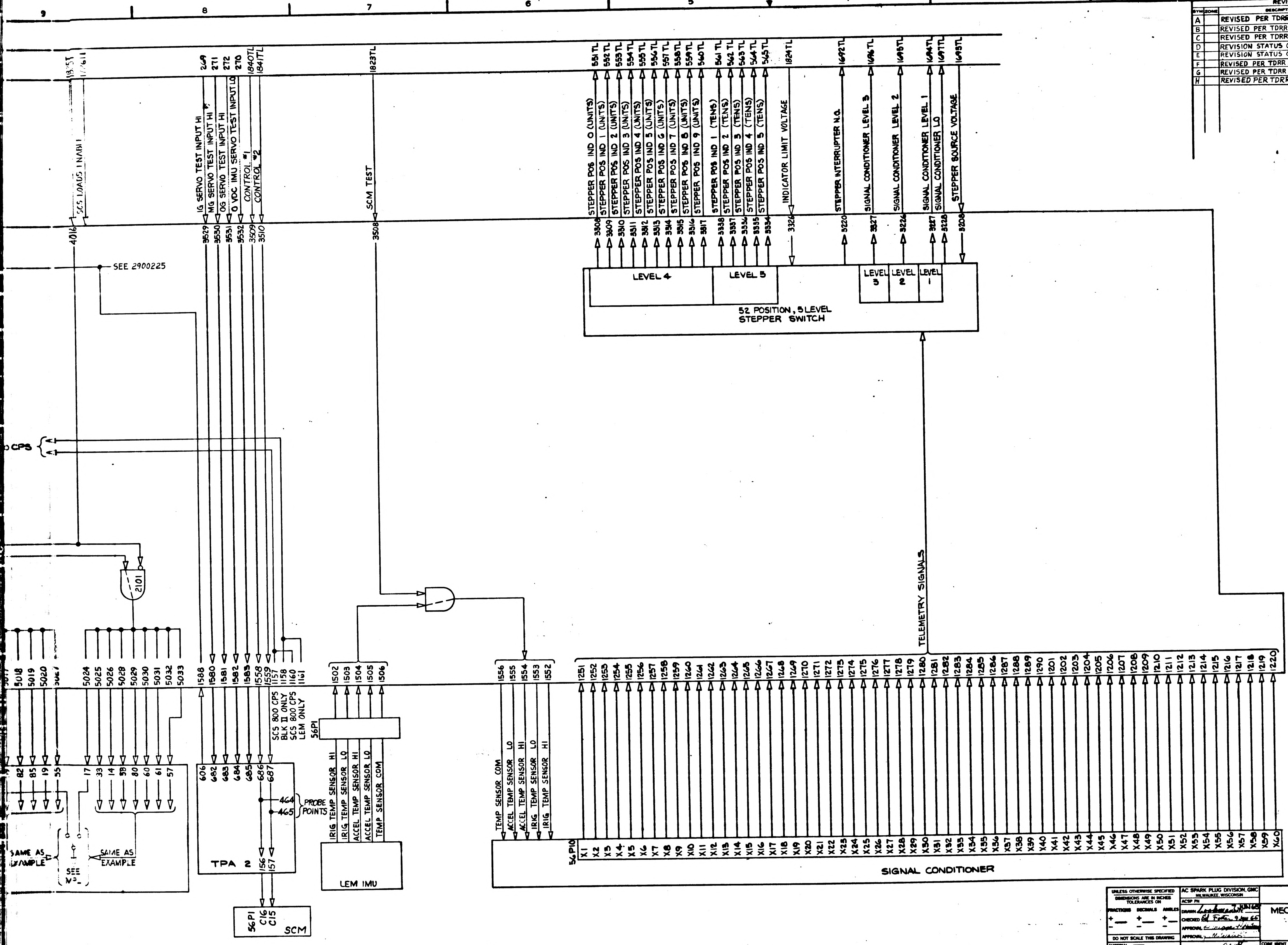

OIA BACKWALL
1823TL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1721TL
1722TL
1742TL
1726TL
1731TL
1825TL
1726TL
SCM TEST
IG 1X CDU FAIL COMMAND
MG 1X CDU FAIL COMMAND
OG 1X CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
+14 VDC RR/OPT
CDU T.P. COM.
+14 VDC ISS
CDU T.P. COM.
XBR-B
XBR-B
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
SCS LOADS ENABLE
SCS LOADS SELECTED
DSKY INTERFACE TEST
SCS LOAD ENABLE
GDB
(GSE DISTRIBUTION BOX)
3508
2032
2031
2030
2142
2143
2144
3014
3018
3145
3146
3147
3148
3137
3138
3012
3104
3115
4016
SEE GPC
SEE 2900225
+14 VDC FAIL LOAD
OVDC
1202
1201
10 WATT LOAD
1211
1207
TO XFMR LEM ONLY
27 VDC RLP
1206
1208
1212
LEM CABLE INTERLOCK
SHORT INPUTS HI'S TO LO'S
SH 4, E11
(6)
(7)
SH 4, C14
(8)
(9)
27VDC RLP
1203
2100
2101
1502
1503
1504
1505
1506
1556
1555
1554
1553
1552
1588
1185
1189
1069
1070
1072
1073
1057
1058
1060
1061
1075
1078
1077
1174
1076
1175
1176
1179
1178
1160
1161
1157
1158
971
1180
1111
1112
1026
1027
1100 HI
1101 LO
1007 HI
1008 LO
1022 HI
1023 LO
1019 HI
1020 LO
1177
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
5024
5025
5026
5033
5028
5029
5030
5031
5032
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
PSA
SIGNAL CONDITIONER MODULE
606
TPA2
IMU ECDU
OPTICS ECDU
TO OPTICS ECDU VIA PSA
G39
G38
G36
G37
G43
G42
G40
G41
905
904
906
907
912
911
914
913
917
918
902
910
909
915
916
908
903
TJB
(TABLE MOUNTED JUNCTION BOX)
OPTICS SIG FROM SXT
TRUN
SHAFT
HI
LO
28V 800 CPS OPTICS
SCS 28V 800 CPS HI
LEM ONLY LO
SCS 28V 800 CPS HI
BLK II ONLY LO
SEE MPL
READ COMMAND
28V 800CPS BRIDGE EXCITATION HI LO
OPTICS SHAFT SET
OPTICS TRUN SET
16X SHAFT SIN
16X SHAFT COS
64X TRUN SIN
64X TRUN COS
SHAFT OR TRUN SLECTED
RSVR BRIDGE PANEL
6
16
15
54
53
59
82
85
19
55
17
33
14
58
80
60
61
57
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
DSKY
3
5
7
P5 510
P23
47
48
GNIC
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
2900206
REV LTR H
SH 3

3H

1/2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	RLP AU
B		REVISED PER TDRR 22006		7 SEP 65	LK EF
C		REVISED PER TDRR 22004		9 SEP 65	LK JRC
D		REVISION STATUS CHANGED		10 SEP 65	LK AU
E		REVISION STATUS CHANGED		13 SEP 65	LK E
F		REVISED PER TDRR 22003		16 SEP 65	LK
G		REVISED PER TDRR 22001		21 SEP 65	LK
H		REVISED PER TDRR 22000		24 SEP 65	

REVISIONS 20486


9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
1825T
1/2611
SCS LOADS ENABLE
4016
SEE 2900225
269
271
272
270
1840TL
1841TL
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
CONTROL #1
CONTROL #2
3529
3530
3531
3532
3509
3510
1823TL
SCM TEST
3508
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
561TL
562TL
563TL
564TL
565TL
1824TL
1692TL
1696TL
1695TL
1694TL
1697TL
1693TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LIMIT VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3338
3337
3336
3335
3334
3326
3220
3227
3226
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
CPS
2101
TELEMETRY SIGNALS
5018
5019
5020
5024
5025
5026
5028
5029
5030
5031
5032
5033
1588
1580
1581
1582
1583
1558
1559
1157
1158
1160
1161
SCS 800 CPS
BLK II ONLY
SCS 800 CPS
LEM ONLY
1502
1503
1504
1505
1506
56P1
1556
1555
1554
1553
1552
82
85
19
55
17
33
14
58
80
60
61
57
606
682
683
684
685
686
687
464
465
PROBE POINTS
SAME AS EXAMPLE
SEE NO.
SAME AS EXAMPLE
TPA 2
156
157
56P1
C16
C15
SCM
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
LEM IMU
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
1251
1252
1253
1254
1255
1256
1257
1258
1259
1260
1261
1262
1263
1264
1265
1266
1267
1268
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1210
1211
1212
1213
1214
1215
1216
1217
1218
1219
1220
56P10
X1
X2
X3
X4
X5
X6
X7
X8
X9
X10
X11
X12
X13
X14
X15
X16
X17
X18
X19
X20
X21
X22
X23
X24
X25
X26
X27
X28
X29
X30
X31
X32
X33
X34
X35
X36
X37
X38
X39
X40
X41
X42
X43
X44
X45
X46
X47
X48
X49
X50
X51
X52
X53
X54
X55
X56
X57
X58
X59
X60
SIGNAL CONDITIONER

34

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Lockman DATE 7 JUN 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

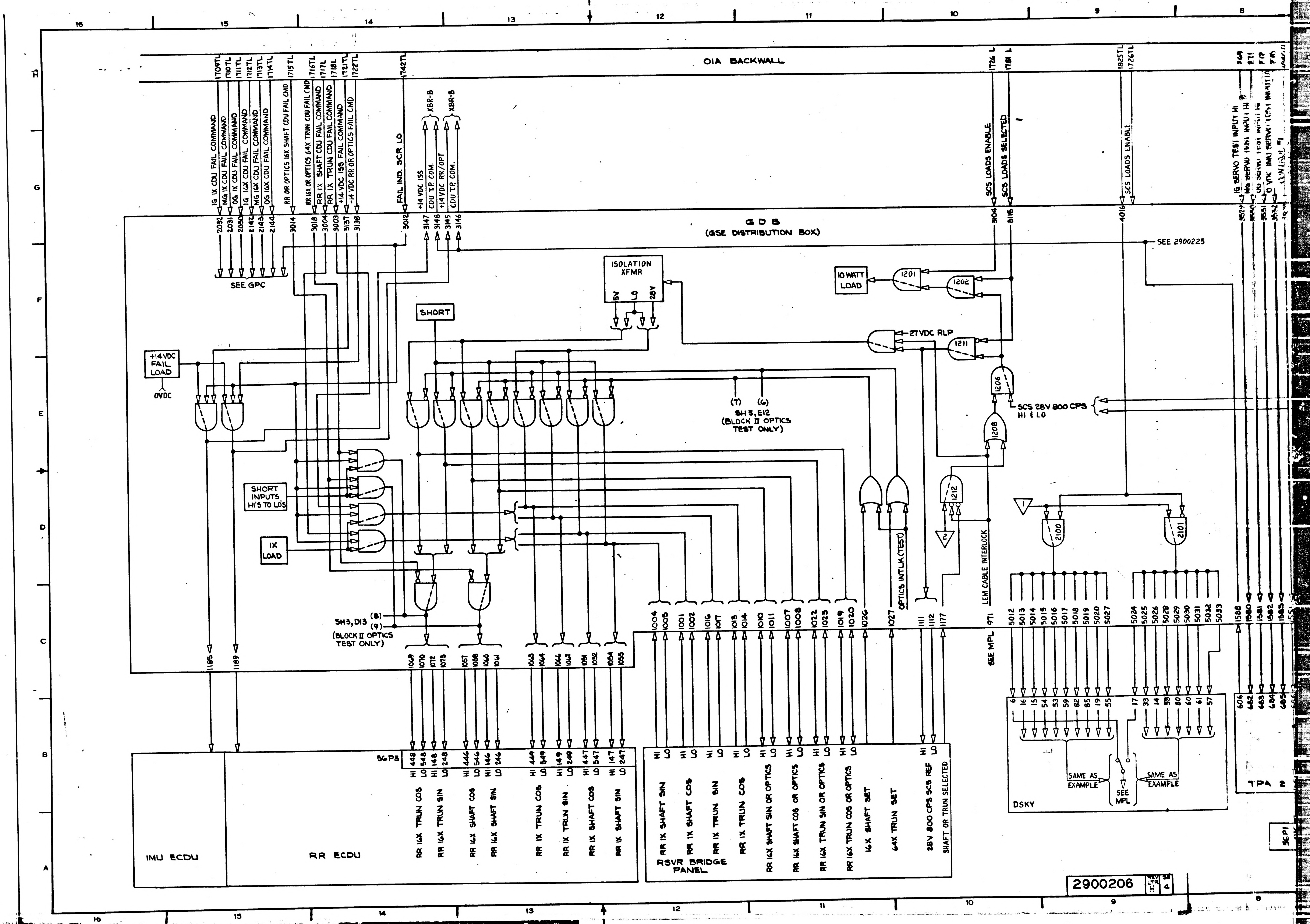
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM- TEST SELECTOR (LEM)

CODE IDENT NO. 99974 SIZE J_2 2900206
SCALE — SHEET 4 OF 4

2900206 REV LTR L SH 4

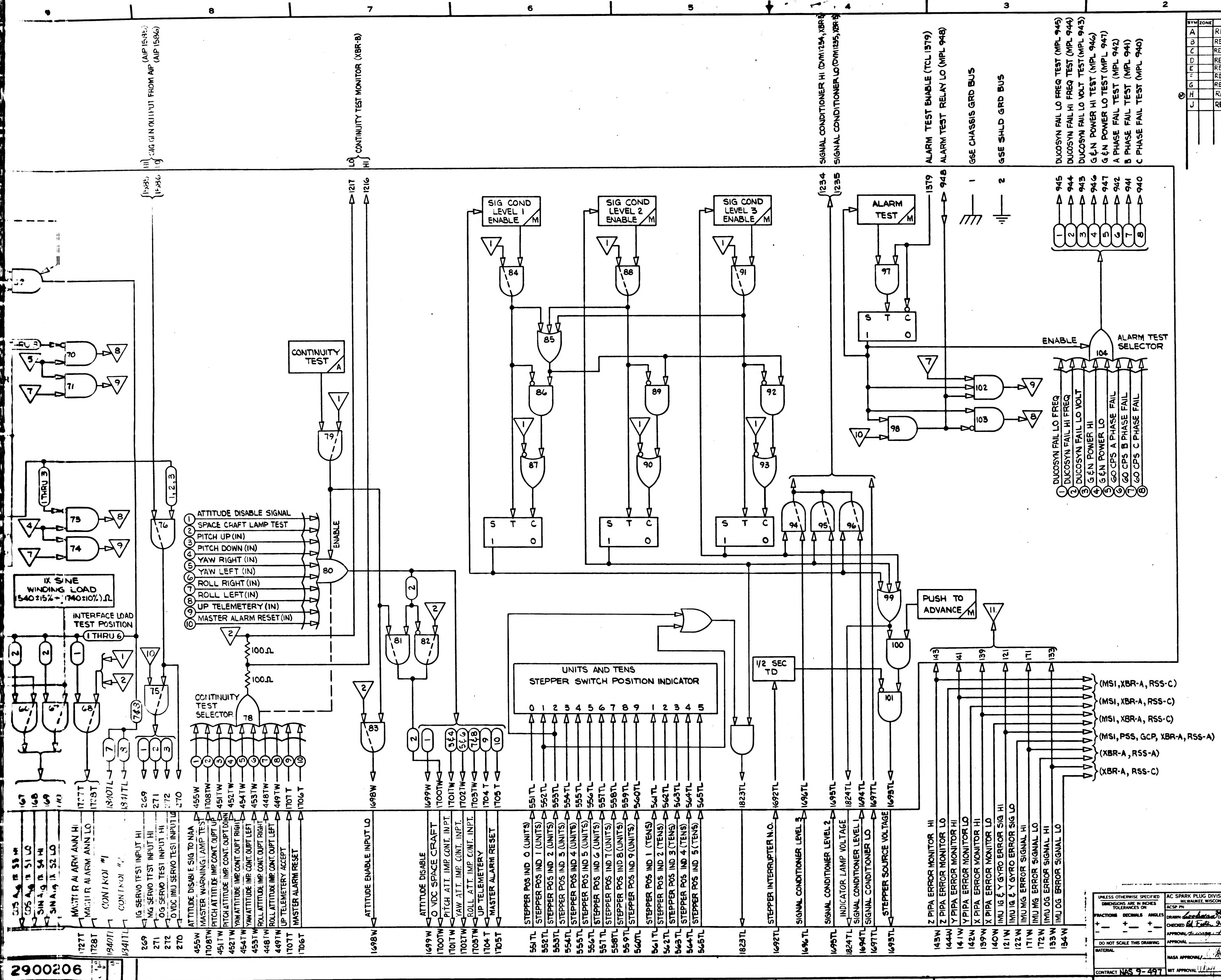
2900206 H


OIA BACKWALL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1717L
1718L
1721TL
1722TL
1742TL
IG 1X CDU FAIL COMMAND
MG 1X CDU FAIL COMMAND
OG 1X CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
RR OR OPTICS 16X SHAFT CDU FAIL CMD
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
RR 1X SHAFT CDU FAIL COMMAND
RR 1X TRUN CDU FAIL COMMAND
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
+14 VDC ISS
CDU T.P. COM.
+14 VDC RR/OPT
CDU T.P. COM.
XBR-B
XBR-B
1726L
1781L
SCS LOADS ENABLE
SCS LOADS SELECTED
1825TL
1726TL
SCS LOADS ENABLE
IG SERVO TEST INPUT HI
GDB
(GSE DISTRIBUTION BOX)
SEE 2900225
SEE GPC
ISOLATION XFMR
5V
LO
28V
10 WATT LOAD
1201
1202
27VDC RLP
1211
1206
1208
1212
SCS 28V 800 CPS HI & LO
SHORT
+14VDC FAIL LOAD
OVDC
SHORT INPUTS HI'S TO LO'S
1X LOAD
(7)
(6)
SH 3, E12
(BLOCK II OPTICS TEST ONLY)
SH3, D13
(8)
(9)
(BLOCK II OPTICS TEST ONLY)
OPTICS INTLK (TEST)
LEM CABLE INTERLOCK
SEE MPL
2100
2101
1185
1189
56P3
IMU ECDU
RR ECDU
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
RR 1X TRUN COS
RR 1X TRUN SIN
RR 1X SHAFT COS
RR 1X SHAFT SIN
RSVR BRIDGE PANEL
RR 1X SHAFT SIN
RR 1X SHAFT COS
RR 1X TRUN SIN
RR 1X TRUN COS
RR 16X SHAFT SIN OR OPTICS
RR 16X SHAFT COS OR OPTICS
RR 16X TRUN SIN OR OPTICS
RR 16X TRUN COS OR OPTICS
16X SHAFT SET
64X TRUN SET
28V 800 CPS SCS REF
SHAFT OR TRUN SELECTED
HI
LO
DSKY
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
TPA 2
56P1
2900206
4
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

34

1/2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APP'D
A		REVISED PER TDRR 21905		SEP 65	
B		REVISED PER TDRR 22006		7 SEP 65	LK
C		REVISED PER TDRR 22004		SEP 65	LK
D		REVISED PER TDRR 22005		10 SEP 65	
E		REVISED PER TDRR 22002		SEP 65	LK
F		REVISED PER TDRR 22003		SEP 65	LK
G		REVISED PER TDRR 22001		21 SEP 65	LK
H		REVISED PER TDRR 22000		SEP 65	
J		REVISED PER TDRR 22743		6 OCT 65	


SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
CONTINUITY TEST MONITOR (XBR-B)
SIGNAL CONDITIONER HI (DVM1234, XBR-B)
SIGNAL CONDITIONER LO (DVM1235, XBR-B)
ALARM TEST ENABLE (TCL 1379)
ALARM TEST RELAY LO (MPL 948)
GSE CHASSIS GRD BUS
GSE SHLD GRD BUS
DUCOSYN FAIL LO FREQ TEST (MPL 945)
DUCOSYN FAIL HI FREQ TEST (MPL 944)
DUCOSYN FAIL LO VOLT TEST (MPL 943)
G&N POWER HI TEST (MPL 946)
G&N POWER LO TEST (MPL 947)
A PHASE FAIL TEST (MPL 942)
B PHASE FAIL TEST (MPL 941)
C PHASE FAIL TEST (MPL 940)
SIG COND LEVEL 1 ENABLE M
SIG COND LEVEL 2 ENABLE M
SIG COND LEVEL 3 ENABLE M
ALARM TEST M
CONTINUITY TEST A
ENABLE
ALARM TEST SELECTOR
DUCOSYN FAIL LO FREQ
DUCOSYN FAIL HI FREQ
DUCOSYN FAIL LO VOLT
G&N POWER HI
G&N POWER LO
400 CPS A PHASE FAIL
400 CPS B PHASE FAIL
400 CPS C PHASE FAIL
S T C 1 0
PUSH TO ADVANCE M
1/2 SEC TD
UNITS AND TENS STEPPER SWITCH POSITION INDICATOR
0 1 2 3 4 5 6 7 8 9 1 2 3 4 5
IX SINE WINDING LOAD (540±15% - 1740±10%) Ω
INTERFACE LOAD TEST POSITION (1 THRU 6)
CONTINUITY TEST SELECTOR
100Ω
100Ω
① ATTITUDE DISABLE SIGNAL
② SPACE CRAFT LAMP TEST
③ PITCH UP (IN)
④ PITCH DOWN (IN)
⑤ YAW RIGHT (IN)
⑥ YAW LEFT (IN)
⑦ ROLL RIGHT (IN)
⑧ ROLL LEFT (IN)
⑨ UP TELEMETRY (IN)
⑩ MASTER ALARM RESET (IN)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, PSS, GCP, XBR-A, RSS-A)
(XBR-A, RSS-A)
(XBR-A, RSS-C)
COS A, 18 S3 HI
COS A, 18 S1 LO
SIN A, 18 S4 HI
SIN A, 18 S2 LO
MASTER ALARM ANN HI
MASTER ALARM ANN LO
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP CONT OUPT UP
PITCH ATTITUDE IMP CONT OUPT DOWN
YAW ATTITUDE IMP CONT OUPT RIGHT
YAW ATTITUDE IMP CONT OUPT LEFT
ROLL ATTITUDE IMP CONT OUPT RIGHT
ROLL ATTITUDE IMP CONT OUPT LEFT
UP TELEMETRY ACCEPT
MASTER ALARM RESET
ATTITUDE ENABLE INPUT LO
ATTITUDE DISABLE
0 VDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
UP TELEMETRY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
INDICATOR LAMP VOLTAGE
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIG HI
IMU IG & Y GYRO ERROR SIG LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
167 168 51 170
1727T 1728T 1840TL 1841TL 269 271 272 270
455W 1708TW 451TW 452TW 453TW 454TW 448TW 449TW 1707T 1706T
1698W
1699W 1700TW 1701TW 1702TW 1703TW 1704T 1705T
551TL 552TL 553TL 554TL 555TL 556TL 557TL 558TL 559TL 560TL 561TL 562TL 563TL 564TL 565TL
1823TL 1692TL 1696TL 1695TL 1824TL 1694TL 1697TL 1693TL
143W 144W 141W 142W 139W 140W 121W 122W 171W 172W 133W 134W
1217 1216 1234 1235 1379 948 1 2 945 944 943 946 947 942 941 940
9 8 7 6 5 4 3 2 1
H G F E D C B A
2900206

44

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Lookman DATE 24 MAY 65
CHECKED Ed Foster 9 Jun 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

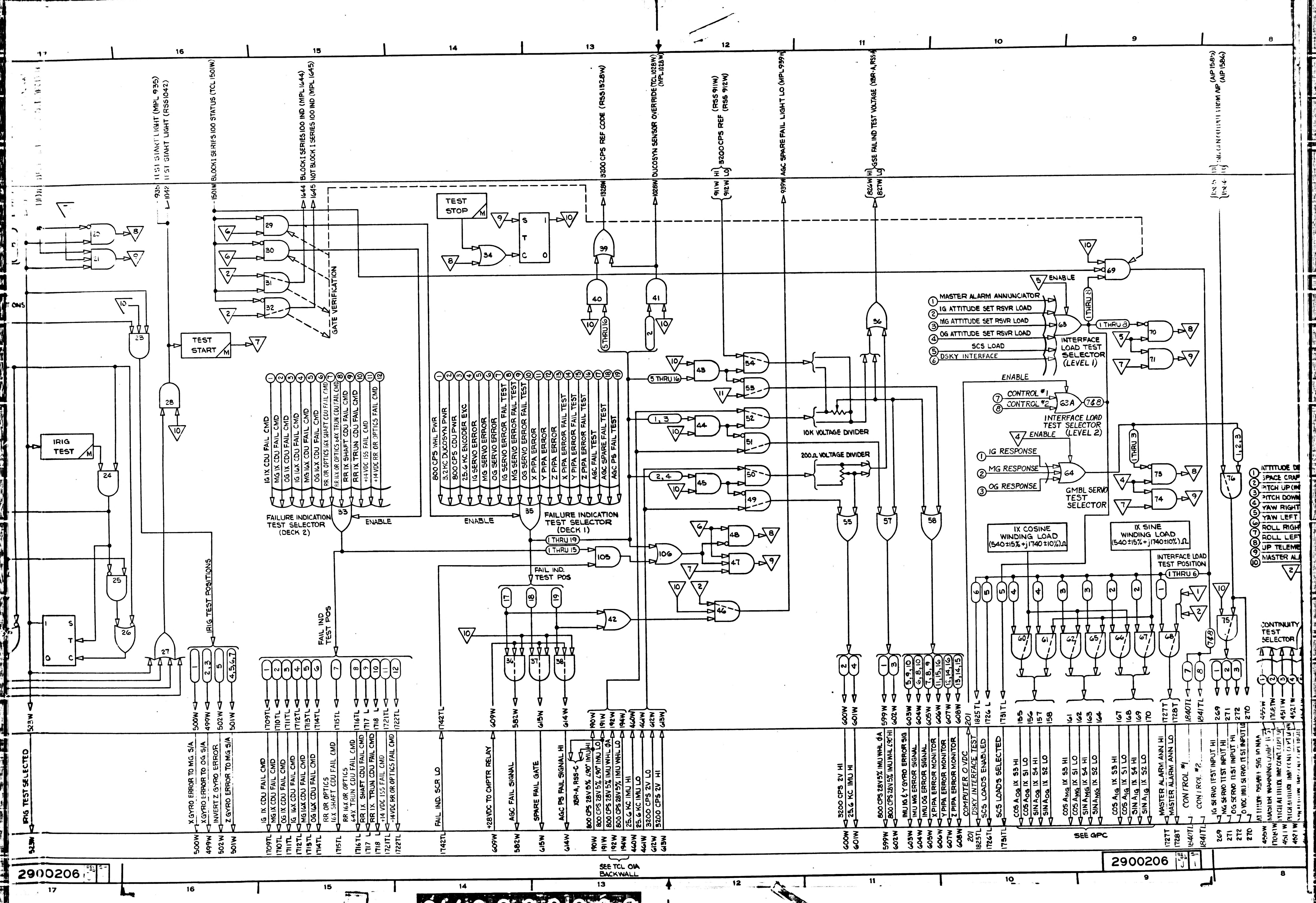
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
TEST SELECTOR
(BLOCK I SERIES 100, BLOCK II & LEM)

CODE IDENT NO. 99974
SIZE J3
2900206
SCALE —
SHEET 1 OF 4

2900206

3 X 2900206



17
16
15
14
13
12
11
10
9
8
935 TEST START LIGHT (MPL 935)
1042 TEST START LIGHT (RSS1042)
1501W BLOCK I SERIES 100 STATUS (TCL 1501W)
1644 BLOCK I SERIES 100 IND (MPL 1644)
1645 NOT BLOCK I SERIES 100 IND (MPL 1645)
1528W 3200 CPS REF CODE (RSS1528W)
1028W DUCOSYN SENSOR OVERRIDE (TCL1028W) (MPL1028W)
911W HI 912W LO 3200CPS REF (RSS 911W) (RSS 912W)
939W AGC SPARE FAIL LIGHT LO (MPL939W)
826W HI 827W LO GSE FAIL IND TEST VOLTAGE (XBR-A, RSS-A)
(AIP 1585) (AIP 1586)
TEST STOP
TEST START
IRIG TEST
GATE VERIFICATION
S T C I O
ENABLE
MASTER ALARM ANNUNCIATOR
IG ATTITUDE SET RSVR LOAD
MG ATTITUDE SET RSVR LOAD
OG ATTITUDE SET RSVR LOAD
SCS LOAD
DSKY INTERFACE
INTERFACE LOAD TEST SELECTOR (LEVEL 1)
1 THRU 8
CONTROL #1
CONTROL #2
INTERFACE LOAD TEST SELECTOR (LEVEL 2)
7&8
IG RESPONSE
MG RESPONSE
OG RESPONSE
GMBL SERVO TEST SELECTOR
1 THRU 3
1, 2, 3
IX COSINE WINDING LOAD (540±15%+j1740±10%)Ω
IX SINE WINDING LOAD (540±15%+j1740±10%)Ω
INTERFACE LOAD TEST POSITION
1 THRU 6
ATTITUDE DI
SPACE CRAF
PITCH UP (IN
PITCH DOWN
YAW RIGHT
YAW LEFT
ROLL RIGH
ROLL LEFT
UP TELEME
MASTER AL
CONTINUITY TEST SELECTOR
10K VOLTAGE DIVIDER
200Ω VOLTAGE DIVIDER
5 THRU 16
1, 3
2, 4
IG 1X CDU FAIL CMD
MG 1X CDU FAIL CMD
OG 1X CDU FAIL CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
RR 16X OR OPTICS 16X SHAFT CDU FAIL CMD
RR 1X OR OPTICS 64X TRUN CDU FAIL CMD
RR 1X SHAFT CDU FAIL CMD
RR 1X TRUN CDU FAIL CMD
+14 VDC 1SS FAIL CMD
+14 VDC RR OR OPTICS FAIL CMD
FAILURE INDICATION TEST SELECTOR (DECK 2)
800 CPS WHL PWR
3.2 MC DUCOSYN PWR
800 CPS CDU PWR
25.6 KC ENCODER EXC
IG SERVO ERROR
MG SERVO ERROR
OG SERVO ERROR
IG SERVO ERROR FAIL TEST
MG SERVO ERROR FAIL TEST
OG SERVO ERROR FAIL TEST
X PIPA ERROR
Y PIPA ERROR
Z PIPA ERROR
X PIPA ERROR FAIL TEST
Y PIPA ERROR FAIL TEST
Z PIPA ERROR FAIL TEST
AGC FAIL TEST
AGC SPARE FAIL TEST
AGC PS FAIL TEST
FAILURE INDICATION TEST SELECTOR (DECK 1)
1 THRU 19
1 THRU 15
FAIL IND. TEST POS
FAIL IND TEST POS
IRIG TEST POSITIONS
2,3
4,5,6,7
523W
500W
499W
502W
501W
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1717 L
1718 L
1721TL
1722TL
1742TL
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
201
1825TL
1726 L
1731TL
155
156
157
158
161
162
163
164
167
168
169
170
1727T
1728T
1840TL
1841TL
269
271
272
270
IRIG TEST SELECTED
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
IG 1X CDU FAIL CMD
MG 1X CDU FAIL CMD
OG 1X CDU FAIL CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
RR OR OPTICS 16X SHAFT CDU FAIL CMD
64X TRUN CDU FAIL CMD
RR 1X SHAFT CDU FAIL CMD
RR 1X TRUN CDU FAIL CMD
+14 VDC 1SS FAIL CMD
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
XBR-A, RSS-C
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5% IMU WHL ØA
800 CPS 28V 5% IMU WHL ØA
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ØA
800 CPS 28V 5% IMU WHL ØA
IMU IG & Y GYRO ERROR SIG
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
COMPUTER O VDC
DSKY INTERFACE TEST
SCS LOADS ENABLED
SCS LOADS SELECTED
COS AOG IX S3 HI
COS AOG IX S1 LO
SIN AOG IX S4 HI
SIN AOG IX S2 LO
COS AMG IX S3 HI
COS AMG IX S1 LO
SIN AMG IX S4 HI
SIN AMG IX S2 LO
COS AIG IX S3 HI
COS AIG IX S1 LO
SIN AIG IX S4 HI
SIN AIG IX S2 LO
MASTER ALARM ANN HI
MASTER ALARM ANN LO
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
O VDC IMU SERVO TEST INPUT LO
SEE TCL 01A BACKWALL
SEE GPC
2900206
2900206
2900206

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM)

2900210	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR)
RLP	RELAY & LAMP POWER SUPPLY
2900208	POWER & DUMMY LOAD-PRIMARY SIGNAL SELECTOR (PDL)
PSS	PRIMARY SIGNAL SELECTOR
2900223	GIMBAL POSITION CONTROL (GPC)
2900207	MONITOR PANEL (MPL)
2900202	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
2900217	SIGNAL SELECTION & MEASUREMENT
XBR-A	CROSSBAR - AC SIGNALS
XBR-B	CROSSBAR - DC SIGNALS
DVM	DIGITAL VOLTMETER
2900218	OSCILLOGRAPH SIGNAL SELECTION
RSS-A	TO FIXED AC CHANNEL
RSS-B	TO FIXED DC CHANNEL
RSS-C	TO SWITCHABLE AC CHANNEL
RSS-D	TO SWITCHABLE DC CHANNEL
2900215	MEASUREMENT REFERENCE POWER SUPPLIES
RSS	OSCILLOGRAPH SIGNAL SELECTOR
2900211	AUXILIARY INPUT-OUTPUT & CALIBRATION (AIP)
2900212	PIPA & IRIG MONITORING
MSI	PHASE SHIFT PANEL
2900200	GYRO CAGING PANEL (GCP)

4. NONSTANDARD SYMBOLS

INDICATES "AND" GATE WITH SWITCHED SIGNAL

① ② INDICATES EXCLUSIVE "OR" GATE WITH SWITCH POSITIONS 1 & 2

NAME M — INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME A — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

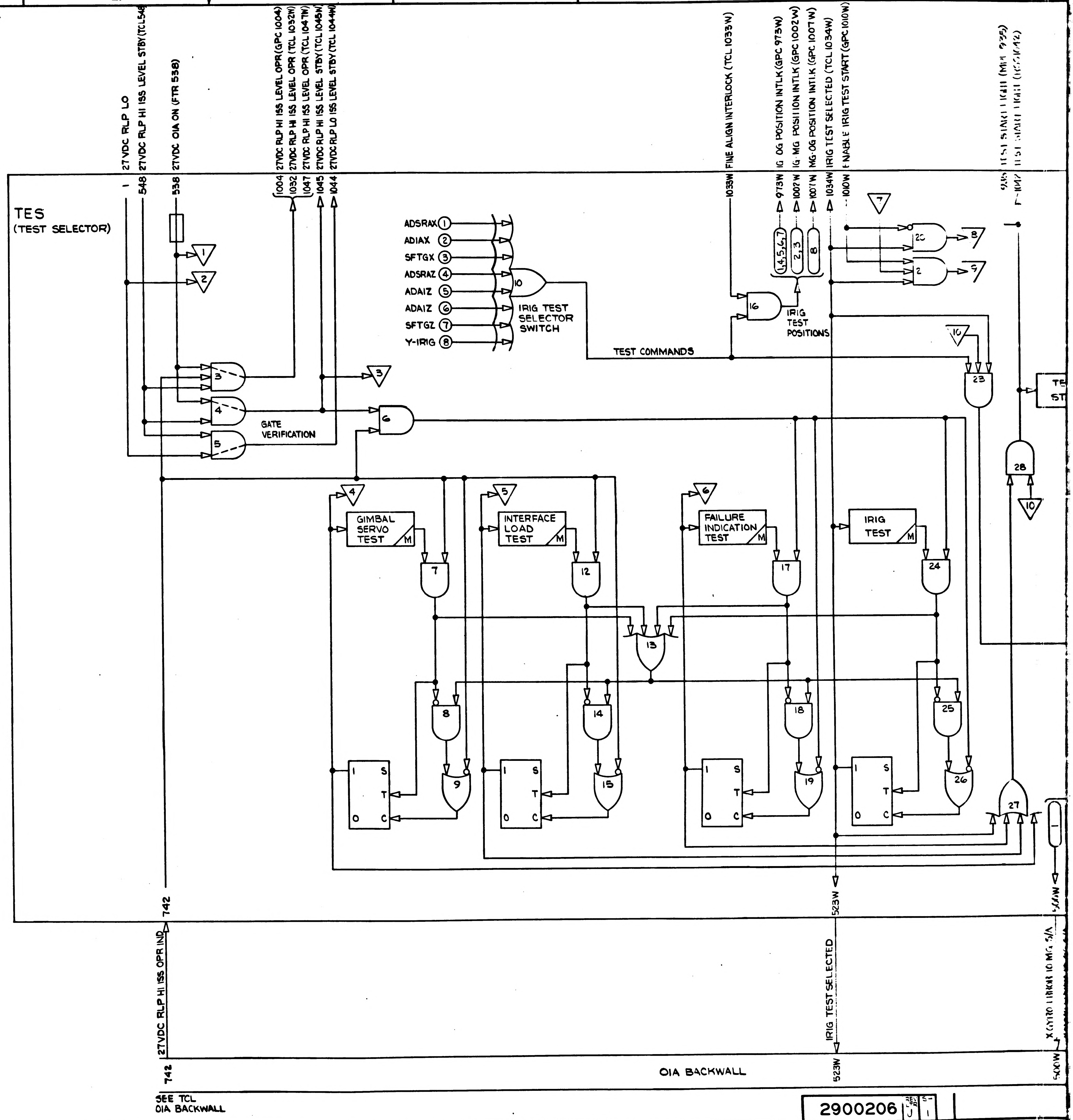
INDICATES "AND" GATE WITH A SWITCHED SIGNAL CAPABLE OF SIGNAL FLOW IN TWO DIRECTIONS

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:

A. W - BLOCK I SERIES 100 ONLY
B. T - BLOCK II ONLY
C. L - LEM ONLY
D. BLANK - ALL G&N CONFIGURATIONS
E. TW, TL, OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

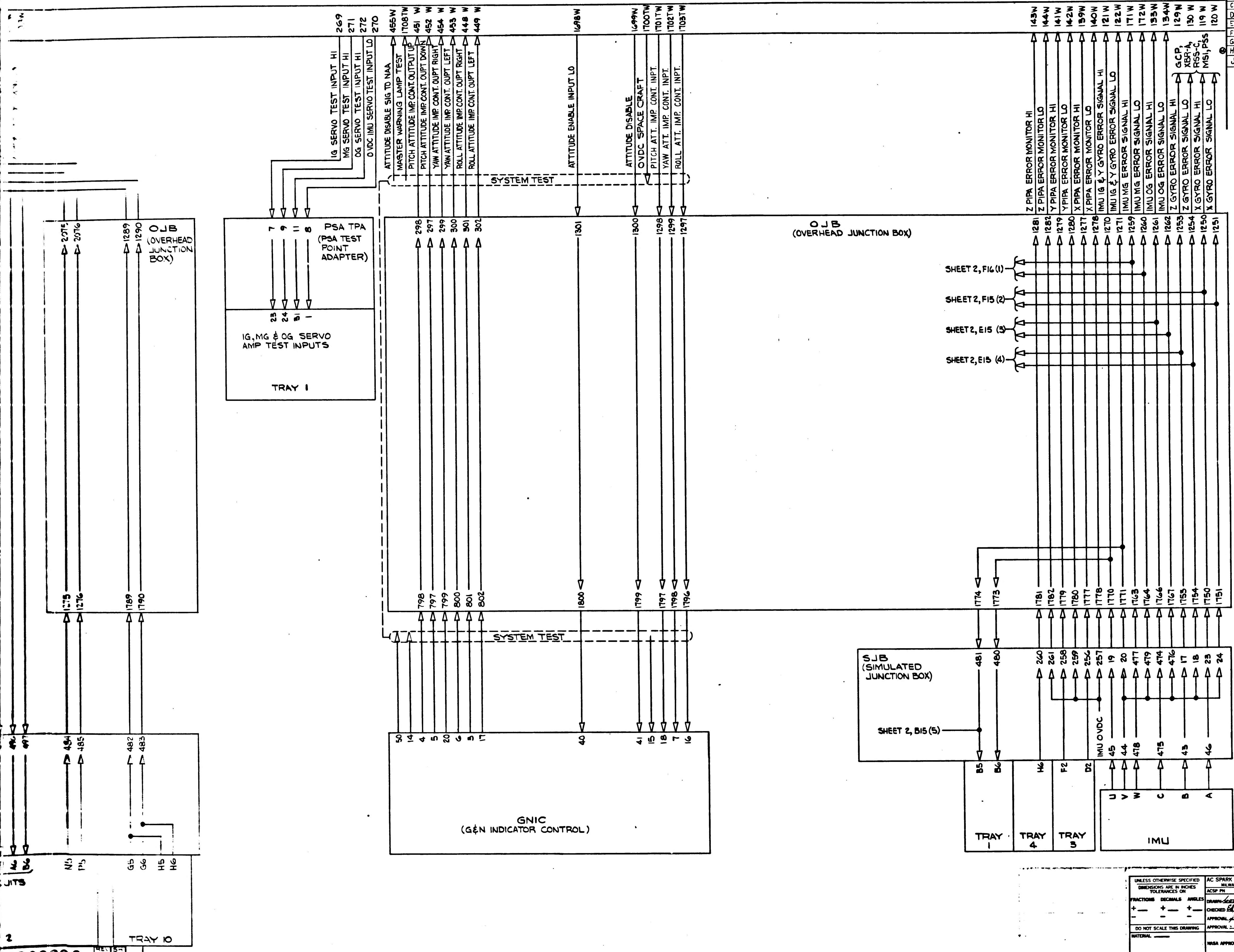
6. SIGNAL REFERENCE

1	27 VDC OIA ON
2	27 VDC RLP LO
3	27 VDC ISS LEVEL STANDBY
4	GIMBAL SERVO TEST SELECTED
5	INTERFACE LOAD TEST SELECTED
6	FAILURE INDICATION TEST SELECTED
7	TEST START, BUTTON DEPRESSED
8	CLEAR
9	SET
C	TEST STARTED
	IMU ERROR SIGNALS


TES
(TEST SELECTOR)
27VDC RLP LO
548 27VDC RLP HI ISS LEVEL STBY (TCL 548)
538 27VDC OIA ON (FTR 538)
1004 27VDC RLP HI ISS LEVEL OPR (GPC 1004)
1032 27VDC RLP HI ISS LEVEL OPR (TCL 1032W)
1047 27VDC RLP HI ISS LEVEL OPR (TCL 1047W)
1045 27VDC RLP HI ISS LEVEL STBY (TCL 1045W)
1044 27VDC RLP LO ISS LEVEL STBY (TCL 1044W)
1033W FINE ALIGN INTERLOCK (TCL 1033W)
973W IG OG POSITION INTLK (GPC 973W)
1002W IG-MG POSITION INTLK (GPC 1002W)
1007W MG-OG POSITION INTLK (GPC 1007W)
1034W IRIG TEST SELECTED (TCL 1034W)
1010W ENABLE IRIG TEST START (GPC 1010W)
TEST START LIGHT
TEST START LIGHT
ADSRAX ①
ADIAX ②
SFTGX ③
ADSRAZ ④
ADAIZ ⑤
ADAIZ ⑥
SFTGZ ⑦
Y-IRIG ⑧
IRIG TEST SELECTOR SWITCH
TEST COMMANDS
1,4,5,6,7
2,3
8
IRIG TEST POSITIONS
GATE VERIFICATION
GIMBAL SERVO TEST M
INTERFACE LOAD TEST M
FAILURE INDICATION TEST M
IRIG TEST M
1 S T 0 C
742
27VDC RLP HI ISS OPR IND
523W
IRIG TEST SELECTED
X GYRO ERROR 10 MG S/A
500W
OIA BACKWALL
SEE TCL OIA BACKWALL

2900206 REV LTR J SH 1

1/2900206


OJB (OVERHEAD JUNCTION BOX)
PSA TPA (PSA TEST POINT ADAPTER)
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
269
271
272
270
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUTPUT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
455W
1708TW
451 W
452 W
454 W
453 W
448 W
449 W
ATTITUDE ENABLE INPUT LO
1698W
ATTITUDE DISABLE
OVDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
1699W
1700TW
1701TW
1702TW
1703TW
SYSTEM TEST
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIGNAL HI
IMU IG & Y GYRO ERROR SIGNAL LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
Z GYRO ERROR SIGNAL HI
Z GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
X GYRO ERROR SIGNAL LO
143W
144W
141W
142W
139W
140W
121W
122W
171W
172W
133W
134W
129W
130 W
119 W
120 W
GCP, XBR-A, RSS-C, MSI, PSS
1281
1282
1279
1280
1277
1278
1270
1271
1259
1260
1261
1262
1253
1254
1250
1251
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (3)
SHEET 2, E15 (4)
7
9
11
8
23
24
51
1
2075
2076
1289
1290
298
297
299
300
301
302
1301
1300
1298
1299
1297
1275
1276
1789
1790
798
797
799
800
801
802
1800
1799
1797
1798
1796
1774
1773
1781
1782
1779
1780
1777
1778
1770
1771
1763
1764
1766
1767
1755
1754
1750
1751
SJB (SIMULATED JUNCTION BOX)
SHEET 2, B15 (5)
481
480
260
261
258
259
256
257
19
20
477
479
474
476
17
18
23
24
IMU OVDC
45
44
478
475
43
46
B5
B6
H6
F2
D2
U
V
W
C
B
A
TRAY 1
TRAY 4
TRAY 3
IMU
GNIC (G&N INDICATOR CONTROL)
50
14
4
5
20
6
3
17
40
41
15
18
7
16
486
487
484
485
482
483
A6
B6
N5
P5
G5
G6
H5
H6
JITS
TRAY 10
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

		REVISIONS Co 6EE			
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		1 SEP 65	
B		REVISION STATUS CHANGED		7 SEP 65	LK
C		REVISION STATUS CHANGED		9 SEP 65	LK
D		REVISION STATUS CHANGED		10 SEP 65	LK
E		REVISED PER TDRR 22002		13 SEP 65	LK
F		REVISION STATUS CHANGED		6 SEP 65	LK
G		REVISION STATUS CHANGED		2 SEP 65	LK
H		REVISION STATUS CHANGED		2 SEP 65	
J		REVISION STATUS CHANGED		6 OC 65	

3H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Cochran DATE 26 MAY 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

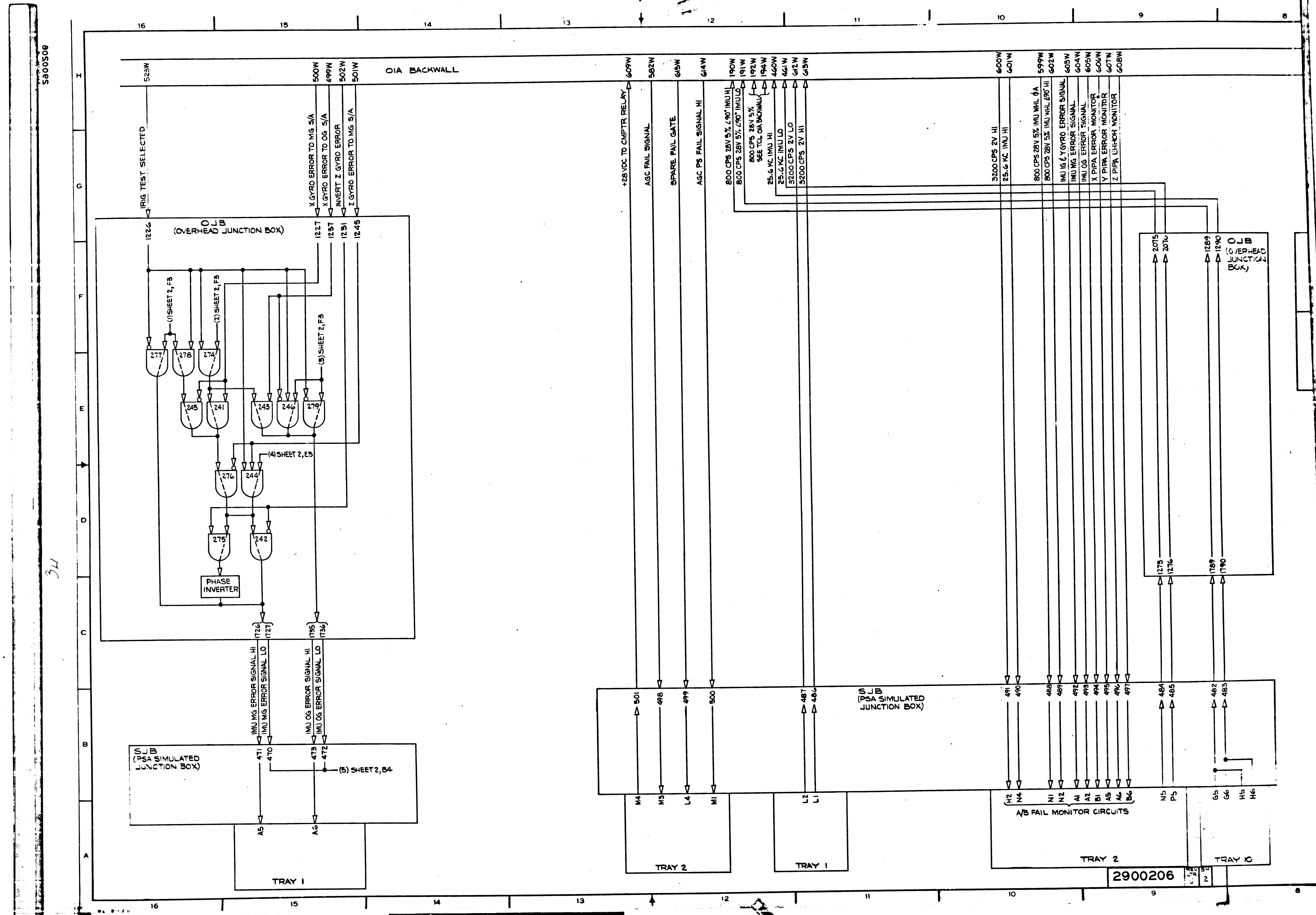
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK I SERIES 100)

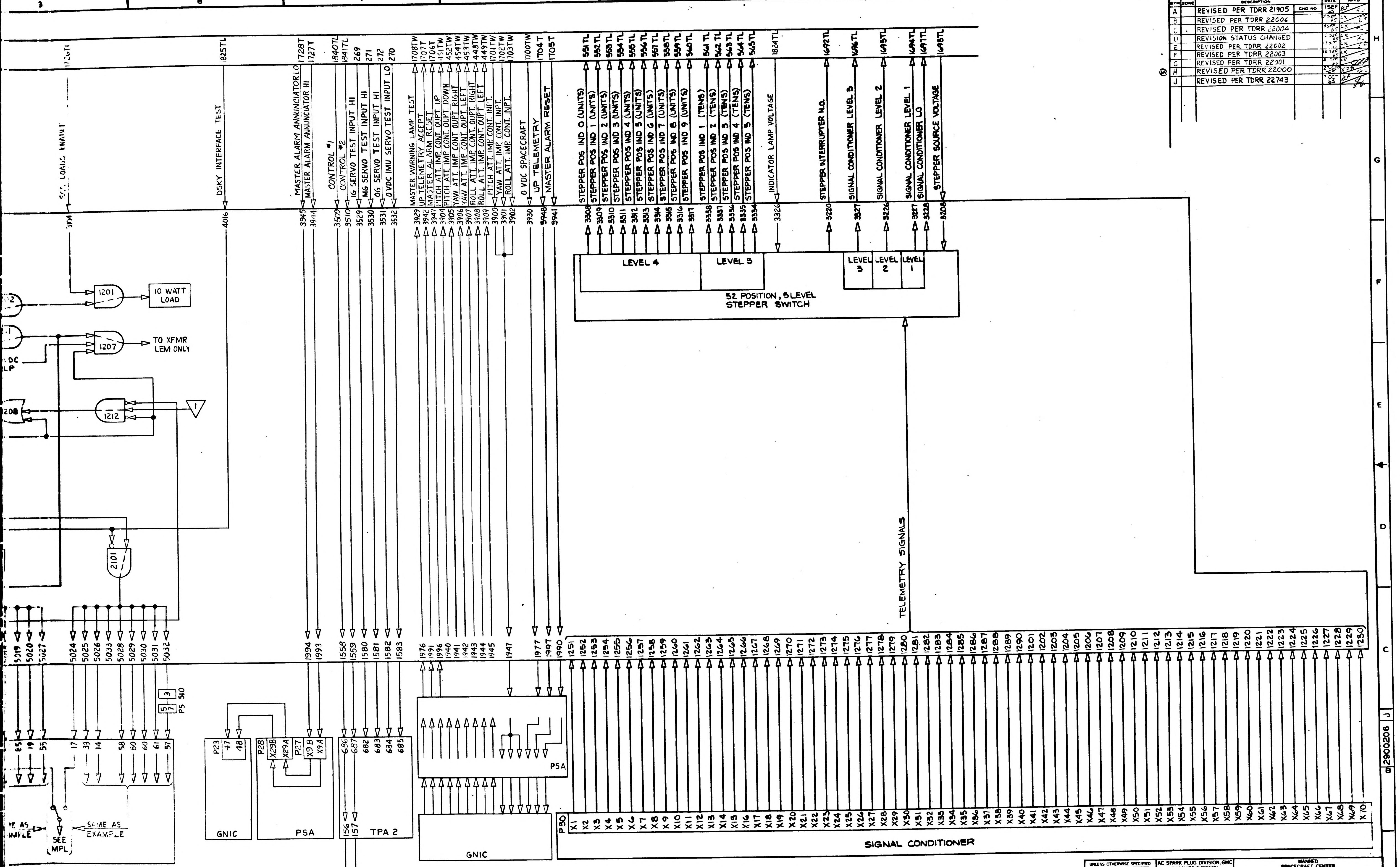
CODE IDENT NO. 99974
SIZE J_2
2900206
SCALE —
SHEET 2 OF 4

2900206 REV LTR J SH 2

2/2900206


S800508
34
OIA BACKWALL
523W
500W
499W
502W
501W
IRIG TEST SELECTED
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
OJB
(OVERHEAD JUNCTION BOX)
1226
1227
1237
1231
1245
(1) SHEET 2, F3
(2) SHEET 2, F3
(3) SHEET 2, F3
(4) SHEET 2, E3
277
278
274
245
241
243
246
279
276
244
275
242
PHASE INVERTER
1726
1727
1735
1736
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
SJB
(PSA SIMULATED JUNCTION BOX)
471
470
473
472
(5) SHEET 2, B4
A5
A6
TRAY 1
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5% SEE TCL OIA BACKWALL
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ϕA
800 CPS 28V 5% IMU WHL ∠90° HI
IMU IG & Y GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
2075
2076
1289
1290
OJB
(OVERHEAD JUNCTION BOX)
1275
1276
1789
1790
SJB
(PSA SIMULATED JUNCTION BOX)
501
498
499
500
487
486
491
490
488
489
492
493
494
495
496
497
484
485
482
483
M4
M3
L4
M1
L2
L1
H2
N4
N1
N2
A1
A2
B1
A5
A6
B6
N5
P5
G5
G6
H5
H6
A/B FAIL MONITOR CIRCUITS
TRAY 2
TRAY 1
TRAY 2
TRAY 10
2900206
REV
C
SH
2
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

1-/2900206


SPS LOADS ENABLE
1726TL
1201
10 WATT LOAD
1207
TO XFMR LEM ONLY
DC LP
1212
208
2101
DSKY INTERFACE TEST
1825TL
4016
MASTER ALARM ANNUNCIATOR LO
MASTER ALARM ANNUNCIATOR HI
1728T
1727T
3945
3944
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
1840TL
1841TL
269
271
272
270
3509
3510
3529
3530
3531
3532
MASTER WARNING LAMP TEST
UP TELEMETRY ACCEPT
MASTER ALARM RESET
PITCH ATT. IMP. CONT. OUPT. UP
PITCH ATT. IMP. CONT. OUPT. DOWN
YAW ATT. IMP. CONT. OUPT. RIGHT
YAW ATT. IMP. CONT. OUPT. LEFT
ROLL ATT. IMP. CONT. OUPT. RIGHT
ROLL ATT. IMP. CONT. OUPT. LEFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
1708TW
1707T
1706T
451TW
452TW
454TW
453TW
448TW
449TW
1701TW
1702TW
1703TW
3929
3942
3947
3904
3905
3906
3907
3908
3909
3900
3901
3902
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
1700TW
1704T
1705T
3930
3948
3941
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
561TL
562TL
563TL
564TL
565TL
3338
3337
3336
3335
3334
INDICATOR LAMP VOLTAGE
1824TL
3326
STEPPER INTERRUPTER N.O.
1692TL
3220
SIGNAL CONDITIONER LEVEL 3
1696TL
3327
SIGNAL CONDITIONER LEVEL 2
1695TL
3226
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
1694TL
1697TL
3227
3228
STEPPER SOURCE VOLTAGE
1693TL
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
TELEMETRY SIGNALS
5019
5020
5027
5024
5025
5026
5033
5028
5029
5030
5031
5032
3
5
7
P5 510
65
19
55
17
33
14
58
80
60
61
57
SAME AS EXAMPLE
SEE MPL
1994
1993
P23
47
48
GNIC
P28
X29B
X29A
P27
X9B
X9A
PSA
1558
1559
1580
1581
1582
1583
686
687
682
683
684
685
156
157
TPA 2
45J1
X23A
X24A
PSA
1976
1991
1996
1940
1941
1942
1943
1944
1945
1947
1977
1997
1990
PSA
GNIC
1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220 1221 1222 1223 1224 1225 1226 1227 1228 1229 1230
P30
X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21 X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38 X39 X40 X41 X42 X43 X44 X45 X46 X47 X48 X49 X50 X51 X52 X53 X54 X55 X56 X57 X58 X59 X60 X61 X62 X63 X64 X65 X66 X67 X68 X69 X70
SIGNAL CONDITIONER
9 8 7 6 5 4 3 2 1
H G F E D C B A
2900206 J

REVISIONS 22486

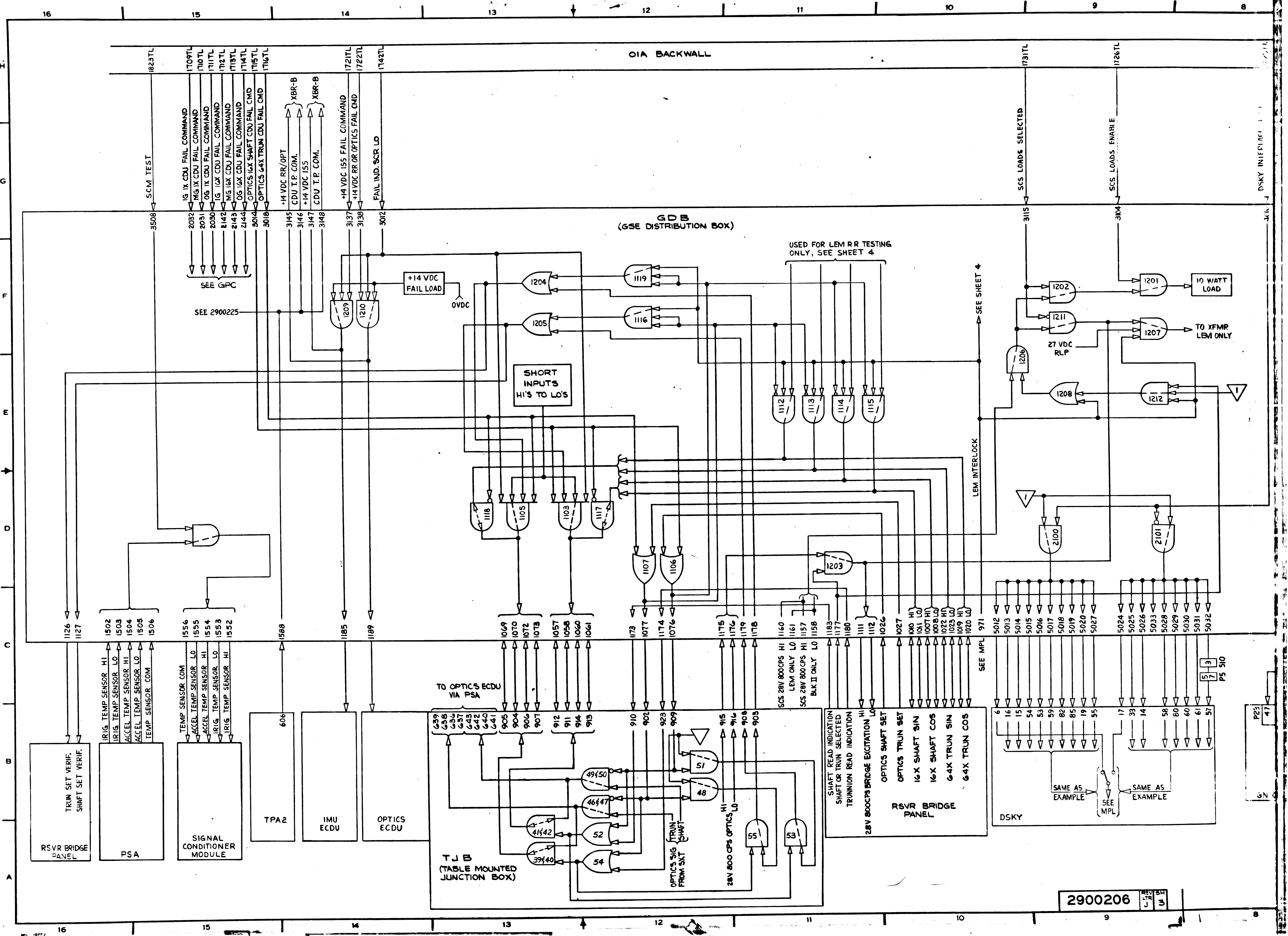
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	
B		REVISED PER TDRR 22006		7 SEP 65	LK
C		REVISED PER TDRR 22004		9 SEP 65	LK
D		REVISION STATUS CHANGED		SEP 65	LK
E		REVISED PER TDRR 22002		13 SEP 65	LK
F		REVISED PER TDRR 22003		16 SEP 65	LK
G		REVISED PER TDRR 22001		2 SEP 65	LK
Ⓜ H		REVISED PER TDRR 22000		2 SEP 65	
J		REVISED PER TDRR 22743		7 OCT 65	

3H

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN	MECHANIZATION DIAGRAM- TEST SELECTOR (BLOCK II)
MATERIAL	DRAWN 3 JUN 65 DATE CHECKED Ed Foster 9 JUN 65 APPROVAL APPROVAL NASA APPROVAL MIT APPROVAL	CODE IDENT NO. 99974 SIZE J2 2900206
CONTRACT NAS 9-497		SCALE SHEET 3 OF 4

2900206 REV LTR J SH 3

2/2900206


OIA BACKWALL
1823TL
SCM TEST
3508
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
IG 1X CDU FAIL COMMAND
MG 1X CDU FAIL COMMAND
OG 1X CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
2032
2031
2030
2142
2143
2144
3014
3018
SEE GPC
XBR-B
XBR-B
+14 VDC RR/OPT
CDU T.P. COM.
+14 VDC ISS
CDU T.P. COM.
3145
3146
3147
3148
1721TL
1722TL
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
3137
3138
1742TL
FAIL IND. SCR LO
3012
GDB
(GSE DISTRIBUTION BOX)
SEE 2900225
+14 VDC FAIL LOAD
0VDC
1209
1210
1204
1205
1119
1116
USED FOR LEM RR TESTING ONLY, SEE SHEET 4
SHORT INPUTS HI'S TO LO'S
1112
1113
1114
1115
1118
1105
1103
1117
1107
1106
1203
SEE SHEET 4
LEM INTERLOCK
1731TL
SCS LOADS SELECTED
3115
1726TL
SCS LOADS ENABLE
3104
DSKY INTERFACE
1202
1201
10 WATT LOAD
1211
1207
TO XFMR LEM ONLY
27 VDC RLP
1206
1208
1212
1
1
2100
2101
1126
1127
1502
1503
1504
1505
1506
1556
1555
1554
1553
1552
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1185
1189
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1076
1175
1176
1179
1178
1160
1161
1157
1158
1183
1177
1180
1111
1112
1026
1027
1100 HI
1101 LO
1007 HI
1008 LO
1022 HI
1023 LO
1019 HI
1020 LO
971
SEE MPL
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
5024
5025
5026
5033
5028
5029
5030
5031
5032
TRUN SET VERIF.
SHAFT SET VERIF.
RSVR BRIDGE PANEL
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
PSA
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
SIGNAL CONDITIONER MODULE
606
TPA2
IMU ECDU
OPTICS ECDU
TO OPTICS ECDU VIA PSA
639
638
636
637
643
642
640
641
905
904
906
907
912
911
914
913
910
902
923
909
915
916
908
903
51
48
49&50
46&47
41&42
52
39&40
54
55
53
OPTICS SIG FROM SXT
TRUN
SHAFT
28V 800 CPS OPTICS HI LO
TJB (TABLE MOUNTED JUNCTION BOX)
SCS 28V 800CPS HI
LEM ONLY LO
SCS 28V 800CPS HI
BLK II ONLY LO
SHAFT READ INDICATION
SHAFT OR TRUN SELECTED
TRUNNION READ INDICATION
28V 800CPS BRIDGE EXCITATION HI LO
OPTICS SHAFT SET
OPTICS TRUN SET
16X SHAFT SIN
16X SHAFT COS
64X TRUN SIN
64X TRUN COS
RSVR BRIDGE PANEL
6
16
15
54
53
59
82
85
19
55
17
33
14
58
80
60
61
57
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
DSKY
5
7
3
P5 510
P23
47
GN
16
15
14
13
12
11
10
9
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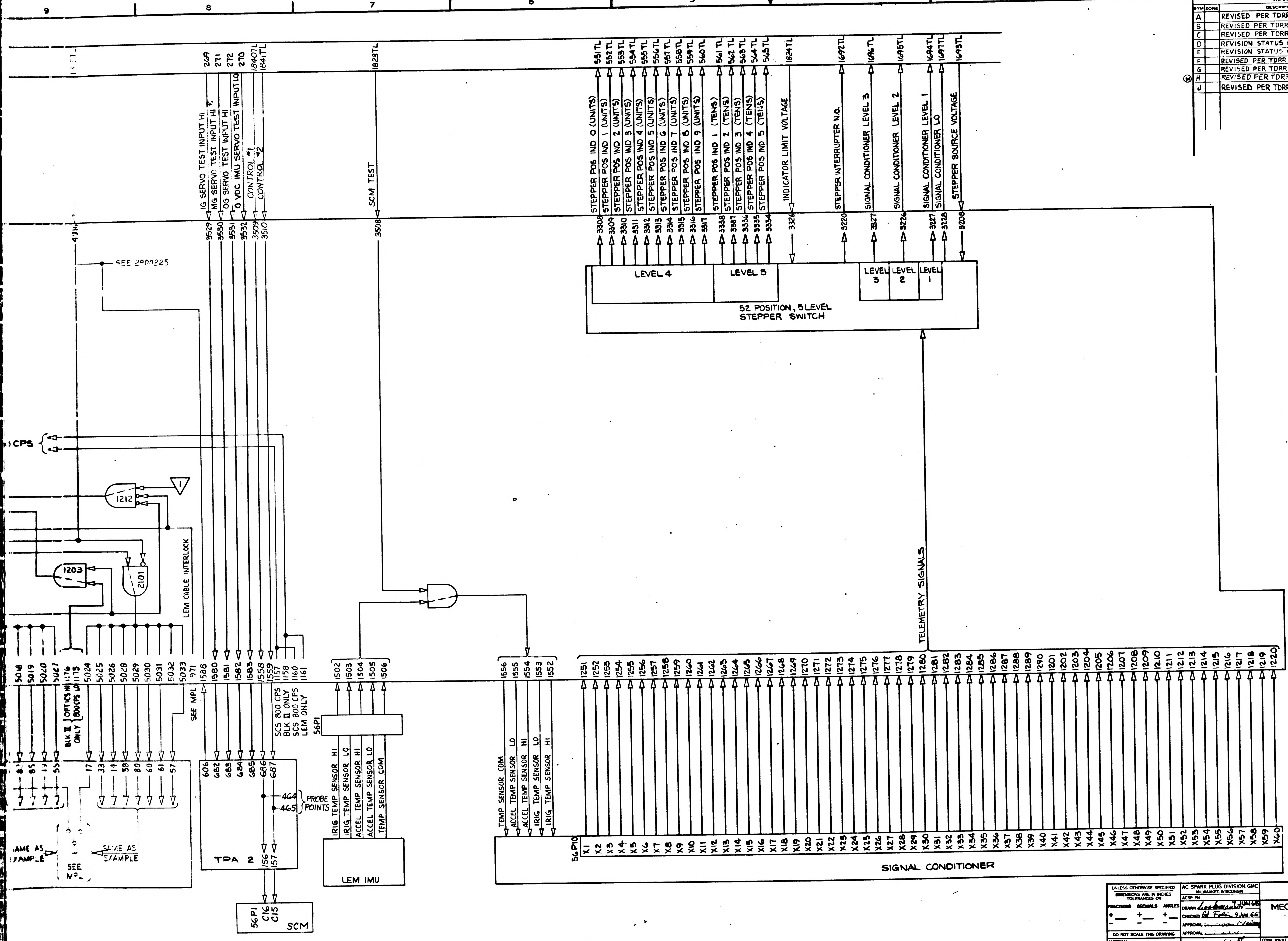
H
G
F
E
D
C
B
A
2900206
REV LTR J
SH 3

1/2900206

REVISIONS 2c7P6

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	RLP AJ
B		REVISED PER TDRR 22006		9 SEP 65	LK
C		REVISED PER TDRR 22004		9 SEP 65	LK
D		REVISION STATUS CHANGED		10 SEP 65	LK AJ
E		REVISION STATUS CHANGED		13 SEP 65	LK
F		REVISED PER TDRR 22003		16 SEP 65	LK
G		REVISED PER TDRR 2200:		21 SEP 65	LK
Ⓜ H		REVISED PER TDRR 22000		[illegible]	[illegible]
J		REVISED PER TDRR 22743		7 OCT 65	CP



269
271
272
270
1840TL
1841TL
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
CONTROL #1
CONTROL #2
3529
3530
3531
3532
3509
3510
1823TL
SCM TEST
3508
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
561TL
562TL
563TL
564TL
565TL
1824TL
1692TL
1696TL
1695TL
1694TL
1691TL
1693TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LIMIT VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3338
3337
3336
3335
3334
3326
3220
3327
3226
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
SEE 2900225
4016
CPS
1212
1
1203
2101
LEM CABLE INTERLOCK
TELEMETRY SIGNALS
5018
5019
5020
5027
1176
5024
5025
5026
5028
5029
5030
5031
5032
5033
971
1588
1580
1581
1582
1583
1558
1559
1157
1158
1160
1161
OPTICS W 800CPS LO
BLK II ONLY
SEE MPL
SCS 800 CPS
BLK II ONLY
SCS 800 CPS
LEM ONLY
1502
1503
1504
1505
1506
56P1
1556
1555
1554
1553
1552
1251
1252
1253
1254
1255
1256
1257
1258
1259
1260
1261
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1211
1212
1213
1214
1215
1216
1217
1218
1219
1220
17
33
14
58
80
60
61
57
606
682
683
684
685
686
687
464
465
PROBE POINTS
TPA 2
156
157
56P1
C16
C15
SCM
SAME AS EXAMPLE
SEE N°
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
LEM IMU
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
56P10
X1
X2
X3
X4
X5
X6
X7
X8
X9
X10
X11
X12
X13
X14
X15
X16
X17
X18
X19
X20
X21
X22
X23
X24
X25
X26
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X30
X31
X32
X33
X34
X35
X36
X37
X38
X39
X40
X41
X42
X43
X44
X45
X46
X47
X48
X49
X50
X51
X52
X53
X54
X55
X56
X57
X58
X59
X60
SIGNAL CONDITIONER

3H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Lockman DATE 7 JUN 65
CHECKED Ed Foster 9 Jun 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

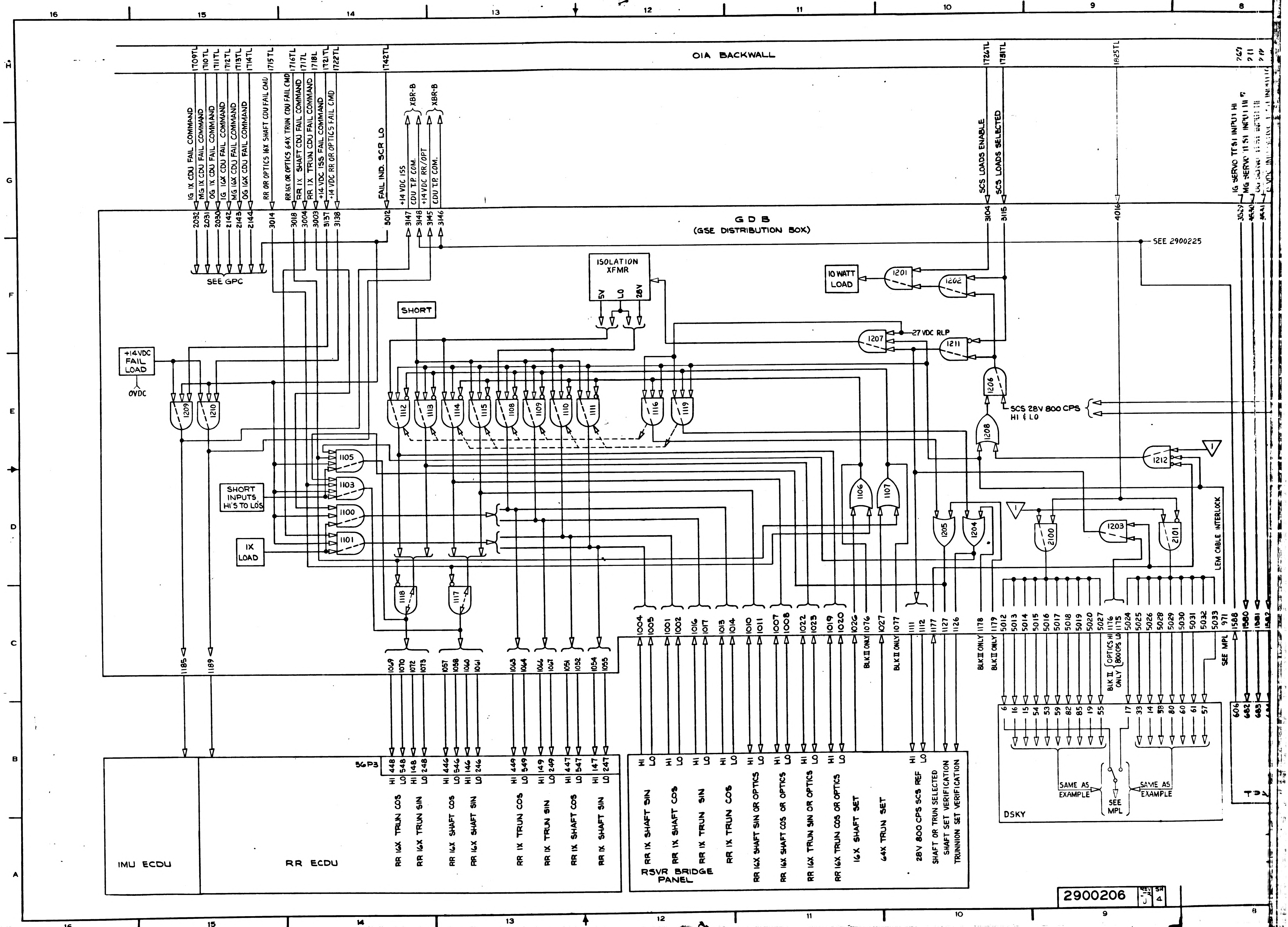
MECHANIZATION DIAGRAM-
TEST SELECTOR
(LEM)

CODE IDENT NO. 99974
SIZE J_2
2900206
SCALE —
SHEET 4 OF 4

2900206 J

2900206 J 4

2 4 2 9 0 0 2 0 6


OIA BACKWALL
G D B
(GSE DISTRIBUTION BOX)
IG IX CDU FAIL COMMAND
MG IX CDU FAIL COMMAND
OG IX CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
RR OR OPTICS 16X SHAFT CDU FAIL CMD
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
RR IX SHAFT CDU FAIL COMMAND
RR IX TRUN CDU FAIL COMMAND
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
+14 VDC ISS
CDU T.P. COM.
+14 VDC RR/OPT
CDU T.P. COM.
XBR-B
XBR-B
SCS LOADS ENABLE
SCS LOADS SELECTED
SEE GPC
SEE 2900225
ISOLATION XFMR
5V
LO
28V
10 WATT LOAD
SHORT
27 VDC RLP
+14VDC FAIL LOAD
OVDC
SCS 28V 800 CPS HI & LO
SHORT INPUTS HI'S TO LO'S
IX LOAD
LEM CABLE INTERLOCK
1201
1202
1207
1211
1206
1208
1212
1209
1210
1112
1113
1114
1115
1108
1109
1110
1111
1116
1119
1105
1103
1100
1101
1118
1117
1106
1107
1205
1204
2100
1203
2101
BLK II ONLY
OPTICS HI 800CPS LO
SEE MPL
56P3
IMU ECDU
RR ECDU
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
RR IX TRUN COS
RR IX TRUN SIN
RR IX SHAFT COS
RR IX SHAFT SIN
RSVR BRIDGE PANEL
RR IX SHAFT SIN
RR IX SHAFT COS
RR IX TRUN SIN
RR IX TRUN COS
RR 16X SHAFT SIN OR OPTICS
RR 16X SHAFT COS OR OPTICS
RR 16X TRUN SIN OR OPTICS
RR 16X TRUN COS OR OPTICS
16X SHAFT SET
64X TRUN SET
28V 800 CPS SCS REF
SHAFT OR TRUN SELECTED
SHAFT SET VERIFICATION
TRUNNION SET VERIFICATION
DSKY
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
16
15
14
13
12
11
10
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8
H
G
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C
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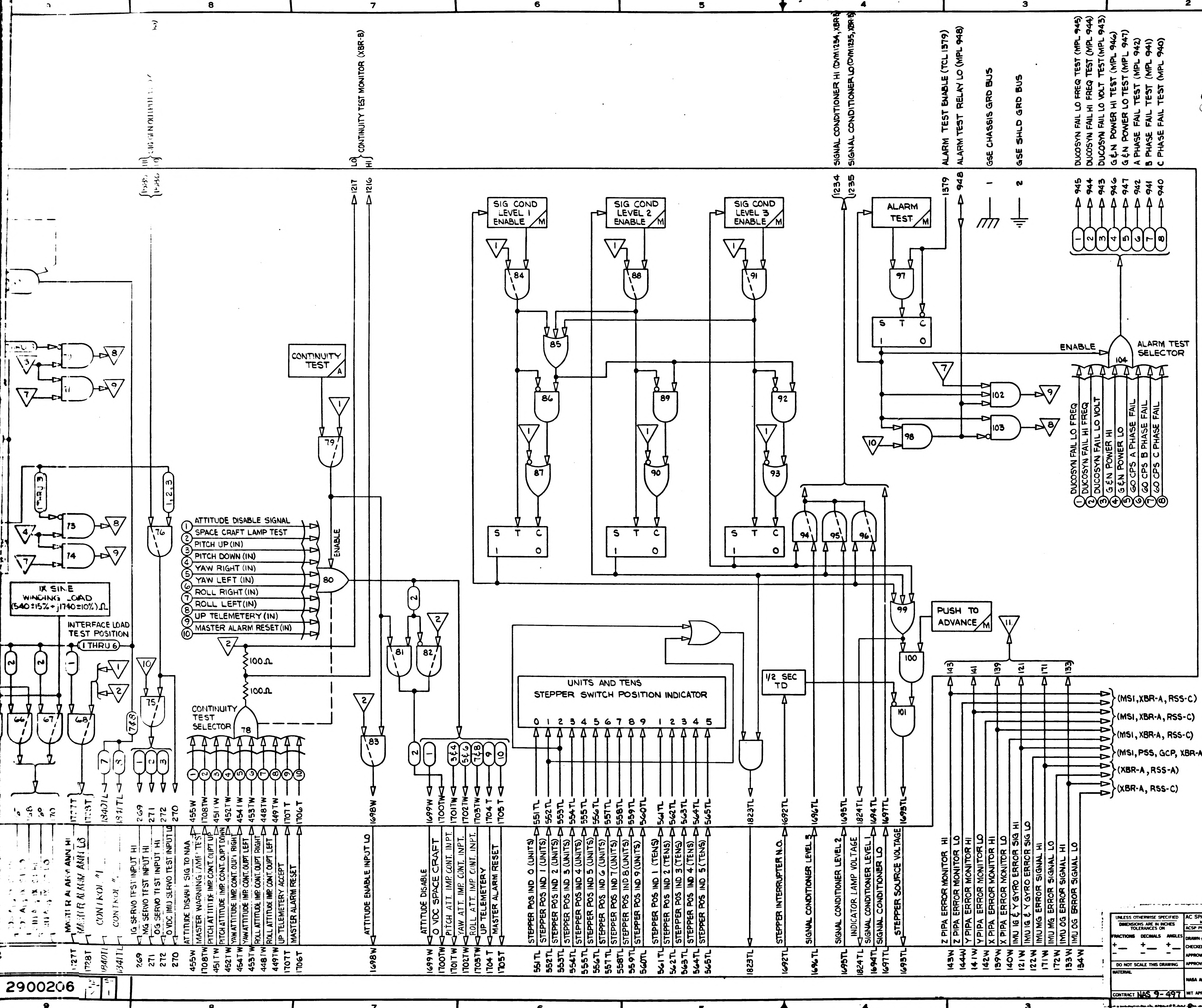
A

2900206 REV J SH 4

34

1/ 2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 22905		SEP 65	
B		REVISED PER TDRR 22006		65	
C		REVISED PER TDRR 22004		65	
D		REVISED PER TDRR 22005		10	
E		REVISED PER TDRR 22002		SEP	
F		REVISED PER TDRR 22003		65	
G		REVISED PER TDRR 22001		21 SEP	
H		REVISED PER TDRR 22000		SEP 65	
J		REVISED PER TDRR 22743		6 OCT 65	
K		REVISION STATUS CHANGED		65	


CONTINUITY TEST MONITOR (XBR-B)
SIGNAL CONDITIONER HI (DVM1234, XBR-B)
SIGNAL CONDITIONER LO (DVM1235, XBR-B)
ALARM TEST ENABLE (TCL 1379)
ALARM TEST RELAY LO (MPL 948)
GSE CHASSIS GRD BUS
GSE SHLD GRD BUS
DUCOSYN FAIL LO FREQ TEST (MPL 945)
DUCOSYN FAIL HI FREQ TEST (MPL 944)
DUCOSYN FAIL LO VOLT TEST (MPL 943)
G & N POWER HI TEST (MPL 946)
G & N POWER LO TEST (MPL 947)
A PHASE FAIL TEST (MPL 942)
B PHASE FAIL TEST (MPL 941)
C PHASE FAIL TEST (MPL 940)
SIG COND LEVEL 1 ENABLE
SIG COND LEVEL 2 ENABLE
SIG COND LEVEL 3 ENABLE
ALARM TEST
CONTINUITY TEST
ENABLE
ALARM TEST SELECTOR
DUCOSYN FAIL LO FREQ
DUCOSYN FAIL HI FREQ
DUCOSYN FAIL LO VOLT
G & N POWER HI
G & N POWER LO
60 CPS A PHASE FAIL
60 CPS B PHASE FAIL
60 CPS C PHASE FAIL
S T C
1 0
1X SINE WINDING LOAD (540±15% + j1740±10%) Ω
INTERFACE LOAD TEST POSITION
1 THRU 6
ATTITUDE DISABLE SIGNAL
SPACE CRAFT LAMP TEST
PITCH UP (IN)
PITCH DOWN (IN)
YAW RIGHT (IN)
YAW LEFT (IN)
ROLL RIGHT (IN)
ROLL LEFT (IN)
UP TELEMETERY (IN)
MASTER ALARM RESET (IN)
100 Ω
CONTINUITY TEST SELECTOR
PUSH TO ADVANCE
1/2 SEC TD
UNITS AND TENS STEPPER SWITCH POSITION INDICATOR
0 1 2 3 4 5 6 7 8 9 1 2 3 4 5
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, PSS, GCP, XBR-A, RSS-A)
(XBR-A, RSS-A)
(XBR-A, RSS-C)
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUPT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
UP TELEMETERY ACCEPT
MASTER ALARM RESET
ATTITUDE ENABLE INPUT LO
ATTITUDE DISABLE
0 VDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
UP TELEMETRY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
INDICATOR LAMP VOLTAGE
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & YGYRO ERROR SIG HI
IMU IG & YGYRO ERROR SIG LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
1121T 1216
1234 1235 1379 948
945 944 943 946 947 942 941 940
143 141 139 121 171 133
269 271 272 270
455W 1708TW 451TW 452TW 454TW 453TW 448TW 449TW 1707T 1706T
1698W
1699W 1700TW 1701TW 1702TW 1703TW 1704T 1705T
551TL 552TL 553TL 554TL 555TL 556TL 557TL 558TL 559TL 560TL 561TL 562TL 563TL 564TL 565TL
1823TL 1692TL 1696TL 1695TL 1824TL 1694TL 1697TL 1693TL
143W 144W 141W 142W 139W 140W 121W 122W 171W 172W 133W 134W

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Lookman DATE 24 MAY 65
CHECKED Ed Foster 9 JUN 65
APPROVAL H Hartman
APPROVAL
NASA APPROVAL
MIT APPROVAL

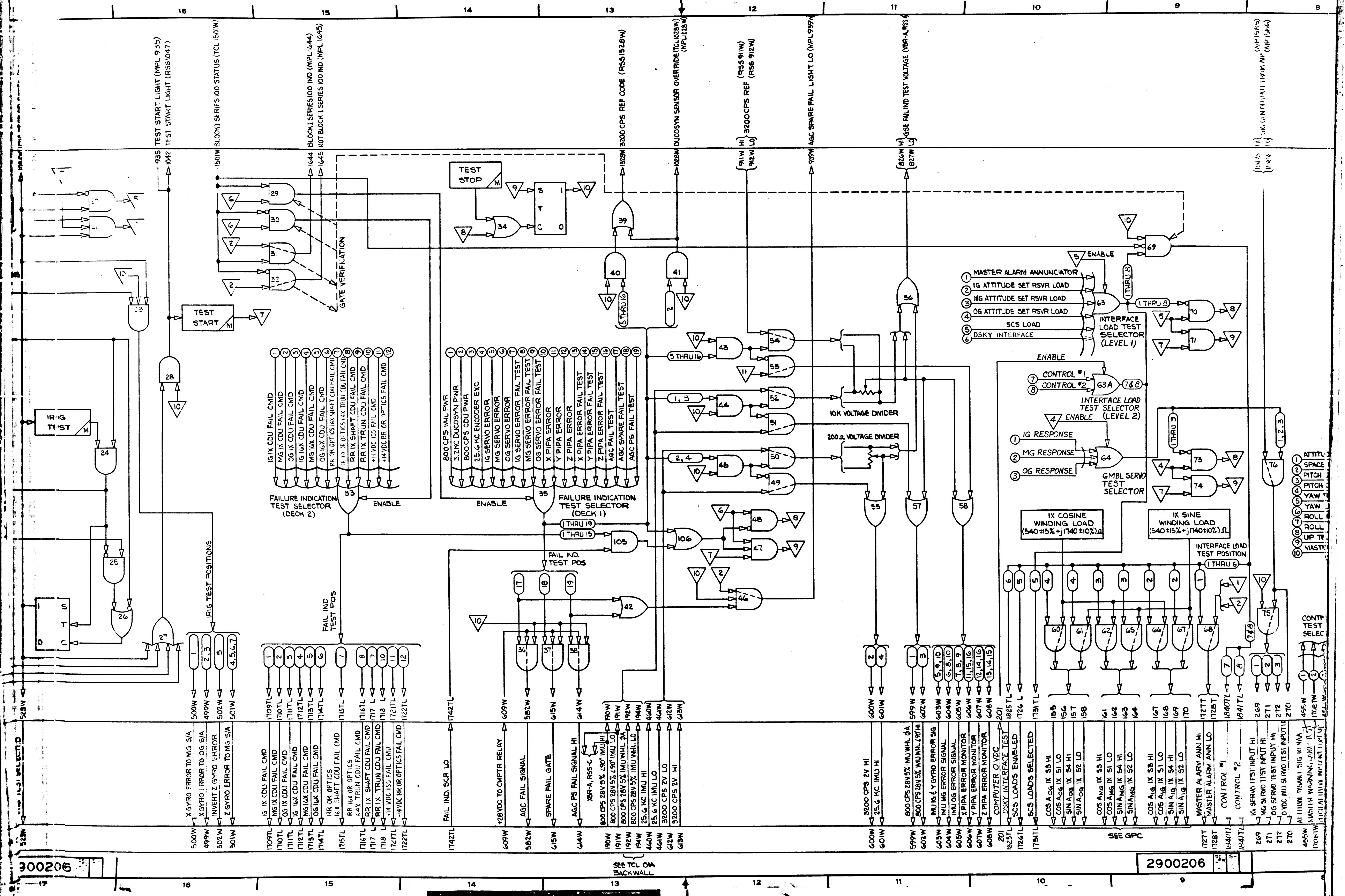
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
TEST SELECTOR
(BLOCK I SERIES 100, BLOCK II & LEM)

CODE IDENT NO. 99974 SIZE J3 2900206
SCALE — SHEET 1 OF 4

2900206

37 2900206


TEST START LIGHT (MPL 935)
TEST START LIGHT (RSS1042)
BLOCK I SERIES 100 STATUS (TCL 1501W)
BLOCK I SERIES 100 IND (MPL 1644)
NOT BLOCK I SERIES 100 IND (MPL 1645)
3200 CPS REF CODE (RSS1528W)
DUCOSYN SENSOR OVERRIDE (TCL 1028W) (MPL 1028W)
3200 CPS REF (RSS 911W) (RSS 912W)
AGC SPARE FAIL LIGHT LO (MPL 939W)
GSE FAIL IND TEST VOLTAGE (XBR-A, RSS-A)
TEST STOP
TEST START
IRIG TEST
GATE VERIFICATION
FAILURE INDICATION TEST SELECTOR (DECK 2)
FAILURE INDICATION TEST SELECTOR (DECK 1)
ENABLE
IG 1X CDU FAIL CMD
MG 1X CDU FAIL CMD
OG 1X CDU FAIL CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
RR 16X OR OPTICS 16X SHAFT CDU FAIL CMD
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
RR 1X SHAFT CDU FAIL CMD
RR 1X TRUN CDU FAIL CMD
+14 VDC 1SS FAIL CMD
+14 VDC RR OR OPTICS FAIL CMD
800 CPS WHL PWR
3.2 KC DUCOSYN PWR
800 CPS CDU PWR
25.6 KC ENCODER EXC
IG SERVO ERROR
MG SERVO ERROR
OG SERVO ERROR
IG SERVO ERROR FAIL TEST
MG SERVO ERROR FAIL TEST
OG SERVO ERROR FAIL TEST
X PIPA ERROR
Y PIPA ERROR
Z PIPA ERROR
X PIPA ERROR FAIL TEST
Y PIPA ERROR FAIL TEST
Z PIPA ERROR FAIL TEST
AGC FAIL TEST
AGC SPARE FAIL TEST
AGC PS FAIL TEST
1 THRU 19
1 THRU 15
FAIL IND. TEST POS
FAIL IND TEST POS
IRIG TEST POSITIONS
5 THRU 16
1, 3
2, 4
10K VOLTAGE DIVIDER
200Ω VOLTAGE DIVIDER
MASTER ALARM ANNUNCIATOR
IG ATTITUDE SET RSVR LOAD
MG ATTITUDE SET RSVR LOAD
OG ATTITUDE SET RSVR LOAD
SCS LOAD
DSKY INTERFACE
INTERFACE LOAD TEST SELECTOR (LEVEL 1)
1 THRU 8
CONTROL #1
CONTROL #2
INTERFACE LOAD TEST SELECTOR (LEVEL 2)
7 & 8
IG RESPONSE
MG RESPONSE
OG RESPONSE
GMBL SERVO TEST SELECTOR
1 THRU 3
1X COSINE WINDING LOAD (540±15% + j1740±10%)Ω
1X SINE WINDING LOAD (540±15% + j1740±10%)Ω
INTERFACE LOAD TEST POSITION
1 THRU 6
ATTITU
SPACE
PITCH
PITCH
YAW
YAW
ROLL
ROLL
UP TE
MASTE
CONT TEST SELEC
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
IG 1X CDU FAIL CMD
MG 1X CDU FAIL CMD
OG 1X CDU FAIL CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
RR OR OPTICS 16X SHAFT CDU FAIL CMD
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
RR 1X SHAFT CDU FAIL CMD
RR 1X TRUN CDU FAIL CMD
+14 VDC 1SS FAIL CMD
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
+28VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
XBR-A, RSS-C
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5% IMU WHL ØA
800 CPS 28V 5% IMU WHL ØB
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ØA
800 CPS 28V 5% IMU WHL ∠90° B
IMU IG & Y GYRO ERROR SIG
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
COMPUTER O VDC
DSKY INTERFACE TEST
SCS LOADS ENABLED
SCS LOADS SELECTED
COS A_OG 1X S3 HI
COS A_OG 1X S1 LO
SIN A_OG 1X S4 HI
SIN A_OG 1X S2 LO
COS A_MG 1X S3 HI
COS A_MG 1X S1 LO
SIN A_MG 1X S4 HI
SIN A_MG 1X S2 LO
COS A_IG 1X S3 HI
COS A_IG 1X S1 LO
SIN A_IG 1X S4 HI
SIN A_IG 1X S2 LO
MASTER ALARM ANN HI
MASTER ALARM ANN LO
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
O VDC IMU SERVO TEST INPUT
SEE GPC
SEE TCL 01A BACKWALL
IRIG TEST SELECTED
2900206
2/2900206
16 15 14 13 12 11 10 9 8 17

2/2900206

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM)

2900210 RLP	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RELAY & LAMP POWER SUPPLY
2900208 PSS	POWER & DUMMY LOAD - PRIMARY SIGNAL SELECTOR (PDL) PRIMARY SIGNAL SELECTOR
2900223	GIMBAL POSITION CONTROL (GPC)
2900207	MONITOR PANEL (MPL)
2900202	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
2900217 XBR-A XBR-B DVM	SIGNAL SELECTION & MEASUREMENT CROSSBAR - AC SIGNALS CROSSBAR - DC SIGNALS DIGITAL VOLTMETER
2900218 RSS-A RSS-B RSS-C RSS-D	OSCILLOGRAPH SIGNAL SELECTION TO FIXED AC CHANNEL TO FIXED DC CHANNEL TO SWITCHABLE AC CHANNEL TO SWITCHABLE DC CHANNEL
2900215 RSS	MEASUREMENT REFERENCE POWER SUPPLIES OSCILLOGRAPH SIGNAL SELECTOR
2900211	AUXILIARY INPUT-OUTPUT & CALIBRATION (AIP)
2900212 MSI	PIPA & IRIG MONITORING PHASE SHIFT PANEL
2900200	GYRO CAGING PANEL (GCP)

4. NONSTANDARD SYMBOLS

INDICATES "AND" GATE WITH SWITCHED SIGNAL

INDICATES EXCLUSIVE "OR" GATE WITH SWITCH POSITIONS 1 & 2

NAME M — INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

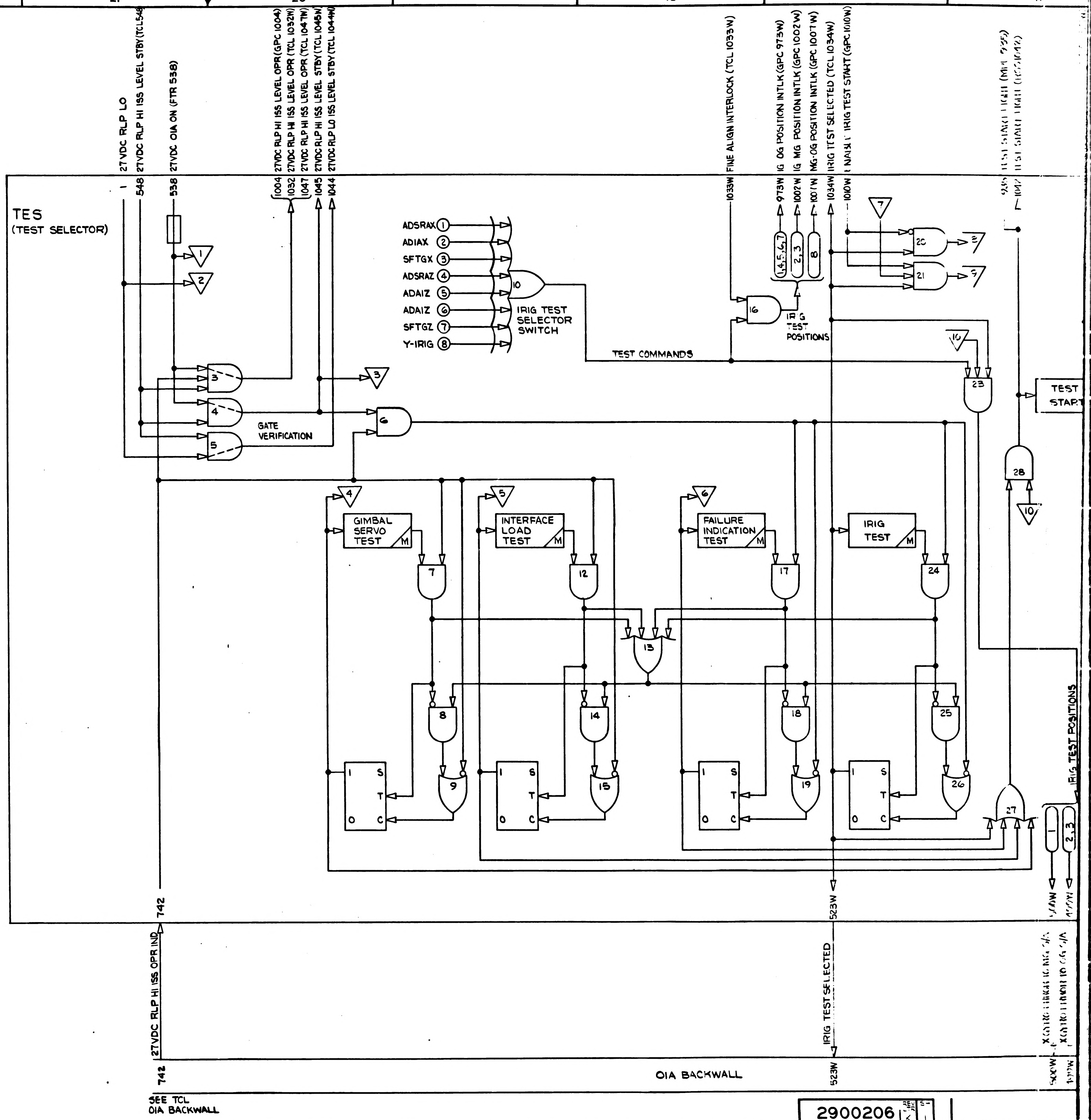
NAME A — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

INDICATES "AND" GATE WITH A SWITCHED SIGNAL CAPABLE OF SIGNAL FLOW IN TWO DIRECTIONS

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G&N CONFIGURATIONS
   - E. TW, TL, OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

6. SIGNAL REFERENCE

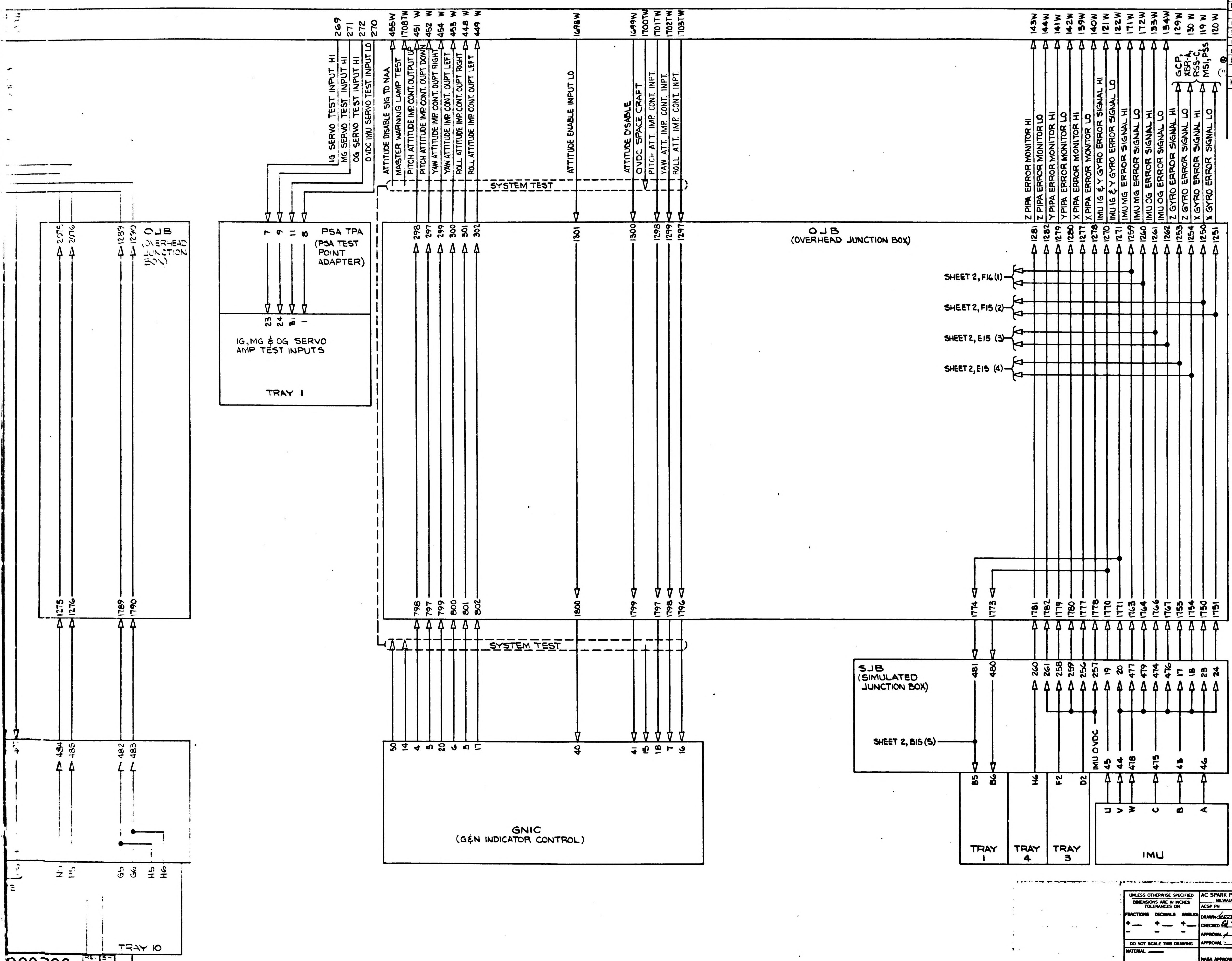
▽1 27 VDC OIA ON
▽2 27 VDC RLP LO
▽3 27 VDC ISS LEVEL STANDBY
▽4 GIMBAL SERVO TEST SELECTED
▽5 INTERFACE LOAD TEST SELECTED
▽6 FAILURE INDICATION TEST SELECTED
▽7 TEST START, BUTTON DEPRESSED
▽8 CLEAR
▽9 SET
▽C TEST STARTED
▽ IMU ERROR SIGNALS


27 VDC RLP LO
27VDC RLP HI ISS LEVEL STBY (TCL 548)
27VDC OIA ON (FTR 538)
27VDC RLP HI ISS LEVEL OPR (GPC 1004)
27VDC RLP HI ISS LEVEL OPR (TCL 1032W)
27VDC RLP HI ISS LEVEL OPR (TCL 1047W)
27VDC RLP HI ISS LEVEL STBY (TCL 1045W)
27VDC RLP LO ISS LEVEL STBY (TCL 1044W)
FINE ALIGN INTERLOCK (TCL 1033W)
IG OG POSITION INTLK (GPC 973W)
IG MG POSITION INTLK (GPC 1002W)
MG-OG POSITION INTLK (GPC 1007W)
IRIG TEST SELECTED (TCL 1034W)
IRIG TEST START (GPC 1010W)
TEST START LIGHT
TEST START LIGHT
1
548
538
1004
1032
1047
1045
1044
1033W
973W
1002W
1007W
1034W
1010W
TES
(TEST SELECTOR)
ADSRAX
ADIAX
SFTGX
ADSRAZ
ADAIZ
ADAIZ
SFTGZ
Y-IRIG
IRIG TEST SELECTOR SWITCH
1,4,5,6,7
2,3
8
IRIG TEST POSITIONS
TEST COMMANDS
GATE VERIFICATION
GIMBAL SERVO TEST M
INTERFACE LOAD TEST M
FAILURE INDICATION TEST M
IRIG TEST M
TEST START
IRIG TEST POSITIONS
I S T O C
742
523W
27VDC RLP HI ISS OPR IND
IRIG TEST SELECTED
742
523W
OIA BACKWALL
SEE TCL OIA BACKWALL

2900206

17 2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		1 SEP 65	
B		REVISION STATUS CHANGED		7 SEP 65	LK
C		REVISION STATUS CHANGED		9 SEP 65	LK
D		REVISION STATUS CHANGED		10 SEP 65	LK
E		REVISED PER TDRR 22002		13 SEP 65	LK
F		REVISION STATUS CHANGED		6 SEP 65	LK
G		REVISION STATUS CHANGED		2 SEP 65	LK
H		REVISION STATUS CHANGED		2 SEP 65	
J		REVISION STATUS CHANGED		6 OCT 65	
K		REVISION STATUS CHANGED		10 NOV 65	



269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
455W
1708TW
451 W
452 W
454 W
453 W
448 W
449 W
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUTPUT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
1698W
ATTITUDE ENABLE INPUT LO
1699W
1700TW
1701TW
1702TW
1703TW
ATTITUDE DISABLE
OVDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
SYSTEM TEST
143W
144W
141W
142W
139W
140W
121W
122W
171W
172W
133W
134W
129W
130W
119W
120W
GCP, XBR-A, RSS-C, MSI, PSS
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIGNAL HI
IMU IG & Y GYRO ERROR SIGNAL LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
Z GYRO ERROR SIGNAL HI
Z GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
X GYRO ERROR SIGNAL LO
OJB
OVER-HEAD JUNCTION BOX
2075
2076
1289
1290
1275
1276
1789
1790
PSA TPA
(PSA TEST POINT ADAPTER)
7
9
11
8
23
24
31
1
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
OJB
(OVERHEAD JUNCTION BOX)
298
297
299
300
301
302
1301
1300
1298
1299
1297
798
797
799
800
801
802
1800
1799
1797
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1796
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1271
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1262
1253
1254
1250
1251
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (3)
SHEET 2, E15 (4)
1774
1773
1781
1782
1779
1780
1777
1778
1770
1771
1763
1764
1766
1767
1753
1754
1750
1751
SJB
(SIMULATED JUNCTION BOX)
481
480
260
261
258
259
256
257
19
20
477
479
474
476
17
18
23
24
SHEET 2, B15 (5)
IMU OVDC
45
44
478
475
43
46
B5
B6
H6
F2
D2
U
V
W
C
B
A
TRAY 1
TRAY 4
TRAY 3
IMU
50
14
4
5
20
6
3
17
40
41
15
18
7
16
GNIC
(G&N INDICATOR CONTROL)
484
485
482
483
N5
P5
G5
G6
H5
H6
TRAY 10

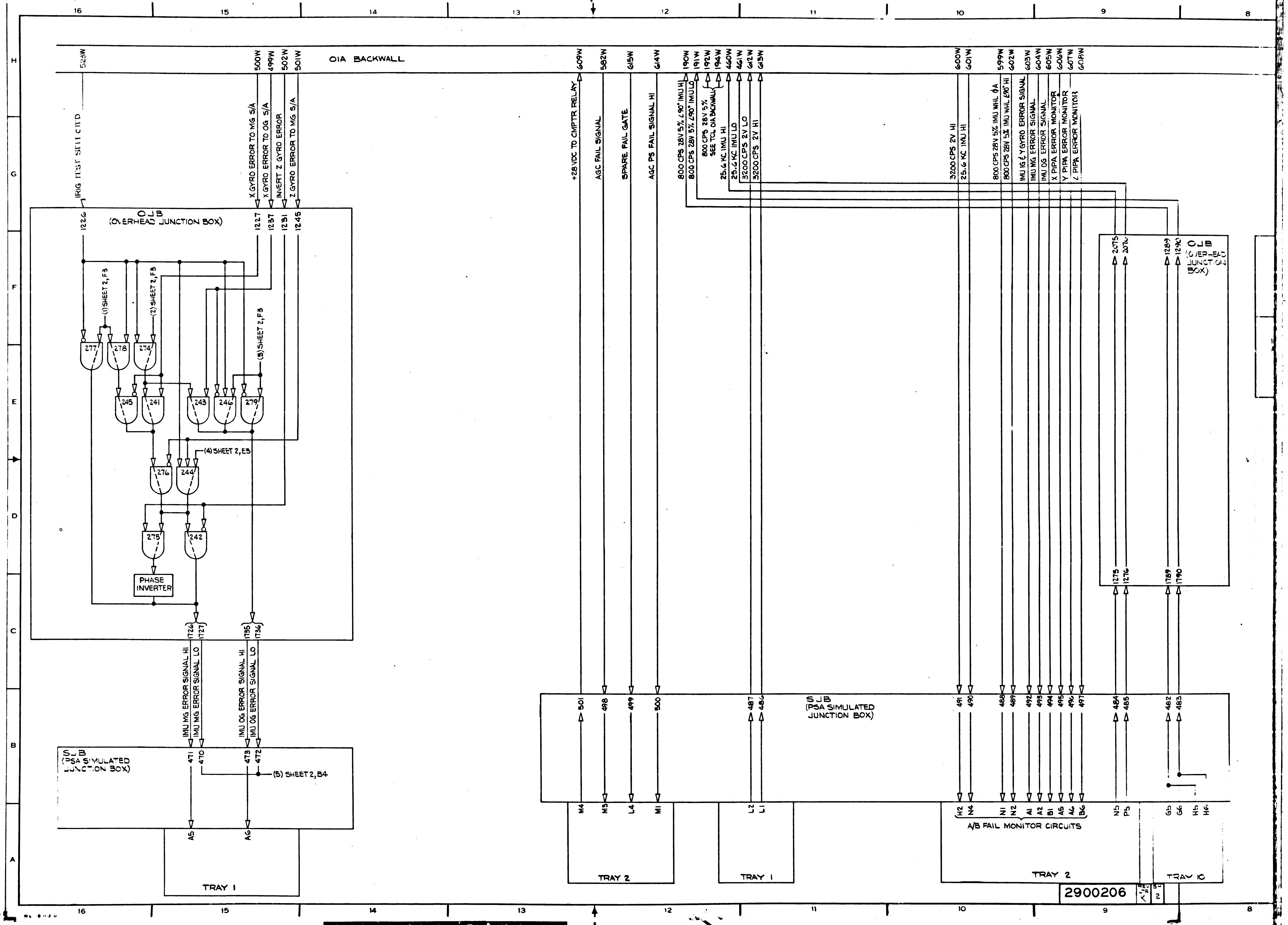
3H

2900206 K

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
FRACTIONS ± — DECIMALS ± — ANGLES ± —	ACSP PN	
	DRAWN DATE 26 MAY 65	MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK I SERIES 100)
	CHECKED Ed Foster 9 JUN 65	
DO NOT SCALE THIS DRAWING	APPROVAL	
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 SIZE J_2 2900206
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — SHEET 2 OF 4

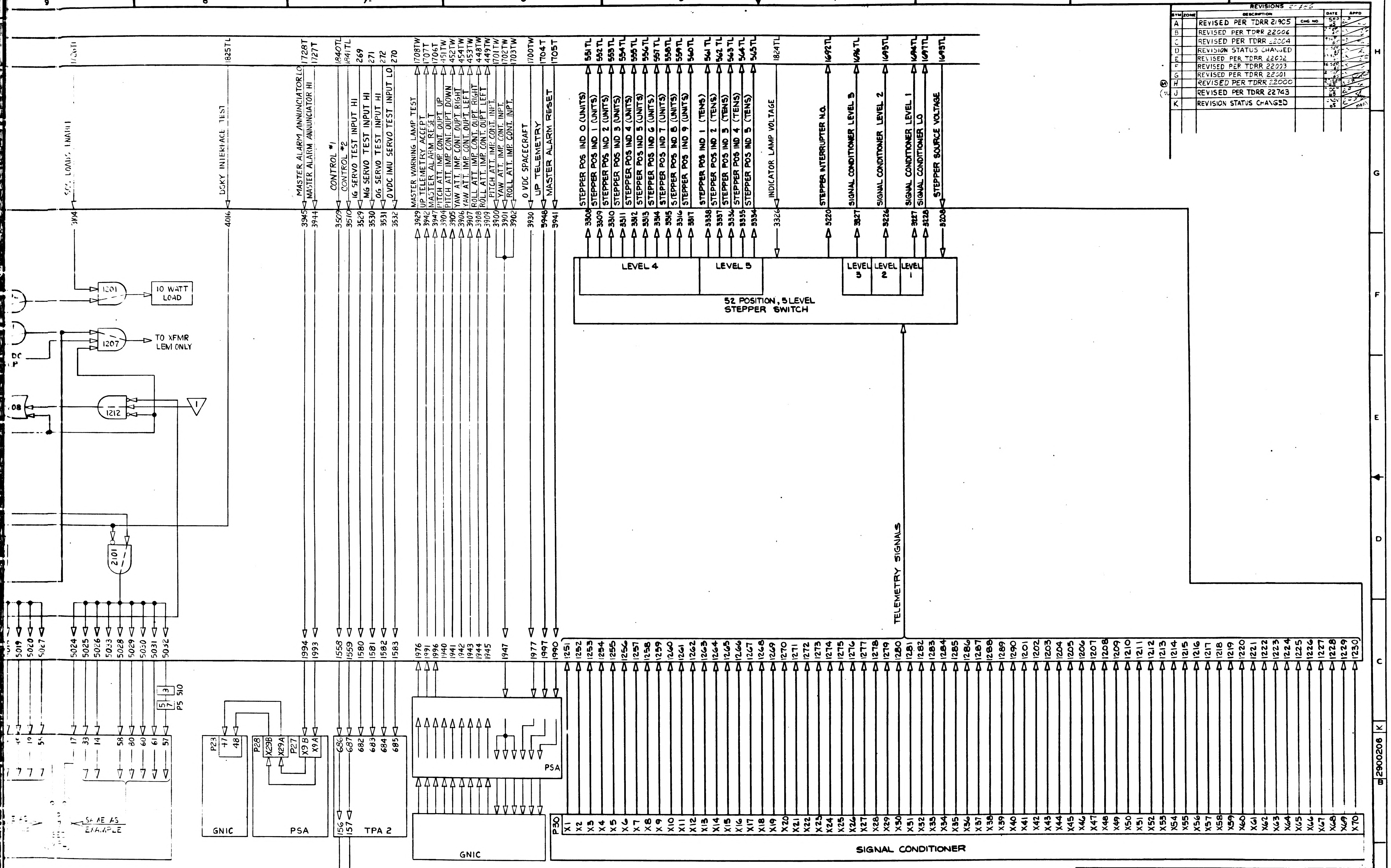
900206 K 2

272900206



16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
523W
500W
499W
502W
501W
IRIG TEST SEL CMD
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
OJB
(OVERHEAD JUNCTION BOX)
1226
1227
1237
1231
1245
(1) SHEET 2, F3
(2) SHEET 2, F3
(3) SHEET 2, F3
277
278
274
245
241
243
246
279
(4) SHEET 2, E3
276
244
275
242
PHASE INVERTER
1726
1727
1735
1736
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
SJB
(PSA SIMULATED JUNCTION BOX)
471
470
473
472
(5) SHEET 2, B4
A5
A6
TRAY 1
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5%
SEE TCL OIA BACKWALL
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ΦA
800 CPS 28V 5% IMU WHL ∠90° HI
IMU IG & Y GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
2075
2076
1289
1290
OJB
(OVERHEAD JUNCTION BOX)
1275
1276
1789
1790
SJB
(PSA SIMULATED JUNCTION BOX)
501
498
499
500
487
486
491
490
488
489
492
493
494
495
496
497
484
485
482
483
M4
M3
L4
M1
TRAY 2
L2
L1
TRAY 1
H2
N4
N1
N2
A1
A2
B1
A5
A6
B6
N5
P5
G5
G6
H5
H6
A/B FAIL MONITOR CIRCUITS
TRAY 2
TRAY 10
2900206
REV K
S 2

172900206


SCS LOADS ENABLE
1726TL
3904
DSKY INTERFACE TEST
1825TL
4016
MASTER ALARM ANNUNCIATOR LO
MASTER ALARM ANNUNCIATOR HI
1728T
1727T
3945
3944
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
1840TL
1841TL
269
271
272
270
3509
3510
3529
3530
3531
3532
MASTER WARNING LAMP TEST
UP TELEMETRY ACCEPT
MASTER ALARM RESET
PITCH ATT. IMP. CONT. OUPT. UP
PITCH ATT. IMP. CONT. OUPT. DOWN
YAW ATT. IMP. CONT. OUPT. RIGHT
YAW ATT. IMP. CONT. OUPT. LEFT
ROLL ATT. IMP. CONT. OUPT. RIGHT
ROLL ATT. IMP. CONT. OUPT. LEFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
1708TW
1707T
1706T
451TW
452TW
454TW
453TW
448TW
449TW
1701TW
1702TW
1703TW
3929
3942
3947
3904
3905
3906
3907
3908
3909
3900
3901
3902
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
1700TW
1704T
1705T
3930
3948
3941
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
561TL
562TL
563TL
564TL
565TL
3338
3337
3336
3335
3334
INDICATOR LAMP VOLTAGE
1824TL
3326
STEPPER INTERRUPTER N.O.
1692TL
3220
SIGNAL CONDITIONER LEVEL 3
1696TL
3227
SIGNAL CONDITIONER LEVEL 2
1695TL
3226
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
1694TL
1697TL
1693TL
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL
STEPPER SWITCH
TELEMETRY SIGNALS
1201
10 WATT LOAD
1207
TO XFMR
LEM ONLY
1212
1208
1
2101
DC
5019
5020
5027
5024
5025
5026
5033
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P5 510
17
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57
SAME AS EXAMPLE
1994
1993
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P23
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GNIC
P28
X29B
X29A
P27
X9B
X9A
PSA
686
687
682
683
684
685
TPA 2
156
157
45J1
X23A
X24A
PSA
GNIC
P30
X1
X2
X3
X4
X5
X6
X7
X8
X9
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X14
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X57
X58
X59
X60
X61
X62
X63
X64
X65
X66
X67
X68
X69
X70
SIGNAL CONDITIONER
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

REVISIONS 2-156

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		SEP 65	
B		REVISED PER TDRR 22006		SEP 65	
C		REVISED PER TDRR 22004		9 SEP 65	
D		REVISION STATUS CHANGED		SEP 65	
E		REVISED PER TDRR 22002		13 SEP 65	
F		REVISED PER TDRR 22003		16 SEP 65	
G		REVISED PER TDRR 22001		2 SEP 65	
H		REVISED PER TDRR 22000		SEP 65	
J		REVISED PER TDRR 22743		OCT 65	
K		REVISION STATUS CHANGED		NOV 65	

3H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ + +
− − −
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 3 JUN 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

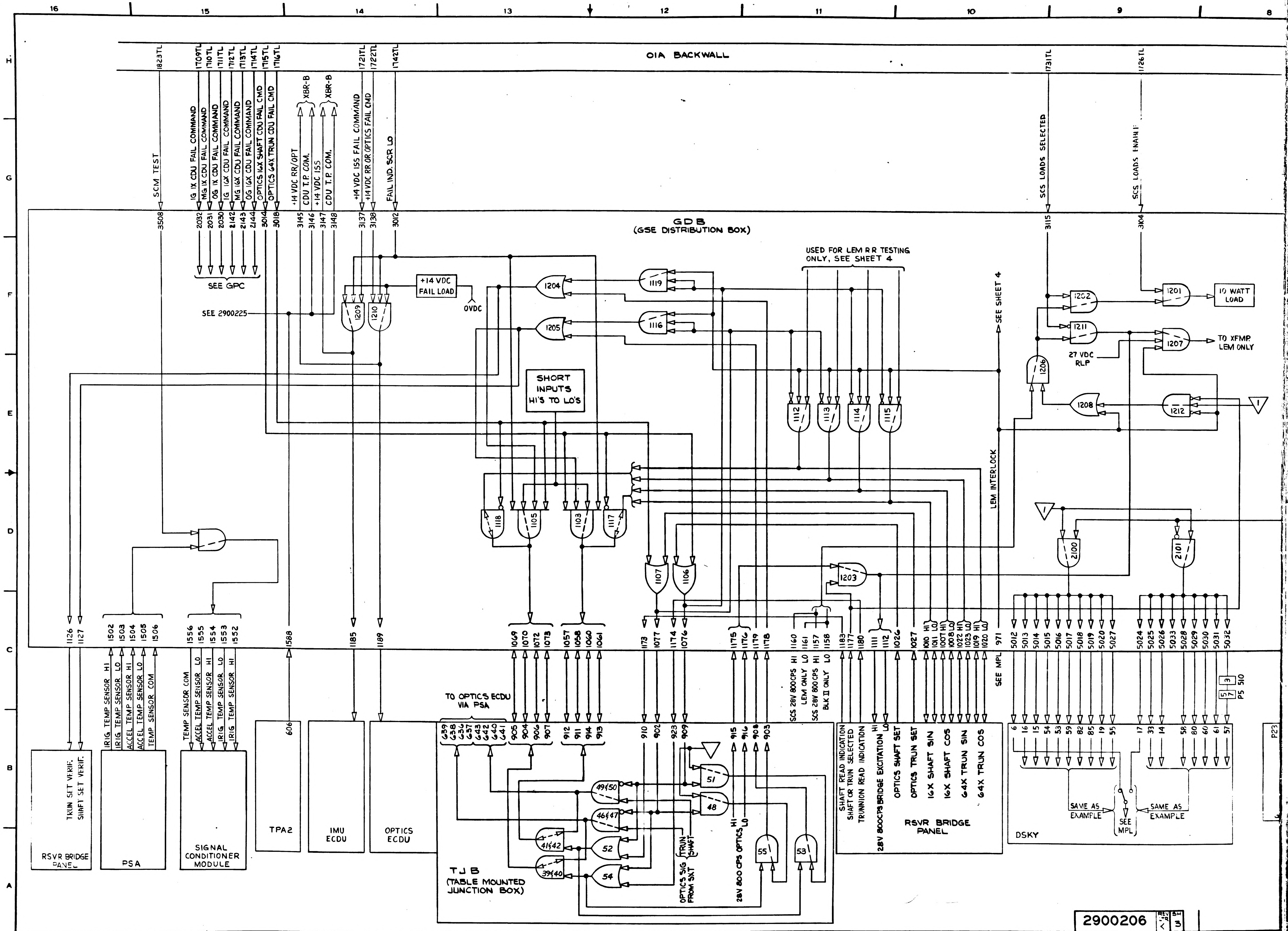
MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK II)

CODE IDENT NO. 99974
SIZE J_2
2900206
SCALE
SHEET 3 OF 4

2900206

2900206

27 2900206



16
15
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9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1823TL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1721TL
1722TL
1742TL
1731TL
1726TL
SCM TEST
IG 1X CDU FAIL COMMAND
MG 1X CDU FAIL COMMAND
OG 1X CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
+14 VDC RR/OPT
CDU T.P. COM.
+14 VDC ISS
CDU T.P. COM.
XBR-B
XBR-B
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
SCS LOADS SELECTED
SCS LOADS ENABLE
GDB
(GSE DISTRIBUTION BOX)
3508
2032
2031
2030
2142
2143
2144
3014
3018
3145
3146
3147
3148
3137
3138
3012
3115
3104
SEE GPC
SEE 2900225
+14 VDC FAIL LOAD
OVDC
USED FOR LEM R.R TESTING ONLY, SEE SHEET 4
SEE SHEET 4
10 WATT LOAD
TO XFMR. LEM ONLY
27 VDC RLP
SHORT INPUTS HI'S TO LO'S
LEM INTERLOCK
1204
1205
1209
1210
1119
1116
1112
1113
1114
1115
1202
1211
1201
1207
1206
1208
1212
1118
1105
1103
1117
1107
1106
1203
2100
2101
1126
1127
1502
1503
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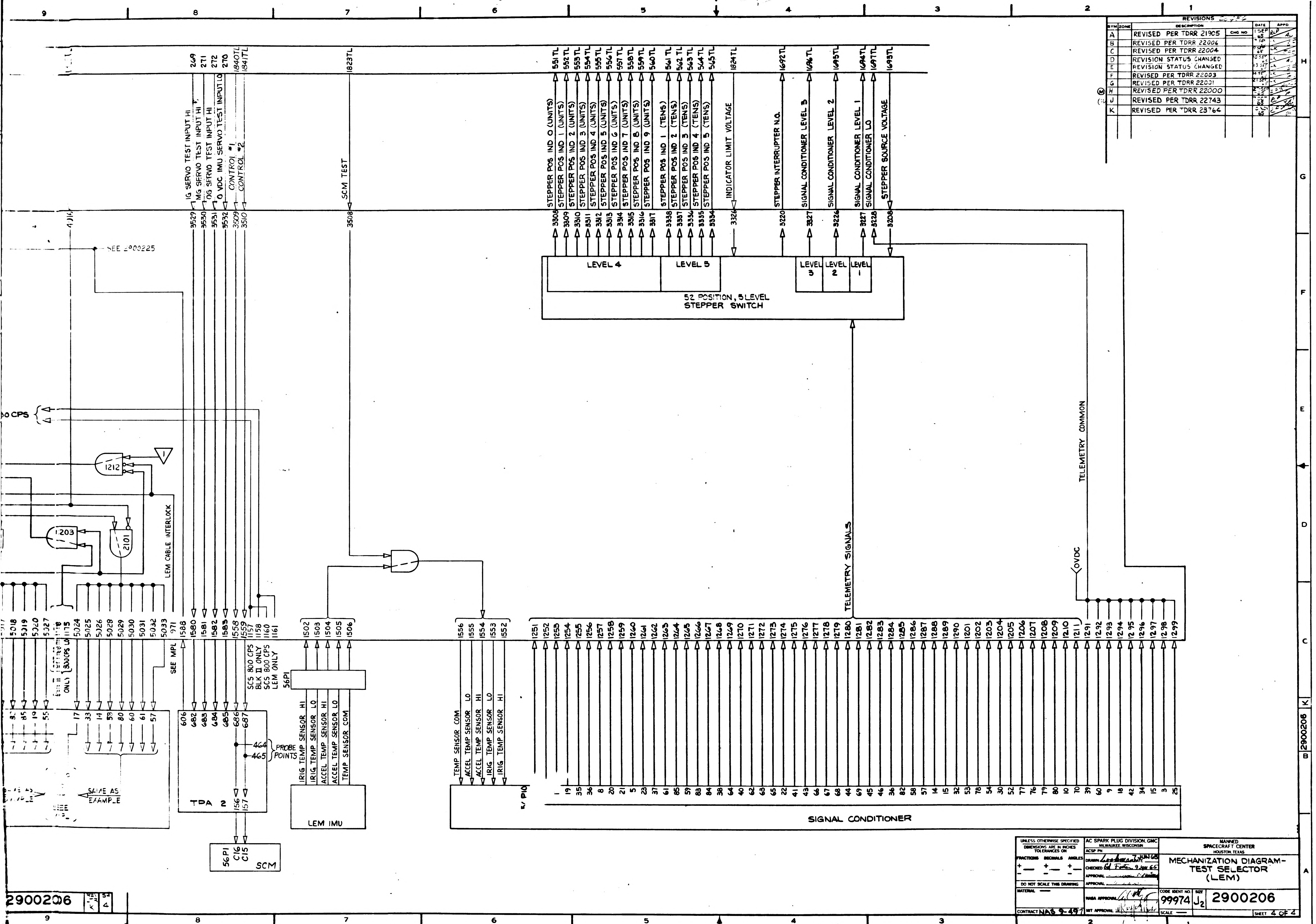
1174
1076
1175
1176
1179
1178
1160
1161
1157
1158
1177
1180
1111
1112
1026
1010 HI
1011 LO
1007 HI
1008 LO
1022 HI
1023 LO
1019 HI
1020 LO
971
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
5024
5025
5026
5033
5028
5029
5030
5031
5032
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
TEMP SENSOR COM.
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
TRUN SET VERIF.
SHAFT SET VERIF.
TO OPTICS ECDU VIA PSA
SCS 28V 800CPS HI
LEM ONLY LO
SCS 28V 800CPS HI
BLK II ONLY LO
SHAFT READ INDICATION
SHAFT OR TRUN SELECTED
TRUNNION READ INDICATION
28V 800CPS BRIDGE EXCITATION HI LO
OPTICS SHAFT SET
OPTICS TRUN SET
16X SHAFT SIN
16X SHAFT COS
64X TRUN SIN
64X TRUN COS
SEE MPL
5 3
7 7
P5 510
606
G39
G38
G36
G37
G43
G42
G40
G41
905
904
906
907
912
911
914
913
910
902
923
909
915
916
908
903
6
16
15
54
53
59
82
85
19
55
17
33
14
58
80
60
61
57
51
48
49&50
46&47
41&42
39&40
52
54
55
53
OPTICS SIG FROM SXT
TRUN
SHAFT
HI
LO
28V 800 CPS OPTICS
RSVR BRIDGE PANEL
PSA
SIGNAL CONDITIONER MODULE
TPA2
IMU ECDU
OPTICS ECDU
TJB
(TABLE MOUNTED JUNCTION BOX)
RSVR BRIDGE PANEL
DSKY
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
P23
2900206
REV
SH 3

S800308

34

1729 00206


SEE 2900225
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
O VDC IMU SERVO TEST INPUT LO
CONTROL #1
CONTROL #2
SCM TEST
STEPPER POS IND O (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LIMIT VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
800 CPS
1212
1203
2101
LEM CABLE INTERLOCK
TELEMETRY COMMON
TELEMETRY SIGNALS
OVDC
SEE MPL
SCS 800 CPS
BLK II ONLY
SCS 800 CPS
LEM ONLY
56P1
464
465
PROBE POINTS
TPA 2
56P1 C16 C15
SCM
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
LEM IMU
SIGNAL CONDITIONER
SAME AS EXAMPLE
2900206
34
2 7 2 9 0 0 2 0 6

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	RLP
B		REVISED PER TDRR 22006		9 SEP	
C		REVISED PER TDRR 22004		9 SEP 65	LK
D		REVISION STATUS CHANGED		10 SEP 65	LK
E		REVISION STATUS CHANGED		13 SEP	LK
F		REVISED PER TDRR 22003		16 SEP	LK
G		REVISED PER TDRR 22001		21 SEP	LK
H		REVISED PER TDRR 22000		[illegible] SEP	
J		REVISED PER TDRR 22743		7 OCT 65	
K		REVISED PER TDRR 23764		[illegible] 65	

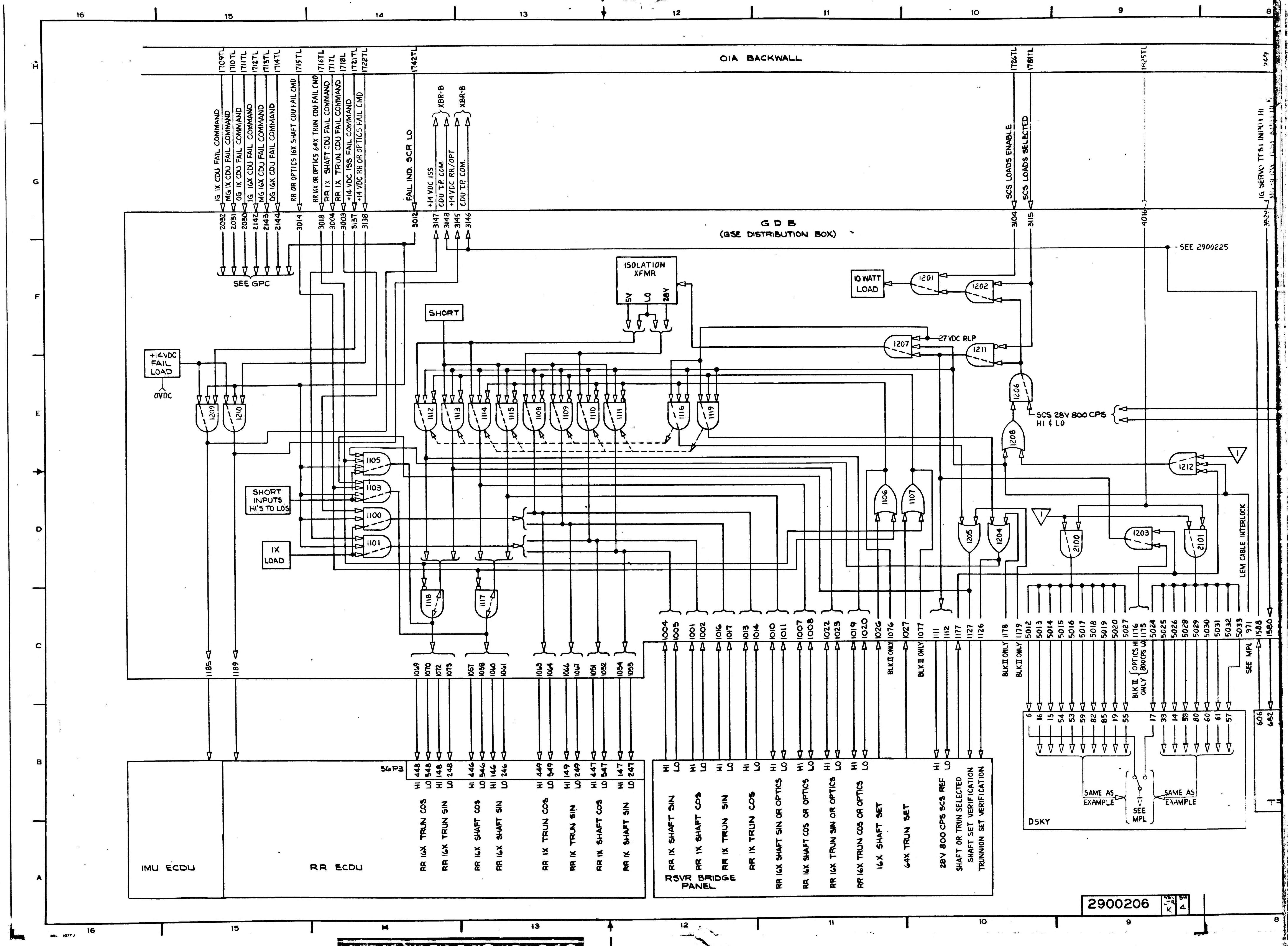
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 7 JUN 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

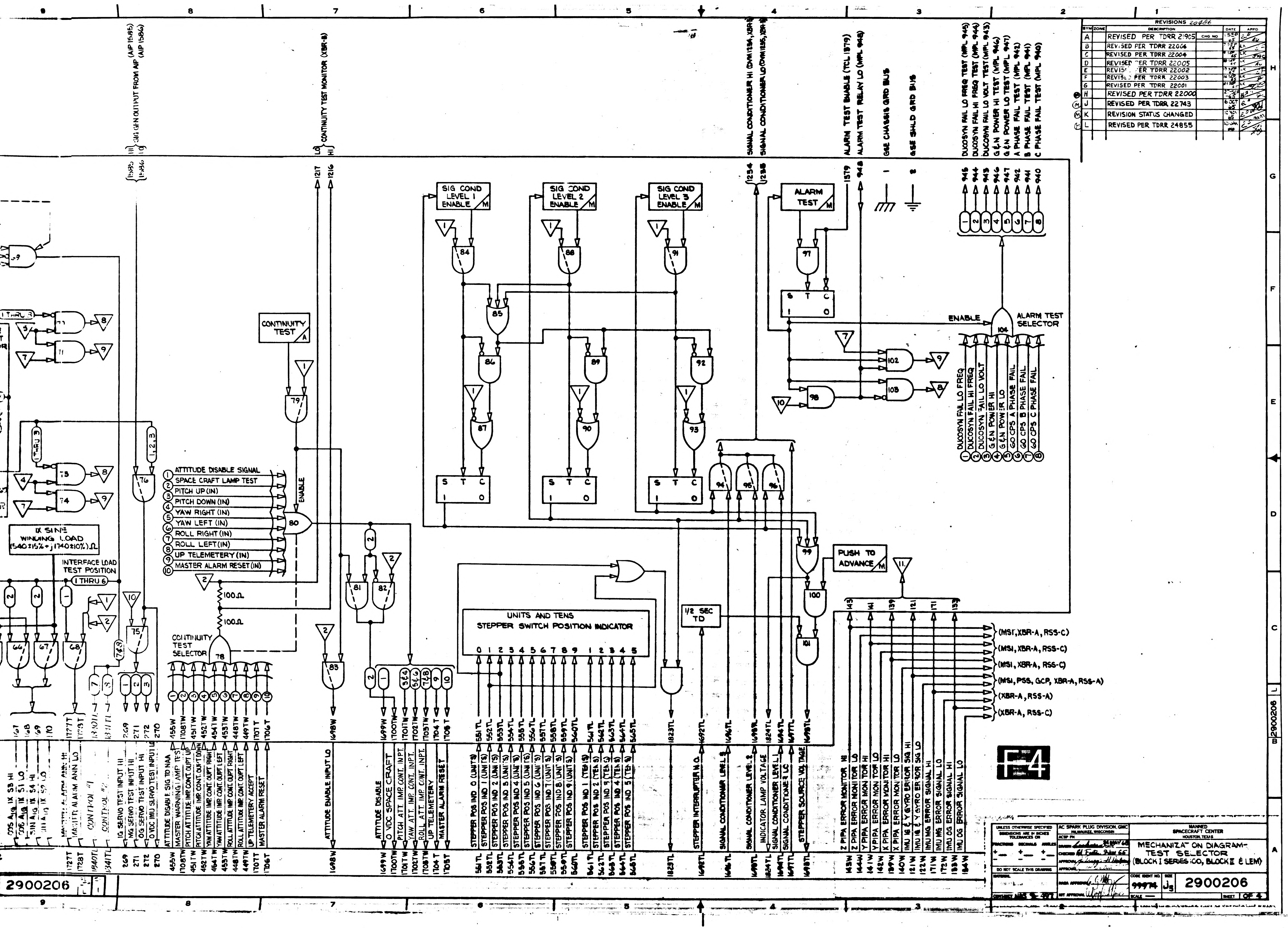
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
TEST SELECTOR
(LEM)

CODE IDENT NO. 99974
SIZE J_2
2900206
SCALE —
SHEET 4 OF 4


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1717L
1718L
1721TL
1722TL
1742TL
1724TL
1751TL
1725TL
IG 1X CDU FAIL COMMAND
MG 1X CDU FAIL COMMAND
OG 1X CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
RR OR OPTICS 16X SHAFT CDU FAIL CMD
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
RR 1X SHAFT CDU FAIL COMMAND
RR 1X TRUN CDU FAIL COMMAND
+14 VDC 1SS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
+14 VDC 1SS
CDU T.P. COM.
+14 VDC RR/OPT
CDU T.P. COM.
XBR-B
XBR-B
SCS LOADS ENABLE
SCS LOADS SELECTED
IG SERVO TEST INPUT HI
G D B
(GSE DISTRIBUTION BOX)
2032
2031
2030
2142
2143
2144
3014
3018
3004
3003
3157
3138
3012
3147
3148
3145
3146
3104
3115
4016
3529
SEE 2900225
SEE GPC
ISOLATION XFMR
5V
LO
28V
10 WATT LOAD
SHORT
+14VDC FAIL LOAD
0VDC
27 VDC RLP
1201
1202
1207
1211
1206
1208
1212
1209
1210
1112
1113
1114
1115
1108
1109
1110
1111
1116
1119
SCS 28V 800 CPS HI & LO
1105
1103
1100
1101
SHORT INPUTS HI'S TO LO'S
1X LOAD
1106
1107
1205
1204
2100
1203
2101
1118
1117
LEM CABLE INTERLOCK
1185
1189
1069
1070
1072
1073
1057
1058
1060
1061
1063
1064
1066
1067
1051
1052
1054
1055
1004
1005
1001
1002
1016
1017
1013
1014
1010
1011
1007
1008
1022
1023
1019
1020
1026
1076
1027
1077
1111
1112
1177
1127
1126
1178
1179
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
1116
1115
5024
5025
5026
5028
5029
5030
5031
5032
5033
971
1588
1580
BLK II ONLY
BLK II ONLY
BLK II ONLY
BLK II ONLY
BLK II ONLY
OPTICS HI 800CPS LO
SEE MPL
6
16
15
54
53
59
82
85
19
55
17
33
14
58
80
60
61
57
606
682
56P3
448
548
148
248
446
546
146
246
449
549
149
249
447
547
147
247
HI
LO
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
RR 1X TRUN COS
RR 1X TRUN SIN
RR 1X SHAFT COS
RR 1X SHAFT SIN
RR 1X SHAFT SIN
RR 1X SHAFT COS
RR 1X TRUN SIN
RR 1X TRUN COS
RR 16X SHAFT SIN OR OPTICS
RR 16X SHAFT COS OR OPTICS
RR 16X TRUN SIN OR OPTICS
RR 16X TRUN COS OR OPTICS
16X SHAFT SET
64X TRUN SET
28V 800 CPS SCS REF
SHAFT OR TRUN SELECTED
SHAFT SET VERIFICATION
TRUNNION SET VERIFICATION
IMU ECDU
RR ECDU
RSVR BRIDGE PANEL
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
DSKY
2900206
K
SH 4

1/2900206


SIG COND LEVEL 1 ENABLE
SIG COND LEVEL 2 ENABLE
SIG COND LEVEL 3 ENABLE
ALARM TEST
CONTINUITY TEST
ALARM TEST SELECTOR
ENABLE
PUSH TO ADVANCE
1/2 SEC TD
UNITS AND TENS STEPPER SWITCH POSITION INDICATOR
0 1 2 3 4 5 6 7 8 9 1 2 3 4 5
CONTINUITY TEST SELECTOR
100Ω
100Ω
IX SINE WINDING LOAD (540±15%+j1740±10%)Ω
INTERFACE LOAD TEST POSITION
1 THRU 6
1 THRU 3
1,2,3
①ATTITUDE DISABLE SIGNAL
②SPACE CRAFT LAMP TEST
③PITCH UP (IN)
④PITCH DOWN (IN)
⑤YAW RIGHT (IN)
⑥YAW LEFT (IN)
⑦ROLL RIGHT (IN)
⑧ROLL LEFT (IN)
⑨UP TELEMETERY (IN)
⑩MASTER ALARM RESET (IN)
①DUCOSYN FAIL LO FREQ
②DUCOSYN FAIL HI FREQ
③DUCOSYN FAIL LO VOLT
④G&N POWER HI
⑤G&N POWER LO
⑥GO CPS A PHASE FAIL
⑦GO CPS B PHASE FAIL
⑧GO CPS C PHASE FAIL
S T C 1 0
79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 66 67 68 73 74 75 76 78
1585 1586 SIG G&N OUTPUT FROM AIP (AIP 1585) (AIP 1586)
LO 121T HI 1216 CONTINUITY TEST MONITOR (XBR-B)
1234 SIGNAL CONDITIONER HI (DVM1234, XBR-B)
1235 SIGNAL CONDITIONER LO (DVM1235, XBR-B)
1579 ALARM TEST ENABLE (TCL 1579)
948 ALARM TEST RELAY LO (MPL 948)
1 G&E CHASSIS GRD BUS
2 GSE SHLD GRD BUS
945 DUCOSYN FAIL LO FREQ TEST (MPL 945)
944 DUCOSYN FAIL HI FREQ TEST (MPL 944)
943 DUCOSYN FAIL LO VOLT TEST (MPL 943)
946 G&N POWER HI TEST (MPL 946)
947 G&N POWER LO TEST (MPL 947)
942 A PHASE FAIL TEST (MPL 942)
941 B PHASE FAIL TEST (MPL 941)
940 C PHASE FAIL TEST (MPL 940)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, PSS, GCP, XBR-A, RSS-A)
(XBR-A, RSS-A)
(XBR-A, RSS-C)
143 141 139 121 171 133
167 COS A IG IX S3 HI
168 COS A IG IX S1 LO
169 SIN A IG IX S4 HI
170 SIN A IG IX S2 LO
1727T MASTER ALARM ANN HI
1728T MASTER ALARM ANN LO
1840TL CONTROL #1
1841TL CONTROL #2
269 IG SERVO TEST INPUT HI
271 MG SERVO TEST INPUT HI
272 OG SERVO TEST INPUT HI
270 0 VDC IMU SERVO TEST INPUT LO
455W ATTITUDE DISABLE SIG TO NAA
1108TW MASTER WARNING LAMP TEST
451TW PITCH ATTITUDE IMP. CONT. OUPT UP
452TW PITCH ATTITUDE IMP. CONT. OUPT DOWN
454TW YAW ATTITUDE IMP. CONT. OUPT RIGHT
453TW YAW ATTITUDE IMP. CONT. OUPT LEFT
448TW ROLL ATTITUDE IMP. CONT. OUPT RIGHT
449TW ROLL ATTITUDE IMP. CONT. OUPT LEFT
1707T UP TELEMETERY ACCEPT
1706T MASTER ALARM RESET
1698W ATTITUDE ENABLE INPUT LO
1699W ATTITUDE DISABLE
1700TW 0 VDC SPACE CRAFT
1701TW PITCH ATT. IMP. CONT. INPT.
1702TW YAW ATT. IMP. CONT. INPT.
1703TW ROLL ATT. IMP. CONT. INPT.
1704T UP TELEMETERY
1705T MASTER ALARM RESET
551TL STEPPER POS IND 0 (UNITS)
552TL STEPPER POS IND 1 (UNITS)
553TL STEPPER POS IND 2 (UNITS)
554TL STEPPER POS IND 3 (UNITS)
555TL STEPPER POS IND 4 (UNITS)
556TL STEPPER POS IND 5 (UNITS)
557TL STEPPER POS IND 6 (UNITS)
558TL STEPPER POS IND 7 (UNITS)
559TL STEPPER POS IND 8 (UNITS)
560TL STEPPER POS IND 9 (UNITS)
561TL STEPPER POS IND 1 (TENS)
562TL STEPPER POS IND 2 (TENS)
563TL STEPPER POS IND 3 (TENS)
564TL STEPPER POS IND 4 (TENS)
565TL STEPPER POS IND 5 (TENS)
1823TL
1692TL STEPPER INTERRUPTER N.O.
1696TL SIGNAL CONDITIONER LEVEL 3
1695TL SIGNAL CONDITIONER LEVEL 2
1824TL INDICATOR LAMP VOLTAGE
1694TL SIGNAL CONDITIONER LEVEL 1
1697TL SIGNAL CONDITIONER LC
1693TL STEPPER SOURCE VOLTAGE
143W Z PIPA ERROR MONITOR HI
144W Z PIPA ERROR MONITOR LO
141W Y PIPA ERROR MONITOR HI
142W Y PIPA ERROR MONITOR LO
139W X PIPA ERROR MONITOR HI
140W X PIPA ERROR MONITOR LO
121W IMU IG & Y GYRO ERROR SIG HI
122W IMU IG & Y GYRO ERROR SIG LO
171W IMU MG ERROR SIGNAL HI
172W IMU MG ERROR SIGNAL LO
133W IMU OG ERROR SIGNAL HI
134W IMU OG ERROR SIGNAL LO
F4
9 8 7 6 5 4 3 2 1
H G F E D C B A
44

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	
B		REVISED PER TDRR 22006		7 SEP 65	LK
C		REVISED PER TDRR 22004		9 SEP 65	LK
D		REVISED PER TDRR 22005		10 SEP 65	LK
E		REVISED PER TDRR 22002		13 SEP 65	LK
F		REVISED PER TDRR 22003		16 SEP 65	LK
G		REVISED PER TDRR 22001		21 SEP 65	LK
H		REVISED PER TDRR 22000		2 SEP 65	
J		REVISED PER TDRR 22743		6 OCT 65	
K		REVISION STATUS CHANGED		10 NOV 65	
L		REVISED PER TDRR 24855		10 JAN 66	

REVISIONS 20486

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

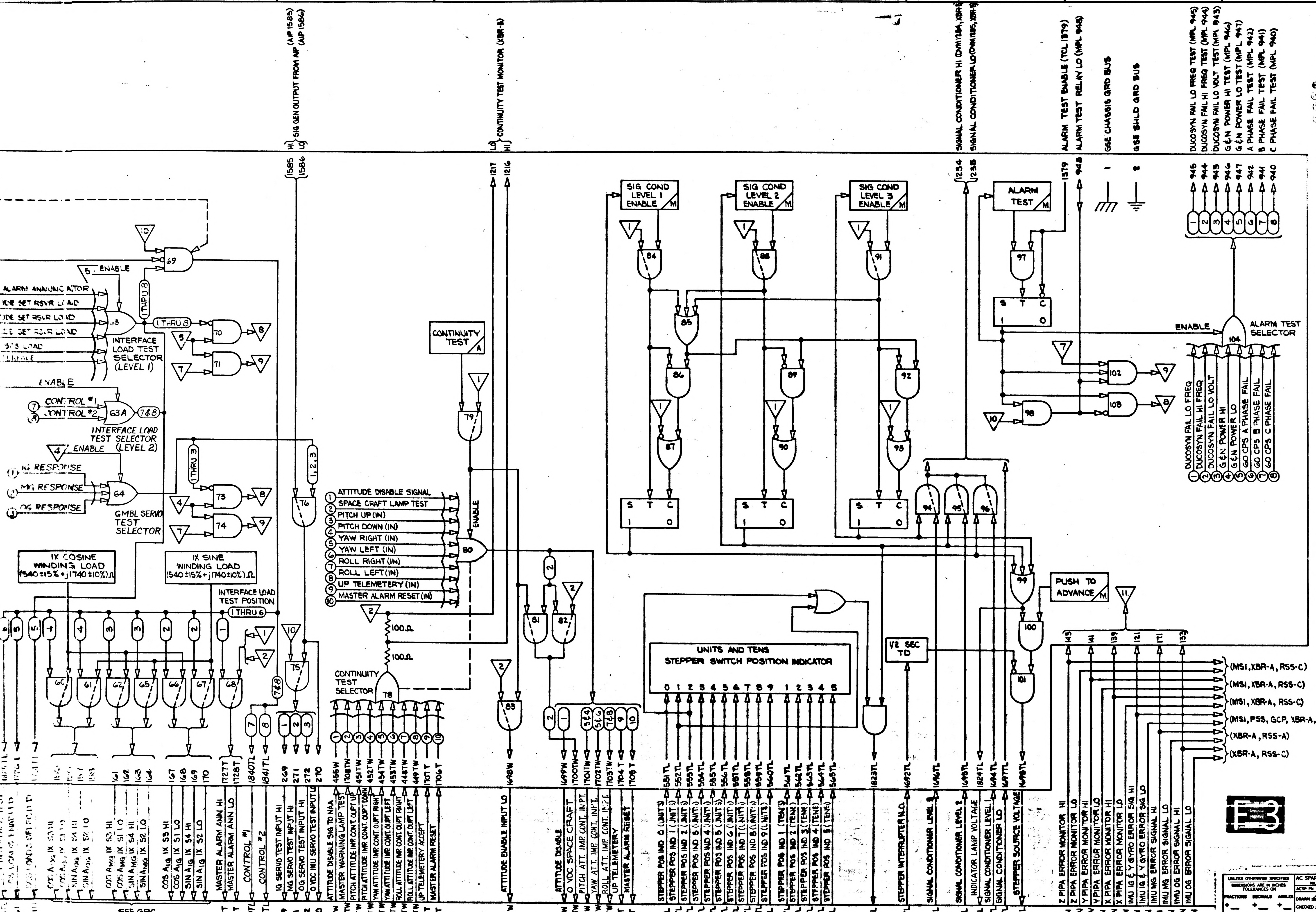
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE MAY 65
CHECKED 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
TEST SELECTOR
(BLOCK I SERIES 100, BLOCK II & LEM)

CODE IDENT NO. 99974
SIZE J3
2900206
SCALE —
SHEET OF 4

2900206


10
9
8
7
6
5
4
3
2
1
HI SIG GEN OUTPUT FROM AP (AIP 1585)
LO (AIP 1586)
1585
1586
LO CONTINUITY TEST MONITOR (XBR-B)
HI
1217
1216
SIGNAL CONDITIONER HI (DVM1234, XBR-B)
SIGNAL CONDITIONER LO (DVM1235, XBR-B)
1234
1235
ALARM TEST ENABLE (TCL 1579)
ALARM TEST RELAY LO (MPL 948)
1579
948
GSE CHASSIS GRD BUS
GSE SHLD GRD BUS
DUCOSYN FAIL LO FREQ TEST (MPL 945)
DUCOSYN FAIL HI FREQ TEST (MPL 944)
DUCOSYN FAIL LO VOLT TEST (MPL 943)
G&N POWER HI TEST (MPL 946)
G&N POWER LO TEST (MPL 947)
A PHASE FAIL TEST (MPL 942)
B PHASE FAIL TEST (MPL 941)
C PHASE FAIL TEST (MPL 940)
945 944 943 946 947 942 941 940
SIG COND LEVEL 1 ENABLE M
SIG COND LEVEL 2 ENABLE M
SIG COND LEVEL 3 ENABLE M
ALARM TEST M
S T C
I O
ENABLE
ALARM TEST SELECTOR
104
DUCOSYN FAIL LO FREQ
DUCOSYN FAIL HI FREQ
DUCOSYN FAIL LO VOLT
G&N POWER HI
G&N POWER LO
GO CPS A PHASE FAIL
GO CPS B PHASE FAIL
GO CPS C PHASE FAIL
84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103
PUSH TO ADVANCE M
1/2 SEC TD
UNITS AND TENS STEPPER SWITCH POSITION INDICATOR
0 1 2 3 4 5 6 7 8 9 1 2 3 4 5
CONTINUITY TEST A
79
80
ENABLE
ATTITUDE DISABLE SIGNAL
① SPACE CRAFT LAMP TEST
② PITCH UP (IN)
③ PITCH DOWN (IN)
④ YAW RIGHT (IN)
⑤ YAW LEFT (IN)
⑥ ROLL RIGHT (IN)
⑦ ROLL LEFT (IN)
⑧ UP TELEMETERY (IN)
⑨ MASTER ALARM RESET (IN)
100Ω
100Ω
CONTINUITY TEST SELECTOR
78
81 82 83
69
5 ENABLE
ALARM ANNUNCIATOR
IDE SET RSVR LOAD
IDE SET RSVR LOAD
IDE SET RSVR LOAD
S/S LOAD
INTERFACE LOAD TEST SELECTOR (LEVEL 1)
63
1 THRU 8
1 THRU 8
70 71
ENABLE
CONTROL #1
CONTROL #2
63A
7&8
INTERFACE LOAD TEST SELECTOR (LEVEL 2)
4 ENABLE
IG RESPONSE
MG RESPONSE
OG RESPONSE
64
GMBL SERVO TEST SELECTOR
1 THRU 3
1,2,3
73 74 75 76
1X COSINE WINDING LOAD (540±15%+j1740±10%)Ω
1X SINE WINDING LOAD (540±15%+j1740±10%)Ω
INTERFACE LOAD TEST POSITION
1 THRU 6
60 61 62 65 66 67 68
7&8
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, PSS, GCP, XBR-A, RSS-A)
(XBR-A, RSS-A)
(XBR-A, RSS-C)
143 141 139 121 171 133
COS A1X S3 HI
COS A1X S1 LO
SIN A1X S4 HI
SIN A1X S2 LO
COS AMG 1X S3 HI
COS AMG 1X S1 LO
SIN AMG 1X S4 HI
SIN AMG 1X S2 LO
COS AIG 1X S3 HI
COS AIG 1X S1 LO
SIN AIG 1X S4 HI
SIN AIG 1X S2 LO
MASTER ALARM ANN HI
MASTER ALARM ANN LO
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
OG IMU SERVO TEST INPUT HI
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUPT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
UP TELEMETERY ACCEPT
MASTER ALARM RESET
ATTITUDE ENABLE INPUT LO
ATTITUDE DISABLE
O VDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
UP TELEMETERY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
INDICATOR LAMP VOLTAGE
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIG HI
IMU IG & Y GYRO ERROR SIG LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
SEE GPC
1727T 1728T 1840TL 1841TL 269 271 272 270
455W 1708TW 451TW 452TW 453TW 454TW 455TW 448TW 449TW 1707T 1706T
1698W
1699W 1700TW 1701TW 1702TW 1703TW 1704T 1705T
561TL 562TL 563TL 564TL 565TL 566TL 567TL 568TL 569TL 560TL 561TL 562TL 563TL 564TL 565TL
1823TL 1692TL 1696TL 1698TL 1824TL 1694TL 1697TL 1693TL
143W 144W 141W 142W 139W 140W 121W 122W 171W 172W 133W 134W

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPR
A		REVISED PER TDRR 22005			
B		REVISED PER TDRR 22006		7 SEP 65	LA
C		REVISED PER TDRR 22004			LA
D		REVISED PER TDRR 22005			LA
E		REVISED PER TDRR 22002			
F		REVISED PER TDRR 22003			LA
G		REVISED PER TDRR 22001		21 SEP 65	LA
H		REVISED PER TDRR 22000			
J		REVISED PER TDRR 22743			
K		REVISION STATUS CHANGED			
L		REVISED PER TDRR 24855			

2900206 REV L SH 1

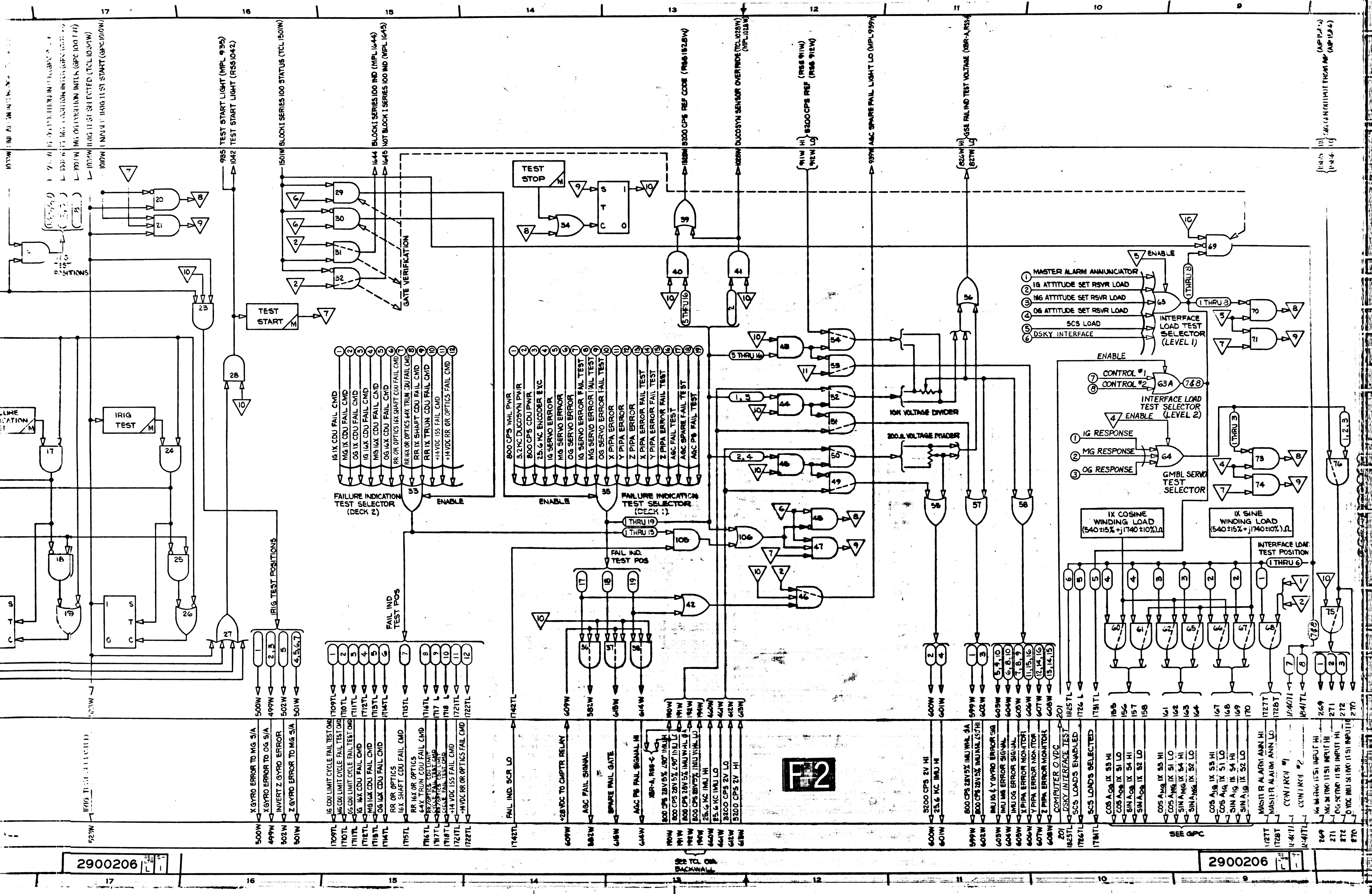
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Lockhart DATE 24 MAY 65
CHECKED Ed Foster 9 Jun 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM TEST SELECTOR BLOCK I SERIES 100, BLOCK II & LEM

CODE IDENT NO. 99974
SIZE J3
2900206
SCALE —
SHEET


17
16
15
14
13
12
11
10
9
1010W IRIG TEST START (GPC 1010W)
1034W IRIG TEST SELECTED (TCL 1034W)
1001W MG OG POSITION INTLK (GPC 1001W)
935 TEST START LIGHT (MPL 935)
1042 TEST START LIGHT (RSS 1042)
1501W BLOCK I SERIES 100 STATUS (TCL 1501W)
1644 BLOCK I SERIES 100 IND (MPL 1644)
1645 NOT BLOCK I SERIES 100 IND (MPL 1645)
1528W 3200 CPS REF CODE (RSS 1528W)
1028W DUCOSYN SENSOR OVERRIDE (TCL 1028W) (MPL 1028W)
911W HI 912W LO 3200 CPS REF (RSS 911W) (RSS 912W)
939W AGC SPARE FAIL LIGHT LO (MPL 939W)
826W HI 827W LO GSE FAIL IND TEST VOLTAGE (XBR-A, RSS-A)
SIGNAL OUTPUT FROM AIP (AIP 15...) (AIP 15...)
TEST STOP
M
S
T
C
1
0
TEST START
GATE VERIFICATION
IRIG TEST
IRIG TEST POSITIONS
POSITIONS
FAILURE INDICATION TEST SELECTOR (DECK 2)
FAILURE INDICATION TEST SELECTOR (DECK 1)
ENABLE
IG 1X CDU FAIL CMD
MG 1X CDU FAIL CMD
OG 1X CDU FAIL CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
RR 16X OR OPTICS 16X SHAFT CDU FAIL CMD
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
RR 1X SHAFT CDU FAIL CMD
RR 1X TRUN CDU FAIL CMD
+14 VDC ISS FAIL CMD
+14 VDC RR OR OPTICS FAIL CMD
800 CPS WHL PWR
3.2 KC DUCOSYN PWR
800 CPS CDU PWR
25.6 KC ENCODER EXC
IG SERVO ERROR
MG SERVO ERROR
OG SERVO ERROR
IG SERVO ERROR FAIL TEST
MG SERVO ERROR FAIL TEST
OG SERVO ERROR FAIL TEST
X PIPA ERROR
Y PIPA ERROR
Z PIPA ERROR
X PIPA ERROR FAIL TEST
Y PIPA ERROR FAIL TEST
Z PIPA ERROR FAIL TEST
AGC FAIL TEST
AGC SPARE FAIL TEST
AGC PS FAIL TEST
FAIL IND TEST POS
FAIL IND. TEST POS
1 THRU 19
1 THRU 15
5 THRU 16
1, 3
2, 4
10K VOLTAGE DIVIDER
200Ω VOLTAGE DIVIDER
MASTER ALARM ANNUNCIATOR
IG ATTITUDE SET RSVR LOAD
MG ATTITUDE SET RSVR LOAD
OG ATTITUDE SET RSVR LOAD
SCS LOAD
DSKY INTERFACE
INTERFACE LOAD TEST SELECTOR (LEVEL 1)
1 THRU 3
1 THRU 8
CONTROL #1
CONTROL #2
63A
7&8
INTERFACE LOAD TEST SELECTOR (LEVEL 2)
IG RESPONSE
MG RESPONSE
OG RESPONSE
GMBL SERVO TEST SELECTOR
1X COSINE WINDING LOAD (540±15%+j1740±10%)Ω
1X SINE WINDING LOAD (540±15%+j1740±10%)Ω
INTERFACE LOAD TEST POSITION
1 THRU 6
1, 2, 3
523W IRIG TEST ... 523W
500W X GYRO ERROR TO MG S/A 500W
499W X GYRO ERROR TO OG S/A 499W
502W INVERT Z GYRO ERROR 502W
501W Z GYRO ERROR TO MG S/A 501W
1709TL IG CDU LIMIT CYCLE FAIL TEST CMD 1709TL
1710TL MG CDU LIMIT CYCLE FAIL TEST CMD 1710TL
1711TL OG CDU LIMIT CYCLE FAIL TEST CMD 1711TL
1712TL IG 16X CDU FAIL CMD 1712TL
1713TL MG 16X CDU FAIL CMD 1713TL
1714TL OG 16X CDU FAIL CMD 1714TL
1715TL RR OR OPTICS 16X SHAFT CDU FAIL CMD 1715TL
1716TL RR 16X OR OPTICS 64X TRUN CDU FAIL CMD 1716TL
1717 L RR/OPTICS CDU LIMIT CYCLE FAIL TEST CMD 1717TL
1718 L RR/OPTICS CDU LIMIT CYCLE FAIL TEST CMD 1718TL
1721TL +14 VDC ISS FAIL CMD 1721TL
1722TL +14 VDC RR OR OPTICS FAIL CMD 1722TL
1742TL FAIL IND. SCR LO 1742TL
609W +28 VDC TO CMPTR RELAY 609W
582W AGC FAIL SIGNAL 582W
615W SPARE FAIL GATE 615W
614W AGC PS FAIL SIGNAL HI 614W
XBR-A, RSS-C
190W 800 CPS 28V 5% ∠90° IMU HI 190W
191W 800 CPS 28V 5% ∠90° IMU LO 191W
192W 800 CPS 28V 5% IMU WHL ∅A 192W
194W 800 CPS 28V 5% IMU WHL LO 194W
460W 25.6 KC IMU HI 460W
461W 25.6 KC IMU LO 461W
612W 3200 CPS 2V LO 612W
613W 3200 CPS 2V HI 613W
SEE TCL OIA BACKWALL
F-2
600W 3200 CPS 2V HI 600W
601W 25.6 KC IMU HI 601W
599W 800 CPS 28V 5% IMU WHL ∅A 599W
602W 800 CPS 28V 5% IMU WHL ∅5 HI 602W
603W IMU IG & Y GYRO ERROR SIG 603W
604W IMU MG ERROR SIGNAL 604W
605W IMU OG ERROR SIGNAL 605W
606W X PIPA ERROR MONITOR 606W
607W Y PIPA ERROR MONITOR 607W
608W Z PIPA ERROR MONITOR 608W
201 COMPUTER O VDC 201
1825TL DSKY INTERFACE TEST 1825TL
1726 L SCS LOADS ENABLED 1726TL
1731TL SCS LOADS SELECTED 1731TL
155 COS A_OG 1X S3 HI
156 COS A_OG 1X S1 LO
157 SIN A_OG 1X S4 HI
158 SIN A_OG 1X S2 LO
161 COS A_MG 1X S3 HI
162 COS A_MG 1X S1 LO
163 SIN A_MG 1X S4 HI
164 SIN A_MG 1X S2 LO
167 COS A_IG 1X S3 HI
168 COS A_IG 1X S1 LO
169 SIN A_IG 1X S4 HI
170 SIN A_IG 1X S2 LO
SEE GPC
1727T MASTER ALARM ANN HI 1727T
1728T MASTER ALARM ANN LO 1728T
1840TL CONTROL #1 1840TL
1841TL CONTROL #2 1841TL
269 IG SERVO TEST INPUT HI 269
271 MG SERVO TEST INPUT HI 271
272 OG SERVO TEST INPUT HI 272
270 O VDC IMU SERVO TEST INPUT LO 270
2900206 L 1
2900206 L 1

NOTES:

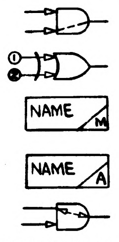
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM)

2900210 RLP	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RELAY & LAMP POWER SUPPLY
2900208 PSS	POWER & DUMMY LOAD-PRIMARY SIGNAL SELECTOR (PDL) PRIMARY SIGNAL SELECTOR
2900223	GIMBAL POSITION CONTROL (GPC)
2900207	MONITOR PANEL (MPL)
2900202	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
2900217 XBR-A XBR-B DVM	SIGNAL SELECTION & MEASUREMENT CROSSBAR - AC SIGNALS CROSSBAR - DC SIGNALS DIGITAL VOLTMETER
2900218 RSS-A RSS-B RSS-C RSS-D	OSCILLOGRAPH SIGNAL SELECTION TO FIXED AC CHANNEL TO FIXED DC CHANNEL TO SWITCHABLE AC CHANNEL TO SWITCHABLE DC CHANNEL
2900215 RSS	MEASUREMENT REFERENCE POWER SUPPLIES OSCILLOGRAPH SIGNAL SELECTOR
2900211	AUXILIARY INPUT-OUTPUT & CALIBRATION (AIP)
2900212 MSI	PIPA & IRIG MONITORING PHASE SHIFT PANEL
2900200	GYRO CAGING PANEL (GCP)

4. NONSTANDARD SYMBOLS



INDICATES "AND" GATE WITH SWITCHED SIGNAL

INDICATES EXCLUSIVE "OR" GATE WITH SWITCH POSITIONS 1&2

INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

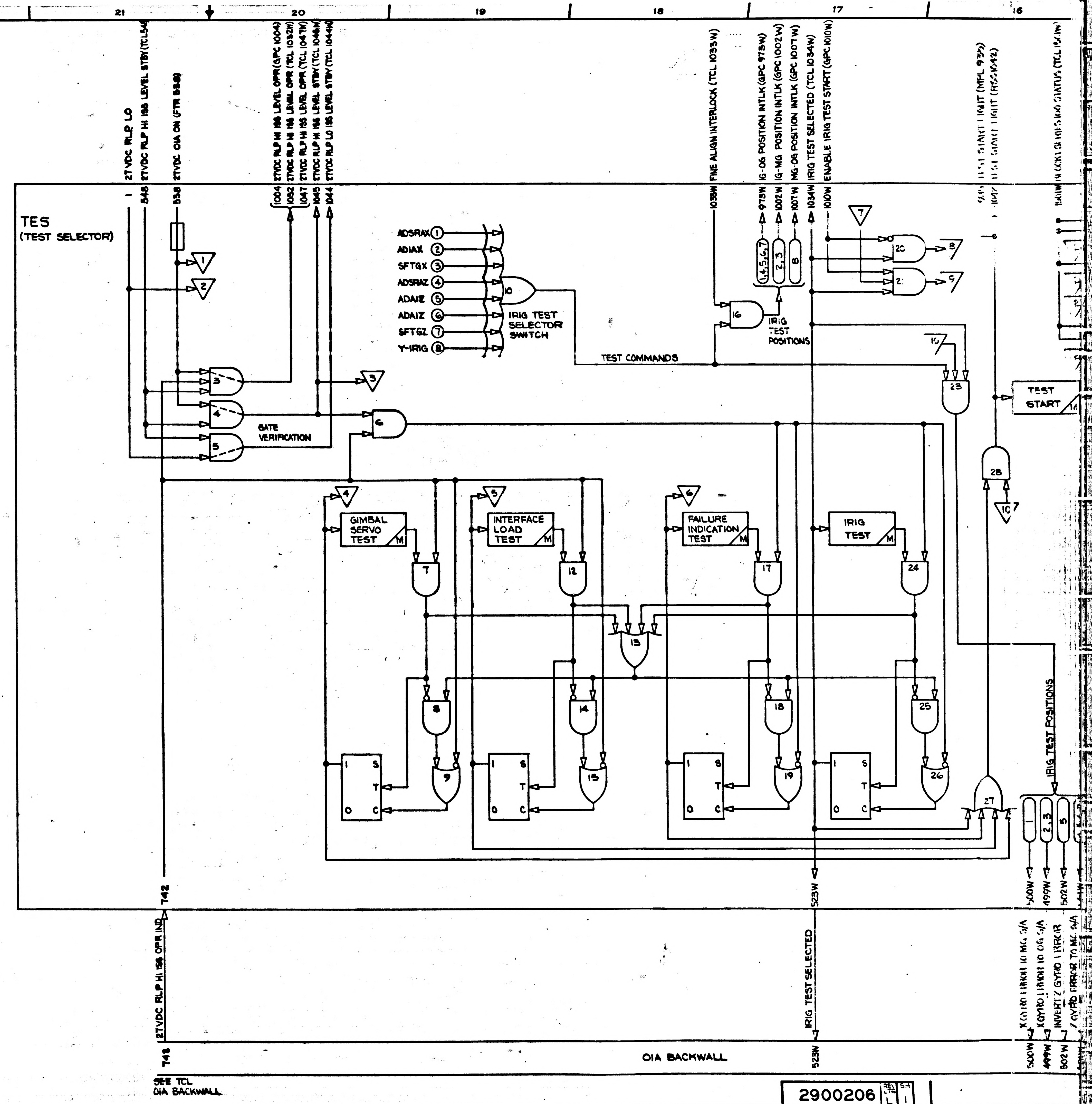
INDICATES "AND" GATE WITH A SWITCHED SIGNAL CAPABLE OF SIGNAL FLOW IN TWO DIRECTIONS

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   A. W - BLOCK I SERIES 100 ONLY
   B. T - BLOCK II ONLY
   C. L - LEM ONLY
   D. BLANK - ALL G&N CONFIGURATIONS
   E. TW, TL, OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

6. SIGNAL REFERENCE

1	27 VDC OIA ON
2	27 VDC RLP LO
3	27 VDC ISS LEVEL STANDBY
4	GIMBAL SERVO TEST SELECTED
5	INTERFACE LOAD TEST SELECTED
6	FAILURE INDICATION TEST SELECTED
7	TEST START, BUTTON DEPRESSED
8	CLEAR
9	SET
10	TEST STARTED
	IMU ERROR SIGNALS

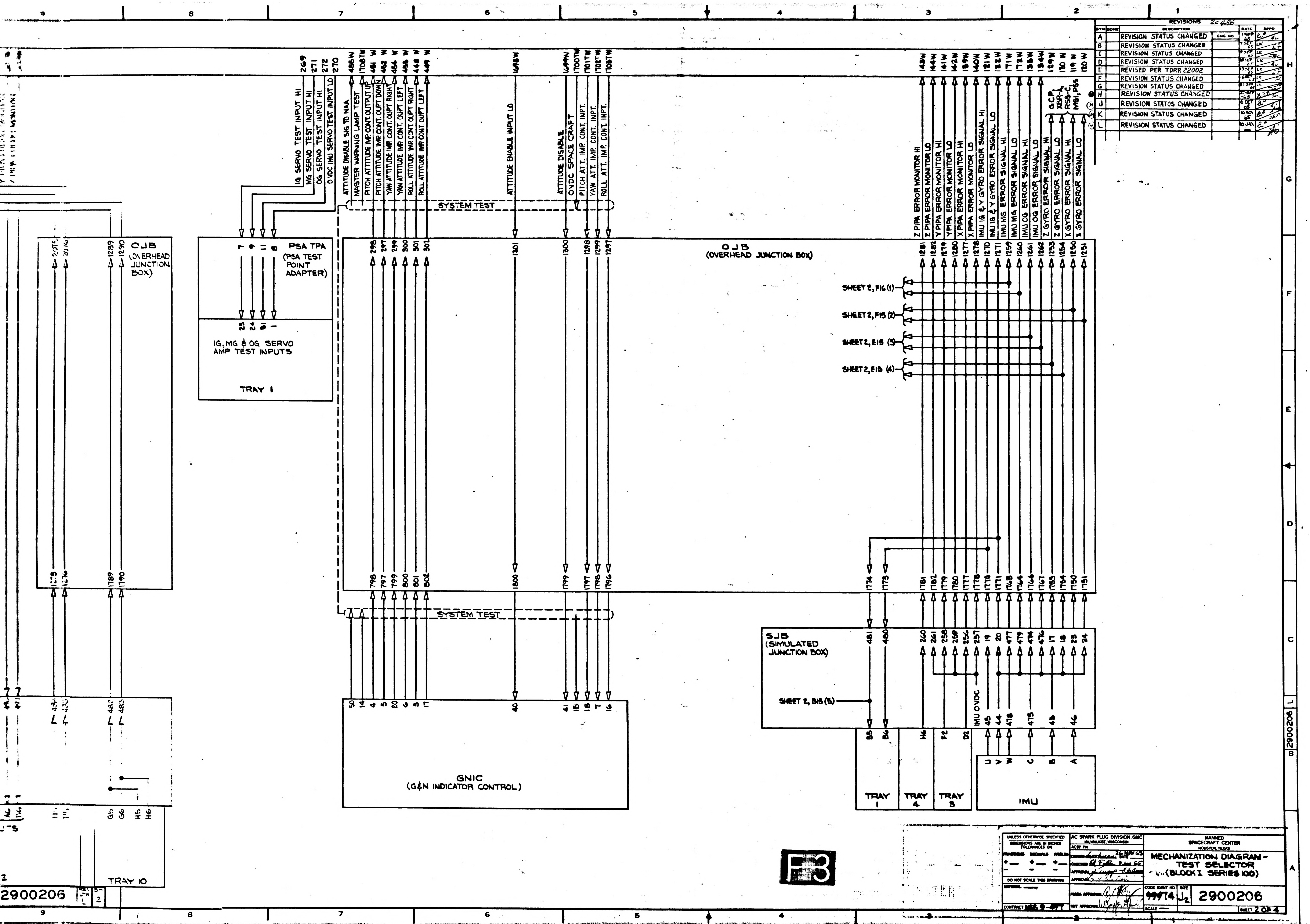
Ⓐ CONNECT TO THE OUTPUT OF GATE 1203



24
23
22
21
20
19
18
17
16
H
G
F
E
D
C
B
A
27 VDC RLP LO
27VDC RLP HI ISS LEVEL STBY (TCL548)
27VDC OIA ON (FTR 558)
27VDC RLP HI ISS LEVEL OPPR (GPC 1004)
27VDC RLP HI ISS LEVEL OPPR (TCL 1032W)
27VDC RLP HI ISS LEVEL OPPR (TCL 1047W)
27VDC RLP HI ISS LEVEL STBY (TCL 1045W)
27VDC RLP LO ISS LEVEL STBY (TCL 1044W)
1
548
558
1004
1032
1047
1045
1044
FINE ALIGN INTERLOCK (TCL 1033W)
1033W
IG-OG POSITION INTLK (GPC 973W)
IG-MG POSITION INTLK (GPC 1002W)
MG-OG POSITION INTLK (GPC 1007W)
IRIG TEST SELECTED (TCL 1034W)
ENABLE IRIG TEST START (GPC 1010W)
973W
1002W
1007W
1034W
1010W
TEST START LIGHT (MPL 935)
TEST START LIGHT (RSS1042)
BACKWIN CCKL SI RIES 100 STATUS (TCL 15(1W)
TES
(TEST SELECTOR)
ADSRAX ①
ADIAX ②
SFTGX ③
ADSRAZ ④
ADAIZ ⑤
ADAIZ ⑥
SFTGZ ⑦
Y-IRIG ⑧
IRIG TEST SELECTOR SWITCH
TEST COMMANDS
IRIG TEST POSITIONS
4,5,6,7
2,3
8
GATE VERIFICATION
TEST START
GIMBAL SERVO TEST
INTERFACE LOAD TEST
FAILURE INDICATION TEST
IRIG TEST
M
A
S
T
C
I
O
IRIG TEST POSITIONS
1
2,3
5
1
2
3
4
5
6
7
8
9
10
12
13
14
15
16
17
18
19
20
21
23
24
25
26
27
28
742
748
523W
27VDC RLP HI ISS OPR IND
IRIG TEST SELECTED
500W
499W
502W
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
OIA BACKWALL
SEE TCL
OIA BACKWALL

2900206 L 1

MIL FORM 1050 J3


9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
455W
1708TW
451 W
452 W
454 W
453 W
448 W
449 W
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUTPUT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
1698W
ATTITUDE ENABLE INPUT LO
1699W
1700TW
1701TW
1702TW
1703TW
ATTITUDE DISABLE
OVDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
SYSTEM TEST
143W
144W
141W
142W
139W
140W
121W
122W
171W
172W
133W
134W
129W
130W
119W
120W
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIGNAL HI
IMU IG & Y GYRO ERROR SIGNAL LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
Z GYRO ERROR SIGNAL HI
Z GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
X GYRO ERROR SIGNAL LO
GCP, XBR-A, RSS-C, MSI, PSS
2075
2076
1289
1290
OJB (OVERHEAD JUNCTION BOX)
1275
1276
1789
1790
481
483
482
483
G5
G6
H5
H6
TRAY 10
2900206
REV LTR L
SH 2
7
9
11
8
PSA TPA (PSA TEST POINT ADAPTER)
25
24
31
1
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
298
297
299
300
301
302
1301
1300
1298
1299
1297
OJB (OVERHEAD JUNCTION BOX)
798
797
799
800
801
802
1800
1799
1797
1798
1796
50
14
4
5
20
6
5
17
40
41
15
18
7
16
GNIC (G&N INDICATOR CONTROL)
1281
1282
1279
1280
1277
1278
1270
1271
1259
1260
1261
1262
1253
1254
1250
1251
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (3)
SHEET 2, E15 (4)
1774
1773
1781
1782
1779
1780
1777
1778
1770
1771
1763
1764
1766
1767
1755
1754
1750
1751
SJB (SIMULATED JUNCTION BOX)
481
480
260
261
258
259
256
257
19
20
477
479
474
476
17
18
23
24
SHEET 2, B15 (5)
IMU OVDC
45
44
478
475
43
46
B5
B6
H6
F2
D2
U
V
W
C
B
A
TRAY 1
TRAY 4
TRAY 5
IMU

SYM	ZONE	REVISIONS 20486 DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		1 SEP 65	
B		REVISION STATUS CHANGED		7 SEP 65	LK
C		REVISION STATUS CHANGED		9 SEP 65	LK
D		REVISION STATUS CHANGED		10 SEP 65	LK
E		REVISED PER TDRR 22002		13 SEP 65	LK
F		REVISION STATUS CHANGED		16 SEP 65	LK
G		REVISION STATUS CHANGED		21 SEP 65	LK
H		REVISION STATUS CHANGED		27 SEP 65	
J		REVISION STATUS CHANGED		6 OCT 65	
K		REVISION STATUS CHANGED		10 NOV 65	
L		REVISION STATUS CHANGED		10 JAN	

3H

F3

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

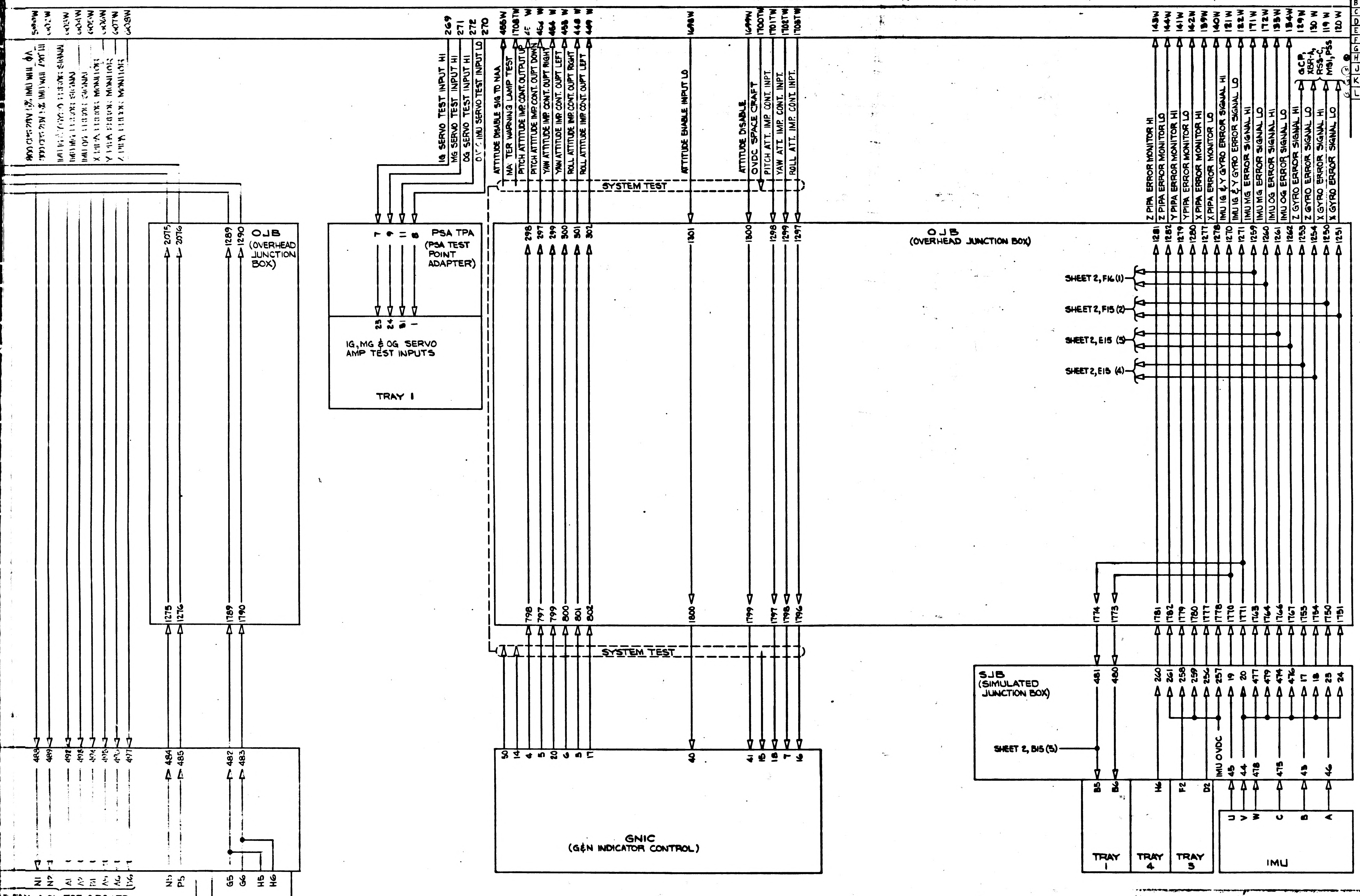
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 26 MAY 65
CHECKED Ed Foster 9 Jun 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
TEST SELECTOR
(BLOCK I SERIES 100)

CODE IDENT NO. 99974
SIZE J_2
2900206
SCALE —
SHEET 2 OF 4

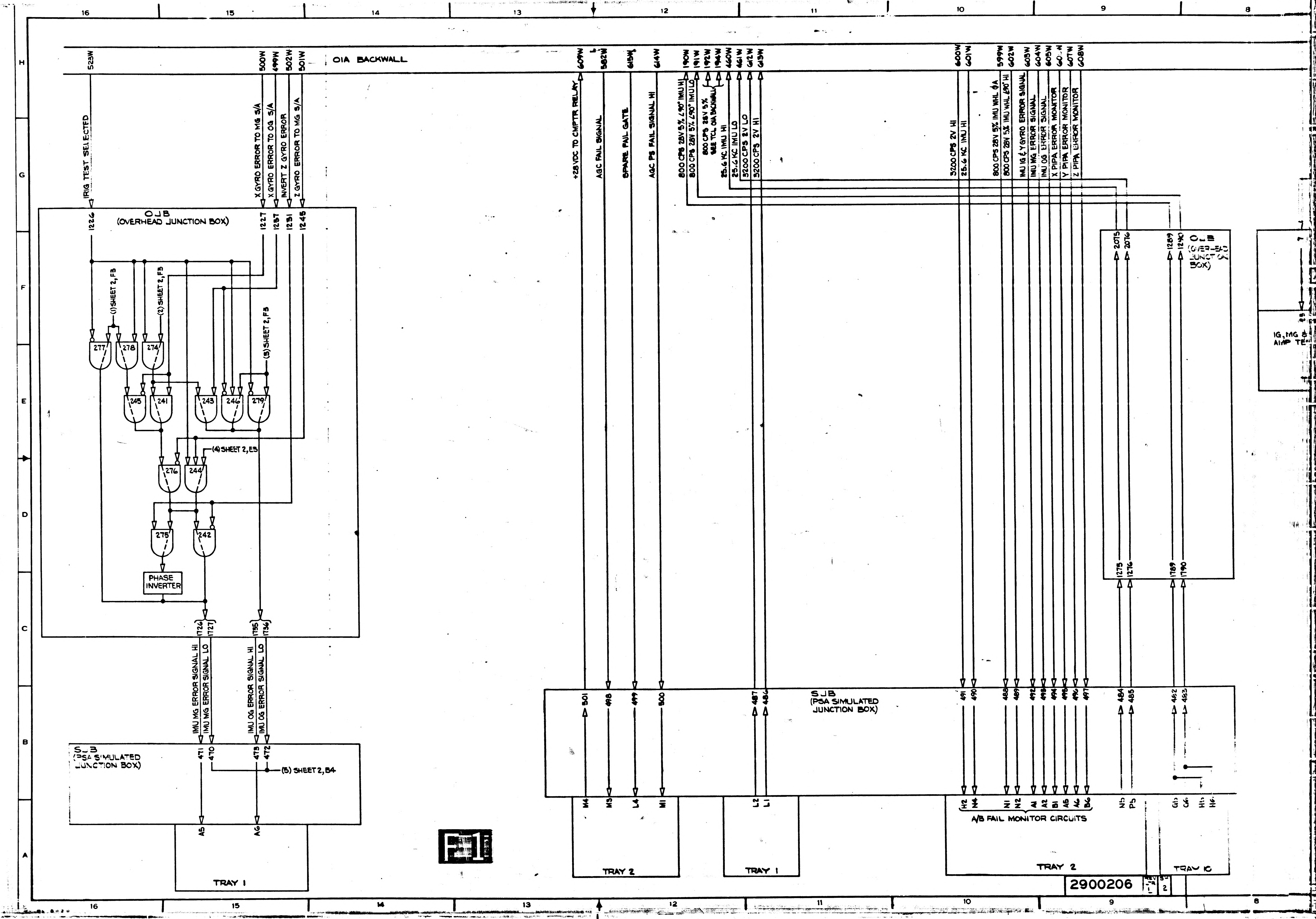
SYM	ZONE	DESCRIPTION		DATE	APPR
A		REVISION STATUS CHANGED	CHG 0		
B		REVISION STATUS CHANGED			
C		REVISION STATUS CHANGED			
D		REVISION STATUS CHANGED			
E		REVISED PER TDRR 22002		13 SEP 65	
F		REVISION STATUS CHANGED			
G		REVISION STATUS CHANGED			
H		REVISION STATUS CHANGED			
J		REVISION STATUS CHANGED			
K		REVISION STATUS CHANGED			
L		REVISION STATUS CHANGED			


9
8
7
6
5
4
3
2
1
800 CPS 28V 1% IMU WH ØA
800 CPS 28V 1% IMU WH 1ØT HI
IMU IG GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
OVDC IMU SERVO TEST INPUT LO
269
271
272
270
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUTPUT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
455W
1708TW
ATTITUDE ENABLE INPUT LO
ATTITUDE DISABLE
OVDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
1700TW
1701TW
1702TW
1703TW
SYSTEM TEST
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIGNAL HI
IMU IG & Y GYRO ERROR SIGNAL LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
Z GYRO ERROR SIGNAL HI
Z GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
X GYRO ERROR SIGNAL LO
143W
144W
141W
142W
139W
140W
121W
122W
171W
172W
135W
134W
129W
130W
119W
120W
G.C.P., XBR-A, RSS-C, MSI, PSS
OJB (OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1289
1290
PSA TPA (PSA TEST POINT ADAPTER)
23
24
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
298
297
299
300
301
302
1801
1800
1298
1299
1297
OJB (OVERHEAD JUNCTION BOX)
1281
1282
1279
1280
1277
1278
1270
1271
1259
1260
1261
1262
1253
1254
1250
1251
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (5)
SHEET 2, E15 (4)
798
797
799
800
801
802
1800
1799
1797
1798
1796
1774
1773
1781
1782
1779
1780
1777
1778
1770
1771
1763
1764
1761
1762
1755
1754
1750
1751
SYSTEM TEST
SJB (SIMULATED JUNCTION BOX)
481
480
260
261
258
259
256
257
19
20
477
479
474
476
17
18
23
24
SHEET 2, B15 (5)
IMU OVDC
45
44
47B
47S
43
46
B5
B6
H6
F2
D2
U
V
W
C
B
A
TRAY 1
TRAY 4
TRAY 3
IMU
488
489
492
493
494
495
496
497
484
485
482
483
50
14
4
5
20
6
3
17
40
41
15
18
7
16
GNIC (G&N INDICATOR CONTROL)
N1
N2
A1
A2
A3
A4
A5
A6
N5
P5
G5
G6
H5
H6
B FAIL MONITOR CIRCUITS
TRAY 2
TRAY 10

2900206 REV L SH 2

F2

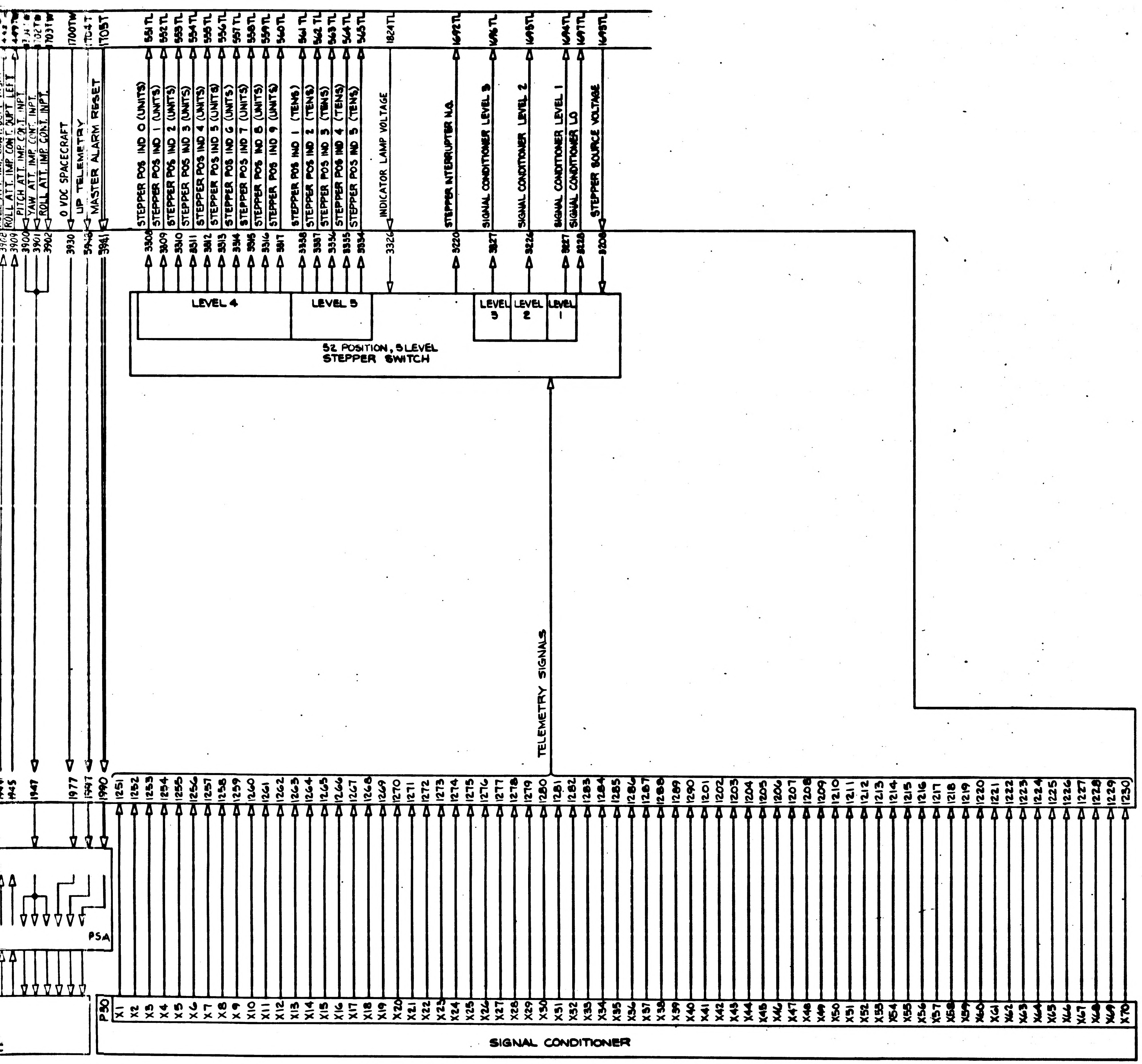
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± — DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	DRAWN DATE 26 MAY 65 CHECKED Ed Foster 2 Jun 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK I SERIES 100)
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 SIZE J2 2900206
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — SHEET 2 OF 4



OIA BACKWALL
523W
500W
499W
502W
501W
IRIG TEST SELECTED
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
OJB
(OVERHEAD JUNCTION BOX)
1226
1227
1257
1231
1245
(1) SHEET 2, F3
(2) SHEET 2, F3
(3) SHEET 2, F3
(4) SHEET 2, E5
277
278
274
245
241
243
246
279
276
244
275
242
PHASE INVERTER
1726
1727
1735
1736
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
SJB
(PSA SIMULATED JUNCTION BOX)
471
470
473
472
(5) SHEET 2, B4
A5
A6
TRAY 1
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5% REF TO OIA BACKWALL
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
600W
601W
3200 CPS 2V HI
25.6 KC IMU HI
599W
602W
603W
604W
605W
606W
607W
608W
800 CPS 28V 5% IMU WHL ∠0A
800 CPS 28V 5% IMU WHL ∠90 HI
IMU IG & Y GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
OJB
(OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1789
1790
SJB
(PSA SIMULATED JUNCTION BOX)
501
498
499
500
487
486
491
490
488
489
492
493
494
495
496
497
484
485
482
483
M4
M3
L4
M1
L2
L1
H2
H4
N1
N2
A1
A2
B1
A5
A6
B6
N3
P3
G3
G6
H3
H6
A/B FAIL MONITOR CIRCUITS
TRAY 2
TRAY 1
TRAY 2
TRAY 10
IG, MG &
AMP TE
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

2900206 2

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO.	DATE	APPROVED
	L	REPLACES REV(K) WITH CHANGE PER TDRR 24855		10 JAN 66	


ROLL ATT. IMP. CONT. OUPT LEFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
1700TW
1705T
3909
3900
3901
3902
3930
3941
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LAMP VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
561TL
562TL
563TL
564TL
565TL
1824TL
3326
3220
3227
3226
3228
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
TELEMETRY SIGNALS
1947
1977
1980
PSA
P30
SIGNAL CONDITIONER

F4

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± 3 PLACE DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.
DRAWN COOKMAN 3 JUN 65
CHECKED FOSTER 8 JUN 65
APPROVAL 1-7-66
CONTRACT NAS 9-497
A. C. METZGER
NASA APPROVAL
MIT APPROVAL

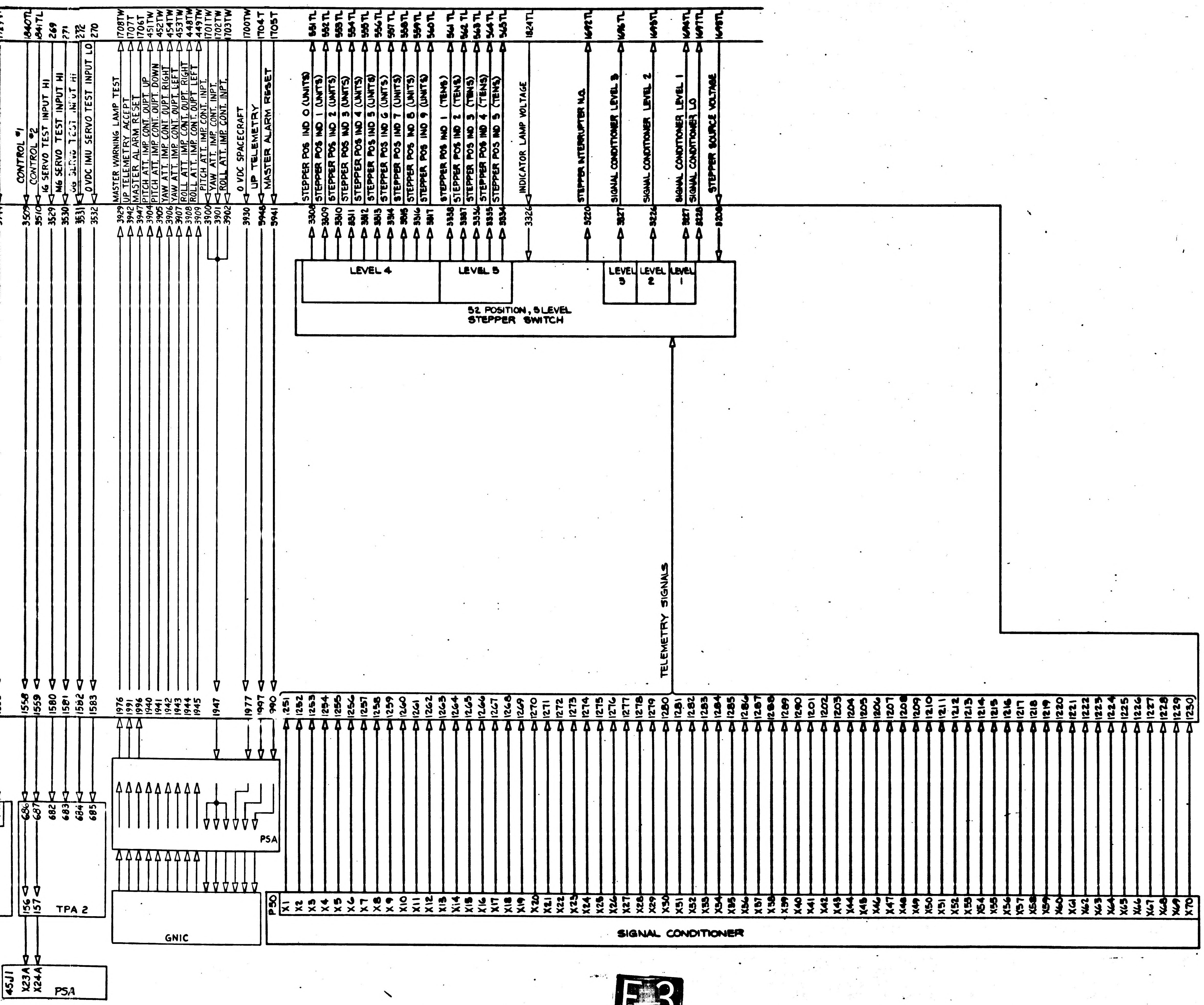
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
TEST SELECTOR
(BLOCK II)

SIZE J | CODE IDENT NO. 99974 | 2900206
SCALE | SHEET 2 OF 4

NEXT ASSY | USED ON
APPLICATION

2900206 | REV L | 3



CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0VDC IMU SERVO TEST INPUT LO
MASTER WARNING LAMP TEST
UP TELEMETRY ACCEPT
MASTER ALARM RESET
PITCH ATT. IMP. CONT. OUPT. UP
PITCH ATT. IMP. CONT. OUPT. DOWN
YAW ATT. IMP. CONT. OUPT. RIGHT
YAW ATT. IMP. CONT. OUPT. LEFT
ROLL ATT. IMP. CONT. OUPT. RIGHT
ROLL ATT. IMP. CONT. OUPT. LEFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LAMP VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
1840TL
1841TL
269
271
272
270
1708TW
1707T
1706T
451TW
452TW
454TW
453TW
448TW
449TW
1701TW
1702TW
1703TW
1700TW
1704T
1705T
1824TL
3509
3510
3529
3530
3531
3532
3929
3942
3947
3904
3905
3906
3907
3908
3909
3900
3901
3902
3930
3948
3941
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3338
3337
3336
3335
3334
3326
3220
3227
3226
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL
STEPPER SWITCH
TELEMETRY SIGNALS
1558
1559
1580
1581
1582
1583
1976
1991
1996
1940
1941
1942
1943
1944
1945
1947
1977
1997
990
686
687
682
683
684
685
156
157
TPA 2
PSA
GNIC
45J1
X23A
X24A
PSA
P30
SIGNAL CONDITIONER

F-3

2900206 REV LTR L SHEET 3

REVISIONS

ZONE	LTR	DESCRIPTION	CHG NO	DATE	
	L	REPLACES REV (K) WITH CHANGE PER TDRR 24855			

(M)

NEXT ASSY	USED ON
APPLICATION	

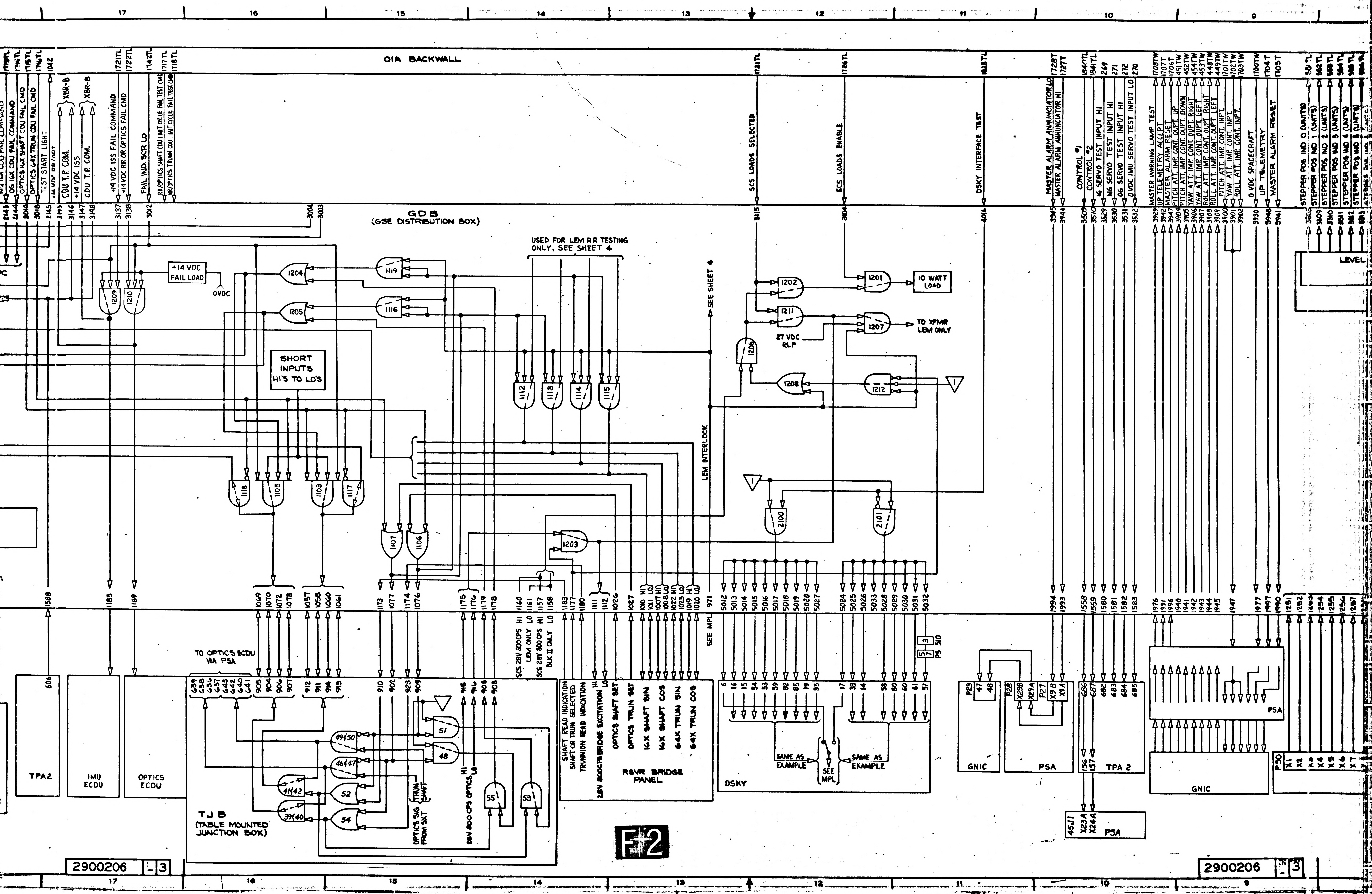
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± 3 PLACE DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

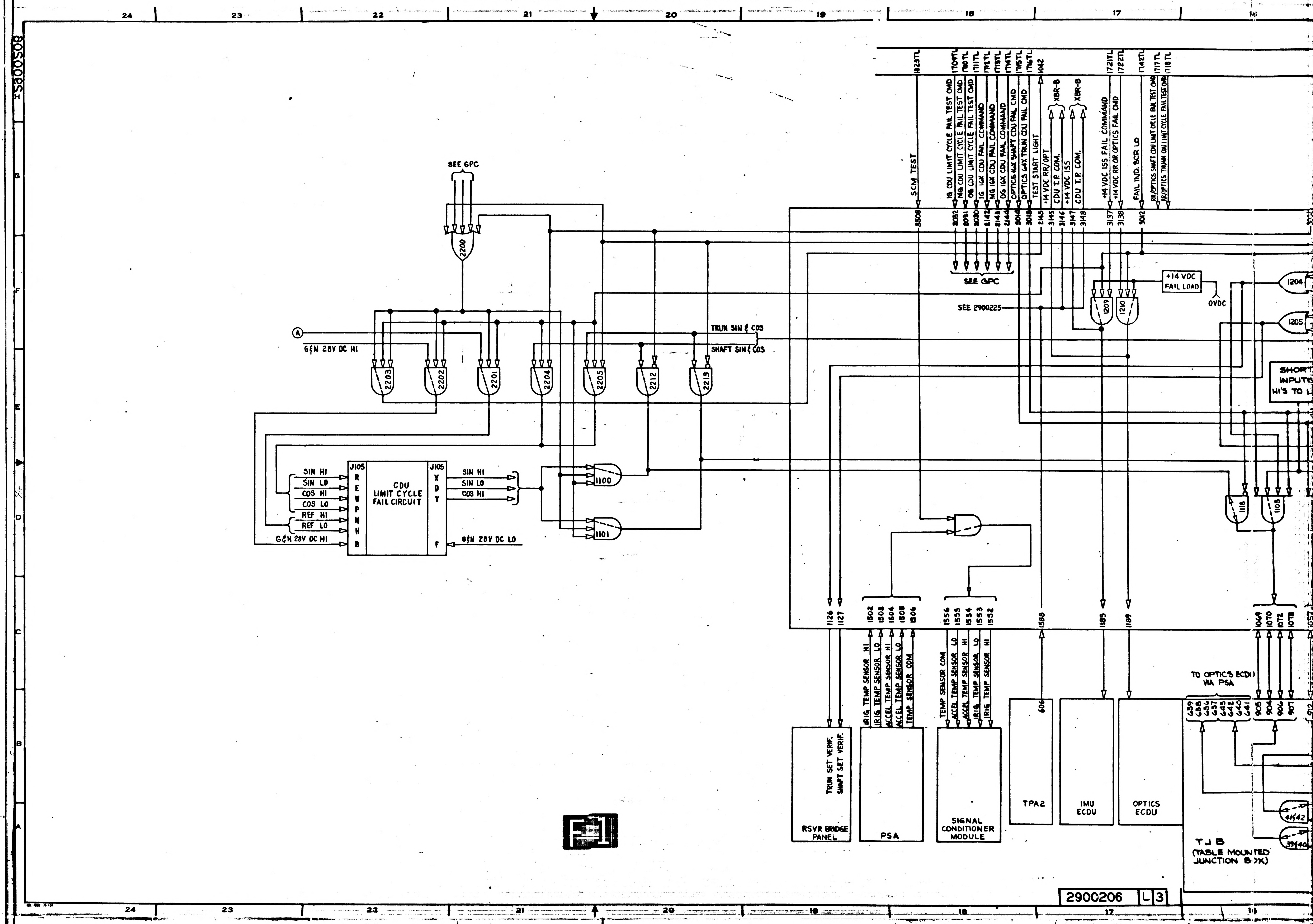
AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.
DRAWN COOKMAN DATE 65
CHECKED FOSTER 65
APPROVAL M. Watson
CONTRACT NAS 9-497
NASA APPROVAL A. L. METZGER
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK II)

SIZE J
CODE IDENT NO. 99974
2900206
SCALE


17
16
15
14
13
12
11
10
9
OIA BACKWALL
1716TL
1715TL
1716TL
1042
1721TL
1722TL
1742TL
1717TL
1718TL
OG 16X CDU FAIL COMMAND
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
TEST START LIGHT
+14 VDC RR/ADT
CDU T.P. COM.
+14 VDC ISS
CDU T.P. COM.
XBR-B
XBR-B
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
RR/OPTICS SHAFT CDU INIT CYCLE FAIL TEST CMD
RR/OPTICS TRUNN CDU INIT CYCLE FAIL TEST CMD
2143
2144
3014
3018
2145
3145
3146
3147
3148
3137
3138
3012
3004
3003
GDB
(GSE DISTRIBUTION BOX)
+14 VDC FAIL LOAD
OVDC
1209
1210
1204
1205
1119
1116
USED FOR LEM RR TESTING ONLY, SEE SHEET 4
SHORT INPUTS HI'S TO LO'S
1112
1113
1114
1115
1118
1105
1103
1117
1107
1106
1203
SEE SHEET 4
LEM INTERLOCK
1731TL
1726TL
1825TL
SCS LOADS SELECTED
SCS LOADS ENABLE
DSKY INTERFACE TEST
3115
3104
4016
1202
1201
10 WATT LOAD
1211
1207
TO XFMR LEM ONLY
27 VDC RLP
1206
1208
1212
1
1
2100
2101
1728T
1727T
1840TL
1841TL
269
271
272
270
MASTER ALARM ANNUNCIATOR LO
MASTER ALARM ANNUNCIATOR HI
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
3945
3944
3509
3510
3529
3530
3531
3532
1708TW
1707T
1706T
451TW
452TW
454TW
453TW
448TW
449TW
1701TW
1702TW
1703TW
1700TW
1704T
1705T
MASTER WARNING LAMP TEST
UP TELEMETRY ACCEPT
MASTER ALARM RESET
PITCH ATT. IMP. CONT. OUPT. UP
PITCH ATT. IMP. CONT. OUPT. DOWN
YAW ATT. IMP. CONT. OUPT. RIGHT
YAW ATT. IMP. CONT. OUPT. LEFT
ROLL ATT. IMP. CONT. OUPT. RIGHT
ROLL ATT. IMP. CONT. OUPT LEFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
3929
3942
3947
3904
3905
3906
3907
3908
3909
3900
3901
3902
3930
3948
3941
552TL
553TL
554TL
555TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
3309
3310
3311
3312
3313
LEVEL
1588
1185
1189
1069
1070
1072
1073
1057
1058
1060
1061
1173
1077
1174
1076
1175
1176
1179
1178
1160
1161
1157
1158
SCS 28V 800CPS HI
LEM ONLY LO
SCS 28V 800 CPS HI
BLK II ONLY LO
1183
1177
1180
1111
1112
1026
1027
1010 HI
1011 LO
1007 HI
1008 LO
1022 HI
1023 LO
1019 HI
1020 LO
971
SEE MPL
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
5024
5025
5026
5033
5028
5029
5030
5031
5032
5 7 3
P5 510
1994
1993
1558
1559
1580
1581
1582
1583
1976
1991
1996
1940
1941
1942
1943
1944
1945
1947
1977
1997
1990
1251
1252
1253
1254
1255
1256
1257
606
TPA2
IMU ECDU
OPTICS ECDU
TO OPTICS ECDU VIA PSA
639
638
636
637
643
642
640
641
905
904
906
907
912
911
914
913
910
902
923
909
915
916
908
903
49&50
46&47
41&42
39&40
51
48
52
54
55
53
OPTICS SIG FROM SXT
TRUN
SHAFT
28V 800 CPS OPTICS
HI
LO
TJB
(TABLE MOUNTED JUNCTION BOX)
SHAFT READ INDICATION
SHAFT OR TRUN SELECTED
TRUNNION READ INDICATION
28V 800CPS BRIDGE EXCITATION
HI
LO
OPTICS SHAFT SET
OPTICS TRUN SET
16X SHAFT SIN
16X SHAFT COS
64X TRUN SIN
64X TRUN COS
RSVR BRIDGE PANEL
6
16
15
54
53
59
82
85
19
55
17
33
14
58
80
60
61
57
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
DSKY
P23
47
48
GNIC
P28
X29B
X29A
P27
X9B
X9A
PSA
686
687
682
683
684
685
156
157
TPA 2
45J1
X23A
X24A
PSA
PSA
GNIC
P30
X1
X2
X3
X4
X5
X6
X7
F2
2900206
-
3
2900206
-
3
17
16
15
14
13
12
11
10
9


5300508
SEE GPC
2200
A
GEN 28V DC HI
2203
2202
2201
2204
2205
2212
2213
TRUN SIN & COS
SHAFT SIN & COS
J105
SIN HI
SIN LO
COS HI
COS LO
REF HI
REF LO
GEN 28V DC HI
R
E
W
P
N
H
B
CDU LIMIT CYCLE FAIL CIRCUIT
X
D
Y
F
SIN HI
SIN LO
COS HI
GEN 28V DC LO
1100
1101
1823TL
3508
SCM TEST
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1042
IG CDU LIMIT CYCLE FAIL TEST CMD
MG CDU LIMIT CYCLE FAIL TEST CMD
OG CDU LIMIT CYCLE FAIL TEST CMD
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
TEST START LIGHT
+14 VDC RR/OPT
CDU T.P. COM.
+14 VDC ISS
CDU T.P. COM.
XBR-B
XBR-B
2032
2031
2030
2142
2143
2144
3014
3018
2145
3145
3146
3147
3148
SEE GPC
1721TL
1722TL
1742TL
1717TL
1718TL
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
RR/OPTICS SHAFT CDU LIMIT CYCLE FAIL TEST CMD
RR/OPTICS TRUNN CDU LIMIT CYCLE FAIL TEST CMD
3137
3138
3012
SEE 2900225
1209
1210
+14 VDC FAIL LOAD
OVDC
1204
1205
SHORT
INPUTS
HI'S TO L
1118
1105
1126
1127
1502
1503
1504
1508
1506
1556
1555
1554
1553
1552
1588
1185
1189
1069
1070
1072
1073
1057
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
TRUN SET VERIF.
SHAFT SET VERIF.
RSVR BRIDGE PANEL
PSA
SIGNAL CONDITIONER MODULE
606
TPA2
IMU ECDU
OPTICS ECDU
TO OPTICS ECDU VIA PSA
639
638
636
637
643
642
640
641
905
904
906
907
912
41&42
39&40
TJB (TABLE MOUNTED JUNCTION BOX)
2900206
L
3
24
23
22
21
20
19
18
17
16
H
G
F
E
D
C
B
A

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO.	DATE	APPROVED
	L	REPLACES REV (K) WITH CHANGE PER TDRR 24855		10 JAN 66	BP

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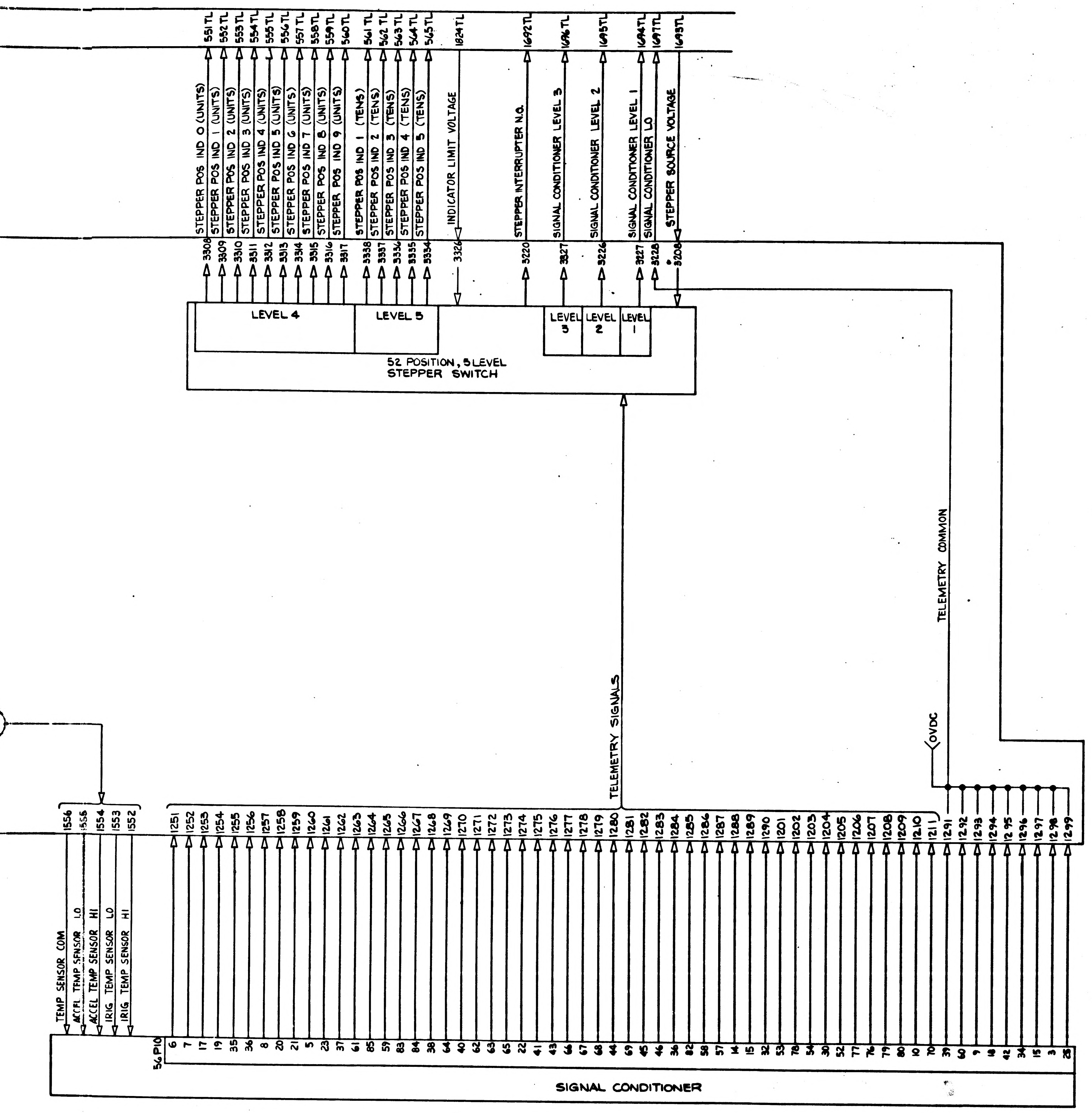

551TL 552TL 553TL 554TL 555TL 556TL 557TL 558TL 559TL 560TL 561TL 562TL 563TL 564TL 565TL 1824TL 1692TL 1696TL 1695TL 1694TL 1697TL 1693TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LIMIT VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3308 3309 3310 3311 3312 3313 3314 3315 3316 3317 3338 3337 3336 3335 3334 3326 3220 3327 3226 3227 3228 3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
TELEMETRY SIGNALS
TELEMETRY COMMON
0VDC
1556 1555 1554 1553 1552
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1291 1292 1293 1294 1295 1296 1297 1298 1299
56P10
6 7 17 19 35 36 8 20 21 5 23 37 61 85 59 83 84 38 64 40 62 63 65 22 41 43 66 67 68 44 69 45 46 36 82 58 57 14 15 32 53 78 54 30 52 77 76 79 80 10 70 39 60 9 18 42 34 15 3 25
SIGNAL CONDITIONER

F4

NEXT ASSY	USED ON
APPLICATION	

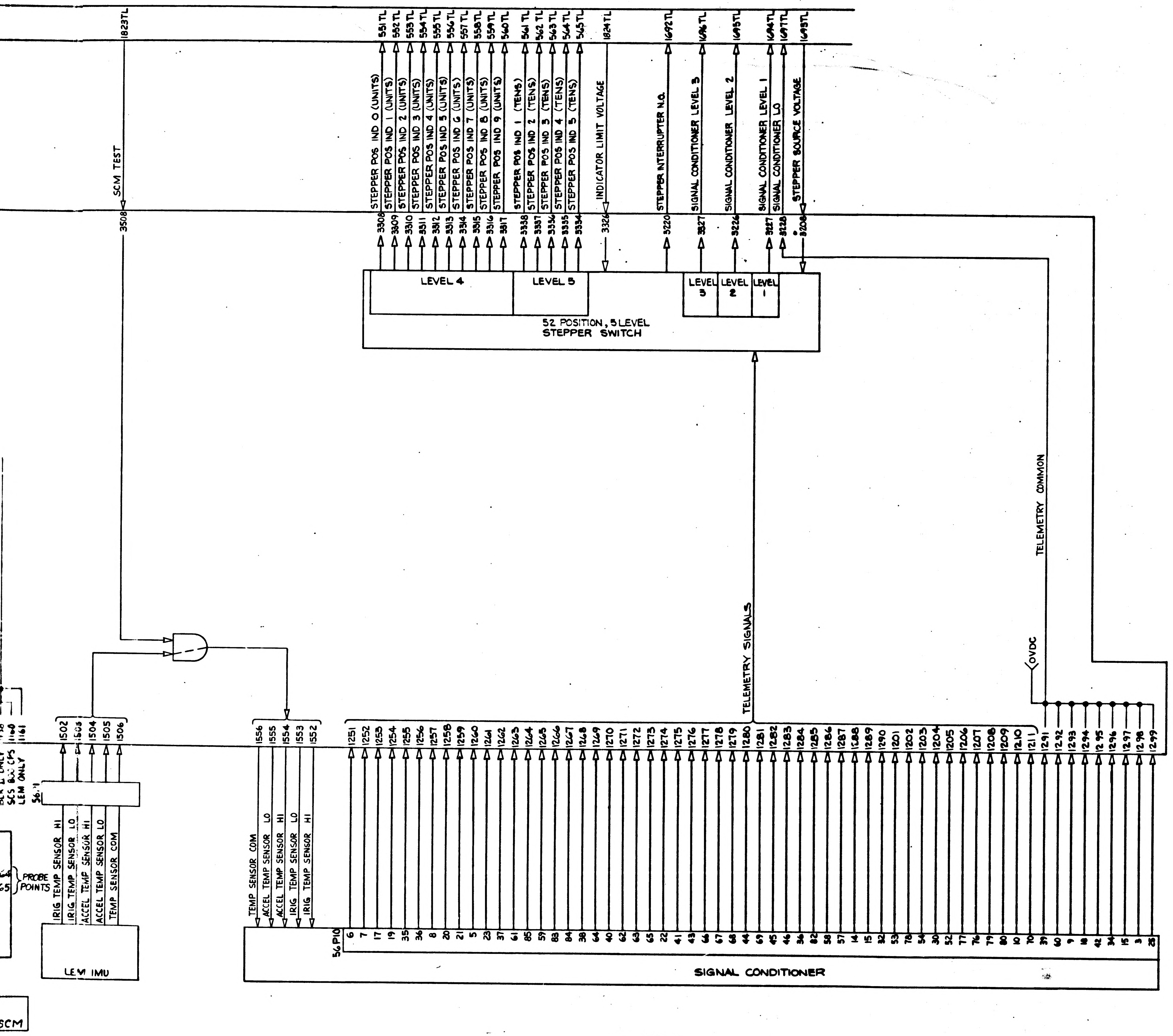
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.
DRAWN COOKMAN DATE 7 JUN 65
CHECKED ED FOSTER 9 JUN 65
APPROVAL J.M. Watson 2-7-66
J.M. WATSON
CONTRACT NAS 9-497
NASA APPROVAL L.C. METZGER
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM - TEST SELECTOR (LEM)

SIZE J5 | CODE IDENT NO. 99974 | 2900206
SCALE — | SHEET 4 OF 4


1823TL
SCM TEST
3508
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
561TL
562TL
563TL
564TL
565TL
1824TL
1692TL
1696TL
1695TL
1694TL
1697TL
1693TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LIMIT VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3338
3337
3336
3335
3334
3326
3220
3327
3226
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL
STEPPER SWITCH
TELEMETRY COMMON
TELEMETRY SIGNALS
0VDC
SCS 800 CPS
LEM ONLY
1160
1161
1502
1503
1504
1505
1506
56J1
64
65
PROBE POINTS
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
LEM IMU
SCM
1556
1555
1554
1553
1552
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
1251
1252
1253
1254
1255
1256
1257
1258
1259
1260
1261
1262
1263
1264
1265
1266
1267
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1210
1211
1291
1292
1293
1294
1295
1296
1297
1298
1299
56P10
6
7
17
19
35
36
8
20
21
5
23
37
61
85
59
83
84
38
64
40
62
63
65
22
41
43
66
67
68
44
69
45
46
36
82
58
57
14
15
32
53
78
54
30
52
77
76
79
80
10
70
39
60
9
18
42
34
15
3
25
SIGNAL CONDITIONER

REVISIONS

ZONE	LTR	DESCRIPTION	DWG NO	DATE
	L	REPLACES REV (K) WITH CHANGE PER TDRR 24855		

F3

REV LTR	SHEET
2900206 L	4

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
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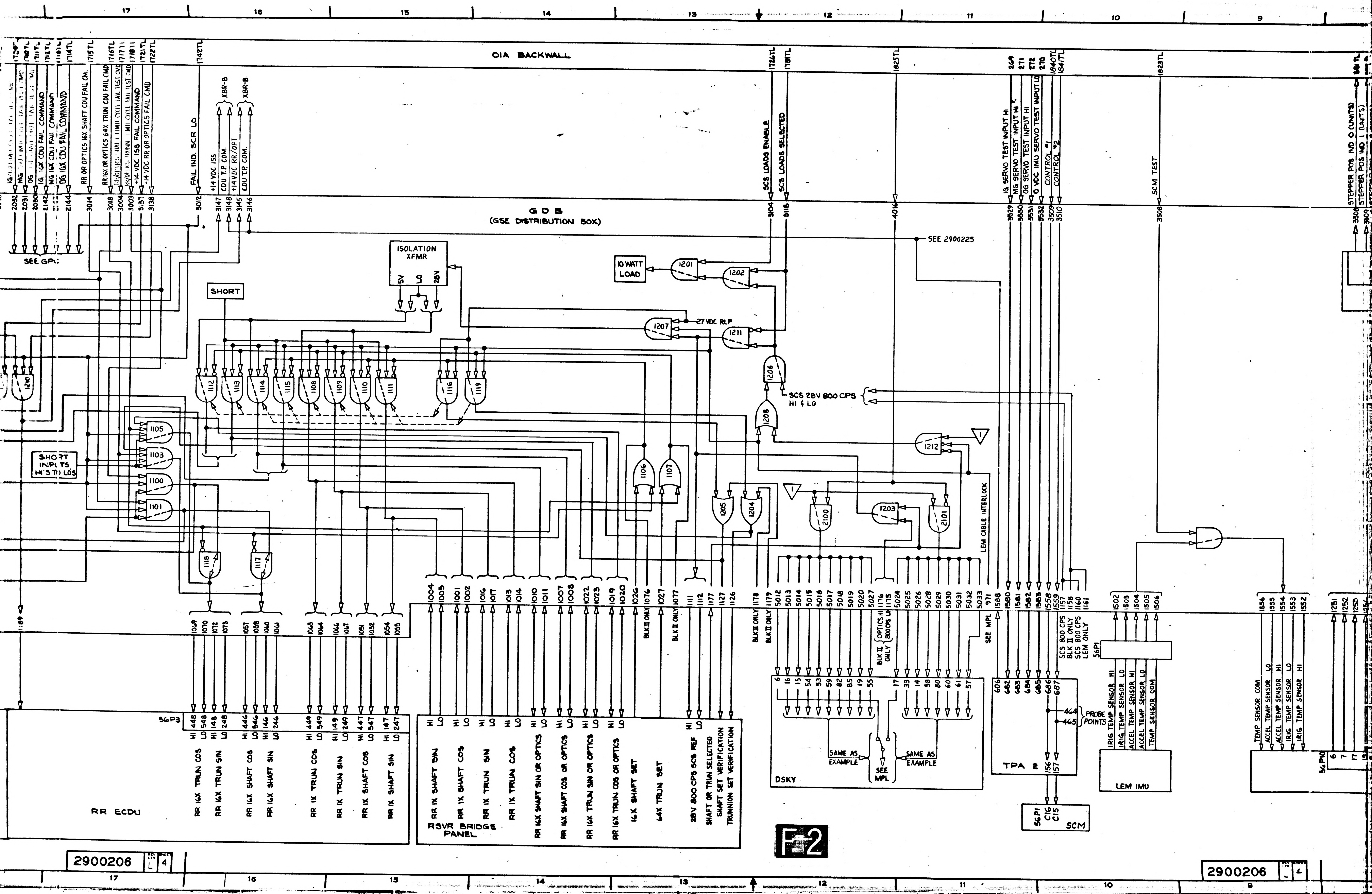
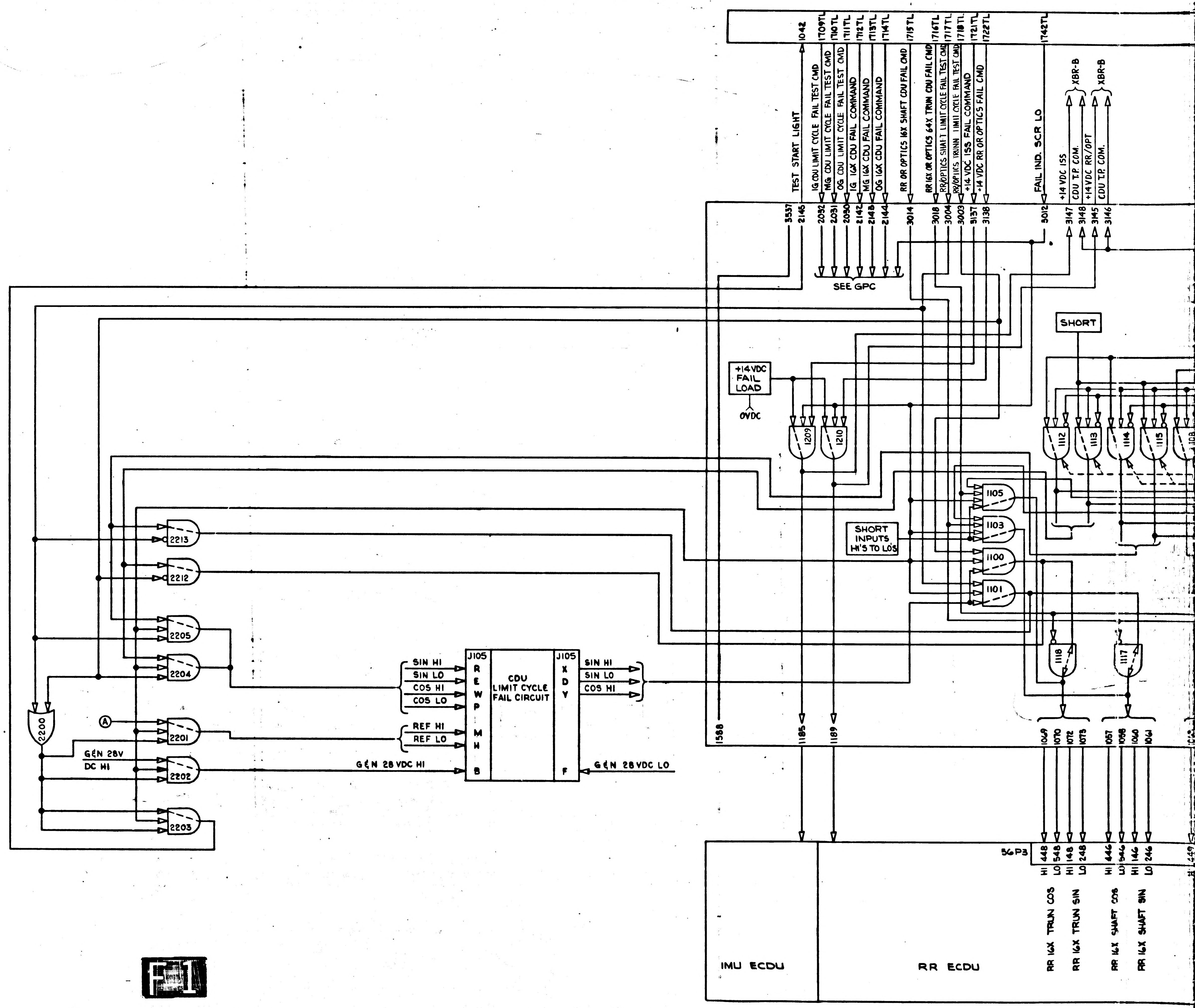
DRAWN COOKMAN DATE 7 JUN 65
CHECKED ED FOSTER 9 JUN 65
APPROVAL J.M. WATSON 1-7-66
CONTRACT NAS 9-497
NASA APPROVAL E. C. METZGER
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM -
TEST SELECTOR
(LEM)

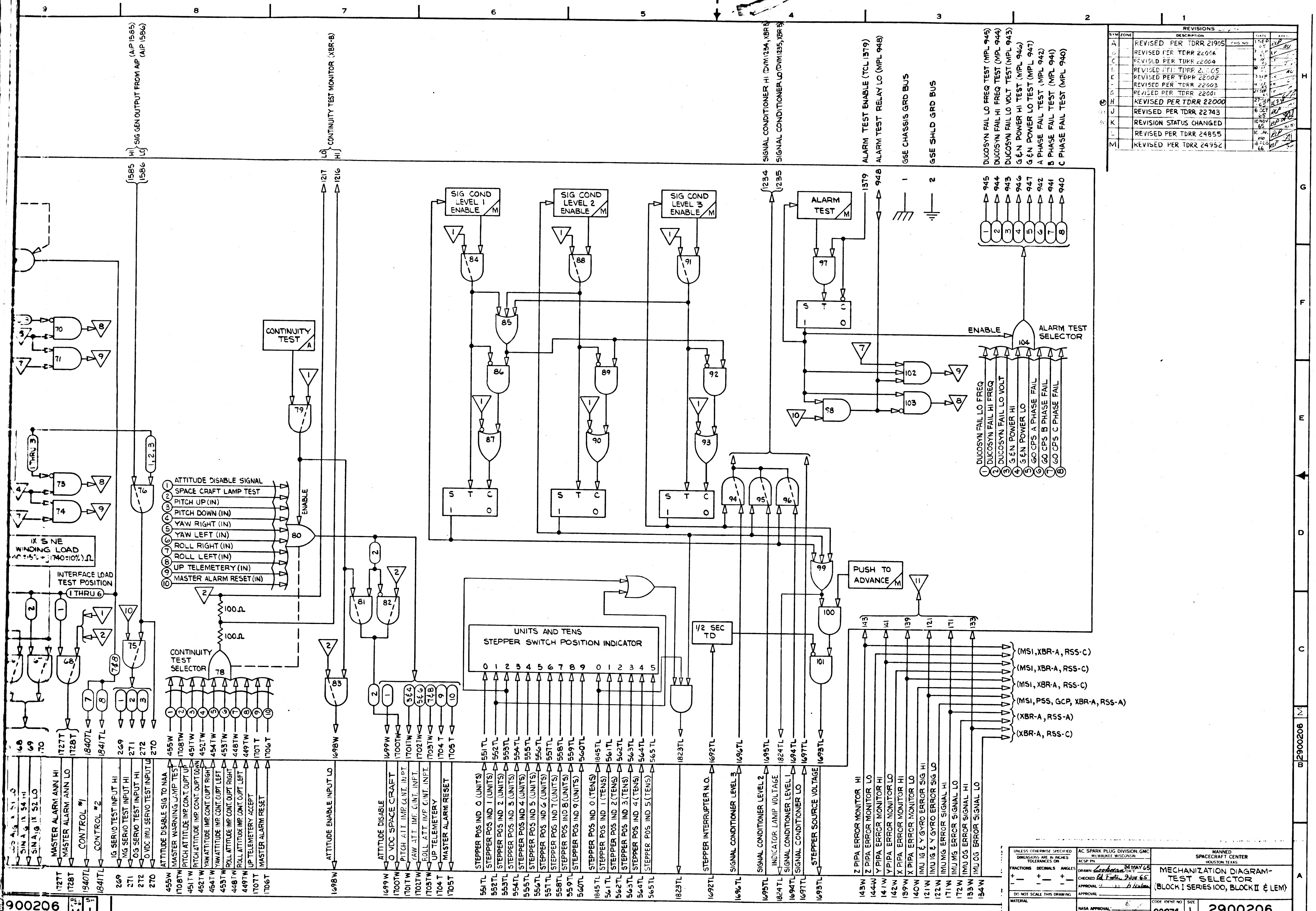
SIZE J3 CODE IDENT NO. 99974 2900206
SCALE — SHEET


17
16
15
14
13
12
11
10
9
OIA BACKWALL
1710TL
1711TL
1712TL
1714TL
1715TL
1716TL
1717TL
1718TL
1721TL
1722TL
1742TL
MG
OG
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
RR OR OPTICS 16X SHAFT CDU FAIL CM.
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
+14 VDC ISS
CDU T.P. COM.
+14 VDC RR/OPT
CDU T.P. COM.
XBR-B
XBR-B
2032
2031
2030
2142
2144
3014
3018
3004
3003
3137
3138
3012
3147
3148
3145
3146
SEE GPC
G D B
(GSE DISTRIBUTION BOX)
SEE 2900225
1826TL
1781TL
1825TL
SCS LOADS ENABLE
SCS LOADS SELECTED
3104
3115
4016
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
CONTROL #1
CONTROL #2
1840TL
1841TL
3529
3530
3531
3532
3509
3510
1823TL
SCM TEST
3508
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
3308
3309
ISOLATION XFMR
5V
LO
28V
SHORT
10 WATT LOAD
1201
1202
1207
27 VDC RLP
1211
1206
1208
SCS 28V 800 CPS HI & LO
1212
1120
1112
1113
1114
1115
1108
1109
1110
1111
1116
1119
1105
1103
1100
1101
SHORT INPUTS HI'S TO LOS
1106
1107
1205
1204
2100
1203
2101
1118
1117
LEM CABLE INTERLOCK
1189
1069
1070
1072
1073
1057
1058
1060
1061
1063
1064
1066
1067
1051
1052
1054
1055
1004
1005
1001
1002
1016
1017
1013
1014
1010
1011
1007
1008
1022
1025
1019
1020
1026
1076
1027
1077
1111
1112
1177
1127
1126
1178
1179
BLK II ONLY
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
1176
1175
OPTICS HI 800CPS LO
BLK II ONLY
5024
5025
5026
5028
5029
5030
5031
5032
5033
971
SEE MPL
1588
1580
1581
1582
1583
1558
1559
1157
1158
1160
1161
SCS 800 CPS
BLK II ONLY
SCS 800 CPS
LEM ONLY
56P1
1502
1503
1504
1505
1506
1556
1555
1554
1553
1552
1251
1252
1253
56P3
448 548
148 248
446 546
146 246
449 549
149 249
447 547
147 247
HI LO
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
RR 1X TRUN COS
RR 1X TRUN SIN
RR 1X SHAFT COS
RR 1X SHAFT SIN
RR ECDU
RR 1X SHAFT SIN
RR 1X SHAFT COS
RR 1X TRUN SIN
RR 1X TRUN COS
RR 16X SHAFT SIN OR OPTICS
RR 16X SHAFT COS OR OPTICS
RR 16X TRUN SIN OR OPTICS
RR 16X TRUN COS OR OPTICS
16X SHAFT SET
64X TRUN SET
28V 800 CPS SCS REF
SHAFT OR TRUN SELECTED
SHAFT SET VERIFICATION
TRUNNION SET VERIFICATION
RSVR BRIDGE PANEL
6
16
15
54
53
59
82
85
19
55
17
33
14
58
80
60
61
57
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
DSKY
606
682
683
684
685
686
687
464
465
PROBE POINTS
156
157
TPA 2
56P1
C16
C15
SCM
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
LEM IMU
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
56P10
6
7
17
F-2
2900206
L
4
2900206
L
4


1042
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1717TL
1718TL
1721TL
1722TL
1742TL
TEST START LIGHT
IG CDU LIMIT CYCLE FAIL TEST CMD
MG CDU LIMIT CYCLE FAIL TEST CMD
OG CDU LIMIT CYCLE FAIL TEST CMD
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
RR OR OPTICS 16X SHAFT CDU FAIL CMD
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
RR/OPTICS SHAFT LIMIT CYCLE FAIL TEST CMD
RR/OPTICS TRUNN LIMIT CYCLE FAIL TEST CMD
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
+14 VDC ISS
CDU T.P. COM.
+14 VDC RR/OPT
CDU T.P. COM.
XBR-B
XBR-B
3537
2145
2032
2031
2030
2142
2143
2144
3014
3018
3004
3003
3137
3138
3012
3147
3148
3145
3146
SEE GPC
SHORT
+14 VDC FAIL LOAD
0VDC
1209
1210
1112
1113
1114
1115
1105
1103
1100
1101
SHORT INPUTS HI'S TO LO'S
1118
1117
2213
2212
2205
2204
2200
Ⓐ
2201
2202
2203
GEN 28V DC HI
SIN HI
SIN LO
COS HI
COS LO
REF HI
REF LO
GEN 28 VDC HI
J105
R
E
W
P
M
H
B
CDU LIMIT CYCLE FAIL CIRCUIT
J105
X
D
Y
F
SIN HI
SIN LO
COS HI
GEN 28 VDC LO
1588
1185
1189
1069
1070
1072
1073
1057
1058
1060
1061
56P3
HI 448
LO 548
HI 148
LO 248
HI 446
LO 546
HI 146
LO 246
IMU ECDU
RR ECDU
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
24
23
22
21
20
19
18
17
16
H
G
F
E
D

F-1

2900206 L 4



SIG GEN OUTPUT FROM AIP (AIP 1585) HI
(AIP 1586) LO
CONTINUITY TEST MONITOR (XBR-B)
SIGNAL CONDITIONER HI (DVM 1234, XBR B)
SIGNAL CONDITIONER LO (DVM 1235, XBR B)
ALARM TEST ENABLE (TCL 1379)
ALARM TEST RELAY LO (MPL 948)
GSE CHASSIS GRD BUS
GSE SHLD GRD BUS
DUCOSYN FAIL LO FREQ TEST (MPL 945)
DUCOSYN FAIL HI FREQ TEST (MPL 944)
DUCOSYN FAIL LO VOLT TEST (MPL 943)
G&N POWER HI TEST (MPL 946)
G&N POWER LO TEST (MPL 947)
A PHASE FAIL TEST (MPL 942)
B PHASE FAIL TEST (MPL 941)
C PHASE FAIL TEST (MPL 940)
SIG COND LEVEL 1 ENABLE
SIG COND LEVEL 2 ENABLE
SIG COND LEVEL 3 ENABLE
ALARM TEST
CONTINUITY TEST
ENABLE
ALARM TEST SELECTOR
DUCOSYN FAIL LO FREQ
DUCOSYN FAIL HI FREQ
DUCOSYN FAIL LO VOLT
G&N POWER HI
G&N POWER LO
GO CPS A PHASE FAIL
GO CPS B PHASE FAIL
GO CPS C PHASE FAIL
ATTITUDE DISABLE SIGNAL
SPACE CRAFT LAMP TEST
PITCH UP (IN)
PITCH DOWN (IN)
YAW RIGHT (IN)
YAW LEFT (IN)
ROLL RIGHT (IN)
ROLL LEFT (IN)
UP TELEMETERY (IN)
MASTER ALARM RESET (IN)
1X SINE WINDING LOAD
INTERFACE LOAD TEST POSITION
1 THRU 6
100Ω
100Ω
CONTINUITY TEST SELECTOR
PUSH TO ADVANCE
1/2 SEC TD
UNITS AND TENS STEPPER SWITCH POSITION INDICATOR
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, PSS, GCP, XBR-A, RSS-A)
(XBR-A, RSS-A)
(XBR-A, RSS-C)
MASTER ALARM ANN HI
MASTER ALARM ANN LO
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUPT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
UP TELEMETERY ACCEPT
MASTER ALARM RESET
ATTITUDE ENABLE INPUT LO
ATTITUDE DISABLE
0 VDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
UP TELEMETERY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 0 (TENS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
INDICATOR LAMP VOLTAGE
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIG HI
IMU IG & Y GYRO ERROR SIG LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
1727T 1728T 1840TL 1841TL 269 271 272 270 455W 1708TW 451TW 452TW 454TW 453TW 448TW 449TW 1707T 1706T 1698W 1699W 1700TW 1701TW 1702TW 1703TW 1704T 1705T
551TL 552TL 553TL 554TL 555TL 556TL 557TL 558TL 559TL 560TL 1845TL 561TL 562TL 563TL 564TL 565TL 1823TL 1692TL 1696TL 1695TL 1824TL 1694TL 1697TL 1693TL
143W 144W 141W 142W 139W 140W 121W 122W 171W 172W 133W 134W

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	RLP AU
B		REVISED PER TDRR 22006		7 SEP 65	LY
C		REVISED PER TDRR 22004		9 SEP 65	LY
D		REVISED PER TDRR 22005		10 SEP 65	AU
E		REVISED PER TDRR 22002		3 SEP 65	LK
F		REVISED PER TDRR 22003		16 SEP 65	LK
G		REVISED PER TDRR 22001		21 SEP 65	LY
H		REVISED PER TDRR 22000		27-SEP-65	
J		REVISED PER TDRR 22743		6 OCT 65	RLP
K		REVISION STATUS CHANGED		10 NOV 65	RLP
L		REVISED PER TDRR 24855		10 JAN 66	RLP
M		REVISED PER TDRR 24952		8 FEB 66	RLP

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Cookman DATE 24 MAY 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

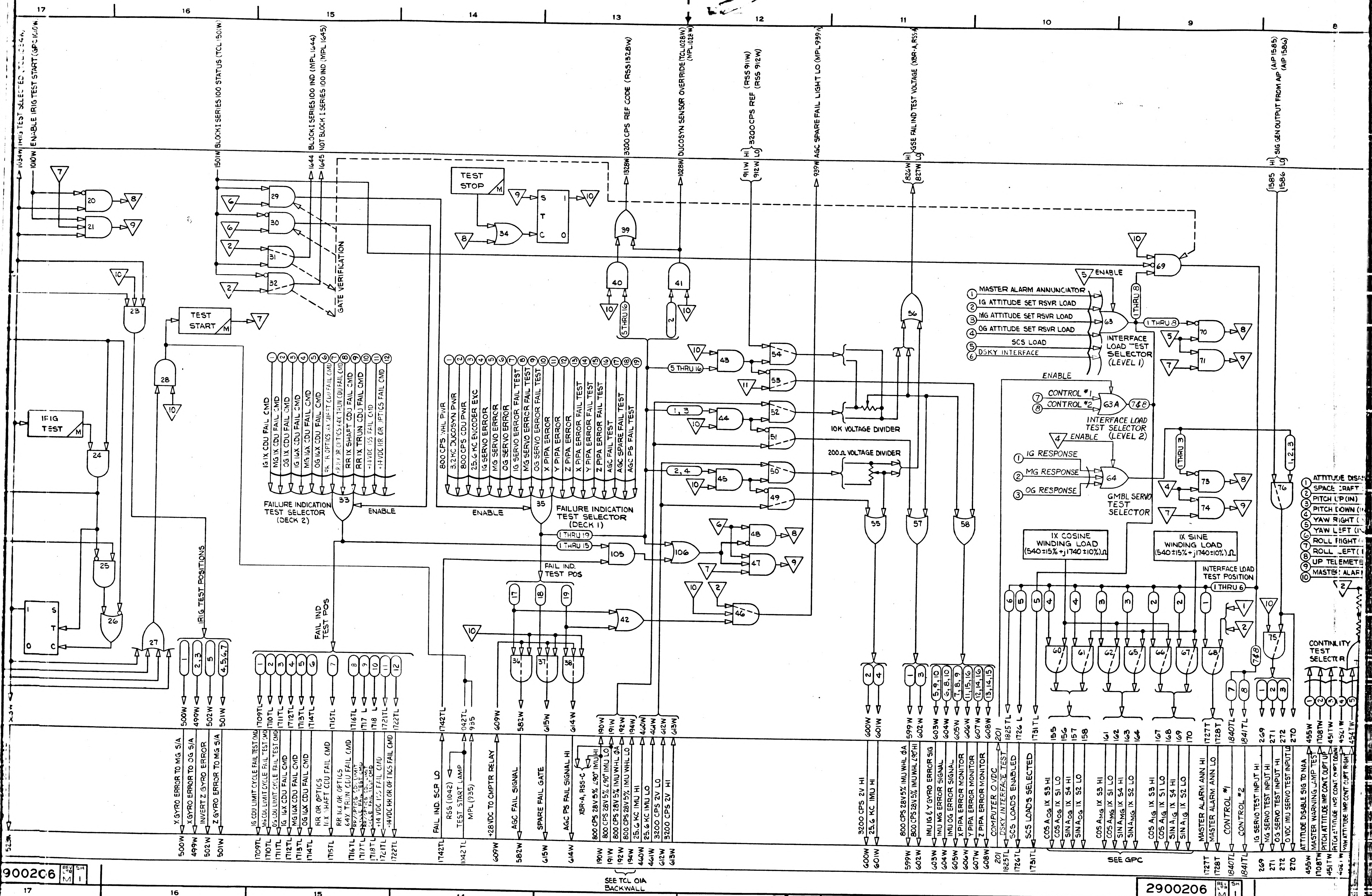
MECHANIZATION DIAGRAM-
TEST SELECTOR
(BLOCK I SERIES 100, BLOCK II & LEM)

CODE IDENT NO 99974
SIZE J3
2900206
SCALE —
SHEET 1 OF 4

2900206 REV M SH 1

37 2900206

44



17
16
15
14
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11
10
9
8
1010W ENABLE IRIG TEST START (GPC 1010W)
1501W BLOCK I SERIES 100 STATUS (TCL 1501W)
1644 BLOCK I SERIES 100 IND (MPL 1644)
1645 NOT BLOCK I SERIES 100 IND (MPL 1645)
1328W 3200 CPS REF CODE (RSS 1328W)
1028W DUCOSYN SENSOR OVERRIDE (TCL 1028W) (MPL 1028W)
911W HI 912W LO 3200 CPS REF (RSS 911W) (RSS 912W)
939W AGC SPARE FAIL LIGHT LO (MPL 939W)
826W HI 827W LO GSE FAIL IND TEST VOLTAGE (XBR-A, RSS-A)
1585 HI 1586 LO SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
TEST STOP
TEST START
IRIG TEST
GATE VERIFICATION
FAILURE INDICATION TEST SELECTOR (DECK 2)
FAILURE INDICATION TEST SELECTOR (DECK 1)
ENABLE
IG IX CDU FAIL CMD
MG IX CDU FAIL CMD
OG IX CDU FAIL CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
RR 1X OPTICS
RR IX SHAFT CDU FAIL CMD
RR IX TRUN CDU FAIL CMD
+14 VDC 1SS FAIL CMD
+14 VDC RR OR OPTICS FAIL CMD
800 CPS WHL PWR
3.2 KC DUCOSYN PWR
800 CPS CDU PWR
25.6 KC ENCODER EXC
IG SERVO ERROR
MG SERVO ERROR
OG SERVO ERROR
IG SERVO ERROR FAIL TEST
MG SERVO ERROR FAIL TEST
OG SERVO ERROR FAIL TEST
X PIPA ERROR
Y PIPA ERROR
Z PIPA ERROR
X PIPA ERROR FAIL TEST
Y PIPA ERROR FAIL TEST
Z PIPA ERROR FAIL TEST
AGC FAIL TEST
AGC SPARE FAIL TEST
AGC PS FAIL TEST
IRIG TEST POSITIONS
FAIL IND TEST POS
FAIL IND. TEST POS
10K VOLTAGE DIVIDER
200 Ω VOLTAGE DIVIDER
MASTER ALARM ANNUNCIATOR
IG ATTITUDE SET RSVR LOAD
MG ATTITUDE SET RSVR LOAD
OG ATTITUDE SET RSVR LOAD
SCS LOAD
DSKY INTERFACE
INTERFACE LOAD TEST SELECTOR (LEVEL 1)
CONTROL #1
CONTROL #2
INTERFACE LOAD TEST SELECTOR (LEVEL 2)
IG RESPONSE
MG RESPONSE
OG RESPONSE
GMBL SERVO TEST SELECTOR
IX COSINE WINDING LOAD (540±15% + j1740±10%)Ω
IX SINE WINDING LOAD (540±15% + j1740±10%)Ω
INTERFACE LOAD TEST POSITION
CONTINUITY TEST SELECTOR
ATTITUDE DISP
SPACE CRAFT
PITCH UP (IN)
PITCH DOWN
YAW RIGHT
YAW LEFT
ROLL RIGHT
ROLL LEFT
UP TELEMETE
MASTER ALAR
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
FAIL IND. SCR LO
RSS (1042)
TEST START LAMP
MPL (935)
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
XBR-A, RSS-C
3200 CPS 2V HI
25.6 KC IMU HI
COMPUTER O VDC
DSKY INTERFACE TEST
SCS LOADS ENABLED
SCS LOADS SELECTED
MASTER ALARM ANN HI
MASTER ALARM ANN LO
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
O VDC IMU SERVO TEST INPUT LO
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
SEE GPC
SEE TCL 01A BACKWALL

2900206 REV LTR M SH 1

27 2900206

NOTES:

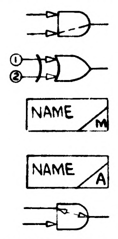
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM)

2900210 RLP	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RELAY & LAMP POWER SUPPLY
2900208 PSS	POWER & DUMMY LOAD-PRIMARY SIGNAL SELECTOR (PDL) PRIMARY SIGNAL SELECTOR
2900223	GIMBAL POSITION CONTROL (GPC)
2900207	MONITOR PANEL (MPL)
2900202	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
2900217 XBR-A XBR-B DVM	SIGNAL SELECTION & MEASUREMENT CROSSBAR - AC SIGNALS CROSSBAR - DC SIGNALS DIGITAL VOLTMETER
2900218 RSS-A RSS-B RSS-C RSS-D	OSCILLOGRAPH SIGNAL SELECTION TO FIXED AC CHANNEL TO FIXED DC CHANNEL TO SWITCHABLE AC CHANNEL TO SWITCHABLE DC CHANNEL
2900215 RSS	MEASUREMENT REFERENCE POWER SUPPLIES OSCILLOGRAPH SIGNAL SELECTOR
2900211	AUXILIARY INPUT-OUTPUT & CALIBRATION (AIP)
2900212 MSI	PIPA & IRIG MONITORING PHASE SHIFT PANEL
2900200	GYRO CAGING PANEL (GCP)

4. NONSTANDARD SYMBOLS



①
②
NAME M
NAME A

INDICATES "AND" GATE WITH SWITCHED SIGNAL

INDICATES EXCLUSIVE "OR" GATE WITH SWITCH POSITIONS 1 & 2

INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

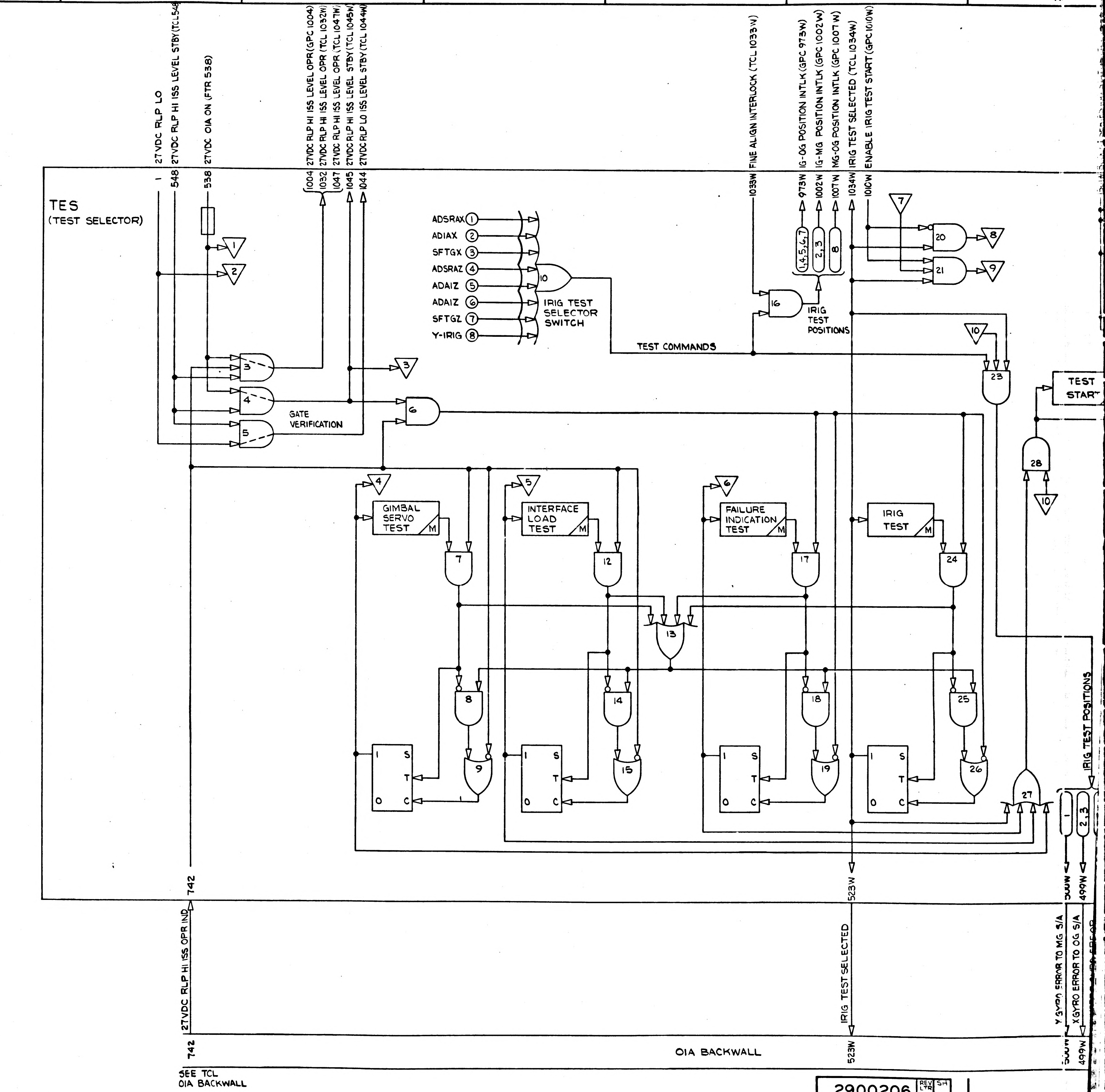
INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

INDICATES "AND" GATE WITH A SWITCHED SIGNAL CAPABLE OF SIGNAL FLOW IN TWO DIRECTIONS

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G&N CONFIGURATIONS
   - E. TW, TL, OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

6. SIGNAL REFERENCE

▽1	27 VDC OIA ON
▽2	27 VDC RLP LO
▽3	27 VDC ISS LEVEL STANDBY
▽4	GIMBAL SERVO TEST SELECTED
▽5	INTERFACE LOAD TEST SELECTED
▽6	FAILURE INDICATION TEST SELECTED
▽7	TEST START, BUTTON DEPRESSED
▽8	CLEAR
▽9	SET
▽10	TEST STARTED
▽11	IMU ERROR SIGNALS
Ⓐ	CONNECT TO THE OUTPUT OF GATE 1203



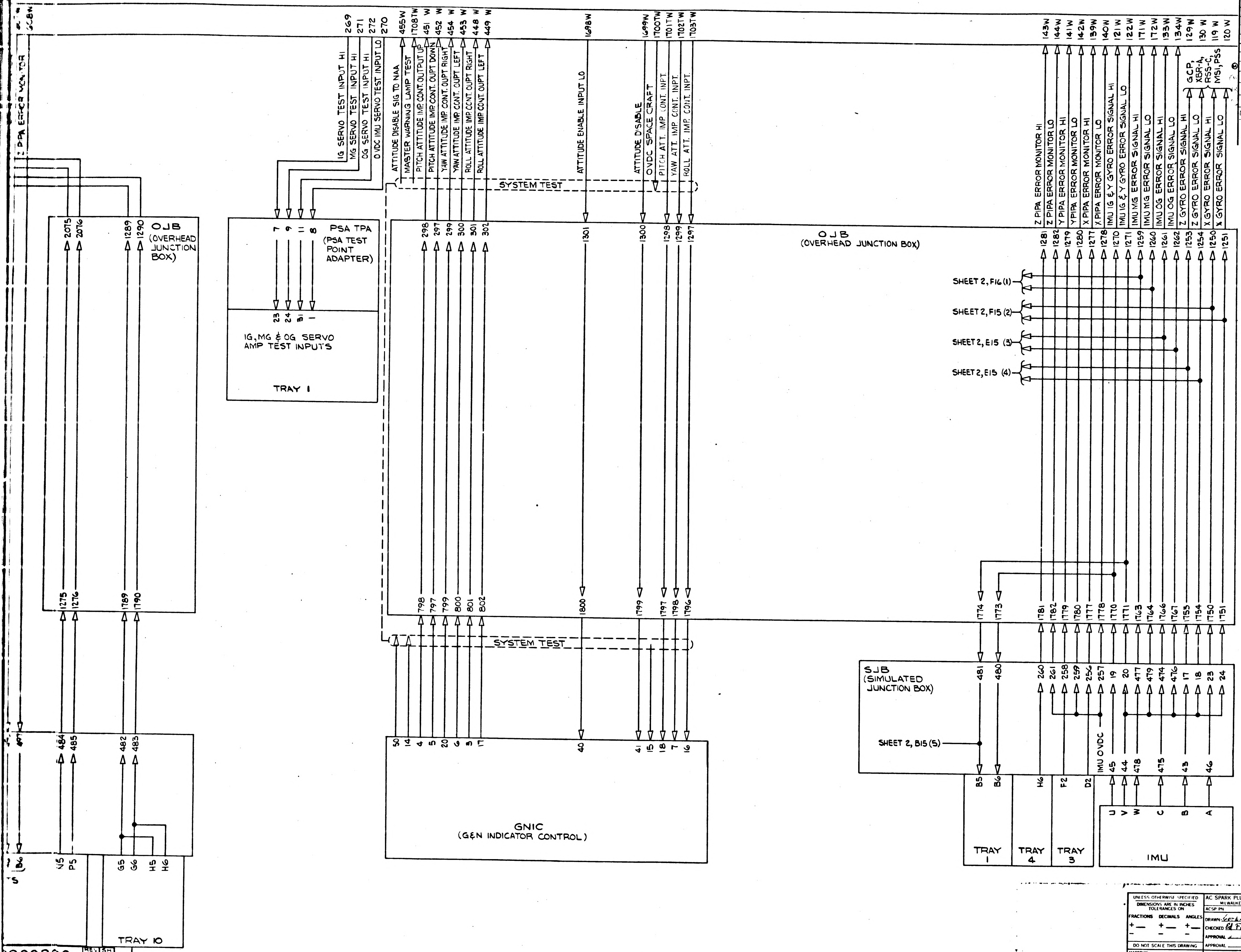
27VDC RLP LO
27VDC RLP HI ISS LEVEL STBY (TCL 548)
27VDC OIA ON (FTR 538)
27VDC RLP HI ISS LEVEL OPR (GPC 1004)
27VDC RLP HI ISS LEVEL OPR (TCL 1032W)
27VDC RLP HI ISS LEVEL OPR (TCL 1047W)
27VDC RLP HI ISS LEVEL STBY (TCL 1045W)
27VDC RLP LO ISS LEVEL STBY (TCL 1044W)
1
548
538
1004
1032
1047
1045
1044
FINE ALIGN INTERLOCK (TCL 1033W)
IG-OG POSITION INTLK (GPC 973W)
IG-MG POSITION INTLK (GPC 1002W)
MG-OG POSITION INTLK (GPC 1007W)
IRIG TEST SELECTED (TCL 1034W)
ENABLE IRIG TEST START (GPC 1010W)
1033W
973W
1002W
1007W
1034W
1010W
TES
(TEST SELECTOR)
ADSRAX 1
ADIAX 2
SFTGX 3
ADSRAZ 4
ADAIZ 5
ADAIZ 6
SFTGZ 7
Y-IRIG 8
IRIG TEST SELECTOR SWITCH
1,4,5,6,7
2,3
8
IRIG TEST POSITIONS
TEST COMMANDS
GATE VERIFICATION
TEST START
GIMBAL SERVO TEST M
INTERFACE LOAD TEST M
FAILURE INDICATION TEST M
IRIG TEST M
S
T
C
I
O
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
23
24
25
26
27
28
IRIG TEST POSITIONS
1
2,3
742
27VDC RLP HI ISS OPR IND
523W
IRIG TEST SELECTED
500W
499W
Y GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
OIA BACKWALL
SEE TCL
OIA BACKWALL

2900206	REV LTR M	SH 1

MIL FORM 1050 J3

17/2900206

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		1 SEP 65	RLP AU
B		REVISION STATUS CHANGED		7 SEP 65	LK
C		REVISION STATUS CHANGED		9 SEP 65	LK
D		REVISION STATUS CHANGED		10 SEP 65	LK AU
E		REVISED PER TDPR 22002		13 SEP 65	LK
F		REVISION STATUS CHANGED		16 SEP 65	LK
G		REVISION STATUS CHANGED		21 SEP 65	
H		REVISION STATUS CHANGED		27 SEP 65	
J		REVISION STATUS CHANGED		6 OCT 65	RLP
K		REVISION STATUS CHANGED		10 NOV 65	RLP
L		REVISION STATUS CHANGED		10 JAN 66	RLP
M		REVISION STATUS CHANGED		18 FEB 66	RLP



Z PIPA ERROR MONITOR
2075
2076
1289
1290
OJB (OVERHEAD JUNCTION BOX)
1275
1276
1789
1790
484
485
482
483
B6
N5
P5
G5
G6
H5
H6
TRAY 10
269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
PSA TPA (PSA TEST POINT ADAPTER)
7
9
11
8
23
24
31
1
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
455W
1708TW
451 W
452 W
454 W
453 W
448 W
449 W
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUTPUT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
1698W
ATTITUDE ENABLE INPUT LO
1699W
1700TW
1701TW
1702TW
1703TW
ATTITUDE DISABLE
OVDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
SYSTEM TEST
298
297
299
300
301
302
1301
1300
1298
1299
1297
OJB (OVERHEAD JUNCTION BOX)
798
797
799
800
801
802
1800
1799
1797
1798
1796
SYSTEM TEST
50
14
4
5
20
6
3
17
40
41
15
18
7
16
GNIC (G&N INDICATOR CONTROL)
143W
144W
141W
142W
139W
140W
121W
122W
171W
172W
133W
134W
129W
130 W
119 W
120 W
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIGNAL HI
IMU IG & Y GYRO ERROR SIGNAL LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
Z GYRO ERROR SIGNAL HI
Z GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
X GYRO ERROR SIGNAL LO
GCP, XBR-A, RSS-C, MSI, PSS
1281
1282
1279
1280
1277
1278
1270
1271
1259
1260
1261
1262
1253
1254
1250
1251
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (3)
SHEET 2, E15 (4)
1774
1773
1781
1782
1779
1780
1777
1778
1770
1771
1763
1764
1766
1767
1753
1754
1750
1751
SJB (SIMULATED JUNCTION BOX)
481
480
260
261
258
259
256
257
19
20
477
479
474
476
17
18
23
24
SHEET 2, B15 (5)
IMU OVDC
45
44
478
475
43
46
B5
B6
H6
F2
D2
TRAY 1
TRAY 4
TRAY 3
U
V
W
C
B
A
IMU

2900206 REV M SH 2

3H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

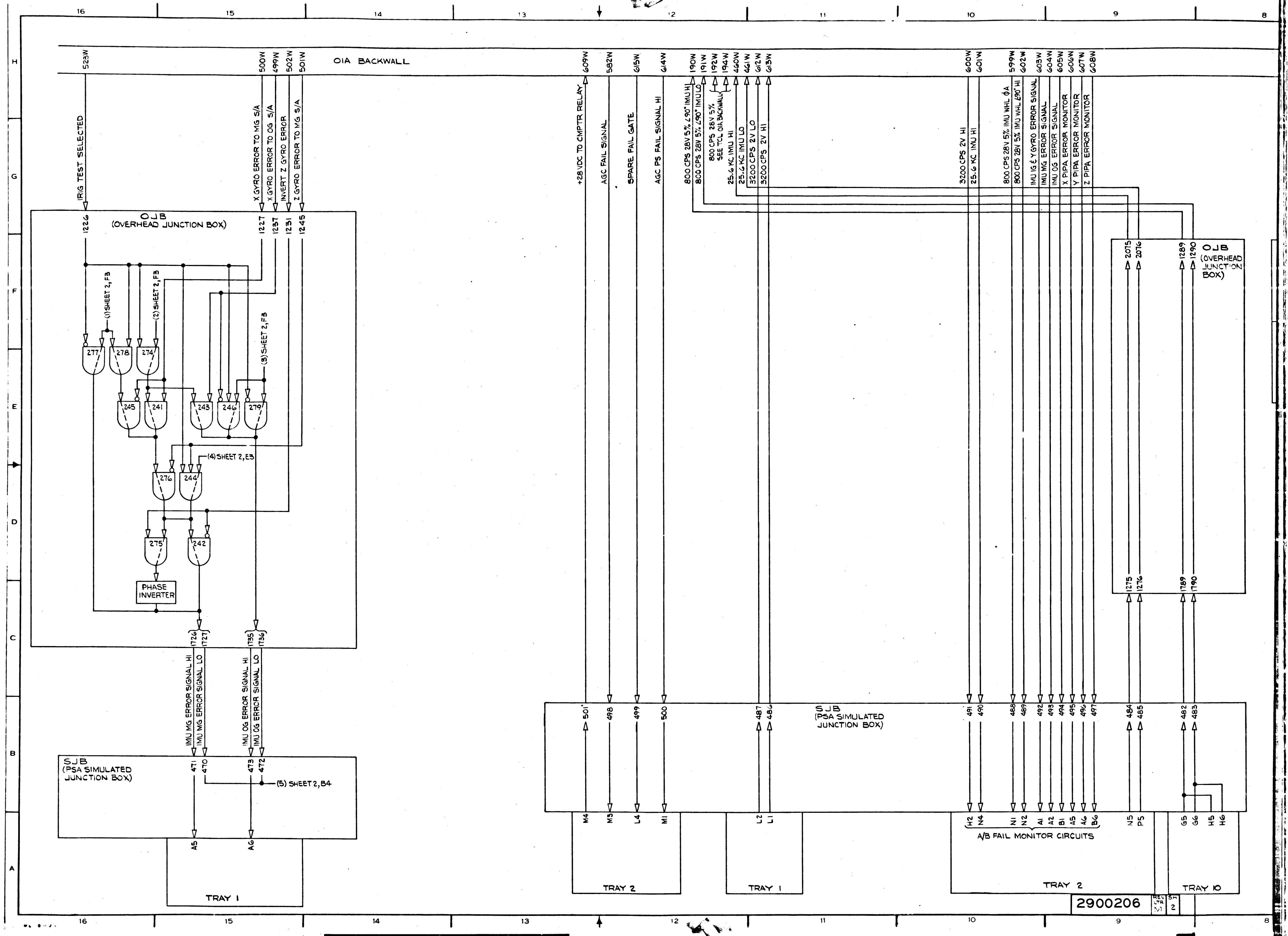
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Cockren DATE 26 MAY 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM -
TEST SELECTOR
(BLOCK I SERIES 100)

CODE IDENT NO 99974
SIZE J_2
2900206
SCALE —
SHEET 2 OF 4

2 / 2900206


OIA BACKWALL
523W
500W
499W
502W
501W
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
IRIG TEST SELECTED
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5% SEE TCL OIA BACKWALL
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ØA
800 CPS 28V 5% IMU WHL ∠90° HI
IMU IG & Y GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
OJB (OVERHEAD JUNCTION BOX)
1226
1227
1237
1231
1245
(1) SHEET 2, F3
(2) SHEET 2, F3
(3) SHEET 2, F3
(4) SHEET 2, E3
277
278
274
245
241
243
246
279
276
244
275
242
PHASE INVERTER
1726
1727
1735
1736
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
SJB (PSA SIMULATED JUNCTION BOX)
471
470
473
472
(5) SHEET 2, B4
A5
A6
TRAY 1
OJB (OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1789
1790
SJB (PSA SIMULATED JUNCTION BOX)
501
498
499
500
487
486
491
490
488
489
492
493
494
495
496
497
484
485
482
483
M4
M3
L4
M1
L2
L1
H2
N4
N1
N2
A1
A2
B1
A5
A6
B6
N5
P5
G5
G6
H5
H6
A/B FAIL MONITOR CIRCUITS
TRAY 2
TRAY 1
TRAY 2
TRAY 10
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
2900206
REV
SH 2

1/4 2900206

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO	DATE	APPROVED
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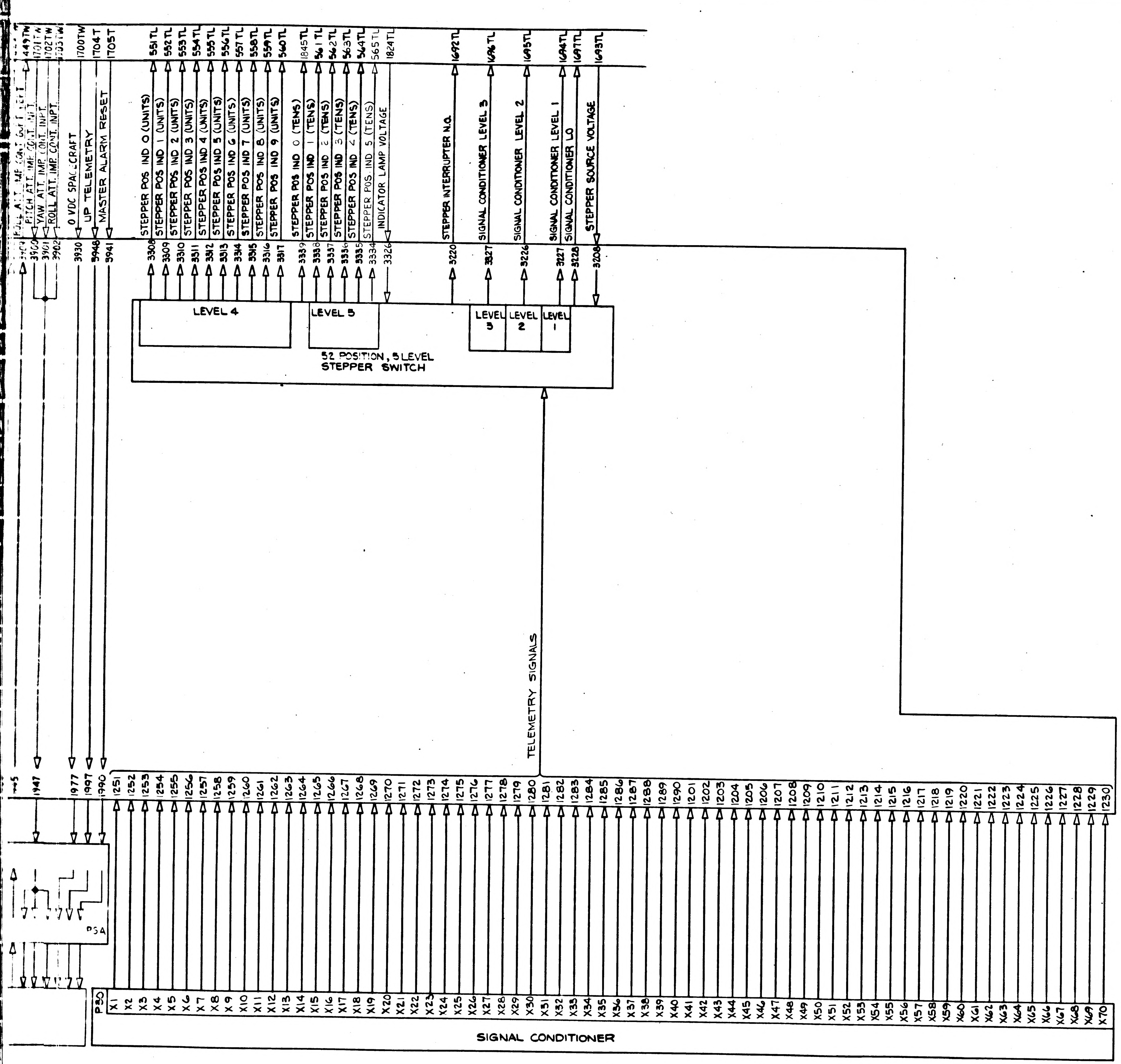
	M	REVISED PER TDRR 24952		18 FEB 66	RLP


9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
449TW
1701TW
1702TW
1703TW
1700TW
1704T
1705T
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
1845TL
561TL
562TL
563TL
564TL
565TL
1824TL
1692TL
1696TL
1695TL
1694TL
1697TL
1693TL
ROLL ATT. IMP. CONT. OUT. LEFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 0 (TENS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS. IND 5 (TENS)
INDICATOR LAMP VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3900
3901
3902
3930
3948
3941
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3339
3338
3337
3336
3335
3334
3326
3220
3327
3226
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL
STEPPER SWITCH
TELEMETRY SIGNALS
1947
1977
1997
1990
1251
1252
1253
1254
1255
1256
1257
1258
1259
1260
1261
1262
1263
1264
1265
1266
1267
1268
1269
1270
1271
1272
1273
1274
1275
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1216
1217
1218
1219
1220
1221
1222
1223
1224
1225
1226
1227
1228
1229
1230
PSA
P50
X1
X2
X3
X4
X5
X6
X7
X8
X9
X10
X11
X12
X13
X14
X15
X16
X17
X18
X19
X20
X21
X22
X23
X24
X25
X26
X27
X28
X29
X30
X31
X32
X33
X34
X35
X36
X37
X38
X39
X40
X41
X42
X43
X44
X45
X46
X47
X48
X49
X50
X51
X52
X53
X54
X55
X56
X57
X58
X59
X60
X61
X62
X63
X64
X65
X66
X67
X68
X69
X70
SIGNAL CONDITIONER

M
2900206

2900206

900206 3

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± 3 PLACE DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN COOKMAN DATE 3 JUN 65
CHECKED FOSTER 9 JUN 65
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

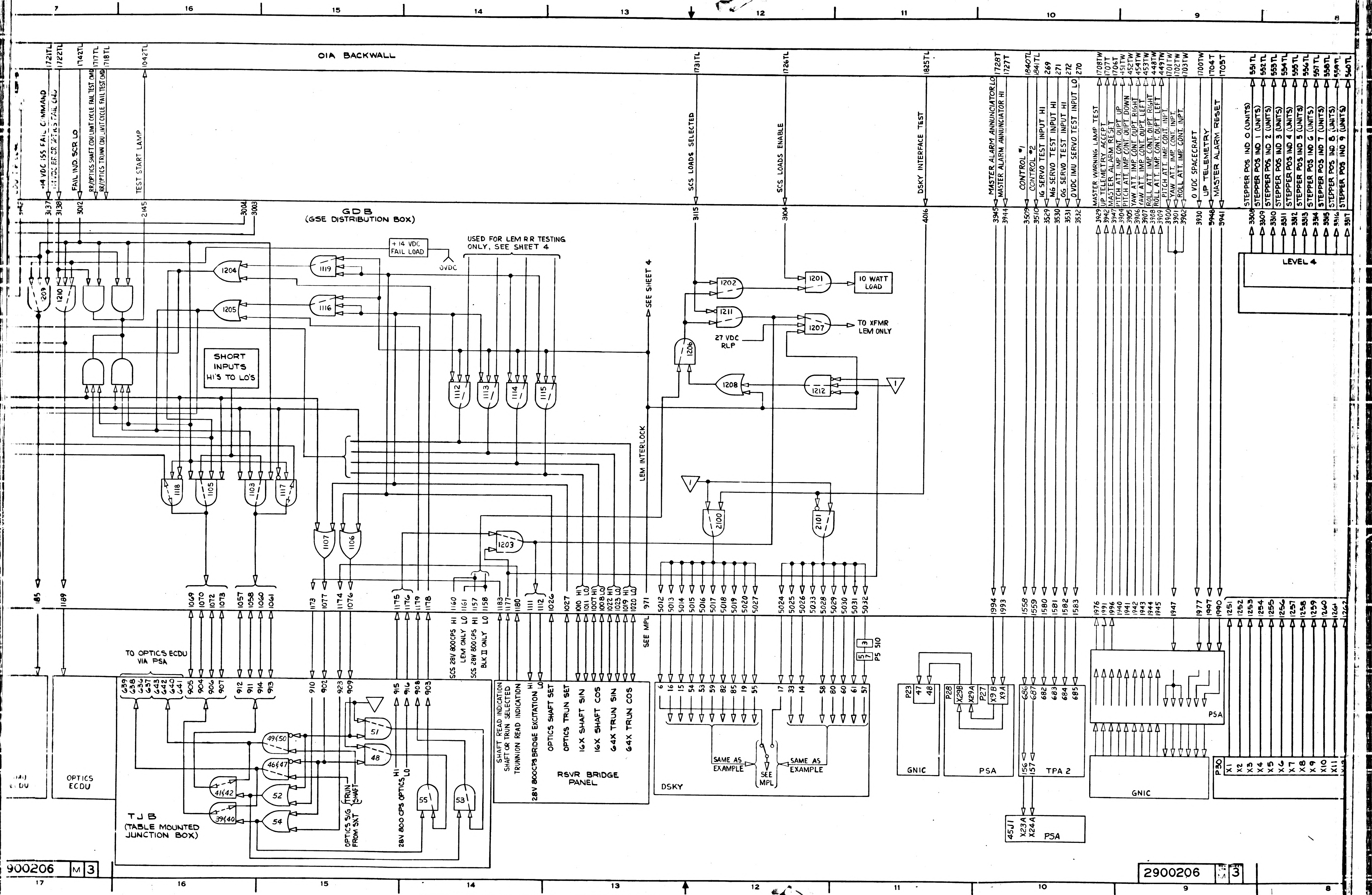
MANNED SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK II)

SIZE J2
CODE IDENT NO 99974
2900206
SCALE
3 OF 4

2900206

3/2900206


17
16
15
14
13
12
11
10
9
8
OIA BACKWALL
1721TL
1722TL
1742TL
1717TL
1718TL
1042TL
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
RR/OPTICS SHAFT CDU LIMIT CYCLE FAIL TEST CMD
RR/OPTICS TRUNN CDU LIMIT CYCLE FAIL TEST CMD
TEST START LAMP
3137
3138
3012
2145
3004
3003
GDB
(GSE DISTRIBUTION BOX)
+14 VDC FAIL LOAD
0VDC
USED FOR LEM RR TESTING ONLY, SEE SHEET 4
1204
1205
1119
1116
1209
1210
SHORT INPUTS HI'S TO LO'S
1112
1113
1114
1115
1118
1105
1103
1117
1107
1106
1203
SEE SHEET 4
LEM INTERLOCK
1731TL
1726TL
1825TL
SCS LOADS SELECTED
SCS LOADS ENABLE
DSKY INTERFACE TEST
3115
3104
4016
1202
1211
1201
1207
1206
1208
1212
2100
2101
10 WATT LOAD
TO XFMR LEM ONLY
27 VDC RLP
1728T
1727T
MASTER ALARM ANNUNCIATOR LO
MASTER ALARM ANNUNCIATOR HI
3945
3944
1840TL
1841TL
269
271
272
270
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
3509
3510
3529
3530
3531
3532
1708TW
1707T
1706T
451TW
452TW
454TW
453TW
448TW
449TW
1701TW
1702TW
1703TW
MASTER WARNING LAMP TEST
UP TELEMETRY ACCEPT
MASTER ALARM RESET
PITCH ATT. IMP. CONT. OUPT. UP
PITCH ATT. IMP. CONT. OUPT. DOWN
YAW ATT. IMP. CONT. OUPT. RIGHT
YAW ATT. IMP. CONT. OUPT. LEFT
ROLL ATT. IMP. CONT. OUPT. RIGHT
ROLL ATT. IMP. CONT. OUPT. LEFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
3929
3942
3947
3904
3905
3906
3907
3908
3909
3900
3901
3902
1700TW
1704T
1705T
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
3930
3948
3941
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
LEVEL 4
185
1189
1069
1070
1072
1073
1057
1058
1060
1061
1173
1077
1174
1076
1175
1176
1179
1178
1160
1161
1157
1158
1183
1177
1180
1111
1112
1026
1027
1010 HI
1011 LO
1007 HI
1008 LO
1022 HI
1023 LO
1019 HI
1020 LO
971
SEE MPL
SCS 28V 800CPS HI
LEM ONLY LO
SCS 28V 800CPS HI
BLK II ONLY LO
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
5024
5025
5026
5033
5028
5029
5030
5031
5032
P5 510
1994
1993
1558
1559
1580
1581
1582
1583
1976
1991
1996
1940
1941
1942
1943
1944
1945
1947
1977
1997
1990
1251
1252
1253
1254
1255
1256
1257
1258
1259
1260
1261
1262
IMU ECDU
OPTICS ECDU
TO OPTICS ECDU VIA PSA
639
638
636
637
643
642
640
641
905
904
906
907
912
911
914
913
910
902
923
909
915
916
908
903
49&50
46&47
41&42
39&40
51
48
52
54
55
53
TRUN
SHAFT
OPTICS SIG FROM SXT
28V 800 CPS OPTICS HI LO
TJB
(TABLE MOUNTED JUNCTION BOX)
SHAFT READ INDICATION
SHAFT OR TRUN SELECTED
TRUNNION READ INDICATION
28V 800CPS BRIDGE EXCITATION HI LO
OPTICS SHAFT SET
OPTICS TRUN SET
16X SHAFT SIN
16X SHAFT COS
64X TRUN SIN
64X TRUN COS
RSVR BRIDGE PANEL
6
16
15
54
53
59
82
85
19
55
17
33
14
58
80
60
61
57
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
DSKY
P23
47
48
GNIC
P28
X29B
X29A
P27
X9B
X9A
PSA
686
687
682
683
684
685
156
157
TPA 2
45J1
X23A
X24A
PSA
PSA
GNIC
P30
X1
X2
X3
X4
X5
X6
X7
X8
X9
X10
X11
X12
900206 M 3
2900206 M 3

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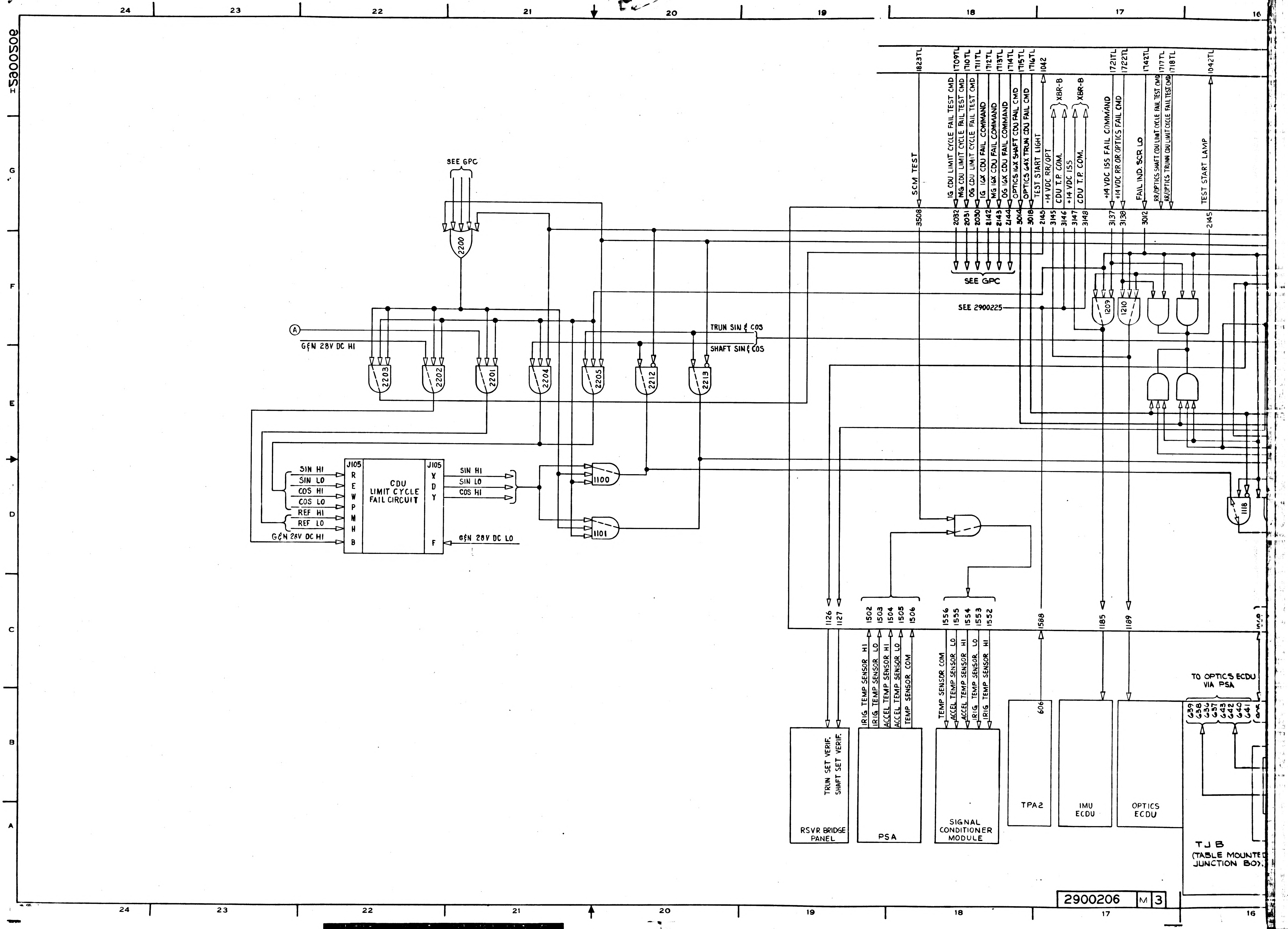
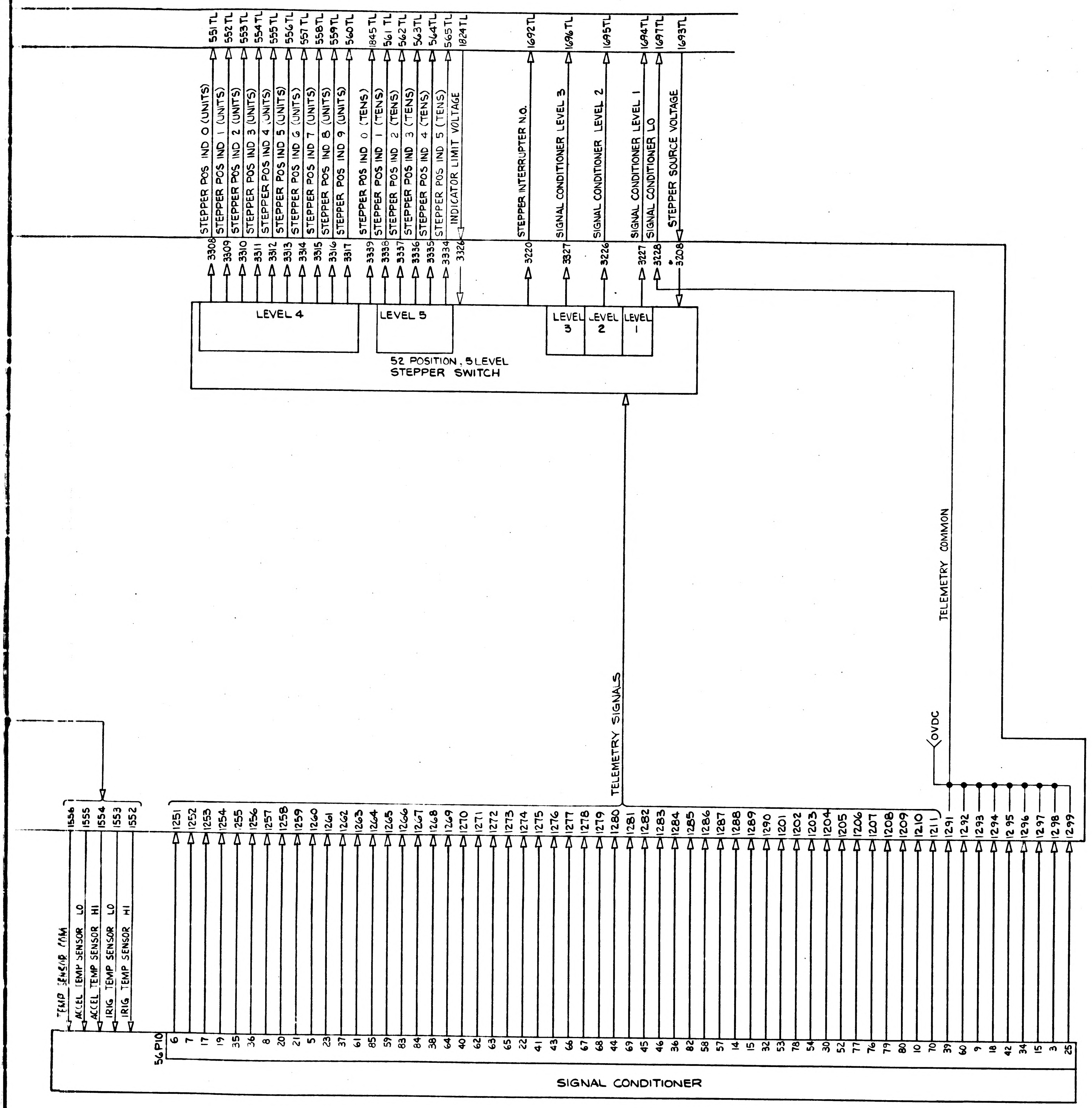


24
23
22
21
20
19
18
17
16
G
F
E
D
C
B
A
SEE GPC
2200
Ⓐ
GEN 28V DC HI
TRUN SIN & COS
SHAFT SIN & COS
2203
2202
2201
2204
2205
2212
2213
J105
R
E
W
P
M
H
B
CDU LIMIT CYCLE FAIL CIRCUIT
J105
X
D
Y
F
SIN HI
SIN LO
COS HI
COS LO
REF HI
REF LO
GEN 28V DC HI
SIN HI
SIN LO
COS HI
GEN 28V DC LO
1100
1101
1823TL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1042
1721TL
1722TL
1742TL
1717TL
1718TL
1042TL
SCM TEST
IG CDU LIMIT CYCLE FAIL TEST CMD
MG CDU LIMIT CYCLE FAIL TEST CMD
OG CDU LIMIT CYCLE FAIL TEST CMD
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
TEST START LIGHT
+14 VDC RR/OPT
CDU T.P. COM.
+14 VDC ISS
CDU T.P. COM.
XBR-B
XBR-B
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
RR/OPTICS SHAFT CDU LIMIT CYCLE FAIL TEST CMD
RR/OPTICS TRUNN CDU LIMIT CYCLE FAIL TEST CMD
TEST START LAMP
3508
2032
2031
2030
2142
2143
2144
3014
3018
2145
3145
3146
3147
3148
3137
3138
3012
2145
SEE GPC
SEE 2900225
1209
1210
1118
1126
1127
1502
1503
1504
1505
1506
1556
1555
1554
1553
1552
1588
1185
1189
TRUN SET VERIF.
SHAFT SET VERIF.
RSVR BRIDGE PANEL
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
PSA
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
SIGNAL CONDITIONER MODULE
606
TPA2
IMU ECDU
OPTICS ECDU
TO OPTICS ECDU VIA PSA
639
638
636
637
643
642
640
641
TJB (TABLE MOUNTED JUNCTION BOX)
2900206
M
3

17 2900206

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO	DATE	APPROVED
	L	REPLACES REV (K) WITH CHANGE PER TDRR 24855		JAN 66	
	M	REVISED PER TDRR 24952		18 FEB 66	

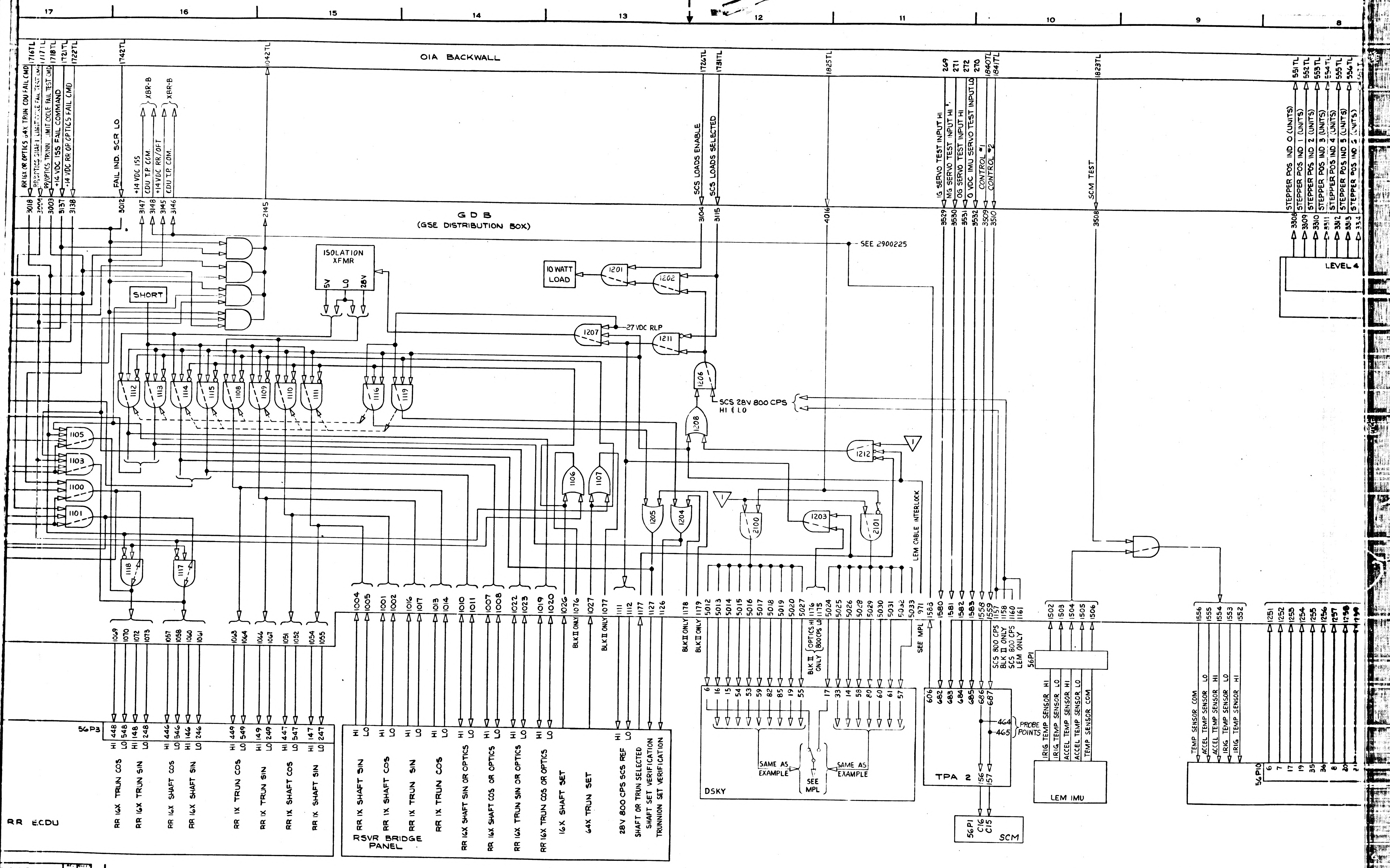


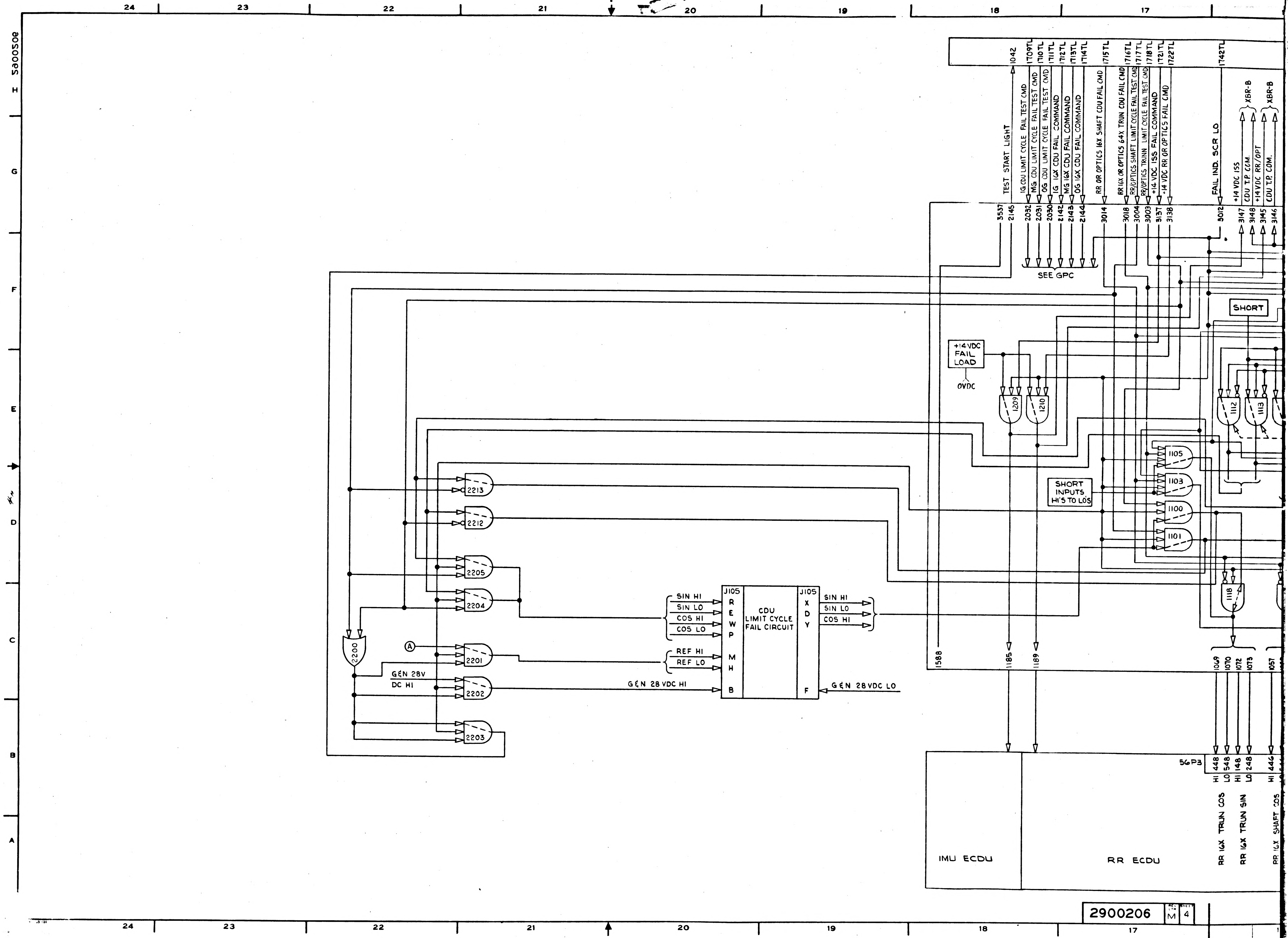
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
1845TL
561TL
562TL
563TL
564TL
565TL
1824TL
1692TL
1696TL
1695TL
1694TL
1697TL
1693TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 0 (TENS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LIMIT VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3339
3338
3337
3336
3335
3334
3326
3220
3327
3226
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
TELEMETRY SIGNALS
TELEMETRY COMMON
0VDC
1556
1555
1554
1553
1552
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1291 1292 1293 1294 1295 1296 1297 1298 1299
56P10
6 7 17 19 35 36 8 20 21 5 23 37 61 85 59 83 84 38 64 40 62 63 65 22 41 43 66 67 68 44 69 45 46 36 82 58 57 14 15 32 53 78 54 30 52 77 76 79 80 10 70 39 60 9 18 42 34 15 3 25
SIGNAL CONDITIONER

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE DECIMALS ± — 3 PLACE DECIMALS ± — ANGLES ± —	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
APPLICATION		DO NOT SCALE THIS DRAWING	DRAWN COOKMAN DATE 7 JUN 65 CHECKED ED FOSTER 9 JUN 65 APPROVAL J. M. WATSON CONTRACT NAS9-497	MECHANIZATION DIAGRAM - TEST SELECTOR (LEM)	
		MATERIAL —	NASA APPROVAL	SIZE J3	CODE IDENT NO 99974
		APPROVAL	MIT APPROVAL W Kuhn	SCALE —	2900206 SHEET 4 OF 4

00206 M 4

3/2900206

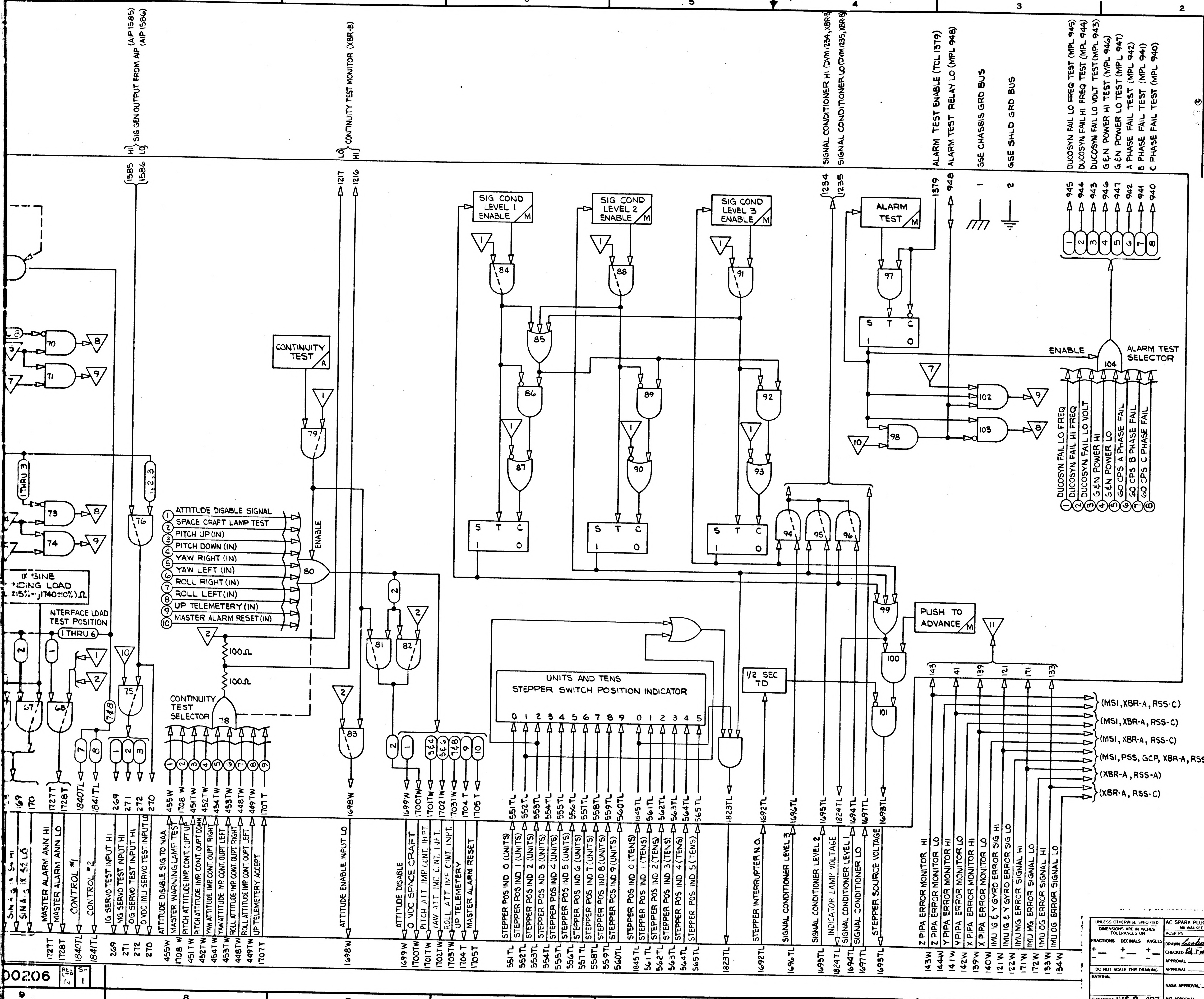

OIA BACKWALL
GDB
(GSE DISTRIBUTION BOX)
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
RR/OPTICS SHAFT LIMIT CYCLE FAIL TEST CMD
RR/OPTICS TRUNN LIMIT CYCLE FAIL TEST CMD
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
+14 VDC ISS
CDU T.P. COM.
+14 VDC RR/OFT
CDU T.P. COM.
XBR-B
XBR-B
ISOLATION XFMR
5V
LO
28V
SHORT
10 WATT LOAD
27 VDC RLP
SEE 2900225
SCS LOADS ENABLE
SCS LOADS SELECTED
SCS 28V 800 CPS HI & LO
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
CONTROL #1
CONTROL #2
SCM TEST
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
LEVEL 4
LEM CABLE INTERLOCK
BLK II ONLY
OPTICS HI 800 CPS LO
SEE MPL
SCS 800 CPS
BLK II ONLY
SCS 800 CPS
LEM ONLY
56P1
56P3
56P10
PROBE POINTS
464
465
SAME AS EXAMPLE
SEE MPL
DSKY
TPA 2
56P1 C16 C15
SCM
LEM IMU
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
RR ECDU
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
RR 1X TRUN COS
RR 1X TRUN SIN
RR 1X SHAFT COS
RR 1X SHAFT SIN
RSVR BRIDGE PANEL
RR 1X SHAFT SIN
RR 1X SHAFT COS
RR 1X TRUN SIN
RR 1X TRUN COS
RR 16X SHAFT SIN OR OPTICS
RR 16X SHAFT COS OR OPTICS
RR 16X TRUN SIN OR OPTICS
RR 16X TRUN COS OR OPTICS
16X SHAFT SET
64X TRUN SET
28V 800 CPS SCS REF
SHAFT OR TRUN SELECTED
SHAFT SET VERIFICATION
TRUNNION SET VERIFICATION
1105
1103
1100
1101
1112
1113
1114
1115
1108
1109
1110
1111
1116
1119
1118
1117
1106
1107
1205
1204
1201
1202
1207
1211
1206
1208
1212
1203
2100
2101
17
16
15
14
13
12
11
10
9
8
2900206
M
4


24
23
22
21
20
19
18
17
H
G
F
E
D
C
B
A
1042
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1717TL
1718TL
1721TL
1722TL
1742TL
TEST START LIGHT
IG CDU LIMIT CYCLE FAIL TEST CMD
MG CDU LIMIT CYCLE FAIL TEST CMD
OG CDU LIMIT CYCLE FAIL TEST CMD
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
RR OR OPTICS 16X SHAFT CDU FAIL CMD
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
RR/OPTICS SHAFT LIMIT CYCLE FAIL TEST CMD
RR/OPTICS TRUNN LIMIT CYCLE FAIL TEST CMD
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
+14 VDC ISS
CDU T.P. COM.
+14 VDC RR/OPT
CDU T.P. COM.
XBR-B
XBR-B
3537
2145
2032
2031
2030
2142
2143
2144
3014
3018
3004
3003
3137
3138
3012
3147
3148
3145
3146
SEE GPC
SHORT
+14 VDC FAIL LOAD
0VDC
1209
1210
1112
1113
1105
1103
1100
1101
1118
SHORT INPUTS HI'S TO LO'S
2213
2212
2205
2204
2200
A
2201
2202
2203
GEN 28V DC HI
GEN 28 VDC HI
GEN 28 VDC LO
SIN HI
SIN LO
COS HI
COS LO
REF HI
REF LO
J105
R
E
W
P
M
H
B
CDU LIMIT CYCLE FAIL CIRCUIT
J105
X
D
Y
F
SIN HI
SIN LO
COS HI
1588
1185
1189
1069
1070
1072
1073
1057
56P3
448
548
148
248
446
HI
LO
HI
LO
HI
IMU ECDU
RR ECDU
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS

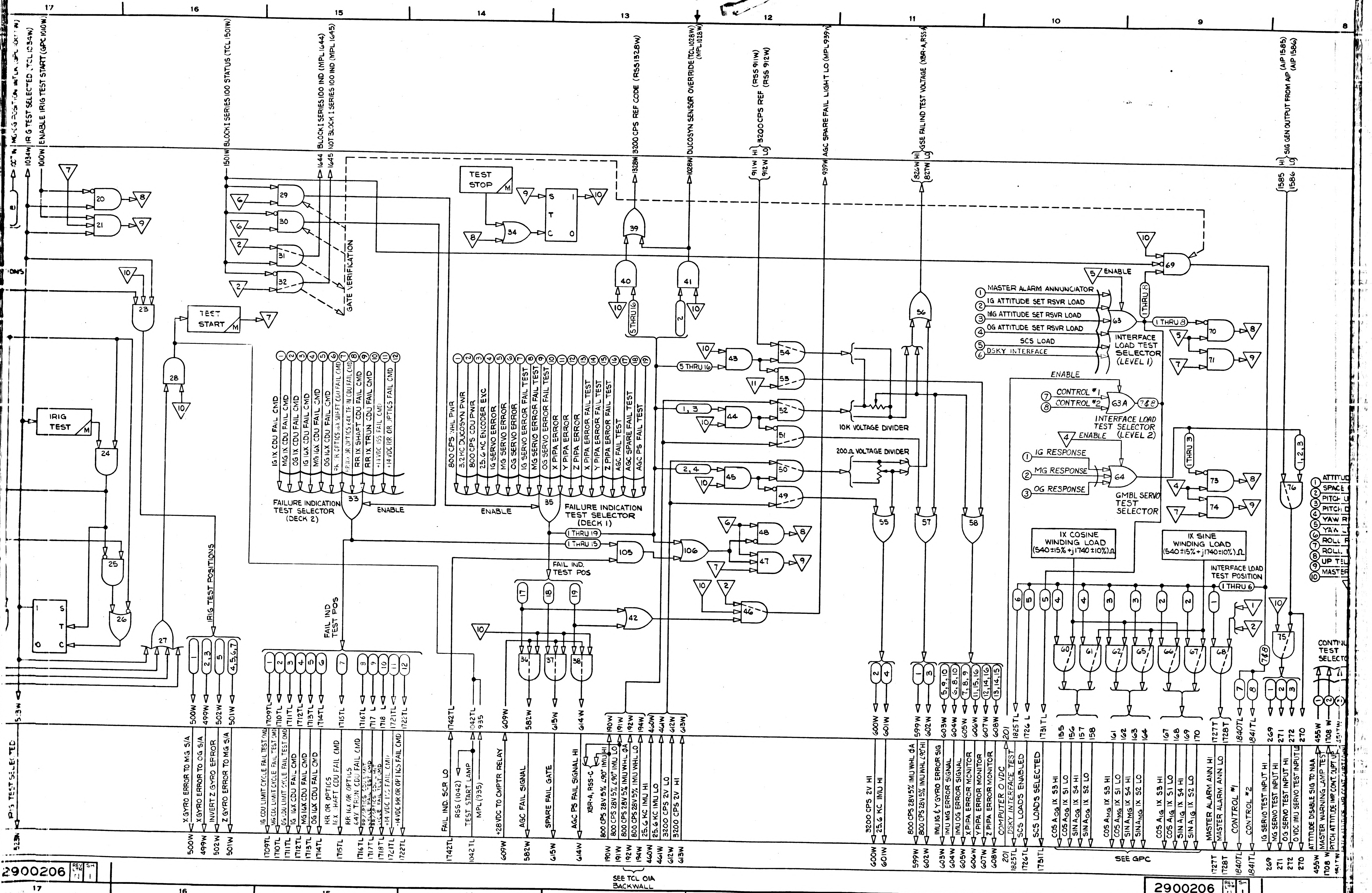
2900206 M 4

1/2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APP'D
A		REVISED PER TDRR 21905		1 SEP 65	RLP AU
B		REVISED PER TDRR 22006		7 SEP 65	LY
C		REVISED PER TDRR 22004		9 SEP 65	LK
D		REVISED PER TDRR 22005		10 SEP 65	LK AU
E		REVISED PER TDRR 22002		13 SEP 65	LK
F		REVISED PER TDRR 22003		16 SEP 65	LK
G		REVISED PER TDRR 22001		21 SEP 65	LK
H		REVISED PER TDRR 22000		27-SEP-65	
J		REVISED PER TDRR 22743		6 OCT 65	RLP
K		REVISION STATUS CHANGED		10 NOV 65	RLP MLM
L		REVISED PER TDRR 24855		10 JAN 66	RLP
M		REVISED PER TDRR 24952		18 FEB 66	RLP
N		REVISED PER TDRR 26332		22 FEB 66	RLP MLM


SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
HI LO 1585 1586
CONTINUITY TEST MONITOR (XBR-B)
LO HI 1217 1216
SIGNAL CONDITIONER HI (DVM1234, XBR-B)
SIGNAL CONDITIONER LO (DVM1235, XBR-B)
1234 1235
ALARM TEST ENABLE (TCL 1379)
ALARM TEST RELAY LO (MPL 948)
1379 948
GSE CHASSIS GRD BUS 1
GSE SHLD GRD BUS 2
DUCOSYN FAIL LO FREQ TEST (MPL 945)
DUCOSYN FAIL HI FREQ TEST (MPL 944)
DUCOSYN FAIL LO VOLT TEST (MPL 943)
G&N POWER HI TEST (MPL 946)
G&N POWER LO TEST (MPL 947)
A PHASE FAIL TEST (MPL 942)
B PHASE FAIL TEST (MPL 941)
C PHASE FAIL TEST (MPL 940)
945 944 943 946 947 942 941 940
SIG COND LEVEL 1 ENABLE M
SIG COND LEVEL 2 ENABLE M
SIG COND LEVEL 3 ENABLE M
ALARM TEST M
CONTINUITY TEST A
PUSH TO ADVANCE M
1/2 SEC TD
S T C 1 0
84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104
70 71 73 74 67 68 75 76 78 79 80 81 82 83
ENABLE
ALARM TEST SELECTOR
DUCOSYN FAIL LO FREQ
DUCOSYN FAIL HI FREQ
DUCOSYN FAIL LO VOLT
G&N POWER HI
G&N POWER LO
60 CPS A PHASE FAIL
60 CPS B PHASE FAIL
60 CPS C PHASE FAIL
ATTITUDE DISABLE SIGNAL
SPACE CRAFT LAMP TEST
PITCH UP (IN)
PITCH DOWN (IN)
YAW RIGHT (IN)
YAW LEFT (IN)
ROLL RIGHT (IN)
ROLL LEFT (IN)
UP TELEMETERY (IN)
MASTER ALARM RESET (IN)
CONTINUITY TEST SELECTOR
100Ω
100Ω
IX SINE NDING LOAD ±15%-j1740±10%)Ω
NTERFACE LOAD TEST POSITION
1 THRU 6
1 THRU 3
1,2,3
7&8
3&4 5&6 7&8
UNITS AND TENS STEPPER SWITCH POSITION INDICATOR
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
143 41 139 121 171 133
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, PSS, GCP, XBR-A, RSS-A)
(XBR-A, RSS-A)
(XBR-A, RSS-C)
169 170 1727T 1728T 1840TL 1841TL 269 271 272 270 455W 1708W 451TW 452TW 454TW 453TW 448TW 449TW 1707T 1698W 1699W 1700TW 1701TW 1702TW 1703TW 1704T 1705T 551TL 552TL 553TL 554TL 555TL 556TL 557TL 558TL 559TL 560TL 1845TL 561TL 562TL 563TL 564TL 565TL 1823TL 1692TL 1696TL 1695TL 1824TL 1694TL 1697TL 1693TL 143W 144W 141W 142W 139W 140W 121W 122W 171W 172W 133W 134W
SIN & IX S4 HI
SIN & IX S2 LO
MASTER ALARM ANN HI
MASTER ALARM ANN LO
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUPT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
UP TELEMETRY ACCEPT
ATTITUDE ENABLE INPUT LO
ATTITUDE DISABLE
0 VDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CNT. INPT.
ROLL ATT. IMP. CNT. INPT.
UP TELEMETRY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 0 (TENS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
INDICATOR LAMP VOLTAGE
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LEVEL 1
STEPPER SOURCE VOLTAGE
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIG HI
IMU IG & Y GYRO ERROR SIG LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
9 8 7 6 5 4 3 2 1
H G F E D C B A
00206
2900206
4-1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Cookman DATE 24 MAY 65 CHECKED Ed Foster 9 JUN 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM- TEST SELECTOR (BLOCK I SERIES 100, BLOCK II & LEM)
MATERIAL	NASA APPROVAL	CODE IDENT NO 99974 SIZE J_3 2900206
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — SHEET 1 OF 4



IRIG TEST
TEST START
TEST STOP
GATE VERIFICATION
IRIG TEST POSITIONS
FAIL IND TEST POS
FAILURE INDICATION TEST SELECTOR (DECK 2)
FAILURE INDICATION TEST SELECTOR (DECK 1)
ENABLE
FAIL IND. TEST POS
10K VOLTAGE DIVIDER
200Ω VOLTAGE DIVIDER
MASTER ALARM ANNUNCIATOR
IG ATTITUDE SET RSVR LOAD
MG ATTITUDE SET RSVR LOAD
OG ATTITUDE SET RSVR LOAD
SCS LOAD
DSKY INTERFACE
INTERFACE LOAD TEST SELECTOR (LEVEL 1)
CONTROL #1
CONTROL #2
INTERFACE LOAD TEST SELECTOR (LEVEL 2)
IG RESPONSE
MG RESPONSE
OG RESPONSE
GMBL SERVO TEST SELECTOR
IX COSINE WINDING LOAD (540±15%+j1740±10%)Ω
IX SINE WINDING LOAD (540±15%+j1740±10%)Ω
INTERFACE LOAD TEST POSITION
CONTINU TEST SELECTO
ENABLE IRIG TEST START (GPC 1010W)
IRIG TEST SELECTED (TCL 1034W)
BLOCK I SERIES 100 STATUS (TCL 1501W)
BLOCK I SERIES 100 IND (MPL 1644)
NOT BLOCK I SERIES 100 IND (MPL 1645)
3200 CPS REF CODE (RSS 1328W)
DUCOSYN SENSOR OVERRIDE (TCL 1028W) (MPL 1028W)
3200 CPS REF (RSS 911W) (RSS 912W)
AGC SPARE FAIL LIGHT LO (MPL 939W)
GSE FAIL IND TEST VOLTAGE (XBR-A, RSS-A)
SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
FAIL IND. SCR LO
RSS (1042)
TEST START LAMP
MPL (935)
+28VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
3200 CPS 2V HI
25.6 KC IMU HI
COMPUTER O VDC
DSKY INTERFACE TEST
SCS LOADS ENABLED
SCS LOADS SELECTED
MASTER ALARM ANN HI
MASTER ALARM ANN LO
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
O VDC IMU SERVO TEST INPUT
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
SEE GPC
SEE TCL 01A BACKWALL
2900206

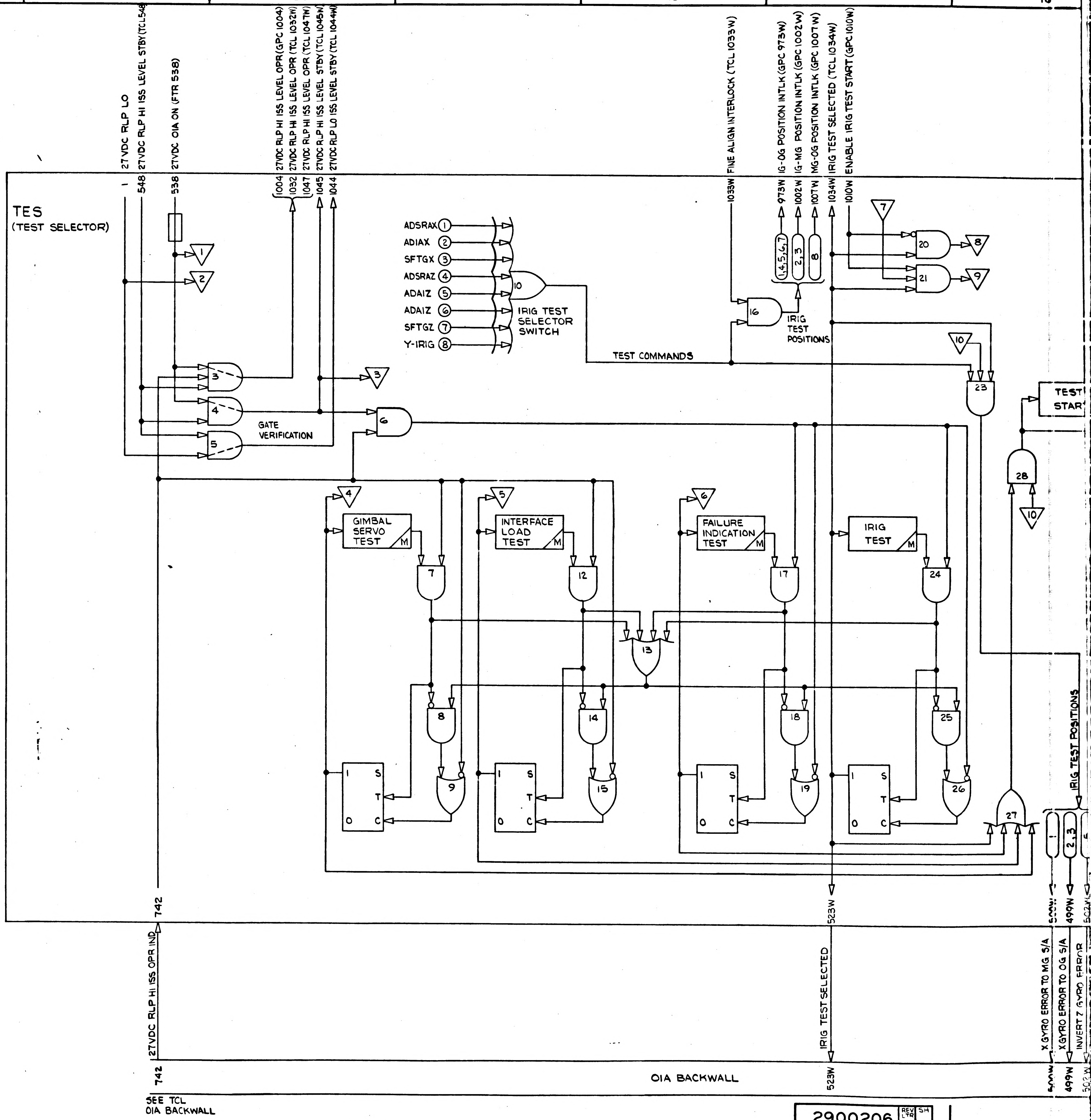
27/2900206

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM)

2900210 RLP	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RELAY & LAMP POWER SUPPLY
2900208 PSS	POWER & DUMMY LOAD-PRIMARY SIGNAL SELECTOR (PDL) PRIMARY SIGNAL SELECTOR
2900223	GIMBAL POSITION CONTROL (GPC)
2900207	MONITOR PANEL (MPL)
2900202	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
2900217 XBR-A XBR-B DVM	SIGNAL SELECTION & MEASUREMENT CROSSBAR - AC SIGNALS CROSSBAR - DC SIGNALS DIGITAL VOLTMETER
2900218 RSS-A RSS-B RSS-C RSS-D	OSCILLOGRAPH SIGNAL SELECTION TO FIXED AC CHANNEL TO FIXED DC CHANNEL TO SWITCHABLE AC CHANNEL TO SWITCHABLE DC CHANNEL
2900215 RSS	MEASUREMENT REFERENCE POWER SUPPLIES OSCILLOGRAPH SIGNAL SELECTOR
2900211	AUXILIARY INPUT-OUTPUT & CALIBRATION (AIP)
2900212 MSI	PIPA & IRIG MONITORING PHASE SHIFT PANEL
2900200	GYRO CAGING PANEL (GCP)

4. NONSTANDARD SYMBOLS
   - INDICATES "AND" GATE WITH SWITCHED SIGNAL
   - INDICATES EXCLUSIVE "OR" GATE WITH SWITCH POSITIONS 1 & 2
   - NAME M — INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
   - NAME A — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
   - INDICATES "AND" GATE WITH A SWITCHED SIGNAL CAPABLE OF SIGNAL FLOW IN TWO DIRECTIONS
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G&N CONFIGURATIONS
   - E. TW, TL, OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.
6. SIGNAL REFERENCE
   - 1 27 VDC OIA ON
   - 2 27 VDC RLP LO
   - 3 27 VDC ISS LEVEL STANDBY
   - 4 GIMBAL SERVO TEST SELECTED
   - 5 INTERFACE LOAD TEST SELECTED
   - 6 FAILURE INDICATION TEST SELECTED
   - 7 TEST START, BUTTON DEPRESSED
   - 8 CLEAR
   - 9 SET
   - 10 TEST STARTED
   - 11 IMU ERROR SIGNALS
   - Ⓐ CONNECT TO THE OUTPUT OF GATE 1203



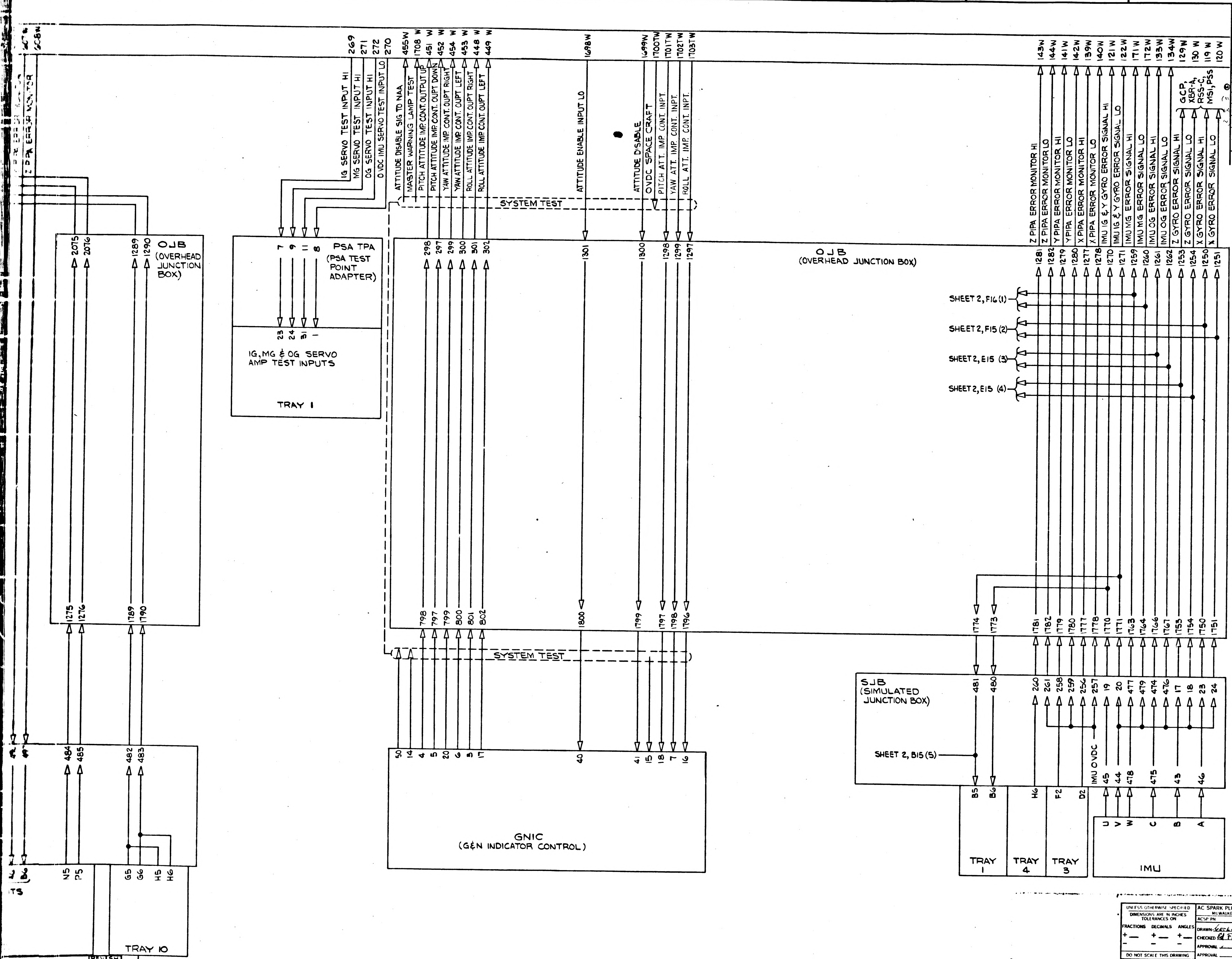
TES
(TEST SELECTOR)
1 27VDC RLP LO
548 27VDC RLP HI ISS LEVEL STBY (TCL 548)
538 27VDC OIA ON (FTR 538)
1004 27VDC RLP HI ISS LEVEL OPR (GPC 1004)
1032 27VDC RLP HI ISS LEVEL OPR (TCL 1032W)
1047 27VDC RLP HI ISS LEVEL OPR (TCL 1047W)
1045 27VDC RLP HI ISS LEVEL STBY (TCL 1045W)
1044 27VDC RLP LO ISS LEVEL STBY (TCL 1044W)
1033W FINE ALIGN INTERLOCK (TCL 1033W)
973W IG-OG POSITION INTLK (GPC 973W)
1002W IG-MG POSITION INTLK (GPC 1002W)
1007W MG-OG POSITION INTLK (GPC 1007W)
1034W IRIG TEST SELECTED (TCL 1034W)
1010W ENABLE IRIG TEST START (GPC 1010W)
ADSRAX 1
ADIAX 2
SFTGX 3
ADSRAZ 4
ADAIZ 5
ADAIZ 6
SFTGZ 7
Y-IRIG 8
IRIG TEST SELECTOR SWITCH
1,4,5,6,7
2,3
8
IRIG TEST POSITIONS
TEST COMMANDS
GATE VERIFICATION
GIMBAL SERVO TEST M
INTERFACE LOAD TEST M
FAILURE INDICATION TEST M
IRIG TEST M
TEST STAR
1 S T O C
IRIG TEST POSITIONS
742
27VDC RLP HI ISS OPR IND
523W
IRIG TEST SELECTED
X GYRO ERROR TO MG S/A
499W
X GYRO ERROR TO OG S/A
502W
INVERT Z GYRO ERROR
OIA BACKWALL
SEE TCL
OIA BACKWALL

2900206 REV LTR N SH 1

MIL FORM 1050 J3

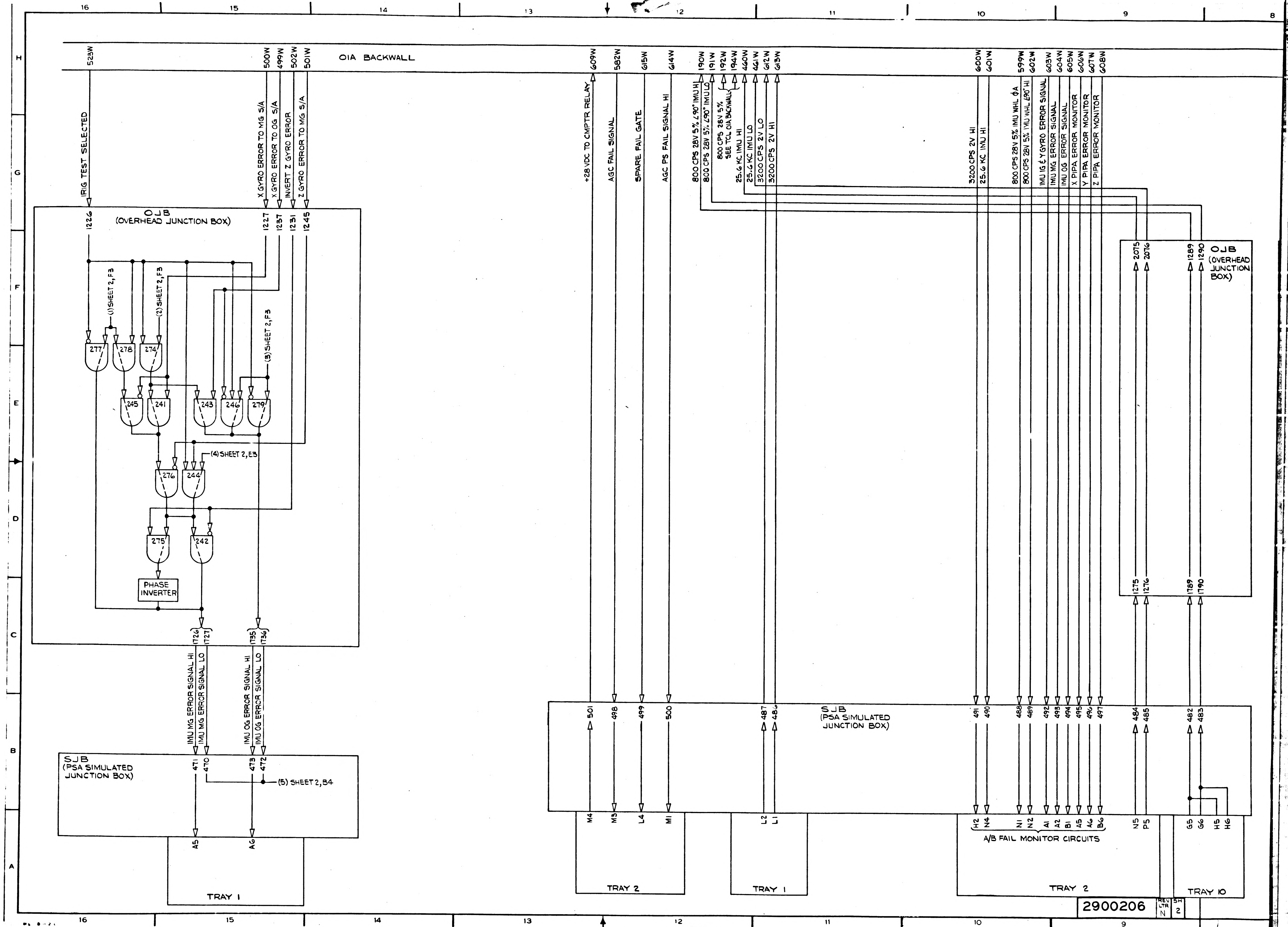
1/2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		1 SEP 65	RLP AU
B		REVISION STATUS CHANGED		7 SEP 65	LK
C		REVISION STATUS CHANGED		9 SEP 65	LK TAC
D		REVISION STATUS CHANGED		10 SEP	LK AU
E		REVISED PER TDPR 22002		13 SEP 65	LK
F		REVISION STATUS CHANGED		6 SEP 65	LK
G		REVISION STATUS CHANGED		21 SEP 65	LK
H		REVISION STATUS CHANGED		27 SEP 65	
J		REVISION STATUS CHANGED		6 OCT 65	RLP
K		REVISION STATUS CHANGED		10 NOV 65	RLP MEM
L		REVISION STATUS CHANGED		10 JAN 66	RLP
M		REVISION STATUS CHANGED		18 FEB 66	RLP
N		REVISED PER TDRR 26332		22 FEB 66	RLP MM



9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
Z PIPA ERROR MONITOR
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
269
271
272
270
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUTPUT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
455W
1708 W
451 W
452 W
454 W
453 W
448 W
449 W
ATTITUDE ENABLE INPUT LO
1698W
ATTITUDE DISABLE
OVDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
1699W
1700TW
1701TW
1702TW
1703TW
SYSTEM TEST
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIGNAL HI
IMU IG & Y GYRO ERROR SIGNAL LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
Z GYRO ERROR SIGNAL HI
Z GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
X GYRO ERROR SIGNAL LO
143W
144W
141W
142W
139W
140W
121W
122W
171W
172W
133W
134W
129W
130W
119W
120W
GCP, XBR-A, RSS-C, MSI, PSS
OJB (OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1789
1790
PSA TPA (PSA TEST POINT ADAPTER)
7
9
11
8
23
24
31
1
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
OJB (OVERHEAD JUNCTION BOX)
298
297
299
300
301
302
1301
1300
1298
1299
1297
798
797
799
800
801
802
1800
1799
1797
1798
1796
1281
1282
1279
1280
1277
1278
1270
1271
1259
1260
1261
1262
1253
1254
1250
1251
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (3)
SHEET 2, E15 (4)
1774
1773
1781
1782
1779
1780
1777
1778
1770
1771
1763
1764
1766
1767
1753
1754
1750
1751
484
485
482
483
N5
P5
G5
G6
H5
H6
TRAY 10
50
14
4
5
20
6
3
17
40
41
15
18
7
16
GNIC
(G&N INDICATOR CONTROL)
SJB (SIMULATED JUNCTION BOX)
481
480
260
261
258
259
256
257
19
20
477
479
474
476
17
18
23
24
SHEET 2, B15 (5)
IMU OVDC
45
44
478
475
43
46
B5
B6
H6
F2
D2
TRAY 1
TRAY 4
TRAY 3
U
V
W
C
B
A
IMU

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES +— +— +— — — —	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN Cochran DATE 22 MAY 65 CHECKED Ed Foster 9 JUN 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK I SERIES 100)
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974 SIZE J2 2900206
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — SHEET 2 OF 4

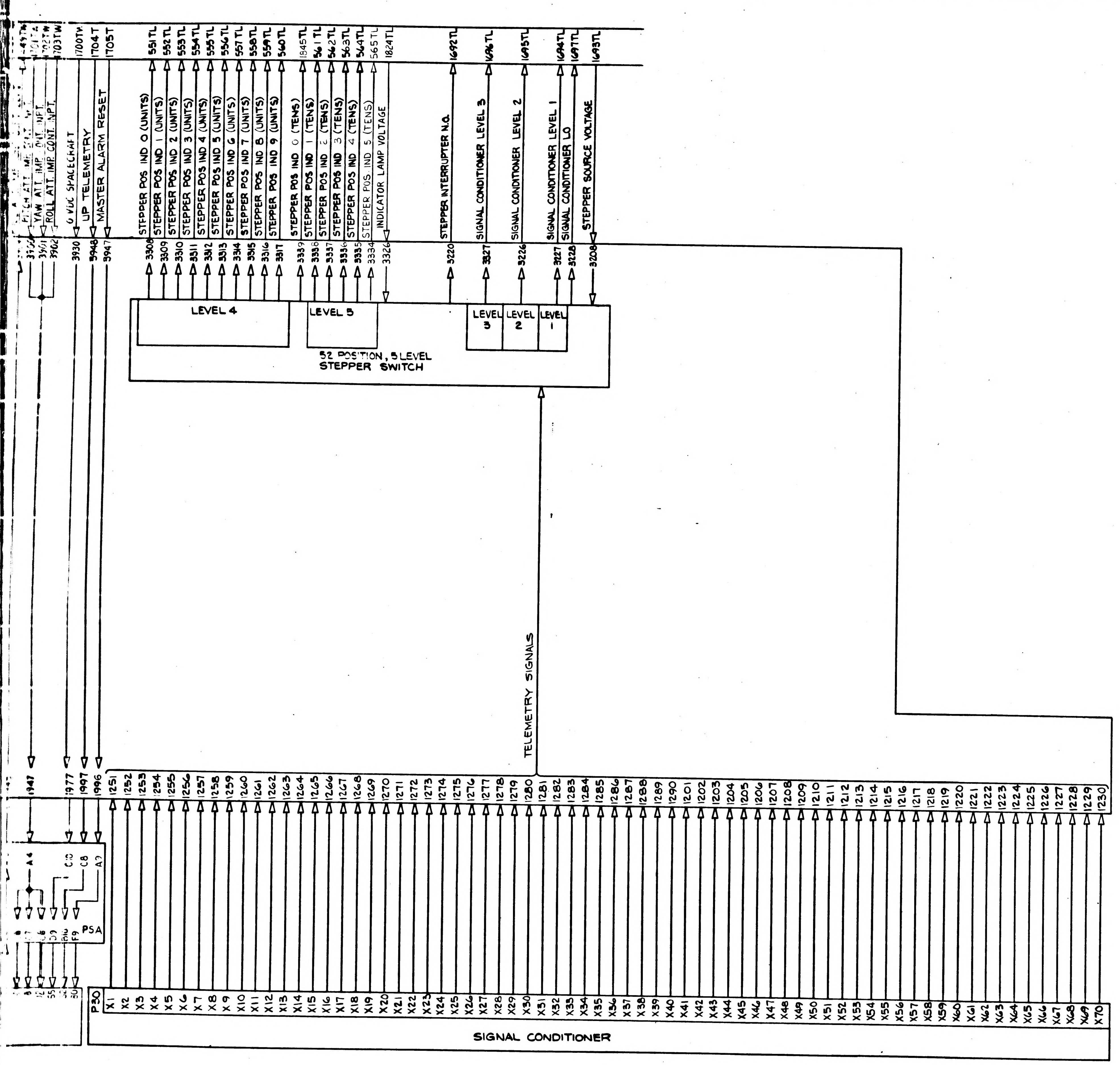


OIA BACKWALL
523W
IRIG TEST SELECTED
500W
499W
502W
501W
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
OJB
(OVERHEAD JUNCTION BOX)
1226
1227
1237
1231
1245
(1) SHEET 2, F3
(2) SHEET 2, F3
(3) SHEET 2, F3
(4) SHEET 2, E3
277
278
274
245
241
243
246
279
276
244
275
242
PHASE INVERTER
1726
1727
1735
1736
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
SJB
(PSA SIMULATED JUNCTION BOX)
471
470
473
472
(5) SHEET 2, B4
A5
A6
TRAY 1
609W
582W
615W
614W
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
190W
191W
192W
194W
460W
461W
612W
613W
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5% SEE TCL OIA BACKWALL
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ØA
800 CPS 28V 5% IMU WHL ∠90° HI
IMU IG & Y GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
OJB
(OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1789
1790
SJB
(PSA SIMULATED JUNCTION BOX)
501
498
499
500
487
486
491
490
488
489
492
493
494
495
496
497
484
485
482
483
M4
M3
L4
M1
L2
L1
H2
N4
N1
N2
A1
A2
B1
A5
A6
B6
N5
P5
G5
G6
H5
H6
A/B FAIL MONITOR CIRCUITS
TRAY 2
TRAY 1
TRAY 2
TRAY 10
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

2900206 REV LTR N SH 2

1/2900206

ZONE	LTR	DESCRIPTION	CHG NO	DATE	APPROVED
	L	REPLACES REV(K) WITH CHANGE PER TDRR 24855		10 JAN 66	KLP
	M	REVISED PER TDRR 24952		18 FEB 66	KLP
	N	REVISED PER TDRR 26332		22 FEB 66	KLP MEM



PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
1700TW
1701TW
1702TW
1703TW
1700TW
1704T
1705T
3900
3901
3902
3930
3948
3947
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 0 (TENS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS. IND 5 (TENS)
INDICATOR LAMP VOLTAGE
551TL 552TL 553TL 554TL 555TL 556TL 557TL 558TL 559TL 560TL
1845TL 561TL 562TL 563TL 564TL 565TL 1824TL
3308 3309 3310 3311 3312 3313 3314 3315 3316 3317
3339 3338 3337 3336 3335 3334 3326
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
1692TL 1696TL 1695TL 1694TL 1697TL 1693TL
3220 3227 3226 3227 3228 3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL
STEPPER SWITCH
TELEMETRY SIGNALS
1947
1977
1997
1996
1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290
1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220 1221 1222 1223 1224 1225 1226 1227 1228 1229 1230
A4
C10
C8
A3
F9
PSA
55
80
P30
X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21 X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38 X39 X40 X41 X42 X43 X44 X45 X46 X47 X48 X49 X50 X51 X52 X53 X54 X55 X56 X57 X58 X59 X60 X61 X62 X63 X64 X65 X66 X67 X68 X69 X70
SIGNAL CONDITIONER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± 3 PLACE DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS
DRAWN COOKMAN DATE 3 JUN 65
CHECKED FOSTER 9 JUN 65
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

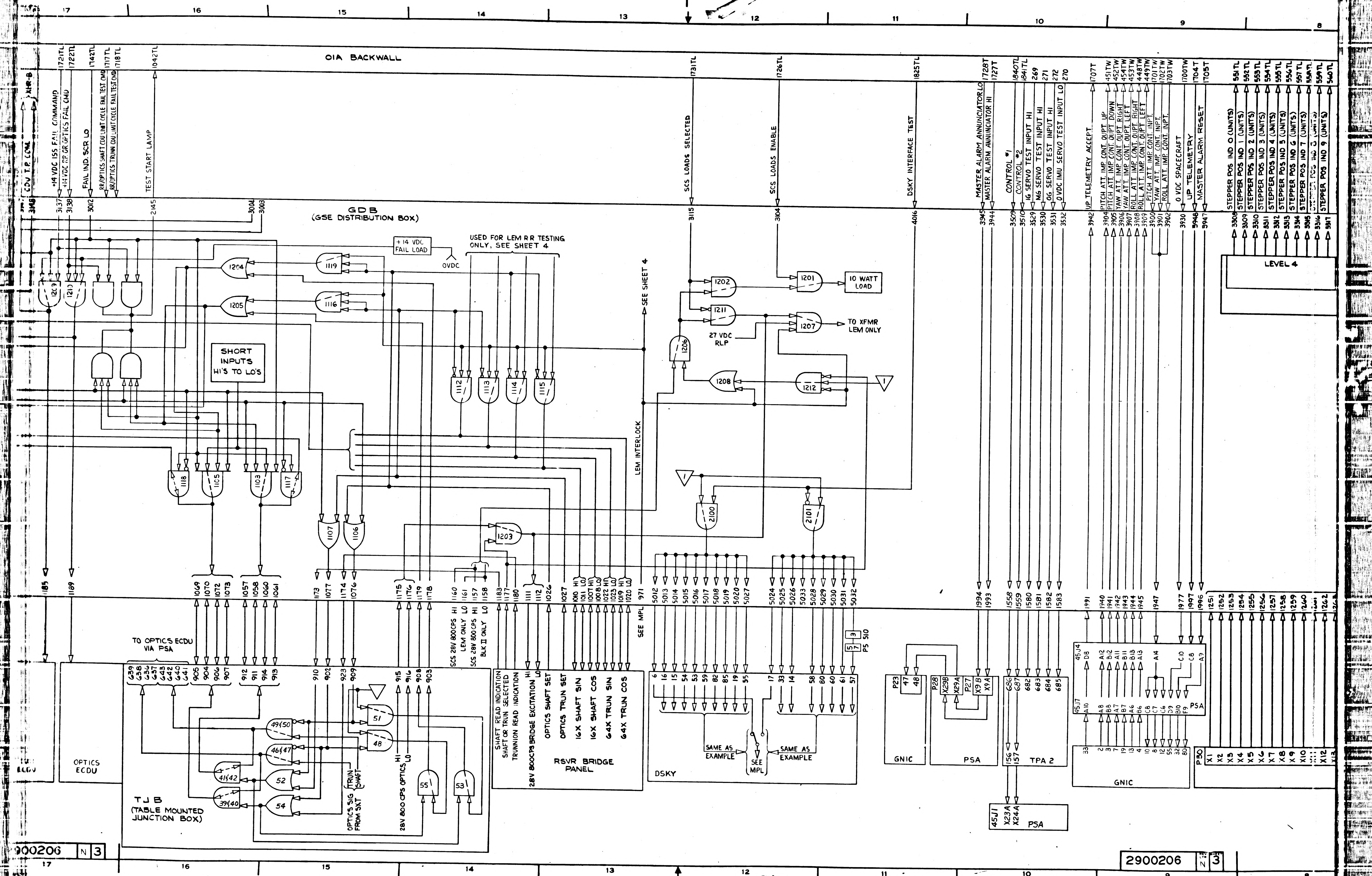
MANNED SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK II)

SIZE J2 CODE IDENT NO 99974 2900206
SCALE 3 OF 4

2900206 Z 3

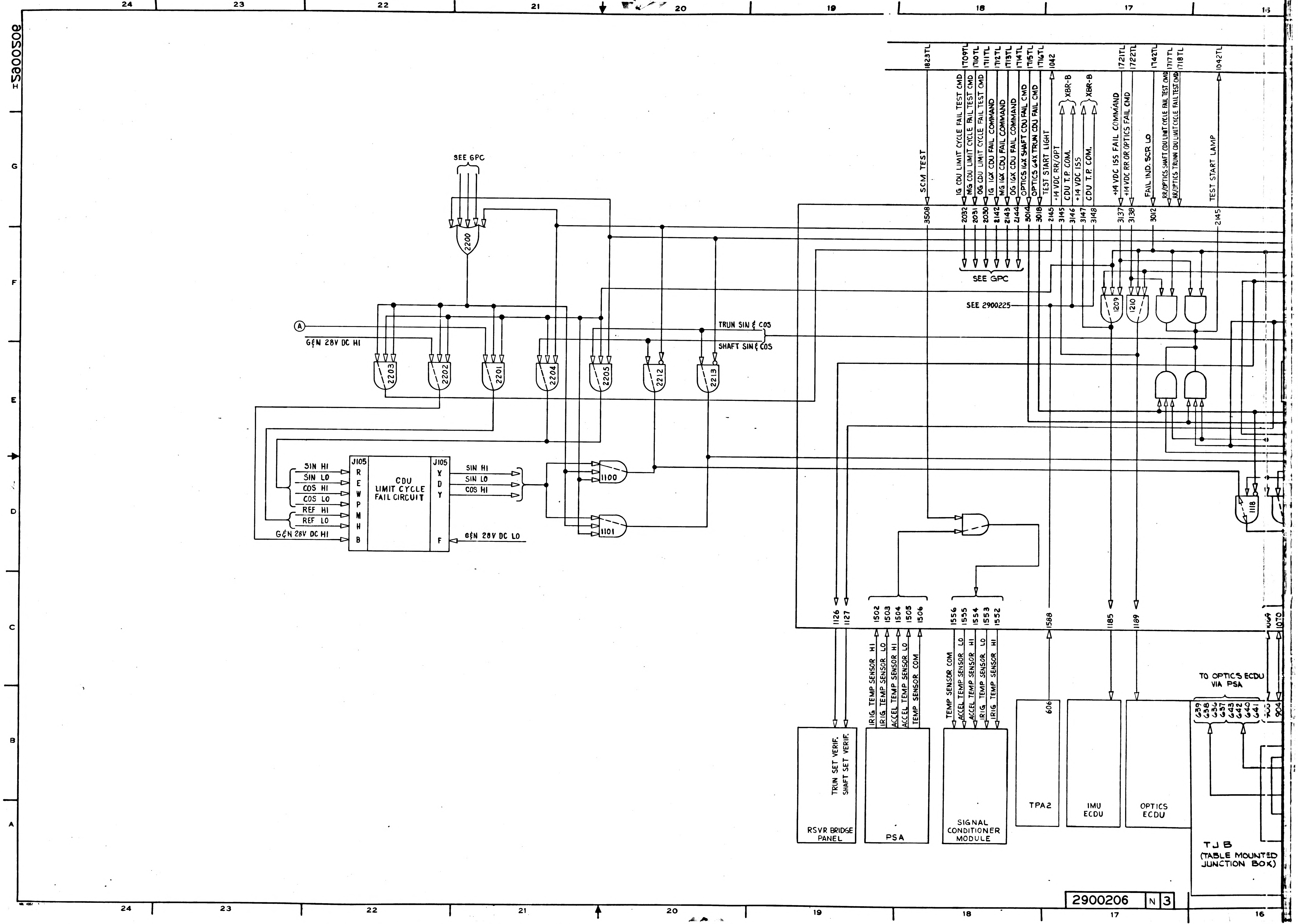
3729002 06


OIA BACKWALL
GDB
(GSE DISTRIBUTION BOX)
CDU T.P. COML
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
RR/OPTICS SHAFT CDU LIMIT CYCLE FAIL TEST CMD
RR/OPTICS TRUNN CDU LIMIT CYCLE FAIL TEST CMD
TEST START LAMP
1721TL
1722TL
1742TL
1717TL
1718TL
1042TL
3137
3138
3012
2145
3004
3003
+14 VDC FAIL LOAD
0VDC
USED FOR LEM RR TESTING ONLY, SEE SHEET 4
SHORT INPUTS HI'S TO LO'S
SEE SHEET 4
LEM INTERLOCK
SCS LOADS SELECTED
SCS LOADS ENABLE
DSKY INTERFACE TEST
1731TL
1726TL
1825TL
3115
3104
4016
10 WATT LOAD
TO XFMR LEM ONLY
27 VDC RLP
1204
1205
1119
1116
1209
1210
1112
1113
1114
1115
1118
1105
1103
1117
1107
1106
1203
1202
1211
1201
1207
1206
1208
1212
2100
2101
MASTER ALARM ANNUNCIATOR LO
MASTER ALARM ANNUNCIATOR HI
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
UP TELEMETRY ACCEPT
PITCH ATT. IMP. CONT. OUPT. UP
PITCH ATT. IMP. CONT. OUPT. DOWN
YAW ATT. IMP. CONT. OUPT. RIGHT
YAW ATT. IMP. CONT. OUPT. LEFT
ROLL ATT. IMP. CONT. OUPT. RIGHT
ROLL ATT. IMP. CONT. OUPT. LEFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
1728T
1727T
1840TL
1841TL
269
271
272
270
1707T
451TW
452TW
454TW
453TW
448TW
449TW
1701TW
1702TW
1703TW
1700TW
1704T
1705T
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
3945
3944
3509
3510
3529
3530
3531
3532
3942
3904
3905
3906
3907
3908
3909
3900
3901
3902
3930
3948
3947
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
LEVEL 4
1185
1189
1069
1070
1072
1073
1057
1058
1060
1061
1173
1077
1174
1076
1175
1176
1179
1178
1160
1161
1157
1158
1183
1177
1180
1111
1112
1026
1027
1010 HI
1011 LO
1007 HI
1008 LO
1022 HI
1023 LO
1019 HI
1020 LO
971
SEE MPL
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
5024
5025
5026
5033
5028
5029
5030
5031
5032
1994
1993
1558
1559
1580
1581
1582
1583
1991
1940
1941
1942
1943
1944
1945
1947
1977
1997
1996
1251
1252
1253
1254
1255
1256
1257
1258
1259
1260
1261
1262
SCS 28V 800CPS HI
LEM ONLY LO
SCS 28V 800CPS HI
BLK II ONLY LO
TO OPTICS ECDU VIA PSA
639
638
636
637
642
643
640
641
905
904
906
907
912
911
914
913
910
902
923
909
915
916
908
903
51
48
49&50
46&47
41&42
52
39&40
54
55
53
OPTICS SIG FROM SXT
TRUN SHAFT
28V 800 CPS OPTICS HI LO
ECDU
OPTICS ECDU
TJB
(TABLE MOUNTED JUNCTION BOX)
SHAFT READ INDICATION
SHAFT OR TRUN SELECTED
TRUNNION READ INDICATION
28V 800CPS BRIDGE EXCITATION HI LO
OPTICS SHAFT SET
OPTICS TRUN SET
16X SHAFT SIN
16X SHAFT COS
64X TRUN SIN
64X TRUN COS
RSVR BRIDGE PANEL
P5 510
6
16
15
54
53
59
82
85
19
55
17
14
58
80
60
61
57
SAME AS EXAMPLE
SEE MPL
DSKY
P23
47
48
GNIC
P28
X29B
X29A
P27
X9B
X9A
PSA
686
687
682
683
684
685
156
157
TPA 2
45J1
X23A
X24A
45J4
45J7
D8
A12
B12
A11
B11
A13
B13
A14
C10
C8
A9
A10
A8
B8
A7
B7
A6
B6
C7
C6
C5
B10
F9
33
2
3
7
19
13
4
10
8
12
55
32
80
P30
X1
X2
X3
X4
X5
X6
X7
X8
X9
X10
X11
X12
X13
17
16
15
14
13
12
11
10
9
8

2900206 N 3

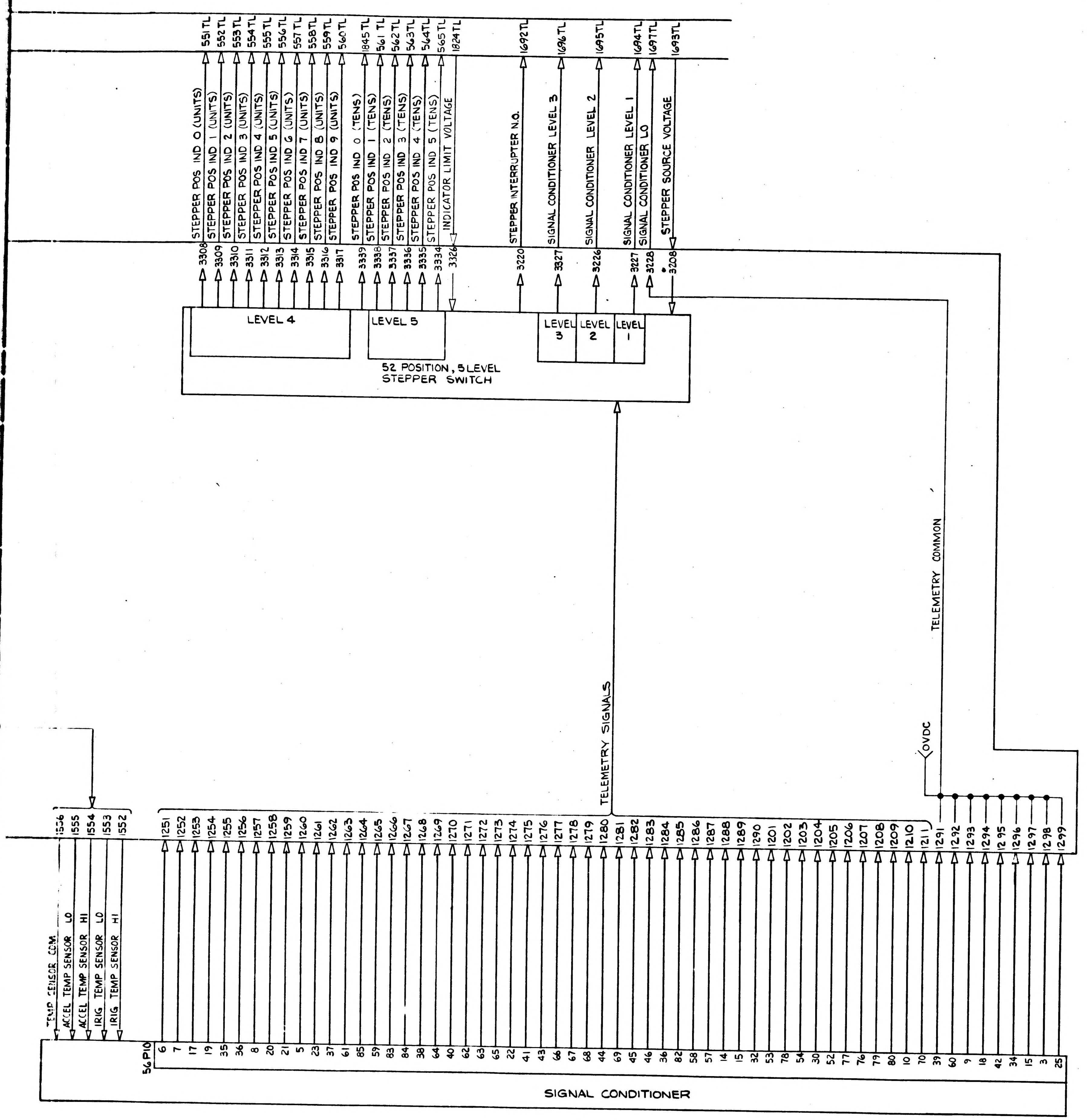
2900206 Z 3

27 2900206



24
23
22
21
20
19
18
17
16
G
F
E
D
C
B
A
SEE GPC
2200
2203
2202
2201
2204
2205
2212
2213
A
GEN 28V DC HI
TRUN SIN & COS
SHAFT SIN & COS
SIN HI
SIN LO
COS HI
COS LO
REF HI
REF LO
GEN 28V DC HI
J105
R
E
W
P
M
H
B
CDU
LIMIT CYCLE
FAIL CIRCUIT
J105
X
D
Y
F
SIN HI
SIN LO
COS HI
GEN 28V DC LO
1100
1101
1823TL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1042
1721TL
1722TL
1742TL
1717TL
1718TL
1042TL
SCM TEST
IG CDU LIMIT CYCLE FAIL TEST CMD
MG CDU LIMIT CYCLE FAIL TEST CMD
OG CDU LIMIT CYCLE FAIL TEST CMD
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
TEST START LIGHT
+14 VDC RR/OPT
CDU T.P. COM.
+14 VDC ISS
CDU T.P. COM.
XBR-B
XBR-B
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
RR/OPTICS SHAFT CDU LIMIT CYCLE FAIL TEST CMD
RR/OPTICS TRUNN CDU LIMIT CYCLE FAIL TEST CMD
TEST START LAMP
3508
2032
2031
2030
2142
2143
2144
3014
3018
2145
3145
3146
3147
3148
3137
3138
3012
2145
SEE GPC
SEE 2900225
1209
1210
1118
1126
1127
1502
1503
1504
1505
1506
1556
1555
1554
1553
1552
1588
1185
1189
1069
1070
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
TRUN SET VERIF.
SHAFT SET VERIF.
RSVR BRIDGE PANEL
PSA
SIGNAL CONDITIONER MODULE
606
TPA2
IMU ECDU
OPTICS ECDU
TO OPTICS ECDU VIA PSA
639
638
636
637
643
642
640
641
904
TJB
(TABLE MOUNTED JUNCTION BOX)
2900206
N
3

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO	DATE	APPROVED
	L	REPLACES REV (K) WITH CHANGE PER TDRR 24855		10 JAN 66	BP
	M	REVISED PER TDRR 24952		18 FEB 66	RP
	N	REVISION STATUS CHANGED		22 FEB 66	RP MCM


551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
1845TL
561TL
562TL
563TL
564TL
565TL
1824TL
1692TL
1696TL
1695TL
1694TL
1697TL
1693TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 0 (TENS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LIMIT VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3339
3338
3337
3336
3335
3334
3326
3220
3327
3226
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
TELEMETRY SIGNALS
TELEMETRY COMMON
0VDC
1556
1555
1554
1553
1552
1251
1252
1253
1254
1255
1256
1257
1258
1259
1260
1261
1262
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1292
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1294
1295
1296
1297
1298
1299
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
56P10
6
7
17
19
35
36
8
20
21
5
23
37
61
85
59
83
84
38
64
40
62
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36
82
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54
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76
79
80
10
70
39
60
9
18
42
34
15
3
25
SIGNAL CONDITIONER

2900206 | 4

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± 3 PLACE DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

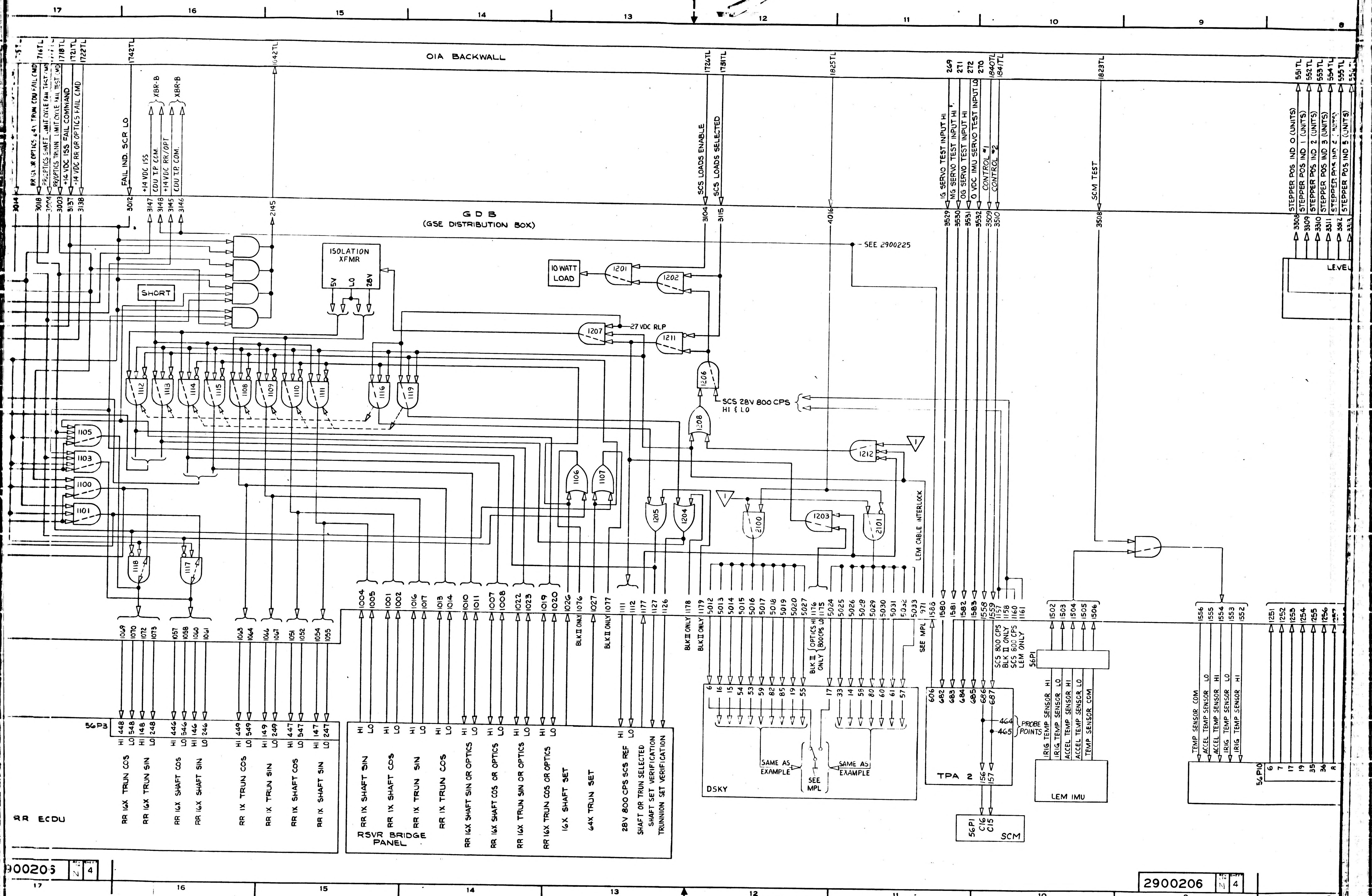
AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN COOKMAN DATE 7 JUN 65
CHECKED ED FOSTER 9 JUN 65
APPROVAL J. M. WATSON
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL W K

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
TEST SELECTOR
(LEM)

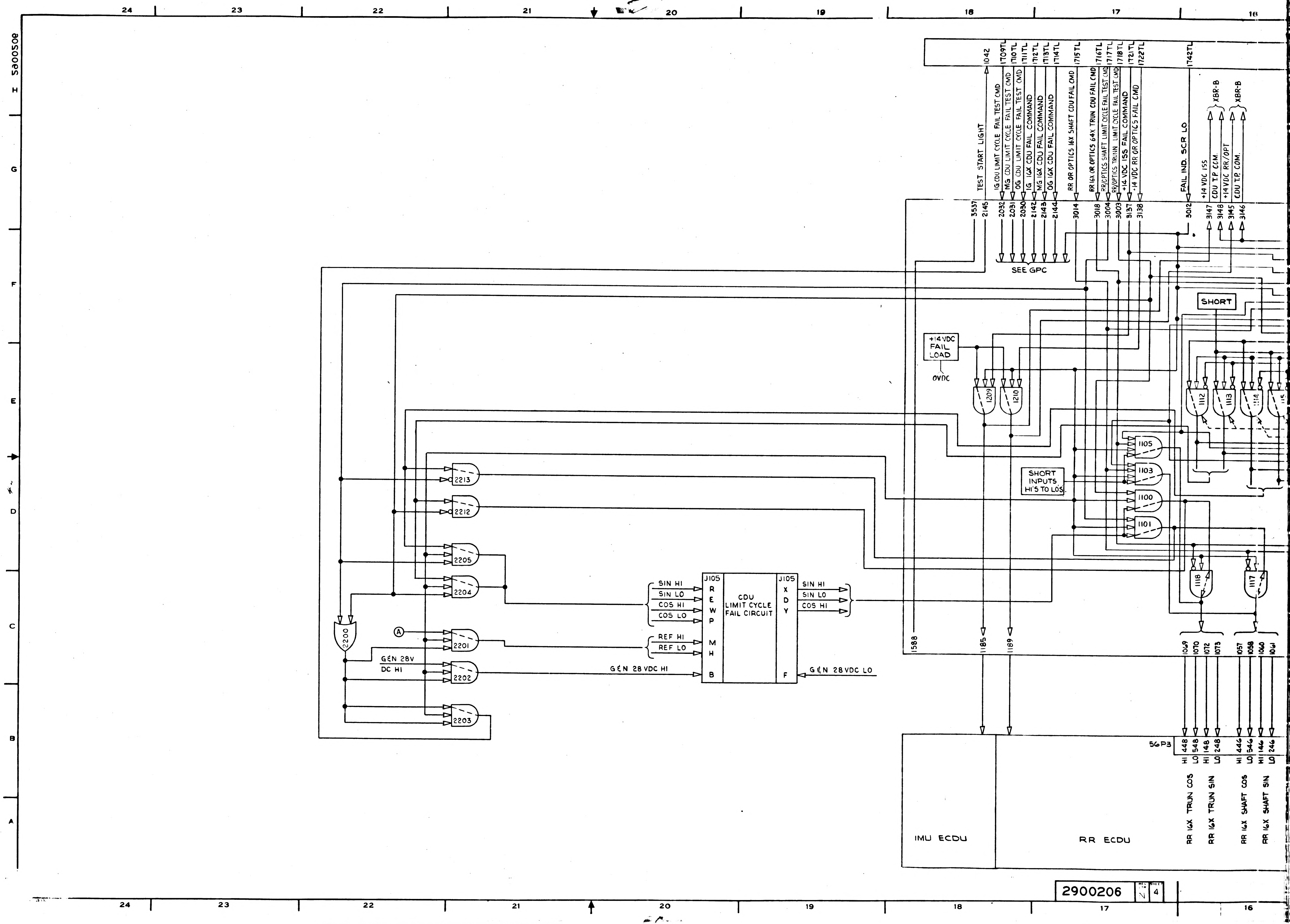
SIZE J3 | CODE IDENT NO 99974 | 2900206
SCALE — | SHEET 4 OF 4

37 2900206

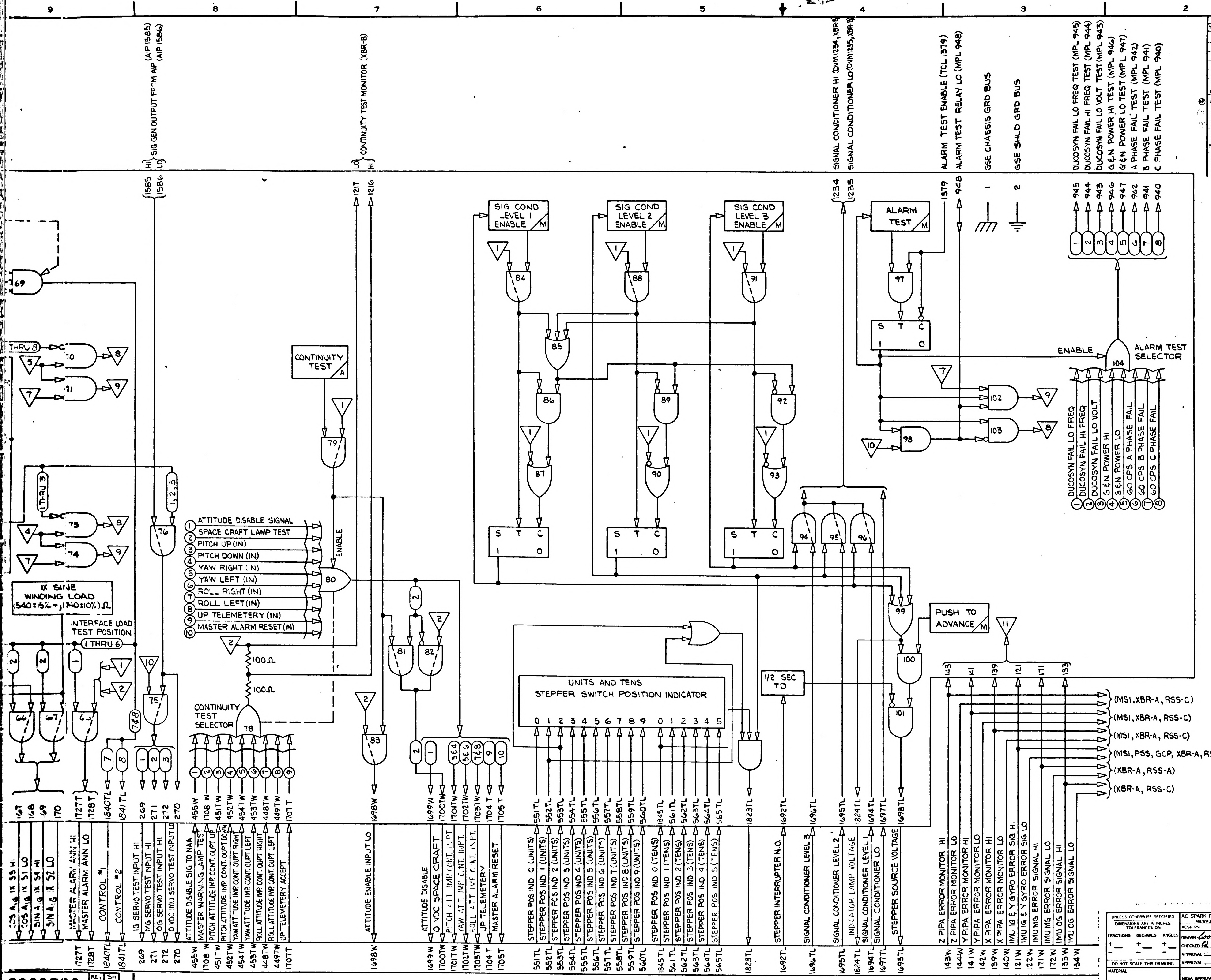


17
16
15
14
13
12
11
10
9
8
OIA BACKWALL
1716TL
1718TL
1721TL
1722TL
1742TL
1642TL
1726TL
1731TL
1825TL
269
271
272
270
1840TL
1841TL
1823TL
551TL
552TL
553TL
554TL
555TL
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
PR/OPTICS SHAFT LIMIT CYCLE FAIL TEST CMD
PR/OPTICS TRUNN LIMIT CYCLE FAIL TEST CMD
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
+14 VDC ISS
CDU T.P. COM.
+14 VDC RR/OPT
CDU T.P. COM.
XBR-B
XBR-B
SCS LOADS ENABLE
SCS LOADS SELECTED
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
O VDC IMU SERVO TEST INPUT LO
CONTROL #1
CONTROL #2
SCM TEST
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
3014
3018
3004
3003
3137
3138
3012
3147
3148
3145
3146
2145
3104
3115
4016
3529
3530
3531
3532
3509
3510
3508
3308
3309
3310
3311
3312
3313
G D B
(GSE DISTRIBUTION BOX)
SEE 2900225
LEVEL
ISOLATION XFMR
5V
LO
28V
SHORT
10 WATT LOAD
1201
1202
1207
1211
27 VDC RLP
1206
SCS 28V 800 CPS HI & LO
1208
1212
1112
1113
1114
1115
1108
1109
1110
1111
1116
1119
1105
1103
1100
1101
1106
1107
1205
1204
2100
1203
2101
1118
1117
LEM CABLE INTERLOCK
1069 1070 1072 1073
1057 1058 1060 1061
1063 1064
1066 1067
1051 1052
1054 1055
1004 1005
1001 1002
1016 1017
1013 1014
1010 1011
1007 1008
1022 1023
1019 1020
1026 1076
BLK II ONLY
1027 1077
BLK II ONLY
1112 1112
1177 1126
1178 1179
BLK II ONLY
BLK II ONLY
5012 5013 5014 5015 5016 5017 5018 5019 5020 5027
1176 1175
OPTICS HI 800CPS LO
BLK II ONLY
5024 5025 5026 5028 5029 5030 5031 5032 5033
971
SEE MPL
1566
1580 1581 1582 1583 1558 1559 1157 1158 1160 1161
SCS 800 CPS
BLK II ONLY
SCS 800 CPS
LEM ONLY
1502 1503 1504 1505 1506
56PI
1556 1555 1554 1553 1552
1251 1252 1253 1254 1255 1256
56P3
448 548 148 248
446 546 146 246
449 549 149 249
447 547 147 247
HI LO HI LO
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
RR 1X TRUN COS
RR 1X TRUN SIN
RR 1X SHAFT COS
RR 1X SHAFT SIN
RR ECDU
RR 1X SHAFT SIN
RR 1X SHAFT COS
RR 1X TRUN SIN
RR 1X TRUN COS
RR 16X SHAFT SIN OR OPTICS
RR 16X SHAFT COS OR OPTICS
RR 16X TRUN SIN OR OPTICS
RR 16X TRUN COS OR OPTICS
16X SHAFT SET
64X TRUN SET
28V 800 CPS SCS REF
SHAFT OR TRUN SELECTED
SHAFT SET VERIFICATION
TRUNNION SET VERIFICATION
RSVR BRIDGE PANEL
6 16 15 54 53 59 82 85 19 55
17 33 14 58 80 60 61 57
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
DSKY
606 682 683 684 685 686 687
464
465
PROBE POINTS
TPA 2
156 157
56PI C16 C15
SCM
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
LEM IMU
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
56P10
6 7 17 19 35 36
900206 4
2900206 4

2729002Q6


TEST START LIGHT
IG CDU LIMIT CYCLE FAIL TEST CMD
MG CDU LIMIT CYCLE FAIL TEST CMD
OG CDU LIMIT CYCLE FAIL TEST CMD
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
RR OR OPTICS 16X SHAFT CDU FAIL CMD
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
RR/OPTICS SHAFT LIMIT CYCLE FAIL TEST CMD
RR/OPTICS TRUNN LIMIT CYCLE FAIL TEST CMD
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
+14 VDC ISS
CDU T.P. CCM.
+14 VDC RR/OPT
CDU T.P. COM.
XBR-B
XBR-B
1042
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1717TL
1718TL
1721TL
1722TL
1742TL
3537
2145
2032
2031
2030
2142
2143
2144
3014
3018
3004
3003
3137
3138
3012
3147
3148
3145
3146
SEE GPC
SHORT
+14 VDC FAIL LOAD
0VDC
1209
1210
1112
1113
1114
1115
1105
1103
1100
1101
SHORT INPUTS HI'S TO LOS
1118
1117
2213
2212
2205
2204
2200
2201
2202
2203
A
GEN 28V DC HI
SIN HI
SIN LO
COS HI
COS LO
REF HI
REF LO
GEN 28 VDC HI
J105
R
E
W
P
M
H
B
CDU LIMIT CYCLE FAIL CIRCUIT
J105
X
D
Y
F
SIN HI
SIN LO
COS HI
GEN 28 VDC LO
1588
1185
1189
1069
1070
1072
1073
1057
1058
1060
1061
56P3
HI 448
LO 548
HI 148
LO 248
HI 446
LO 546
HI 146
LO 246
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
IMU ECDU
RR ECDU
24
23
22
21
20
19
18
17
16
H
G
F
E
D
C
B
A
2900206
4

1/2900206


9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
HI SIG GEN OUTPUT FROM AIP (AIP 1585)
LO (AIP 1586)
1585
1586
LO CONTINUITY TEST MONITOR (XBR-B)
HI
1217
1216
SIGNAL CONDITIONER HI (DVM1234, XBR-B)
SIGNAL CONDITIONER LO (DVM1235, XBR-B)
1234
1235
ALARM TEST ENABLE (TCL 1379)
ALARM TEST RELAY LO (MPL 948)
GSE CHASSIS GRD BUS
GSE SHLD GRD BUS
1379
948
1
2
DUCOSYN FAIL LO FREQ TEST (MPL 945)
DUCOSYN FAIL HI FREQ TEST (MPL 944)
DUCOSYN FAIL LO VOLT TEST (MPL 943)
G&N POWER HI TEST (MPL 946)
G&N POWER LO TEST (MPL 947)
A PHASE FAIL TEST (MPL 942)
B PHASE FAIL TEST (MPL 941)
C PHASE FAIL TEST (MPL 940)
945
944
943
946
947
942
941
940
SIG COND LEVEL 1 ENABLE M
SIG COND LEVEL 2 ENABLE M
SIG COND LEVEL 3 ENABLE M
ALARM TEST M
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
S T C
I O
ENABLE
ALARM TEST SELECTOR
DUCOSYN FAIL LO FREQ
DUCOSYN FAIL HI FREQ
DUCOSYN FAIL LO VOLT
G&N POWER HI
G&N POWER LO
60 CPS A PHASE FAIL
60 CPS B PHASE FAIL
60 CPS C PHASE FAIL
69
70
71
73
74
75
76
78
79
80
81
82
83
THRU 8
THRU 3
1,2,3
CONTINUITY TEST A
ENABLE
ATTITUDE DISABLE SIGNAL
SPACE CRAFT LAMP TEST
PITCH UP (IN)
PITCH DOWN (IN)
YAW RIGHT (IN)
YAW LEFT (IN)
ROLL RIGHT (IN)
ROLL LEFT (IN)
UP TELEMETERY (IN)
MASTER ALARM RESET (IN)
1X SINE WINDING LOAD (540±15% + j1740±10%) Ω
INTERFACE LOAD TEST POSITION
1 THRU 6
66
67
68
7&8
100Ω
100Ω
CONTINUITY TEST SELECTOR
PUSH TO ADVANCE M
UNITS AND TENS STEPPER SWITCH POSITION INDICATOR
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
1/2 SEC TD
143
141
139
121
171
133
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, PSS, GCP, XBR-A, RSS-A)
(XBR-A, RSS-A)
(XBR-A, RSS-C)
167
168
169
170
1727T
1728T
1840TL
1841TL
269
271
272
270
455W
1708W
451TW
452TW
454TW
453TW
448TW
449TW
1707T
1698W
1699W
1700TW
1701TW
1702TW
1703TW
1704T
1705T
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
1845TL
561TL
562TL
563TL
564TL
565TL
1823TL
1692TL
1696TL
1695TL
1824TL
1694TL
1697TL
1693TL
COS A 1G 1X 53 HI
COS A 1G 1X 51 LO
SIN A 1G 1X 54 HI
SIN A 1G 1X 52 LO
MASTER ALARM ANN HI
MASTER ALARM ANN LO
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP CONT OUPT UP
PITCH ATTITUDE IMP CONT OUPT DOWN
YAW ATTITUDE IMP CONT OUPT RIGHT
YAW ATTITUDE IMP CONT OUPT LEFT
ROLL ATTITUDE IMP CONT OUPT RIGHT
ROLL ATTITUDE IMP CONT OUPT LEFT
UP TELEMETERY ACCEPT
ATTITUDE ENABLE INPUT LO
ATTITUDE DISABLE
0 VDC SPACE CRAFT
PITCH ATT IMP CONT INPT
YAW ATT IMP CONT INPT
ROLL ATT IMP CONT INPT
UP TELEMETRY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 0 (TENS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
INDICATOR LAMP VOLTAGE
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIG HI
IMU IG & Y GYRO ERROR SIG LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
143W
144W
141W
142W
139W
140W
121W
122W
171W
172W
133W
134W
2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APP'D
A		REVISED PER TDRR 21905		1 SEP 65	RLP AU
B		REVISED PER TDRR 22006		7 SEP 65	LK
C		REVISED PER TDRR 22004		9 SEP 65	LK
D		REVISED PER TDRR 22005		10 SEP 65	LK AU
E		REVISED PER TDRR 22002		13 SEP 65	LK
F		REVISED PER TDRR 22003		16 SEP 65	LK
G		REVISED PER TDRR 22001		21 SEP 65	LK
H		REVISED PER TDRR 22000		27-SEP-65	
J		REVISED PER TDRR 22743		6 OCT 65	RLP
K		REVISION STATUS CHANGED		10 NOV 65	RLP MEM
L		REVISED PER TDRR 24855		10 JAN 66	RLP
M		REVISED PER TDRR 24952		18 FEB 66	RLP
N		REVISED PER TDRR 26332		22 FEB 66	RLP MEM
P		REVISION STATUS CHANGED		23 FEB 66	RWT RWH

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Cookman DATE 24 MAY 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
TEST SELECTOR
(BLOCK I SERIES 100, BLOCK II & LEM)

CODE IDENT NO 99974
SIZE J3
2900206
SCALE —
SHEET 1 OF 4

2900206 REL SH 1

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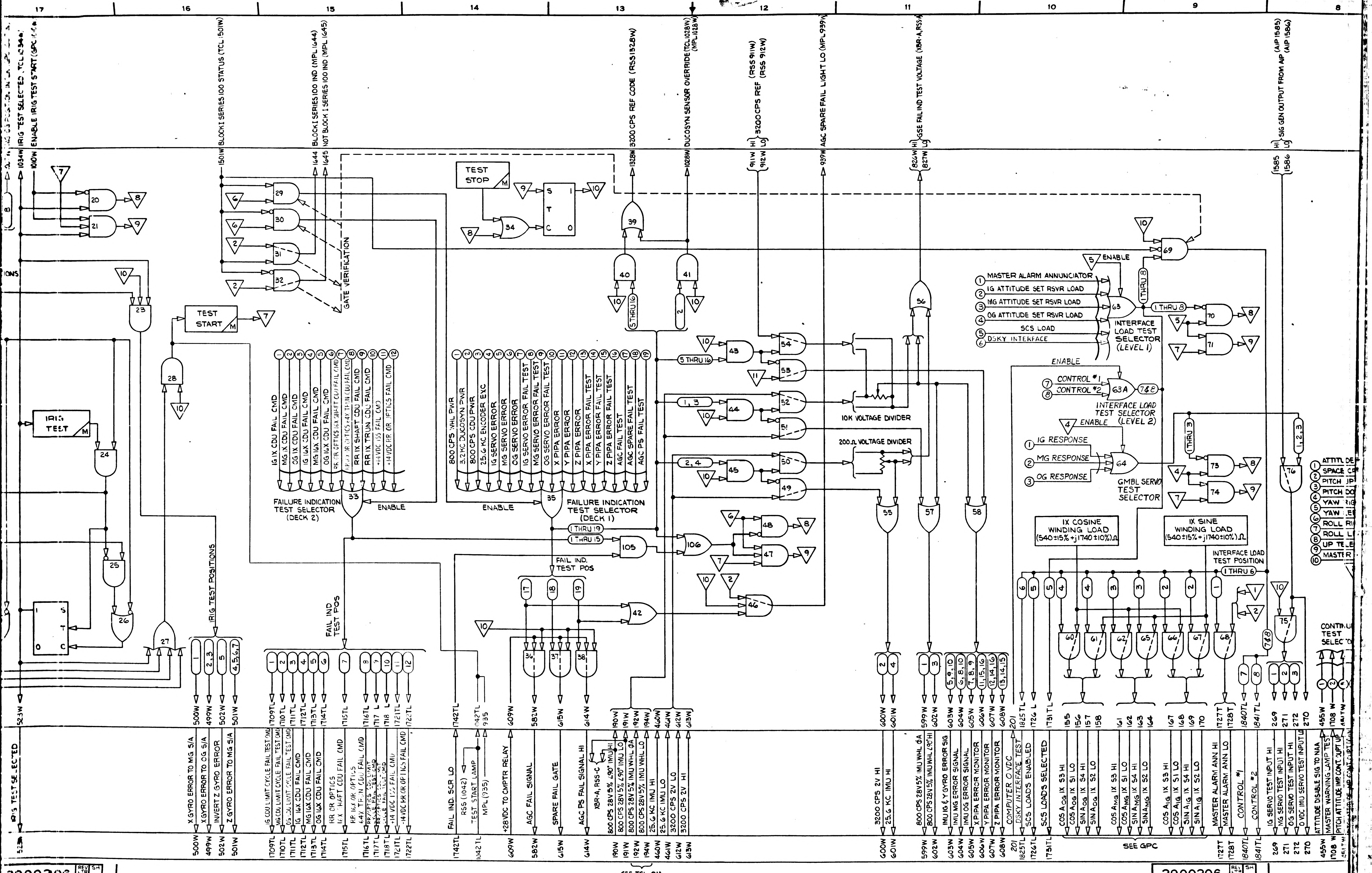

17
16
15
14
13
12
11
10
9
8
1034W IRIG TEST SELECTED (TCL 1034A)
1010W ENABLE IRIG TEST START (GPC 1010A)
1501W BLOCK I SERIES 100 STATUS (TCL 1501W)
1644 BLOCK I SERIES 100 IND (MPL 1644)
1645 NOT BLOCK I SERIES 100 IND (MPL 1645)
1328W 3200 CPS REF CODE (RSS 1328W)
1028W DUCOSYN SENSOR OVERRIDE (TCL 1028W) (MPL 1028W)
911W HI 912W LO 3200 CPS REF (RSS 911W) (RSS 912W)
939W AGC SPARE FAIL LIGHT LO (MPL 939W)
826W HI 827W LO GSE FAIL IND TEST VOLTAGE (XBR-A, RSS-A)
1585 HI 1586 LO SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
TEST STOP
TEST START
IRIG TEST
GATE VERIFICATION
FAILURE INDICATION TEST SELECTOR (DECK 2)
FAILURE INDICATION TEST SELECTOR (DECK 1)
ENABLE
IG IX CDU FAIL CMD
MG IX CDU FAIL CMD
OG IX CDU FAIL CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
RR OR OPTICS 16X SHAFT CDU FAIL CMD
RR 1X SHAFT CDU FAIL CMD
RR 1X TRUN CDU FAIL CMD
+14 VDC SS FAIL CMD
-14 VDC RR OR OPTICS FAIL CMD
800 CPS WHL PWR
3.2 KC DUCOSYN PWR
800 CPS CDU PWR
25.6 KC ENCODER EXC
IG SERVO ERROR
MG SERVO ERROR
OG SERVO ERROR
IG SERVO ERROR FAIL TEST
MG SERVO ERROR FAIL TEST
OG SERVO ERROR FAIL TEST
X PIPA ERROR
Y PIPA ERROR
Z PIPA ERROR
X PIPA ERROR FAIL TEST
Y PIPA ERROR FAIL TEST
Z PIPA ERROR FAIL TEST
AGC FAIL TEST
AGC PS FAIL TEST
FAIL IND TEST POS
IRIG TEST POSITIONS
10K VOLTAGE DIVIDER
200Ω VOLTAGE DIVIDER
MASTER ALARM ANNUNCIATOR
IG ATTITUDE SET RSVR LOAD
MG ATTITUDE SET RSVR LOAD
OG ATTITUDE SET RSVR LOAD
SCS LOAD
DSKY INTERFACE
INTERFACE LOAD TEST SELECTOR (LEVEL 1)
CONTROL #1
CONTROL #2
INTERFACE LOAD TEST SELECTOR (LEVEL 2)
IG RESPONSE
MG RESPONSE
OG RESPONSE
GMBL SERVO TEST SELECTOR
1X COSINE WINDING LOAD (540±15%+j1740±10%)Ω
1X SINE WINDING LOAD (540±15%+j1740±10%)Ω
INTERFACE LOAD TEST POSITION
ATTITUDE
SPACE
PITCH
PITCH
YAW
YAW
ROLL
ROLL
UP TEL
MASTER
CONTINU TEST SELECTO
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
IG CDU LIMIT CYCLE FAIL TEST CMD
MG CDU LIMIT CYCLE FAIL TEST CMD
OG CDU LIMIT CYCLE FAIL TEST CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
RR OR OPTICS 16X CDU FAIL CMD
RR 16X OR OPTICS
+14 VDC SS FAIL CMD
-14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
RSS (1042)
TEST START LAMP
MPL (935)
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
XBR-A, RSS-C
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5% IMU WHL ∅A
800 CPS 28V 5% IMU WHL LO
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ∅A
800 CPS 28V 5% IMU WHL ∅B HI
IMU IG & Y GYRO ERROR SIG
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
COMPUTER 0 VDC
DSKY INTERFACE TEST
SCS LOADS ENABLED
SCS LOADS SELECTED
COS A OG 1X S3 HI
COS A OG 1X S1 LO
SIN A OG 1X S4 HI
SIN A OG 1X S2 LO
COS A MG 1X S3 HI
COS A MG 1X S1 LO
SIN A MG 1X S4 HI
SIN A MG 1X S2 LO
COS A IG 1X S3 HI
COS A IG 1X S1 LO
SIN A IG 1X S4 HI
SIN A IG 1X S2 LO
MASTER ALARM ANN HI
MASTER ALARM ANN LO
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP CONT OUPT UP
SEE GPC
SEE TCL 01A BACKWALL
523W
IRIG TEST SELECTED

2900206 REV SH 1

2900206 REV SH 1

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NOTES:

1. INTERFRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM)

2900210	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR)
RLP	RELAY & LAMP POWER SUPPLY
2900208	POWER & DUMMY LOAD-PRIMARY SIGNAL SELECTOR (PDL)
PSS	PRIMARY SIGNAL SELECTOR
2900223	GIMBAL POSITION CONTROL (GPC)
2900207	MONITOR PANEL (MPL)
2900202	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
2900217	SIGNAL SELECTION & MEASUREMENT
XBR-A	CROSSBAR - AC SIGNALS
XBR-B	CROSSBAR - DC SIGNALS
DVM	DIGITAL VOLTMETER
2900218	OSCILLOGRAPH SIGNAL SELECTION
RSS-A	TO FIXED AC CHANNEL
RSS-B	TO FIXED DC CHANNEL
RSS-C	TO SWITCHABLE AC CHANNEL
RSS-D	TO SWITCHABLE DC CHANNEL
2900215	MEASUREMENT REFERENCE POWER SUPPLIES
RSS	OSCILLOGRAPH SIGNAL SELECTOR
2900211	AUXILIARY INPUT-OUTPUT & CALIBRATION (AIP)
2900212	PIPA & IRIG MONITORING
MSI	PHASE SHIFT PANEL
2900200	GYRO CAGING PANEL (GCP)

4. NONSTANDARD SYMBOLS

INDICATES "AND" GATE WITH SWITCHED SIGNAL

① ② INDICATES EXCLUSIVE "OR" GATE WITH SWITCH POSITIONS 1 & 2

NAME M — INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME A — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

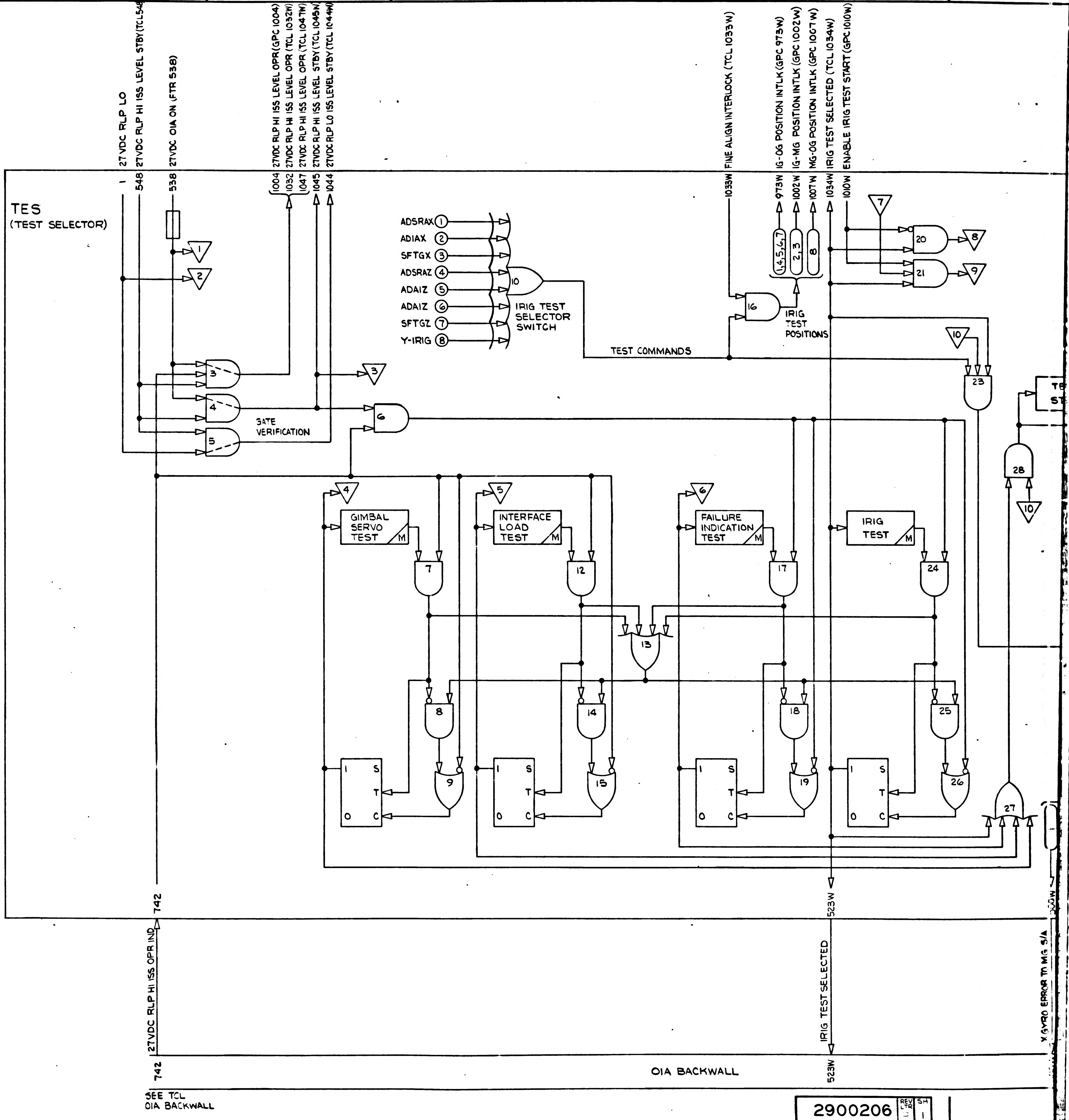
INDICATES "AND" GATE WITH A SWITCHED SIGNAL CAPABLE OF SIGNAL FLOW IN TWO DIRECTIONS

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G&N CONFIGURATIONS
   - E. TW, TL, OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

6. SIGNAL REFERENCE

1	27 VDC OIA ON
2	27 VDC RLP LO
3	27 VDC ISS LEVEL STANDBY
4	GIMBAL SERVO TEST SELECTED
5	INTERFACE LOAD TEST SELECTED
6	FAILURE INDICATION TEST SELECTED
7	TEST START, BUTTON DEPRESSED
8	CLEAR
9	SET
10	TEST STARTED
11	IMU ERROR SIGNALS

Ⓐ CONNECT TO THE OUTPUT OF GATE 1203



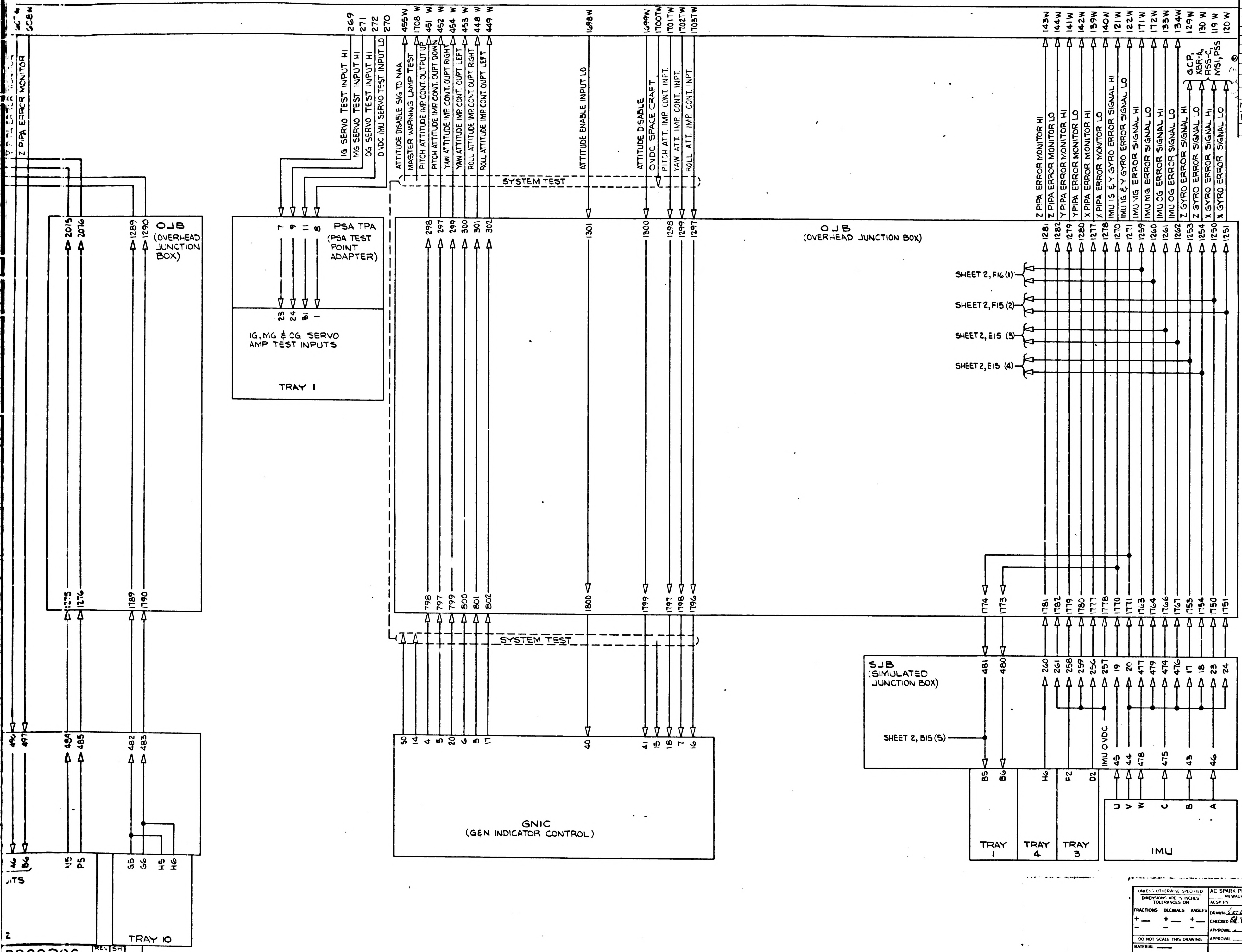
27 VDC RLP LO
1
27VDC RLP HI ISS LEVEL STBY (TCL 548
548
27VDC OIA ON (FTR 538)
538
27VDC RLP HI ISS LEVEL OPR (GPC 1004)
27VDC RLP HI ISS LEVEL OPR (TCL 1032W)
27VDC RLP HI ISS LEVEL OPR (TCL 1047W)
27VDC RLP HI ISS LEVEL STBY (TCL 1045W)
27VDC RLP LO ISS LEVEL STBY (TCL 1044W)
1004
1032
1047
1045
1044
FINE ALIGN INTERLOCK (TCL 1033W)
1033W
IG-OG POSITION INTLK (GPC 973W)
IG-MG POSITION INTLK (GPC 1002W)
MG-OG POSITION INTLK (GPC 1007W)
IRIG TEST SELECTED (TCL 1034W)
ENABLE IRIG TEST START (GPC 1010W)
973W
1002W
1007W
1034W
1010W
1,4,5,6,7
2,3
8
TES
(TEST SELECTOR)
ADSRAX ①
ADIAX ②
SFTGX ③
ADSRAZ ④
ADAIZ ⑤
ADAIZ ⑥
SFTGZ ⑦
Y-IRIG ⑧
IRIG TEST SELECTOR SWITCH
IRIG TEST POSITIONS
TEST COMMANDS
GATE VERIFICATION
GIMBAL SERVO TEST M
INTERFACE LOAD TEST M
FAILURE INDICATION TEST M
IRIG TEST M
S T C
1 0
TE
ST
742
27VDC RLP HI ISS OPR IND
523W
IRIG TEST SELECTED
X GYRO ERROR TO MG S/A
OIA BACKWALL
SEE TCL OIA BACKWALL

2900206 REV LTR SH 1

MIL FORM 1050 J3

1/2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		1 SEP 65	RLP AU
B		REVISION STATUS CHANGED		7 SEP 65	LK
C		REVISION STATUS CHANGED		9 SEP 65	LK JBC
D		REVISION STATUS CHANGED		10 SEP 65	LK AU
E		REVISED PER TDRR 22002		13 SEP 65	LK
F		REVISION STATUS CHANGED		6 SEP 65	LK
G		REVISION STATUS CHANGED		21 SEP 65	LK
H		REVISION STATUS CHANGED		27 SEP 65	
J		REVISION STATUS CHANGED		6 OCT 65	RLP
K		REVISION STATUS CHANGED		10 NOV 65	RLP MEM
L		REVISION STATUS CHANGED		10 JAN 66	RLP
M		REVISION STATUS CHANGED		18 FEB 66	RLP
N		REVISED PER TDRR 26332		22 FEB 66	RLP MM
P		REVISION STATUS CHANGED		23 FEB 66	RWT RWH


9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
Z PIPA ERROR MONITOR
SC8 N
1289
1290
OJB (OVERHEAD JUNCTION BOX)
2015
2076
1275
1276
1789
1790
496
497
484
485
482
483
A6
B6
N5
P5
G5
G6
H5
H6
TRAY 10
269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
PSA TPA (PSA TEST POINT ADAPTER)
7
9
11
8
23
24
31
1
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
455W
1708 W
451 W
452 W
454 W
453 W
448 W
449 W
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUTPUT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
1698W
ATTITUDE ENABLE INPUT LO
1699W
1700TW
1701TW
1702TW
1703TW
ATTITUDE DISABLE
OVDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
SYSTEM TEST
OJB (OVERHEAD JUNCTION BOX)
298
297
299
300
301
302
1301
1300
1298
1299
1297
798
797
799
800
801
802
1800
1799
1797
1798
1796
SYSTEM TEST
50
14
4
5
20
6
5
17
40
41
15
18
7
16
GNIC (G&N INDICATOR CONTROL)
143W
144W
141W
142W
139W
140W
121W
122W
171W
172W
133W
134W
129W
130 W
119 W
120 W
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIGNAL HI
IMU IG & Y GYRO ERROR SIGNAL LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
Z GYRO ERROR SIGNAL HI
Z GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
X GYRO ERROR SIGNAL LO
GCP, XBR-A, RSS-C, MSI, PSS
1281
1282
1279
1280
1277
1278
1270
1271
1259
1260
1261
1262
1253
1254
1250
1251
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (3)
SHEET 2, E15 (4)
1774
1773
1781
1782
1779
1780
1777
1778
1770
1771
1763
1764
1766
1767
1753
1754
1750
1751
SJB (SIMULATED JUNCTION BOX)
481
480
260
261
258
259
256
257
19
20
477
479
474
476
17
18
23
24
SHEET 2, B15 (5)
IMU OVDC
45
44
478
475
43
46
B5
B6
H6
F2
D2
TRAY 1
TRAY 4
TRAY 3
U
V
W
C
B
A
IMU

2900206 | REV LTR P | SH 2

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Lochman DATE 22 MAY 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

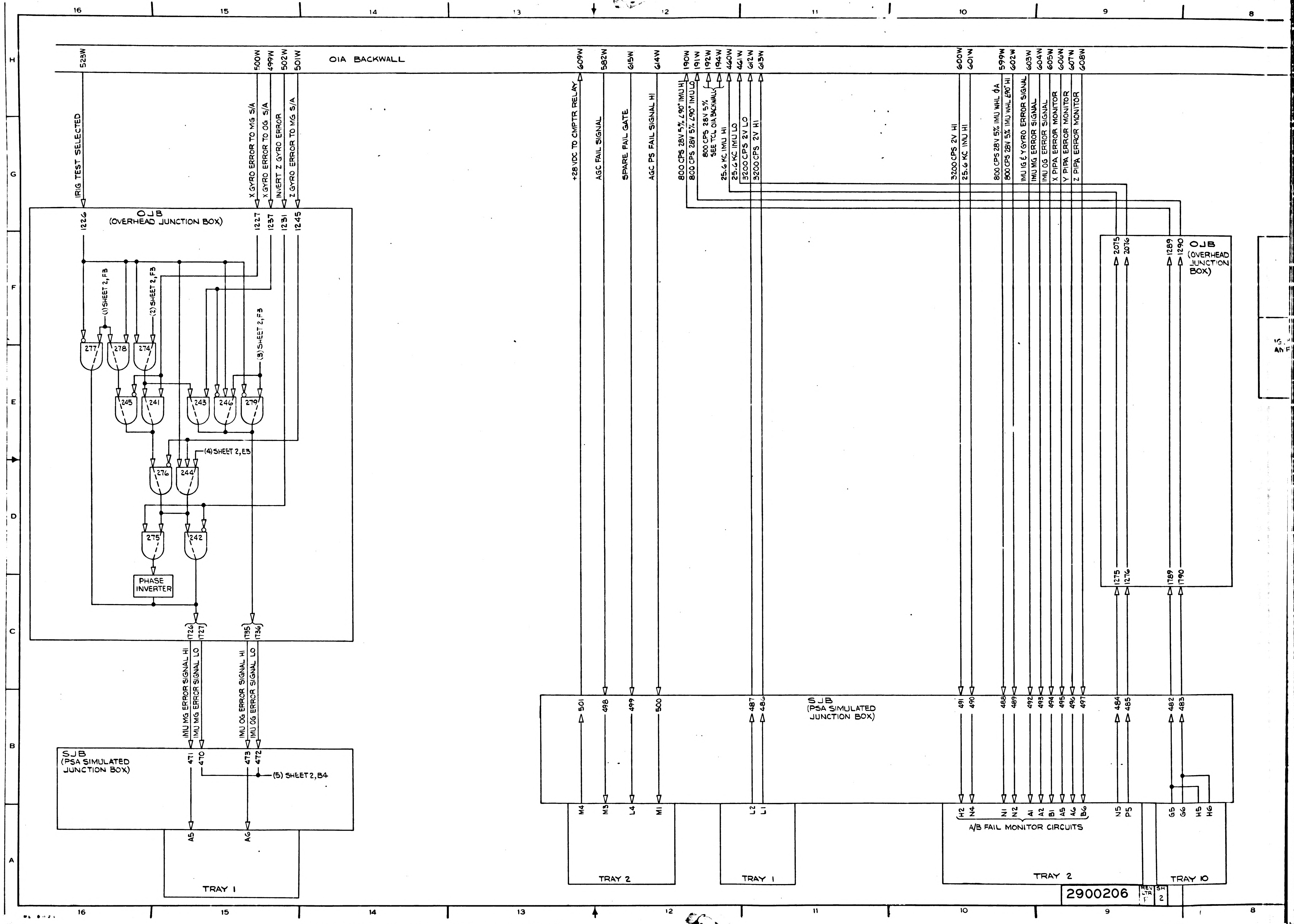
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM -
TEST SELECTOR
(BLOCK I SERIES 100)

CODE IDENT NO 99974 | SIZE J2 | 2900206
SCALE — | SHEET 2 OF 4

3H

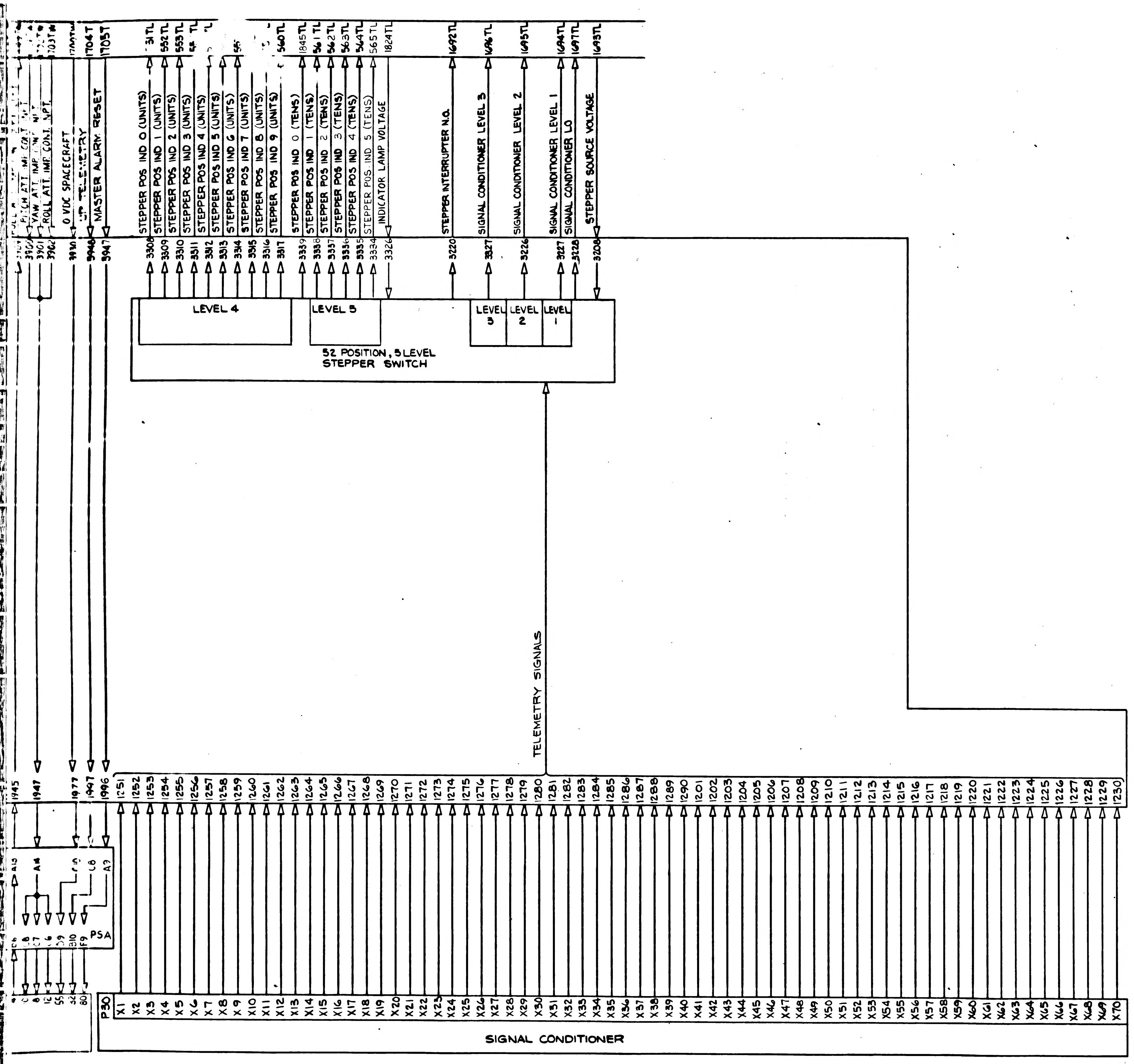
2/2900206



OIA BACKWALL
523W
IRIG TEST SELECTED
500W
499W
502W
501W
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
OJB
(OVERHEAD JUNCTION BOX)
1226
1227
1237
1231
1245
(1) SHEET 2, F3
(2) SHEET 2, F3
(3) SHEET 2, F3
(4) SHEET 2, E3
277
278
274
245
241
243
246
279
276
244
275
242
PHASE INVERTER
1726
1727
1735
1736
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
SJB
(PSA SIMULATED JUNCTION BOX)
471
470
473
472
(5) SHEET 2, B4
A5
A6
TRAY 1
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5% SEE TCL OIA BACKWALL
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ϕA
800 CPS 28V 5% IMU WHL ∠90° HI
IMU IG & Y GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
2075
2076
1289
1290
OJB
(OVERHEAD JUNCTION BOX)
1275
1276
1789
1790
SJB
(PSA SIMULATED JUNCTION BOX)
501
498
499
500
487
486
491
490
488
489
492
493
494
495
496
497
484
485
482
483
M4
M3
L4
M1
TRAY 2
L2
L1
TRAY 1
H2
N4
N1
N2
A1
A2
B1
A5
A6
B6
A/B FAIL MONITOR CIRCUITS
N5
P5
TRAY 2
G5
G6
H5
H6
TRAY 10
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
2900206
REV LTR T
SH 2

1/2900206

ZONE	LTR	DESCRIPTION	CHG NO	DATE	APPROVED
	L	REPLACES REV(K) WITH CHANGE PER TDRR 24855		10 JAN 66	RLP
	M	REVISED PER TDRR 24952		18 FEB 66	RLP
	N	REVISED PER TDRR 26332		22 FEB 66	RLP
	P	REVISED PER TDRR 26339		28 FEB 66	RWT


PITCH ATT. IMP. CONT. NPT.
YAW ATT. IMP. CONT. NPT.
ROLL ATT. IMP. CONT. NPT.
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
1703T
1704T
1705T
3900
3901
3902
3930
3946
3947
551TL
552TL
553TL
560TL
1845TL
561TL
562TL
563TL
564TL
565TL
1824TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 0 (TENS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS. IND 5 (TENS)
INDICATOR LAMP VOLTAGE
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3339
3338
3337
3336
3335
3334
3326
1692TL
1696TL
1695TL
1694TL
1697TL
1693TL
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3220
3227
3226
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
TELEMETRY SIGNALS
1945
1947
1977
1997
1996
1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220 1221 1222 1223 1224 1225 1226 1227 1228 1229 1230
A15
A14
C10
C8
A9
PSA
C6
C8
C7
C6
C9
B10
F9
10
8
12
55
32
80
P30
X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21 X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38 X39 X40 X41 X42 X43 X44 X45 X46 X47 X48 X49 X50 X51 X52 X53 X54 X55 X56 X57 X58 X59 X60 X61 X62 X63 X64 X65 X66 X67 X68 X69 X70
SIGNAL CONDITIONER

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± 3 PLACE DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

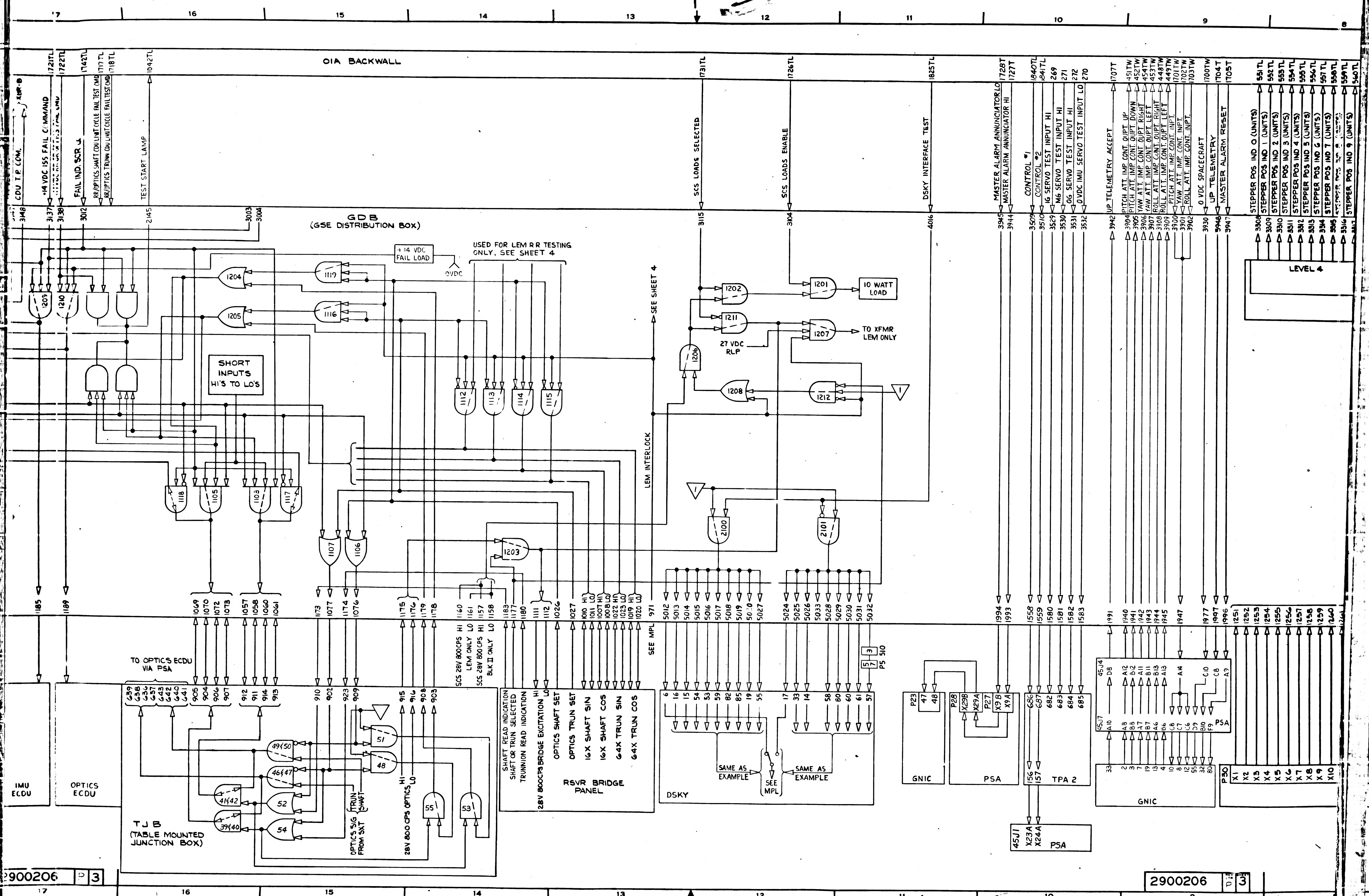
NEXT ASSY | USED ON
APPLICATION

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN COOKMAN DATE 3 JUN 65
CHECKED FOSTER 9 JUN 65
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

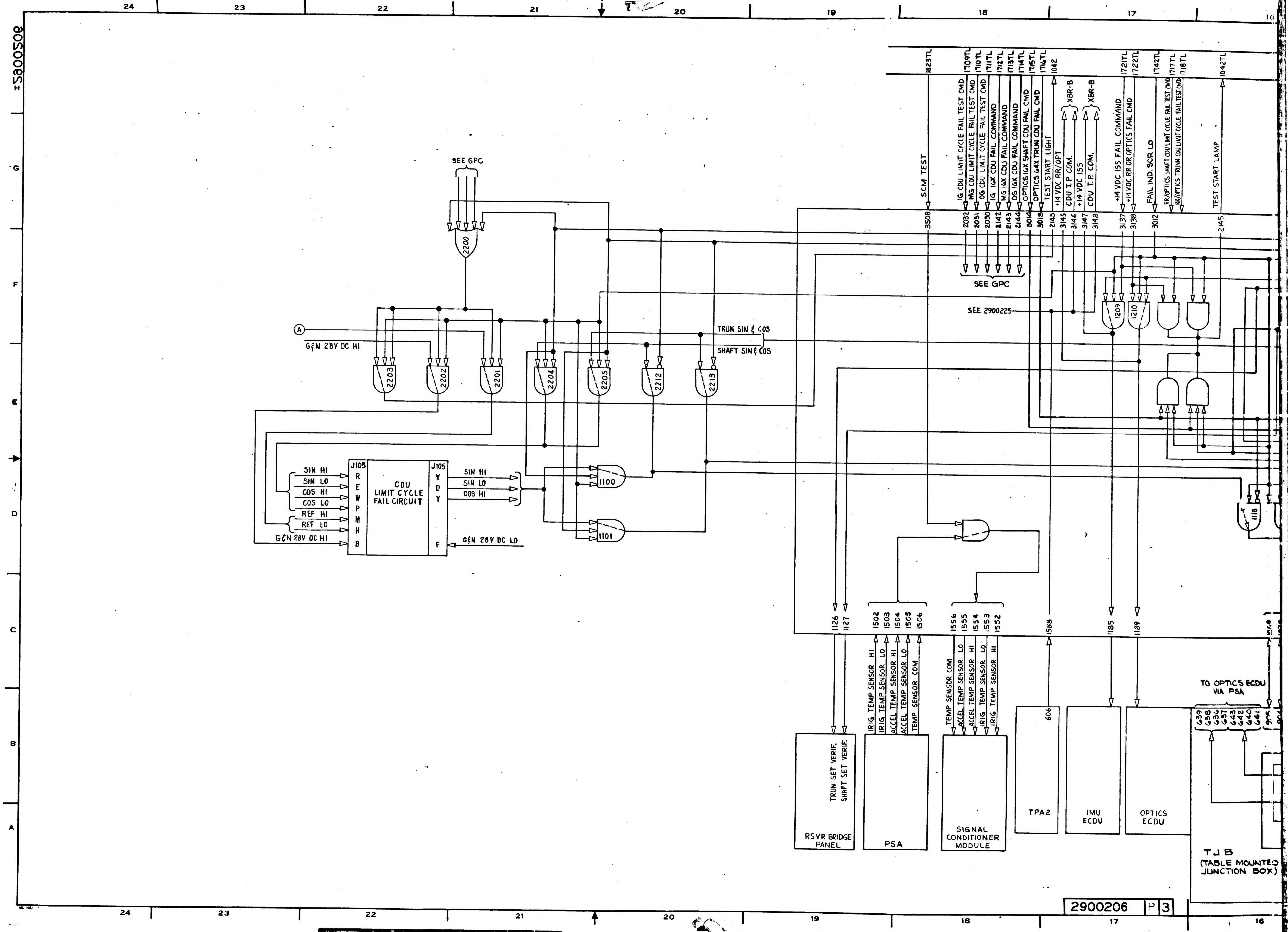
MANNED SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM -
TEST SELECTOR
(BLOCK II)

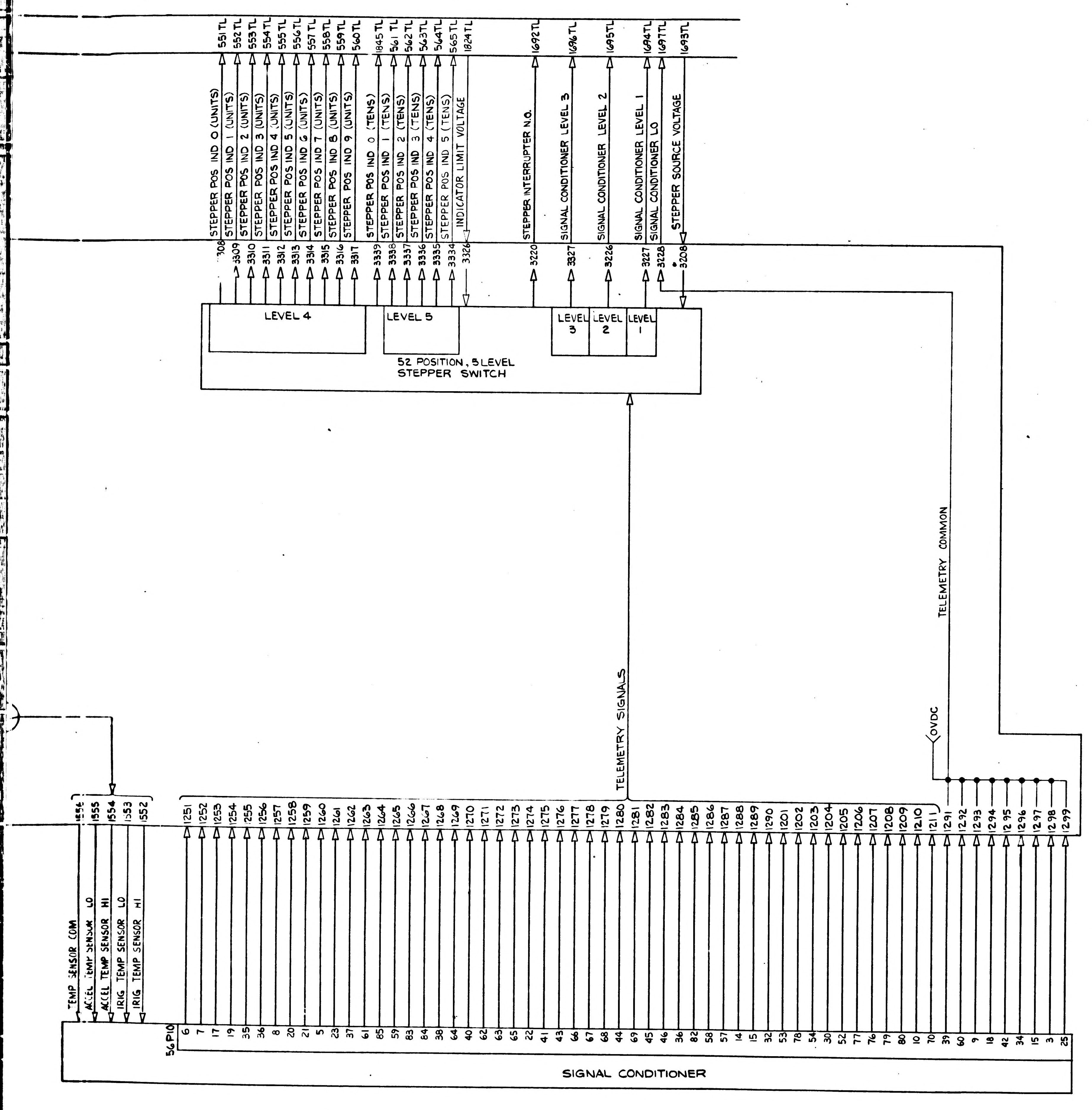
SIZE J2 CODE IDENT NO 99974 2900206
SCALE 3 OF 4


OIA BACKWALL
GDB
(GSE DISTRIBUTION BOX)
CDU T.P. COM.
+14 VDC ISS FAIL COMMAND
FAIL IND SCR
RR/OPTICS SHAFT CDU LIMIT CYCLE FAIL TEST CMD
RR/OPTICS TRUNN CDU LIMIT CYCLE FAIL TEST CMD
TEST START LAMP
+14 VDC FAIL LOAD
0VDC
USED FOR LEM R R TESTING ONLY, SEE SHEET 4
SHORT INPUTS HI'S TO LO'S
SEE SHEET 4
LEM INTERLOCK
SCS LOADS SELECTED
SCS LOADS ENABLE
10 WATT LOAD
TO XFMR LEM ONLY
27 VDC RLP
DSKY INTERFACE TEST
MASTER ALARM ANNUNCIATOR LO
MASTER ALARM ANNUNCIATOR HI
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0VDC IMU SERVO TEST INPUT LO
UP TELEMETRY ACCEPT
PITCH ATT. IMP. CONT. OUPT. UP
PITCH ATT. IMP. CONT. OUPT. DOWN
YAW ATT. IMP. CONT. OUPT. RIGHT
YAW ATT. IMP. CONT. OUPT. LEFT
ROLL ATT. IMP. CONT. OUPT. RIGHT
ROLL ATT. IMP. CONT. OUPT. LEFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
LEVEL 4
1209 1210 1204 1205 1119 1116 1112 1113 1114 1115 1118 1105 1103 1117 1107 1106 1203 1202 1211 1201 1207 1206 1208 1212 2100 2101
TO OPTICS ECDU VIA PSA
IMU ECDU
OPTICS ECDU
TJB (TABLE MOUNTED JUNCTION BOX)
49&50 46&47 41&42 39&40 51 48 52 54 55 53
TRUN SHAFT
OPTICS SIG FROM SXT
28V 800 CPS OPTICS HI LO
SCS 28V 800CPS HI
LEM ONLY LO
SCS 28V 800CPS HI
BLK II ONLY LO
SHAFT READ INDICATION
SHAFT OR TRUN SELECTED
TRUNNION READ INDICATION
28V 800CPS BRIDGE EXCITATION HI LO
OPTICS SHAFT SET
OPTICS TRUN SET
16X SHAFT SIN
16X SHAFT COS
64X TRUN SIN
64X TRUN COS
RSVR BRIDGE PANEL
SEE MPL
DSKY
SAME AS EXAMPLE
SEE MPL
P5 510
GNIC
PSA
TPA 2
45J1 X23A X24A PSA
45J4 45J7
GNIC
P30 X1 X2 X3 X4 X5 X6 X7 X8 X9 X10
17 16 15 14 13 12 11 10 9 8
2900206 D 3

27 2900206


SEE GPC
2200
2203
2202
2201
2204
2205
2212
2213
A
GEN 28V DC HI
TRUN SIN & COS
SHAFT SIN & COS
J105
R
E
W
P
M
H
B
SIN HI
SIN LO
COS HI
COS LO
REF HI
REF LO
GEN 28V DC HI
CDU LIMIT CYCLE FAIL CIRCUIT
J105
X
D
Y
F
SIN HI
SIN LO
COS HI
GEN 28V DC LO
1100
1101
1823TL
SCM TEST
3508
1709TL
IG CDU LIMIT CYCLE FAIL TEST CMD
2032
1710TL
MG CDU LIMIT CYCLE FAIL TEST CMD
2031
1711TL
OG CDU LIMIT CYCLE FAIL TEST CMD
2030
1712TL
IG 16X CDU FAIL COMMAND
2142
1713TL
MG 16X CDU FAIL COMMAND
2143
1714TL
OG 16X CDU FAIL COMMAND
2144
1715TL
OPTICS 16X SHAFT CDU FAIL CMD
5014
1716TL
OPTICS 64X TRUN CDU FAIL CMD
3018
1042
TEST START LIGHT
2145
+14 VDC RR/OPT
3145
CDU T.P. COM.
3146
+14 VDC ISS
3147
CDU T.P. COM.
3148
XBR-B
XBR-B
1721TL
+14 VDC ISS FAIL COMMAND
3137
1722TL
+14 VDC RR OR OPTICS FAIL CMD
3138
1742TL
FAIL IND. SCR LO
3012
1717TL
RR/OPTICS SHAFT CDU LIMIT CYCLE FAIL TEST CMD
1718TL
RR/OPTICS TRUN CDU LIMIT CYCLE FAIL TEST CMD
1042TL
TEST START LAMP
2145
SEE GPC
SEE 2900225
1209
1210
1118
1126
1127
TRUN SET VERIF.
SHAFT SET VERIF.
RSVR BRIDGE PANEL
1502
1503
1504
1505
1506
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
PSA
1556
1555
1554
1553
1552
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
SIGNAL CONDITIONER MODULE
1588
606
TPA2
1185
IMU ECDU
1189
OPTICS ECDU
TO OPTICS ECDU VIA PSA
639
638
636
637
643
642
640
641
TJB (TABLE MOUNTED JUNCTION BOX)
24
23
22
21
20
19
18
17
16
G
F
E
D
C
B
A

ZONE	LTR	DESCRIPTION	CHG NO	DATE	APPROVED
	L	REPLACES REV (K) WITH CHANGE PER TDRR 24855		10 JAN 66	RP
	M	REVISED PER TDRR 24952		18 FEB 66	RP
	N	REVISION STATUS CHANGED		22 FEB 66	RP MLM
	P	REVISED PER TDRR 26339		23 FEB 66	RWT RWH


551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
1845TL
561TL
562TL
563TL
564TL
565TL
1824TL
1692TL
1696TL
1695TL
1694TL
1697TL
1693TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 0 (TENS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LIMIT VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3339
3338
3337
3336
3335
3334
3326
3220
3327
3226
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
TELEMETRY COMMON
TELEMETRY SIGNALS
0VDC
1556
1555
1554
1553
1552
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
1251
1252
1253
1254
1255
1256
1257
1258
1259
1260
1261
1262
1263
1264
1265
1266
1267
1268
1269
1270
1271
1272
1273
1274
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1290
1201
1202
1203
1204
1205
1206
1207
1208
1209
1210
1211
1291
1292
1293
1294
1295
1296
1297
1298
1299
56P10
6
7
17
19
35
36
8
20
21
5
23
37
61
85
59
83
84
38
64
40
62
63
65
22
41
43
66
67
68
44
69
45
46
36
82
58
57
14
15
32
53
78
54
30
52
77
76
79
80
10
70
39
60
9
18
42
34
15
3
25
SIGNAL CONDITIONER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS ± —
3 PLACE DECIMALS ± —
ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN COOKMAN DATE 7 JUN 65
CHECKED ED FOSTER 9 JUN 65
APPROVAL J. M. WATSON
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL W Kupelian

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM - TEST SELECTOR (LEM)

SIZE J3 | CODE IDENT NO 99974 | 2900206
SCALE — | SHEET 4 OF 4

2900206 P 4

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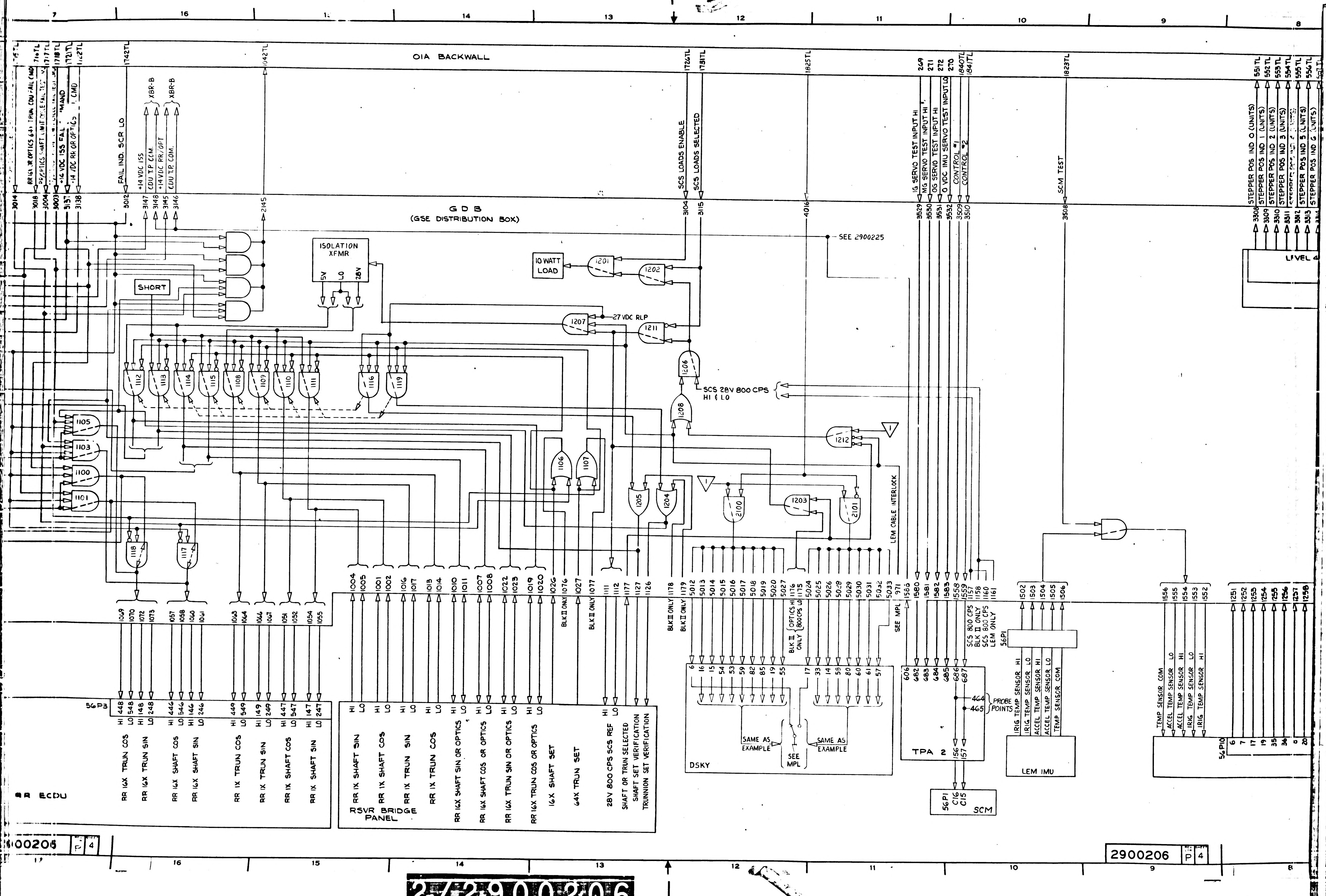
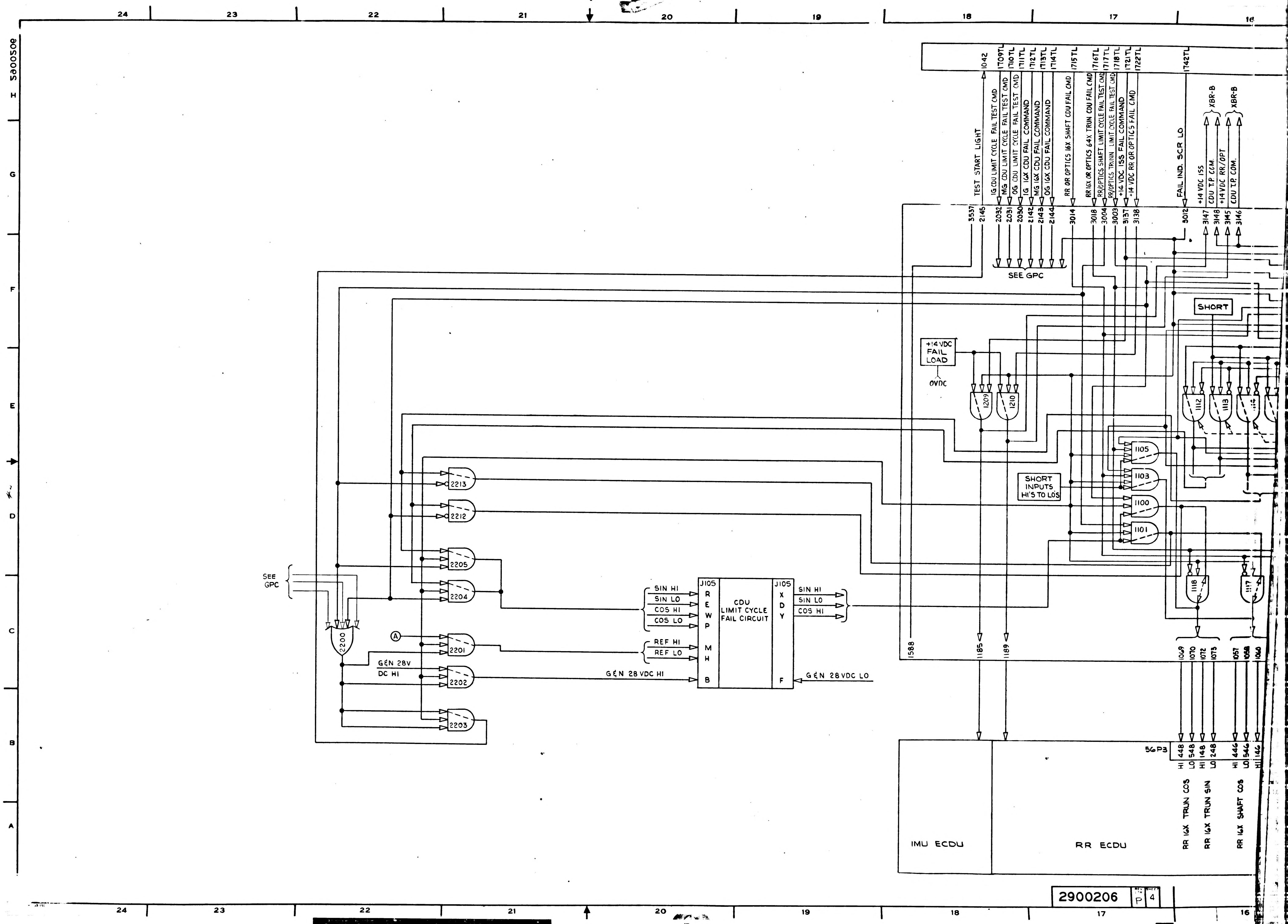
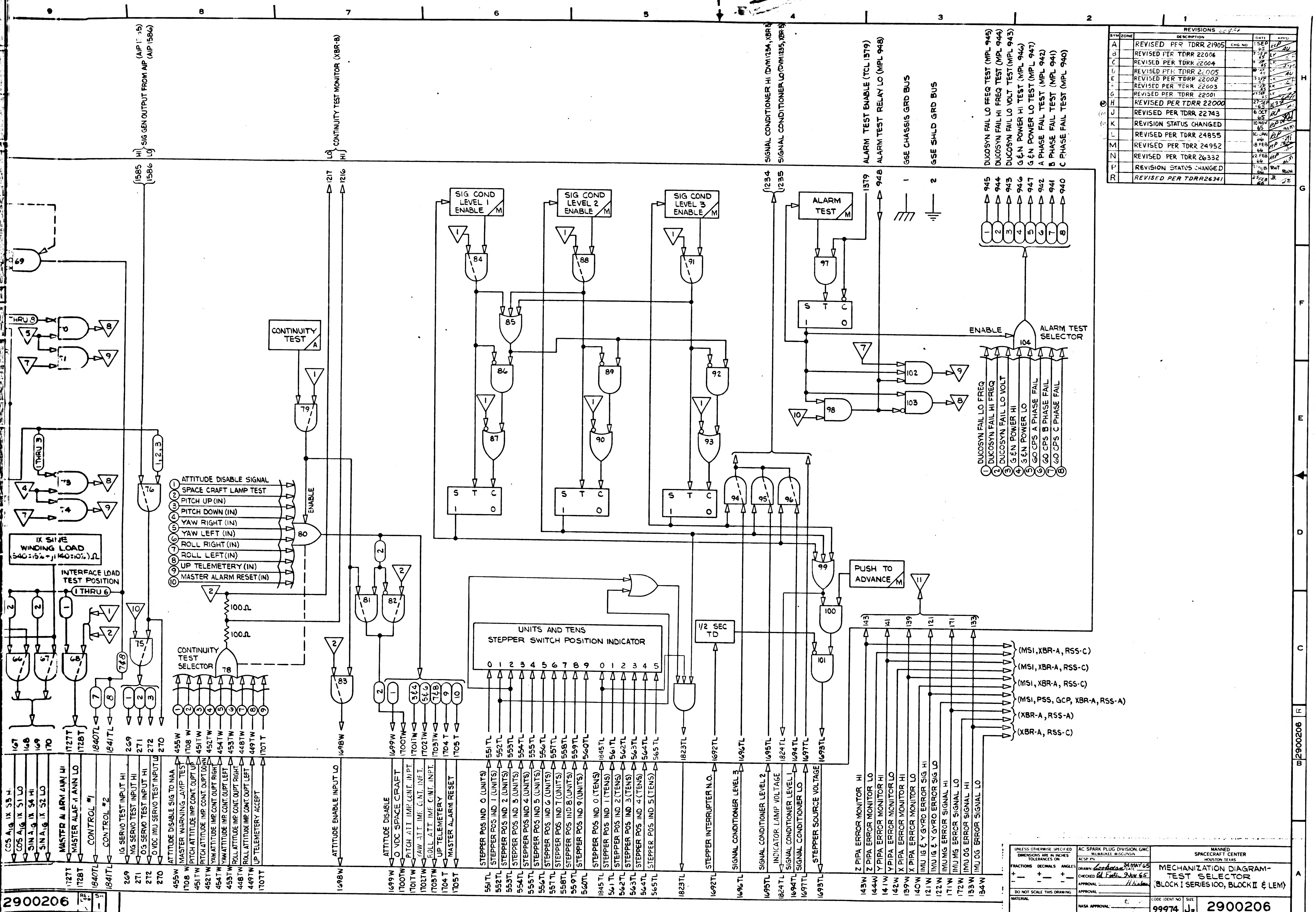

OIA BACKWALL
G D B
(GSE DISTRIBUTION BOX)
1742TL
1042TL
1726TL
1731TL
1825TL
1840TL
1841TL
1823TL
551TL
552TL
553TL
554TL
555TL
556TL
FAIL IND. SCR LO
+14 VDC ISS
CDU T.P. COM.
+14 VDC RR/OPT
CDU T.P. COM.
XBR-B
XBR-B
+14 VDC ISS FAIL
+14 VDC RR OR OPTICS
SCS LOADS ENABLE
SCS LOADS SELECTED
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
O VDC IMU SERVO TEST INPUT LO
CONTROL #1
CONTROL #2
SCM TEST
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
LEVEL 4
3014
3018
3004
3003
3137
3138
5012
3147
3148
3145
3146
2145
3104
3115
4016
3529
3530
3531
3532
3509
3510
3508
3308
3309
3310
3311
3312
3313
SEE 2900225
ISOLATION XFMR
5V
LO
28V
SHORT
10 WATT LOAD
1201
1202
1207
1211
27 VDC RLP
1206
SCS 28V 800 CPS HI & LO
1208
1212
1112
1113
1114
1115
1108
1109
1110
1111
1116
1119
1105
1103
1100
1101
1106
1107
1205
1204
2100
1203
2101
1118
1117
LEM CABLE INTERLOCK
1069
1070
1072
1073
1057
1058
1061
1063
1064
1066
1067
1051
1052
1054
1055
1004
1005
1001
1002
1016
1017
1013
1014
1010
1011
1007
1008
1022
1023
1019
1020
1026
1076
1027
1077
BLK II ONLY
1111
1112
1177
1127
1126
1178
1179
5013
5014
5015
5016
5017
5018
5019
5020
5027
1176
1175
OPTICS HI 800 CPS LO
BLK II ONLY
5024
5025
5026
5028
5029
5030
5031
5032
5033
971
SEE MPL
1568
1580
1581
1582
1583
1558
1559
1157
1158
1160
1161
SCS 800 CPS
BLK II ONLY
SCS 800 CPS
LEM ONLY
1502
1503
1504
1505
1506
56P1
1556
1555
1554
1553
1552
1251
1252
1253
1254
1255
1256
1257
1258
56P3
HI 448 LO 548 HI 148 LO 248
HI 446 LO 546 HI 146 LO 246
HI 449 LO 549 HI 149 LO 249 HI 447 LO 547 HI 147 LO 247
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
RR 1X TRUN COS
RR 1X TRUN SIN
RR 1X SHAFT COS
RR 1X SHAFT SIN
RR ECDU
HI LO
RR 1X SHAFT SIN
RR 1X SHAFT COS
RR 1X TRUN SIN
RR 1X TRUN COS
RSVR BRIDGE PANEL
RR 16X SHAFT SIN OR OPTICS
RR 16X SHAFT COS OR OPTICS
RR 16X TRUN SIN OR OPTICS
RR 16X TRUN COS OR OPTICS
16X SHAFT SET
64X TRUN SET
28V 800 CPS SCS REF
SHAFT OR TRUN SELECTED
SHAFT SET VERIFICATION
TRUNNION SET VERIFICATION
6
16
15
54
53
59
82
85
19
55
17
33
14
58
80
60
61
57
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
DSKY
606
682
683
684
685
686
687
464
465
PROBE POINTS
TPA 2
156
157
56P1
C16
C15
SCM
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
LEM IMU
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
56P10
6
7
17
19
35
36
8
20
16
15
14
13
12
11
10
9
8
2900206
P 4
2/2900206


TEST START LIGHT
IG CDU LIMIT CYCLE FAIL TEST CMD
MG CDU LIMIT CYCLE FAIL TEST CMD
OG CDU LIMIT CYCLE FAIL TEST CMD
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
RR OR OPTICS 16X SHAFT CDU FAIL CMD
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
RR/OPTICS SHAFT LIMIT CYCLE FAIL TEST CMD
RR/OPTICS TRUNN LIMIT CYCLE FAIL TEST CMD
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
+14 VDC ISS
CDU T.P. COM.
+14 VDC RR/OPT
CDU T.P. COM.
XBR-B
XBR-B
1042
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1717TL
1718TL
1721TL
1722TL
1742TL
3537
2145
2032
2031
2030
2142
2143
2144
3014
3018
3004
3003
3137
3138
3012
3147
3148
3145
3146
SEE GPC
SHORT
+14 VDC FAIL LOAD
OVDC
1209
1210
1112
1113
1114
1105
1103
1100
1101
SHORT INPUTS HI'S TO LOS
1118
1117
SEE GPC
2213
2212
2205
2204
2200
A
2201
GEN 28V DC HI
2202
2203
SIN HI
SIN LO
COS HI
COS LO
REF HI
REF LO
GEN 28 VDC HI
J105
R
E
W
P
M
H
B
CDU LIMIT CYCLE FAIL CIRCUIT
J105
X
D
Y
F
SIN HI
SIN LO
COS HI
GEN 28 VDC LO
1588
1185
1189
1069
1070
1072
1073
1057
1058
1060
56P3
HI 448
LO 548
HI 148
LO 248
HI 446
LO 546
HI 146
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
IMU ECDU
RR ECDU
24
23
22
21
20
19
18
17
16
H
G
F
E
D
C
B
A

2900206 P 4

1729000206


SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
HI
LO
1585
1586
CONTINUITY TEST MONITOR (XBR-8)
LO
HI
1217
1216
SIGNAL CONDITIONER HI (DVM 1234, XBR-8)
SIGNAL CONDITIONER LO (DVM 1235, XBR-8)
1234
1235
ALARM TEST ENABLE (TCL 1379)
ALARM TEST RELAY LO (MPL 948)
GSE CHASSIS GRD BUS
GSE SHLD GRD BUS
1379
948
1
2
DUCOSYN FAIL LO FREQ TEST (MPL 945)
DUCOSYN FAIL HI FREQ TEST (MPL 944)
DUCOSYN FAIL LO VOLT TEST (MPL 943)
G & N POWER HI TEST (MPL 946)
G & N POWER LO TEST (MPL 947)
A PHASE FAIL TEST (MPL 942)
B PHASE FAIL TEST (MPL 941)
C PHASE FAIL TEST (MPL 940)
945 944 943 946 947 942 941 940
SIG COND LEVEL 1 ENABLE M
SIG COND LEVEL 2 ENABLE M
SIG COND LEVEL 3 ENABLE M
ALARM TEST M
84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104
S T C 1 0
ENABLE
ALARM TEST SELECTOR
DUCOSYN FAIL LO FREQ
DUCOSYN FAIL HI FREQ
DUCOSYN FAIL LO VOLT
G & N POWER HI
G & N POWER LO
60 CPS A PHASE FAIL
60 CPS B PHASE FAIL
60 CPS C PHASE FAIL
CONTINUITY TEST A
79
ENABLE
80
ATTITUDE DISABLE SIGNAL
① SPACE CRAFT LAMP TEST
② PITCH UP (IN)
③ PITCH DOWN (IN)
④ YAW RIGHT (IN)
⑤ YAW LEFT (IN)
⑥ ROLL RIGHT (IN)
⑦ ROLL LEFT (IN)
⑧ UP TELEMETERY (IN)
⑨ MASTER ALARM RESET (IN)
⑩
100Ω
100Ω
CONTINUITY TEST SELECTOR
78
81 82 83
PUSH TO ADVANCE M
1/2 SEC TD
UNITS AND TENS STEPPER SWITCH POSITION INDICATOR
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
143 141 139 121 171 133
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, PSS, GCP, XBR-A, RSS-A)
(XBR-A, RSS-A)
(XBR-A, RSS-C)
69
THRU 8
1 THRU 3
73 74 75 76 66 67 68
IX SINE WINDING LOAD (540±5%+j1140±10%)Ω
INTERFACE LOAD TEST POSITION (1 THRU 6)
7&8
3&4 5&6 7&8
167 168 169 170
COS A1G 1X S3 HI
COS A1G 1X S1 LO
SIN A1G 1X S4 HI
SIN A1G 1X S2 LO
1727T MASTER ALARM (ANN) HI
1728T MASTER ALARM ANN LO
1840TL CONTROL #1
1841TL CONTROL #2
269 IG SERVO TEST INPUT HI
271 MG SERVO TEST INPUT HI
272 OG SERVO TEST INPUT HI
270 0 VDC IMU SERVO TEST INPUT LO
455W ATTITUDE DISABLE SIG TO NAA
1708W MASTER WARNING LAMP TEST
451TW PITCH ATTITUDE IMP. CONT. OUPT UP
452TW PITCH ATTITUDE IMP. CONT. OUPT DOWN
454TW YAW ATTITUDE IMP. CONT. OUPT RIGHT
453TW YAW ATTITUDE IMP. CONT. OUPT LEFT
448TW ROLL ATTITUDE IMP. CONT. OUPT RIGHT
449TW ROLL ATTITUDE IMP. CONT. OUPT LEFT
1707T UP TELEMETERY ACCEPT
1698W ATTITUDE ENABLE INPUT LO
1699W ATTITUDE DISABLE
1700TW 0 VDC SPACE CRAFT
1701TW PITCH ATT. IMP. CONT. INPT.
1702TW YAW ATT. IMP. CONT. INPT.
1703TW ROLL ATT. IMP. CONT. INPT.
1704T UP TELEMETERY
1705T MASTER ALARM RESET
551TL STEPPER POS IND 0 (UNITS)
552TL STEPPER POS IND 1 (UNITS)
553TL STEPPER POS IND 2 (UNITS)
554TL STEPPER POS IND 3 (UNITS)
555TL STEPPER POS IND 4 (UNITS)
556TL STEPPER POS IND 5 (UNITS)
557TL STEPPER POS IND 6 (UNITS)
558TL STEPPER POS IND 7 (UNITS)
559TL STEPPER POS IND 8 (UNITS)
560TL STEPPER POS IND 9 (UNITS)
1845TL STEPPER POS IND 0 (TENS)
561TL STEPPER POS IND 1 (TENS)
562TL STEPPER POS IND 2 (TENS)
563TL STEPPER POS IND 3 (TENS)
564TL STEPPER POS IND 4 (TENS)
565TL STEPPER POS IND 5 (TENS)
1823TL
1692TL STEPPER INTERRUPTER N.O.
1696TL SIGNAL CONDITIONER LEVEL 3
1695TL SIGNAL CONDITIONER LEVEL 2
1824TL INDICATOR LAMP VOLTAGE
1694TL SIGNAL CONDITIONER LEVEL 1
1697TL SIGNAL CONDITIONER LO
1693TL STEPPER SOURCE VOLTAGE
143W Z PIPA ERROR MONITOR HI
144W Z PIPA ERROR MONITOR LO
141W Y PIPA ERROR MONITOR HI
142W Y PIPA ERROR MONITOR LO
139W X PIPA ERROR MONITOR HI
140W X PIPA ERROR MONITOR LO
121W IMU IG & Y GYRO ERROR SIG HI
122W IMU IG & Y GYRO ERROR SIG LO
171W IMU MG ERROR SIGNAL HI
172W IMU MG ERROR SIGNAL LO
133W IMU OG ERROR SIGNAL HI
134W IMU OG ERROR SIGNAL LO
9 8 7 6 5 4 3 2 1
H G F E D C B A

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21905		1 SEP 65	RLP AU
B		REVISED PER TDRR 22006		7 SEP 65	LK
C		REVISED PER TDRR 22004		9 SEP 65	LK
D		REVISED PER TDRR 22005		10 SEP 65	LK AU
E		REVISED PER TDRR 22002		13 SEP 65	LK
F		REVISED PER TDRR 22003		16 SEP 65	LK
G		REVISED PER TDRR 22001		21 SEP 65	LK
H		REVISED PER TDRR 22000		27-SEP-65	
J		REVISED PER TDRR 22743		6 OCT 65	RLP
K		REVISION STATUS CHANGED		10 NOV 65	RLP MEM
L		REVISED PER TDRR 24855		10 JAN 66	RLP
M		REVISED PER TDRR 24952		18 FEB 66	RLP
N		REVISED PER TDRR 26332		22 FEB 66	RLP MLM
P		REVISION STATUS CHANGED		[illegible] FEB 66	RWT RWH
R		REVISED PER TDRR 26341		25 FEB 66	B.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Cookman DATE 24 MAY 65
CHECKED Ed Foster 9 JUN 65
APPROVAL H Hinkam
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM-TEST SELECTOR (BLOCK I SERIES 100, BLOCK II & LEM)

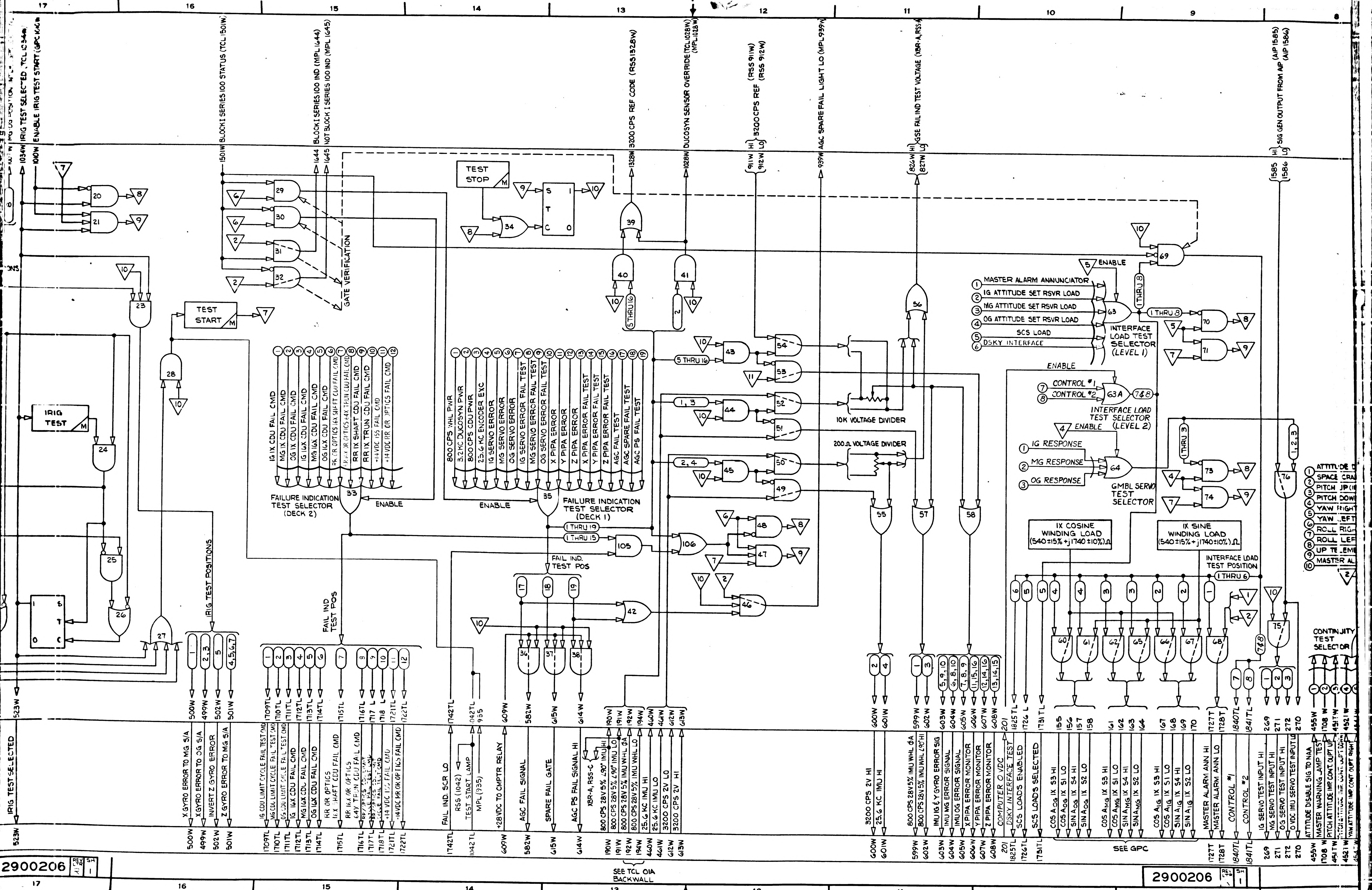
CODE IDENT NO 99974 SIZE J3 2900206
SCALE — SHEET 1 OF 4

2900206 REV LTR SH 1

2900206 R

4/1

37 2900206



17
16
15
14
13
12
11
10
9
8
1034W IRIG TEST SELECTED (TCL 1034W)
1010W ENABLE IRIG TEST START (GPC KJCB)
1501W BLOCK I SERIES 100 STATUS (TCL 1501W)
1644 BLOCK I SERIES 100 IND (MPL 1644)
1645 NOT BLOCK I SERIES 100 IND (MPL 1645)
1328W 3200 CPS REF CODE (RSS 1328W)
1028W DUCOSYN SENSOR OVERRIDE (TCL 1028W) (MPL 1028W)
911W HI 912W LO 3200 CPS REF (RSS 911W) (RSS 912W)
939W AGC SPARE FAIL LIGHT LO (MPL 939W)
826W HI 827W LO GSE FAIL IND TEST VOLTAGE (XBR-A, RSS-A)
1585 HI 1586 LO SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
TEST STOP M
S T C 1 0
GATE VERIFICATION
TEST START M
IRIG TEST M
IRIG TEST POSITIONS
1 / 2,3 / 5 / 4,5,6,7
IG IX CDU FAIL CMD
MG IX CDU FAIL CMD
OG IX CDU FAIL CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
RR OR OPTICS 16X SHAFT CDU FAIL CMD
RR OR OPTICS 64X TRUN CDU FAIL CMD
RR IX SHAFT CDU FAIL CMD
RR IX TRUN CDU FAIL CMD
+14 VDC 155 FAIL CMD
+14 VDC RR OR OPTICS FAIL CMD
FAILURE INDICATION TEST SELECTOR (DECK 2)
ENABLE
800 CPS WHL PWR
3.2 KC DUCOSYN PWR
800 CPS CDU PWR
25.6 KC ENCODER EXC
IG SERVO ERROR
MG SERVO ERROR
OG SERVO ERROR
IG SERVO ERROR FAIL TEST
MG SERVO ERROR FAIL TEST
OG SERVO ERROR FAIL TEST
X PIPA ERROR
Y PIPA ERROR
Z PIPA ERROR
X PIPA ERROR FAIL TEST
Y PIPA ERROR FAIL TEST
Z PIPA ERROR FAIL TEST
AGC FAIL TEST
AGC SPARE FAIL TEST
AGC PS FAIL TEST
FAILURE INDICATION TEST SELECTOR (DECK 1)
1 THRU 19
1 THRU 15
FAIL IND. TEST POS
FAIL IND TEST POS
5 THRU 16
1, 3
2, 4
10K VOLTAGE DIVIDER
200 Ω VOLTAGE DIVIDER
MASTER ALARM ANNUNCIATOR
IG ATTITUDE SET RSVR LOAD
MG ATTITUDE SET RSVR LOAD
OG ATTITUDE SET RSVR LOAD
SCS LOAD
DSKY INTERFACE
ENABLE
INTERFACE LOAD TEST SELECTOR (LEVEL 1)
1 THRU 8
CONTROL #1
CONTROL #2
7 & 8
INTERFACE LOAD TEST SELECTOR (LEVEL 2)
IG RESPONSE
MG RESPONSE
OG RESPONSE
GMBL SERVO TEST SELECTOR
1 THRU 3
1,2,3
IX COSINE WINDING LOAD (540±15% + j1740±10%) Ω
IX SINE WINDING LOAD (540±15% + j1740±10%) Ω
INTERFACE LOAD TEST POSITION
1 THRU 6
CONTINUITY TEST SELECTOR
ATTITUDE
SPACE CRAFT
PITCH UP
PITCH DOWN
YAW RIGHT
YAW LEFT
ROLL RIGHT
ROLL LEFT
UP TELEMETRY
MASTER AL
523W IRIG TEST SELECTED 523W
500W X GYRO ERROR TO MG S/A 500W
499W X GYRO ERROR TO OG S/A 499W
502W INVERT Z GYRO ERROR 502W
501W Z GYRO ERROR TO MG S/A 501W
1709TL IG CDU LIMIT CYCLE FAIL TEST CMD 1709TL
1710TL MG CDU LIMIT CYCLE FAIL TEST CMD 1710TL
1711TL OG CDU LIMIT CYCLE FAIL TEST CMD 1711TL
1712TL IG 16X CDU FAIL CMD 1712TL
1713TL MG 16X CDU FAIL CMD 1713TL
1714TL OG 16X CDU FAIL CMD 1714TL
1715TL RR OR OPTICS 16 X SHAFT CDU FAIL CMD 1715TL
1716TL RR 16X OR OPTICS 64Y TRUN CDU FAIL CMD 1716TL
1717TL 1717TL
1718TL 1718TL
1721TL +14 VDC 155 FAIL CMD 1721TL
1722TL +14 VDC RR OR OPTICS FAIL CMD 1722TL
1742TL FAIL IND. SCR LO 1742TL
1042TL RSS (1042) TEST START LAMP 1042TL
935 MPL (935)
609W +28VDC TO CMPTR RELAY 609W
582W AGC FAIL SIGNAL 582W
615W SPARE FAIL GATE 615W
614W AGC PS FAIL SIGNAL HI 614W
XBR-A, RSS-C
190W 800 CPS 28V 5% ∠0° IMU HI 190W
191W 800 CPS 28V 5% ∠90° IMU LO 191W
192W 800 CPS 28V 5% IMU WHL ØA 192W
194W 800 CPS 28V 5% IMU WHL LO 194W
460W 25.6 KC IMU HI 460W
461W 25.6 KC IMU LO 461W
612W 3200 CPS 2V LO 612W
613W 3200 CPS 2V HI 613W
SEE TCL 01A BACKWALL
600W 3200 CPS 2V HI 600W
601W 25.6 KC IMU HI 601W
599W 800 CPS 28V 5% IMU WHL ØA 599W
602W 800 CPS 28V 5% IMU WHL ØA 602W
603W IMU IG & Y GYRO ERROR SIG 603W
604W IMU MG ERROR SIGNAL 604W
605W IMU OG ERROR SIGNAL 605W
606W X PIPA ERROR MONITOR 606W
607W Y PIPA ERROR MONITOR 607W
608W Z PIPA ERROR MONITOR 608W
201 COMPUTER 0 VDC 201
DSKY INTERFACE TEST
1825TL SCS LOADS ENABLED 1825TL
1726TL 1726TL
1731TL SCS LOADS SELECTED 1731TL
155 COS A OG IX S3 HI
156 COS A OG IX S1 LO
157 SIN A OG IX S4 HI
158 SIN A OG IX S2 LO
161 COS A MG IX S3 HI
162 COS A MG IX S1 LO
163 SIN A MG IX S4 HI
164 SIN A MG IX S2 LO
167 COS A IG IX S3 HI
168 COS A IG IX S1 LO
169 SIN A IG IX S4 HI
170 SIN A IG IX S2 LO
SEE GPC
1727T MASTER ALARM ANN HI 1727T
1728T MASTER ALARM ANN LO 1728T
1840TL CONTROL #1 1840TL
1841TL CONTROL #2 1841TL
269 IG SERVO TEST INPUT HI 269
271 MG SERVO TEST INPUT HI 271
272 OG SERVO TEST INPUT HI 272
270 VDC IMU SERVO TEST INPUT LO 270
455W ATTITUDE DISABLE SIG TO NAA 455W
1108W MASTER WARNING LAMP TEST 1108W
4511W PITCH ATTITUDE IMP CONT OUPT UP
4521W
4541W YAW ATTITUDE IMP CONT OUPT RIGHT
2900206 REV SH 1
2900206 REV SH 1
27 2900206

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM)

2900210	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR)
RLP	RELAY & LAMP POWER SUPPLY
2900208	POWER & DUMMY LOAD-PRIMARY SIGNAL SELECTOR (PDL)
PSS	PRIMARY SIGNAL SELECTOR
2900223	GIMBAL POSITION CONTROL (GPC)
2900207	MONITOR PANEL (MPL)
2900202	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
2900217	SIGNAL SELECTION & MEASUREMENT
XBR-A	CROSSBAR - AC SIGNALS
XBR-B	CROSSBAR - DC SIGNALS
DVM	DIGITAL VOLTMETER
2900218	OSCILLOGRAPH SIGNAL SELECTION
RSS-A	TO FIXED AC CHANNEL
RSS-B	TO FIXED DC CHANNEL
RSS-C	TO SWITCHABLE AC CHANNEL
RSS-D	TO SWITCHABLE DC CHANNEL
2900215	MEASUREMENT REFERENCE POWER SUPPLIES
RSS	OSCILLOGRAPH SIGNAL SELECTOR
2900211	AUXILIARY INPUT-OUTPUT & CALIBRATION (AIP)
2900212	PIPA & IRIG MONITORING
MSI	PHASE SHIFT PANEL
2900200	GYRO CAGING PANEL (GCP)

4. NONSTANDARD SYMBOLS

INDICATES "AND" GATE WITH SWITCHED SIGNAL

INDICATES EXCLUSIVE "OR" GATE WITH SWITCH POSITIONS 1 & 2

INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

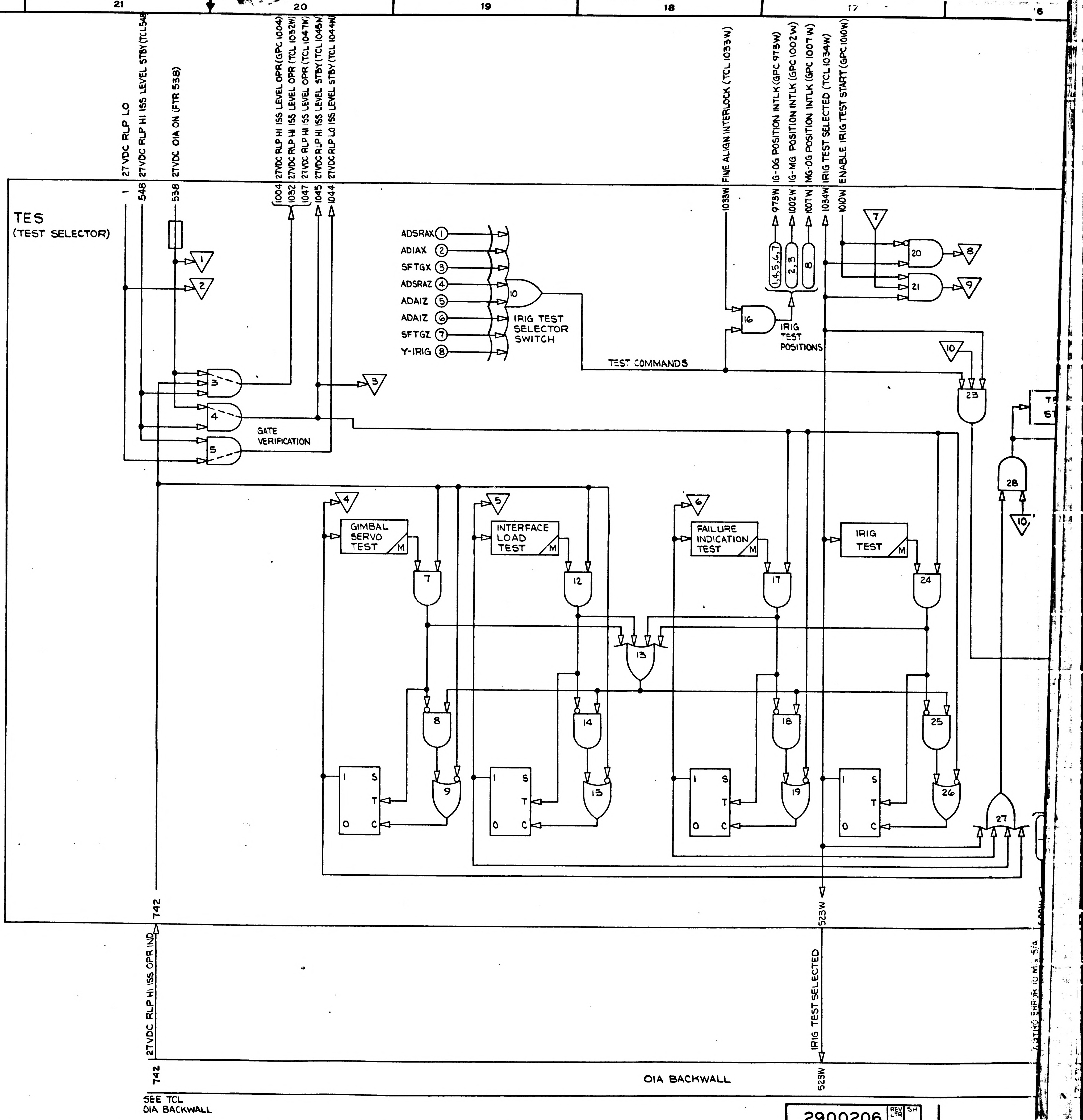
INDICATES "AND" GATE WITH A SWITCHED SIGNAL CAPABLE OF SIGNAL FLOW IN TWO DIRECTIONS

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
A. W - BLOCK I SERIES 100 ONLY
B. T - BLOCK II ONLY
C. L - LEM ONLY
D. BLANK - ALL G&N CONFIGURATIONS
E. TW, TL, OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

6. SIGNAL REFERENCE

1	27 VDC OIA ON
2	27 VDC RLP LO
3	27 VDC ISS LEVEL STANDBY
4	GIMBAL SERVO TEST SELECTED
5	INTERFACE LOAD TEST SELECTED
6	FAILURE INDICATION TEST SELECTED
7	TEST START, BUTTON DEPRESSED
8	CLEAR
9	SET
10	TEST STARTED
11	IMU ERROR SIGNALS

Ⓐ CONNECT TO THE OUTPUT OF GATE 1203


27 VDC RLP LO
1
27VDC RLP HI ISS LEVEL STBY (TCL 548
548
27VDC OIA ON (FTR 538)
538
27VDC RLP HI ISS LEVEL OPR (GPC 1004)
27VDC RLP HI ISS LEVEL OPR (TCL 1032W)
27VDC RLP HI ISS LEVEL OPR (TCL 1047W)
27VDC RLP HI ISS LEVEL STBY (TCL 1045W)
27VDC RLP LO ISS LEVEL STBY (TCL 1044W)
1004
1032
1047
1045
1044
FINE ALIGN INTERLOCK (TCL 1033W)
1033W
IG-OG POSITION INTLK (GPC 973W)
IG-MG POSITION INTLK (GPC 1002W)
MG-OG POSITION INTLK (GPC 1007W)
IRIG TEST SELECTED (TCL 1034W)
ENABLE IRIG TEST START (GPC 1010W)
973W
1002W
1007W
1034W
1010W
TES
(TEST SELECTOR)
1
2
3
4
5
GATE VERIFICATION
ADSRAX ①
ADIAX ②
SFTGX ③
ADSRAZ ④
ADAIZ ⑤
ADAIZ ⑥
SFTGZ ⑦
Y-IRIG ⑧
10
IRIG TEST SELECTOR SWITCH
TEST COMMANDS
1,4,5,6,7
2,3
8
16
IRIG TEST POSITIONS
7
20
21
8
9
10
23
28
10
GIMBAL SERVO TEST
M
INTERFACE LOAD TEST
M
FAILURE INDICATION TEST
M
IRIG TEST
M
4
5
6
7
12
17
24
13
8
14
18
25
9
15
19
26
27
1
S
T
0
C
742
27VDC RLP HI ISS OPR IND
742
523W
IRIG TEST SELECTED
523W
OIA BACKWALL
SEE TCL
OIA BACKWALL

2900206	REV LTR	SH 1

MIL FORM 1050 J3

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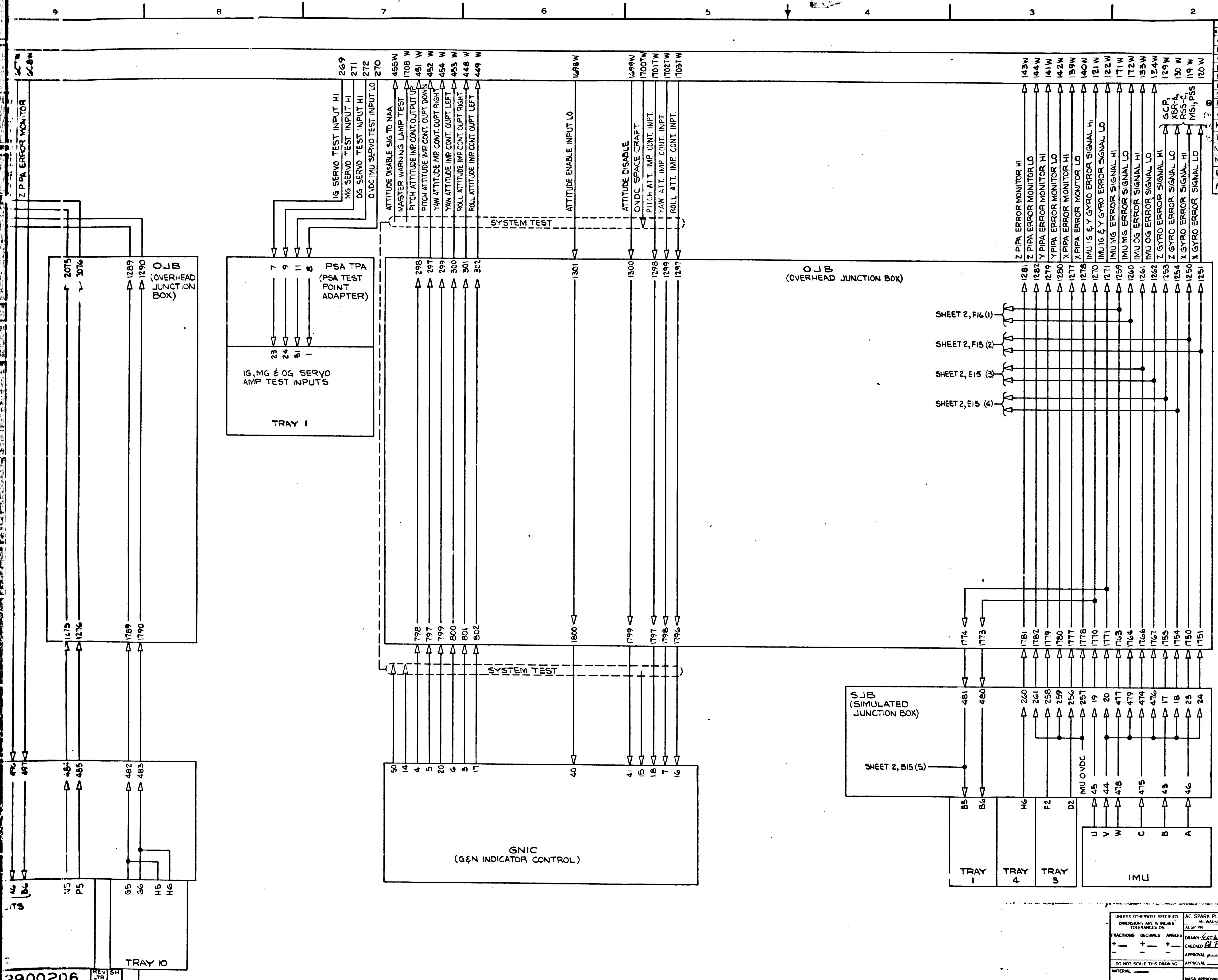

Z PIPA ERROR MONITOR
OJB (OVER-HEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1789
1790
496
497
484
485
482
483
B6
N5
P5
G5
G6
H5
H6
TRAY 10
269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
PSA TPA (PSA TEST POINT ADAPTER)
7
9
11
8
23
24
31
1
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
455W
1708 W
451 W
452 W
454 W
453 W
448 W
449 W
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUTPUT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
1698W
ATTITUDE ENABLE INPUT LO
1699W
1700TW
1701TW
1702TW
1703TW
ATTITUDE DISABLE
OVDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
SYSTEM TEST
298
297
299
300
301
302
1301
1300
1298
1299
1297
OJB (OVERHEAD JUNCTION BOX)
798
797
799
800
801
802
1800
1799
1797
1798
1796
SYSTEM TEST
50
14
4
5
20
6
3
17
40
41
15
18
7
16
GNIC (G&N INDICATOR CONTROL)
143W
144W
141W
142W
139W
140W
121W
122W
171W
172W
133W
134W
129W
130 W
119 W
120 W
GCP, XBR-A, RSS-C, MSI, PSS
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIGNAL HI
IMU IG & Y GYRO ERROR SIGNAL LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
Z GYRO ERROR SIGNAL HI
Z GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
X GYRO ERROR SIGNAL LO
1281
1282
1279
1280
1277
1278
1270
1271
1259
1260
1261
1262
1253
1254
1250
1251
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (3)
SHEET 2, E15 (4)
1774
1773
1781
1782
1779
1780
1777
1778
1770
1771
1763
1764
1766
1767
1753
1754
1750
1751
SJB (SIMULATED JUNCTION BOX)
481
480
260
261
258
259
256
257
19
20
477
479
476
474
17
18
23
24
SHEET 2, B15 (5)
IMU 0 VDC
45
44
478
475
43
46
B5
B6
H6
F2
D2
U
V
W
C
B
A
TRAY 1
TRAY 4
TRAY 3
IMU

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		1 SEP 65	RLP AU
B		REVISION STATUS CHANGED		7 SEP 65	LK EF
C		REVISION STATUS CHANGED		9 SEP 65	LK JDC
D		REVISION STATUS CHANGED		10 SEP 65	LK AU
E		REVISED PER TDRR 22002		13 SEP 65	LK EF
F		REVISION STATUS CHANGED		16 SEP 65	LK
G		REVISION STATUS CHANGED		21 SEP 65	LK
H		REVISION STATUS CHANGED		27-SEP-65	
J		REVISION STATUS CHANGED		6 OCT 65	RLP
K		REVISION STATUS CHANGED		1 NOV 65	RLP MEM
L		REVISION STATUS CHANGED		10 JAN 66	RLP
M		REVISION STATUS CHANGED		18 FEB 66	RLP
N		REVISED PER TDRR 26332		22 FEB 66	RLP MM
P		REVISION STATUS CHANGED		23 FEB 66	RWT RWH
R		REVISION STATUS CHANGED		25-FEB-66	B. W.D.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 26 MAY 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK I SERIES 100)

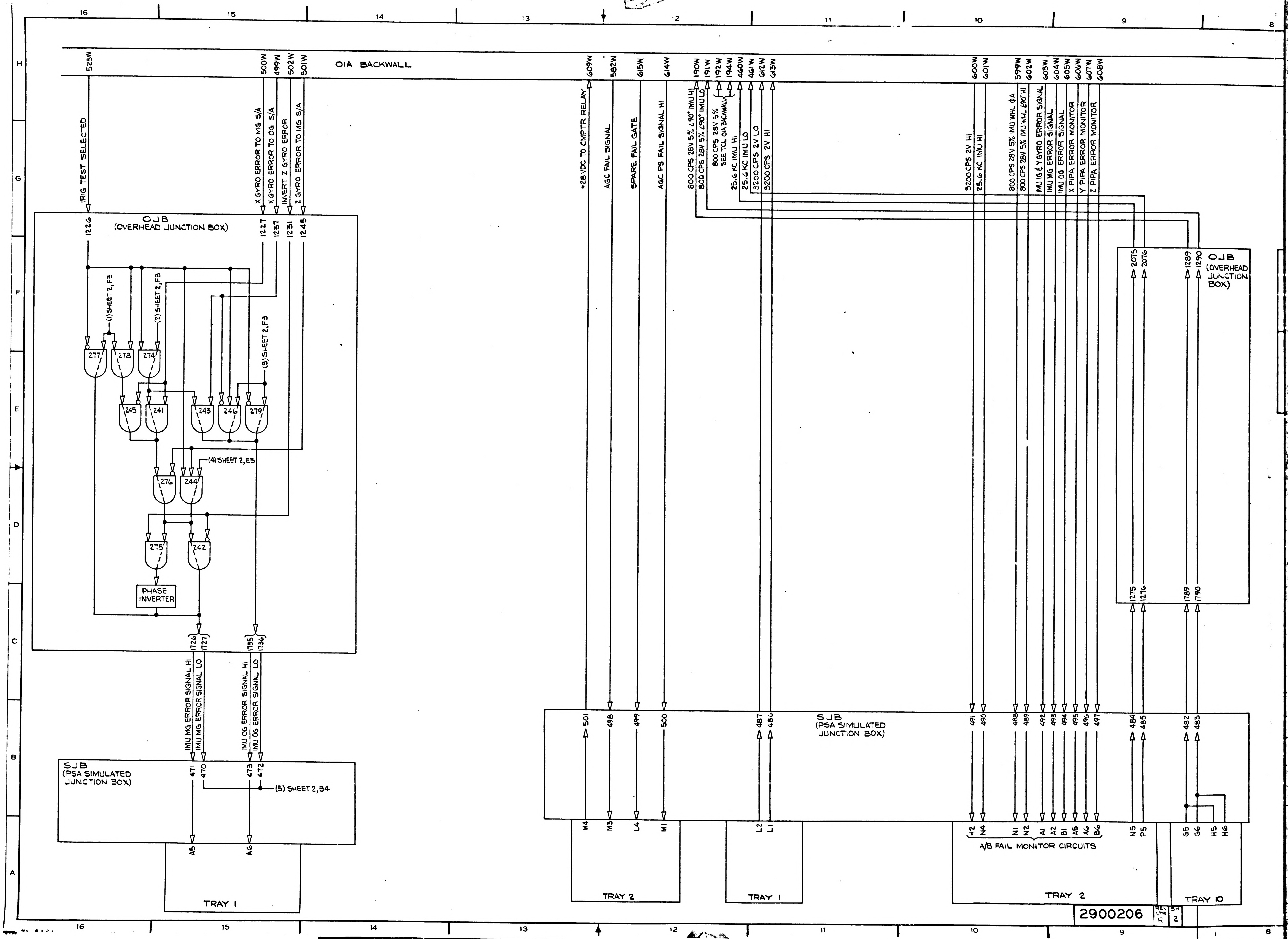
CODE IDENT NO 99974
SIZE J_2
2900206
SCALE —
SHEET 2 OF 4

2900206 REV LTR R SH 2

3H

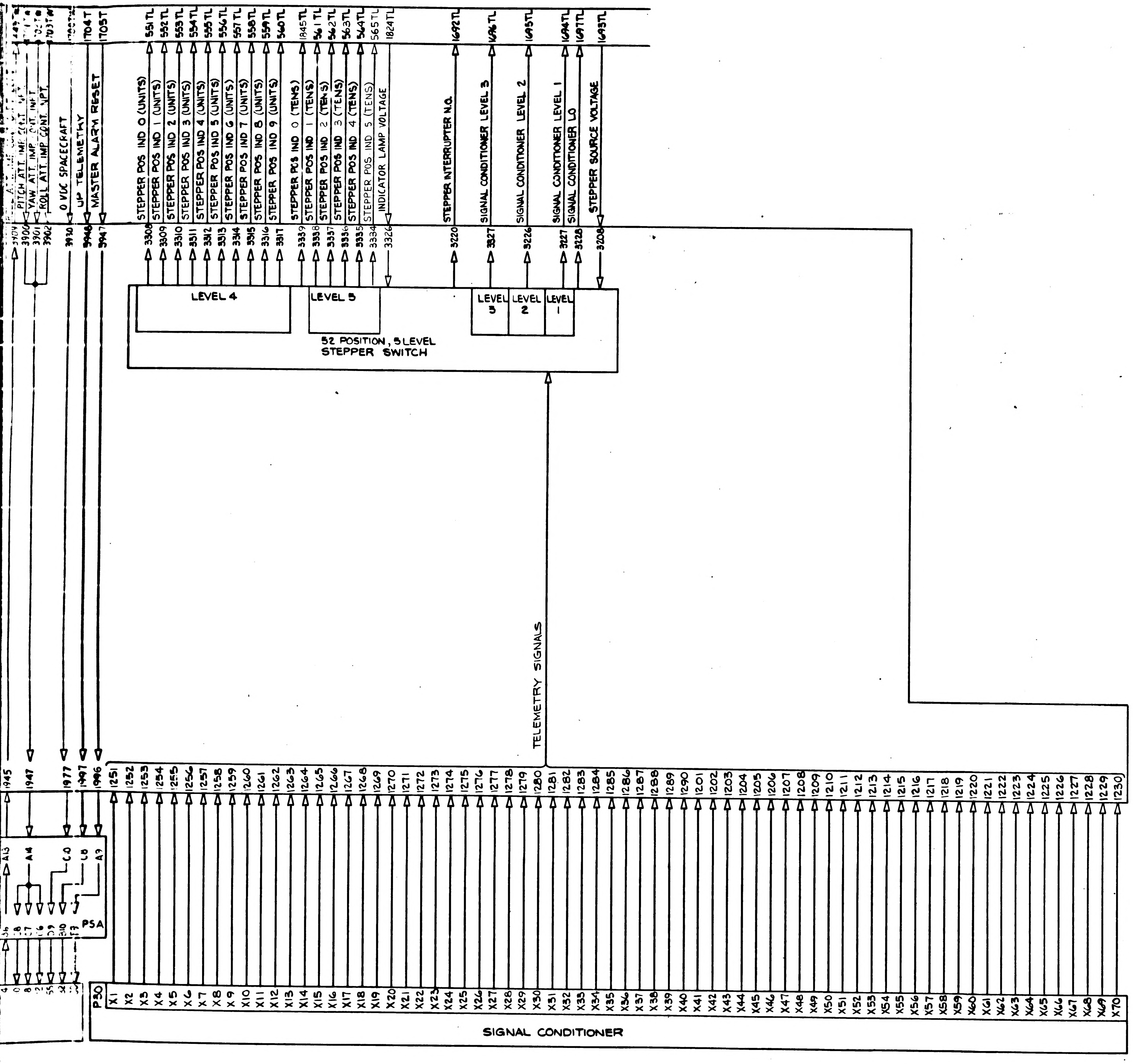
27 2900206

2900206 SH 2 OF 4



16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
523W
500W
499W
502W
501W
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
IRIG TEST SELECTED
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5%
SEE TCL OIA BACKWALL
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ΦA
800 CPS 28V 5% IMU WHL ∠90° HI
IMU IG & Y GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
OJB
(OVERHEAD JUNCTION BOX)
1226
1227
1237
1231
1245
(1) SHEET 2, F3
(2) SHEET 2, F3
(3) SHEET 2, F3
(4) SHEET 2, E3
277
278
274
245
241
243
246
279
276
244
275
242
PHASE INVERTER
1726
1727
1735
1736
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
SJB
(PSA SIMULATED JUNCTION BOX)
471
470
473
472
(5) SHEET 2, B4
A5
A6
TRAY 1
OJB
(OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1789
1790
SJB
(PSA SIMULATED JUNCTION BOX)
501
498
499
500
487
486
491
490
488
489
492
493
494
495
496
497
484
485
482
483
M4
M3
L4
M1
L2
L1
H2
N4
N1
N2
A1
A2
B1
A5
A6
B6
N5
P5
G5
G6
H5
H6
A/B FAIL MONITOR CIRCUITS
TRAY 2
TRAY 1
TRAY 2
TRAY 10
2900206
REV LTR
SH 2

1729 00206


PITCH ATT IMP CMT INPT
YAW ATT IMP CNT INPT
ROLL ATT IMP CONT INPT
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
1704T
1705T
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 0 (TENS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LAMP VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
551TL 552TL 553TL 554TL 555TL 556TL 557TL 558TL 559TL 560TL
1845TL 561TL 562TL 563TL 564TL 565TL 1824TL
1692TL 1696TL 1695TL 1694TL 1691TL 1693TL
3900 3901 3902 3930 3946 3947
3308 3309 3310 3311 3312 3313 3314 3315 3316 3317
3339 3338 3337 3336 3335 3334 3326
3220 3327 3226 3127 3128 3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL
STEPPER SWITCH
TELEMETRY SIGNALS
1945 1947 1977 1997 1996
A13 A14 C0 L6 A9
PSA
1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220 1221 1222 1223 1224 1225 1226 1227 1228 1229 1230
P30
X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21 X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38 X39 X40 X41 X42 X43 X44 X45 X46 X47 X48 X49 X50 X51 X52 X53 X54 X55 X56 X57 X58 X59 X60 X61 X62 X63 X64 X65 X66 X67 X68 X69 X70
SIGNAL CONDITIONER

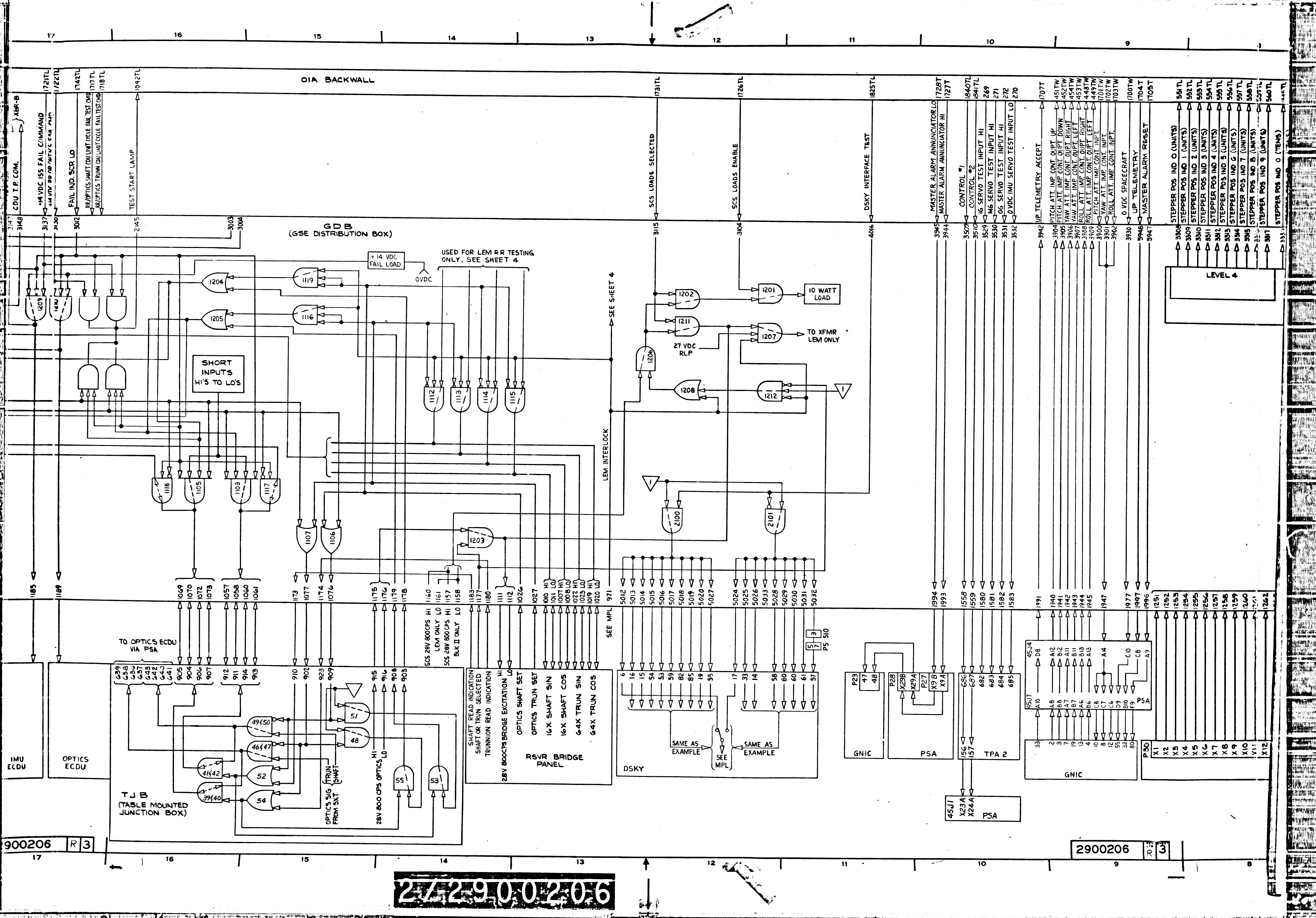
00206 R 3

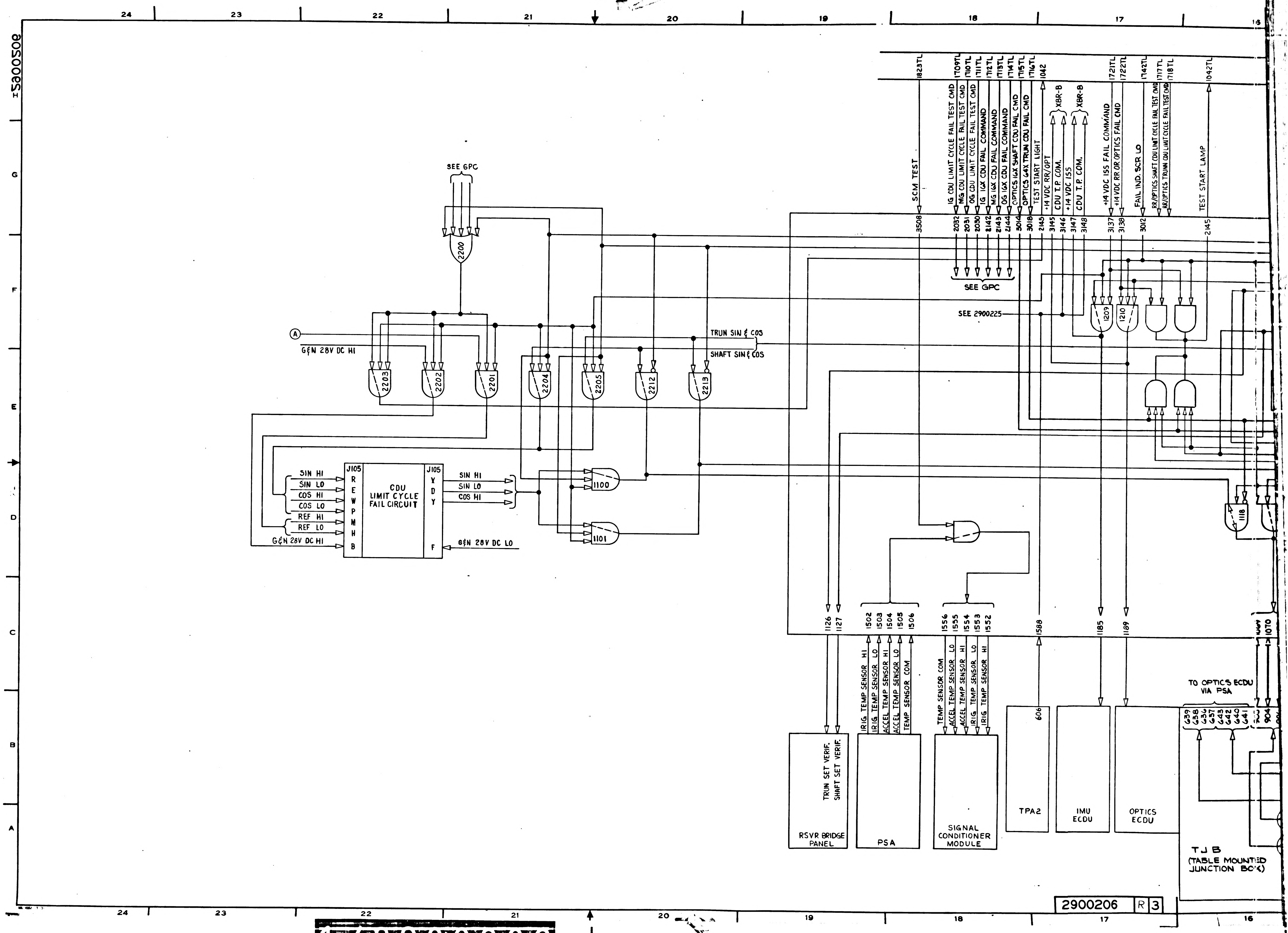
REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO	DATE	APPROVED
	L	REPLACES REV(K) WITH CHANGE PER TDRR 24855		10 JAN 66	KLP
	M	REVISED PER TDRR 24952		18 FEB 66	
	N	REVISED PER TDRR 26332		22 FEB 66	KLP
	P	REVISED PER TDRR 26339		23 FEB 66	TWH
	R	REVISION STATUS CHANGED		25-FEB-66	J.B. W.D.

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE DECIMALS ± 3 PLACE DECIMALS ± ANGLES ± DO NOT SCALE THIS DRAWING	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS DRAWN COOKMAN DATE 3 JUN 65 CHECKED FOSTER 9 JUN 65 APPROVAL CONTRACT NAS 9-497	MANNED SPACECRAFT CENTER HOUSTON TEXAS MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK II)
APPLICATION		MATERIAL APPROVAL	NASA APPROVAL MIT APPROVAL	SIZE J2 · CODE IDENT NO 99974 · 2900206 SCALE · 3 OF 4

2900206 R

37 2900206


17
16
15
14
13
12
11
10
9
8
OIA BACKWALL
GDB
(GSE DISTRIBUTION BOX)
CDU T.P. COM.
XBR-B
+14 VDC ISS FAIL COMMAND
FAIL IND. SCR LO
RR/OPTICS SHAFT CDU LIMIT CYCLE FAIL TEST CMD
RR/OPTICS TRUNN CDU LIMIT CYCLE FAIL TEST CMD
TEST START LAMP
1721TL
1722TL
1742TL
1717TL
1718TL
1042TL
3147
3148
3137
3130
3012
2145
3003
3004
+14 VDC FAIL LOAD
OVDC
USED FOR LEM RR TESTING ONLY, SEE SHEET 4
SHORT INPUTS HI'S TO LO'S
SEE SHEET 4
LEM INTERLOCK
SEE MPL
SCS LOADS SELECTED
SCS LOADS ENABLE
DSKY INTERFACE TEST
1731TL
1726TL
1825TL
3115
3104
4016
10 WATT LOAD
TO XFMR LEM ONLY
27 VDC RLP
1204
1205
1119
1116
1209
1210
1112
1113
1114
1115
1118
1105
1103
1117
1107
1106
1203
1202
1211
1201
1207
1206
1208
1212
2100
2101
MASTER ALARM ANNUNCIATOR LO
MASTER ALARM ANNUNCIATOR HI
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
UP TELEMETRY ACCEPT
PITCH ATT. IMP. CONT. OUPT. UP
PITCH ATT. IMP. CONT. OUPT. DOWN
YAW ATT. IMP. CONT. OUPT. RIGHT
YAW ATT. IMP. CONT. OUPT. LEFT
ROLL ATT. IMP. CONT. OUPT. RIGHT
ROLL ATT. IMP. CONT. OUPT. LEFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
1728T
1727T
1840TL
1841TL
269
271
272
270
1707T
451TW
452TW
454TW
453TW
448TW
449TW
1701TW
1702TW
1703TW
1700TW
1704T
1705T
3945
3944
3509
3510
3529
3530
3531
3532
3942
3904
3905
3906
3907
3908
3909
3900
3901
3902
3930
3948
3947
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 0 (TENS)
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
560TL
3308
3309
3310
3311
3312
3313
3314
3315
3317
LEVEL 4
1185
1189
1069
1070
1072
1073
1057
1058
1060
1061
1173
1077
1174
1076
1175
1176
1179
1178
1160
1161
1157
1158
SCS 28V 800CPS HI
LEM ONLY LO
SCS 28V 800CPS HI
BLK II ONLY LO
1183
1177
1180
1111
1112
1026
1027
1010 HI
1011 LO
1007 HI
1008 LO
1022 HI
1023 LO
1019 HI
1020 LO
971
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
5024
5025
5026
5033
5028
5029
5030
5031
5032
P5 510
1994
1993
1558
1559
1580
1581
1582
1583
1991
1940
1941
1942
1943
1944
1945
1947
1977
1997
1996
1251
1252
1253
1254
1255
1256
1257
1258
1259
1260
1262
TO OPTICS ECDU VIA PSA
IMU ECDU
OPTICS ECDU
639
638
636
637
643
642
640
641
905
904
906
907
912
911
914
913
910
902
923
909
915
916
908
903
49&50
46&47
41&42
39&40
51
48
52
54
55
53
TRUN
SHAFT
OPTICS SIG FROM SXT
28V 800 CPS OPTICS HI LO
TJB
(TABLE MOUNTED JUNCTION BOX)
SHAFT READ INDICATION
SHAFT OR TRUN SELECTED
TRUNNION READ INDICATION
28V 800CPS BRIDGE EXCITATION HI LO
OPTICS SHAFT SET
OPTICS TRUN SET
16X SHAFT SIN
16X SHAFT COS
64X TRUN SIN
64X TRUN COS
RSVR BRIDGE PANEL
6
16
15
54
53
59
82
85
19
55
17
33
14
58
80
60
61
57
SAME AS EXAMPLE
SEE MPL
DSKY
P23
47
48
GNIC
P28
X29B
X29A
P27
X9B
X9A
PSA
636
687
682
683
684
685
TPA 2
156
157
45J1
X23A
X24A
45J4
D8
A12
B12
A11
B11
B13
A13
A14
C10
C8
A9
45J7
A10
A8
B8
B7
A6
B6
C8
C7
C6
D9
B10
F9
33
2
8
7
19
13
4
10
12
55
32
80
P30
X1
X2
X3
X4
X5
X6
X7
X8
X9
X10
X11
X12
2900206
R 3
2729002206

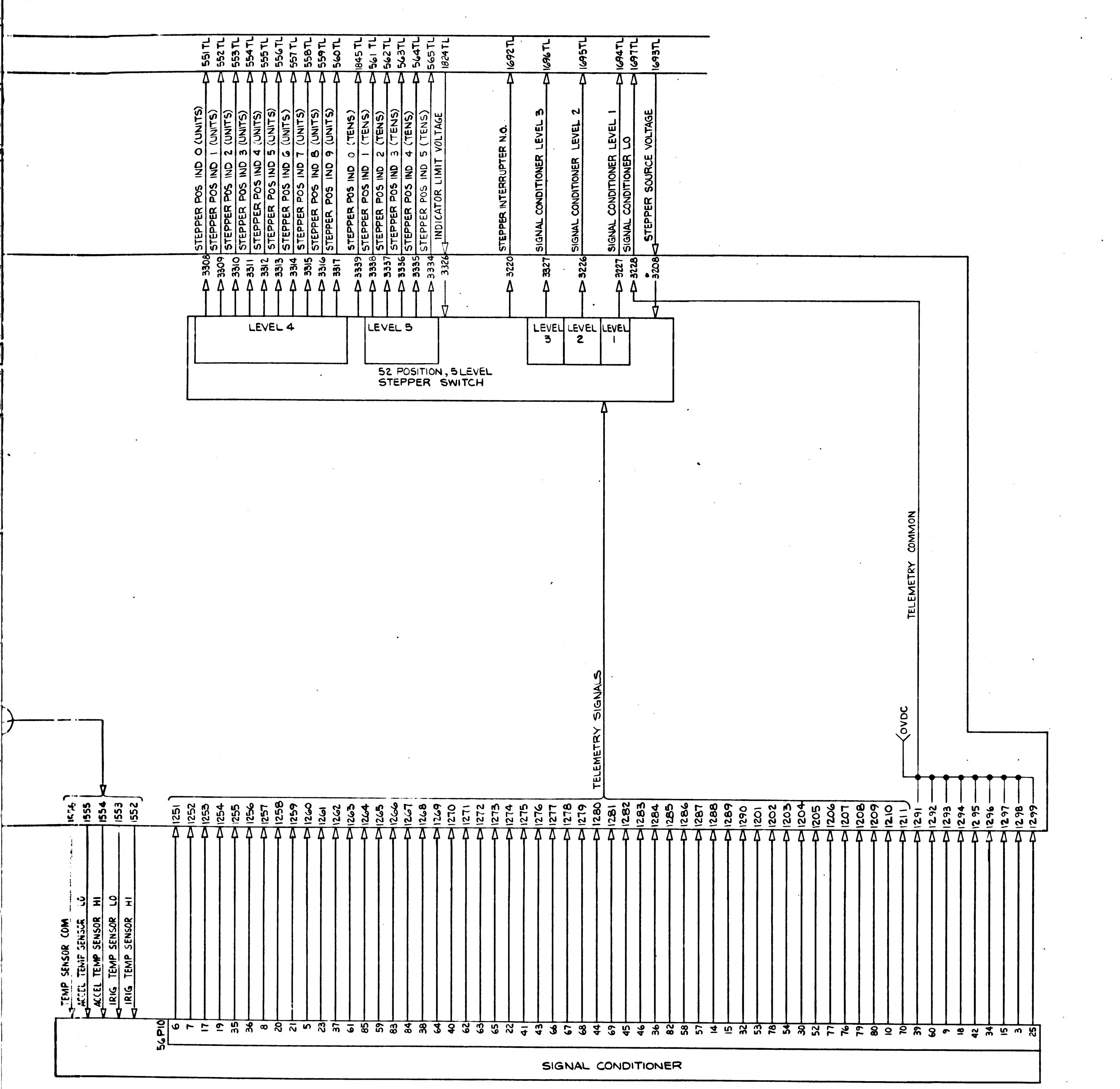


24
23
22
21
20
19
18
17
16
G
F
E
D
C
B
A
2900206 I
SEE GPC
2200
A
GEN 28V DC HI
2203
2202
2201
2204
2205
2212
2213
TRUN SIN & COS
SHAFT SIN & COS
J105
R
E
W
P
M
H
B
SIN HI
SIN LO
COS HI
COS LO
REF HI
REF LO
GEN 28V DC HI
CDU
LIMIT CYCLE
FAIL CIRCUIT
J105
X
D
Y
F
SIN HI
SIN LO
COS HI
GEN 28V DC LO
1100
1101
1823TL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1042
1721TL
1722TL
1742TL
1717TL
1718TL
1042TL
SCM TEST
IG CDU LIMIT CYCLE FAIL TEST CMD
MG CDU LIMIT CYCLE FAIL TEST CMD
OG CDU LIMIT CYCLE FAIL TEST CMD
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
TEST START LIGHT
+14 VDC RR/OPT
CDU T.P. COM.
+14 VDC ISS
CDU T.P. COM.
XBR-B
XBR-B
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
RR/OPTICS SHAFT CDU LIMIT CYCLE FAIL TEST CMD
RR/OPTICS TRUNN CDU LIMIT CYCLE FAIL TEST CMD
TEST START LAMP
3508
2032
2031
2030
2142
2143
2144
3014
3018
2145
3145
3146
3147
3148
3137
3138
3012
2145
SEE GPC
SEE 2900225
1209
1210
1118
1126
1127
1502
1503
1504
1505
1506
1556
1555
1554
1553
1552
1588
1185
1189
1070
TRUN SET VERIF.
SHAFT SET VERIF.
RSVR BRIDGE PANEL
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
PSA
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
SIGNAL CONDITIONER MODULE
606
TPA2
IMU ECDU
OPTICS ECDU
TO OPTICS ECDU VIA PSA
639
638
636
637
643
642
640
641
904
TJB
(TABLE MOUNTED JUNCTION BOX)

2900206 R 3

1-42900206

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO	DATE	APPROVED
	L	REPLACES REV (K) WITH CHANGE PER TDRR 24855		10 JAN 66	BP
	M	REVISED PER TDRR 24952		18 FEB 66	RP
	N	REVISION STATUS CHANGED		22 FEB 66	RP
	P	REVISED PER TDRR 26339		23 FEB 66	RWT RWH
	R	*REVISION STATUS CHANGED*		25-FEB-66	JB W.D


551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
1845TL
561TL
562TL
563TL
564TL
565TL
1824TL
1692TL
1696TL
1695TL
1694TL
1697TL
1693TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 0 (TENS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LIMIT VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3339
3338
3337
3336
3335
3334
3326
3220
3327
3226
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
TELEMETRY COMMON
TELEMETRY SIGNALS
0VDC
1556
1555
1554
1553
1552
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
1251
1252
1253
1254
1255
1256
1257
1258
1259
1260
1261
1262
1263
1264
1265
1266
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1202
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1205
1206
1207
1208
1209
1210
1211
1291
1292
1293
1294
1295
1296
1297
1298
1299
56P10
6
7
17
19
35
36
8
20
21
5
23
37
61
85
59
83
84
38
64
40
62
63
65
22
41
43
66
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68
44
69
45
46
36
82
58
57
14
15
32
53
78
54
30
52
77
76
79
80
10
70
39
60
9
18
42
34
15
3
25
SIGNAL CONDITIONER

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS 3 PLACE DECIMALS ANGLES
+ — + — + —
DO NOT SCALE THIS DRAWING
MATERIAL —
APPROVAL

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN COOKMAN DATE 7 JUN 65
CHECKED ED FOSTER 9 JUN 65
APPROVAL J. M. WATSON
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL W Kwitowski

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM - TEST SELECTOR (LEM)

SIZE J3 | CODE IDENT NO 99974 | 2900206
SCALE — | SHEET 4 OF 4

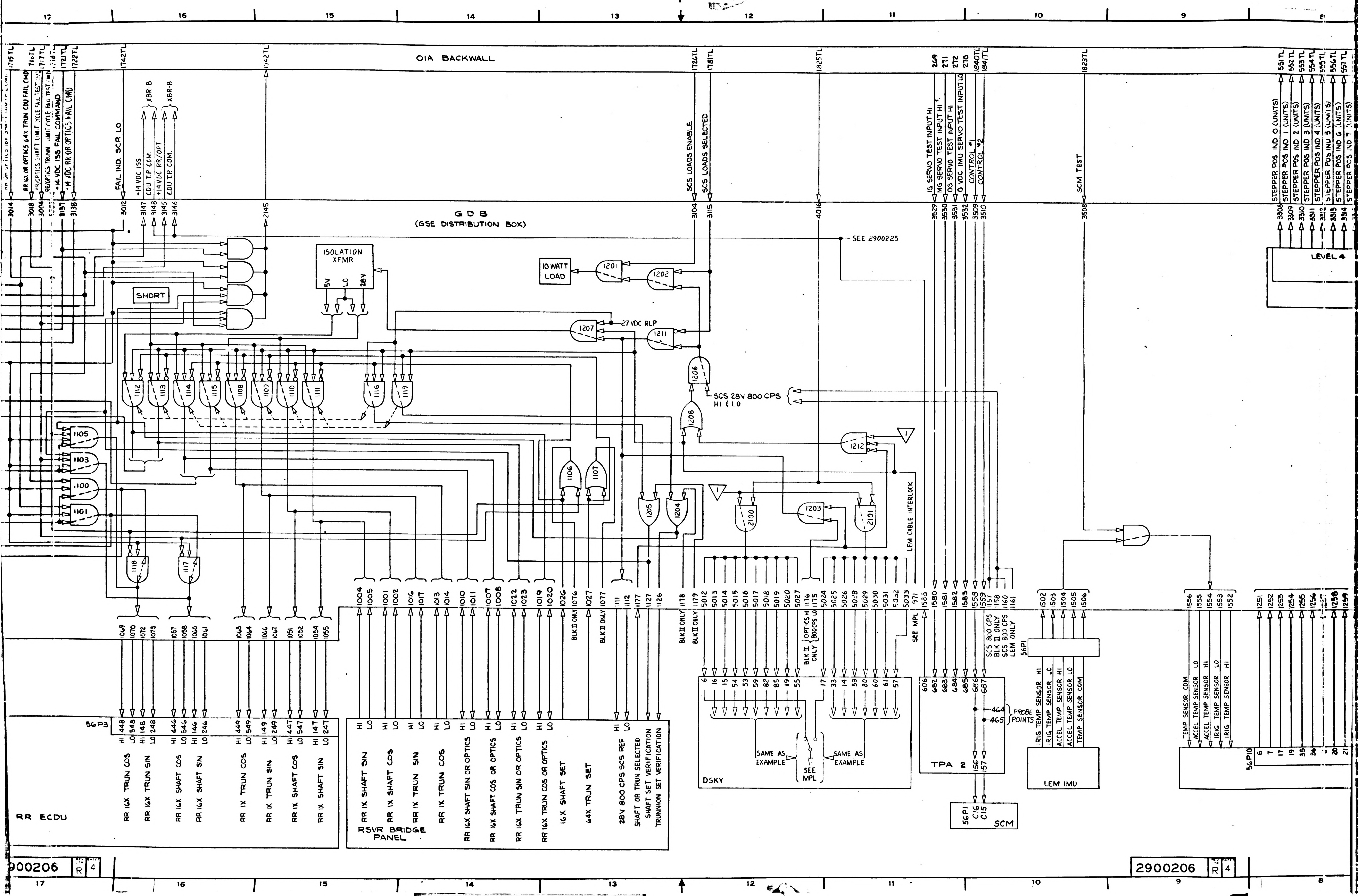
2900206 R

2900206

2900206

900206 R 4

3/4 2900206



OIA BACKWALL
G D B
(GSE DISTRIBUTION BOX)
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
FAIL IND. SCR LO
+14 VDC ISS
CDU T.P. COM.
+14 VDC RR/OPT
CDU T.P. COM.
XBR-B
XBR-B
SCS LOADS ENABLE
SCS LOADS SELECTED
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
CONTROL #1
CONTROL #2
SCM TEST
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
LEVEL 4
SEE 2900225
ISOLATION XFMR
5V
LO
28V
10 WATT LOAD
SHORT
27 VDC RLP
SCS 28V 800 CPS HI & LO
LEM CABLE INTERLOCK
1201
1202
1207
1211
1206
1208
1212
1203
2100
2101
1204
1205
1106
1107
1112
1113
1114
1115
1108
1109
1110
1111
1116
1119
1105
1103
1100
1101
1118
1117
BLK II ONLY
OPTICS HI 800 CPS LO
SEE MPL
SCS 800 CPS
BLK II ONLY
SCS 800 CPS
LEM ONLY
56P1
56P3
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
RR 1X TRUN COS
RR 1X TRUN SIN
RR 1X SHAFT COS
RR 1X SHAFT SIN
RR ECDU
RR 1X SHAFT SIN
RR 1X SHAFT COS
RR 1X TRUN SIN
RR 1X TRUN COS
RR 16X SHAFT SIN OR OPTICS
RR 16X SHAFT COS OR OPTICS
RR 16X TRUN SIN OR OPTICS
RR 16X TRUN COS OR OPTICS
16X SHAFT SET
64X TRUN SET
RSVR BRIDGE PANEL
28V 800 CPS SCS REF
SHAFT OR TRUN SELECTED
SHAFT SET VERIFICATION
TRUNNION SET VERIFICATION
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
DSKY
464
465
PROBE POINTS
TPA 2
56P1
C16
C15
SCM
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
LEM IMU
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
56P10
17
16
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11
10
9
8

900206 R 4

2900206 R 4

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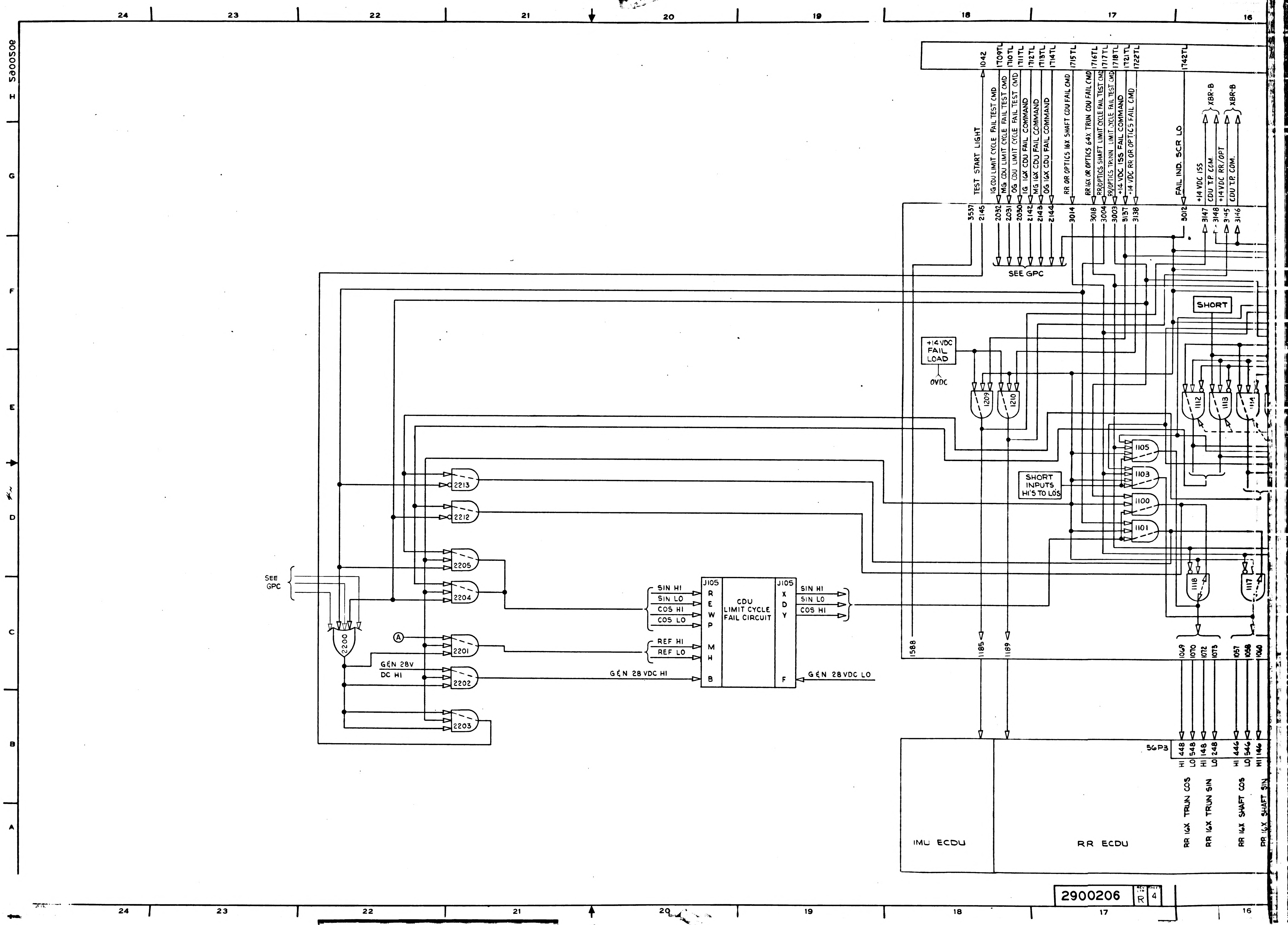24
23
22
21
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19
18
17
16
H
G
F
E
D
C
B
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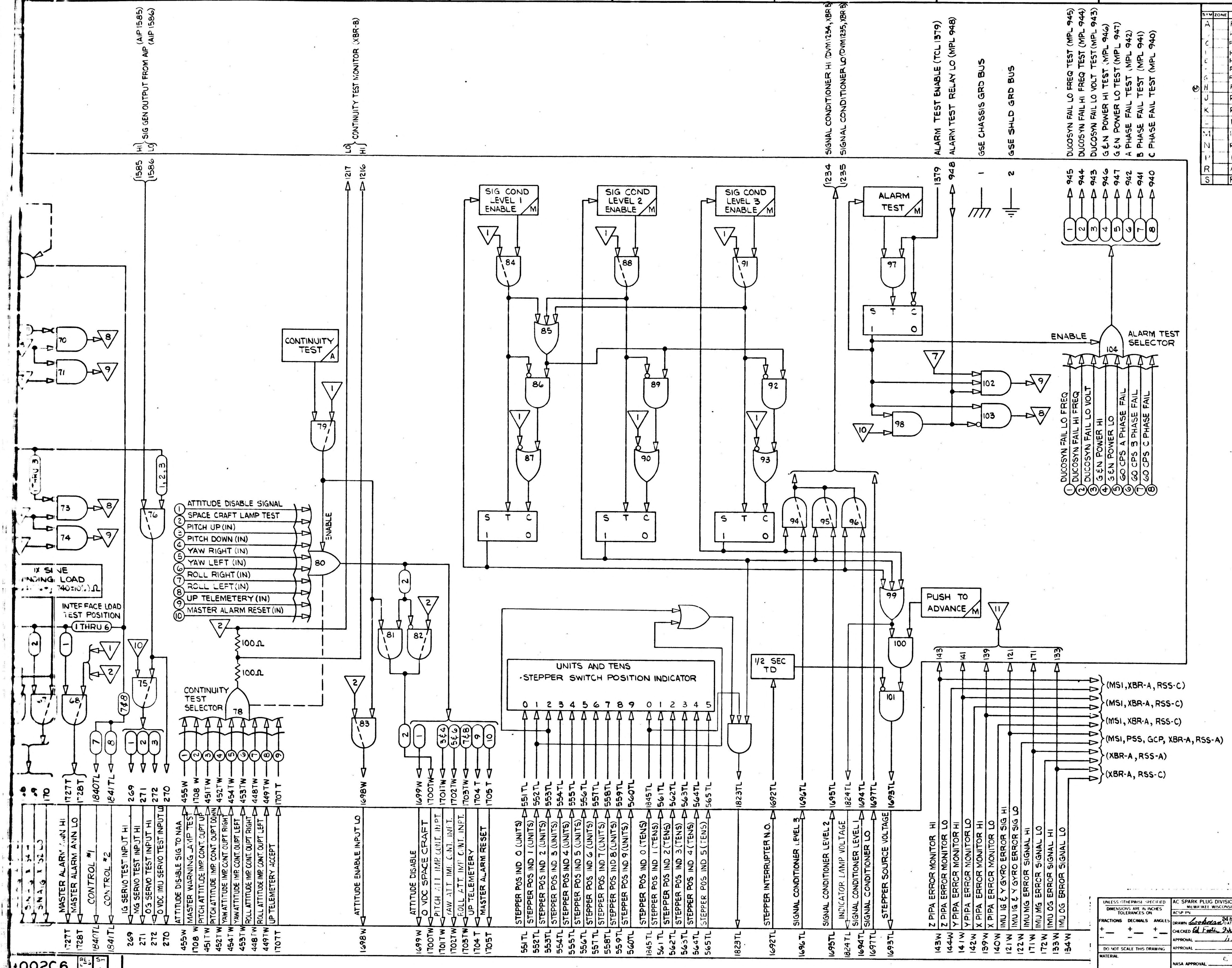
2900206
1042
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1717TL
1718TL
1721TL
1722TL
1742TL
TEST START LIGHT
IG CDU LIMIT CYCLE FAIL TEST CMD
MG CDU LIMIT CYCLE FAIL TEST CMD
OG CDU LIMIT CYCLE FAIL TEST CMD
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
RR OR OPTICS 16X SHAFT CDU FAIL CMD
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
RR/OPTICS SHAFT LIMIT CYCLE FAIL TEST CMD
RR/OPTICS TRUNN LIMIT CYCLE FAIL TEST CMD
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
+14 VDC ISS
CDU T.P. COM.
+14 VDC RR/OPT
CDU T.P. COM.
XBR-B
XBR-B
3537
2145
2032
2031
2030
2142
2143
2144
3014
3018
3004
3003
3137
3138
3012
3147
3148
3145
3146
SEE GPC
SHORT
+14 VDC FAIL LOAD
0VDC
1209
1210
1112
1113
1114
1105
1103
1100
1101
SHORT INPUTS HI'S TO LO'S
1118
1117
2213
2212
2205
2204
2201
2202
2203
2200
SEE GPC
A
GEN 28V DC HI
SIN HI
SIN LO
COS HI
COS LO
REF HI
REF LO
J105
R
E
W
P
M
H
B
CDU LIMIT CYCLE FAIL CIRCUIT
J105
X
D
Y
F
SIN HI
SIN LO
COS HI
GEN 28 VDC HI
GEN 28 VDC LO
1588
1185
1189
1069
1070
1072
1073
1057
1058
1060
56P3
448 HI
548 LO
148 HI
248 LO
446 HI
546 LO
146 HI
IMU ECDU
RR ECDU
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
2900206
R
4
24
23
22
21
20
19
18
17
16

1/2900206

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPR
A		REVISED PER TDRR 21905		1 SEP 65	RLP AU
B		REVISED PER TDRR 22006		7 SEP 65	LP
C		REVISED PER TDRR 22004		9 SEP 65	LP
D		REVISED PER TDRR 22005		10 [illegible]	AU
E		REVISED PER TDRR 22002		[illegible] SEP	LK
F		REVISED PER TDRR 22003		16 SEP 65	LK
G		REVISED PER TDRR 22001		21 SEP	LK
Ⓜ H		REVISED PER TDRR 22000		27 SEP 65	[illegible]
J		REVISED PER TDRR 22743		6 OCT 65	RLP
K		REVISION STATUS CHANGED		10 NOV 65	RLP MLH
L		REVISED PER TDRR 24855		10 JAN 66	RLP
M		REVISED PER TDRR 24952		8 FEB 66	RLP MLH
N		REVISED PER TDRR 26332		22 FEB 66	RLP MLH
P		REVISION STATUS CHANGED		[illegible] FEB 66	RWT RWH
R		REVISED PER TDRR 26341		25 FEB 66	B.
S		REVISION STATUS CHANGER		28 [illegible]	RWT


SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
HI LO
1585
1586
CONTINUITY TEST MONITOR (XBR-B)
LO HI
1217
1216
SIG COND LEVEL 1 ENABLE M
SIG COND LEVEL 2 ENABLE M
SIG COND LEVEL 3 ENABLE M
SIGNAL CONDITIONER HI (DVM1234, XBR-B)
SIGNAL CONDITIONER LO (DVM1235, XBR-B)
1234
1235
ALARM TEST M
ALARM TEST ENABLE (TCL 1379)
ALARM TEST RELAY LO (MPL 948)
1379
948
GSE CHASSIS GRD BUS
GSE SHLD GRD BUS
1
2
DUCOSYN FAIL LO FREQ TEST (MPL 945)
DUCOSYN FAIL HI FREQ TEST (MPL 944)
DUCOSYN FAIL LO VOLT TEST (MPL 943)
G&N POWER HI TEST (MPL 946)
G&N POWER LO TEST (MPL 947)
A PHASE FAIL TEST (MPL 942)
B PHASE FAIL TEST (MPL 941)
C PHASE FAIL TEST (MPL 940)
945
944
943
946
947
942
941
940
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100
101
102
103
104
S T C
I O
ENABLE
ALARM TEST SELECTOR
DUCOSYN FAIL LO FREQ
DUCOSYN FAIL HI FREQ
DUCOSYN FAIL LO VOLT
G&N POWER HI
G&N POWER LO
60 CPS A PHASE FAIL
60 CPS B PHASE FAIL
60 CPS C PHASE FAIL
CONTINUITY TEST A
70
71
73
74
75
76
78
79
80
81
82
83
IX SINE LOADING LOAD
INTERFACE LOAD TEST POSITION
1 THRU 6
1 THRU 3
1,2,3
ATTITUDE DISABLE SIGNAL
SPACE CRAFT LAMP TEST
PITCH UP (IN)
PITCH DOWN (IN)
YAW RIGHT (IN)
YAW LEFT (IN)
ROLL RIGHT (IN)
ROLL LEFT (IN)
UP TELEMETERY (IN)
MASTER ALARM RESET (IN)
ENABLE
100Ω
100Ω
CONTINUITY TEST SELECTOR
3&6
5&6
7&8
UNITS AND TENS
STEPPER SWITCH POSITION INDICATOR
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
1/2 SEC TD
PUSH TO ADVANCE M
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, PSS, GCP, XBR-A, RSS-A)
(XBR-A, RSS-A)
(XBR-A, RSS-C)
143
144
141
139
121
171
133
170
1727T
1728T
1840TL
1841TL
269
271
272
270
455W
1708W
451TW
452TW
454TW
453TW
448TW
449TW
1707T
1698W
1699W
1700TW
1701TW
1702TW
1703TW
1704T
1705T
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
1845TL
561TL
562TL
563TL
564TL
565TL
1823TL
1692TL
1696TL
1695TL
1824TL
1694TL
1697TL
1693TL
MASTER ALARM ANN HI
MASTER ALARM ANN LO
CONTROL #1
CONTROL #2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
O VDC IMU SERVO TEST INPUT LO
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUPT UP
PITCH ATTITUDE IMP. CONT OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
UP TELEMETERY ACCEPT
ATTITUDE ENABLE INPUT LO
ATTITUDE DISABLE
O VDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
UP TELEMETERY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 0 (TENS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
INDICATOR LAMP VOLTAGE
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIG HI
IMU IG & Y GYRO ERROR SIG LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
143W
144W
141W
142W
139W
140W
121W
122W
171W
172W
133W
134W
9 8 7 6 5 4 3 2 1
H G F E D C B A

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Lookman DATE 24 MAY 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM-
TEST SELECTOR
(BLOCK I SERIES 100, BLOCK II & LEM)

CODE IDENT NO 99974
SIZE J_3
2900206
SCALE —
SHEET 1 OF 4

2900206

002C6 REV SH 1

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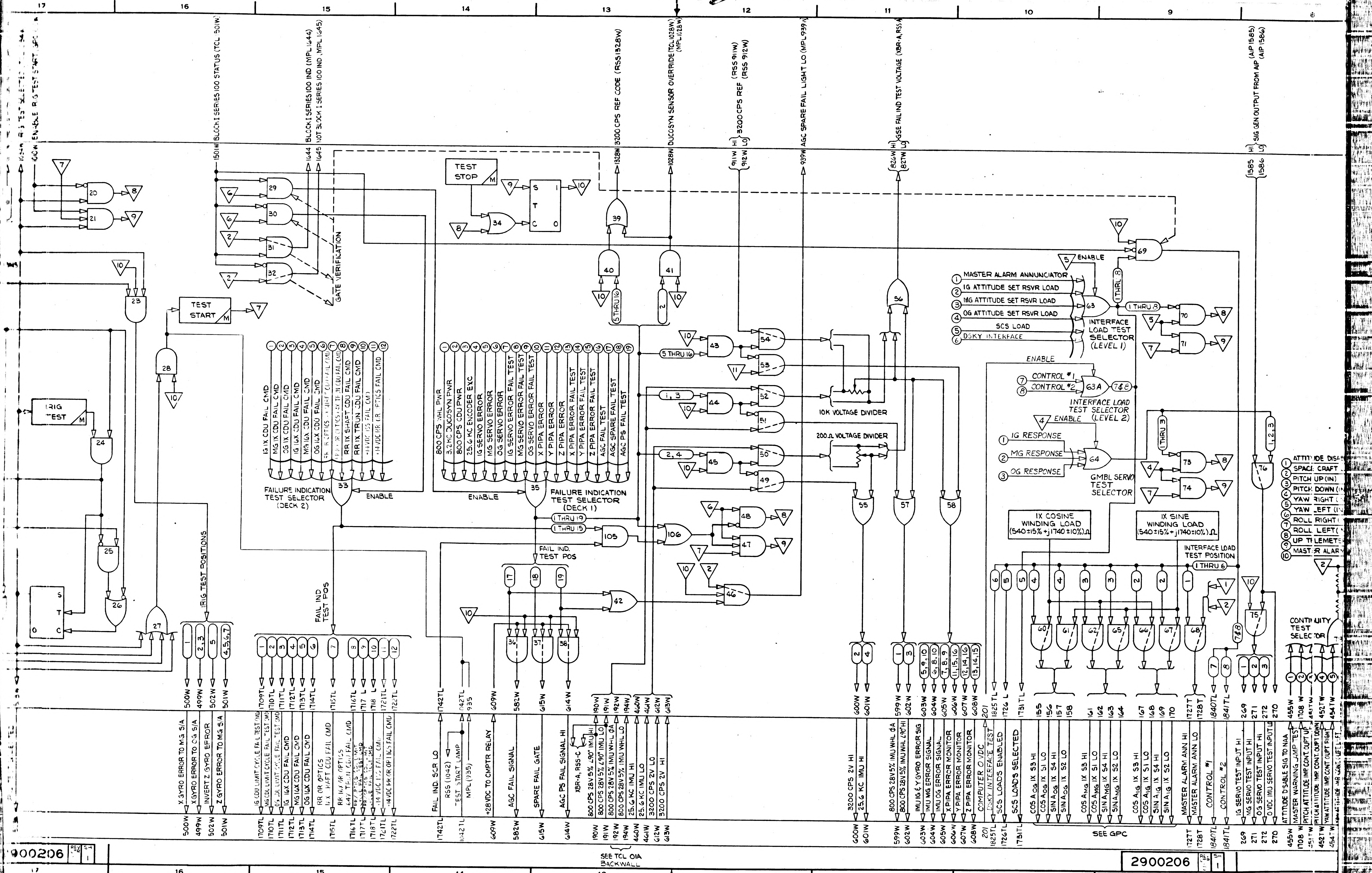
17
16
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11
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9
1520W ENABLE IRIG TEST START
1501W BLOCK I SERIES 100 STATUS (TCL 501W)
1644 BLOCK I SERIES 100 IND (MPL 1644)
1645 NOT BLOCK I SERIES 100 IND (MPL 1645)
1328W 3200 CPS REF CODE (RSS 1328W)
1028W DUCOSYN SENSOR OVERRIDE (TCL 1028W) (MPL 1028W)
911W HI 912W LO 3200 CPS REF (RSS 911W) (RSS 912W)
939W AGC SPARE FAIL LIGHT LO (MPL 939)
826W HI 827W LO GSE FAIL IND TEST VOLTAGE (XBR-A, RSS-A)
1585 HI 1586 LO SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
TEST STOP M
S T C
I O
TEST START M
IRIG TEST M
GATE VERIFICATION
20
21
23
24
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43
44
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48
49
50
51
52
53
54
55
56
57
58
60
61
62
63
63A
64
65
66
67
68
69
70
71
73
74
75
76
105
106
IG IX CDU FAIL CMD
MG IX CDU FAIL CMD
OG IX CDU FAIL CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
RR OR OPTICS 16X TRUN CDU FAIL CMD
RR OR OPTICS 64X TRUN CDU FAIL CMD
RR IX SHAFT CDU FAIL CMD
RR IX TRUN CDU FAIL CMD
+14 VDC ISS FAIL CMD
-14 VDC RR OR OPTICS FAIL CMD
FAILURE INDICATION TEST SELECTOR (DECK 2)
ENABLE
800 CPS WHL PWR
3.2 KC DUCOSYN PWR
800 CPS CDU PWR
25.6 KC ENCODER EXC
IG SERVO ERROR
MG SERVO ERROR
OG SERVO ERROR
IG SERVO ERROR FAIL TEST
MG SERVO ERROR FAIL TEST
OG SERVO ERROR FAIL TEST
X PIPA ERROR
Y PIPA ERROR
Z PIPA ERROR
X PIPA ERROR FAIL TEST
Y PIPA ERROR FAIL TEST
Z PIPA ERROR FAIL TEST
AGC FAIL TEST
AGC SPARE FAIL TEST
AGC PS FAIL TEST
FAILURE INDICATION TEST SELECTOR (DECK 1)
ENABLE
1 THRU 19
1 THRU 15
5 THRU 16
1, 3
2, 4
FAIL IND. TEST POS
FAIL IND TEST POS
IRIG TEST POSITIONS
10K VOLTAGE DIVIDER
200 Ω VOLTAGE DIVIDER
ENABLE
MASTER ALARM ANNUNCIATOR
IG ATTITUDE SET RSVR LOAD
MG ATTITUDE SET RSVR LOAD
OG ATTITUDE SET RSVR LOAD
SCS LOAD
DSKY INTERFACE
INTERFACE LOAD TEST SELECTOR (LEVEL I)
1 THRU 8
ENABLE
CONTROL #1
CONTROL #2
7 & 8
INTERFACE LOAD TEST SELECTOR (LEVEL 2)
ENABLE
IG RESPONSE
MG RESPONSE
OG RESPONSE
GMBL SERVO TEST SELECTOR
1 THRU 3
1, 2, 3
IX COSINE WINDING LOAD (540±15% + j1740±10%)Ω
IX SINE WINDING LOAD (540±15% + j1740±10%)Ω
INTERFACE LOAD TEST POSITION
1 THRU 6
ATTITUDE DISABLE
SPACE CRAFT
PITCH UP (IN)
PITCH DOWN (IN)
YAW RIGHT (IN)
YAW LEFT (IN)
ROLL RIGHT (IN)
ROLL LEFT (IN)
UP TELEMETRY
MASTER ALARM
CONTINUITY TEST SELECTOR
500W X GYRO ERROR TO MG S/A
499W X GYRO ERROR TO OG S/A
502W INVERT Z GYRO ERROR
501W Z GYRO ERROR TO MG S/A
1709TL IG CDU LIMIT CYCLE FAIL TEST CMD
1710TL MG CDU LIMIT CYCLE FAIL TEST CMD
1711TL OG CDU LIMIT CYCLE FAIL TEST CMD
1712TL IG 16X CDU FAIL CMD
1713TL MG 16X CDU FAIL CMD
1714TL OG 16X CDU FAIL CMD
1715TL RR OR OPTICS 16X SHAFT CDU FAIL CMD
1716TL RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
1717TL RR/OPTICS CDU LIMIT CYCLE FAIL TEST CMD
1718TL RR/OPTICS CDU LIMIT CYCLE FAIL TEST CMD
1721TL +14 VDC ISS FAIL CMD
1722TL -14 VDC RR OR OPTICS FAIL CMD
1742TL FAIL IND. SCR LO
1042TL RSS (1042) TEST START LAMP
935 MPL (935)
609W +28 VDC TO CMPTR RELAY
582W AGC FAIL SIGNAL
615W SPARE FAIL GATE
614W AGC PS FAIL SIGNAL HI
XBR-A, RSS-C
190W 800 CPS 28V 5% ∠90° IMU HI
191W 800 CPS 28V 5% ∠90° IMU LO
192W 800 CPS 28V 5% IMU WHL ØA
194W 800 CPS 28V 5% IMU WHL LO
460W 25.6 KC IMU HI
461W 25.6 KC IMU LO
612W 3200 CPS 2V LO
613W 3200 CPS 2V HI
SEE TCL 01A BACKWALL
600W 3200 CPS 2V HI
601W 25.6 KC IMU HI
599W 800 CPS 28V 5% IMU WHL ØA
602W 800 CPS 28V 5% IMU WHL ∠90° HI
603W IMU IG & Y GYRO ERROR SIG
604W IMU MG ERROR SIGNAL
605W IMU OG ERROR SIGNAL
606W X PIPA ERROR MONITOR
607W Y PIPA ERROR MONITOR
608W Z PIPA ERROR MONITOR
201 COMPUTER O VDC
1825TL DSKY INTERFACE TEST
1726TL SCS LOADS ENABLED
1731TL SCS LOADS SELECTED
155 COS A_OG IX S3 HI
156 COS A_OG IX S1 LO
157 SIN A_OG IX S4 HI
158 SIN A_OG IX S2 LO
161 COS A_MG IX S3 HI
162 COS A_MG IX S1 LO
163 SIN A_MG IX S4 HI
164 SIN A_MG IX S2 LO
167 COS A_IG IX S3 HI
168 COS A_IG IX S1 LO
169 SIN A_IG IX S4 HI
170 SIN A_IG IX S2 LO
SEE GPC
1727T MASTER ALARM ANN HI
1728T MASTER ALARM ANN LO
1840TL CONTROL #1
1841TL CONTROL #2
269 IG SERVO TEST INPUT HI
271 MG SERVO TEST INPUT HI
272 OG SERVO TEST INPUT HI
270 O VDC IMU SERVO TEST INPUT LO
455W ATTITUDE DISABLE SIG TO NAA
1708W MASTER WARNING LAMP TEST
451TW PITCH ATTITUDE IMP CONT OUPT UP
452TW PITCH ATTITUDE IMP CONT OUPT DOWN
454TW YAW ATTITUDE IMP CONT OUPT RIGHT
YAW ATTITUDE IMP CONT OUPT LEFT
900206 REV SH 1
2900206 REV SH 1

2729002O6

NOTES:

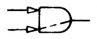
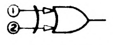
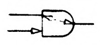
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM)

2900210 RLP	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RELAY & LAMP POWER SUPPLY
2900208 PSS	POWER & DUMMY LOAD-PRIMARY SIGNAL SELECTOR (PDL) PRIMARY SIGNAL SELECTOR
2900223	GIMBAL POSITION CONTROL (GPC)
2900207	MONITOR PANEL (MPL)
2900202	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
2900217 XBR-A XBR-B DVM	SIGNAL SELECTION & MEASUREMENT CROSSBAR - AC SIGNALS CROSSBAR - DC SIGNALS DIGITAL VOLTMETER
2900218 RSS-A RSS-B RSS-C RSS-D	OSCILLOGRAPH SIGNAL SELECTION TO FIXED AC CHANNEL TO FIXED DC CHANNEL TO SWITCHABLE AC CHANNEL TO SWITCHABLE DC CHANNEL
2900215 RSS	MEASUREMENT REFERENCE POWER SUPPLIES OSCILLOGRAPH SIGNAL SELECTOR
2900211	AUXILIARY INPUT-OUTPUT & CALIBRATION (AIP)
2900212 MSI	FIPA & IRIG MONITORING PHASE SHIFT PANEL
2900200	GYRO CAGING PANEL (GCP)

4. NONSTANDARD SYMBOLS

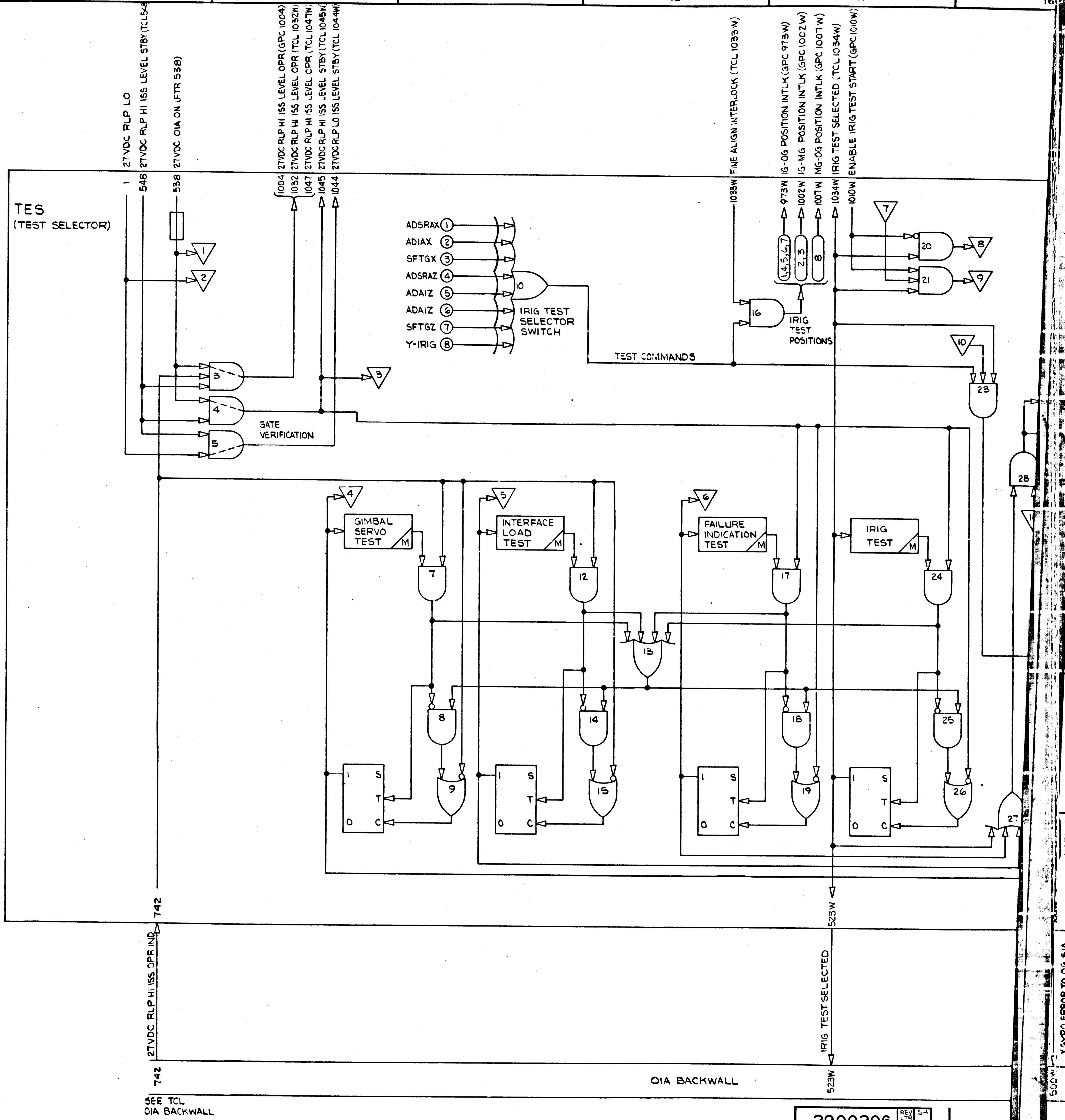
	INDICATES "AND" GATE WITH SWITCHED SIGNAL
	INDICATES EXCLUSIVE "OR" GATE WITH SWITCH POSITIONS 1 & 2
NAME M	INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
	INDICATES "AND" GATE WITH A SWITCHED SIGNAL CAPABLE OF SIGNAL FLOW IN TWO DIRECTIONS

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G&N CONFIGURATIONS
   - E. TW, TL, OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

6. SIGNAL REFERENCE

1	27 VDC OIA ON
2	27 VDC RLP LO
3	27 VDC ISS LEVEL STANDBY
4	GIMBAL SERVO TEST SELECTED
5	INTERFACE LOAD TEST SELECTED
6	FAILURE INDICATION TEST SELECTED
7	TEST START, BUTTON DEPRESSED
8	CLEAR
9	SET
10	TEST STARTED
11	IMU ERROR SIGNALS

Ⓐ CONNECT TO THE OUTPUT OF GATE 1203



TES
(TEST SELECTOR)
1 27 VDC RLP LO
548 27 VDC RLP HI ISS LEVEL STBY (TCL 548)
538 27 VDC OIA ON (FTR 538)
1004 27VDC RLP HI ISS LEVEL OPR (GPC 1004)
1032 27VDC RLP HI ISS LEVEL OPR (TCL 1032W)
1047 27VDC RLP HI ISS LEVEL OPR (TCL 1047W)
1045 27VDC RLP HI ISS LEVEL STBY (TCL 1045W)
1044 27VDC RLP LO ISS LEVEL STBY (TCL 1044W)
1033W FINE ALIGN INTERLOCK (TCL 1033W)
973W IG-OG POSITION INTLK (GPC 973W)
1002W IG-MG POSITION INTLK (GPC 1002W)
1007W MG-OG POSITION INTLK (GPC 1007W)
1034W IRIG TEST SELECTED (TCL 1034W)
1010W ENABLE IRIG TEST START (GPC 1010W)
ADSRAX ①
ADIAX ②
SFTGX ③
ADSRAZ ④
ADAIZ ⑤
ADAIZ ⑥
SFTGZ ⑦
Y-IRIG ⑧
10
IRIG TEST SELECTOR SWITCH
1,4,5,6,7
2,3
8
16
IRIG TEST POSITIONS
20
21
TEST COMMANDS
3
4
5
GATE VERIFICATION
GIMBAL SERVO TEST M
INTERFACE LOAD TEST M
FAILURE INDICATION TEST M
IRIG TEST M
7
8
9
12
13
14
15
17
18
19
23
24
25
26
27
28
1 S T 0 C
742
742 27VDC RLP HI ISS OPR IND
523W IRIG TEST SELECTED 523W
IRIG TEST POSITIONS
2,3
499W X GYRO ERROR TO OG S/A 499W
500W
INVERT Z GYRO ERROR
OIA BACKWALL
SEE TCL
OIA BACKWALL

2900206	REV LTR	SH 1

MIL FORM 1050 J3

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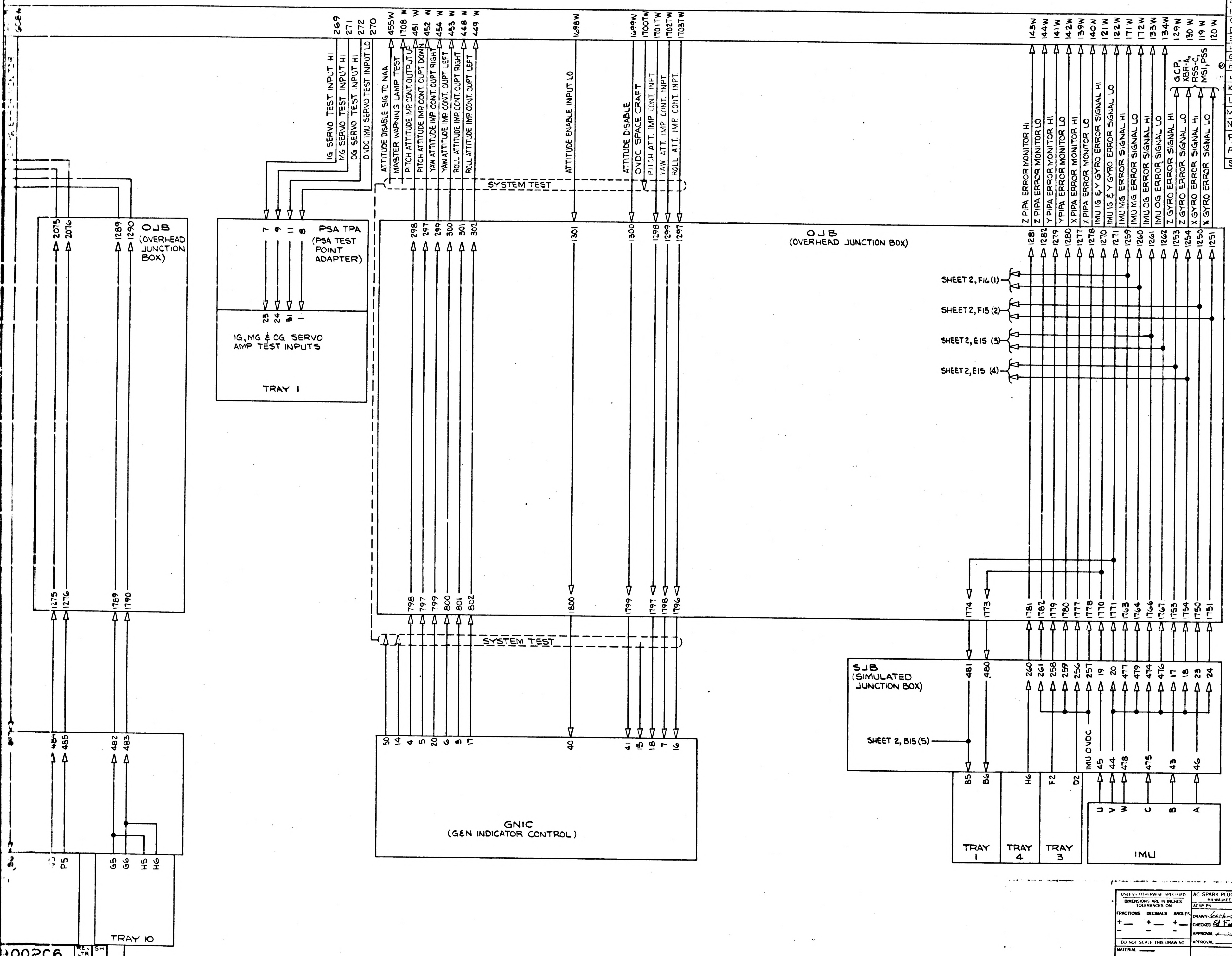

269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
455W
1708 W
451 W
452 W
454 W
453 W
448 W
449 W
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUTPUT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
1698W
ATTITUDE ENABLE INPUT LO
1699W
1700TW
1701TW
1702TW
1703TW
ATTITUDE DISABLE
OVDC SPACE CRAFT
PITCH ATT. IMP. CONT. INPT
YAW ATT. IMP. CONT. INPT
ROLL ATT. IMP. CONT. INPT
SYSTEM TEST
143W
144W
141W
142W
139W
140W
121W
122W
171W
172W
133W
134W
129W
130 W
119 W
120 W
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIGNAL HI
IMU IG & Y GYRO ERROR SIGNAL LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
Z GYRO ERROR SIGNAL HI
Z GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
X GYRO ERROR SIGNAL LO
GCP, XBR-A, RSS-C, MSI, PSS
OJB (OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1789
1790
PSA TPA (PSA TEST POINT ADAPTER)
7
9
11
8
23
24
31
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
OJB (OVERHEAD JUNCTION BOX)
298
297
299
300
301
302
1301
1300
1298
1299
1297
1281
1282
1279
1280
1277
1278
1270
1271
1259
1260
1261
1262
1253
1254
1250
1251
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (3)
SHEET 2, E15 (4)
798
797
799
800
801
802
1800
1799
1797
1798
1796
1774
1773
1781
1782
1779
1780
1777
1778
1770
1771
1763
1764
1766
1767
1755
1754
1750
1751
SYSTEM TEST
484
485
482
483
P5
G5
G6
H5
H6
TRAY 10
50
14
4
5
20
6
5
17
40
41
15
18
7
16
GNIC (G&N INDICATOR CONTROL)
SJB (SIMULATED JUNCTION BOX)
481
480
260
261
258
259
256
257
19
20
477
479
474
476
17
18
23
24
SHEET 2, B15 (5)
IMU 0VDC
45
44
478
475
43
46
B5
B6
H6
F2
D2
U
V
W
C
B
A
TRAY 1
TRAY 4
TRAY 3
IMU

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		1 SEP 65	RLP AU
B		REVISION STATUS CHANGED		7 SEP 65	LK
C		REVISION STATUS CHANGED		9 SEP 65	LK TBC
D		REVISION STATUS CHANGED		10 SEP	LK AU
E		REVISED PER TDPP 22002		13 SEP 65	LK
F		REVISION STATUS CHANGED		OCT 65	LK
G		REVISION STATUS CHANGED		21 SEP 65	LK
H		REVISION STATUS CHANGED		27 SEP 65	
J		REVISION STATUS CHANGED		6 OCT 65	RLP
K		REVISION STATUS CHANGED		10 NOV 65	RLP MEM
L		REVISION STATUS CHANGED		10 JAN 66	RLP
M		REVISION STATUS CHANGED		18 FEB 66	RLP
N		REVISED PER TDRR 26332		22 FEB 66	RLP MM
P		REVISION STATUS CHANGED		23 FEB 66	RWT RWH
R		REVISION STATUS CHANGED		25-FEB-66	B. WT
S		REVISION STATUS CHANGED		28 FEB 66	R.W.T.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Cockman DATE 26 MAY 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK I SERIES 100)

CODE IDENT NO 99974 SIZE J_2 2900206
SCALE —
SHEET 2 OF 4

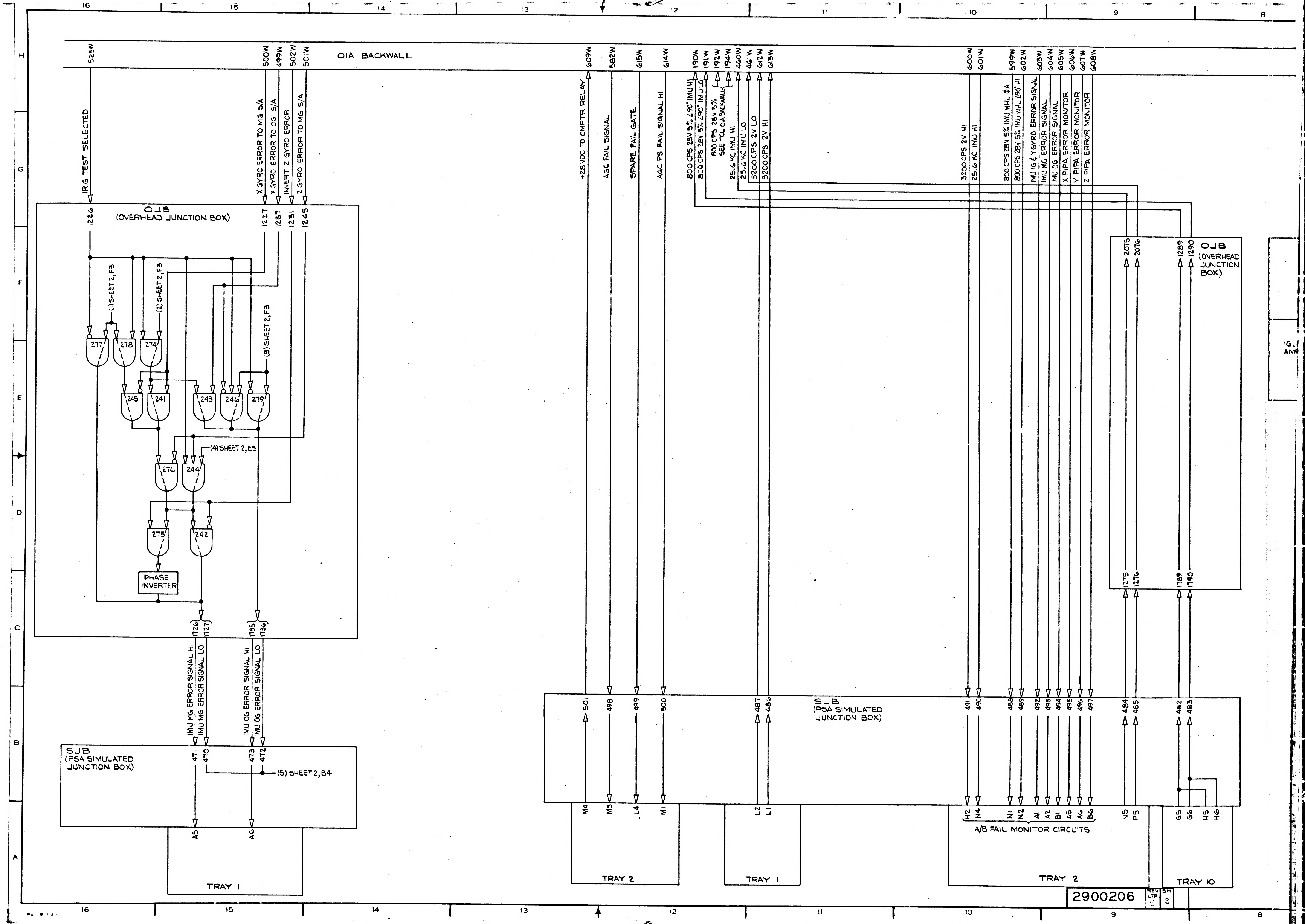
2900206 S

2900206 REV LTR S SH 2

3H

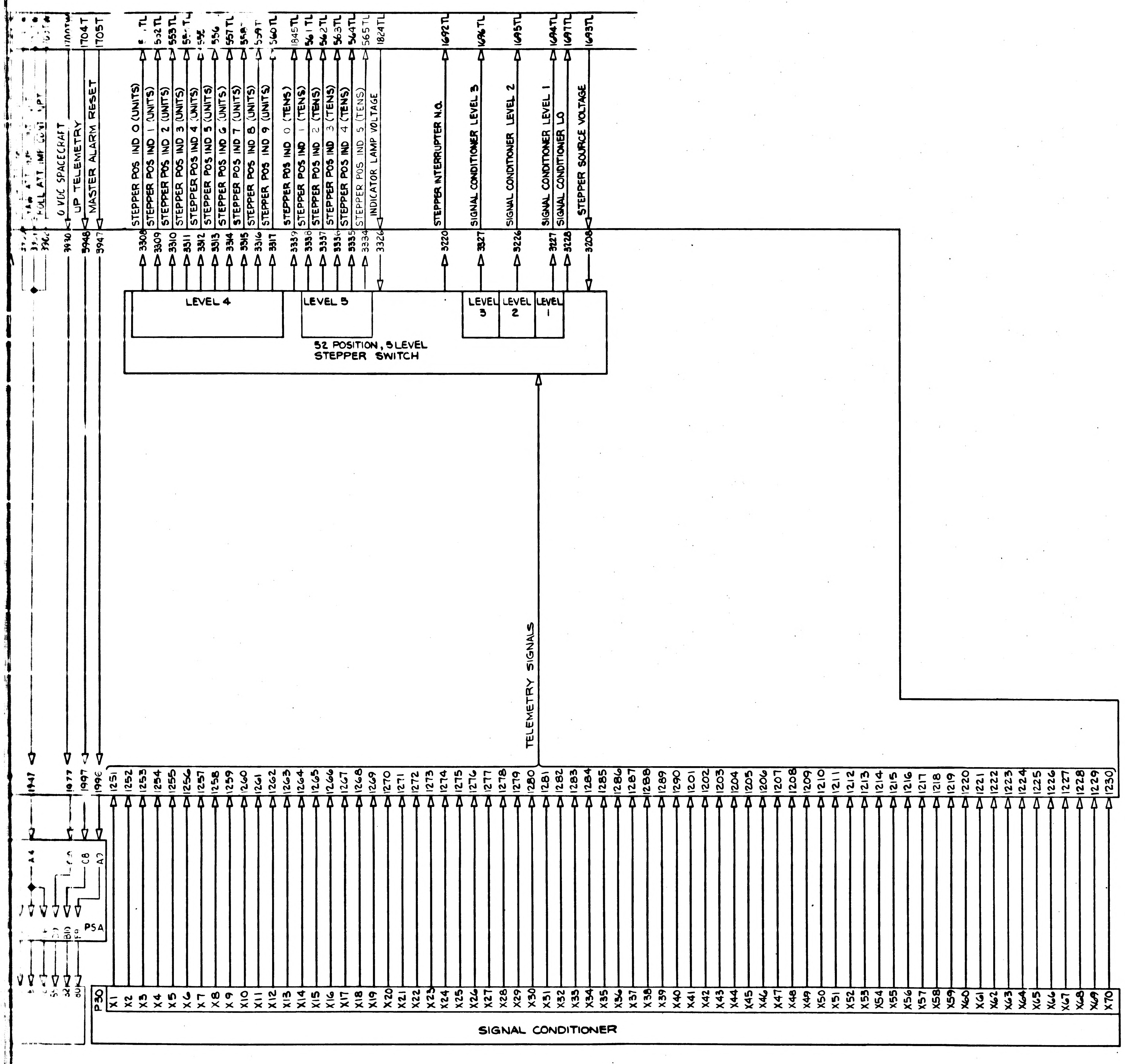
27/2900206

2900206
SH 2 OF 4



16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
523W
IRIG TEST SELECTED
500W
499W
502W
501W
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
OJB
(OVERHEAD JUNCTION BOX)
1226
1227
1237
1231
1245
(1) SHEET 2, F3
(2) SHEET 2, F3
(3) SHEET 2, F3
(4) SHEET 2, E3
277
278
274
245
241
243
246
279
276
244
275
242
PHASE INVERTER
1726
1727
1735
1736
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
SJB
(PSA SIMULATED JUNCTION BOX)
471
470
473
472
(5) SHEET 2, B4
A5
A6
TRAY 1
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5% SEE TCL OIA BACKWALL
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ΦA
800 CPS 28V 5% IMU WHL ∠90° HI
IMU IG & Y GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
OJB
(OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1789
1790
SJB
(PSA SIMULATED JUNCTION BOX)
501
498
499
500
487
486
491
490
488
489
492
493
494
495
496
497
484
485
482
483
M4
M3
L4
M1
TRAY 2
L2
L1
TRAY 1
H2
N4
N1
N2
A1
A2
B1
A5
A6
B6
N5
P5
A/B FAIL MONITOR CIRCUITS
TRAY 2
G5
G6
H5
H6
TRAY 10
IG.
AM
2900206
REV LTR
5
SH
2

17/2900206


1700TM
1704T
1705T
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
3930
3948
3947
552TL
553TL
556
557TL
559T
560TL
1845TL
561TL
562TL
563TL
564TL
565TL
1824TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 0 (TENS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LAMP VOLTAGE
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3339
3338
3337
3336
3335
3334
3326
1692TL
1696TL
1695TL
1694TL
1691TL
1693TL
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3220
3227
3226
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
TELEMETRY SIGNALS
1947
1977
1997
1996
1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220 1221 1222 1223 1224 1225 1226 1227 1228 1229 1230
A4
C8
A2
PSA
P30
X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21 X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38 X39 X40 X41 X42 X43 X44 X45 X46 X47 X48 X49 X50 X51 X52 X53 X54 X55 X56 X57 X58 X59 X60 X61 X62 X63 X64 X65 X66 X67 X68 X69 X70
SIGNAL CONDITIONER

REVISIONS

ZONE	LTR	DESCRIPTION	CHG NO	DATE	APPROVED
	L	REPLACES REV(K) WITH CHANGE PER TDRR 24855		JAN 66	KLP
	M	REVISED PER TDRR 24952		18 FEB 66	RP
	N	REVISED PER TDRR 26332		22 FEB 66	KLP
	P	REVISED PER TDRR 26339		23 FEB 66	R.W.T.
	R	*REVISION STATUS CHANGED*		25-FEB-66	J.B.
	S	REVISED PER TDRR 26342		28 FEB 66	R.W.T.

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
2 PLACE DECIMALS 3 PLACE DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
APPROVAL

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN COOKMAN DATE 3 JUN 65
CHECKED FOSTER 9 JUN 65
APPROVAL
CONTRACT NAS 9-497
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM -
TEST SELECTOR
(BLOCK II)

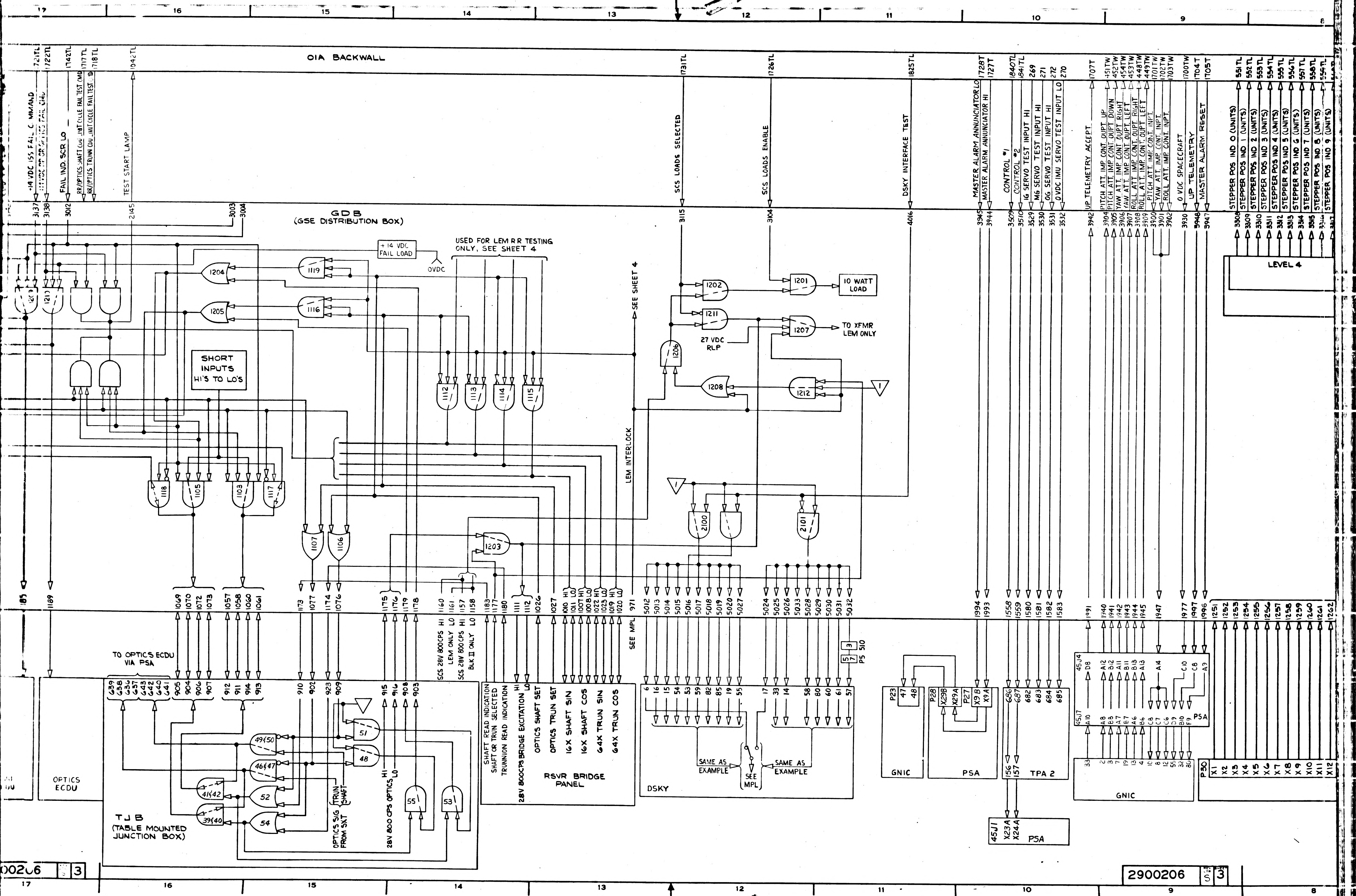
SIZE J2 CODE IDENT NO 99974 2900206
SCALE 3 OF 4

00206 3

2900206

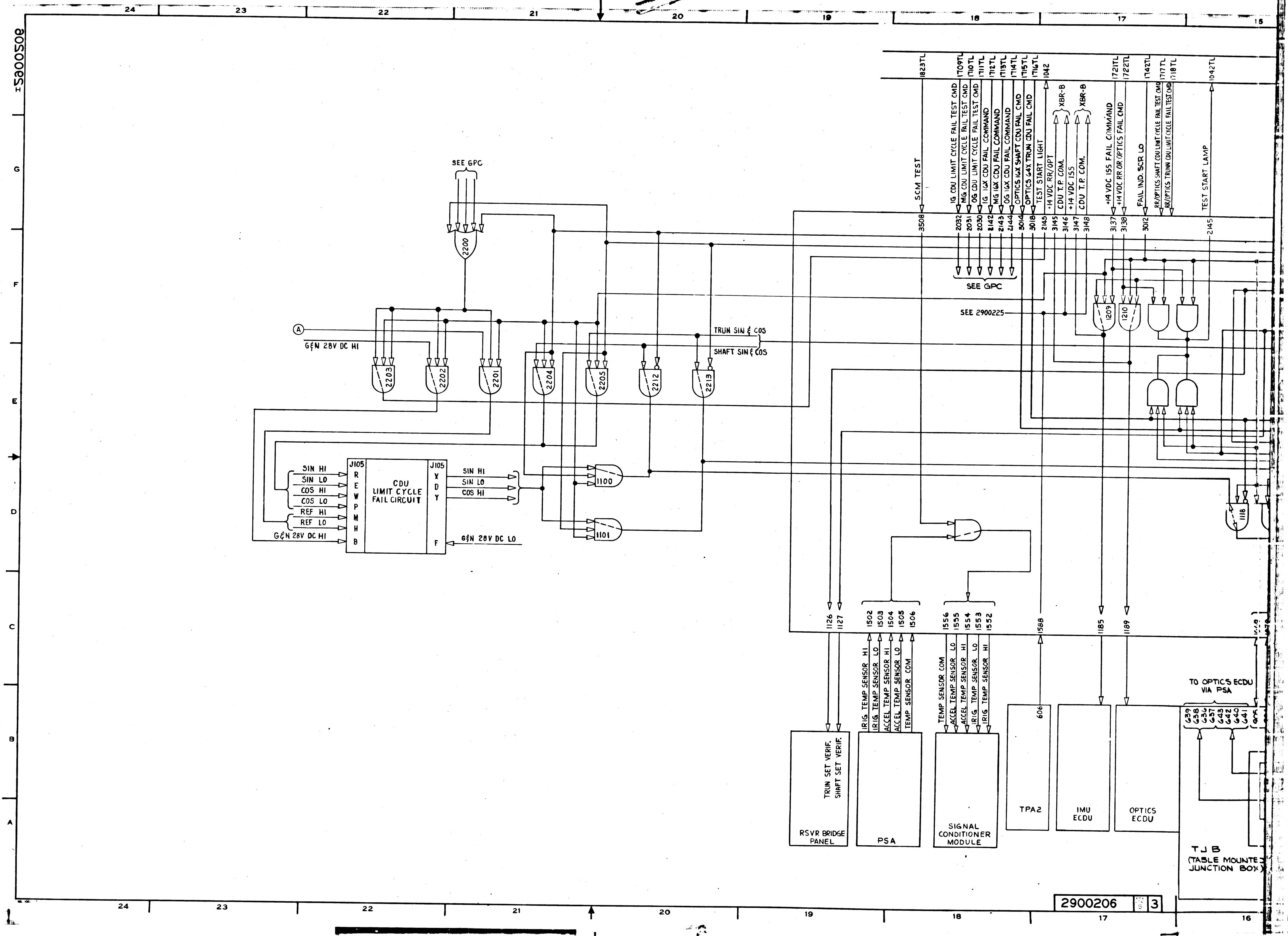
2900206

37/2900206



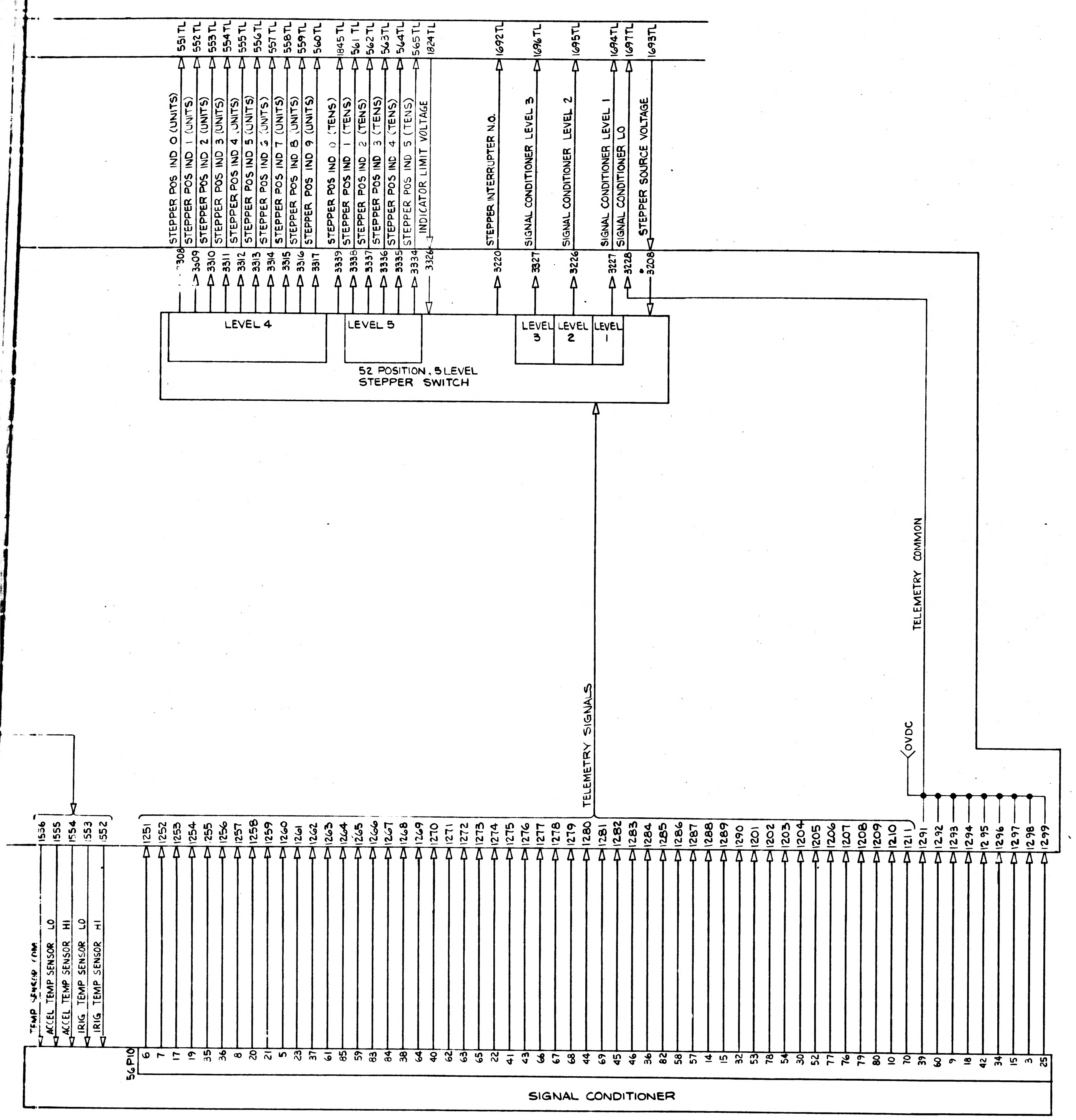
17
16
15
14
13
12
11
10
9
8
OIA BACKWALL
GDB
(GSE DISTRIBUTION BOX)
+14 VDC 155 FAIL COMMAND
FAIL IND. SCR LO
RR/OPTICS SHAFT CDU LIMIT CYCLE FAIL TEST CMD
RR/OPTICS TRUNN CDU LIMIT CYCLE FAIL TEST
TEST START LAMP
SCS LOADS SELECTED
SCS LOADS ENABLE
DSKY INTERFACE TEST
MASTER ALARM ANNUNCIATOR LO
MASTER ALARM ANNUNCIATOR HI
CONTROL *1
CONTROL *2
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
UP TELEMETRY ACCEPT
PITCH ATT. IMP. CONT. OUPT. UP
PITCH ATT. IMP. CONT. OUPT. DOWN
YAW ATT. IMP. CONT. OUPT. RIGHT
YAW ATT. IMP. CONT. OUPT. LEFT
ROLL ATT. IMP. CONT. OUPT. RIGHT
ROLL ATT. IMP. CONT. OUPT. LEFT
PITCH ATT. IMP. CONT. INPT.
YAW ATT. IMP. CONT. INPT.
ROLL ATT. IMP. CONT. INPT.
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
LEVEL 4
+14 VDC FAIL LOAD
0VDC
USED FOR LEM R R TESTING ONLY, SEE SHEET 4
SEE SHEET 4
10 WATT LOAD
TO XFMR LEM ONLY
27 VDC RLP
SHORT INPUTS HI'S TO LO'S
LEM INTERLOCK
SEE MPL
1204
1205
1119
1116
1209
1210
1202
1201
1211
1207
1206
1208
1212
112
113
114
115
118
1105
1103
1117
1107
1106
1203
2100
2101
SCS 28V 800CPS HI
LEM ONLY LO
SCS 28V 800CPS HI
BLK II ONLY LO
P5 510
TO OPTICS ECDU VIA PSA
OPTICS ECDU
TJB
(TABLE MOUNTED JUNCTION BOX)
49&50
46&47
41&42
39&40
51
48
52
54
55
53
TRUN
SHAFT
OPTICS SIG FROM SXT
28V 800 CPS OPTICS
HI
LO
SHAFT READ INDICATION
SHAFT OR TRUN SELECTED
TRUNNION READ INDICATION
28V 800CPS BRIDGE EXCITATION
OPTICS SHAFT SET
OPTICS TRUN SET
16X SHAFT SIN
16X SHAFT COS
64X TRUN SIN
64X TRUN COS
RSVR BRIDGE PANEL
DSKY
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
GNIC
PSA
TPA 2
45J1
X23A
X24A
PSA
45J4
45J7
GNIC
P30
X1
X2
X3
X4
X5
X6
X7
X8
X9
X10
X11
X12

27/2900206


24
23
22
21
20
19
18
17
16
G
F
E
D
C
B
A
SEE GPC
2200
Ⓐ
GEN 28V DC HI
2203
2202
2201
2204
2205
2212
2213
TRUN SIN & COS
SHAFT SIN & COS
SIN HI
SIN LO
COS HI
COS LO
REF HI
REF LO
GEN 28V DC HI
J105
R
E
W
P
M
H
B
CDU
LIMIT CYCLE
FAIL CIRCUIT
J105
X
D
Y
F
SIN HI
SIN LO
COS HI
GEN 28V DC LO
1100
1101
1823TL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1042
1721TL
1722TL
1742TL
1717TL
1718TL
1042TL
SCM TEST
IG CDU LIMIT CYCLE FAIL TEST CMD
MG CDU LIMIT CYCLE FAIL TEST CMD
OG CDU LIMIT CYCLE FAIL TEST CMD
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
TEST START LIGHT
+14 VDC RR/OPT
CDU T.P. COM.
+14 VDC ISS
CDU T.P. COM.
XBR-B
XBR-B
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
RR/OPTICS SHAFT CDU LIMIT CYCLE FAIL TEST CMD
RR/OPTICS TRUNN CDU LIMIT CYCLE FAIL TEST CMD
TEST START LAMP
3508
2032
2031
2030
2142
2143
2144
3014
3018
2145
3145
3146
3147
3148
3137
3138
3012
2145
SEE GPC
SEE 2900225
1209
1210
1118
1126
1127
1502
1503
1504
1505
1506
1556
1555
1554
1553
1552
1588
1185
1189
TRUN SET VERIF.
SHAFT SET VERIF.
RSVR BRIDGE
PANEL
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
PSA
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
SIGNAL
CONDITIONER
MODULE
606
TPA2
IMU
ECDU
OPTICS
ECDU
TO OPTICS ECDU
VIA PSA
639
638
636
637
643
642
640
641
TJB
(TABLE MOUNTE
JUNCTION BOX)
2900206
3

17 2900206

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG NO	DA	APPROVED
	L	REPLACES REV (K) WITH CHANGE PER TDRR 24855		10 JAN 66	
	M	REVISED PER TDRR 24952		18 FEB 66	
	N	REVISION STATUS CHANGED		22 FEB 66	
	P	REVISED PER TDRR 26339		23 FEB 66	RWT RWH
	R	REVISION STATUS CHANGED		25-FEB-66	W.T.
	S	REVISED PER TDRR 26342		28 FEB 66	R.W.T.

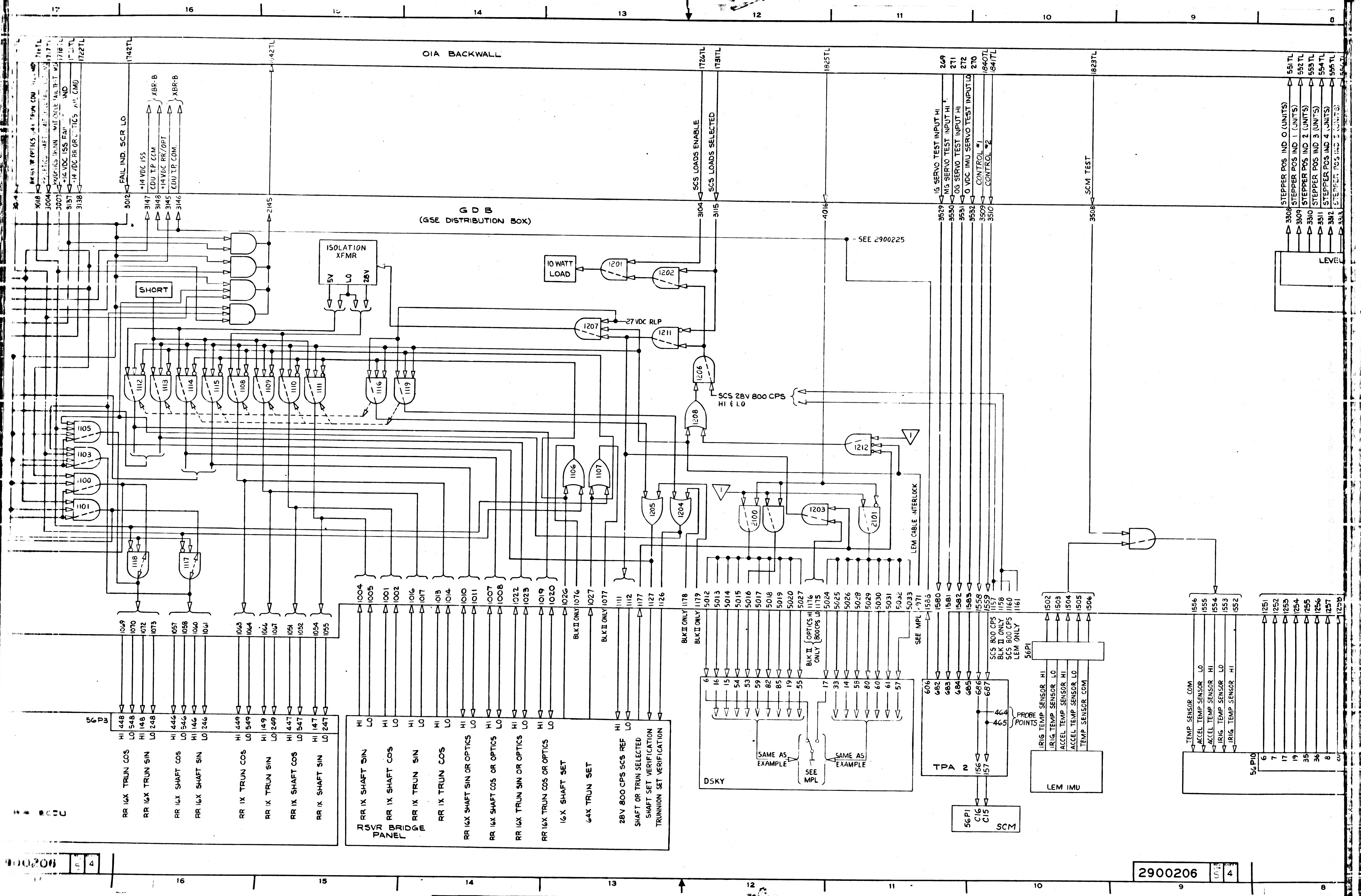

551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
1845TL
561TL
562TL
563TL
564TL
565TL
1824TL
1692TL
1696TL
1695TL
1694TL
1691TL
1693TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 0 (TENS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
INDICATOR LIMIT VOLTAGE
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3339
3338
3337
3336
3335
3334
3326
3220
3327
3226
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
TELEMETRY SIGNALS
TELEMETRY COMMON
0VDC
1556
1555
1554
1553
1552
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1291 1292 1293 1294 1295 1296 1297 1298 1299
56P10
6 7 17 19 35 36 8 20 21 5 23 37 61 85 59 83 84 38 64 40 62 63 65 22 41 43 66 67 68 44 69 45 46 36 82 58 57 14 15 32 53 78 54 30 52 77 76 79 80 10 70 39 60 9 18 42 34 15 3 25
SIGNAL CONDITIONER

NEXT ASSY	USED ON	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE DECIMALS +— − 3 PLACE DECIMALS +— − ANGLES +— − DO NOT SCALE THIS DRAWING	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS
APPLICATION		MATERIAL —	DRAWN COOKMAN DATE 7 JUN 65 CHECKED ED FOSTER 9 JUN 65 APPROVAL J. M. WATSON CONTRACT NAS9-497
		APPROVAL	NASA APPROVAL MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
TEST SELECTOR
(LEM)

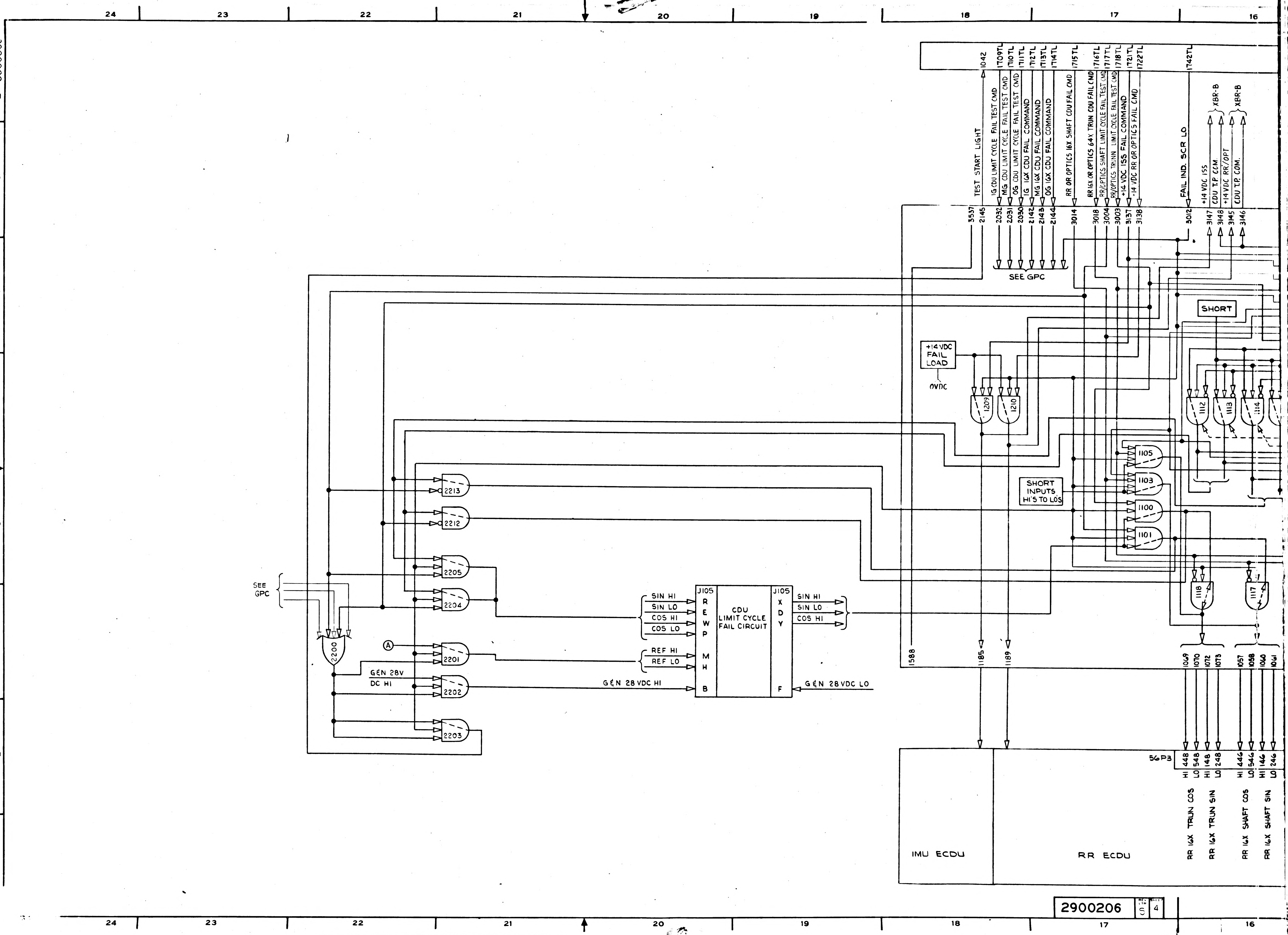
SIZE	CODE IDENT NO	
J3	99974	2900206
SCALE —		SHEET 4 OF 4


OIA BACKWALL
G D B
(GSE DISTRIBUTION BOX)
1742TL
2142TL
1726TL
1731TL
1825TL
1823TL
1722TL
FAIL IND. SCR LO
+14 VDC ISS FAIL
+14 VDC RR OR OPTICS FAIL CMD
+14 VDC ISS
CDU T.P. COM
+14 VDC RR/OPT
CDU T.P. COM.
XBR-B
XBR-B
3018
3004
3003
3137
3138
3012
3147
3148
3145
3146
2145
ISOLATION XFMR
5V
LO
28V
SHORT
10 WATT LOAD
1201
1202
1207
1211
1206
1208
1212
27 VDC RLP
SCS LOADS ENABLE
SCS LOADS SELECTED
3104
3115
4016
SEE 2900225
SCS 28V 800 CPS HI & LO
1G SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
CONTROL #1
CONTROL #2
269
271
272
270
1840TL
1841TL
3529
3530
3531
3532
3509
3510
SCM TEST
3508
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
551TL
552TL
553TL
554TL
555TL
556TL
3308
3309
3310
3311
3312
3313
LEVEL
1112
1113
1114
1115
1108
1109
1110
1111
1116
1119
1105
1103
1100
1101
1118
1117
1106
1107
1205
1204
2100
2102
1203
2101
LEM CABLE INTERLOCK
1069
1070
1072
1073
1057
1058
1060
1061
1063
1064
1066
1067
1051
1052
1054
1055
1004
1005
1001
1002
1016
1017
1013
1014
1010
1011
1007
1008
1022
1023
1019
1020
1026
1076
1027
1077
1111
1112
1177
1127
1126
1178
1179
BLK II ONLY
BLK II ONLY
BLK II ONLY
BLK II ONLY
5012
5013
5014
5015
5016
5017
5018
5019
5020
5027
1176
1175
5024
5025
5026
5028
5029
5030
5031
5032
5033
1971
1586
1580
1581
1582
1583
1558
1559
1157
1158
1160
1161
BLK II ONLY
OPTICS HI 800CPS LO
SEE MPL
SCS 800 CPS
BLK II ONLY
SCS 800 CPS
LEM ONLY
1502
1503
1504
1505
1506
56P1
1556
1555
1554
1553
1552
1251
1252
1253
1254
1255
1256
1257
1258
56P3
HI 448
LO 548
HI 148
LO 248
HI 446
LO 546
HI 146
LO 246
HI 449
LO 549
HI 149
LO 249
HI 447
LO 547
HI 147
LO 247
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
RR 1X TRUN COS
RR 1X TRUN SIN
RR 1X SHAFT COS
RR 1X SHAFT SIN
HI LO
RR 1X SHAFT SIN
RR 1X SHAFT COS
RR 1X TRUN SIN
RR 1X TRUN COS
RR 16X SHAFT SIN OR OPTICS
RR 16X SHAFT COS OR OPTICS
RR 16X TRUN SIN OR OPTICS
RR 16X TRUN COS OR OPTICS
16X SHAFT SET
64X TRUN SET
28V 800 CPS SCS REF
SHAFT OR TRUN SELECTED
SHAFT SET VERIFICATION
TRUNNION SET VERIFICATION
RSVR BRIDGE PANEL
6
16
15
54
53
59
82
85
19
55
17
33
14
58
80
60
61
57
SAME AS EXAMPLE
SEE MPL
SAME AS EXAMPLE
DSKY
606
682
683
684
685
686
687
464
465
PROBE POINTS
TPA 2
156
157
56P1
C16
C15
SCM
IRIG TEMP SENSOR HI
IRIG TEMP SENSOR LO
ACCEL TEMP SENSOR HI
ACCEL TEMP SENSOR LO
TEMP SENSOR COM
LEM IMU
TEMP SENSOR COM
ACCEL TEMP SENSOR LO
ACCEL TEMP SENSOR HI
IRIG TEMP SENSOR LO
IRIG TEMP SENSOR HI
56P10
6
7
17
19
35
36
8
17
16
15
14
13
12
11
10
9
8

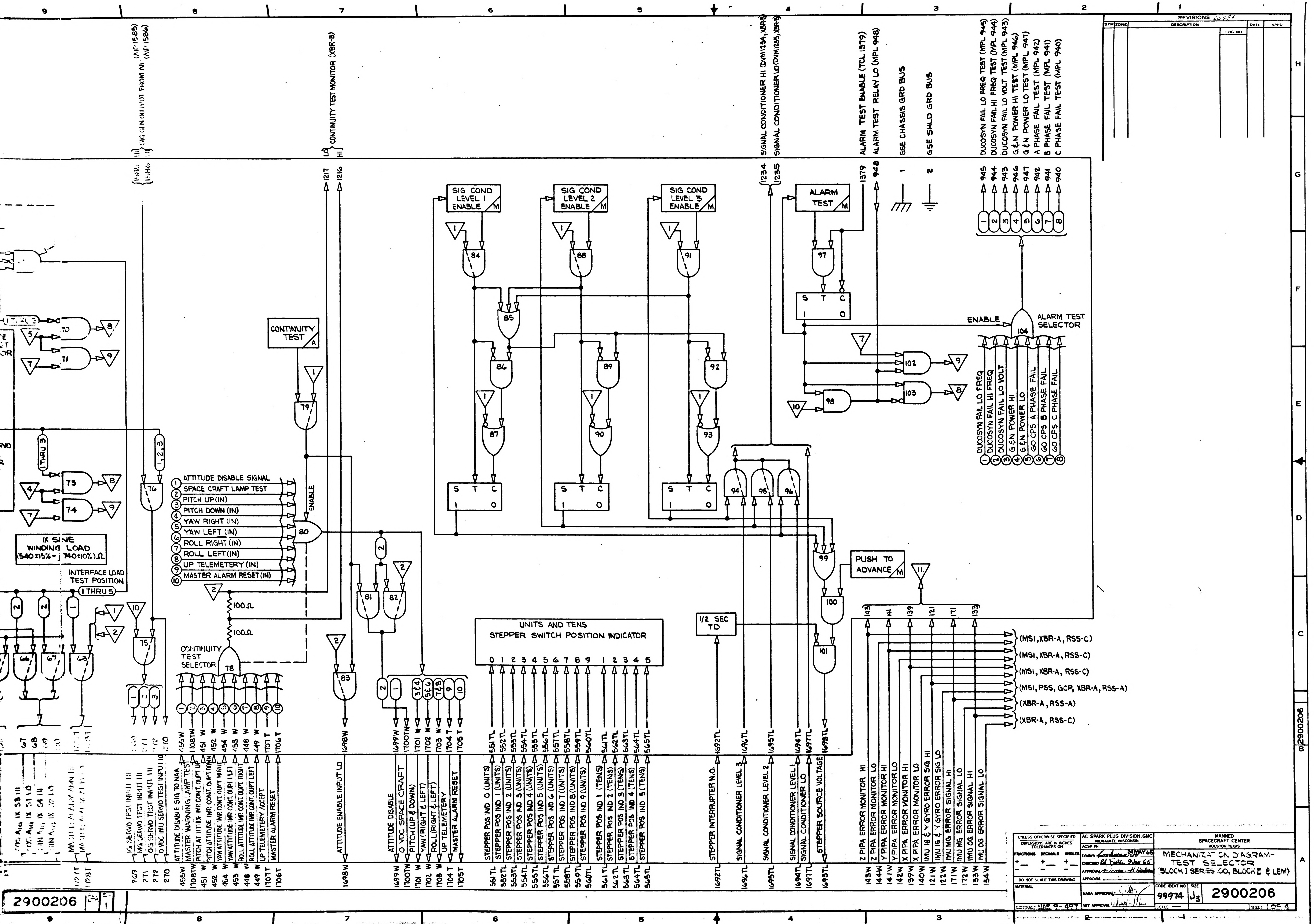
2900206 S 4

2900206 S 4

2 2 2 9 0 0 2 0 6


24
23
22
21
20
19
18
17
16
H
G
F
E
D
C
B
A
1042
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715TL
1716TL
1717TL
1718TL
1721TL
1722TL
1742TL
TEST START LIGHT
IG CDU LIMIT CYCLE FAIL TEST CMD
MG CDU LIMIT CYCLE FAIL TEST CMD
OG CDU LIMIT CYCLE FAIL TEST CMD
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
RR OR OPTICS 16X SHAFT CDU FAIL CMD
RR 16X OR OPTICS 64X TRUN CDU FAIL CMD
RR/OPTICS SHAFT LIMIT CYCLE FAIL TEST CMD
RR/OPTICS TRUNN LIMIT CYCLE FAIL TEST CMD
+14 VDC ISS FAIL COMMAND
+14 VDC RR OR OPTICS FAIL CMD
FAIL IND. SCR LO
+14 VDC ISS
CDU T.P. COM.
+14 VDC RR/OPT
CDU T.P. COM.
XBR-B
XBR-B
3537
2145
2032
2031
2030
2142
2143
2144
3014
3018
3004
3003
3137
3138
3012
3147
3148
3145
3146
SEE GPC
SHORT
+14 VDC FAIL LOAD
OVDC
1209
1210
1112
1113
1114
1105
1103
1100
1101
SHORT INPUTS HI'S TO LOS
1118
1117
2213
2212
2205
2204
2200
2201
2202
2203
SEE GPC
A
GEN 28V DC HI
SIN HI
SIN LO
COS HI
COS LO
REF HI
REF LO
J105
R
E
W
P
M
H
B
CDU LIMIT CYCLE FAIL CIRCUIT
J105
X
D
Y
F
SIN HI
SIN LO
COS HI
GEN 28 VDC HI
GEN 28 VDC LO
1588
1185
1189
1069
1070
1072
1073
1057
1058
1060
1061
56P3
448
548
148
248
446
546
146
246
HI
LO
HI
LO
HI
LO
HI
LO
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
IMU ECDU
RR ECDU
2900206
D
4

1/2900206


SIG GEN OUTPUT FROM AII (AIP 1585) (AIP 1586)
HI LO
1585 1586
CONTINUITY TEST MONITOR (XBR-B)
LO HI
1217 1216
SIGNAL CONDITIONER HI (DVM1234, XBR-B)
SIGNAL CONDITIONER LO (DVM1235, XBR-B)
1234 1235
ALARM TEST ENABLE (TCL 1379)
ALARM TEST RELAY LO (MPL 948)
1379 948
GSE CHASSIS GRD BUS
GSE SHLD GRD BUS
1 2
DUCOSYN FAIL LO FREQ TEST (MPL 945)
DUCOSYN FAIL HI FREQ TEST (MPL 944)
DUCOSYN FAIL LO VOLT TEST (MPL 943)
G&N POWER HI TEST (MPL 946)
G&N POWER LO TEST (MPL 947)
A PHASE FAIL TEST (MPL 942)
B PHASE FAIL TEST (MPL 941)
C PHASE FAIL TEST (MPL 940)
945 944 943 946 947 942 941 940
SIG COND LEVEL 1 ENABLE M
SIG COND LEVEL 2 ENABLE M
SIG COND LEVEL 3 ENABLE M
ALARM TEST M
84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104
S T C I O
ENABLE
ALARM TEST SELECTOR
① DUCOSYN FAIL LO FREQ
② DUCOSYN FAIL HI FREQ
③ DUCOSYN FAIL LO VOLT
④ G&N POWER HI
⑤ G&N POWER LO
⑥ 60 CPS A PHASE FAIL
⑦ 60 CPS B PHASE FAIL
⑧ 60 CPS C PHASE FAIL
PUSH TO ADVANCE M
1/2 SEC TD
CONTINUITY TEST A
79 80 81 82 83 78 75 76 73 74 70 71 66 67 68
ENABLE
① ATTITUDE DISABLE SIGNAL
② SPACE CRAFT LAMP TEST
③ PITCH UP (IN)
④ PITCH DOWN (IN)
⑤ YAW RIGHT (IN)
⑥ YAW LEFT (IN)
⑦ ROLL RIGHT (IN)
⑧ ROLL LEFT (IN)
⑨ UP TELEMETERY (IN)
⑩ MASTER ALARM RESET (IN)
100Ω
100Ω
CONTINUITY TEST SELECTOR
1X SINE WINDING LOAD (540±15%+j 740±10%)Ω
INTERFACE LOAD TEST POSITION (1 THRU 5)
1 THRU 3
1, 2, 3
UNITS AND TENS STEPPER SWITCH POSITION INDICATOR
0 1 2 3 4 5 6 7 8 9 1 2 3 4 5
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, XBR-A, RSS-C)
(MSI, PSS, GCP, XBR-A, RSS-A)
(XBR-A, RSS-A)
(XBR-A, RSS-C)
143 141 139 121 171 133
COS AIG 1X S3 HI
COS AIG 1X S1 LO
SIN AIG 1X S4 HI
SIN AIG 1X S2 LO
67 68 69 70
MASTER ALARM ANN HI
MASTER ALARM ANN LO
1127T 1128T
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
269 271 272 270
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUPT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
UP TELEMETERY ACCEPT
MASTER ALARM RESET
455W 1108TW 451 W 452 W 454 W 453 W 448 W 449 W 1707T 1706T
ATTITUDE ENABLE INPUT LO
1698W
ATTITUDE DISABLE
0 VDC SPACE CRAFT
PITCH (UP & DOWN)
YAW (RIGHT & LEFT)
ROLL (RIGHT & LEFT)
UP TELEMETERY
MASTER ALARM RESET
1699W 1700TW 1701 W 1702 W 1703 W 1704 T 1705 T
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
551TL 552TL 553TL 554TL 555TL 556TL 557TL 558TL 559TL 560TL 561TL 562TL 563TL 564TL 565TL
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
1692TL 1696TL 1695TL 1694TL 1697TL 1693TL
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIG HI
IMU IG & Y GYRO ERROR SIG LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
143W 144W 141W 142W 139W 140W 121W 122W 171W 172W 133W 134W
REVISIONS
SYM ZONE DESCRIPTION CHG NO DATE APPD
9 8 7 6 5 4 3 2 1
H G F E D C B A
2900206
44

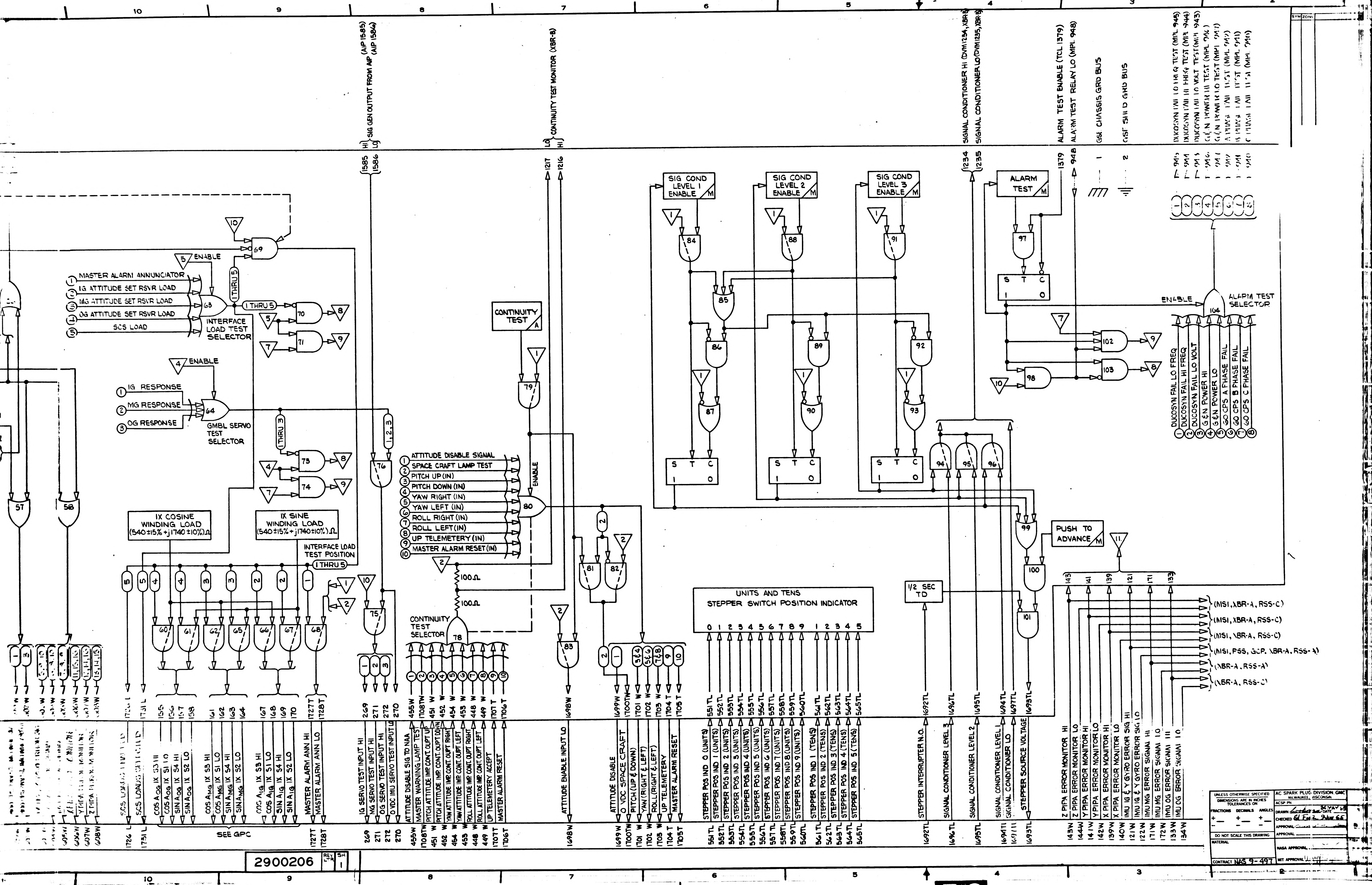
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Lookman DATE 24 MAY 65
CHECKED Ed Foster 9 Jun 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
TEST SELECTOR
(BLOCK I SERIES 100, BLOCK II & LEM)

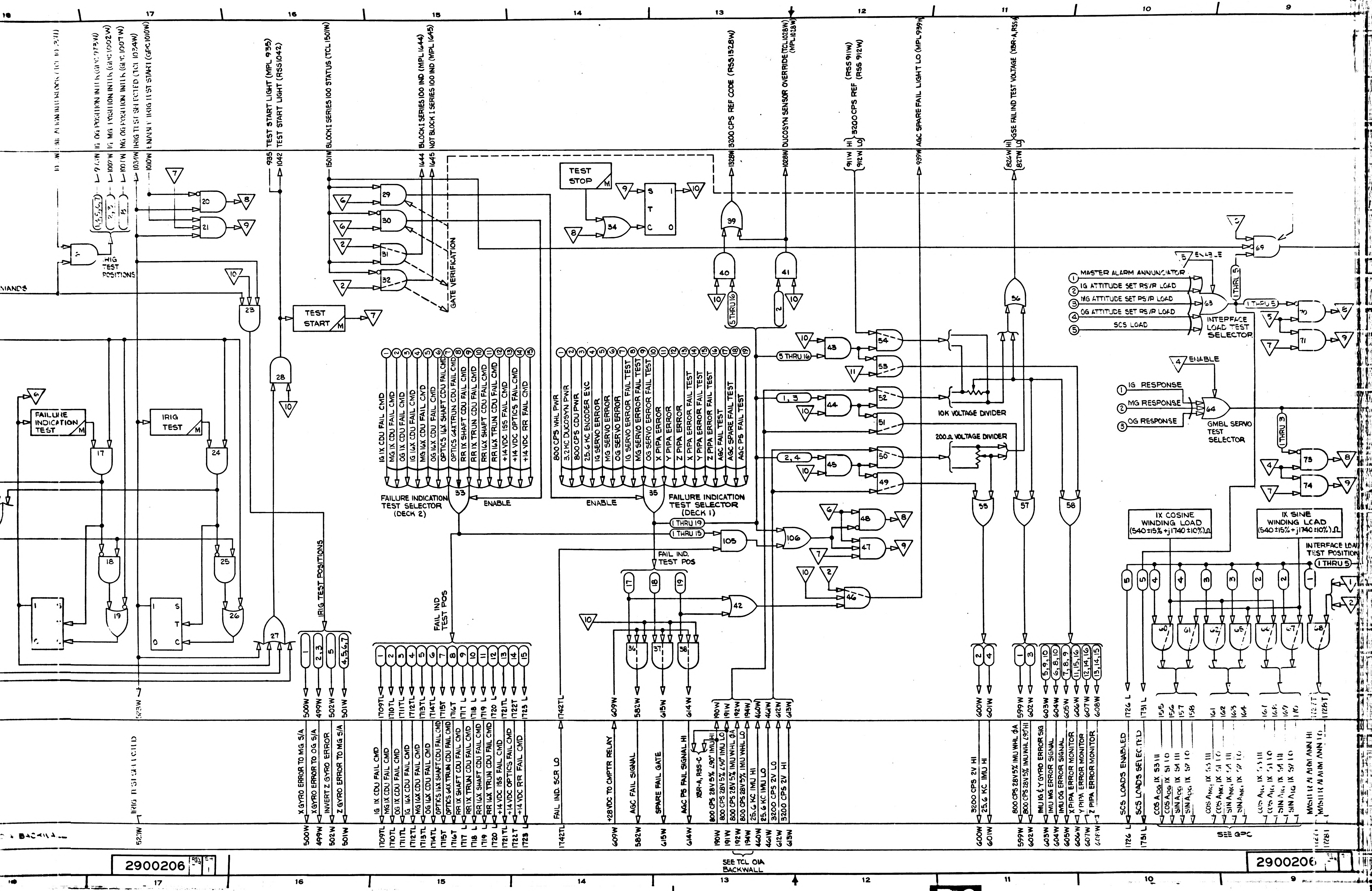
CODE IDENT NO. 99974
SIZE J3
2900206
SCALE —
SHEET 1 OF 4


10
9
8
7
6
5
4
3
2
SIG GEN OUTPUT FROM AIP (AIP 1585) (AIP 1586)
CONTINUITY TEST MONITOR (XBR-8)
SIGNAL CONDITIONER HI (DVM1234, XBR-8)
SIGNAL CONDITIONER LO (DVM1235, XBR-8)
ALARM TEST ENABLE (TCL 1379)
ALARM TEST RELAY LO (MPL 948)
GSE CHASSIS GRD BUS
GSE SHIELD GRD BUS
SIG COND LEVEL 1 ENABLE
SIG COND LEVEL 2 ENABLE
SIG COND LEVEL 3 ENABLE
ALARM TEST
ENABLE
ALARM TEST SELECTOR
DUCOSYN FAIL LO FREQ
DUCOSYN FAIL HI FREQ
DUCOSYN FAIL LO VOLT
GEN POWER HI
GEN POWER LO
400 CPS A PHASE FAIL
400 CPS B PHASE FAIL
400 CPS C PHASE FAIL
MASTER ALARM ANNUNCIATOR
IG ATTITUDE SET RSVR LOAD
MG ATTITUDE SET RSVR LOAD
OG ATTITUDE SET RSVR LOAD
SCS LOAD
INTERFACE LOAD TEST SELECTOR
1 THRU 5
IG RESPONSE
MG RESPONSE
OG RESPONSE
GMBL SERVO TEST SELECTOR
1 THRU 3
CONTINUITY TEST
ATTITUDE DISABLE SIGNAL
SPACE CRAFT LAMP TEST
PITCH UP (IN)
PITCH DOWN (IN)
YAW RIGHT (IN)
YAW LEFT (IN)
ROLL RIGHT (IN)
ROLL LEFT (IN)
UP TELEMETERY (IN)
MASTER ALARM RESET (IN)
100Ω
CONTINUITY TEST SELECTOR
IX COSINE WINDING LOAD (540±15%+j1740±10%)Ω
IX SINE WINDING LOAD (540±15%+j1740±10%)Ω
INTERFACE LOAD TEST POSITION
UNITS AND TENS STEPPER SWITCH POSITION INDICATOR
0 1 2 3 4 5 6 7 8 9 1 2 3 4 5
1/2 SEC TD
PUSH TO ADVANCE
(MSI, XBR-A, RSS-C)
(MSI, PSS, GCP, XBR-A, RSS-A)
(XBR-A, RSS-A)
(XBR-A, RSS-C)
SCS LOADS
COS A OG IX S3 HI
COS A OG IX S1 LO
SIN A OG IX S4 HI
SIN A OG IX S2 LO
COS A MG IX S3 HI
COS A MG IX S1 LO
SIN A MG IX S4 HI
SIN A MG IX S2 LO
COS A IG IX S3 HI
COS A IG IX S1 LO
SIN A IG IX S4 HI
SIN A IG IX S2 LO
MASTER ALARM ANN HI
MASTER ALARM ANN LO
SEE GPC
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUPT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
UP TELEMETERY ACCEPT
MASTER ALARM RESET
ATTITUDE ENABLE INPUT LO
ATTITUDE DISABLE
0 VDC SPACE CRAFT
PITCH (UP & DOWN)
YAW (RIGHT & LEFT)
ROLL (RIGHT & LEFT)
UP TELEMETERY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIG HI
IMU IG & Y GYRO ERROR SIG LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
1726 L
1731 L
155
156
157
158
161
162
163
164
167
168
169
170
1727T
1728T
269
271
272
270
455W
1708TW
451 W
452 W
454 W
453 W
448 W
449 W
1707T
1706T
1698W
1699W
1700TW
1701 W
1702 W
1703 W
1704 T
1705 T
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
561TL
562TL
563TL
564TL
565TL
1692TL
1696TL
1695TL
1694TL
1697TL
1693TL
143W
144W
141W
142W
139W
140W
121W
122W
171W
172W
133W
134W
606W
607W
608W
1585
1586
1217
1216
1234
1235
1379
948

2900206 REV SH 1

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 24 MAY 65
CHECKED Ed Fei 9 Jun 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL


18
17
16
15
14
13
12
11
10
9
TEST START LIGHT (MPL 935)
TEST START LIGHT (RSS1042)
BLOCK I SERIES 100 STATUS (TCL 1501W)
BLOCK I SERIES 100 IND (MPL 1644)
NOT BLOCK I SERIES 100 IND (MPL 1645)
3200 CPS REF CODE (RSS 1328W)
DUCOSYN SENSOR OVERRIDE (TCL 1028W) (MPL 1028W)
3200 CPS REF (RSS 911W) (RSS 912W)
AGC SPARE FAIL LIGHT LO (MPL 939W)
GSE FAIL IND TEST VOLTAGE (X6R-A, RSS-)
IG OG POSITION INTLK (GPC 1002W)
MG OG POSITION INTLK (GPC 1007W)
IRIG TEST SELECTED (TCL 1034W)
IRIG TEST START (GPC 1010W)
IRIG TEST POSITIONS
TEST STOP
TEST START
FAILURE INDICATION TEST
IRIG TEST
GATE VERIFICATION
IG 1X CDU FAIL CMD
MG 1X CDU FAIL CMD
OG 1X CDU FAIL CMD
IG 16X CDU FAIL CMD
MG 16X CDU FAIL CMD
OG 16X CDU FAIL CMD
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
RR 1X SHAFT CDU FAIL CMD
RR 1X TRUN CDU FAIL CMD
RR 16X SHAFT CDU FAIL CMD
RR 16X TRUN CDU FAIL CMD
+14 VDC ISS FAIL CMD
+14 VDC OPTICS FAIL CMD
+14 VDC RR FAIL CMD
800 CPS WHL PWR
3.2 KC DUCOSYN PWR
800 CPS CDU PWR
25.6 KC ENCODER EXC
IG SERVO ERROR
MG SERVO ERROR
OG SERVO ERROR
IG SERVO ERROR FAIL TEST
MG SERVO ERROR FAIL TEST
OG SERVO ERROR FAIL TEST
X PIPA ERROR
Y PIPA ERROR
Z PIPA ERROR
X PIPA ERROR FAIL TEST
Y PIPA ERROR FAIL TEST
Z PIPA ERROR FAIL TEST
AGC FAIL TEST
AGC SPARE FAIL TEST
AGC PS FAIL TEST
FAILURE INDICATION TEST SELECTOR (DECK 2)
FAILURE INDICATION TEST SELECTOR (DECK 1)
ENABLE
FAIL IND TEST POS
10K VOLTAGE DIVIDER
200Ω VOLTAGE DIVIDER
MASTER ALARM ANNUNCIATOR
IG ATTITUDE SET RS/R LOAD
MG ATTITUDE SET RS/R LOAD
OG ATTITUDE SET RS/R LOAD
SCS LOAD
INTERFACE LOAD TEST SELECTOR
IG RESPONSE
MG RESPONSE
OG RESPONSE
GMBL SERVO TEST SELECTOR
1X COSINE WINDING LOAD (540±15%+j1740±10%)Ω
1X SINE WINDING LOAD (540±15%+j1740±10%)Ω
INTERFACE LOAD TEST POSITION
X GYRO ERROR TO MG S/A
Y GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
IRIG TEST SELECTED
FAIL IND. SCR LO
+28VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
800 CPS 28V 5% IMU HI
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ØA
800 CPS 28V 5% IMU WHL Ø90°
IMU IG & Y GYRO ERROR SIG
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
SCS LOADS ENABLED
SCS LOADS SELECTED
MASTER ALARM ANN HI
MASTER ALARM ANN LO
SEE GPC
SEE TCL 01A BACKWALL
BACKWALL
2900206

F2

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM)

2900210	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR)
RLP	RELAY & LAMP POWER SUPPLY
2900208	POWER & DUMMY LOAD-PRIMARY SIGNAL SELECTOR (PDL)
PSS	PRIMARY SIGNAL SELECTOR
2900223	GIMBAL POSITION CONTROL (GPC)
2900207	MONITOR PANEL (MPL)
2900202	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
2900217	SIGNAL SELECTION & MEASUREMENT
XBR-A	CROSSBAR - AC SIGNALS
XBR-B	CROSSBAR - DC SIGNALS
DVM	DIGITAL VOLTMETER
2900218	OSCILLOGRAPH SIGNAL SELECTION
RSS-A	TO FIXED AC CHANNEL
RSS-B	TO FIXED DC CHANNEL
RSS-C	TO SWITCHABLE AC CHANNEL
RSS-D	TO SWITCHABLE DC CHANNEL
2900215	MEASUREMENT REFERENCE POWER SUPPLIES
RSS	OSCILLOGRAPH SIGNAL SELECTOR
2900211	AUXILIARY INPUT-OUTPUT & CALIBRATION (AIP)
2900212	PIPA & IRIG MONITORING
MSI	PHASE SHIFT PANEL
2900200	GYRO CAGING PANEL (GCP)

4. NONSTANDARD SYMBOLS

INDICATES "AND" GATE WITH SWITCHED SIGNAL

INDICATES EXCLUSIVE "OR" GATE WITH SWITCH POSITIONS 1 & 2

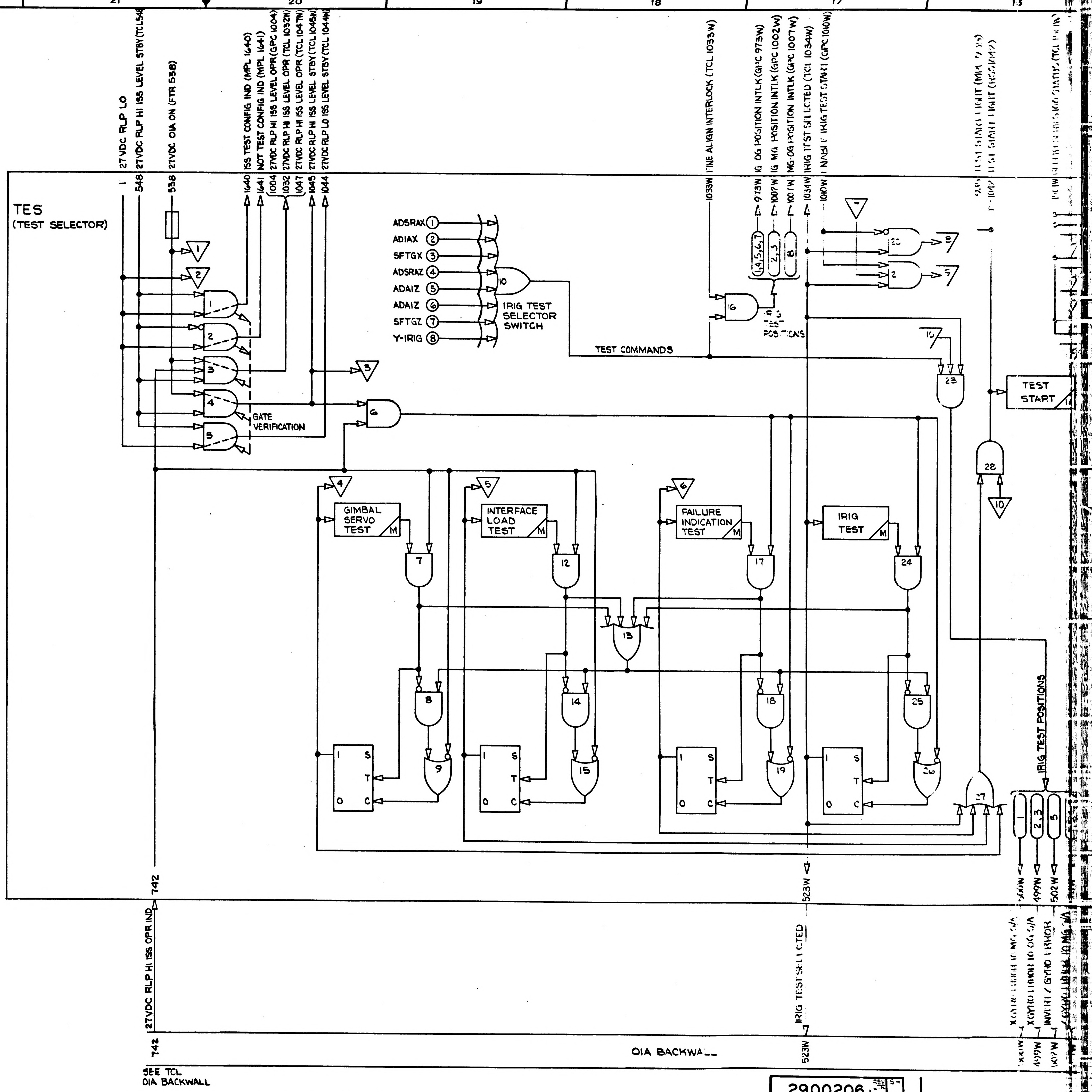
NAME M — INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME A — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G&N CONFIGURATIONS
   - E. TW, TL, OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

6. SIGNAL REFERENCE

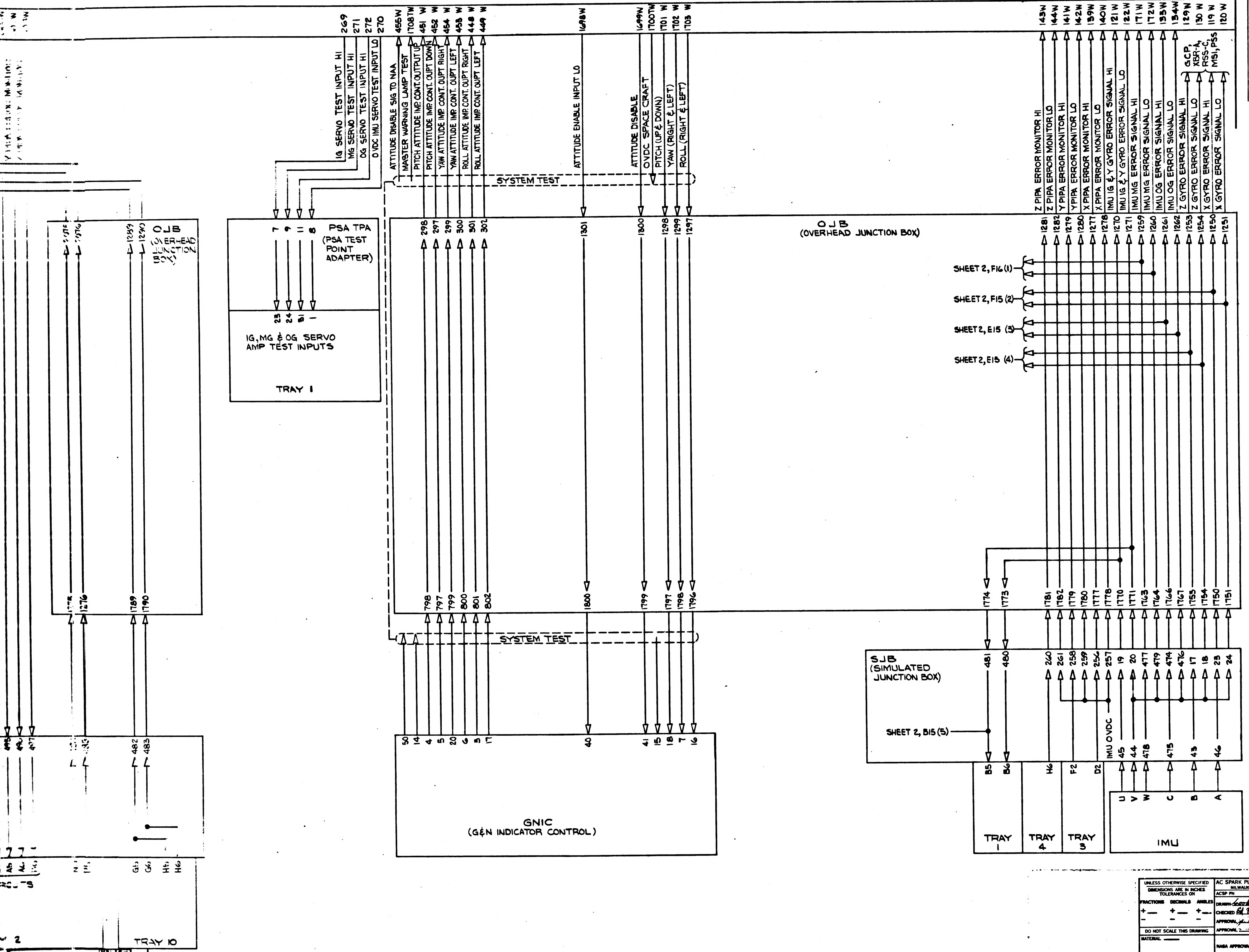
1	27 VDC OIA ON
2	27 VDC RLP LO
3	27 VDC ISS LEVEL STANDBY
4	GIMBAL SERVO TEST SELECTED
5	INTERFACE LOAD TEST SELECTED
6	FAILURE INDICATION TEST SELECTED
7	TEST START, BUTTON DEPRESSED
8	CLEAR
9	SET
10	TEST STARTED
	IMU ERROR SIGNALS



TES
(TEST SELECTOR)
1 27VDC RLP LO
548 27VDC RLP HI ISS LEVEL STBY (TCL548
538 27VDC OIA ON (FTR 538)
1640 ISS TEST CONFIG IND (MPL 1640)
1641 NOT TEST CONFIG IND (MPL 1641)
1004 27VDC RLP HI ISS LEVEL OPR (GPC 1004)
1032 27VDC RLP HI ISS LEVEL OPR (TCL 1032W)
1047 27VDC RLP HI ISS LEVEL OPR (TCL 1047W)
1045 27VDC RLP HI ISS LEVEL STBY (TCL 1045W)
1044 27VDC RLP LO ISS LEVEL STBY (TCL 1044W)
1033W FINE ALIGN INTERLOCK (TCL 1033W)
973W IG OG POSITION INTLK (GPC 973W)
1002W IG MG POSITION INTLK (GPC 1002W)
1007W MG-OG POSITION INTLK (GPC 1007W)
1034W IRIG TEST SELECTED (TCL 1034W)
1010W ENABLE IRIG TEST START (GPC 1010W)
1,4,5,6,7
2,3
8
GATE VERIFICATION
ADSRAX 1
ADIAX 2
SFTGX 3
ADSRAZ 4
ADAIZ 5
ADAIZ 6
SFTGZ 7
Y-IRIG 8
IRIG TEST SELECTOR SWITCH
TEST COMMANDS
TEST POSITIONS
TEST START
GIMBAL SERVO TEST M
INTERFACE LOAD TEST M
FAILURE INDICATION TEST M
IRIG TEST M
IRIG TEST POSITIONS
1
2,3
5
S T C
1 0
742 27VDC RLP HI ISS OPR IND 742
SEE TCL OIA BACKWALL
523W IRIG TEST SELECTED 523W
OIA BACKWALL
499W
502W
INVERT / GYRO ERROR

2900206 REV S 1

MIL FORM 1080 J3

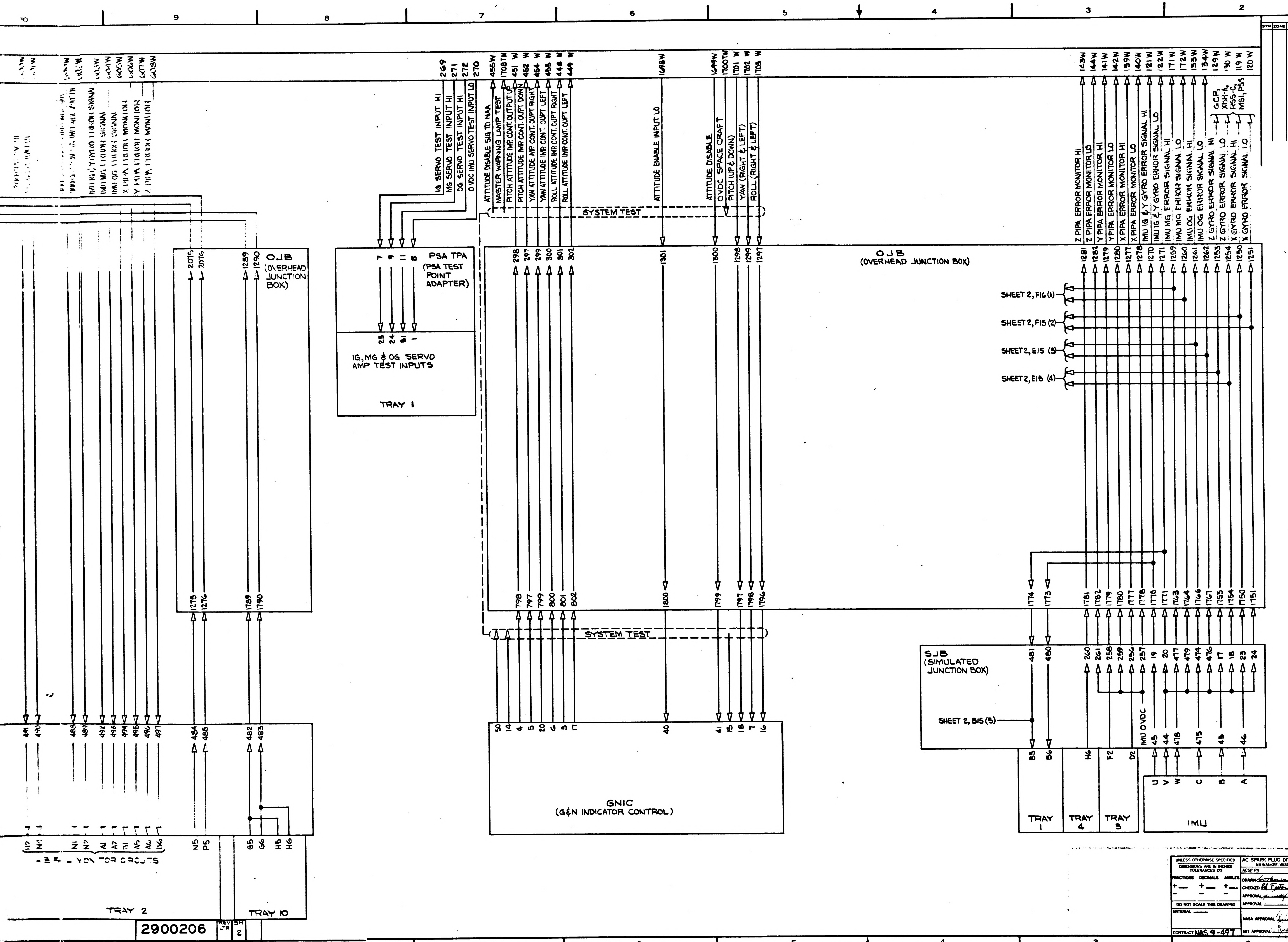

269
271
272
270
455W
1708TW
451 W
452 W
454 W
453 W
448 W
449 W
1698W
1699W
1700TW
1701 W
1702 W
1703 W
143W
144W
141W
142W
139W
140W
121W
122W
171W
172W
133W
134W
129W
130 W
119 W
120 W
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUTPUT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
ATTITUDE ENABLE INPUT LO
ATTITUDE DISABLE
OVDC SPACE CRAFT
PITCH (UP & DOWN)
YAW (RIGHT & LEFT)
ROLL (RIGHT & LEFT)
SYSTEM TEST
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIGNAL HI
IMU IG & Y GYRO ERROR SIGNAL LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
Z GYRO ERROR SIGNAL HI
Z GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
X GYRO ERROR SIGNAL LO
GCP, XBR-A, RSS-C, MSI, PSS
OJB (OVERHEAD JUNCTION BOX)
PSA TPA (PSA TEST POINT ADAPTER)
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (3)
SHEET 2, E15 (4)
SJB (SIMULATED JUNCTION BOX)
SHEET 2, B15 (5)
IMU 0 VDC
GNIC (G&N INDICATOR CONTROL)
TRAY 1
TRAY 4
TRAY 3
IMU
U V W C B A
B5 B6 H6 F2 D2
TRAY 10
2900206

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

3H

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN DATE 26 MAY 65 CHECKED Ed Foster 9 JUN 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK I SERIES 100)
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 SIZE J_2 2900206
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — SHEET 2 OF 4


IMU IG & Y GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
603W
604W
605W
606W
607W
608W
OJB (OVERHEAD JUNCTION BOX)
2075
2076
1289
1290
1275
1276
1789
1790
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
269
271
272
270
PSA TPA (PSA TEST POINT ADAPTER)
IG, MG & OG SERVO AMP TEST INPUTS
TRAY 1
ATTITUDE DISABLE SIG TO NAA
MASTER WARNING LAMP TEST
PITCH ATTITUDE IMP. CONT. OUTPUT UP
PITCH ATTITUDE IMP. CONT. OUPT DOWN
YAW ATTITUDE IMP. CONT. OUPT RIGHT
YAW ATTITUDE IMP. CONT. OUPT LEFT
ROLL ATTITUDE IMP. CONT. OUPT RIGHT
ROLL ATTITUDE IMP. CONT. OUPT LEFT
455W
1708TW
451 W
452 W
454 W
453 W
448 W
449 W
ATTITUDE ENABLE INPUT LO
1698W
ATTITUDE DISABLE
OVDC SPACE CRAFT
PITCH (UP & DOWN)
YAW (RIGHT & LEFT)
ROLL (RIGHT & LEFT)
1699W
1700TW
1701 W
1702 W
1703 W
SYSTEM TEST
298 297 299 300 301 302
1301
1300
1298 1299 1297
OJB (OVERHEAD JUNCTION BOX)
798 797 799 800 801 802
1800
1799
1797 1798 1796
SYSTEM TEST
30 14 4 5 20 6 5 17
40
41 15 19 7 16
GNIC (G&N INDICATOR CONTROL)
Z PIPA ERROR MONITOR HI
Z PIPA ERROR MONITOR LO
Y PIPA ERROR MONITOR HI
Y PIPA ERROR MONITOR LO
X PIPA ERROR MONITOR HI
X PIPA ERROR MONITOR LO
IMU IG & Y GYRO ERROR SIGNAL HI
IMU IG & Y GYRO ERROR SIGNAL LO
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
Z GYRO ERROR SIGNAL HI
Z GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
X GYRO ERROR SIGNAL LO
143W 144W 141W 142W 139W 140W 121W 122W 171W 172W 135W 134W 129W 130 W 119 W 120 W
GCP, XKH-A, RSS-C, MSI, PSS
1281 1282 1279 1280 1277 1278 1270 1271 1259 1260 1261 1262 1253 1254 1250 1251
SHEET 2, F16 (1)
SHEET 2, F15 (2)
SHEET 2, E15 (3)
SHEET 2, E15 (4)
1774 1773
1781 1782 1779 1780 1777 1778 1770 1771 1763 1764 1766 1767 1753 1754 1750 1751
SJB (SIMULATED JUNCTION BOX)
481 480
260 261 258 259 256 257 19 20 477 479 474 476 17 18 23 24
SHEET 2, B15 (5)
IMU OVDC
45 44 478 475 43 46
B5 B6
H6
F2 D2
TRAY 1
TRAY 4
TRAY 3
U V W C B A
IMU
491 490 488 489 492 493 494 495 496 497
484 485
482 483
N5 P5
G5 G6 H5 H6
N1 N2 A1 A2 B1 A5 A6 B6
TRAY 2
TRAY 10
10 9 8 7 6 5 4 3 2 1
H G F E D C B A

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

2900206 REV LTR SH 2

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

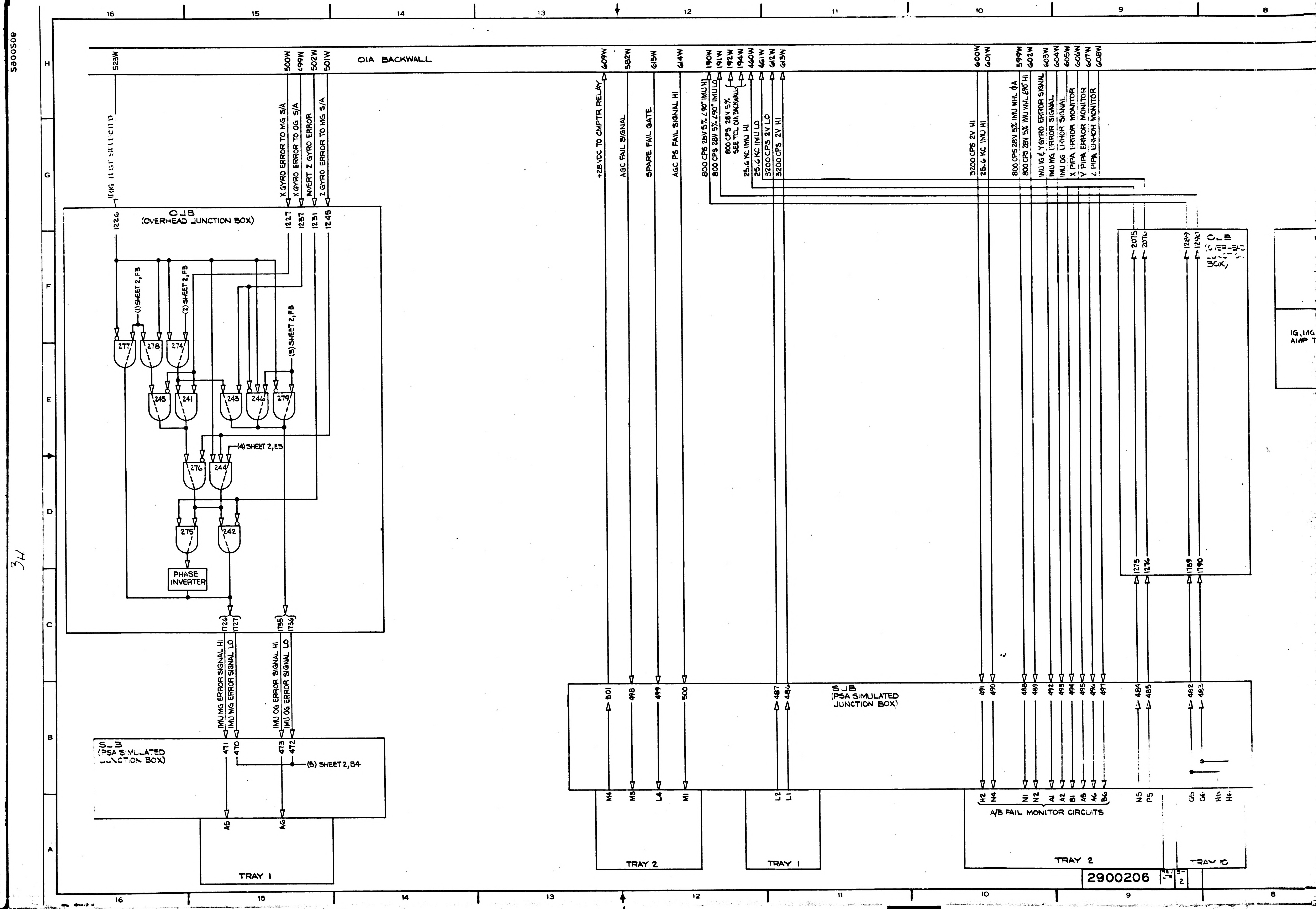
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE
CHECKED Ed Foster 9 Jun 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

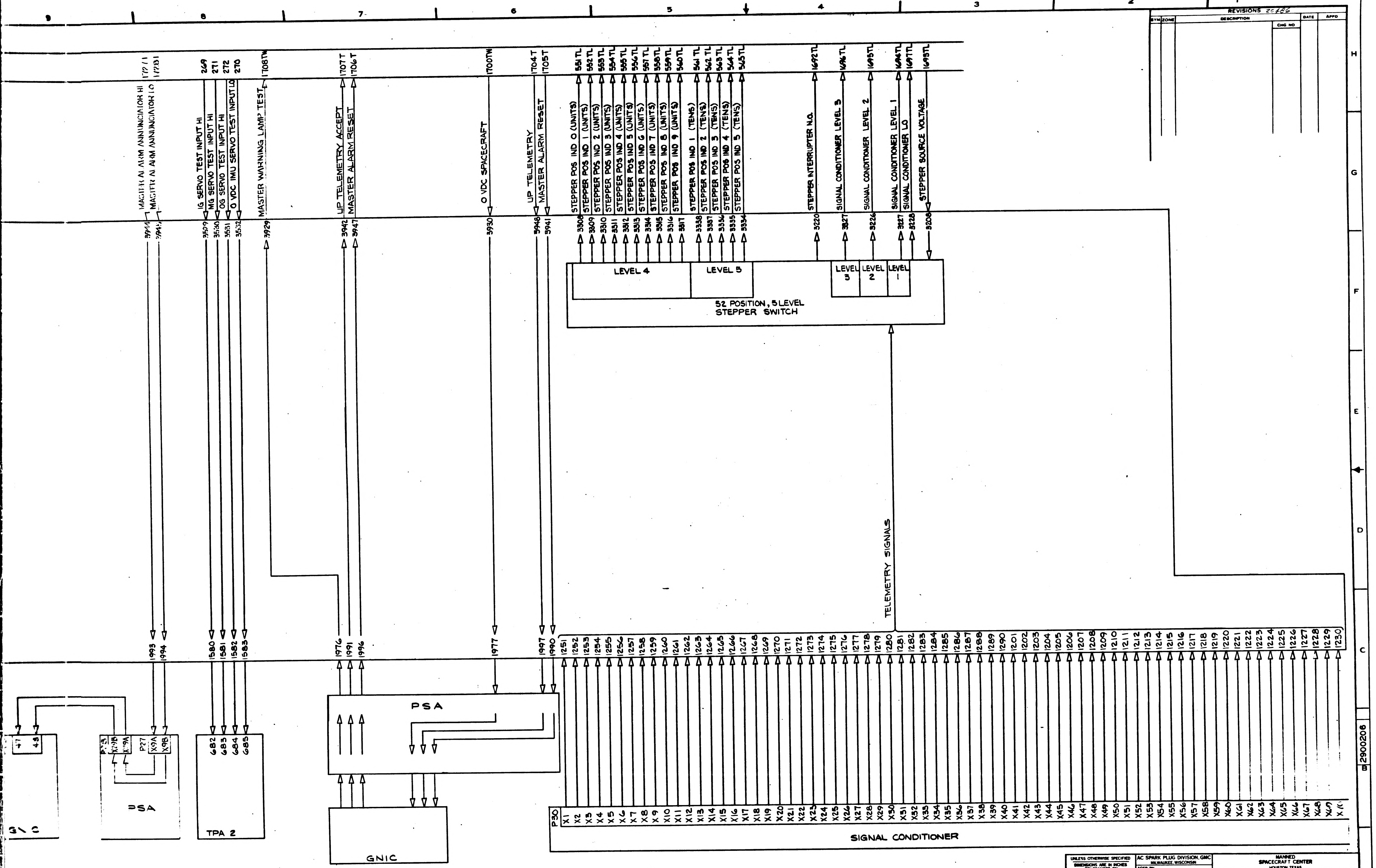
MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK I SERIES 100)

CODE IDENT NO. 99974 SIZE J_2 2900206
SCALE — SHEET 2 OF

E-2



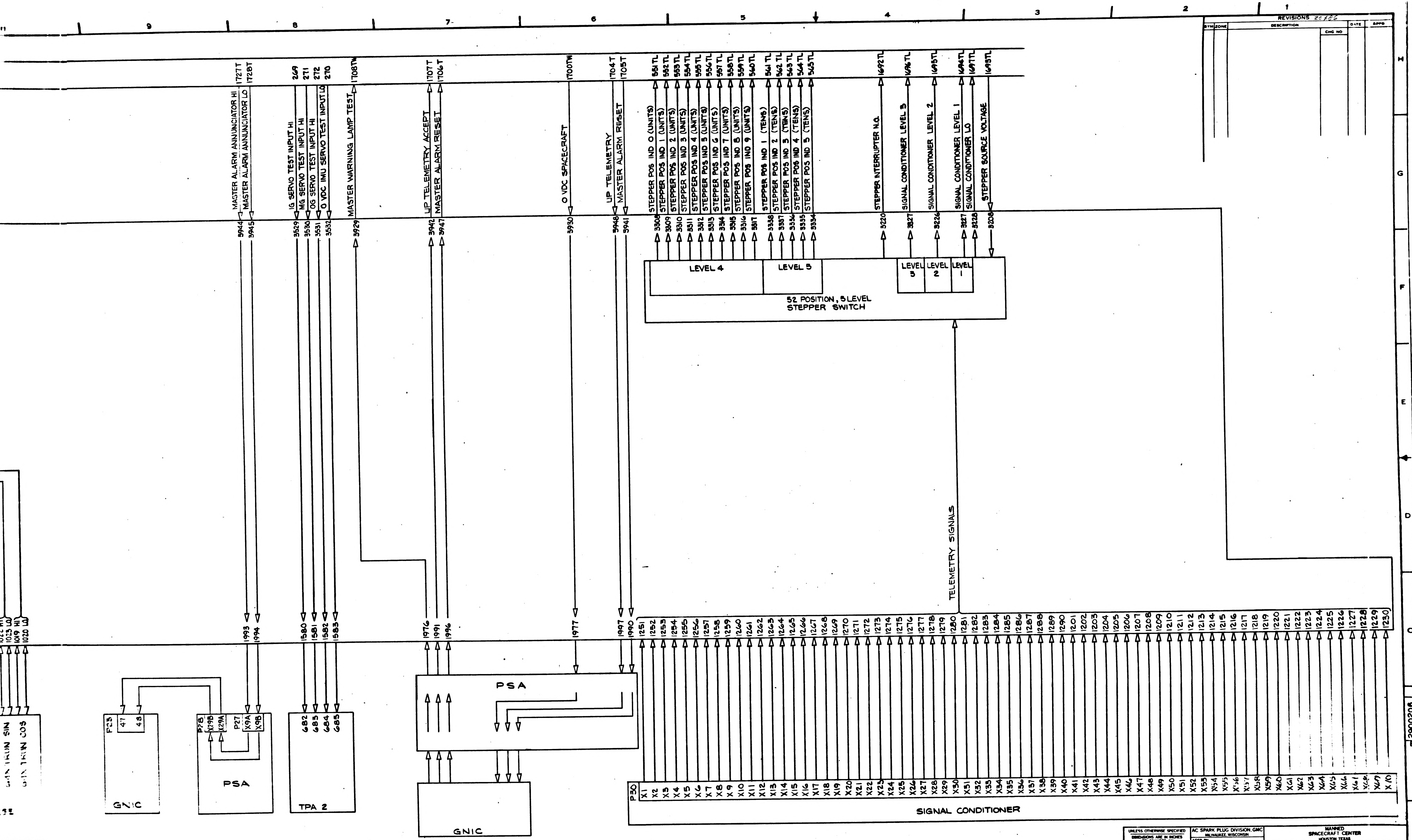
OIA BACKWALL
523W
500W
499W
502W
501W
IRIG TEST SWITCHED
X GYRO ERROR TO MG S/A
X GYRO ERROR TO OG S/A
INVERT Z GYRO ERROR
Z GYRO ERROR TO MG S/A
OJB (OVERHEAD JUNCTION BOX)
1226
1227
1237
1231
1245
(1) SHEET 2, F3
(2) SHEET 2, F3
(3) SHEET 2, F3
(4) SHEET 2, E3
277
278
274
245
241
243
246
279
276
244
275
242
PHASE INVERTER
1726
1727
1735
1736
IMU MG ERROR SIGNAL HI
IMU MG ERROR SIGNAL LO
IMU OG ERROR SIGNAL HI
IMU OG ERROR SIGNAL LO
SJB (PSA SIMULATED JUNCTION BOX)
471
470
473
472
(5) SHEET 2, B4
A5
A6
TRAY 1
609W
582W
615W
614W
190W
191W
192W
194W
460W
461W
612W
613W
+28 VDC TO CMPTR RELAY
AGC FAIL SIGNAL
SPARE FAIL GATE
AGC PS FAIL SIGNAL HI
800 CPS 28V 5% ∠90° IMU HI
800 CPS 28V 5% ∠90° IMU LO
800 CPS 28V 5% SEE TCL OIA BACKWALL
25.6 KC IMU HI
25.6 KC IMU LO
3200 CPS 2V LO
3200 CPS 2V HI
600W
601W
599W
602W
603W
604W
605W
606W
607W
608W
3200 CPS 2V HI
25.6 KC IMU HI
800 CPS 28V 5% IMU WHL ϕA
800 CPS 28V 5% IMU WHL ∠90° HI
IMU IG & Y GYRO ERROR SIGNAL
IMU MG ERROR SIGNAL
IMU OG ERROR SIGNAL
X PIPA ERROR MONITOR
Y PIPA ERROR MONITOR
Z PIPA ERROR MONITOR
2075
2076
1289
1290
OJB (OVERHEAD JUNCTION BOX)
1275
1276
1789
1790
IG, MG AMP T
SJB (PSA SIMULATED JUNCTION BOX)
501
498
499
500
487
486
491
490
488
489
492
493
494
495
496
497
484
485
482
483
M4
M3
L4
M1
L2
L1
H2
N4
N1
N2
A1
A2
B1
A5
A6
B6
N5
P5
G5
G6
H5
H6
A/B FAIL MONITOR CIRCUITS
TRAY 2
TRAY 1
TRAY 2
TRAY 6
2900206
2
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
S80050E
34


REVISIONS
SYM ZONE DESCRIPTION CHG NO DATE APPD
MASTER ALARM ANNUNCIATOR HI
MASTER ALARM ANNUNCIATOR LO
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
MASTER WARNING LAMP TEST
UP TELEMETRY ACCEPT
MASTER ALARM RESET
0 VDC SPACECRAFT
UP TELEMETRY
MASTER ALARM RESET
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
269 271 272 270
1708TW 1707T 1706T 1700TW 1704T 1705T
551TL 552TL 553TL 554TL 555TL 556TL 557TL 558TL 559TL 560TL
561TL 562TL 563TL 564TL 565TL
1692TL 1696TL 1695TL 1694TL 1697TL 1693TL
3529 3530 3531 3532 3929 3942 3947 3930 3948 3941
3308 3309 3310 3311 3312 3313 3314 3315 3316 3317
3338 3337 3336 3335 3334
3220 3227 3226 3227 3228 3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
TELEMETRY SIGNALS
1993 1994 1580 1581 1582 1583 1976 1991 1996 1977 1997 1990
47 48
X29B X29A X9A X9B
P27
PSA
682 683 684 685
TPA 2
PSA
GNIC
P30
SIGNAL CONDITIONER
G\C
2900206

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN 3 Jun 65 DATE CHECKED Ed Foster 9 JUN 65 APPROVAL APPROVAL 6-25-65	MECHANIZATION DIAGRAM- TEST SELECTOR (BLOCK II)
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 SIZE J2 2900206
CONTRACT NAS 9-497	MIT APPROVAL	SCALE SHEET 3 OF 4

2900206 | PT LTR | SH 3

3H



REVISIONS
SYM ZONE DESCRIPTION CHG NO DATE APPD
1727T 1728T
MASTER ALARM ANNUNCIATOR HI
MASTER ALARM ANNUNCIATOR LO
3944 3945
1993 1994
269 271 272 270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
3529 3530 3531 3532
1580 1581 1582 1583
1708TW
MASTER WARNING LAMP TEST
3929
1707T 1706T
UP TELEMETRY ACCEPT
MASTER ALARM RESET
3942 3947
1976 1991 1996
1700TW
0 VDC SPACECRAFT
3930
1977
1704T 1705T
UP TELEMETRY
MASTER ALARM RESET
3948 3941
1997 1990
551TL 552TL 553TL 554TL 555TL 556TL 557TL 558TL 559TL 560TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
3308 3309 3310 3311 3312 3313 3314 3315 3316 3317
561TL 562TL 563TL 564TL 565TL
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
3338 3337 3336 3335 3334
1692TL
STEPPER INTERRUPTER N.O.
3220
1696TL
SIGNAL CONDITIONER LEVEL 3
3327
1695TL
SIGNAL CONDITIONER LEVEL 2
3226
1694TL 1697TL
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
3227 3228
1693TL
STEPPER SOURCE VOLTAGE
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
TELEMETRY SIGNALS
1025 LO 1019 HI 1020 LO
GMX TRUN SIN
GMX TRUN COS
P23 47 48
GNIC
P28 X29B X29A P27 X9A X9B
PSA
682 683 684 685
TPA 2
PSA
GNIC
1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220 1221 1222 1223 1224 1225 1226 1227 1228 1229 1230
P30 X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21 X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38 X39 X40 X41 X42 X43 X44 X45 X46 X47 X48 X49 X50 X51 X52 X53 X54 X55 X56 X57 X58 X59 X60 X61 X62 X63 X64 X65 X66 X67 X68 X69 X70
SIGNAL CONDITIONER
9 8 7 6 5 4 3 2 1
H G F E D C B A
2900206

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 3 JUN 65
CHECKED Ed Foster 9 JUN 65
APPROVAL 6-25-65
APPROVAL
NASA APPROVAL
MIT APPROVAL

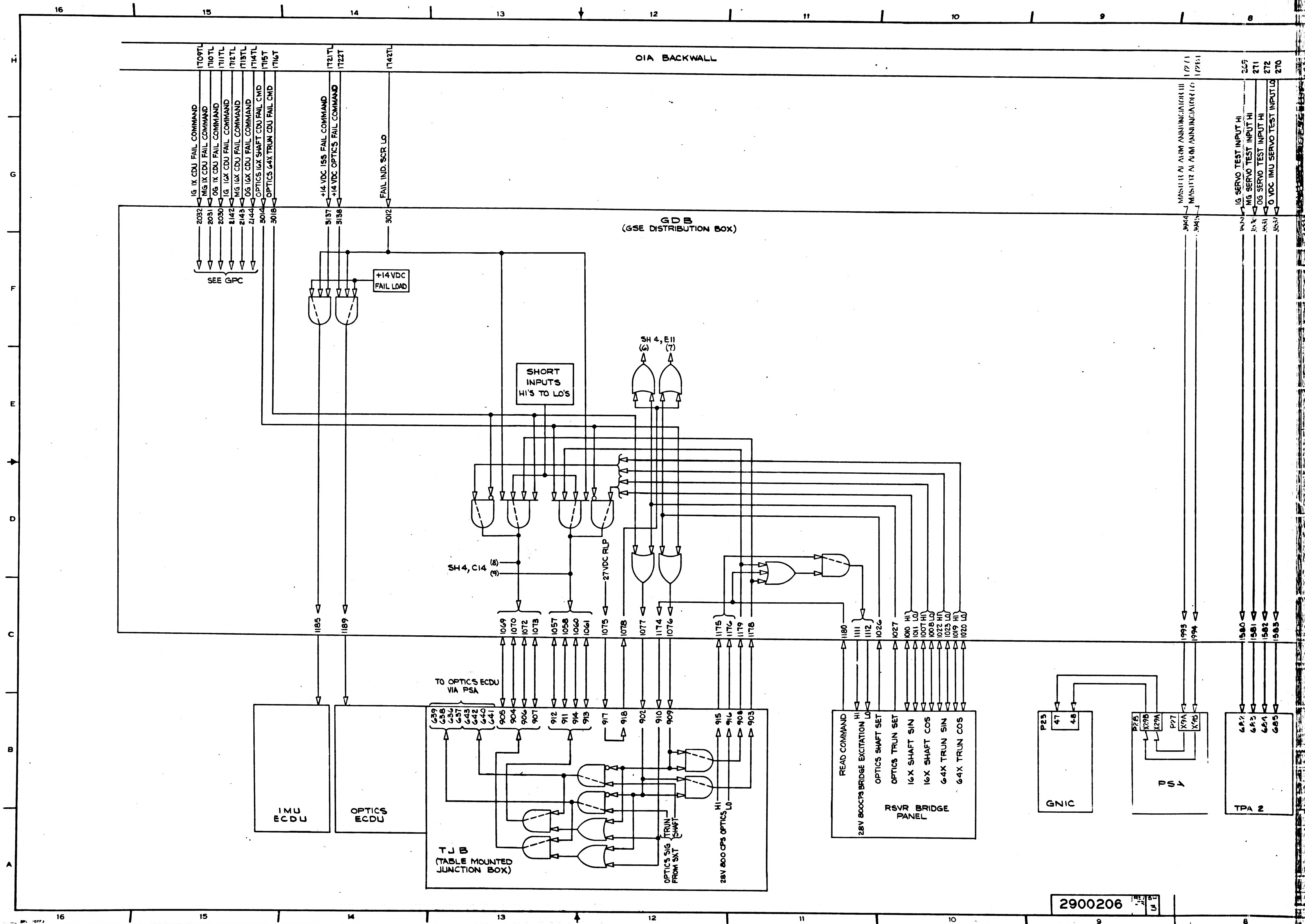
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM - TEST SELECTOR (BLOCK II)

CODE IDENT NO. 99974 SIZE J2 2900206
SCALE SHEET 3 OF 4

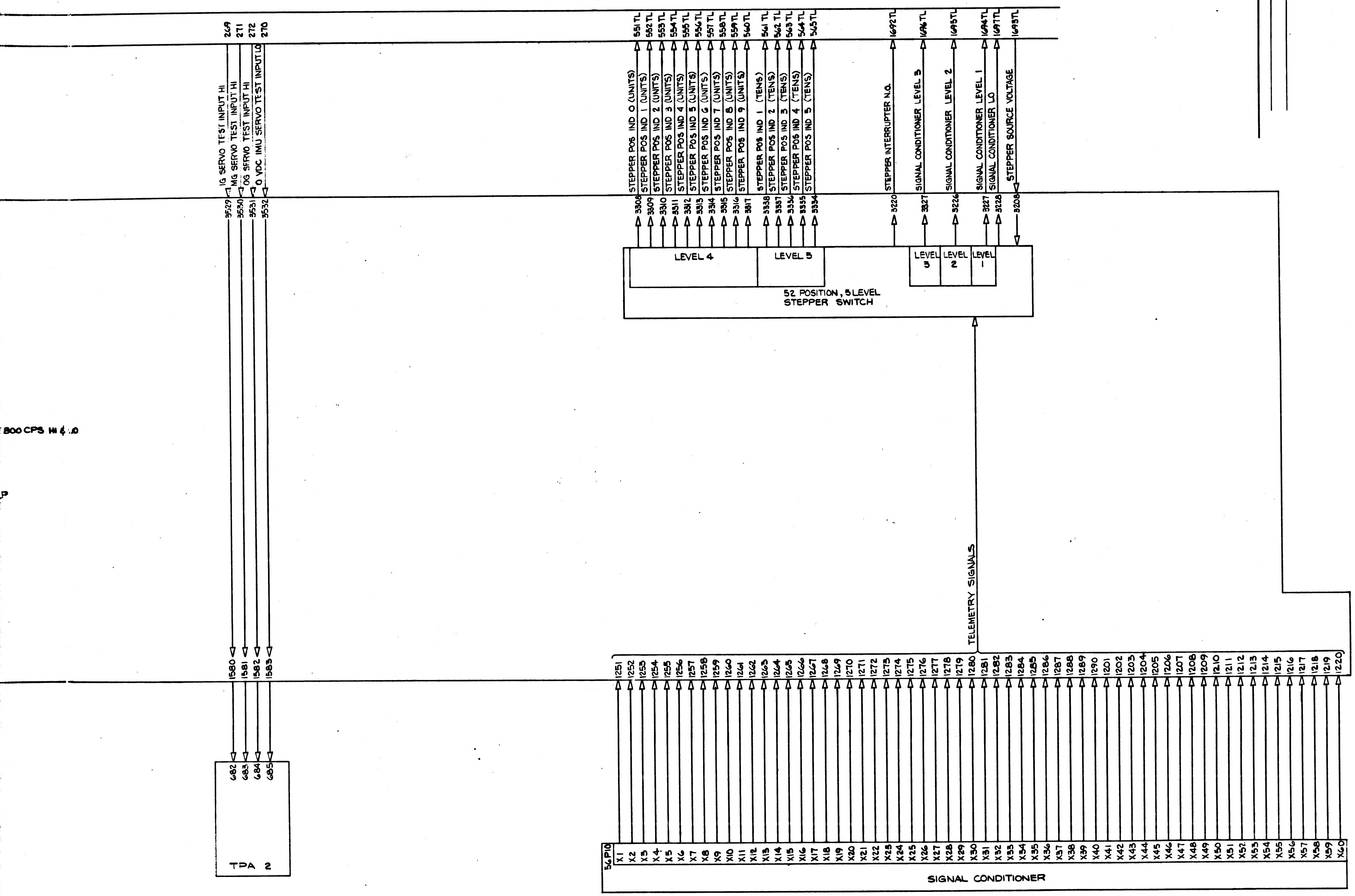
5800508

3H


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1715T
1716T
1721TL
1722T
1742TL
IG 1X CDU FAIL COMMAND
MG 1X CDU FAIL COMMAND
OG 1X CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
OPTICS 16X SHAFT CDU FAIL CMD
OPTICS 64X TRUN CDU FAIL CMD
+14 VDC ISS FAIL COMMAND
+14 VDC OPTICS FAIL COMMAND
FAIL IND. SCR LO
2032
2031
2030
2142
2143
2144
3014
3018
3137
3138
3012
GDB
(GSE DISTRIBUTION BOX)
SEE GPC
+14 VDC
FAIL LOAD
SHORT
INPUTS
HI'S TO LO'S
SH 4, E11
(6)
(7)
SH 4, C14
(8)
(9)
27VDC RLP
1185
1189
1069
1070
1072
1073
1057
1058
1060
1061
1075
1078
1077
1174
1076
1175
1176
1179
1178
1180
1111
1112
1026
1027
1010 HI
1011 LO
1007 HI
1008 LO
1022 HI
1023 LO
1019 HI
1020 LO
MASTER ALARM ANNUNCIATOR HI
MASTER ALARM ANNUNCIATOR LO
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
271
272
270
1993
1994
1580
1581
1582
1583
TO OPTICS ECDU
VIA PSA
IMU
ECDU
OPTICS
ECDU
639
638
636
637
643
642
640
641
905
904
906
907
912
911
914
913
917
918
902
910
909
915
916
908
903
TJB
(TABLE MOUNTED
JUNCTION BOX)
OPTICS SIG FROM SXT
TRUN
SHAFT
28V 800 CPS OPTICS
HI
LO
READ COMMAND
28V 800CPS BRIDGE EXCITATION
HI
LO
OPTICS SHAFT SET
OPTICS TRUN SET
16X SHAFT SIN
16X SHAFT COS
64X TRUN SIN
64X TRUN COS
RSVR BRIDGE
PANEL
P23
47
48
GNIC
P28
X29B
X29A
P27
X9A
X9B
PSA
682
683
684
685
TPA 2

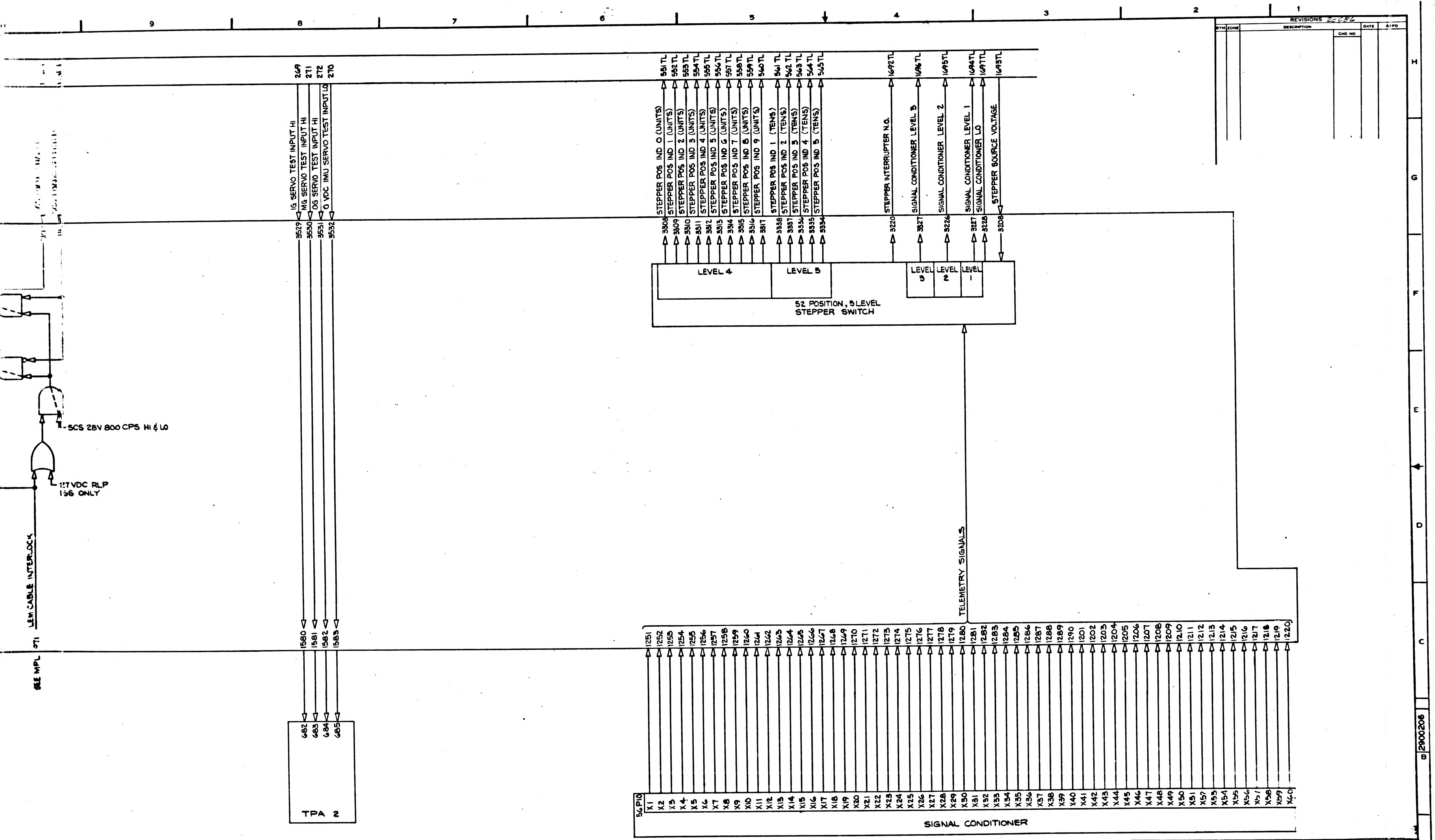
2900206 3

REVISIONS 20486					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD


269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
3529
3530
3531
3532
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
561TL
562TL
563TL
564TL
565TL
1692TL
1696TL
1695TL
1694TL
1697TL
1693TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3338
3337
3336
3335
3334
3220
3327
3226
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
800 CPS HI ϕ:0
TELEMETRY SIGNALS
1580
1581
1582
1583
682
683
684
685
TPA 2
1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220
56P10
X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21 X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38 X39 X40 X41 X42 X43 X44 X45 X46 X47 X48 X49 X50 X51 X52 X53 X54 X55 X56 X57 X58 X59 X60
SIGNAL CONDITIONER

34

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± __ DECIMALS ± __ ANGLES ± __	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN	
	DRAWN Lockmann DATE 7 JUN 65	MECHANIZATION DIAGRAM- TEST SELECTOR (LEM)
	CHECKED Ed Foster 9 JUN 65	
	APPROVAL	
	APPROVAL	
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 2900206
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — · SHEET 4 OF 4



REVISIONS
SYM
ZONE
DESCRIPTION
CHG NO
DATE
APPD
269
271
272
270
IG SERVO TEST INPUT HI
MG SERVO TEST INPUT HI
OG SERVO TEST INPUT HI
0 VDC IMU SERVO TEST INPUT LO
3529
3530
3531
3532
1580
1581
1582
1583
682
683
684
685
TPA 2
551TL
552TL
553TL
554TL
555TL
556TL
557TL
558TL
559TL
560TL
561TL
562TL
563TL
564TL
565TL
1692TL
1696TL
1695TL
1694TL
1697TL
1693TL
STEPPER POS IND 0 (UNITS)
STEPPER POS IND 1 (UNITS)
STEPPER POS IND 2 (UNITS)
STEPPER POS IND 3 (UNITS)
STEPPER POS IND 4 (UNITS)
STEPPER POS IND 5 (UNITS)
STEPPER POS IND 6 (UNITS)
STEPPER POS IND 7 (UNITS)
STEPPER POS IND 8 (UNITS)
STEPPER POS IND 9 (UNITS)
STEPPER POS IND 1 (TENS)
STEPPER POS IND 2 (TENS)
STEPPER POS IND 3 (TENS)
STEPPER POS IND 4 (TENS)
STEPPER POS IND 5 (TENS)
STEPPER INTERRUPTER N.O.
SIGNAL CONDITIONER LEVEL 3
SIGNAL CONDITIONER LEVEL 2
SIGNAL CONDITIONER LEVEL 1
SIGNAL CONDITIONER LO
STEPPER SOURCE VOLTAGE
3308
3309
3310
3311
3312
3313
3314
3315
3316
3317
3338
3337
3336
3335
3334
3220
3327
3226
3227
3228
3208
LEVEL 4
LEVEL 5
LEVEL 3
LEVEL 2
LEVEL 1
52 POSITION, 5 LEVEL STEPPER SWITCH
TELEMETRY SIGNALS
1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220
56P10
X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 X16 X17 X18 X19 X20 X21 X22 X23 X24 X25 X26 X27 X28 X29 X30 X31 X32 X33 X34 X35 X36 X37 X38 X39 X40 X41 X42 X43 X44 X45 X46 X47 X48 X49 X50 X51 X52 X53 X54 X55 X56 X57 X58 X59 X60
SIGNAL CONDITIONER
SCS 28V 800 CPS HI & LO
127 VDC RLP
ISS ONLY
LEM CABLE INTERLOCK
571
SEE MPL
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Lockman DATE 7 JUN 65
CHECKED Ed Foster 9 JUN 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

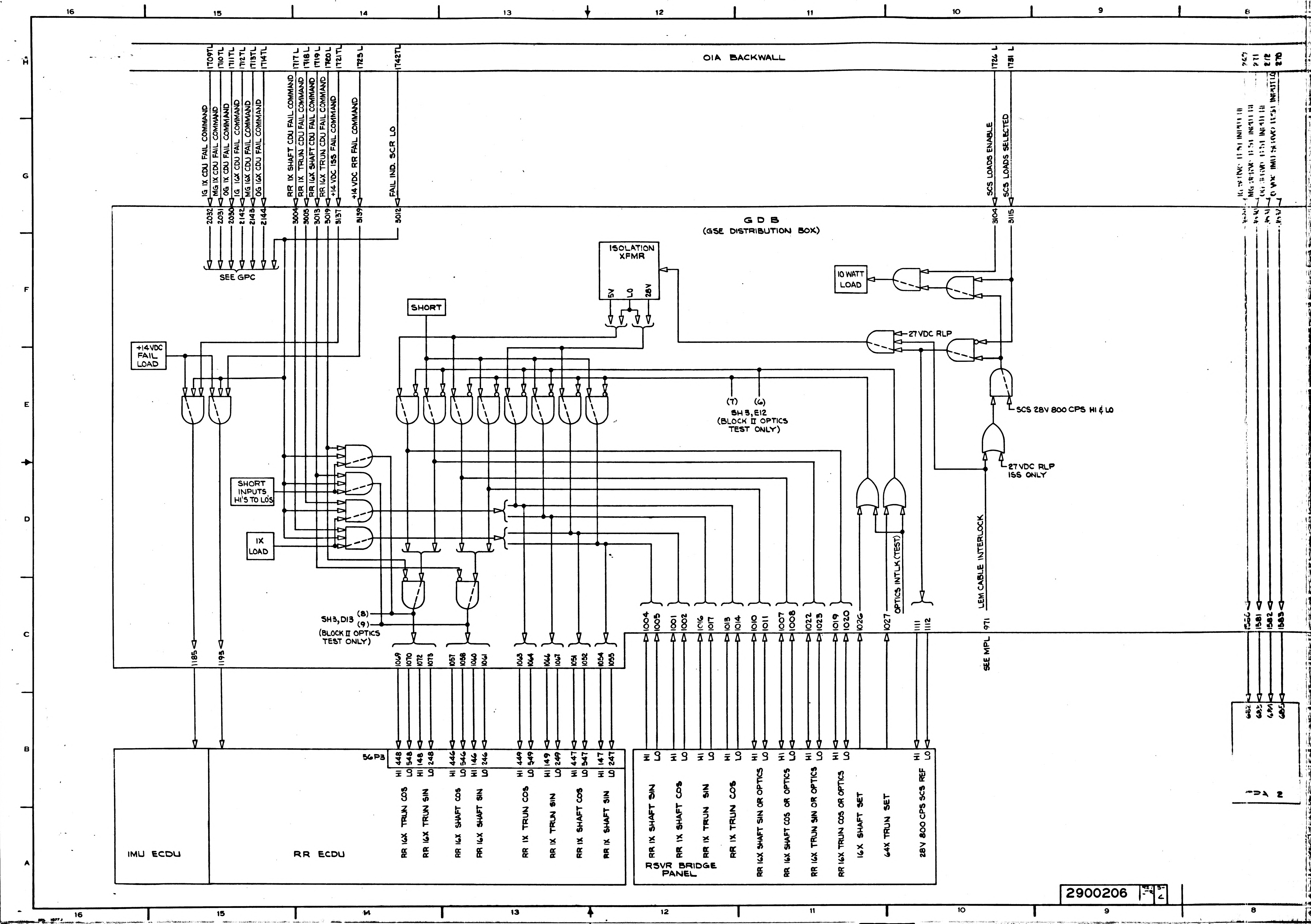
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
TEST SELECTOR
(LEM)

CODE IDENT NO. 99974
SIZE J2
2900206
SCALE —
SHEET 4 OF 4

2900206 REV LTR SH 4

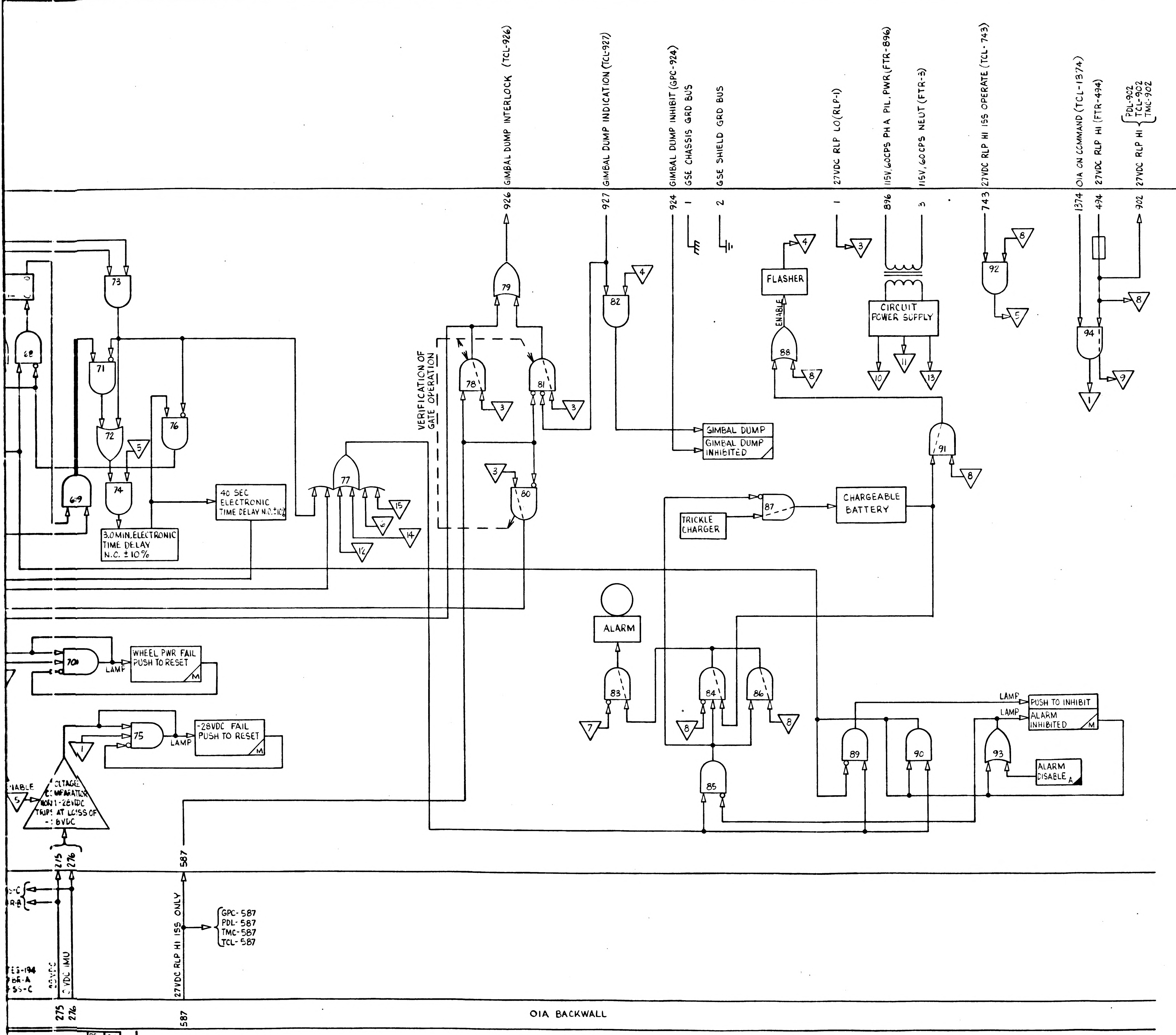
2900206


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1709TL
1710TL
1711TL
1712TL
1713TL
1714TL
1717 L
1718 L
1719 L
1720 L
1721TL
1725 L
1742TL
1726 L
1731 L
IG IX CDU FAIL COMMAND
MG IX CDU FAIL COMMAND
OG IX CDU FAIL COMMAND
IG 16X CDU FAIL COMMAND
MG 16X CDU FAIL COMMAND
OG 16X CDU FAIL COMMAND
RR IX SHAFT CDU FAIL COMMAND
RR IX TRUN CDU FAIL COMMAND
RR 16X SHAFT CDU FAIL COMMAND
RR 16X TRUN CDU FAIL COMMAND
+14 VDC ISS FAIL COMMAND
+14 VDC RR FAIL COMMAND
FAIL IND. SCR LO
SCS LOADS ENABLE
SCS LOADS SELECTED
2032
2031
2030
2142
2143
2144
3004
3005
3013
3019
3137
3139
3012
3104
3115
G D B
(GSE DISTRIBUTION BOX)
SEE GPC
ISOLATION XFMR
5V
LO
28V
10 WATT LOAD
27 VDC RLP
SCS 28V 800 CPS HI & LO
27 VDC RLP ISS ONLY
SHORT
+14VDC FAIL LOAD
(7)
(6)
SH 3, E12
(BLOCK II OPTICS TEST ONLY)
SHORT INPUTS HI'S TO LOS
IX LOAD
SH3, D13
(8)
(9)
(BLOCK II OPTICS TEST ONLY)
OPTICS INTLK (TEST)
LEM CABLE INTERLOCK
971
SEE MPL
1185
1193
1069
1070
1072
1073
1057
1058
1060
1061
1063
1064
1066
1067
1051
1052
1054
1055
1004
1005
1001
1002
1016
1017
1013
1014
1010
1011
1007
1008
1022
1023
1019
1020
1026
1027
1111
1112
56P3
448
548
148
248
446
546
146
246
449
549
149
249
447
547
147
247
HI
LO
RR 16X TRUN COS
RR 16X TRUN SIN
RR 16X SHAFT COS
RR 16X SHAFT SIN
RR IX TRUN COS
RR IX TRUN SIN
RR IX SHAFT COS
RR IX SHAFT SIN
IMU ECDU
RR ECDU
RR IX SHAFT SIN
RR IX SHAFT COS
RR IX TRUN SIN
RR IX TRUN COS
RR 16X SHAFT SIN OR OPTICS
RR 16X SHAFT COS OR OPTICS
RR 16X TRUN SIN OR OPTICS
RR 16X TRUN COS OR OPTICS
16X SHAFT SET
64X TRUN SET
28V 800 CPS SCS REF
RSVR BRIDGE PANEL
271
272
270
IMU SERVO TEST INPUT LO
1581
1582
1583
2900206

5800508

34

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPR
A		REVISED PER TDRR 20487		2 JUL 65	RLP M.



9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
926 GIMBAL DUMP INTERLOCK (TCL-926)
927 GIMBAL DUMP INDICATION (TCL-927)
924 GIMBAL DUMP INHIBIT (GPC-924)
1 GSE CHASSIS GRD BUS
2 GSE SHIELD GRD BUS
1 27VDC RLP LO (RLP-1)
896 115V, 60CPS PH A PIL. PWR (FTR-896)
3 115V, 60CPS NEUT (FTR-3)
743 27VDC RLP HI ISS OPERATE (TCL-743)
1374 OIA ON COMMAND (TCL-1374)
494 27VDC RLP HI (FTR-494)
902 27VDC RLP HI PDL-902 TCL-902 TMC-902
73
68
71
72
76
74
69
77
79
78
81
80
82
88
92
94
91
87
83
84
86
85
89
90
93
70
75
FLASHER
ENABLE
CIRCUIT POWER SUPPLY
VERIFICATION OF GATE OPERATION
GIMBAL DUMP
GIMBAL DUMP INHIBITED
40 SEC ELECTRONIC TIME DELAY N.O. ±10%
3.0 MIN. ELECTRONIC TIME DELAY N.C. ±10%
TRICKLE CHARGER
CHARGEABLE BATTERY
ALARM
LAMP
PUSH TO INHIBIT
ALARM INHIBITED
M
ALARM DISABLE
WHEEL PWR FAIL PUSH TO RESET
-28VDC FAIL PUSH TO RESET
VOLTAGE COMPARATOR MON -28VDC TRIPS AT LOSS OF -18VDC
ENABLE
275 276
587
27VDC RLP HI ISS ONLY
GPC-587
PDL-587
TMC-587
TCL-587
VDC IMU
OIA BACKWALL
275 276
587
1
3
4
5
7
8
9
10
11
12
13
14
15

2900207 REV LTR A SH 1

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

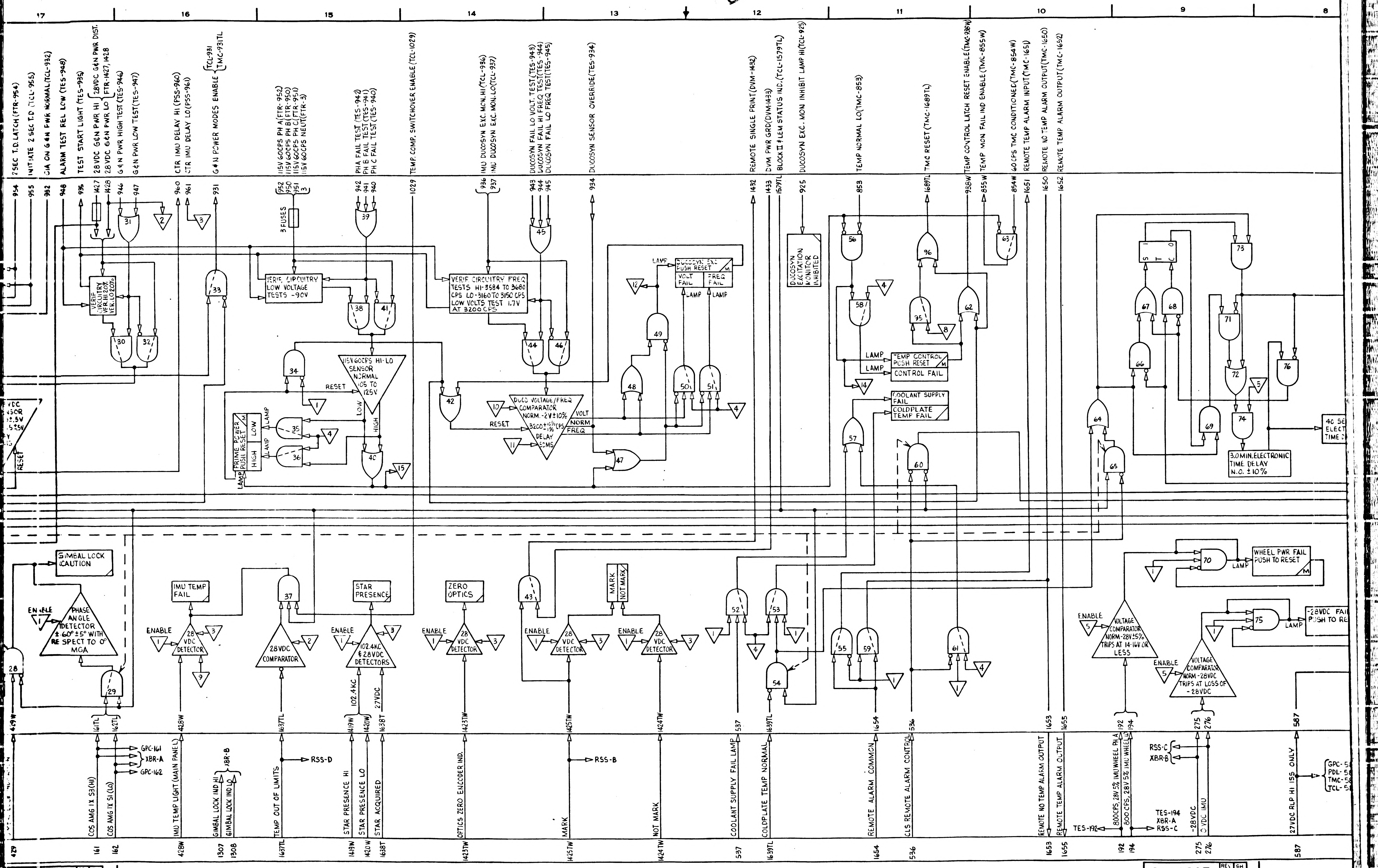
AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Sylane DATE 7 MAY 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK I SERIES 100, BLOCK II, LEM)

CODE IDENT NO
SIZE
2900207
SCALE —
SHEET 1 OF 4

3/2900207


17
16
15
14
13
12
11
10
9
8
2SEC T.D. LATCH (FTR-954)
INITIATE 2 SEC T.D (TCL-955)
GIA ON G&N PWR NORMAL (TCL-932)
ALARM TEST REL LOW (TES-948)
TEST START LIGHT (TES-935)
28VDC G&N PWR HI
28VDC G&N PWR LO
G&N PWR DIST. FTR-1427, 1428
G&N PWR HIGH TEST (TES-946)
G&N PWR LOW TEST (TES-947)
CTR IMU DELAY HI (PSS-960)
CTR IMU DELAY LO (PSS-961)
G&N POWER MODES ENABLE
TCL-931
TMC-931TL
115V 60CPS PH A (FTR-952)
115V 60CPS PH B (FTR-950)
115V 60CPS PH C (FTR-951)
115V 60CPS NEUT (FTR-3)
PHA FAIL TEST (TES-942)
PH B FAIL TEST (TES-941)
PH C FAIL TEST (TES-940)
TEMP. COMP. SWITCHOVER ENABLE (TCL-1029)
IMU DUCOSYN EXC. MON. HI (TCL-936)
IMU DUCOSYN EXC. MON. LO (TCL-937)
DUCOSYN FAIL LO VOLT. TEST (TES-943)
DUCOSYN FAIL HI FREQ TEST (TES-944)
DUCOSYN FAIL LO FREQ TEST (TES-945)
DUCOSYN SENSOR OVERRIDE (TES-934)
REMOTE SINGLE PRINT (DVM-1432)
DVM PWR GRD (DVM-1433)
BLOCK II & LEM STATUS IND. (TCL-1579TL)
DUCOSYN EXC. MON INHIBIT LAMP HI (TCL-925)
TEMP NORMAL LO (TMC-853)
TMC RESET (TMC-1689TL)
TEMP CONTROL LATCH RESET ENABLE (TMC-936W)
TEMP MON FAIL IND ENABLE (TMC-855W)
60CPS TMC CONDITIONED (TMC-854W)
REMOTE TEMP ALARM INPUT (TMC-1651)
REMOTE NO TEMP ALARM OUTPUT (TMC-1650)
REMOTE TEMP ALARM OUTPUT (TMC-1652)
954
955
932
948
935
1427
1428
946
947
960
961
931
952
950
951
3
942
941
940
1029
936
937
943
944
945
934
1432
1433
1579TL
925
853
1689TL
936W
855W
854W
1651
1650
1652
3 FUSES
VERIF CIRCUITRY VER. HI 20% VER. LO 20%
VERIF. CIRCUITRY LOW VOLTAGE TESTS -90V
VERIF CIRCUITRY FREQ TESTS HI-3584 TO 3680 CPS LO-3160 TO 3150 CPS LOW VOLTS TEST 1.7V AT 3200 CPS
115V 60CPS HI-LO SENSOR NORMAL 105 TO 125V
RESET
LOW
HIGH
PRIME POWER PUSH RESET
LAMP
DUCO VOLTAGE/FREQ COMPARATOR NORM. -2V ±10% 3200 +10% -1% CPS DELAY 50MS
VOLT
NORM
FREQ
DUCOSYN EXC PUSH RESET
VOLT FAIL
FREQ FAIL
DUCOSYN EXCITATION MONITOR INHIBITED
TEMP CONTROL PUSH RESET
CONTROL FAIL
COOLANT SUPPLY FAIL
COLDPLATE TEMP FAIL
S T C O
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
40 SE ELECT TIME D
VDC NSOR 2.5V 5±5V
GIMBAL LOCK CAUTION
ENABLE
PHASE ANGLE DETECTOR ±60° ±5° WITH RESPECT TO 0° MGA
IMU TEMP FAIL
28 VDC DETECTOR
28VDC COMPARATOR
STAR PRESENCE
102.4KC & 28VDC DETECTORS
102.4KC
27VDC
ZERO OPTICS
MARK
NOT MARK
WHEEL PWR FAIL PUSH TO RESET
VOLTAGE COMPARATOR NORM-28V±5% TRIPS AT 14-16V OR LESS
VOLTAGE COMPARATOR NORM -28VDC TRIPS AT LOSS OF -28VDC
-28VDC FAIL PUSH TO RE
28
29
30
31
32
33
34
35
36
37
38
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41
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64
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66
67
68
69
70
71
72
73
74
75
76
429
161TL
162TL
428W
1637TL
1419W
1420W
1638T
1423TW
1425TW
1424TW
537
1639TL
1654
536
1653
1655
192
194
275
276
587
GPC-161
XBR-A
GPC-162
XBR-B
RSS-D
RSS-B
RSS-C
COS AMG 1X S3 (HI)
COS AMG 1X S1 (LO)
IMU TEMP LIGHT (MAIN PANEL)
GIMBAL LOCK IND HI
GIMBAL LOCK IND LO
TEMP OUT OF LIMITS
STAR PRESENCE HI
STAR PRESENCE LO
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
REMOTE ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
800CPS, 28V 5% IMU WHEEL PH A
800 CPS, 28V 5% IMU WHEEL
TES-192
TES-194
-28VDC
0 VDC IMU
27VDC RLP HI ISS ONLY
GPC-5
PDL-5
TMC-5
TCL-5
429
161
162
428W
1307
1308
1637TL
1419W
1420W
1638T
1423TW
1425TW
1424TW
537
1639TL
1654
536
1653
1655
192
194
275
276
587

2900207 REV LTR A SH 1

2900207 REV LTR A SH 1

2/2900207

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS:

2900210 AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR)
RLP RELAY & LAMP POWER SUPPLY
2900204 TEMPERATURE MONITOR CONTROL PANEL (BLOCK I, SERIES 100)(TMC)
2900203 TEMPERATURE MONITOR CONTROL PANEL (BLOCK II & LEM)(TMC)
2900208 POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL)
2900223 GIMBAL POSITION CONTROL (GPC)
2900202 TEST CONTROL PANEL (BLOCK I, SERIES 100) (TCL)
2900201 TEST CONTROL PANEL (BLOCK II & LEM)(TCL)
2900206 TEST SELECTOR PANEL (TES)
2900200 GYRO CAGING PANEL (BLOCK II & LEM)(GCP)
2900218 OSCILLOGRAPH SIGNAL SELECTION
RSS-B TO FIXED DC CHANNEL, RSS-C TO SWITCHABLE AC CHANNEL,
RSS-D TO SWITCHABLE DC CHANNEL
2900217 SIGNAL SELECTION & MEASUREMENT
XBR-A CROSSBAR-AC SIGNALS
XBR-B CROSSBAR-DC SIGNALS
2900219 COUNTER SIGNAL SELECTION
PRIMARY SIGNAL SELECTOR (PSS)
2900214 GSE GROUNDING (BLOCK I SERIES 100)
2900213 GSE GROUNDING (BLOCK II & LEM)
2900209 COMPUTER SIMULATOR INTERFACE (CMS)
2900211 AUXILIARY INPUT/OUTPUT CALIBRATION (AIP)

4. NON STANDARD SYMBOLOGY:

INDICATES "AND" GATE WITH SWITCHED SIGNAL

NAME INDICATES INDICATOR LIGHT

NAME M INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME A INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

NAME / NAME INDICATES SPLIT SCREEN INDICATOR LIGHT

NAME / NAME M INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME A INDICATES UNLIGHTED PUSHBUTTON OR TOGGLE SWITCH (ALTERNATE ACTION)

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:

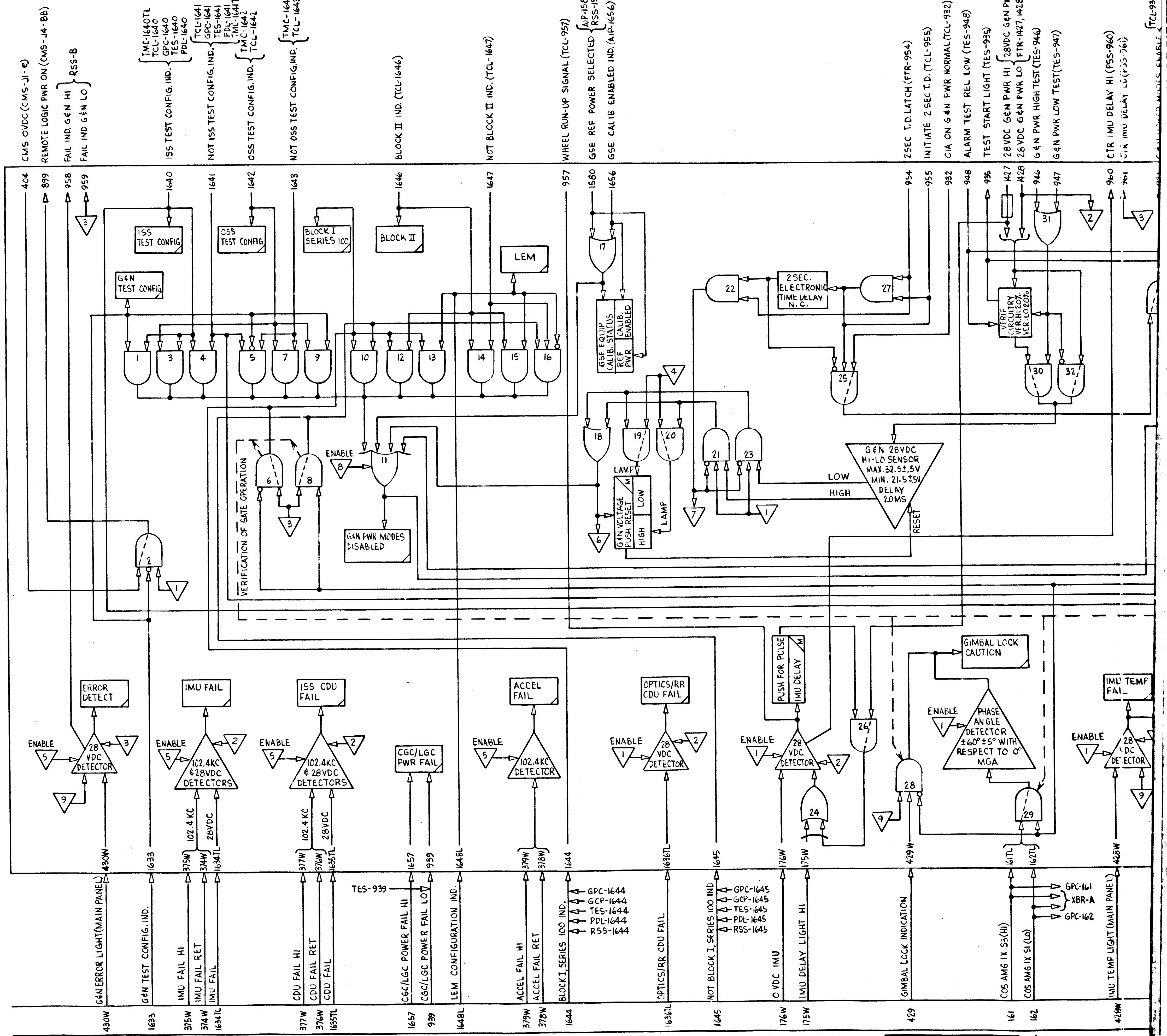
A. W-BLOCK I SERIES 100 ONLY
B. T-BLOCK II ONLY
C. L-LEM ONLY
D. BLANK-ALL G&N CONFIGURATIONS
E. TW, TL OR WL-USED IN MORE THAN ONE G&N CONFIGURATION AS SHOWN.

6. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK I SERIES 100	SH 1 SH 2
BLOCK II	SH 1 SH 3
LEM	SH 1 SH 4

7. SIGNAL REFERENCE:

1 = OIA ON
2 = 28VDC G&N PWR LO
3 = 27VDC RLP LO
4 = FLASHER
5 = ISS OPER. 5SEC T.D.
6 = G&N PWR FAIL
7 = 2 SEC T.D. AT OIA ON
8 = 27VDC PIL. PWR
9 = 27VDC OIA ON
10 = +28VDC
11 = -28VDC
12 = DUCO EXC. FAIL
13 = +45 VDC
14 = TMC FAIL
15 = PRIME PWR FAIL

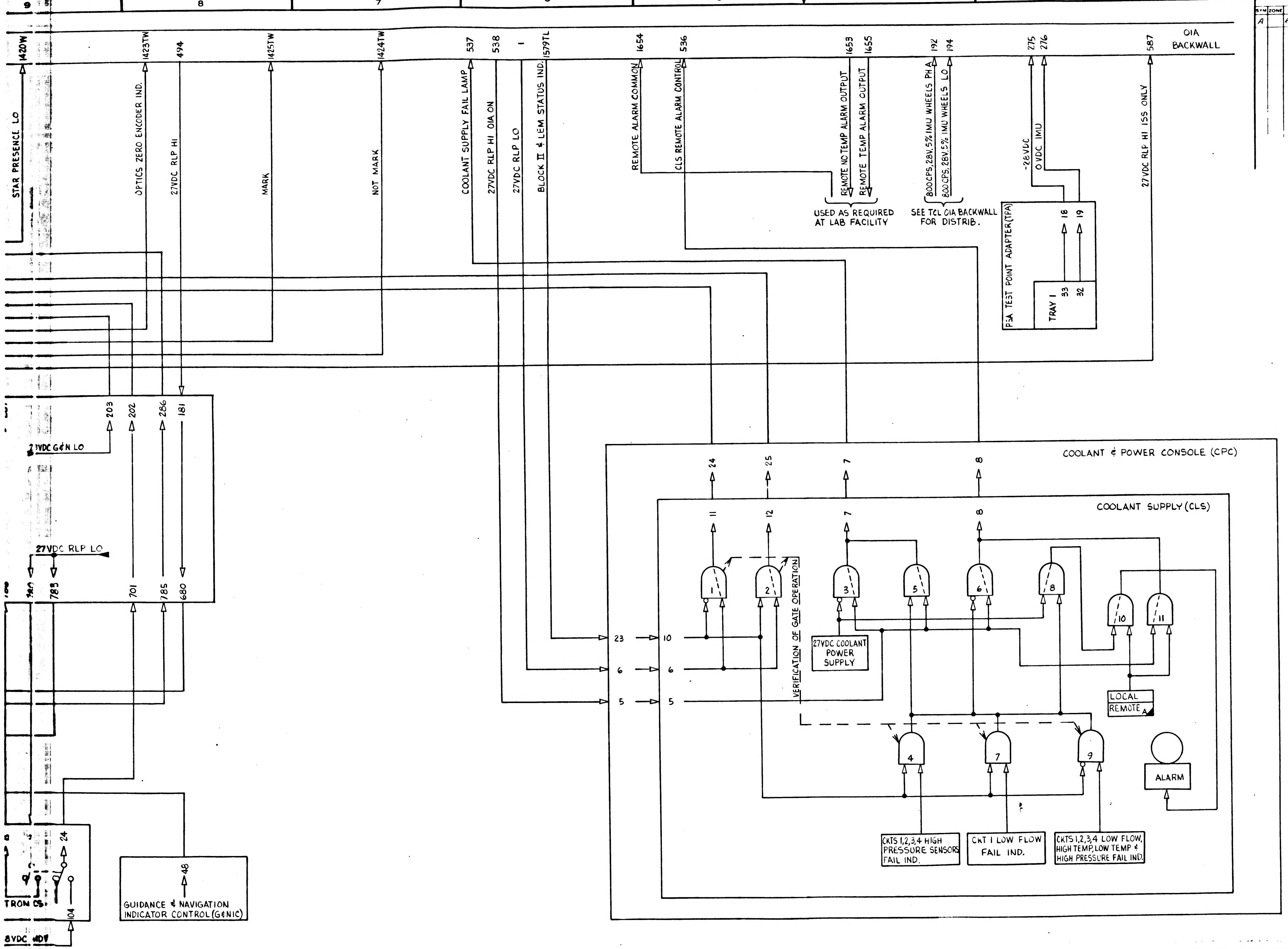

CMS OVDC (CMS-J1-e)
404
REMOTE LOGIC PWR ON (CMS-J4-BB)
899
FAIL IND. G&N HI
FAIL IND G&N LO
RSS-B
958
959
ISS TEST CONFIG. IND.
TMC-1640TL
TCL-1640
GPC-1640
TES-1640
PDL-1640
1640
NOT ISS TEST CONFIG. IND.
TCL-1641
GPC-1641
TES-1641
PDL-1641
TMC-1641TL
1641
OSS TEST CONFIG. IND.
TMC-1642
TCL-1642
1642
NOT OSS TEST CONFIG. IND.
TMC-1643
TCL-1643
1643
BLOCK II IND. (TCL-1646)
1646
NOT BLOCK II IND. (TCL-1647)
1647
WHEEL RUN-UP SIGNAL (TCL-957)
957
GSE REF POWER SELECTED
AIP-1580
RSS-1580
1580
GSE CALIB ENABLED IND. (AIP-1656)
1656
2SEC T.D. LATCH (FTR-954)
954
INITIATE 2 SEC T.D. (TCL-955)
955
CIA ON G&N PWR NORMAL (TCL-932)
932
ALARM TEST REL LOW (TES-948)
948
TEST START LIGHT (TES-935)
935
28VDC G&N PWR HI
28VDC G&N PWR LO
28VDC G&N PWR DIST.
FTR-1427, 1428
1427
1428
G&N PWR HIGH TEST (TES-946)
946
G&N PWR LOW TEST (TES-947)
947
CTR IMU DELAY HI (PSS-960)
CTR IMU DELAY LO (PSS-961)
960
961
TCL-931
ISS TEST CONFIG
OSS TEST CONFIG
BLOCK I SERIES 100
BLOCK II
LEM
G&N TEST CONFIG
GSE EQUIP CALIB. STATUS
REF PWR
CALIB. ENABLED
2 SEC. ELECTRONIC TIME DELAY N.C.
VERIF CIRCUITRY VER. HI 20% VER. LO 20%
ENABLE
G&N PWR MODES DISABLED
VERIFICATION OF GATE OPERATION
LAMP
G&N VOLTAGE PUSH RESET
LOW
HIGH
G&N 28VDC HI-LO SENSOR MAX. 32.5±.5V MIN. 21.5±.5V DELAY 20MS
RESET
LOW
HIGH
GIMBAL LOCK CAUTION
PUSH FOR PULSE
IMU DELAY
ERROR DETECT
IMU FAIL
ISS CDU FAIL
ACCEL FAIL
OPTICS/RR CDU FAIL
IMU TEMP FAIL
CGC/LGC PWR FAIL
28 VDC DETECTOR
102.4KC & 28VDC DETECTORS
102.4KC DETECTOR
PHASE ANGLE DETECTOR ±60°±5° WITH RESPECT TO 0° MGA
102.4 KC
28VDC
430W
1633
375W
374W
1634TL
377W
376W
1635TL
1657
939
1648L
379W
378W
1644
1636TL
1645
176W
175W
429W
161TL
162TL
428W
G&N ERROR LIGHT (MAIN PANEL)
G&N TEST CONFIG. IND.
IMU FAIL HI
IMU FAIL RET
IMU FAIL
CDU FAIL HI
CDU FAIL RET
CDU FAIL
TES-939
CGC/LGC POWER FAIL HI
CGC/LGC POWER FAIL LO
LEM CONFIGURATION IND.
ACCEL FAIL HI
ACCEL FAIL RET
BLOCK I, SERIES 100 IND.
GPC-1644
GCP-1644
TES-1644
PDL-1644
RSS-1644
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND
GPC-1645
GCP-1645
TES-1645
PDL-1645
RSS-1645
O VDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK INDICATION
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
GPC-161
XBR-A
GPC-162
IMU TEMP LIGHT (MAIN PANEL)
430W
1633
375W
374W
1634TL
377W
376W
1635TL
1657
939
1648L
379W
378W
1644
1636TL
1645
176W
175W
429
161
162
428W

2900207 REV LTR A SH 1

MIL FORM 1050 J3

1-/-2900207

SYM	ZONE	REVISIONS DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP



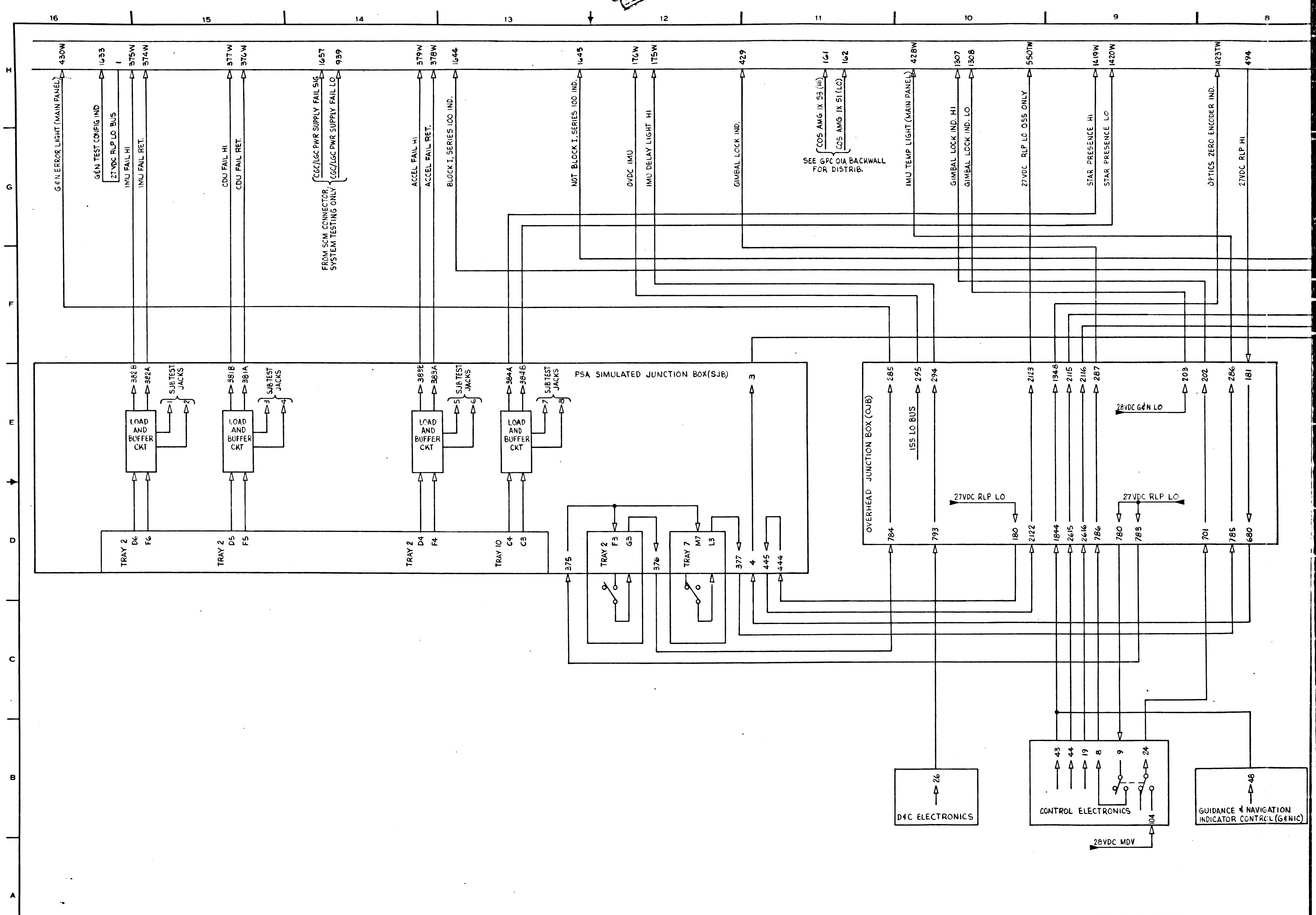
OIA BACKWALL
1420W
1423TW
494
1425TW
1424TW
537
538
1579TL
1654
536
1653
1655
192
194
275
276
587
STAR PRESENCE LO
OPTICS ZERO ENCODER IND.
27VDC RLP HI
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND.
REMOTE ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
800CPS,28V,5% IMU WHEELS PH A
800CPS,28V,5% IMU WHEELS LO
-28VDC
0VDC IMU
27VDC RLP HI ISS ONLY
USED AS REQUIRED AT LAB FACILITY
SEE TCL OIA BACKWALL FOR DISTRIB.
PSA TEST POINT ADAPTER (TPA)
18
19
TRAY 1
33
32
203
202
286
181
27VDC G&N LO
27VDC RLP LO
780
783
701
785
680
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
1
2
3
5
6
8
10
11
23
6
5
10
6
5
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
4
7
9
ALARM
CKTS 1,2,3,4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL IND.
CKTS 1,2,3,4 LOW FLOW, HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND.
24
104
TRON CS
8VDC MDV
48
GUIDANCE & NAVIGATION INDICATOR CONTROL (GENIC)

2H

900207 REV LTR A SH 2

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ___ ± ___ ± ___	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN Splane DATE 7 MAY 65 CHECKED 4 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK I SERIES 100)
MATERIAL ___	NASA APPROVAL	CODE IDENT NO / SIZE / 2900207
CONTRACT	MIT APPROVAL	SCALE — / SHEET 2 OF 4

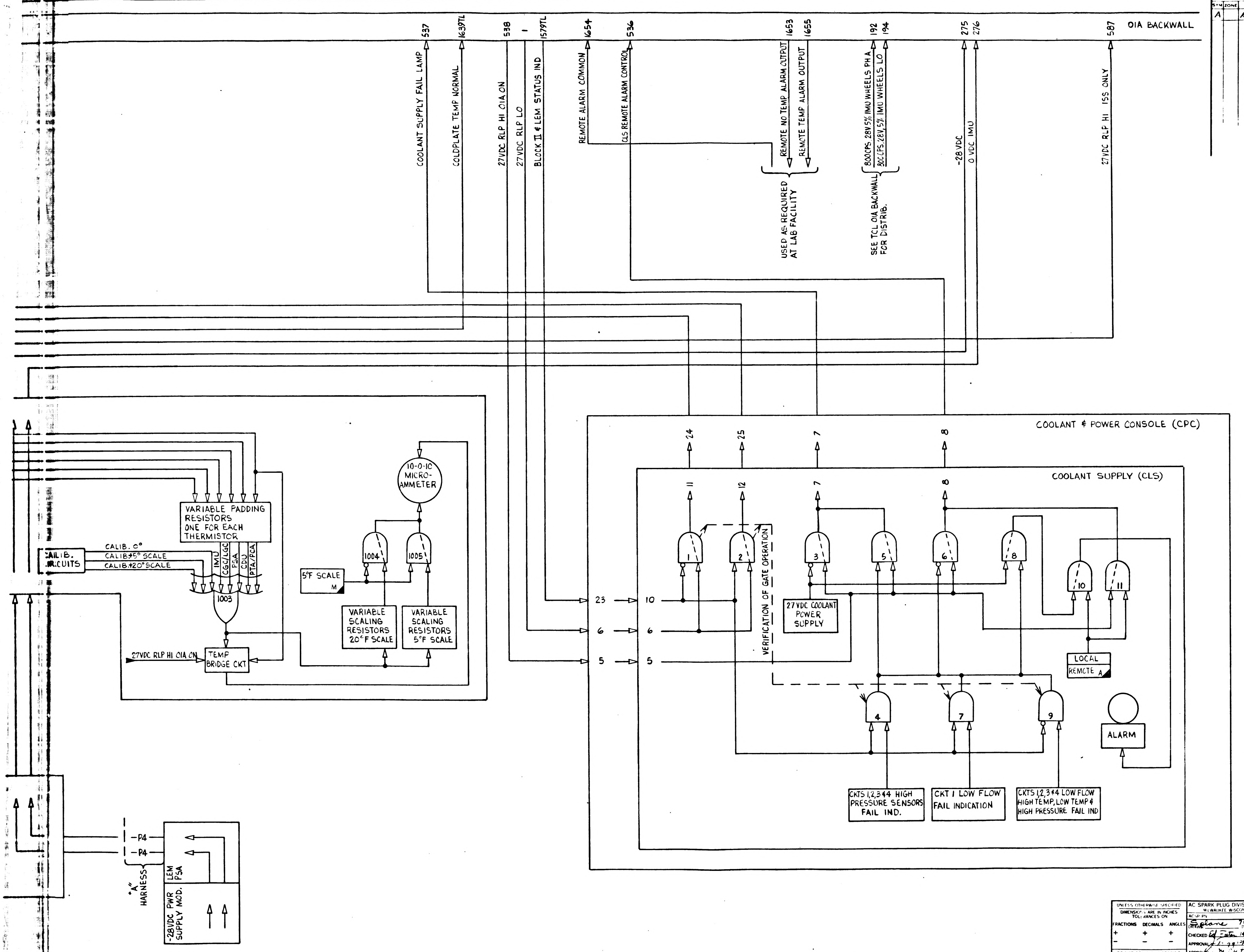
2 / 2900207


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
430W
1633
1
375W
374W
377W
376W
1657
939
379W
378W
1644
1645
176W
175W
429
161
162
428W
1307
1308
550TW
1419W
1420W
1423TW
494
G&N ERROR LIGHT (MAIN PANEL)
G&N TEST CONFIG IND
27VDC RLP LO BUS
IMU FAIL HI
IMU FAIL RET.
CDU FAIL HI
CDU FAIL RET.
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR, SYSTEM TESTING ONLY
ACCEL FAIL HI
ACCEL FAIL RET.
BLOCK I, SERIES 100 IND.
NOT BLOCK I, SERIES 100 IND.
0VDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK IND.
COS AMG IX 53 (HI)
COS AMG IX 51 (LO)
SEE GPC 01A BACKWALL FOR DISTRIB.
IMU TEMP LIGHT (MAIN PANEL)
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
27VDC RLP LO OSS ONLY
STAR PRESENCE HI
STAR PRESENCE LO
OPTICS ZERO ENCODER IND.
27VDC RLP HI
PSA SIMULATED JUNCTION BOX (SJB)
382B
382A
381B
381A
383B
383A
384A
384B
SJB TEST JACKS
1
2
3
4
5
6
7
8
LOAD AND BUFFER CKT
TRAY 2
D6
F6
TRAY 2
D5
F5
TRAY 2
D4
F4
TRAY 10
C4
C3
3
375
TRAY 2
F3
G3
376
TRAY 7
M7
L3
377
4
445
444
OVERHEAD JUNCTION BOX (OJB)
285
295
294
2123
1348
2115
2116
287
203
202
286
181
ISS LO BUS
28VDC G&N LO
27VDC RLP LO
27VDC RLP LO
784
793
180
2122
1844
2615
2616
786
780
783
701
785
680
26
D&C ELECTRONICS
43
44
19
8
9
24
104
CONTROL ELECTRONICS
28VDC MDV
48
GUIDANCE & NAVIGATION INDICATOR CONTROL (G&NIC)
H2

2900207 REV LTR A SH 2

1/2900207

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	CLP / MM



8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
OIA BACKWALL
537
1639TL
538
1579TL
1654
536
1653
1655
192
194
275
276
587
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND
REMOTE ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
800CPS 28V5% IMU WHEELS PH A
800CPS 28V5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
0 VDC IMU
27VDC RLP HI ISS ONLY
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
1
2
3
5
6
8
10
11
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
23
10
6
6
5
5
LOCAL
REMOTE A
4
7
9
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND
10-0-10 MICRO-AMMETER
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. C°
CALIB. ±5° SCALE
CALIB. ±20° SCALE
IMU
CGS/LGC
PSA
CDU
PTA/PCA
1003
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
-P4
-P4
"A" HARNESS
LEM PSA
-28VDC PWR SUPPLY MOD.

2900207 A

2H

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON		
FRACTIONS	DECIMALS	ANGLES
+	+	+
–	–	–

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN

ACSP PN

DRAWN Splane DATE 7 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL [illegible]
APPROVAL M [illegible]
NASA APPROVAL [illegible]
MIT APPROVAL [illegible]

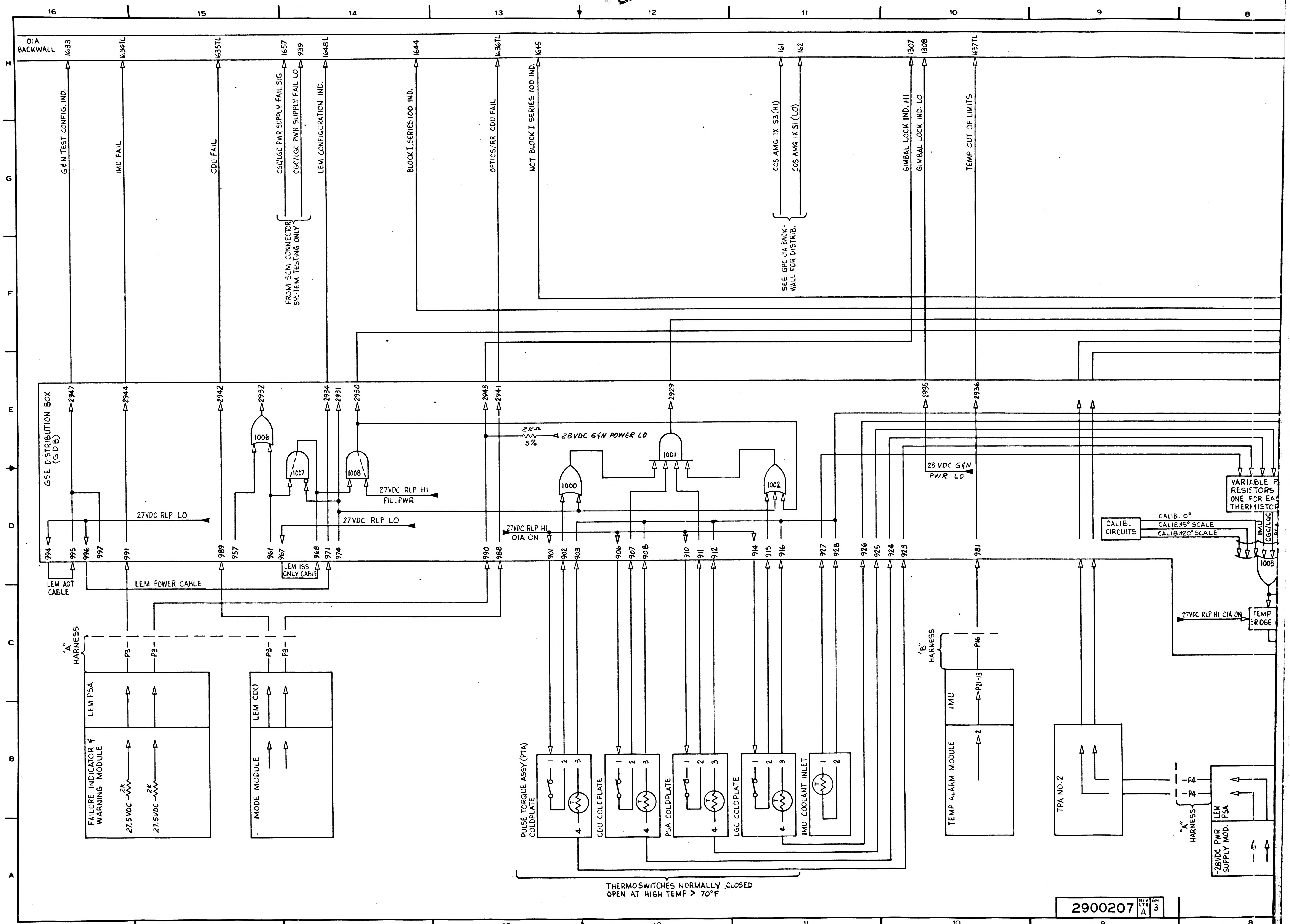
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM MONITOR PANEL (LEM)

CODE IDENT NO | SIZE | 2900207
SCALE | SHEET 3 OF 4

2900207 | REV LTR A | SH 3

2/2900207

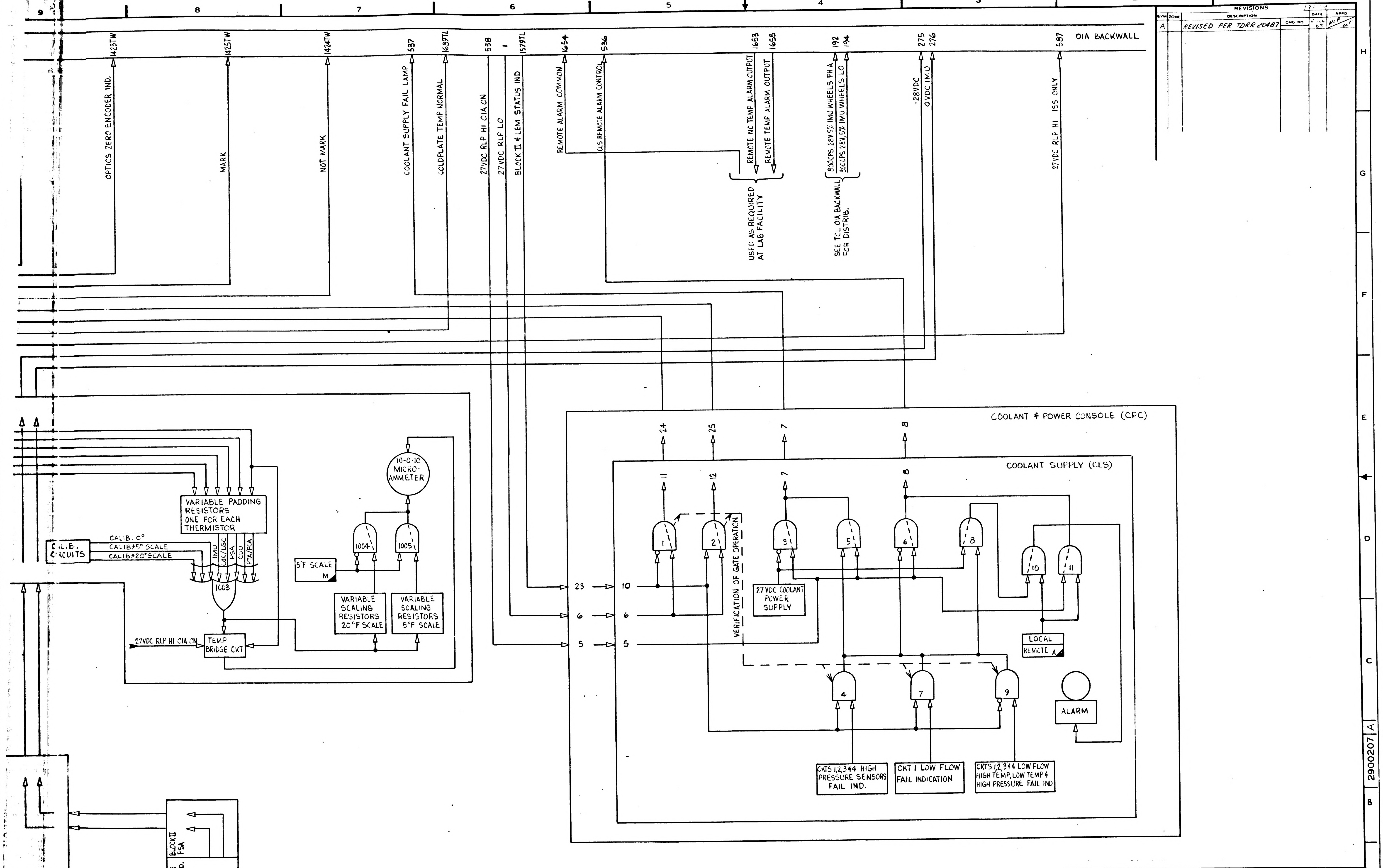


OIA BACKWALL
1633
1634TL
1635TL
1657
939
1648L
1644
1636TL
1645
161
162
1307
1308
1637TL
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
LEM CONFIGURATION IND.
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG 1X S3 (HI)
COS AMG 1X S1 (LO)
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
TEMP OUT OF LIMITS
FROM SCM CONNECTOR SYSTEM TESTING ONLY
SEE GPC OIA BACKWALL FOR DISTRIB.
GSE DISTRIBUTION BOX (GDB)
2947
2944
2942
2932
2934
2931
2930
2943
2941
2929
2935
2936
1006
1007
1008
1000
1001
1002
1003
2KΩ 5%
28VDC G&N POWER LO
27VDC RLP HI FIL. PWR
27VDC RLP LO
27VDC RLP LO
27VDC RLP HI OIA ON
28 VDC G&N PWR LO
VARIABLE RESISTORS ONE FOR EA THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB.+5° SCALE
CALIB.+20° SCALE
IMU
CGC/LGC
994
995
996
997
991
989
957
961
967
968
971
974
990
988
901
902
903
906
907
908
910
911
912
914
915
916
927
928
926
925
924
923
981
LEM AOT CABLE
LEM POWER CABLE
LEM ISS ONLY CABLE
27VDC RLP HI OIA ON
TEMP BRIDGE
"A" HARNESS
P3
P3
P3
P3
LEM PSA
FAILURE INDICATOR & WARNING MODULE
27.5 VDC 2K
27.5 VDC 2K
LEM CDU
MODE MODULE
PULSE TORQUE ASSY (PTA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
LGC COLDPLATE
IMU COOLANT INLET
T
1
2
3
4
THERMOSWITCHES NORMALLY CLOSED OPEN AT HIGH TEMP > 70°F
"B" HARNESS
P16
P21-13
IMU
2
TEMP ALARM MODULE
TPA NO. 2
P4
P4
"A" HARNESS
LEM PSA
28VDC PWR SUPPLY MOD.
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

2900207 REV LTR A SH 3

1/2900207

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	RLP


9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
OIA BACKWALL
1423TW
1425TW
1424TW
537
1639TL
538
1
1579TL
1654
536
1653
1655
192
194
275
276
587
OPTICS ZERO ENCODER IND.
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND
REMOTE ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
800CPS 28V 5% IMU WHEELS PH A
800CPS 28V 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
0VDC IMU
27VDC RLP HI ISS ONLY
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB ±5° SCALE
CALIB ±20° SCALE
IMU
LGC/LGC
PSA
CDU
PTA/PCA
1003
TEMP BRIDGE CKT
27VDC RLP HI OIA ON
10-0-10 MICRO-AMMETER
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
1
2
3
5
6
8
10
11
VERIFICATION OF GATE OPERATION
23
10
6
6
5
5
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
4
7
9
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND
BLOCK II PSA
-28VDC PWR SUPPLY MOD.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Solane DATE 7 MAY 65
CHECKED 14 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

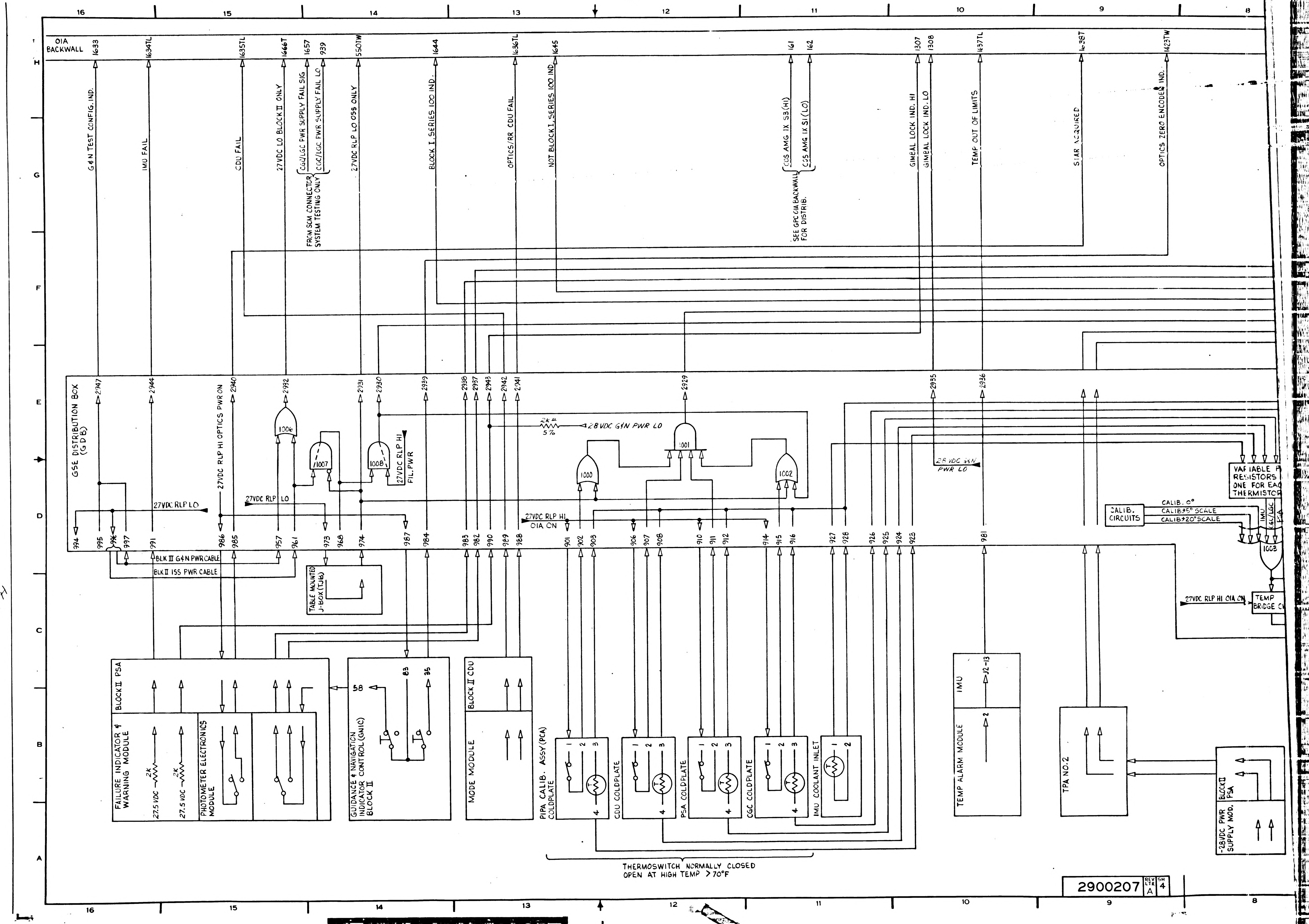
MECHANIZATION DIAGRAM
MONITOR PANEL
(BLOCK II)

CODE IDENT NO
SIZE
2900207
SCALE
SHEET 4 OF 4

2900207 A

2900207 REV LTR A SH 4

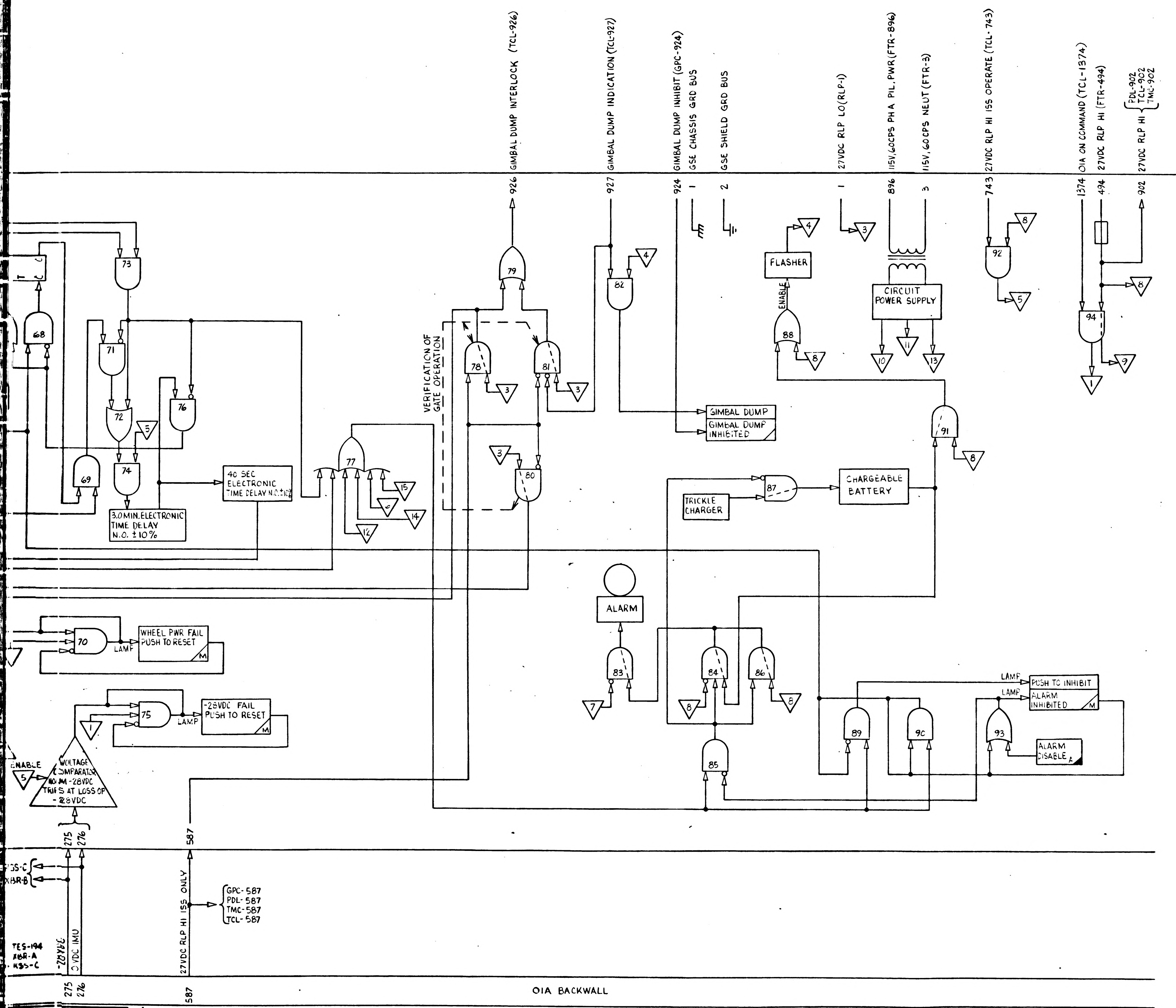
2/2900207


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1633
1634TL
1635TL
1666T
1657
939
550TW
1644
1636TL
1645
161
162
1307
1308
1637TL
1638T
1423TW
G & N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
27VDC LO BLOCK II ONLY
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR SYSTEM TESTING ONLY
27VDC RLP LO OSS ONLY
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
TEMP OUT OF LIMITS
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
GSE DISTRIBUTION BOX (GDB)
2947
2944
2940
2932
2931
2930
2939
2938
2937
2943
2942
2941
2929
2935
2936
27VDC RLP HI OPTICS PWR ON
1006
1007
1008
27VDC RLP HI FIL. PWR
2kΩ 5%
28VDC G&N PWR LO
1001
1000
1002
28 VDC G&N PWR LO
27VDC RLP LO
27VDC RLP LO
27VDC RLP HI OIA ON
VARIABLE RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB. +5° SCALE
CALIB. +20° SCALE
IMU
CGC/LGC
PSA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
994
995
996
997
991
986
985
957
961
973
968
974
987
984
983
982
990
989
988
901
902
903
906
907
908
910
911
912
914
915
916
927
928
926
925
924
923
981
BLK II G&N PWR CABLE
BLK II ISS PWR CABLE
TABLE MOUNTED J-BOX (TJB)
BLOCK II PSA
FAILURE INDICATOR & WARNING MODULE
2K
2K
27.5 VDC
27.5 VDC
PHOTOMETER ELECTRONICS MODULE
58
83
35
GUIDANCE & NAVIGATION INDICATOR CONTROL (GNIC) BLOCK II
BLOCK II CDU
MODE MODULE
PIPA CALIB. ASSY (PCA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
CGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
IMU
J2-13
2
TEMP ALARM MODULE
TPA NO. 2
BLOCK II PSA
-28VDC PWR SUPPLY MOD.
THERMOSWITCH NORMALLY CLOSED OPEN AT HIGH TEMP >70°F

2900207 REV LTR A SH 4

1/2900207

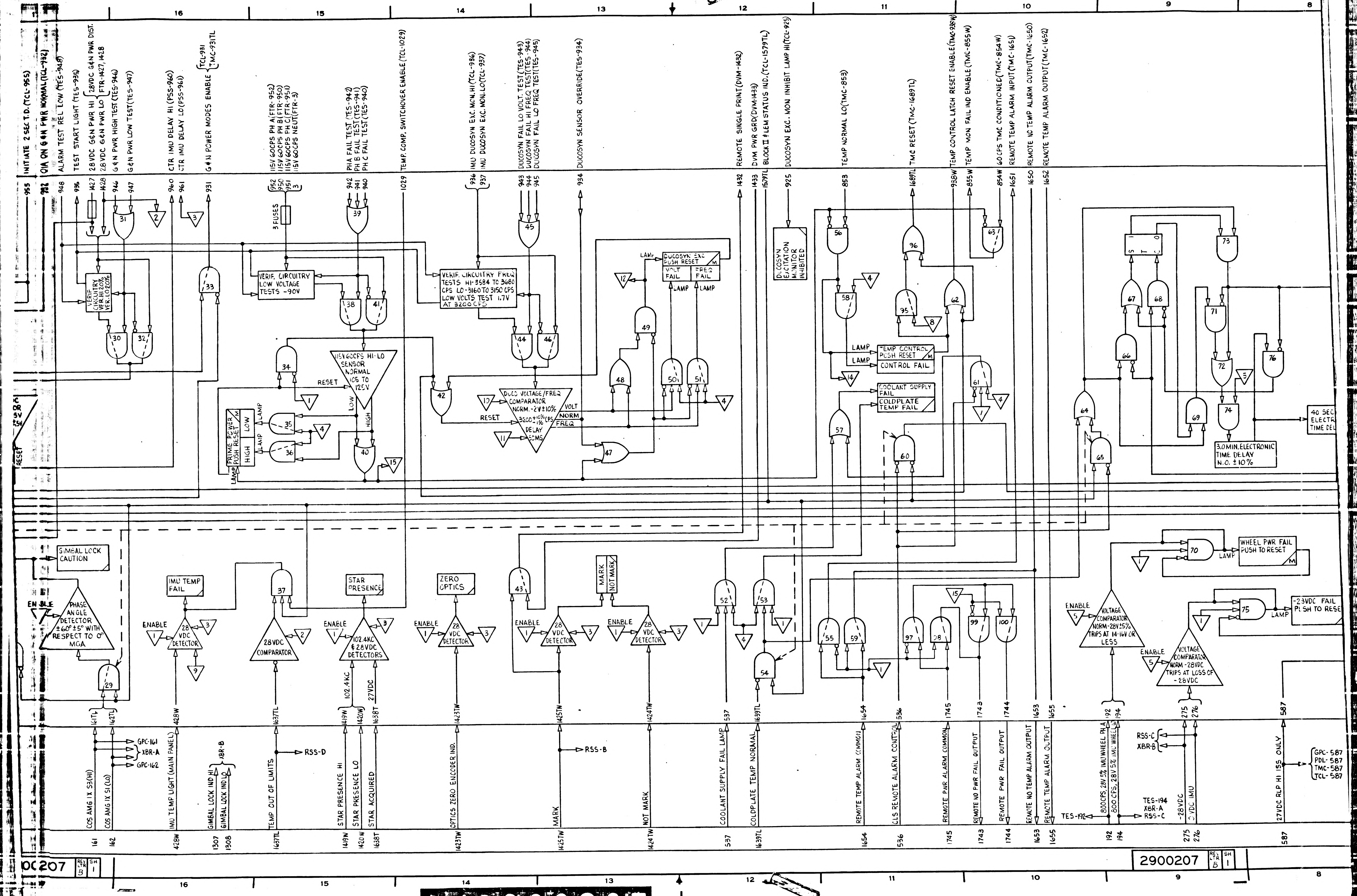
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	RLP
B		REVISED PER TDRR 20488		7 JUL 65	RLP



926 GIMBAL DUMP INTERLOCK (TCL-926)
927 GIMBAL DUMP INDICATION (TCL-927)
924 GIMBAL DUMP INHIBIT (GPC-924)
1 GSE CHASSIS GRD BUS
2 GSE SHIELD GRD BUS
1 27VDC RLP LO (RLP-1)
896 115V, 60CPS PH A PIL. PWR (FTR-896)
3 115V, 60CPS NEUT (FTR-3)
743 27VDC RLP HI ISS OPERATE (TCL-743)
1374 OIA ON COMMAND (TCL-1374)
494 27VDC RLP HI (FTR-494)
902 27VDC RLP HI
PDL-902
TCL-902
TMC-902
73
68
71
72
76
69
74
5
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
40 SEC ELECTRONIC TIME DELAY N.O. ±10%
77
15
6
14
12
VERIFICATION OF GATE OPERATION
79
78
81
80
3
82
4
GIMBAL DUMP
GIMBAL DUMP INHIBITED
FLASHER
ENABLE
88
8
CIRCUIT POWER SUPPLY
10
11
13
92
5
94
9
1
91
TRICKLE CHARGER
87
CHARGEABLE BATTERY
ALARM
83
84
86
85
7
89
90
93
LAMP
PUSH TO INHIBIT
ALARM INHIBITED
M
ALARM DISABLE
70
WHEEL PWR FAIL PUSH TO RESET
75
-28VDC FAIL PUSH TO RESET
ENABLE
VOLTAGE COMPARATOR NOM -28VDC TRIPS AT LOSS OF -28VDC
275
276
587
SS-C
XBR-B
TES-194
XBR-A
KSS-C
-28VDC
VDC IMU
27VDC RLP HI ISS ONLY
GPC-587
PDL-587
TMC-587
TCL-587
OIA BACKWALL

2900207 | REV LTR B | SH 1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN Splane DATE 7 MAY 65 CHECKED APPROVAL APPROVAL	MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK I SERIES 100, BLOCK II, LEM)
MATERIAL —	NASA APPROVAL	CODE IDENT NO · SIZE · 2900207
CONTRACT	MIT APPROVAL	SCALE — · SHEET 1 OF 4



16
15
14
13
12
11
10
9
8
INITIATE 2 SEC T.D.(TCL-955)
Q/A ON G&N PWR NORMAL(TCL-932)
ALARM TEST REL LOW (TES-948)
TEST START LIGHT (TES-935)
28 VDC G&N PWR HI
28 VDC G&N PWR LO
28VDC G&N PWR DIST. FTR-1427, 1428
G&N PWR HIGH TEST(TES-946)
G&N PWR LOW TEST(TES-947)
CTR IMU DELAY HI (PSS-960)
CTR IMU DELAY LO(PSS-961)
G&N POWER MODES ENABLE
TCL-931
TMC-931TL
115V 60CPS PH A(FTR-952)
115V 60CPS PH B(FTR-950)
115V 60CPS PH C(FTR-951)
115V 60CPS NEUT(FTR-3)
PH A FAIL TEST (TES-942)
PH B FAIL TEST (TES-941)
PH C FAIL TEST (TES-940)
TEMP. COMP. SWITCHOVER ENABLE (TCL-1029)
IMU DUCOSYN EXC. MON. HI (TCL-936)
IMU DUCOSYN EXC. MON. LO(TCL-937)
DUCOSYN FAIL LO VOLT. TEST (TES-943)
DUCOSYN FAIL HI FREQ TEST(TES-944)
DUCOSYN FAIL LO FREQ TEST(TES-945)
DUCOSYN SENSOR OVERRIDE (TES-934)
REMOTE SINGLE PRINT(DVM-1432)
DVM PWR GRD(DVM-1433)
BLOCK II & LEM STATUS IND.(TCL-1579TL)
DUCOSYN EXC. MON INHIBIT LAMP HI(TCL-925)
TEMP NORMAL LO(TMC-853)
TMC RESET (TMC-1689TL)
TEMP CONTROL LATCH RESET ENABLE(TMC-938W)
TEMP MON FAIL IND ENABLE(TMC-855W)
60 CPS TMC CONDITIONED(TMC-854W)
REMOTE TEMP ALARM INPUT(TMC-1651)
REMOTE NO TEMP ALARM OUTPUT(TMC-1650)
REMOTE TEMP ALARM OUTPUT(TMC-1652)
955
932
948
935
1427
1428
946
947
960
961
931
952
950
951
3
942
941
940
1029
936
937
943
944
945
934
1432
1433
1579TL
925
853
1689TL
938W
855W
854W
1651
1650
1652
3 FUSES
VERIF. CIRCUITRY VER.HI 20% VER.LO 20%
VERIF. CIRCUITRY LOW VOLTAGE TESTS -90V
VERIF. CIRCUITRY FREQ TESTS HI-3584 TO 3680 CPS LO-3160 TO 3150 CPS LOW VOLTS TEST 1.7V AT 3200 CPS
115V 60CPS HI-LO SENSOR NORMAL 105 TO 125V
LOW
HIGH
RESET
PRIME POWER PUSH RESET
LOW
HIGH
LAMP
DUCO VOLTAGE/FREQ COMPARATOR NORM. -2V ±10% 3200 ±10/1% CPS DELAY 50MS
VOLT
NORM
FREQ
LAMP
DUCOSYN EXC PUSH RESET
VOLT FAIL
FREQ FAIL
M
DUCOSYN EXCITATION MONITOR INHIBITED
TEMP CONTROL PUSH RESET
CONTROL FAIL
COOLANT SUPPLY FAIL
COLDPLATE TEMP FAIL
S
T
C
O
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
40 SEC ELECTR TIME DEL
29
30
31
32
33
34
35
36
37
38
39
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41
42
43
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45
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48
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51
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62
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66
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68
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70
71
72
73
74
75
76
95
96
97
98
99
100
1
2
3
4
5
8
9
11
12
14
15
RESET
GIMBAL LOCK CAUTION
ENABLE
PHASE ANGLE DETECTOR ±60° ±5° WITH RESPECT TO 0° MGA
IMU TEMP FAIL
28 VDC DETECTOR
28VDC COMPARATOR
STAR PRESENCE
102.4KC & 28VDC DETECTORS
102.4KC
27VDC
ZERO OPTICS
28 VDC DETECTOR
MARK
NOT MARK
WHEEL PWR FAIL PUSH TO RESET
VOLTAGE COMPARATOR NORM. 28V ±5% TRIPS AT 14-16V OR LESS
VOLTAGE COMPARATOR NORM -28VDC TRIPS AT LOSS OF -28VDC
-28VDC FAIL PUSH TO RESET
161TL
162TL
428W
1637TL
1419W
1420W
1638T
1423TW
1425TW
1424TW
537
1639TL
1654
536
1745
1743
1744
1653
1655
192
194
275
276
587
GPC-161
XBR-A
GPC-162
XBR-B
RSS-D
RSS-B
RSS-C
XBR-B
GPC-587
PDL-587
TMC-587
TCL-587
COS AMG 1X 53(HI)
COS AMG 1X 51 (LO)
IMU TEMP LIGHT (MAIN PANEL)
GIMBAL LOCK IND HI
GIMBAL LOCK IND LO
TEMP OUT OF LIMITS
STAR PRESENCE HI
STAR PRESENCE LO
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
REMOTE TEMP ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE PWR ALARM COMMON
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
800CPS 28V 5% IMU WHEEL PH A
800 CPS 28V 5% IMU WHEEL
TES-192
TES-194
XBR-A
RSS-C
-28VDC
0VDC IMU
27VDC RLP HI ISS ONLY
161
162
428W
1307
1308
1637TL
1419W
1420W
1638T
1423TW
1425TW
1424TW
537
1639TL
1654
536
1745
1743
1744
1653
1655
192
194
275
276
587
2900207 REV LTR B SH 1

2900207
SH 1 OF 4

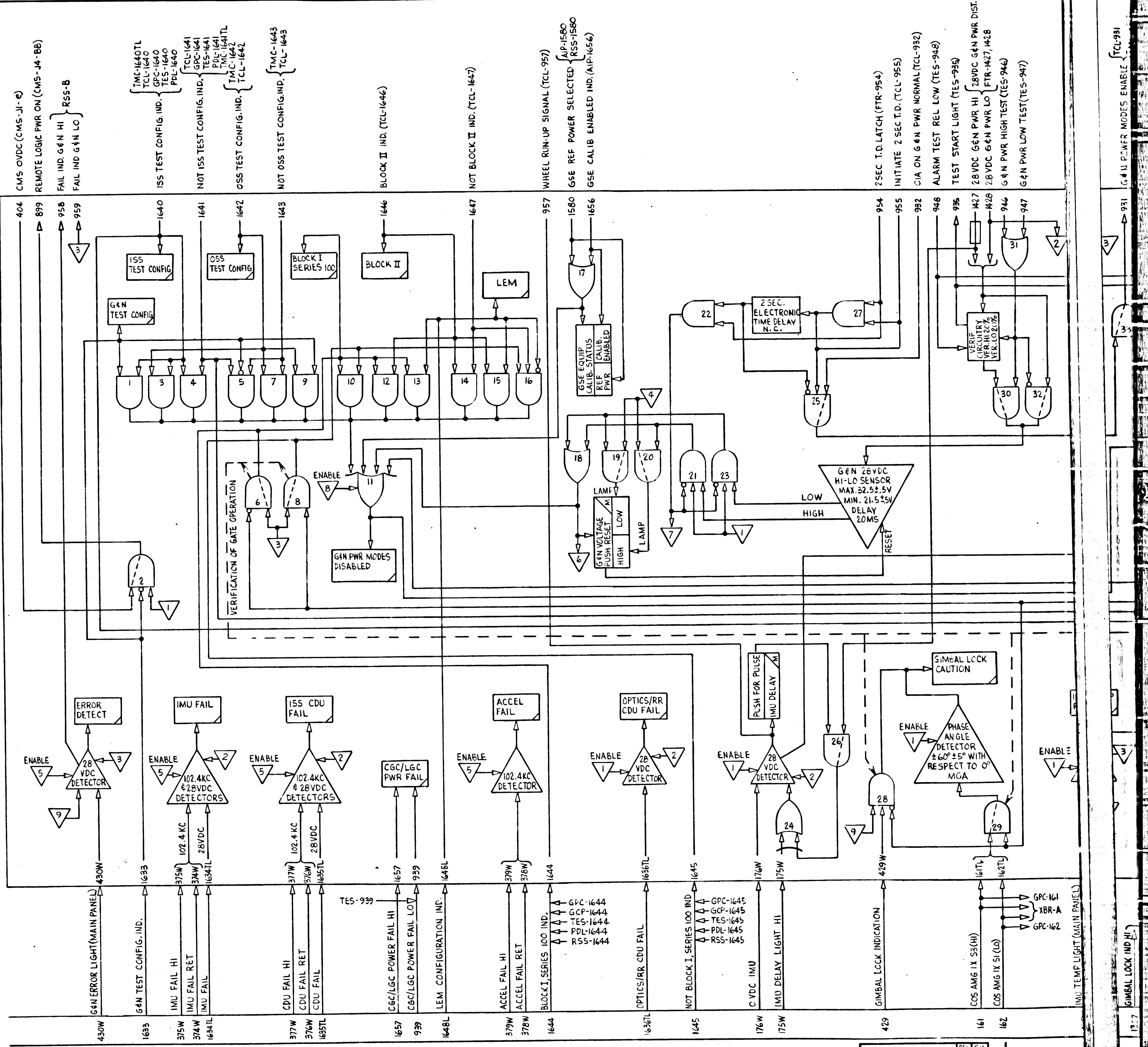
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS:
   - 2900210 AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR)
     RLP. RELAY & LAMP POWER SUPPLY
   - 2900204 TEMPERATURE MONITOR CONTROL PANEL (BLOCK I, SERIES 100)(TMC)
   - 2900203 TEMPERATURE MONITOR CONTROL PANEL (BLOCK II & LEM)(TMC)
   - 2900208 POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR
     GYRO CAGING FUNCTIONS (PDL)
   - 2900223 GIMBAL POSITION CONTROL (GPC)
   - 2900202 TEST CONTROL PANEL (BLOCK I, SERIES 100)(TCL)
   - 2900201 TEST CONTROL PANEL (BLOCK II & LEM)(TCL)
   - 2900206 TEST SELECTOR PANEL (TES)
   - 2900200 GYRO CAGING PANEL (BLOCK II & LEM)(GCP)
   - 2900218 OSCILLOGRAPH SIGNAL SELECTION
     RSS-B TO FIXED DC CHANNEL, RSS-C TO SWITCHABLE AC CHANNEL,
     RSS-D TO SWITCHABLE DC CHANNEL
   - 2900217 SIGNAL SELECTION & MEASUREMENT
     XBR-A CROSSBAR-AC SIGNALS
     XBR-B CROSSBAR-DC SIGNALS
   - 2900219 COUNTER SIGNAL SELECTION
     PRIMARY SIGNAL SELECTOR (PSS)
   - 2900214 GSE GROUNDING (BLOCK I SERIES 100)
   - 2900213 GSE GROUNDING (BLOCK II & LEM)
   - 2900209 COMPUTER SIMULATOR INTERFACE (CMS)
   - 2900211 AUXILIARY INPUT/OUTPUT CALIBRATION (AIP)
4. NON STANDARD SYMBOLOGY:
   - ⊐D- INDICATES "AND" GATE WITH SWITCHED SIGNAL
   - NAME INDICATES INDICATOR LIGHT
   - NAME M INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
   - NAME A INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
   - NAME / NAME INDICATES SPLIT SCREEN INDICATOR LIGHT
   - NAME / NAME M INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
   - NAME A INDICATES UNLIGHTED PUSHBUTTON OR TOGGLE SWITCH (ALTERNATE ACTION)
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   - A. W-BLOCK I SERIES 100 ONLY
   - B. T-BLOCK II ONLY
   - C. L-LEM ONLY
   - D. BLANK-ALL G&N CONFIGURATIONS
   - E. TW, TL OR WL-USED IN MORE THAN ONE G&N CONFIGURATION AS SHOWN.
6. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK I SERIES 100	SH 1 SH 2
BLOCK II	SH 1 SH 3
LEM	SH 1 SH 4

7. SIGNAL REFERENCE:

▽1 = OIA ON
▽2 = 28VDC G&N PWR LO
▽3 = 27VDC RLP LO
▽4 = FLASHER
▽5 = ISS OPER. 5SEC T.D.
▽6 = G&N PWR FAIL
▽7 = 2 SEC T.D. AT OIA ON
▽8 = 27VDC PIL. PWR
▽9 = 27VDC OIA ON
▽10 = +28VDC
▽11 = -28VDC
▽12 = DUCO EXC. FAIL
▽13 = +45VDC
▽14 = TMC FAIL
▽15 = PRIME PWR FAIL



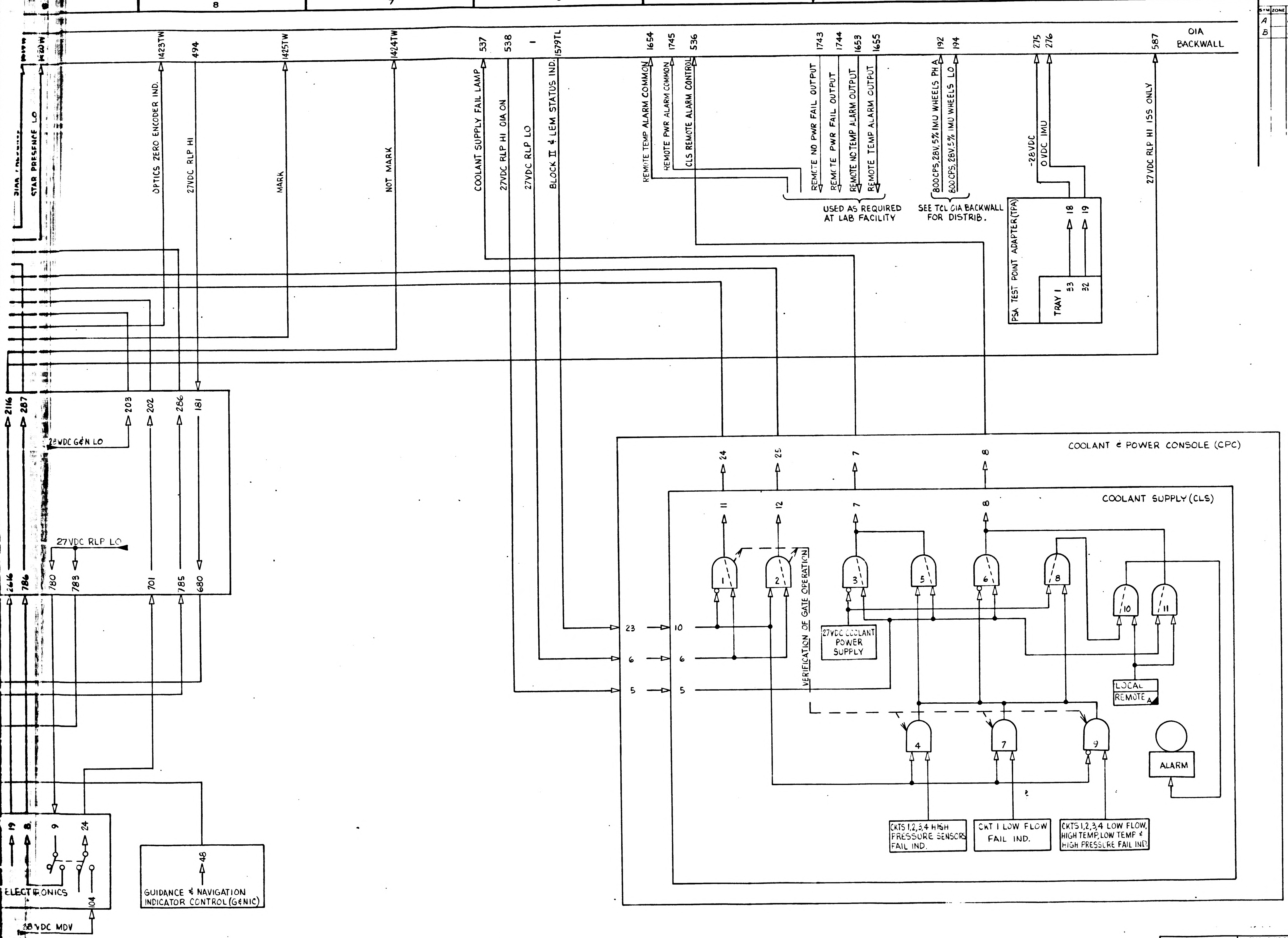
CMS OVDC (CMS-J1-e)
404
REMOTE LOGIC PWR ON (CMS-J4-BB)
899
FAIL IND. G&N HI
FAIL IND G&N LO
RSS-B
958
959
ISS TEST CONFIG. IND.
TMC-1640TL
TCL-1640
GPC-1640
TES-1640
PDL-1640
1640
NOT ISS TEST CONFIG. IND.
TCL-1641
GPC-1641
TES-1641
PDL-1641
TMC-1641TL
1641
OSS TEST CONFIG. IND.
TMC-1642
TCL-1642
1642
NOT OSS TEST CONFIG. IND.
TMC-1643
TCL-1643
1643
BLOCK II IND. (TCL-1646)
1646
NOT BLOCK II IND. (TCL-1647)
1647
WHEEL RUN-UP SIGNAL (TCL-957)
957
GSE REF POWER SELECTED
AIP-1580
RSS-1580
1580
GSE CALIB ENABLED IND. (AIP-1656)
1656
2SEC T.D. LATCH (FTR-954)
954
INITIATE 2 SEC T.D. (TCL-955)
955
OIA ON G&N PWR NORMAL (TCL-932)
932
ALARM TEST REL LOW (TES-948)
948
TEST START LIGHT (TES-935)
935
28VDC G&N PWR HI
28VDC G&N PWR LO
28VDC G&N PWR DIST.
FTR-1427, 1428
1427
1428
G&N PWR HIGH TEST (TES-946)
946
G&N PWR LOW TEST (TES-947)
947
G&N POWER MODES ENABLE
TCL-931
931
ISS TEST CONFIG
OSS TEST CONFIG
BLOCK I SERIES 100
BLOCK II
LEM
G&N TEST CONFIG
GSE EQUIP CALIB. STATUS
REF PWR
CALIB. ENABLED
2 SEC. ELECTRONIC TIME DELAY N.C.
VERIF. CIRCUITRY VER. HI 2C% VER. LO 2.0%
1
3
4
5
7
9
10
12
13
14
15
16
17
22
27
31
30
32
25
18
19
20
21
23
6
8
11
2
ENABLE
VERIFICATION OF GATE OPERATION
G&N PWR MODES DISABLED
LAMP
G&N VOLTAGE PUSH RESET
HIGH
LOW
M
G&N 28VDC HI-LO SENSOR MAX. 32.5±.5V MIN. 21.5±.5V DELAY 20MS
RESET
ERROR DETECT
IMU FAIL
ISS CDU FAIL
CGC/LGC PWR FAIL
ACCEL FAIL
OPTICS/RR CDU FAIL
PUSH FOR PULSE
IMU DELAY
GIMBAL LOCK CAUTION
28 VDC DETECTOR
102.4KC & 28VDC DETECTORS
102.4KC DETECTOR
28 VDC DETECTOR
PHASE ANGLE DETECTOR ±60°±5° WITH RESPECT TO 0° MGA
26
24
28
29
102.4 KC
28VDC
430W
1633
375W
374W
1634TL
377W
376W
1635TL
TES-939
1657
939
1648L
379W
378W
1644
1636TL
1645
176W
175W
429W
161TL
162TL
G&N ERROR LIGHT (MAIN PANEL)
G&N TEST CONFIG. IND.
IMU FAIL HI
IMU FAIL RET
IMU FAIL
CDU FAIL HI
CDU FAIL RET
CDU FAIL
CGC/LGC POWER FAIL HI
CGC/LGC POWER FAIL LO
LEM CONFIGURATION IND.
ACCEL FAIL HI
ACCEL FAIL RET
BLOCK I, SERIES 100 IND.
GPC-1644
GCP-1644
TES-1644
PDL-1644
RSS-1644
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND
GPC-1645
GCP-1645
TES-1645
PDL-1645
RSS-1645
O VDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK INDICATION
COS AMG IX S3(HI)
COS AMG IX S1(LO)
GPC-161
XBR-A
GPC-162
IMU TEMP LIGHT (MAIN PANEL)
GIMBAL LOCK IND HI
430W
1633
375W
374W
1634TL
377W
376W
1635TL
1657
939
1648L
379W
378W
1644
1636TL
1645
176W
175W
429
161
162

2900207 REV LTR B SH 1

MIL FORM 1050 J3

1/2900207

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP
B		REVISED PER TDRR 20488		7 JUL 65	RLP



8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
STAR PRESENCE LO
1420W
1423TW
OPTICS ZERO ENCODER IND.
494
27VDC RLP HI
1425TW
MARK
1424TW
NOT MARK
537
COOLANT SUPPLY FAIL LAMP
538
27VDC RLP HI OIA ON
27VDC RLP LO
1579TL
BLOCK II ¢ LEM STATUS IND.
1654
REMOTE TEMP ALARM COMMON
1745
REMOTE PWR ALARM COMMON
536
CLS REMOTE ALARM CONTROL
1743
REMOTE NO PWR FAIL OUTPUT
1744
REMOTE PWR FAIL OUTPUT
1653
REMOTE NO TEMP ALARM OUTPUT
1655
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
192
800CPS, 28V, 5% IMU WHEELS PH A
194
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
275
-28VDC
276
0 VDC IMU
PSA TEST POINT ADAPTER (TPA)
18
19
TRAY I
33
32
587
27VDC RLP HI ISS ONLY
OIA BACKWALL
2116
287
203
202
286
181
28VDC G&N LO
27VDC RLP LO
2616
786
780
783
701
785
680
19
8
9
24
ELECTRONICS
104
28VDC MDV
48
GUIDANCE & NAVIGATION INDICATOR CONTROL (G&NIC)
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
23
6
5
COOLANT SUPPLY (CLS)
11
12
7
8
10
6
5
1
2
3
5
6
8
10
11
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
4
7
9
ALARM
CKTS 1,2,3,4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL IND.
CKTS 1,2,3,4 LOW FLOW, HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND.

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

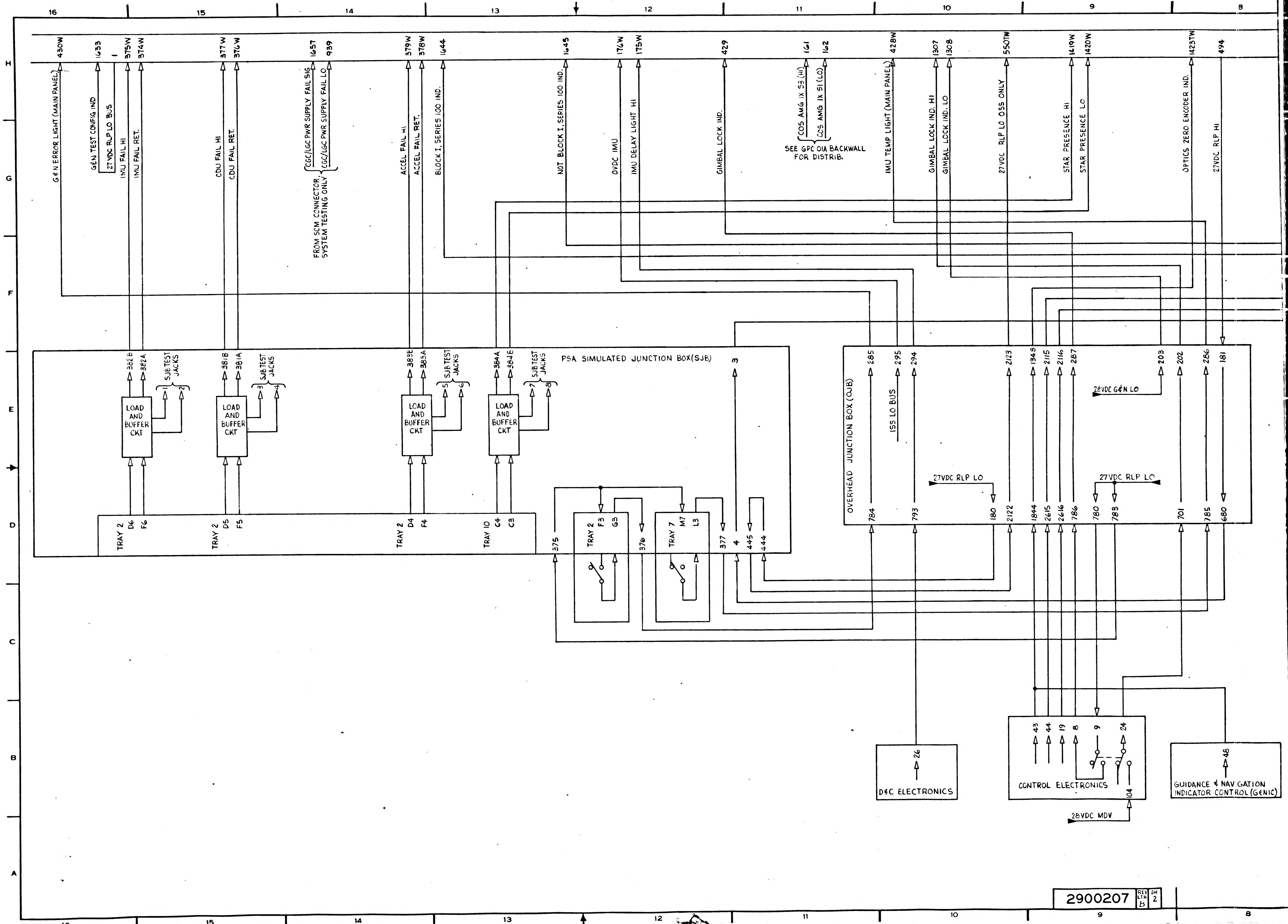
AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Sisane DATE 7 MAY 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
MONITOR PANEL
(BLOCK I SERIES 100)

CODE IDENT NO
SIZE
2900207
SCALE —
SHEET 2 OF 4

2H



430W G&N ERROR LIGHT (MAIN PANEL)
1633 G&N TEST CONFIG IND
1 27VDC RLP LO BUS
375W IMU FAIL HI
374W IMU FAIL RET.
377W CDU FAIL HI
376W CDU FAIL RET.
1657 CGC/LGC PWR SUPPLY FAIL SIG
939 CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR, SYSTEM TESTING ONLY
379W ACCEL FAIL HI
378W ACCEL FAIL RET.
1644 BLOCK I, SERIES 100 IND.
1645 NOT BLOCK I, SERIES 100 IND.
176W OVDC IMU
175W IMU DELAY LIGHT HI
429 GIMBAL LOCK IND.
161 COS AMG IX 53 (HI)
162 COS AMG IX 51 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
428W IMU TEMP LIGHT (MAIN PANEL)
1307 GIMBAL LOCK IND. HI
1308 GIMBAL LOCK IND. LO
550TW 27VDC RLP LO 055 ONLY
1419W STAR PRESENCE HI
1420W STAR PRESENCE LO
1423TW OPTICS ZERO ENCODER IND.
494 27VDC RLP HI
PSA SIMULATED JUNCTION BOX (SJB)
LOAD AND BUFFER CKT
SJB TEST JACKS
382B 382A 381B 381A 383B 383A 384A 384E
1 2 3 4 5 6 7 8
TRAY 2 D6 F6
TRAY 2 D5 F5
TRAY 2 D4 F4
TRAY 10 C4 C3
TRAY 2 F3 G3
TRAY 7 M7 L3
375 376 377 3 4 445 444
OVERHEAD JUNCTION BOX (OJB)
285 295 294 2123 1348 2115 2116 287 203 202 286 181
155 LO BUS
28VDC G&N LO
27VDC RLP LO
784 793 180 2122 1844 2615 2616 786 780 783 701 785 680
26 D&C ELECTRONICS
43 44 19 8 9 24 CONTROL ELECTRONICS 104
28VDC MDV
48 GUIDANCE & NAVIGATION INDICATOR CONTROL (G&NIC)
16 15 14 13 12 11 10 9 8
H G F E D C B A

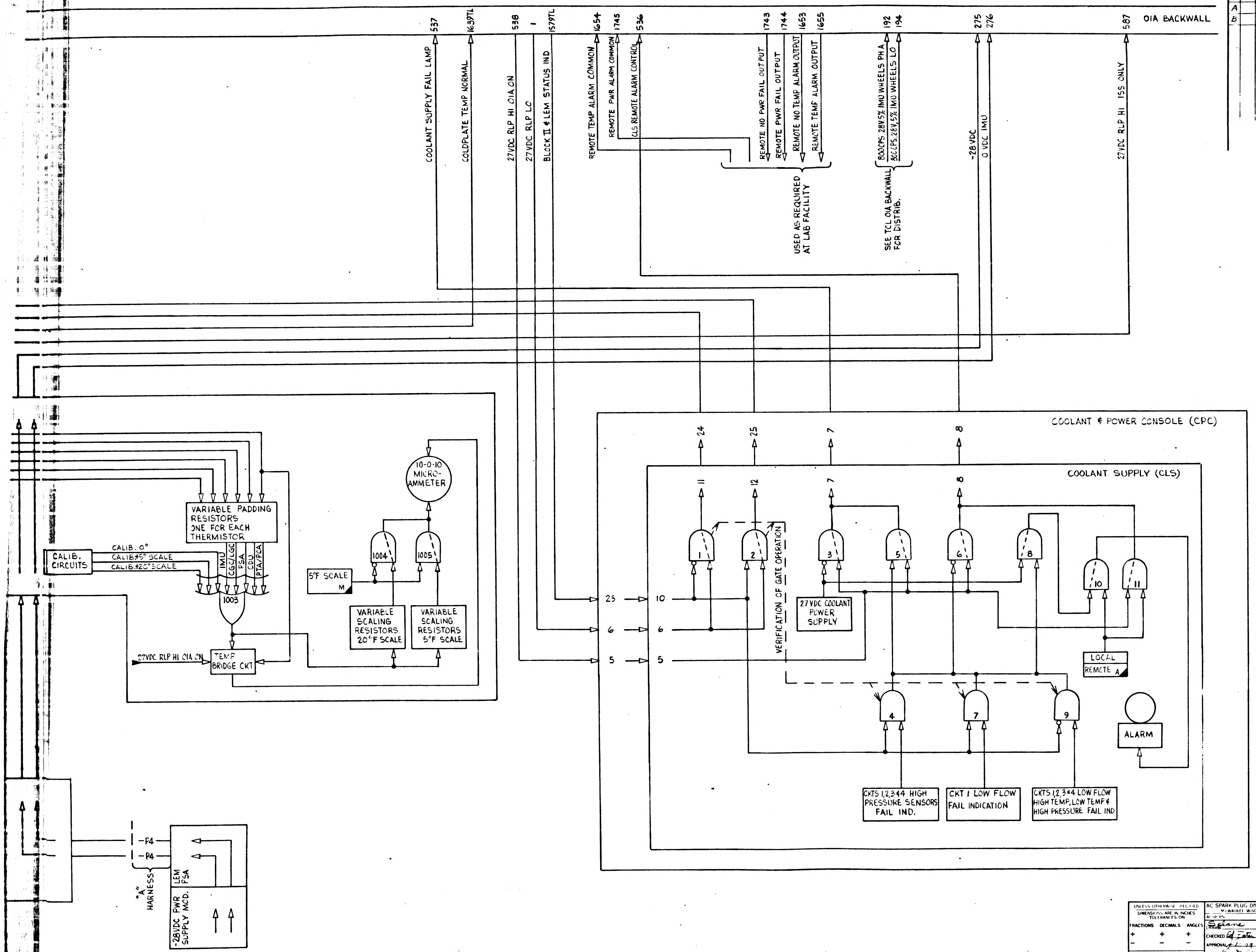
2900207 REV LTR B SH 2

H2

1/ 2900207

SYM	ZONE	REVISIONS DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	RLP MLM
B		REVISED PER TDRR 20488		7 JUL 65	RLP

19254



OIA BACKWALL
537
1639TL
538
1
1579TL
1654
1745
536
1743
1744
1653
1655
192
194
275
276
587
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND
REMOTE TEMP ALARM COMMON
REMOTE PWR ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
800CPS 28V5% IMU WHEELS PH A
800CPS 28V 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
0 VDC IMU
27VDC RLP HI ISS ONLY
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
1
2
3
5
6
8
10
11
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
23
10
6
6
5
5
LOCAL
REMOTE A
4
7
9
ALARM
CKTS 1,2,3&4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3&4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND
10-0-10 MICRO-AMMETER
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB.±5° SCALE
CALIB.±20° SCALE
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
-P4
-P4
"A" HARNESS
LEM PSA
-28VDC PWR SUPPLY MOD.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON		
FRACTIONS	DECIMALS	ANGLES
+	+	+
–	–	–

DO NOT SCALE THIS DRAWING

MATERIAL

CONTRACT

AC SPARK PLUG DIVISION. GMC
MILWAUKEE WISCONSIN

ACSP PN

DRAWN Splane DATE 7 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL M Watson
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

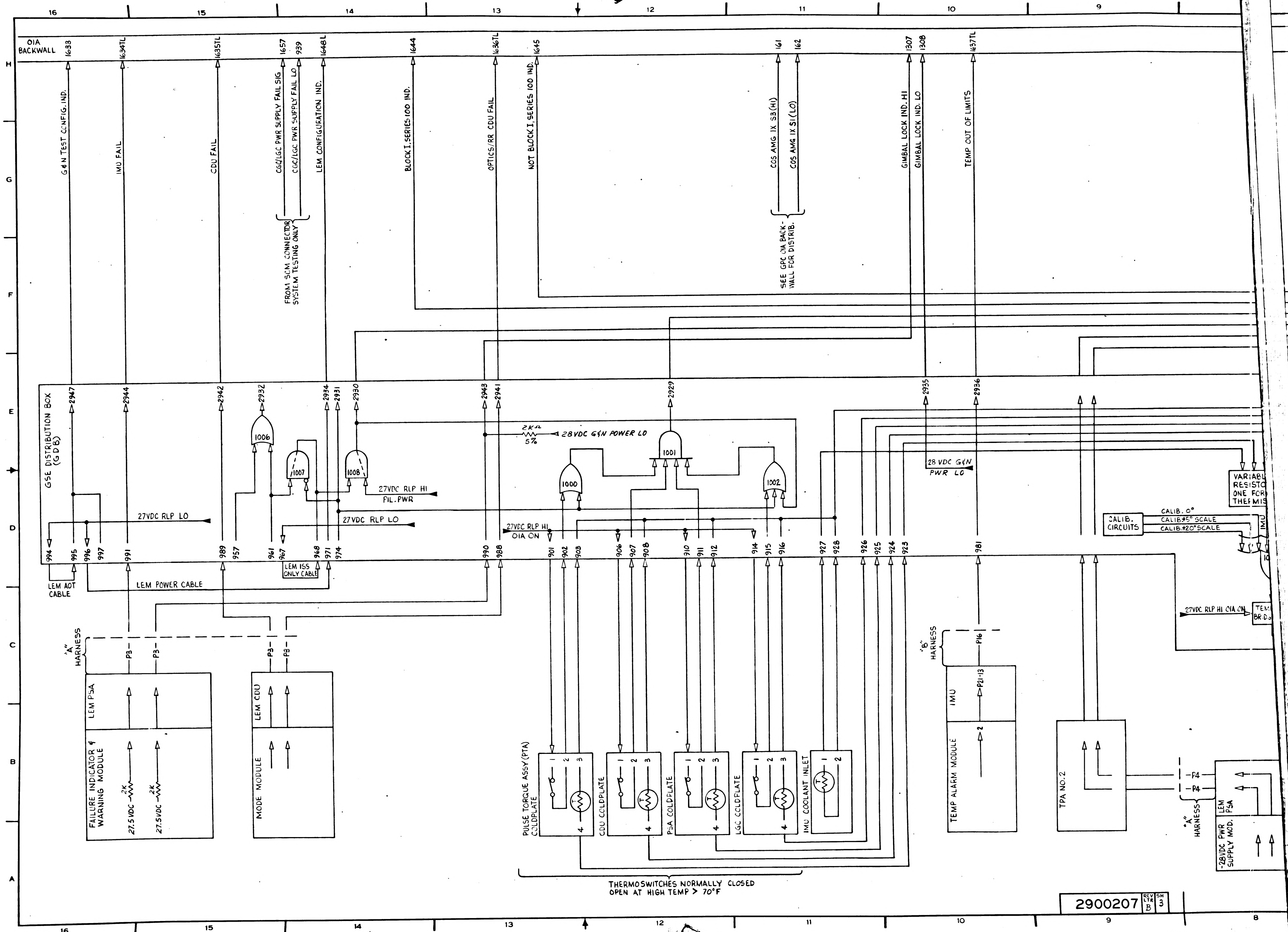
MECHANIZATION DIAGRAM
MONITOR PANEL
(LEM)

CODE IDENT NO
SIZE
2900207
SCALE
SHEET 3 OF 4

2900207 B

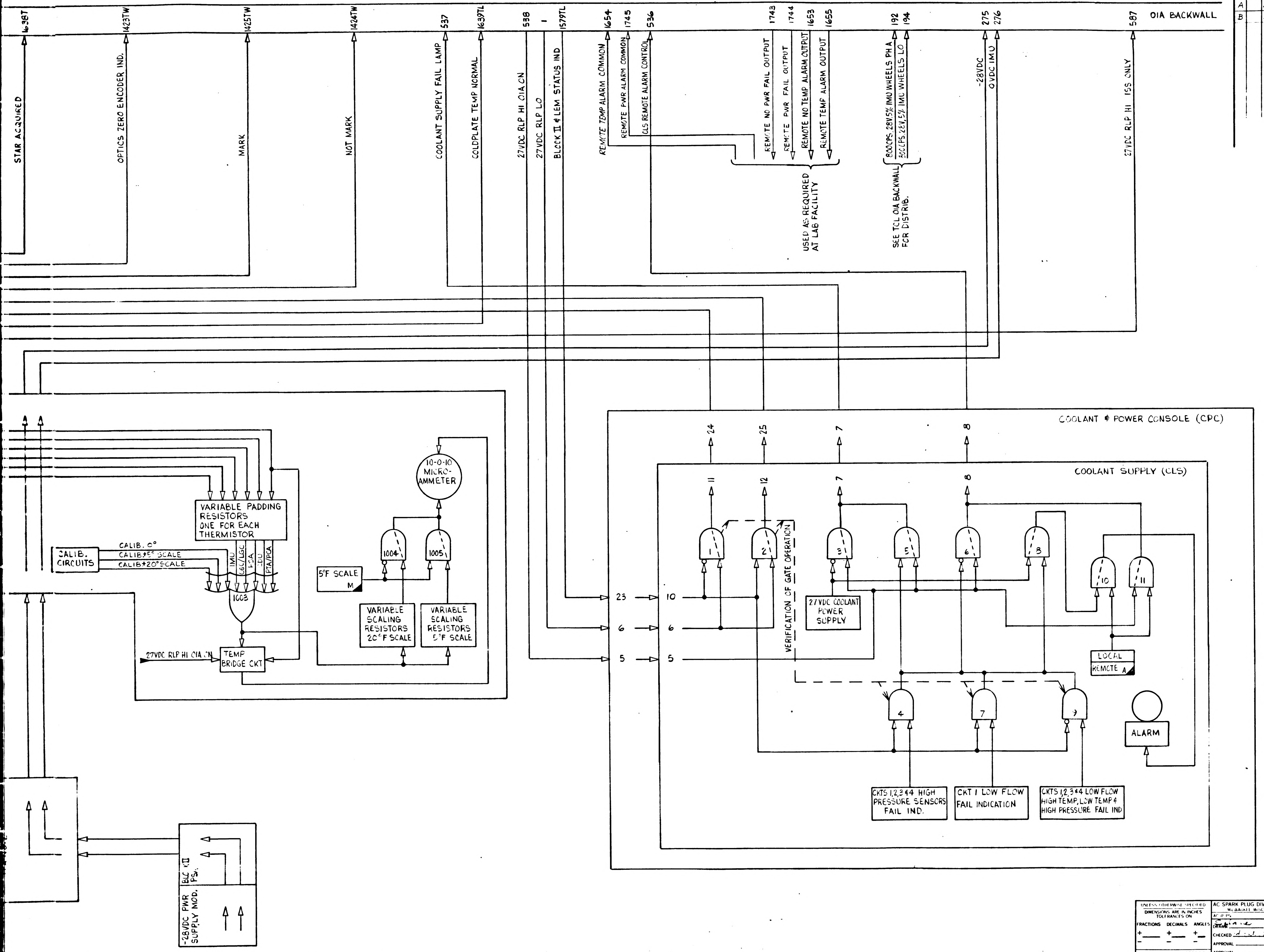
2900207 REV LTR B SH 3

2/2900207


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1633
1634TL
1635TL
1657
939
1648L
1644
1636TL
1645
161
162
1307
1308
1637TL
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR SYSTEM TESTING ONLY
LEM CONFIGURATION IND.
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3(HI)
COS AMG IX S1(LO)
SEE GPC OIA BACK-WALL FOR DISTRIB.
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
TEMP OUT OF LIMITS
GSE DISTRIBUTION BOX (GDB)
2947
2944
2942
2932
2934
2931
2930
2943
2941
2929
2935
2936
1006
1007
1008
1000
1001
1002
2KΩ 5%
28VDC G&N POWER LO
27VDC RLP HI PIL. PWR
27VDC RLP LO
27VDC RLP LO
27VDC RLP HI OIA ON
28 VDC G&N PWR LO
994
995
996
997
991
989
957
961
967
968
971
974
990
988
901
902
903
906
907
908
910
911
912
914
915
916
927
928
926
925
924
923
981
LEM AOT CABLE
LEM ISS ONLY CABLE
LEM POWER CABLE
"A" HARNESS
P3
P3
P3
P3
LEM PSA
FAILURE INDICATOR & WARNING MODULE
2K
2K
27.5VDC
27.5VDC
LEM CDU
MODE MODULE
PULSE TORQUE ASSY (PTA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
LGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
THERMOSWITCHES NORMALLY CLOSED OPEN AT HIGH TEMP > 70°F
"B" HARNESS
P16
P21-13
IMU
TEMP ALARM MODULE
2
TPA NO.2
P4
P4
"A" HARNESS
LEM PSA
-28VDC PWR SUPPLY MOD.
VARIABL RESISTO ONE FOR THERMIS
CALIB. CIRCUITS
CALIB. 0°
CALIB.+5° SCALE
CALIB.+20° SCALE
IMU
10
27VDC RLP HI OIA ON
TEM BRIDG
2900207
REV LTR B
SH 3

1/2900207

SYM	ZONE	REVISIONS DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	RLP
B		REVISED PER TDRR 20488		7 JUL 65	RLP



9
8
7
6
5
4
3
2
1
OIA BACKWALL
1638T
STAR ACQUIRED
1423TW
OPTICS ZERO ENCODER IND.
1425TW
MARK
1424TW
NOT MARK
537
COOLANT SUPPLY FAIL LAMP
1639TL
COLDPLATE TEMP NORMAL
538
27VDC RLP HI OIA ON
27VDC RLP LO
1579TL
BLOCK II & LEM STATUS IND
1654
REMOTE TEMP ALARM COMMON
1745
REMOTE PWR ALARM COMMON
536
CLS REMOTE ALARM CONTROL
1743
REMOTE NO PWR FAIL OUTPUT
1744
REMOTE PWR FAIL OUTPUT
1653
REMOTE NO TEMP ALARM OUTPUT
1655
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
192
800CPS, 28V, 5% IMU WHEELS PH A
194
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
275
-28VDC
276
0VDC IMU
587
27VDC RLP HI ISS ONLY
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB ±5° SCALE
CALIB ±20° SCALE
IMU
LGC/LGC
PSA
CDU
PTA/PCA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
10-0-10 MICRO-AMMETER
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
BLOCK II PS.
-28VDC PWR SUPPLY MOD.
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
1
2
3
5
6
8
10
11
4
7
9
VERIFICATION OF GATE OPERATION
23
10
6
6
5
5
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
AC SP PN
DRAWN DATE 7 MAY 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

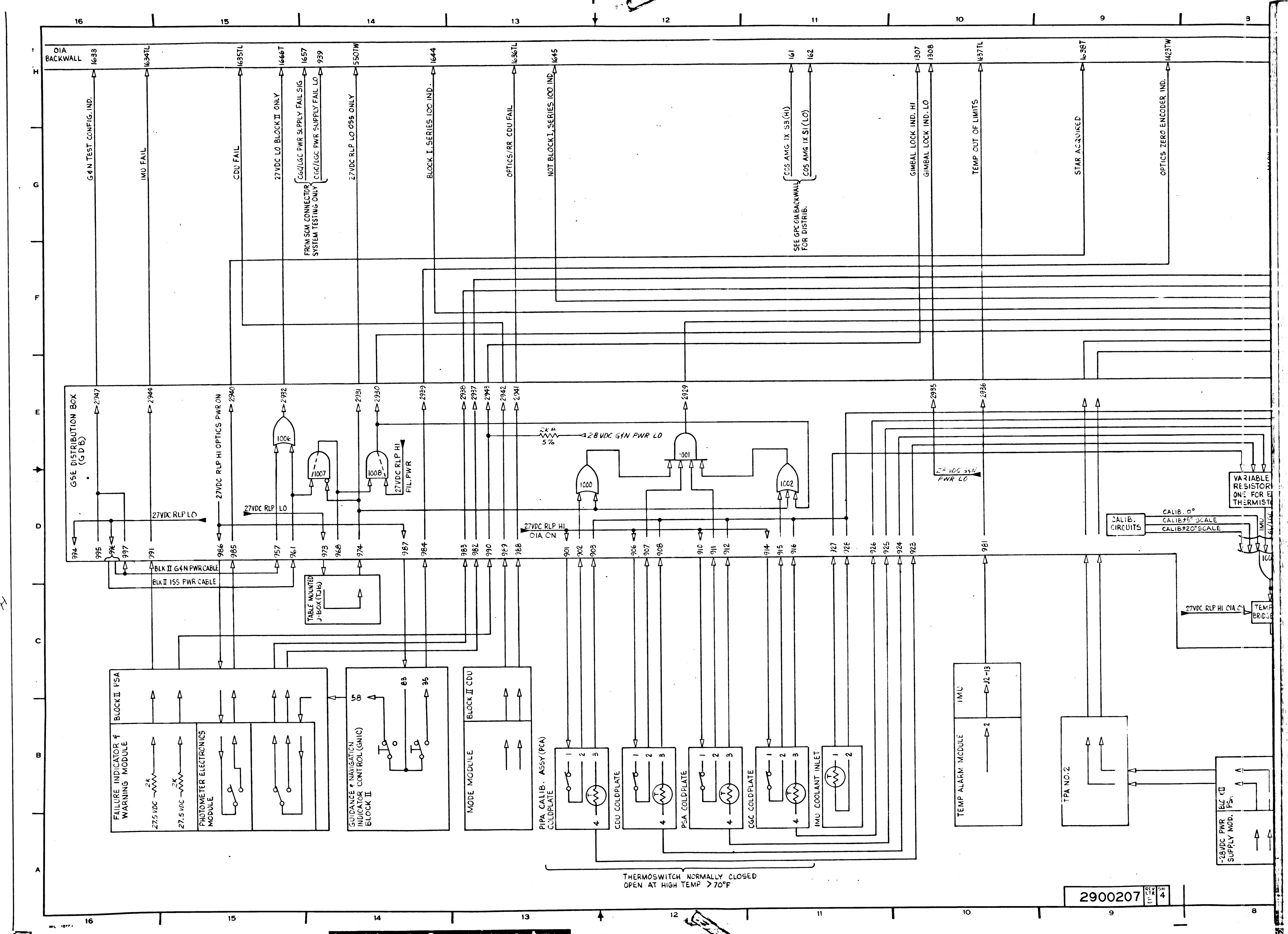
MECHANIZATION DIAGRAM
MONITOR PANEL
(BLOCK II)

CODE IDENT NO
SIZE
2900207
SCALE —
SHEET 4 OF 4

2900207 b

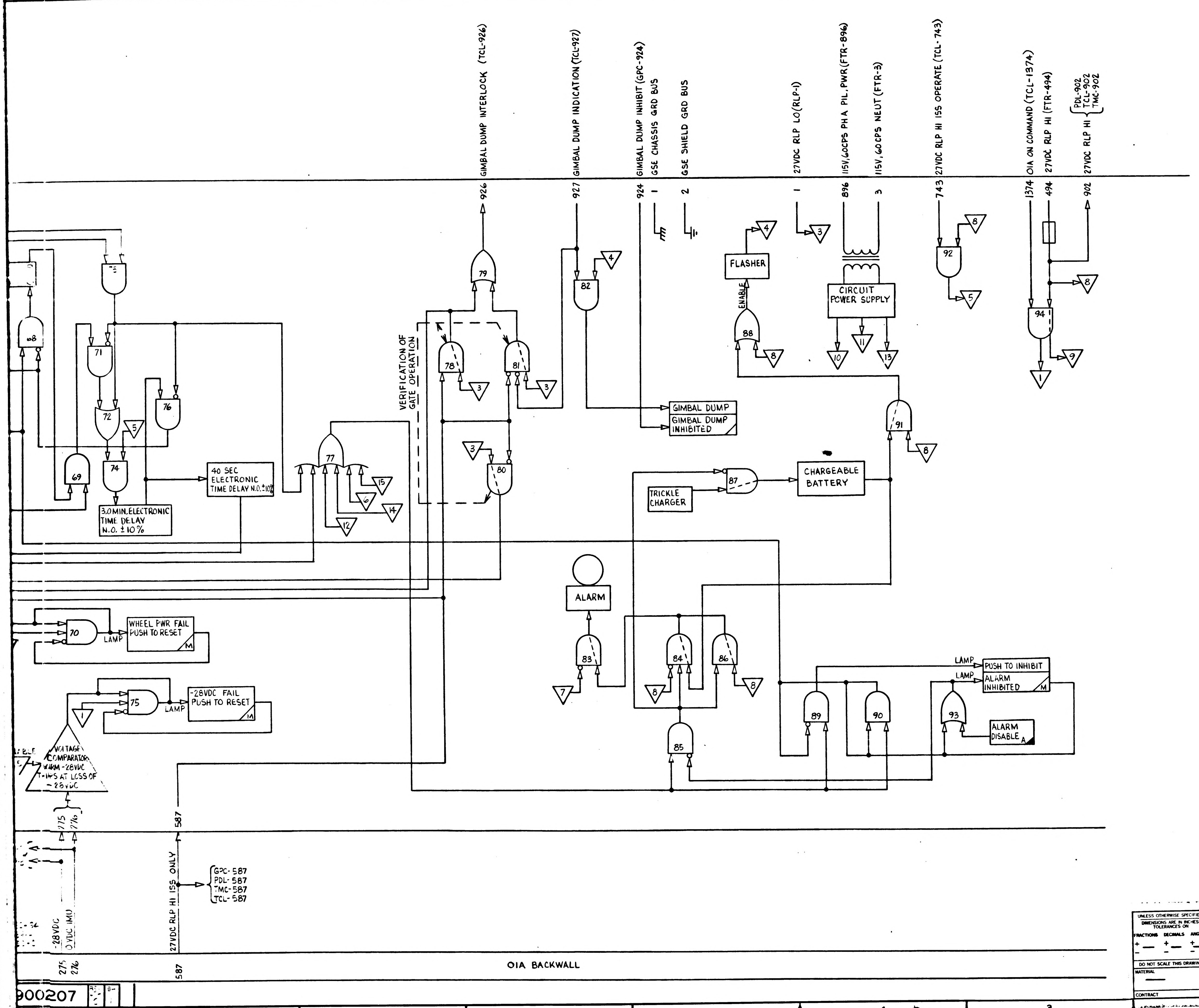
2900207	REV LTR B	SH 4

2/2900207


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1633
1634TL
1635TL
1666T
1657
939
550TW
1644
1636TL
1645
161
162
1307
1308
1637TL
1638T
1423TW
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
27VDC LO BLOCK II ONLY
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR
SYSTEM TESTING ONLY
27VDC RLP LO OSS ONLY
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3(HI)
COS AMG IX S1(LO)
SEE GPC OIA BACKWALL
FOR DISTRIB.
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
TEMP OUT OF LIMITS
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
GSE DISTRIBUTION BOX
(GDB)
2947
2944
27VDC RLP HI OPTICS PWR ON
2940
2932
2931
2930
2939
2938
2937
2943
2942
2941
2929
2935
2936
1006
1007
1008
1000
1001
1002
27VDC RLP HI
PIL. PWR
2KΩ
5%
28 VDC G&N PWR LO
28 VDC G&N
PWR LO
27VDC RLP LO
27VDC RLP LO
27VDC RLP HI
OIA ON
994
995
996
997
991
986
985
757
961
973
968
974
987
984
983
982
990
969
988
901
902
903
906
907
908
910
911
912
914
915
916
927
928
926
925
924
923
981
VARIABLE
RESISTOR
ONE FOR E
THERMIST
CALIB.
CIRCUITS
CALIB. 0°
CALIB.+5° SCALE
CALIB.+20° SCALE
IMU
CGC/LGC
100
27VDC RLP HI OIA ON
TEMP
BRIDGE
BLK II G&N PWR CABLE
BLK II ISS PWR CABLE
TABLE MOUNTED
J-BOX (TJB)
BLOCK II PSA
FAILURE INDICATOR &
WARNING MODULE
2K
2K
27.5 VDC
27.5 VDC
PHOTOMETER ELECTRONICS
MODULE
58
83
35
GUIDANCE & NAVIGATION
INDICATOR CONTROL (GNIC)
BLOCK II
BLOCK II CDU
MODE MODULE
PIPA CALIB. ASSY (PCA)
COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
CGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
IMU
J2-13
2
TEMP ALARM MODULE
TPA NO.2
BLC KII
PS.
-28VDC PWR
SUPPLY MOD.
THERMOSWITCH NORMALLY CLOSED
OPEN AT HIGH TEMP >70°F
2900207
REV LTR
SH 4

1/2900207

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	
B		REVISED PER TDRR 20488		[illegible] JUL 65	
C		REVISED PER TDRR 2049		3 JUL 65	


926 GIMBAL DUMP INTERLOCK (TCL-926)
927 GIMBAL DUMP INDICATION (TCL-927)
924 GIMBAL DUMP INHIBIT (GPC-924)
1 GSE CHASSIS GRD BUS
2 GSE SHIELD GRD BUS
1 27VDC RLP LO (RLP-1)
896 115V,60CPS PH A PIL. PWR (FTR-896)
3 115V,60CPS NEUT (FTR-3)
743 27VDC RLP HI ISS OPERATE (TCL-743)
1374 OIA ON COMMAND (TCL-1374)
494 27VDC RLP HI (FTR-494)
902 27VDC RLP HI PDL-902 TCL-902 TMC-902
VERIFICATION OF GATE OPERATION
FLASHER
ENABLE
CIRCUIT POWER SUPPLY
GIMBAL DUMP
GIMBAL DUMP INHIBITED
40 SEC ELECTRONIC TIME DELAY N.O. ±10%
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
TRICKLE CHARGER
CHARGEABLE BATTERY
ALARM
WHEEL PWR FAIL PUSH TO RESET
-28VDC FAIL PUSH TO RESET
LAMP
M
PUSH TO INHIBIT
ALARM INHIBITED
ALARM DISABLE
A
VOLTAGE COMPARATOR ~~NRM~~ -28VDC T=1MS AT LOSS OF -28VDC
68 69 70 71 72 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94
1 3 4 5 6 7 8 9 10 11 12 13 14 15
775 776
-28VDC
0VDC IMU
275 276
587
27VDC RLP HI ISS ONLY
GPC-587
PDL-587
TMC-587
TCL-587
OIA BACKWALL
9 8 7 6 5 4 3 2 1
H G F E D C B A
900207
2900207
4H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

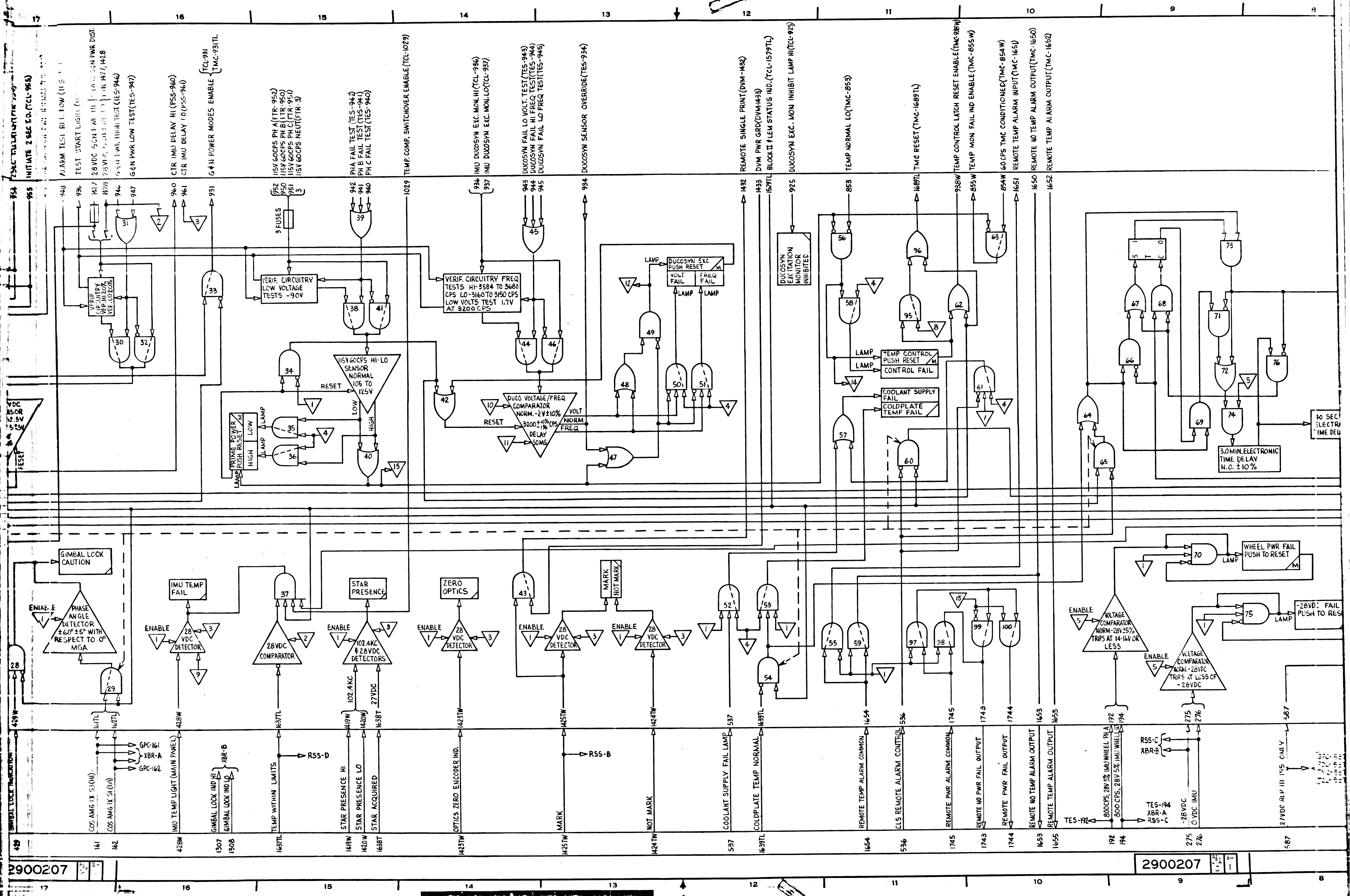
AC SPARK PLUG DIVISION. GMC
MILWAUKEE. WISCONSIN
ACSP PN
DRAWN Splane DATE 7 MAY 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
MONITOR PANEL
(BLOCK I SERIES 100, BLOCK II, LEM)

CODE IDENT NO. | SIZE | 2900207
SCALE —
SHEET 1 OF 4

3/2900207


17
16
15
14
13
12
11
10
9
8
2SEC TULATUM(FTR 954)
INITIATE 2 SEC T.D.(TCL-955)
ALARM TEST REL. LOW (TES
TEST START LIGHT
28VDC G&N PWR HI
28VDC G&N PWR LO
G&N PWR DIST.
FTR 1427, 1428
G&N PWR HIGH TEST (TES-946)
G&N PWR LOW TEST(TES-947)
CTR IMU DELAY HI (PSS-960)
CTR IMU DELAY LO(PSS-961)
G&N POWER MODES ENABLE
TCL-931
TMC-931TL
115V 60CPS PH A(FTR-952)
115V 60CPS PH B(FTR-950)
115V 60CPS PH C(FTR-951)
115V 60CPS NEUT(FTR-3)
PHA FAIL TEST (TES-942)
PH B FAIL TEST(TES-941)
PH C FAIL TEST(TES-940)
TEMP. COMP. SWITCHOVER ENABLE(TCL-1029)
IMU DUCOSYN EXC. MON. HI(TCL-936)
IMU DUCOSYN EXC. MON. LO(TCL-937)
DUCOSYN FAIL LO VOLT. TEST(TES-943)
DUCOSYN FAIL HI FREQ TEST(TES-944)
DUCOSYN FAIL LO FREQ TEST(TES-945)
DUCOSYN SENSOR OVERRIDE(TES-934)
REMOTE SINGLE PRINT(DVM-1432)
DVM PWR GRD(DVM-1433)
BLOCK II & LEM STATUS IND.(TCL-1579TL)
DUCOSYN EXC. MON INHIBIT LAMP HI(TCL-925)
TEMP NORMAL LO(TMC-853)
TMC RESET(TMC-1689TL)
TEMP CONTROL LATCH RESET ENABLE(TMC-938W)
TEMP MON FAIL IND ENABLE(TMC-855W)
60CPS TMC CONDITIONED(TMC-854W)
REMOTE TEMP ALARM INPUT(TMC-1651)
REMOTE NO TEMP ALARM OUTPUT(TMC-1650)
REMOTE TEMP ALARM OUTPUT(TMC-1652)
954
955
948
935
1427
1428
946
947
960
961
931
952
950
951
3
942
941
940
1029
936
937
943
944
945
934
1432
1433
1579TL
925
853
1689TL
938W
855W
854W
1651
1650
1652
3 FUSES
VERIF CIRCUITRY VER. HI 120V VER. LO 20%
VERIF. CIRCUITRY LOW VOLTAGE TESTS -90V
VERIF. CIRCUITRY FREQ TESTS HI-3584 TO 3680 CPS LO-3160 TO 3150 CPS LOW VOLTS TEST 1.7V AT 3200 CPS
115V 60CPS HI-LO SENSOR NORMAL 105 TO 125V
LOW
HIGH
RESET
PRIME POWER PUSH RESET
LOW
HIGH
LAMP
DUCO VOLTAGE/FREQ COMPARATOR NORM. -2V±10% 3200 +10% -1% CPS DELAY 50MS
VOLT
NORM
FREQ
DUCOSYN EXC PUSH RESET
VOLT FAIL
FREQ FAIL
LAMP
DUCOSYN EXCITATION MONITOR INHIBITED
TEMP CONTROL PUSH RESET
CONTROL FAIL
COOLANT SUPPLY FAIL
COLDPLATE TEMP FAIL
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
30 SEC ELECTR TIME DEL
S
T
C
VDC
SOR
RESET
M
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
95
96
97
98
99
100
GIMBAL LOCK CAUTION
ENABLE
PHASE ANGLE DETECTOR ±60°±5° WITH RESPECT TO 0° MGA
IMU TEMP FAIL
28 VDC DETECTOR
28VDC COMPARATOR
STAR PRESENCE
102.4KC & 28VDC DETECTORS
ZERO OPTICS
MARK
NOT MARK
WHEEL PWR FAIL PUSH TO RESET
VOLTAGE COMPARATOR NORM-28V±5% TRIPS AT 14-16V OR LESS
VOLTAGE COMPARATOR NORM -28VDC TRIPS AT LOSS OF -28VDC
-28VDC FAIL PUSH TO RESET
102.4KC
27VDC
429W
161TL
162TL
428W
1637TL
1419W
1420W
1638T
1423TW
1425TW
1424TW
537
1639TL
1654
536
1745
1743
1744
1653
1655
192
194
275
276
587
GIMBAL LOCK INDICATION
COS AMG IX S3(HI)
COS AMG IX S1(LO)
GPC-161
XBR-A
GPC-162
IMU TEMP LIGHT (MAIN PANEL)
GIMBAL LOCK IND HI
GIMBAL LOCK IND LO
XBR-B
TEMP WITHIN LIMITS
RSS-D
STAR PRESENCE HI
STAR PRESENCE LO
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
RSS-B
NOT MARK
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
REMOTE TEMP ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE PWR ALARM COMMON
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
800CPS, 28V 5% IMU WHEEL PH A
800 CPS, 28V 5% IMU WHEEL LO
TES-192
TES-194
XBR-A
RSS-C
RSS-C
XBR-B
-28VDC
0 VDC IMU
27VDC RLP III ISS ONLY
429
161
162
1307
1308
2900207
REV C
SH 1

2/2900207

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS:

2900210	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RLP RELAY & LAMP POWER SUPPLY
2900204	TEMPERATURE MONITOR CONTROL PANEL (BLOCK I, SERIES 100)(TMC)
2900203	TEMPERATURE MONITOR CONTROL PANEL (BLOCK II & LEM)(TMC)
2900208	POWER & DUMMY LOAD PANEL-PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL)
2900223	GIMBAL POSITION CONTROL (GPC)
2900202	TEST CONTROL PANEL (BLOCK I, SERIES 100)(TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM)(TCL)
2900206	TEST SELECTOR PANEL (TES)
2900200	GYRO CAGING PANEL (BLOCK II & LEM)(GCP)
2900218	OSCILLOGRAPH SIGNAL SELECTION RSS-B TO FIXED DC CHANNEL, RSS-C TO SWITCHABLE AC CHANNEL, RSS-D TO SWITCHABLE DC CHANNEL
2900217	SIGNAL SELECTION & MEASUREMENT XBR-A CROSSBAR-AC SIGNALS XBR-B CROSSBAR-DC SIGNALS
2900219	COUNTER SIGNAL SELECTION PRIMARY SIGNAL SELECTOR (PSS)
2900214	GSE GROUNDING (BLOCK I SERIES 100)
2900213	GSE GROUNDING (BLOCK II & LEM)
2900209	COMPUTER SIMULATOR INTERFACE (CMS)
2900211	AUXILIARY INPUT/OUTPUT CALIBRATION (AIP)

4. NON STANDARD SYMBOLOGY:

⊐D-	INDICATES "AND" GATE WITH SWITCHED SIGNAL
NAME	INDICATES INDICATOR LIGHT
NAME M	INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
NAME NAME	INDICATES SPLIT SCREEN INDICATOR LIGHT
NAME NAME M	INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES UNLIGHTED PUSHBUTTON OR TOGGLE SWITCH (ALTERNATE ACTION)

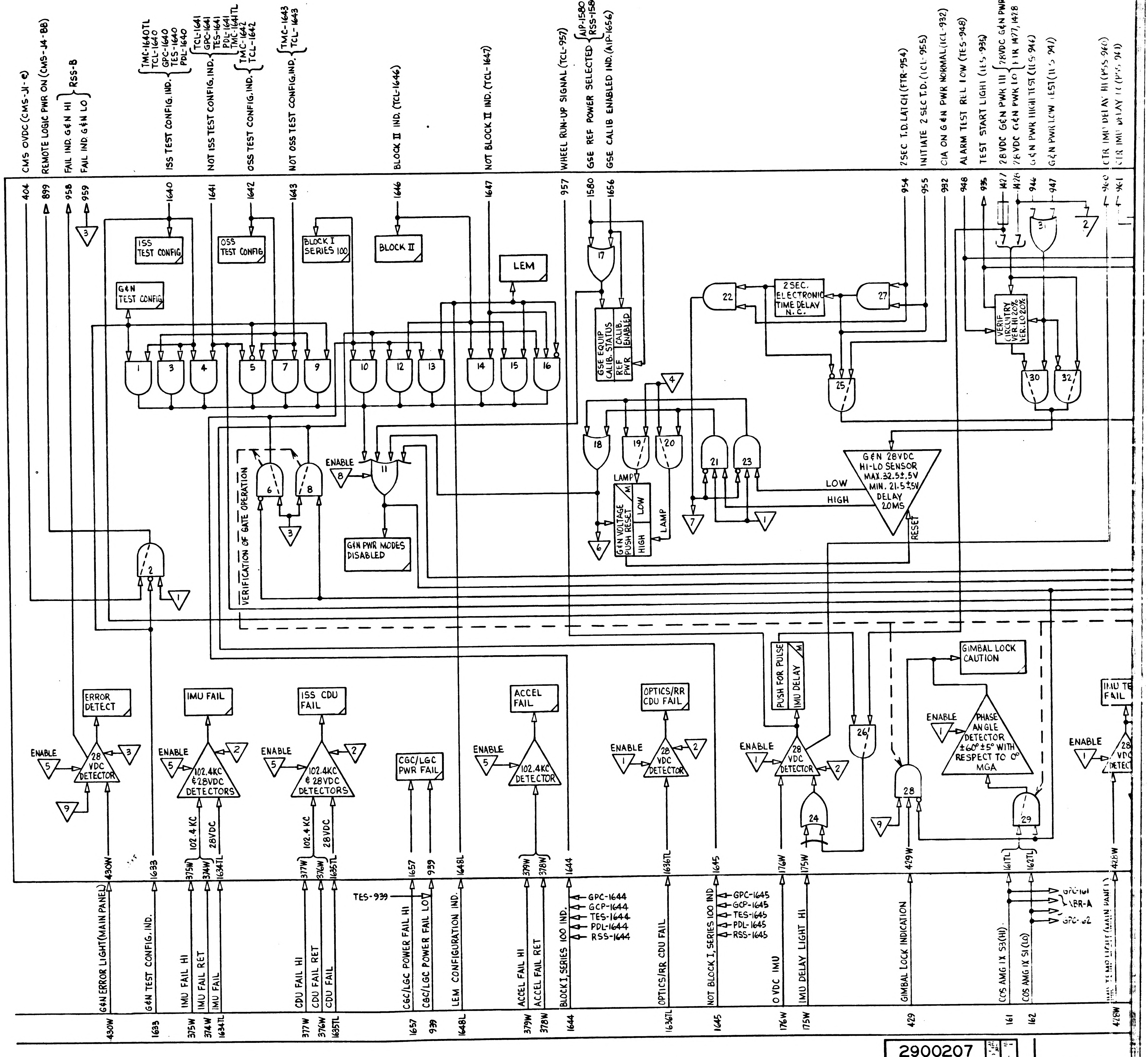
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   - A. W-BLOCK I SERIES 100 ONLY
   - B. T-BLOCK II ONLY
   - C. L-LEM ONLY
   - D. BLANK-ALL G&N CONFIGURATIONS
   - E. TW, TL OR WL-USED IN MORE THAN ONE G&N CONFIGURATION AS SHOWN.

6. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK I SERIES 100	SH 1 SH 2
BLOCK II	SH 1 SH 3
LEM	SH 1 SH 4

7. SIGNAL REFERENCE:

▽1 = OIA ON
▽2 = 28VDC G&N PWR LO
▽3 = 27VDC RLP LO
▽4 = FLASHER
▽5 = ISS OPER. 5SEC T.D.
▽6 = G&N PWR FAIL
▽7 = 2 SEC T.D. AT OIA ON
▽8 = 27VDC PIL. PWR
▽9 = 27VDC OIA ON
▽10 = +28VDC
▽11 = -28VDC
▽12 = DUCO EXC. FAIL
▽13 = +45 VDC
▽14 = TMC FAIL
▽15 = PRIME PWR FAIL



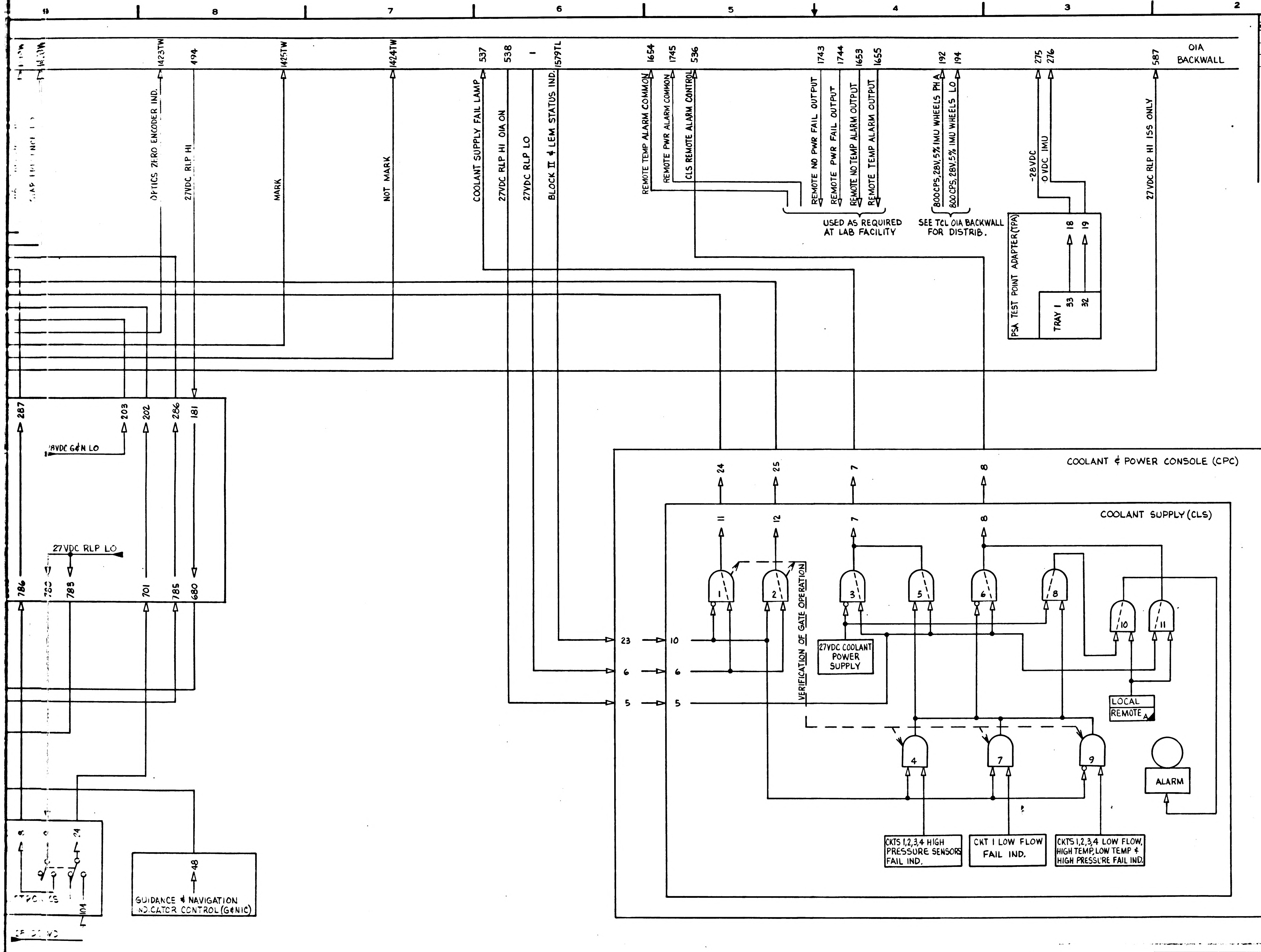
CMS OVDC (CMS-J1-e) 404
REMOTE LOGIC PWR ON (CMS-J4-BB) 899
FAIL IND. G&N HI 958
FAIL IND. G&N LO 959
RSS-B
ISS TEST CONFIG. IND. 1640
TMC-1640TL
TCL-1640
GPC-1640
TES-1640
PDL-1640
NOT ISS TEST CONFIG. IND. 1641
TCL-1641
GPC-1641
TES-1641
PDL-1641
TMC-1641TL
OSS TEST CONFIG. IND. 1642
TMC-1642
TCL-1642
NOT OSS TEST CONFIG. IND. 1643
TMC-1643
TCL-1643
BLOCK II IND. (TCL-1646) 1646
NOT BLOCK II IND. (TCL-1647) 1647
WHEEL RUN-UP SIGNAL (TCL-957) 957
GSE REF POWER SELECTED 1580
AIP-1580
RSS-1580
GSE CALIB ENABLED IND. (AIP-1656) 1656
2SEC T.D. LATCH (FTR-954) 954
INITIATE 2 SEC T.D. (TCL-955) 955
OIA ON G&N PWR NORMAL (TCL-932) 932
ALARM TEST REL LOW (TES-948) 948
TEST START LIGHT (TES-935) 935
28VDC G&N PWR HI 1427
28VDC G&N PWR LO 1428
28VDC G&N PWR DIST.
FTR 1427, 1428
G&N PWR HIGH TEST (TES-946) 946
G&N PWR LOW TEST (TES-947) 947
CTR IMU DELAY HI (PSS-960) 960
CTR IMU DELAY LO (PSS-961) 961
ISS TEST CONFIG
OSS TEST CONFIG
BLOCK I SERIES 100
BLOCK II
LEM
G&N TEST CONFIG
GSE EQUIP CALIB. STATUS
REF PWR
CALIB. ENABLED
2SEC. ELECTRONIC TIME DELAY N.C.
VERIF CIRCUITRY VER. HI 20% VER. LO 20%
1 3 4 5 7 9 10 12 13 14 15 16 17 18 19 20 21 22 23 25 27 30 31 32
ENABLE
VERIFICATION OF GATE OPERATION
6 8 11
G&N PWR MODES DISABLED
LAMP
G&N VOLTAGE PUSH RESET
LOW
HIGH
G&N 28VDC HI-LO SENSOR MAX. 32.5±.5V MIN. 21.5±.5V DELAY 20MS
RESET
LOW
HIGH
2
GIMBAL LOCK CAUTION
PUSH FOR PULSE
IMU DELAY
ERROR DETECT
IMU FAIL
ISS CDU FAIL
CGC/LGC PWR FAIL
ACCEL FAIL
OPTICS/RR CDU FAIL
IMU TEMP FAIL
28 VDC DETECTOR
102.4KC & 28VDC DETECTORS
102.4KC DETECTOR
PHASE ANGLE DETECTOR ±60°±5° WITH RESPECT TO 0° MGA
24 26 28 29
102.4 KC
28VDC
TES-939
430W 1633 375W 374W 1634TL 377W 376W 1635TL 1657 939 1648L 379W 378W 1644 1636TL 1645 176W 175W 429W 161TL 162TL 428W
G&N ERROR LIGHT (MAIN PANEL)
G&N TEST CONFIG. IND.
IMU FAIL HI
IMU FAIL RET
IMU FAIL
CDU FAIL HI
CDU FAIL RET
CDU FAIL
CGC/LGC POWER FAIL HI
CGC/LGC POWER FAIL LO
LEM CONFIGURATION IND.
ACCEL FAIL HI
ACCEL FAIL RET
BLOCK I, SERIES 100 IND.
GPC-1644
GCP-1644
TES-1644
PDL-1644
RSS-1644
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND
GPC-1645
GCP-1645
TES-1645
PDL-1645
RSS-1645
O VDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK INDICATION
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
GPC-161
XBR-A
GPC-162
IMU TEMP LIGHT (MAIN PANEL)
430W 1633 375W 374W 1634TL 377W 376W 1635TL 1657 939 1648L 379W 378W 1644 1636TL 1645 176W 175W 429 161 162 428W

MIL FORM 1050 J3

2900207

1/2900207

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	
B		REVISED PER TDRR 20438		7 JUL 65	
C		REVISION STATUS CHANGED		8 JUL 65	



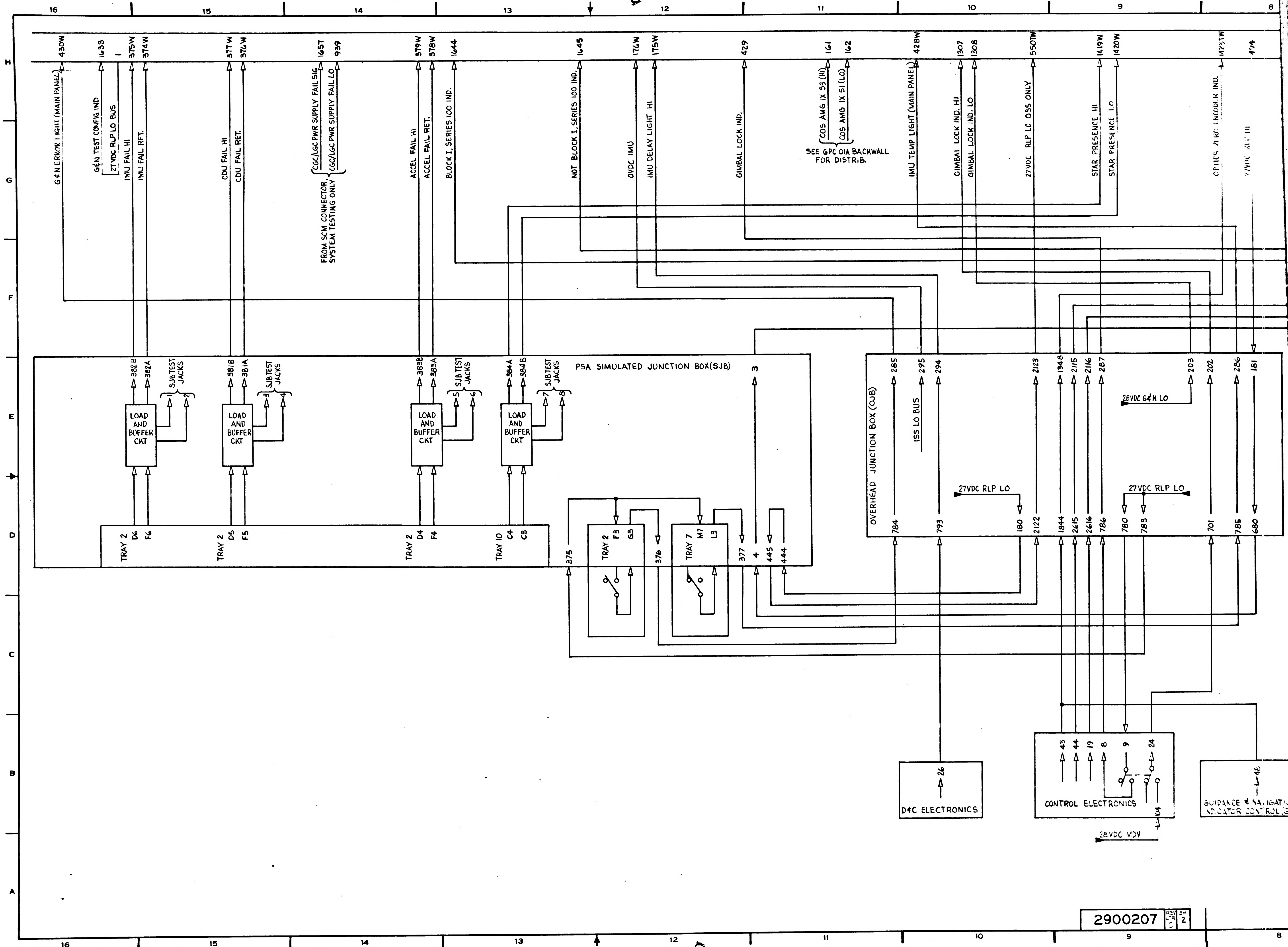
9
8
7
6
5
4
3
2
1
1423TW
494
1425TW
1424TW
537
538
1579TL
1654
1745
536
1743
1744
1653
1655
192
194
275
276
587
OIA BACKWALL
OPTICS ZERO ENCODER IND.
27VDC RLP HI
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND.
REMOTE TEMP ALARM COMMON
REMOTE PWR ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
800CPS,28V,5% IMU WHEELS PH A
800CPS,28V,5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
0VDC IMU
27VDC RLP HI ISS ONLY
PSA TEST POINT ADAPTER (TPA)
18
19
TRAY 1
33
32
287
203
202
286
181
28VDC GEN LO
27VDC RLP LO
786
788
701
785
680
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
1
2
3
5
6
8
10
11
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
23
10
6
6
5
5
LOCAL
REMOTE
4
7
9
ALARM
CKTS 1,2,3,4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL IND.
CKTS 1,2,3,4 LOW FLOW, HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND.
24
104
48
GUIDANCE & NAVIGATION INDICATOR CONTROL (G&NIC)

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN Splane DATE 7 MAY 65	MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK I SERIES 100)
	CHECKED Ed Foster 4 MAY 65	
	APPROVAL	
DO NOT SCALE THIS DRAWING	APPROVAL	
MATERIAL —	NASA APPROVAL	CODE IDENT NO | SIZE | 2900207
CONTRACT	MIT APPROVAL	SCALE — | SHEET 2 OF 4

2900207 C

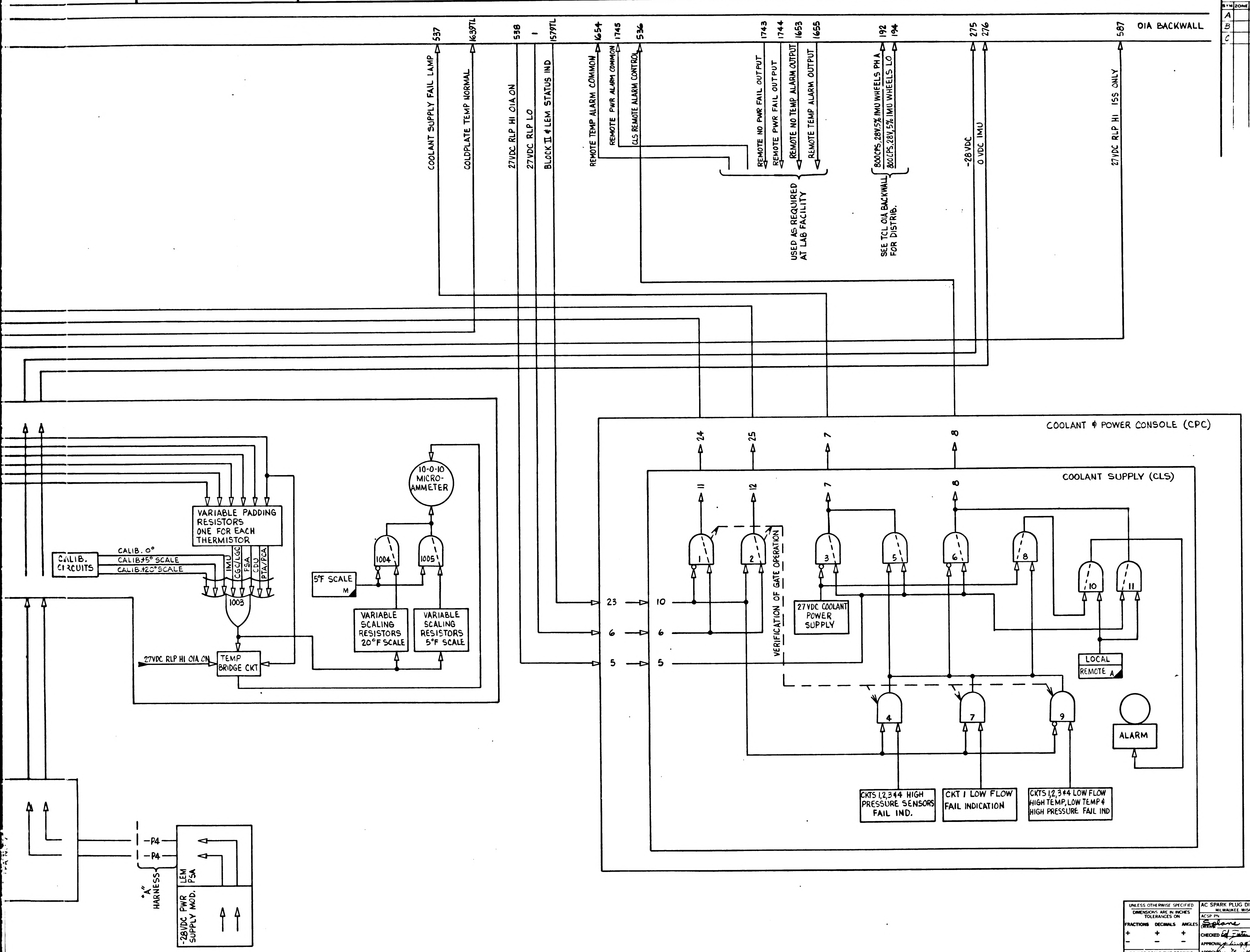
2H

27 2900207


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
430W
G&N ERROR LIGHT (MAIN PANEL)
1633
G&N TEST CONFIG IND
1
27 VDC RLP LO BUS
375W
IMU FAIL HI
374W
IMU FAIL RET.
377W
CDU FAIL HI
376W
CDU FAIL RET.
1657
CGC/LGC PWR SUPPLY FAIL SIG
939
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR, SYSTEM TESTING ONLY
379W
ACCEL FAIL HI
378W
ACCEL FAIL RET.
1644
BLOCK I, SERIES 100 IND.
1645
NOT BLOCK I, SERIES 100 IND.
176W
OVDC IMU
175W
IMU DELAY LIGHT HI
429
GIMBAL LOCK IND.
161
COS AMG IX 53 (HI)
162
COS AMG IX 51 (LO)
SEE GPC 01A BACKWALL FOR DISTRIB.
428W
IMU TEMP LIGHT (MAIN PANEL)
1307
GIMBAL LOCK IND. HI
1308
GIMBAL LOCK IND. LO
550TW
27VDC RLP LO OSS ONLY
1419W
STAR PRESENCE HI
1420W
STAR PRESENCE LO
1423TW
OPTICS ZERO ENCODER IND.
194
27VDC RET HI
PSA SIMULATED JUNCTION BOX (SJB)
382B
382A
SJB TEST JACKS
1
2
LOAD AND BUFFER CKT
381B
381A
SJB TEST JACKS
3
4
LOAD AND BUFFER CKT
383B
383A
SJB TEST JACKS
5
6
LOAD AND BUFFER CKT
384A
384B
SJB TEST JACKS
7
8
LOAD AND BUFFER CKT
TRAY 2
D6
F6
TRAY 2
D5
F5
TRAY 2
D4
F4
TRAY 10
C4
C3
3
375
TRAY 2
F3
G3
376
TRAY 7
M7
L3
377
4
445
444
OVERHEAD JUNCTION BOX (OJB)
285
295
294
ISS LO BUS
2123
1348
2115
2116
287
28VDC G&N LO
203
202
286
181
27VDC RLP LO
27VDC RLP LO
784
793
180
2122
1844
2615
2616
786
780
783
701
785
680
26
D&C ELECTRONICS
43
44
19
8
9
24
CONTROL ELECTRONICS
104
28VDC MDV
48
GUIDANCE & NAVIGATION INDICATOR CONTROL, G&N
2900207
2

1/2900207

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	
B		REVISED PER TDRR 20488		JUL 65	
C		REVISED PER TDRR 20491		8 JUL 65	



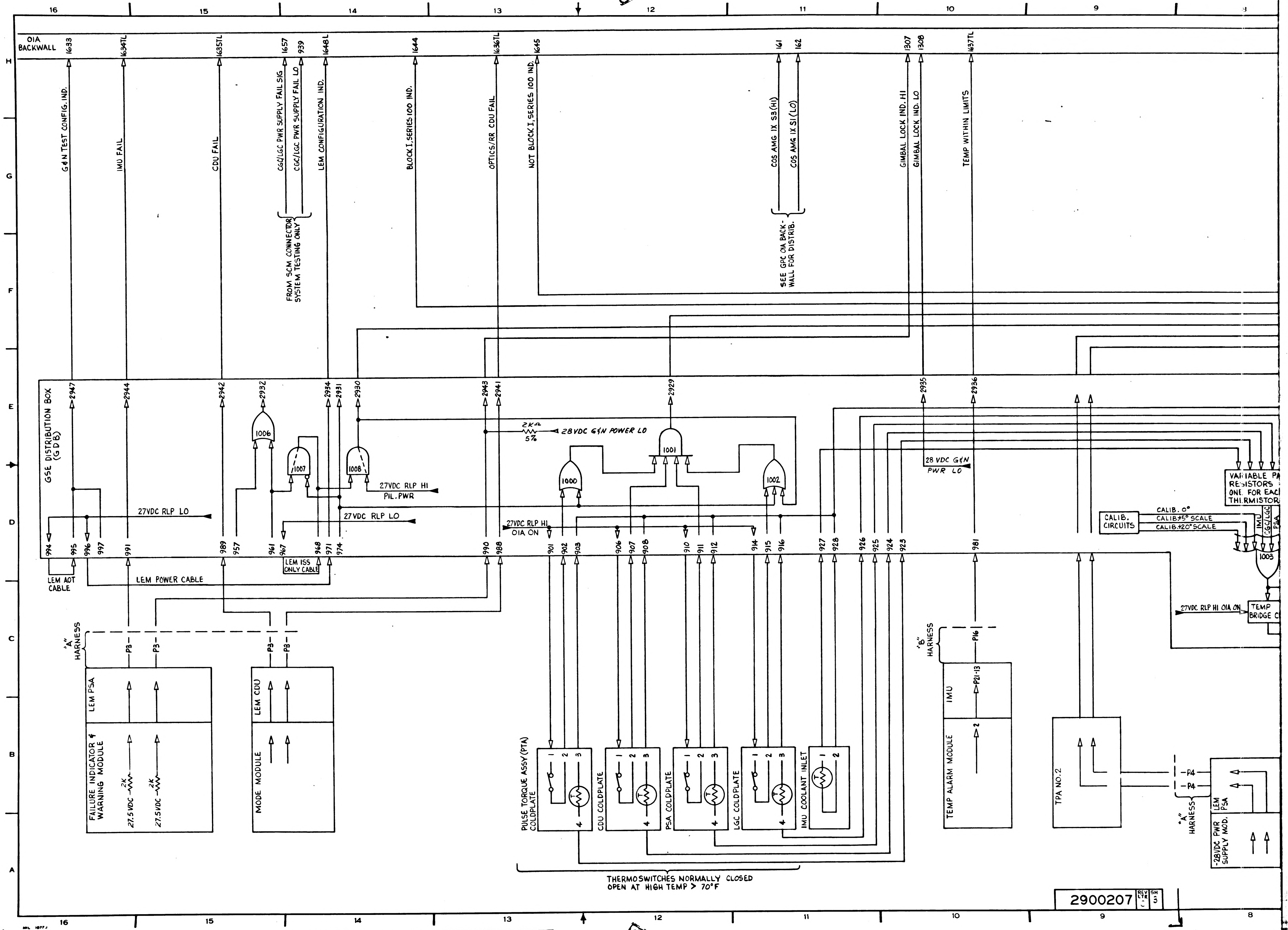
OIA BACKWALL
537
1639TL
538
1579TL
1654
1745
536
1743
1744
1653
1655
192
194
275
276
587
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND
REMOTE TEMP ALARM COMMON
REMOTE PWR ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
800CPS, 28V±5% IMU WHEELS PH A
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
-28 VDC
0 VDC IMU
27VDC RLP HI 1SS ONLY
COOLANT & POWER CONSOLE (CPC)
COOLANT SUPPLY (CLS)
24
25
7
8
11
12
23
10
6
5
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB.+5° SCALE
CALIB.+20° SCALE
IMU
CG/LGC
PSA
CDU
PTA/PCA
1003
1004
1005
10-0-10 MICRO-AMMETER
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
-P4
"A" HARNESS
LEM PSA
-28VDC PWR SUPPLY MOD.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
FRACTIONS + − DECIMALS + − ANGLES + −	ACSP PN DRAWN Splane DATE 7 MAY 65 CHECKED Ed Foster 14 MAY 65 APPROVAL APPROVAL M. Watson	MECHANIZATION DIAGRAM MONITOR PANEL (LEM)
DO NOT SCALE THIS DRAWING		
MATERIAL	NASA APPROVAL	CODE IDENT NO. SIZE 2900207
CONTRACT	MIT APPROVAL	SCALE SHEET 3 OF 4

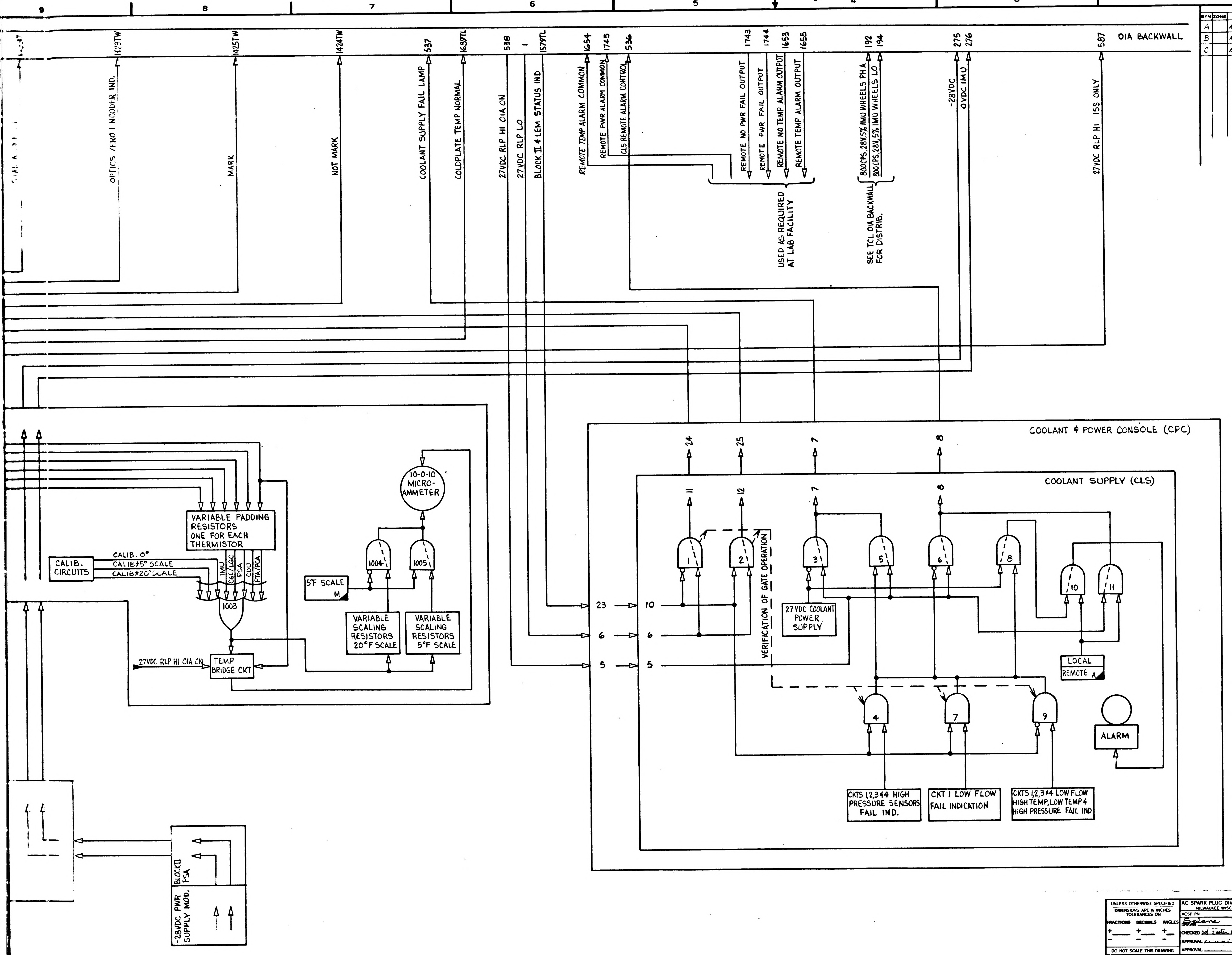
2900207 C

2900207 REV LTR - SH 3

2-4 2900207


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1633
1634TL
1635TL
1657
939
1648L
1644
1636TL
1645
161
162
1307
1308
1637TL
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
CGC/LGC PWR SUPPLY FAIL SIG.
CGC/LGC PWR SUPPLY FAIL LO
LEM CONFIGURATION IND.
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
TEMP WITHIN LIMITS
FROM SCM CONNECTOR SYSTEM TESTING ONLY
SEE GPC OIA BACKWALL FOR DISTRIB.
GSE DISTRIBUTION BOX (GDB)
2947
2944
2942
2932
2934
2931
2930
2943
2941
2929
2935
2936
1006
1007
1008
1000
1001
1002
1003
2KΩ 5%
28VDC G&N POWER LO
27VDC RLP HI PIL. PWR
27VDC RLP LO
27VDC RLP LO
27VDC RLP HI OIA ON
28 VDC G&N PWR LO
VARIABLE PA RESISTORS ONE FOR EAC THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB.+5° SCALE
CALIB.+20° SCALE
IMU
CGC/LGC
PSA
27VDC RLP HI OIA ON
TEMP BRIDGE C
994
995
996
997
991
989
957
961
967
968
971
974
990
988
901
902
903
906
907
908
910
911
912
914
915
916
927
928
926
925
924
923
981
LEM AOT CABLE
LEM POWER CABLE
LEM ISS ONLY CABLE
"A" HARNESS
P3
P3
P3
P3
LEM PSA
FAILURE INDICATOR & WARNING MODULE
2K
2K
27.5VDC
27.5VDC
LEM CDU
MODE MODULE
"B" HARNESS
P16
P21-13
IMU
2
TEMP ALARM MODULE
TPA NO. 2
P4
P4
"A" HARNESS
LEM PSA
-28VDC PWR SUPPLY MOD.
PULSE TORQUE ASSY (PTA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
LGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
THERMOSWITCHES NORMALLY CLOSED OPEN AT HIGH TEMP > 70°F
2900207
REV LTR
-
SH
3

1/2900207


OIA BACKWALL
1423TW
OPTICS ZERO ENCODER IND.
1425TW
MARK
1424TW
NOT MARK
537
COOLANT SUPPLY FAIL LAMP
1639TL
COLDPLATE TEMP NORMAL
538
27VDC RLP HI OIA ON
27VDC RLP LO
1579TL
BLOCK II & LEM STATUS IND
1654
REMOTE TEMP ALARM COMMON
1745
REMOTE PWR ALARM COMMON
536
CLS REMOTE ALARM CONTROL
1743
REMOTE NO PWR FAIL OUTPUT
1744
REMOTE PWR FAIL OUTPUT
1653
REMOTE NO TEMP ALARM OUTPUT
1655
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
192
800CPS, 28V, 5% IMU WHEELS PH A
194
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
275
-28VDC
276
0VDC IMU
587
27VDC RLP HI ISS ONLY
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB ±5° SCALE
CALIB ±20° SCALE
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
10-0-10 MICRO-AMMETER
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
BLOCK II PSA
-28VDC PWR SUPPLY MOD.
COOLANT & POWER CONSOLE (CPC)
COOLANT SUPPLY (CLS)
24
25
7
8
11
12
7
8
23
6
5
10
6
5
1
2
3
5
6
8
10
11
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
4
7
9
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APP'D
A		REVISED PER TDRR 20487		7 JUL 65	
B		REVISED PER TDRR 20488		7 JUL 65	
C		REVISED PER TDRR 20491		8 JUL 65	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Solane DATE 7 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

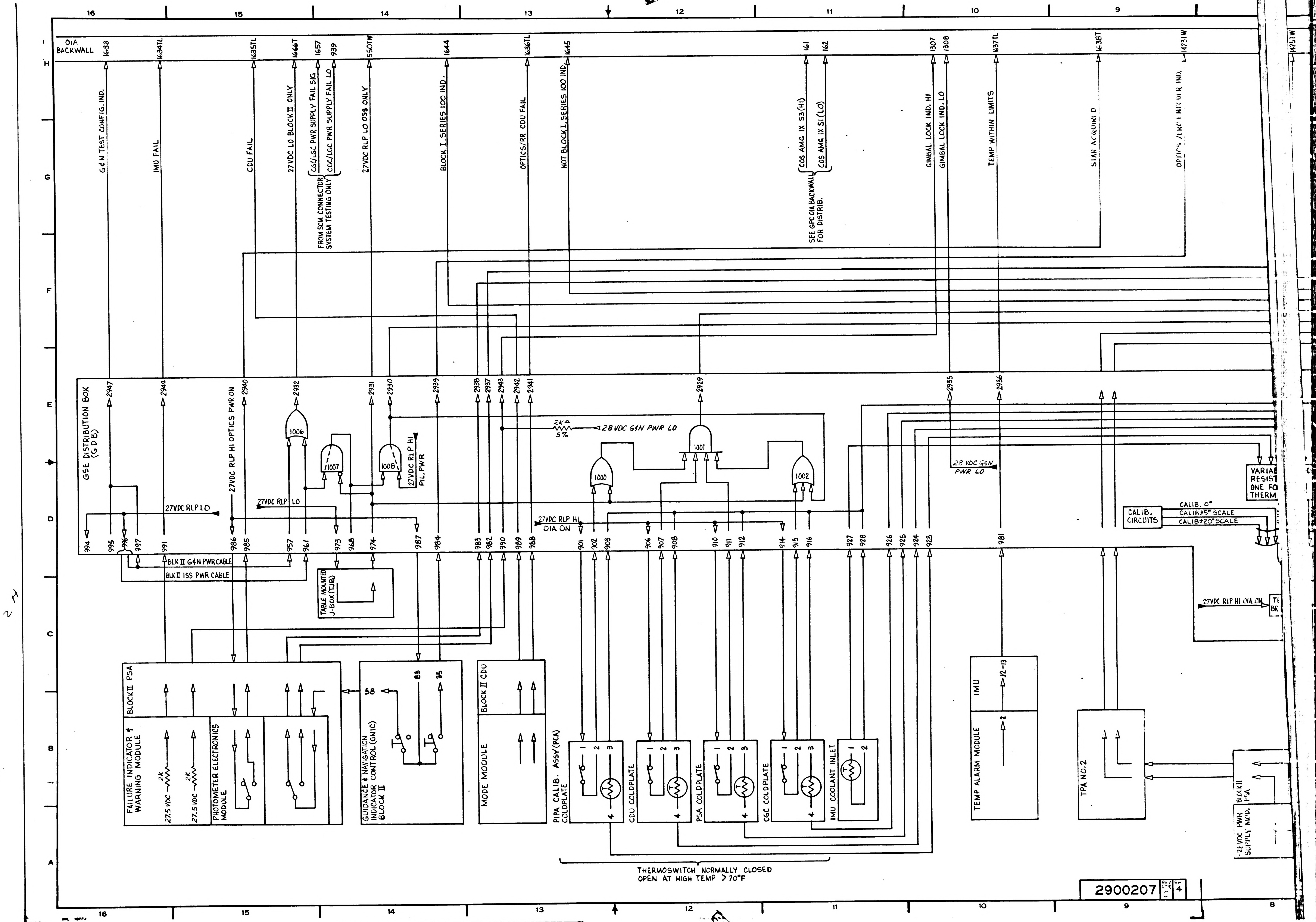
MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK II)

CODE IDENT NO.
SIZE
2900207
SCALE —
SHEET 4 OF 4

2900207 REV LTR C SH 4

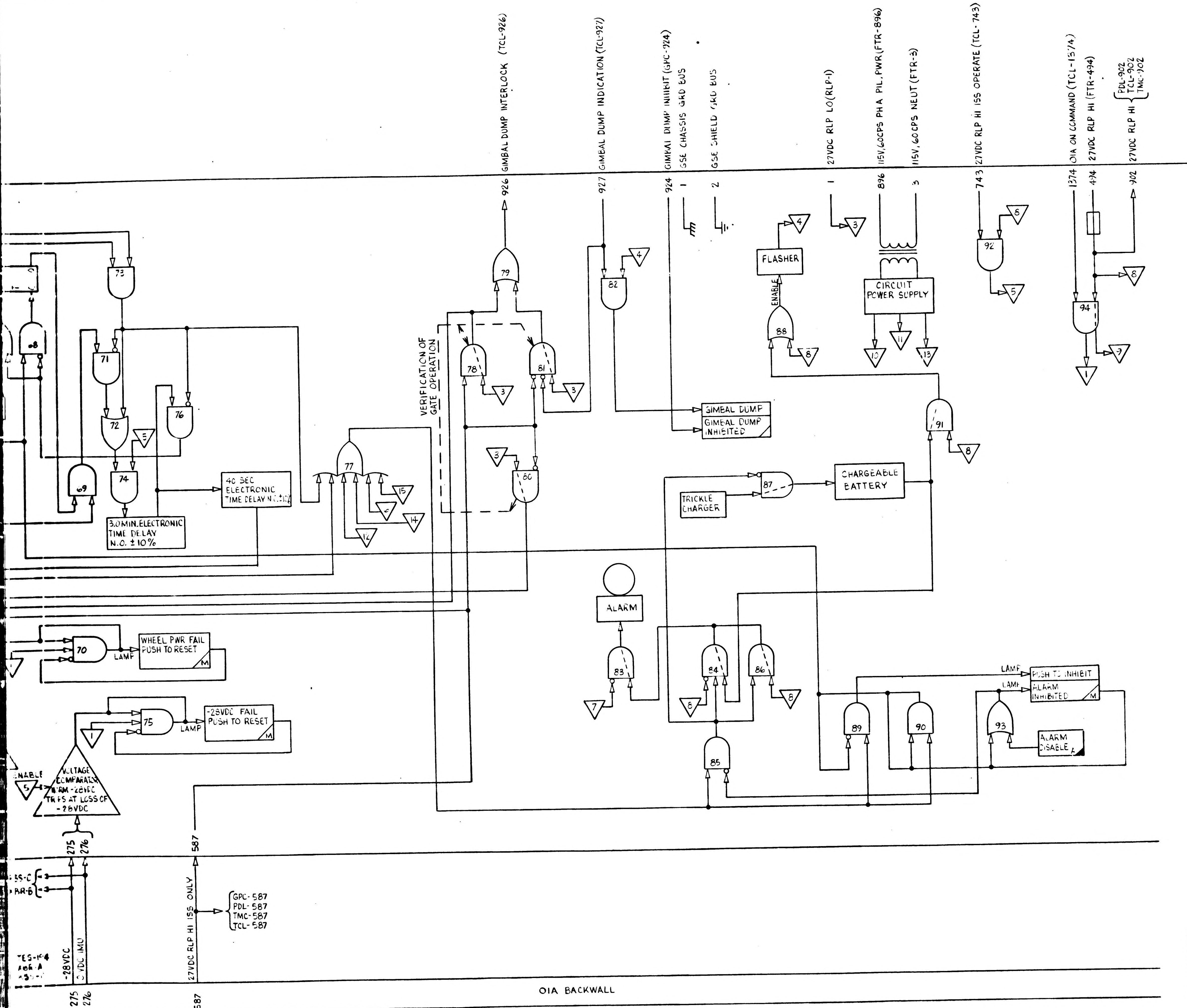
2900207 C

2/2900207


16
15
14
13
12
11
10
9
8
OIA BACKWALL
H
G
F
E
D
C
B
A
1633
1634TL
1635TL
1666T
1657
939
5501W
1644
1636TL
1645
161
162
1307
1308
1637TL
1638T
1423TW
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
27VDC LO BLOCK II ONLY
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR SYSTEM TESTING ONLY
27VDC RLP LO 05S ONLY
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG 1X S3 (HI)
COS AMG 1X S1 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
TEMP WITHIN LIMITS
STAR ACQUIRED
OPTICS /TRC1 NEEDLE IND.
GSE DISTRIBUTION BOX (GDB)
2947
2944
2940
2932
2931
2930
2939
2938
2937
2943
2942
2941
2929
2935
2936
27VDC RLP HI OPTICS PWR ON
1006
1007
1008
27VDC RLP HI PIL. PWR
2KΩ 5%
28 VDC G&N PWR LO
1000
1001
1002
28 VDC G&N PWR LO
VARIAB RESIST ONE FO THERM
27VDC RLP LO
27VDC RLP LO
27VDC RLP HI OIA ON
CALIB. CIRCUITS
CALIB. 0°
CALIB.±5° SCALE
CALIB.±20° SCALE
994
995
996
997
991
986
985
957
961
973
968
974
987
984
983
982
990
989
988
901
902
903
906
907
908
910
911
912
914
915
916
927
928
926
925
924
923
981
BLK II G&N PWR CABLE
BLK II ISS PWR CABLE
TABLE MOUNTED J-BOX (TJB)
27VDC RLP HI OIA ON
TE BR
BLOCK II PSA
FAILURE INDICATOR & WARNING MODULE
2K
2K
27.5 VDC
27.5 VDC
PHOTOMETER ELECTRONICS MODULE
58
83
85
GUIDANCE & NAVIGATION INDICATOR CONTROL (GNIC) BLOCK II
BLOCK II CDU
MODE MODULE
PIPA CALIB. ASSY (PCA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
CGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
IMU
J2-13
2
TEMP ALARM MODULE
TPA NO. 2
BLCK II PSA
28 VDC PWR SUPPLY NK'D.
THERMOSWITCH NORMALLY CLOSED OPEN AT HIGH TEMP >70°F
2900207
REV C
SH 4

1/2900207

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	RLP
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISED PER TDRR 20491		8 JUL 65	RLP
D		REVISED PER TDRR 21911		1 SEP 65	RLP


926 GIMBAL DUMP INTERLOCK (TCL-926)
927 GIMBAL DUMP INDICATION (TCL-927)
924 GIMBAL DUMP INHIBIT (GPC-924)
1 GSE CHASSIS GRD BUS
2 GSE SHIELD GRD BUS
1 27VDC RLP LO (RLP-1)
896 115V, 60CPS PHA PIL. PWR (FTR-896)
3 115V, 60CPS NEUT (FTR-3)
743 27VDC RLP HI ISS OPERATE (TCL-743)
1374 OIA ON COMMAND (TCL-1374)
494 27VDC RLP HI (FTR-494)
902 27VDC RLP HI PDL-902 TCL-902 TMC-902
FLASHER
ENABLE
CIRCUIT POWER SUPPLY
VERIFICATION OF GATE OPERATION
GIMBAL DUMP
GIMBAL DUMP INHIBITED
40 SEC ELECTRONIC TIME DELAY N.O.
3.0 MIN. ELECTRONIC TIME DELAY N.O. ± 10%
CHARGEABLE BATTERY
TRICKLE CHARGER
ALARM
WHEEL PWR FAIL PUSH TO RESET
LAMP
M
-28VDC FAIL PUSH TO RESET
ENABLE
VOLTAGE COMPARATOR FRM -28VDC TRIPS AT LOSS OF -28VDC
PUSH TO INHIBIT
ALARM INHIBITED
ALARM DISABLE
587 27VDC RLP HI ISS ONLY GPC-587 PDL-587 TMC-587 TCL-587
275 -28VDC
276 OVDC IMU
ISS-C
PRR-B
TES-1-4
OIA BACKWALL
73 71 72 74 76 69 70 75 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

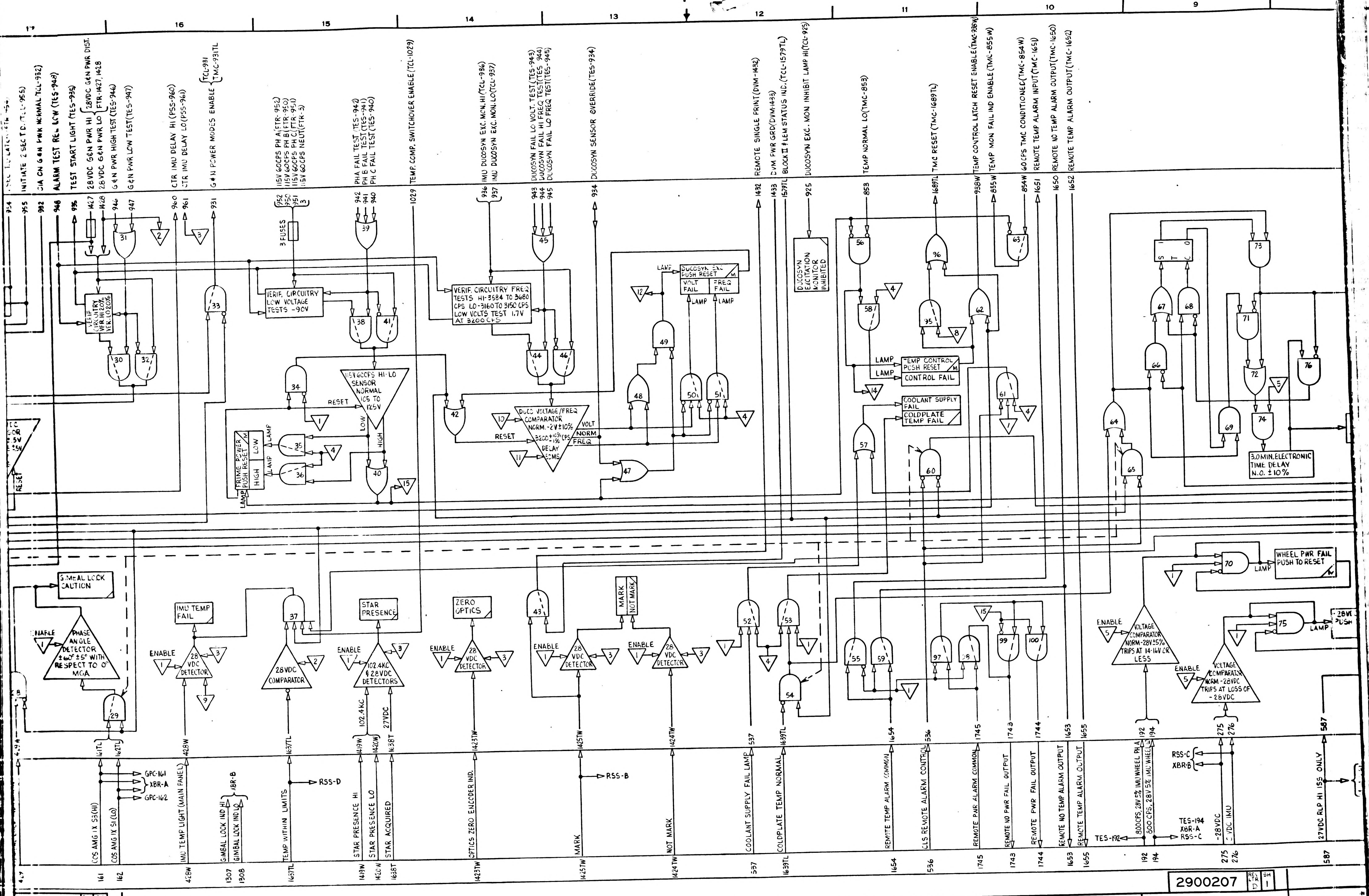
ACSP PN
DRAWN Sulin ne DATE 7 MAY 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MECHANIZATION DIAGRAM
MONITOR PANEL
(BLOCK I SERIES 100, BLOCK II, LEM)

CODE IDENT NO SIZE 2900207
SCALE — SHEET OF 4

2900207 REV LTR D SH 1

3/2900207


INITIATE 2 SEC T.D.(TCL-955)
GIA ON G&N PWR NORMAL TCL-932)
ALARM TEST REL LOW (TES-948)
TEST START LIGHT (TES-935)
28VDC G&N PWR HI
28VDC G&N PWR LO
28VDC G&N PWR DIST. FTR-1427, 1428
G&N PWR HIGH TEST (TES-946)
G&N PWR LOW TEST(TES-947)
CTR IMU DELAY HI (PSS-960)
CTR IMU DELAY LO(PSS-961)
G&N POWER MODES ENABLE TCL-931 TMC-931TL
115V 60CPS PH A(FTR-952)
115V 60CPS PH B(FTR-950)
115V 60CPS PH C(FTR-951)
115V 60CPS NEUT(FTR-3)
PHA FAIL TEST (TES-942)
PH B FAIL TEST (TES-941)
PH C FAIL TEST (TES-940)
TEMP. COMP. SWITCHOVER ENABLE (TCL-1029)
IMU DUCOSYN EXC. MON. HI (TCL-936)
IMU DUCOSYN EXC. MON. LO(TCL-937)
DUCOSYN FAIL LO VOLT. TEST (TES-943)
DUCOSYN FAIL HI FREQ TEST(TES 944)
DUCOSYN FAIL LO FREQ TEST(TES-945)
DUCOSYN SENSOR OVERRIDE(TES-934)
REMOTE SINGLE PRINT(DVM-1432)
DVM PWR GRD(DVM-1433)
BLOCK II & LEM STATUS IND.(TCL-1579TL)
DUCOSYN EXC. MON INHIBIT LAMP HI(TCL-925)
TEMP NORMAL LO(TMC-853)
TMC RESET (TMC-1689TL)
TEMP CONTROL LATCH RESET ENABLE(TMC-938W)
TEMP MON FAIL IND ENABLE (TMC-855W)
60CPS TMC CONDITIONED(TMC-854W)
REMOTE TEMP ALARM INPUT(TMC-1651)
REMOTE NO TEMP ALARM OUTPUT(TMC-1650)
REMOTE TEMP ALARM OUTPUT(TMC-1652)
954 955 932 948 935 1427 1428 946 947 960 961 931 952 950 951 3 942 941 940 1029 936 937 943 944 945 934 1432 1433 1579TL 925 853 1689TL 938W 855W 854W 1651 1650 1652
3 FUSES
VERIF. CIRCUITRY VER. HI 20% VER. LO 20%
VERIF. CIRCUITRY LOW VOLTAGE TESTS -90V
VERIF. CIRCUITRY FREQ TESTS HI-3684 TO 3680 CPS LO-3160 TO 3150 CPS LOW VOLTS TEST 1.7V AT 3200 CPS
115V 60CPS HI-LO SENSOR NORMAL 105 TO 125V
LOW
HIGH
RESET
PRIME POWER PUSH RESET
LAMP
LOW
HIGH
M
DUCOSYN EXC PUSH RESET
VOLT FAIL
FREQ FAIL
DUCOSYN VOLTAGE/FREQ COMPARATOR NORM. -2V ±10% 3200 ±1% CPS DELAY 5CMS
VOLT
NORM
FREQ
DUCOSYN EXCITATION MONITOR INHIBITED
TEMP CONTROL PUSH RESET
CONTROL FAIL
COOLANT SUPPLY FAIL
COLDPLATE TEMP FAIL
S T C
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
WHEEL PWR FAIL PUSH TO RESET
GIMBAL LOCK CAUTION
ENABLE
PHASE ANGLE DETECTOR ±60° ±5° WITH RESPECT TO 0° MGA
IMU TEMP FAIL
28 VDC DETECTOR
28VDC COMPARATOR
STAR PRESENCE
102.4KC & 28VDC DETECTORS
ZERO OPTICS
MARK
NOT MARK
VOLTAGE COMPARATOR NORM-28V ±5% TRIPS AT 14-16V OR LESS
VOLTAGE COMPARATOR NORM -28VDC TRIPS AT LOSS OF -28VDC
+28V PUSH
29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 95 96 97 98 99 100
102.4KC
27VDC
161TL 162TL 428W 1637TL 1419W 1420W 1638T 1423TW 1425TW 1424TW 537 1639TL 1654 536 1745 1743 1744 1653 1655 192 194 275 276 587
GPC-161
XBR-A
GPC-162
XBR-B
RSS-D
RSS-B
RSS-C
TES-192
TES-194
COS AMG IX S3(HI)
COS AMG IX S1(LO)
IMU TEMP LIGHT (MAIN PANEL)
GIMBAL LOCK IND HI
GIMBAL LOCK IND LO
TEMP WITHIN LIMITS
STAR PRESENCE HI
STAR PRESENCE LO
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
REMOTE TEMP ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE PWR ALARM COMMON
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
800CPS, 28V 5% IMU WHEEL PH A
800 CPS, 28V 5% IMU WHEEL
-28VDC
VDC IMU
27VDC RLP HI ISS ONLY
161 162 428W 1307 1308 1637TL 1419W 1420W 1638T 1423TW 1425TW 1424TW 537 1639TL 1654 536 1745 1743 1744 1653 1655 192 194 275 276 587
17 16 15 14 13 12 11 10 9

2900207 REV LTR D SH 1

2900207 SH 1

2/2900207

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS:

2900210	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RLP RELAY & LAMP POWER SUPPLY
2900204	TEMPERATURE MONITOR CONTROL PANEL (BLOCK I, SERIES 100)(TMC)
2900203	TEMPERATURE MONITOR CONTROL PANEL (BLOCK II & LEM)(TMC)
2900208	POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL)
2900223	GIMBAL POSITION CONTROL (GPC)
2900202	TEST CONTROL PANEL (BLOCK I, SERIES 100)(TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM)(TCL)
2900206	TEST SELECTOR PANEL (TES)
2900200	GYRO CAGING PANEL (BLOCK II & LEM)(GCP)
2900218	OSCILLOGRAPH SIGNAL SELECTION RSS-B TO FIXED DC CHANNEL, RSS-C TO SWITCHABLE AC CHANNEL, RSS-D TO SWITCHABLE DC CHANNEL
2900217	SIGNAL SELECTION & MEASUREMENT XBR-A CROSSBAR-AC SIGNALS XBR-B CROSSBAR-DC SIGNALS
2900219	COUNTER SIGNAL SELECTION PRIMARY SIGNAL SELECTOR (PSS)
2900214	GSE GROUNDING (BLOCK I SERIES 100)
2900213	GSE GROUNDING (BLOCK II & LEM)
2900209	COMPUTER SIMULATOR INTERFACE (CMS)
2900211	AUXILIARY INPUT/OUTPUT CALIBRATION (AIP)

4. NON STANDARD SYMBOLOGY:

⊐- -⊃	INDICATES "AND" GATE WITH SWITCHED SIGNAL
NAME	INDICATES INDICATOR LIGHT
NAME M	INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
NAME NAME	INDICATES SPLIT SCREEN INDICATOR LIGHT
NAME NAME M	INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES UNLIGHTED PUSHBUTTON OR TOGGLE SWITCH (ALTERNATE ACTION)

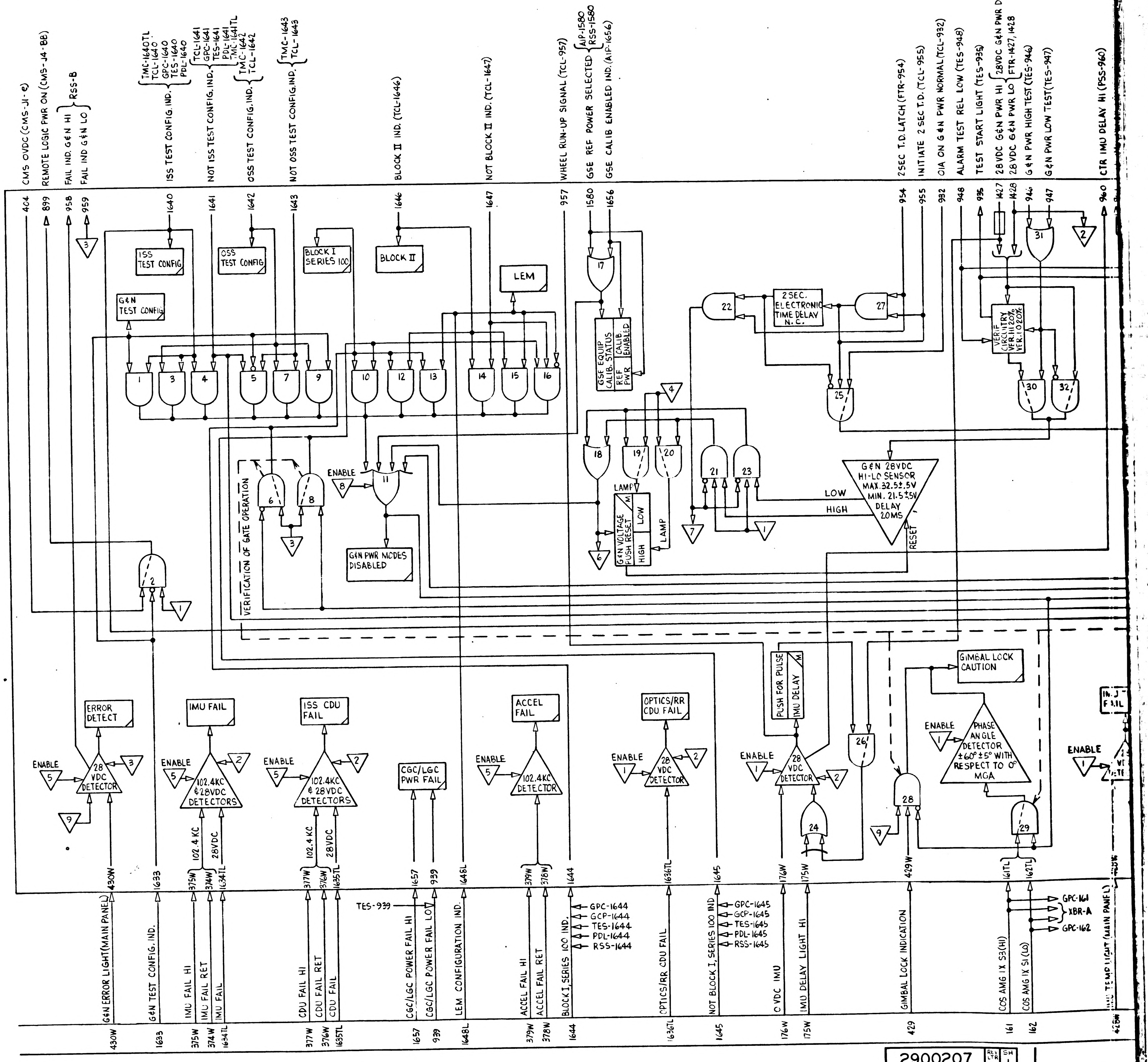
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   A. W - BLOCK I SERIES 100 ONLY
   B. T - BLOCK II ONLY
   C. L - LEM ONLY
   D. BLANK - ALL G&N CONFIGURATIONS
   E. TW, TL OR WL - USED IN MORE THAN ONE G&N CONFIGURATION AS SHOWN.

6. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK I SERIES 100	SH 1 SH 2
BLOCK II	SH 1 SH 3
LEM	SH 1 SH 4

7. SIGNAL REFERENCE:

▽1 = OIA ON	▽11 = -28VDC
▽2 = 28VDC G&N PWR LO	▽12 = DUCO EXC. FAIL
▽3 = 27 VDC RLP LO	▽13 = +45 VDC
▽4 = FLASHER	▽14 = TMC FAIL
▽5 = ISS OPER. 5SEC T.D.	▽15 = PRIME PWR FAIL
▽6 = G&N PWR FAIL	
▽7 = 2 SEC T.D. AT OIA ON	
▽8 = 27 VDC PIL. PWR	
▽9 = 27VDC OIA ON	
▽10 = +28VDC	



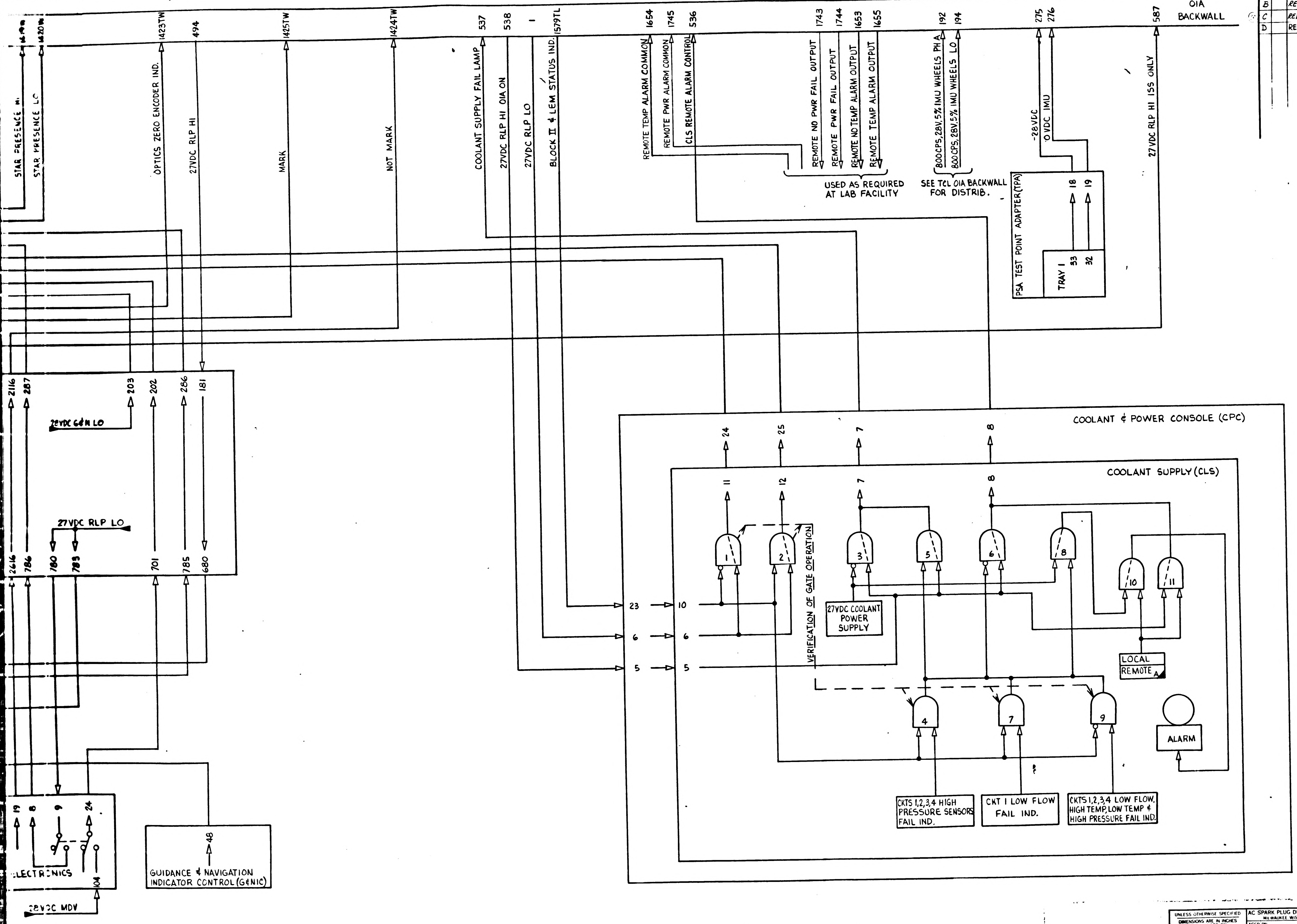
24
23
22
21
20
19
18
17
16
H
G
F
E
D
C
B
A
CMS OVDC (CMS-J1-e) 404
REMOTE LOGIC PWR ON (CMS-J4-BB) 899
FAIL IND. G&N HI 958
FAIL IND G&N LO 959
RSS-B
ISS TEST CONFIG. IND. 1640
TMC-1640TL
TCL-1640
GPC-1640
TES-1640
PDL-1640
NOT ISS TEST CONFIG. IND. 1641
TCL-1641
GPC-1641
TES-1641
PDL-1641
TMC-1641TL
OSS TEST CONFIG. IND. 1642
TMC-1642
TCL-1642
NOT OSS TEST CONFIG. IND. 1643
TMC-1643
TCL-1643
BLOCK II IND. (TCL-1646) 1646
NOT BLOCK II IND. (TCL-1647) 1647
WHEEL RUN-UP SIGNAL (TCL-957) 957
GSE REF POWER SELECTED 1580
AIP-1580
RSS-1580
GSE CALIB ENABLED IND. (AIP-1656) 1656
2SEC T.D. LATCH (FTR-954) 954
INITIATE 2 SEC T.D. (TCL-955) 955
OIA ON G&N PWR NORMAL (TCL-932) 932
ALARM TEST REL LOW (TES-948) 948
TEST START LIGHT (TES-935) 935
28VDC G&N PWR HI 1427
28VDC G&N PWR LO 1428
28VDC G&N PWR DIST.
FTR-1427, 1428
G&N PWR HIGH TEST (TES-946) 946
G&N PWR LOW TEST (TES-947) 947
CTR IMU DELAY HI (PSS-960) 960
ISS TEST CONFIG
OSS TEST CONFIG
BLOCK I SERIES 100
BLOCK II
LEM
G&N TEST CONFIG
GSE EQUIP CALIB. STATUS
REF PWR
CALIB ENABLED
2 SEC. ELECTRONIC TIME DELAY N.C.
VERIF CIRCUITRY VER. I 1 20% VER. II 0 20%
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
ENABLE
G&N PWR MODES DISABLED
VERIFICATION OF GATE OPERATION
LAMP
G&N VOLTAGE PUSH RESET
HIGH
LOW
M
LAMP
LOW
HIGH
G&N 28VDC HI-LO SENSOR MAX. 32.5±.5V MIN. 21.5±.5V DELAY 20MS
RESET
PUSH FOR PULSE
IMU DELAY
GIMBAL LOCK CAUTION
PHASE ANGLE DETECTOR ±60°±5° WITH RESPECT TO 0° MGA
ERROR DETECT
28 VDC DETECTOR
IMU FAIL
102.4KC & 28VDC DETECTORS
ISS CDU FAIL
CGC/LGC PWR FAIL
ACCEL FAIL
102.4KC DETECTOR
OPTICS/RR CDU FAIL
28 VDC DETECTOR
IMU FAIL
102.4 KC
28VDC
430W
1633
375W
374W
1634TL
377W
376W
1635TL
1657
939
1648L
379W
378W
1644
1636TL
1645
176W
175W
429W
161TL
162TL
G&N ERROR LIGHT (MAIN PANEL)
G&N TEST CONFIG. IND.
IMU FAIL HI
IMU FAIL RET
IMU FAIL
CDU FAIL HI
CDU FAIL RET
CDU FAIL
TES-939
CGC/LGC POWER FAIL HI
CGC/LGC POWER FAIL LO
LEM CONFIGURATION IND.
ACCEL FAIL HI
ACCEL FAIL RET
BLOCK I, SERIES 100 IND.
GPC-1644
GCP-1644
TES-1644
PDL-1644
RSS-1644
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND
GPC-1645
GCP-1645
TES-1645
PDL-1645
RSS-1645
0 VDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK INDICATION
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
GPC-161
XBR-A
GPC-162
TEMP LIGHT (MAIN PANEL)
430W
1633
375W
374W
1634TL
377W
376W
1635TL
1657
939
1648L
379W
378W
1644
1636TL
1645
176W
175W
429
161
162
428W

2900207	REV LTR D	SH 1

MIL FORM 1050 J3

17 2900207

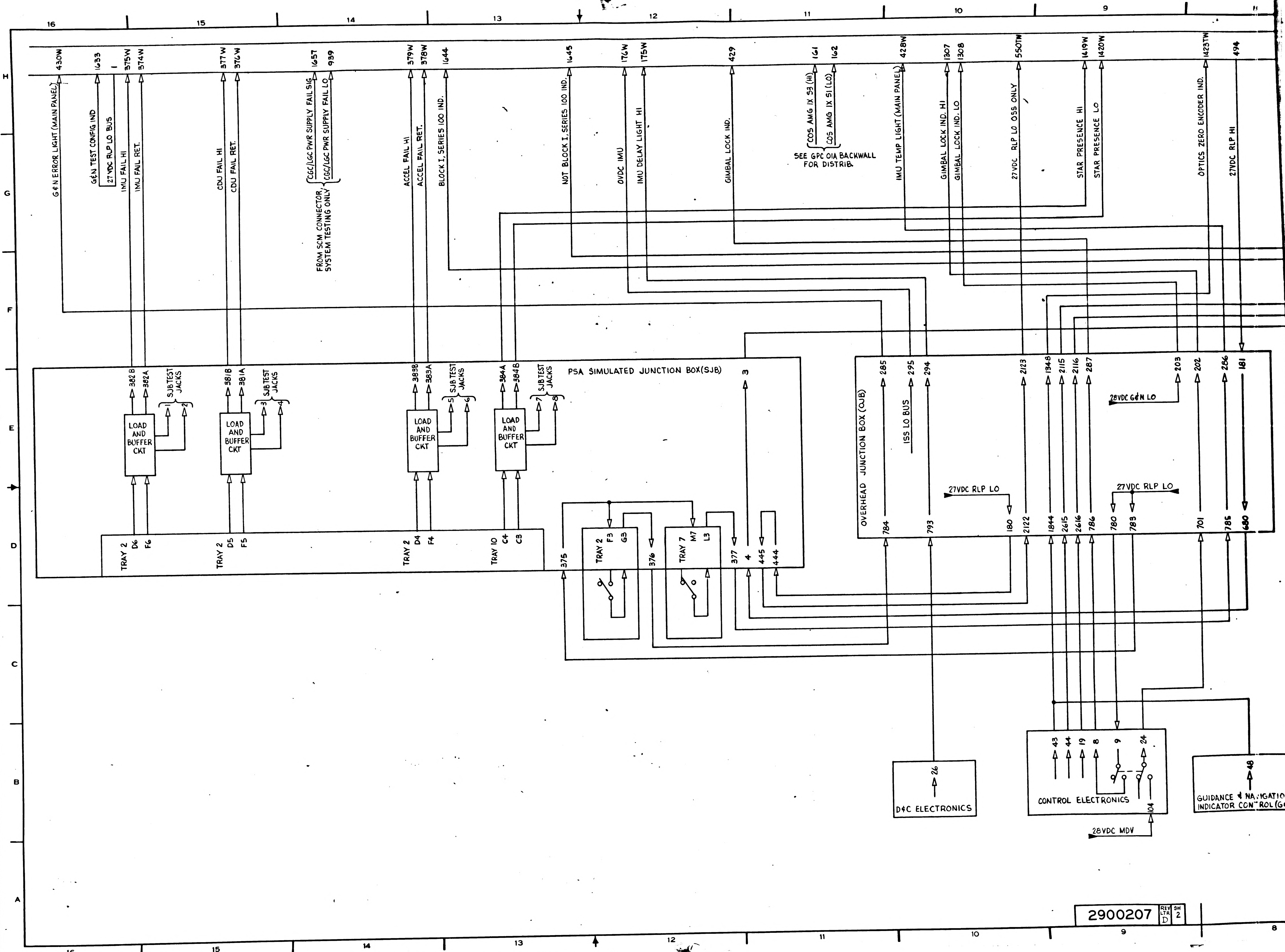
SYM	ZONE	REVISIONS 19254 DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP MCM
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISION STATUS CHANGED		8 JUL 65	RLP
D		REVISION STATUS CHANGED		1 SEP 65	RLP


STAR PRESENCE HI
STAR PRESENCE LO
1420W
OPTICS ZERO ENCODER IND.
1423TW
27VDC RLP HI
494
MARK
1425TW
NOT MARK
1424TW
COOLANT SUPPLY FAIL LAMP
537
27VDC RLP HI OIA ON
538
27VDC RLP LO
BLOCK II & LEM STATUS IND.
1579TL
REMOTE TEMP ALARM COMMON
1654
REMOTE PWR ALARM COMMON
1745
CLS REMOTE ALARM CONTROL
536
REMOTE NO PWR FAIL OUTPUT
1743
REMOTE PWR FAIL OUTPUT
1744
REMOTE NO TEMP ALARM OUTPUT
1653
REMOTE TEMP ALARM OUTPUT
1655
USED AS REQUIRED AT LAB FACILITY
800CPS, 28V, 5% IMU WHEELS PH A
192
800CPS, 28V, 5% IMU WHEELS LO
194
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
275
0VDC IMU
276
27VDC RLP HI ISS ONLY
587
OIA BACKWALL
PSA TEST POINT ADAPTER (TPA)
18
19
TRAY 1
33
32
2116
287
203
202
286
181
28VDC G&N LO
27VDC RLP LO
2616
786
780
783
701
785
680
19
8
9
24
104
ELECTRONICS
28VDC MDV
GUIDANCE & NAVIGATION INDICATOR CONTROL (G&NIC)
48
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
23
6
5
COOLANT SUPPLY (CLS)
11
12
7
8
10
6
5
1
2
3
5
6
8
10
11
4
7
9
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
ALARM
CKTS 1,2,3,4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL IND.
CKTS 1,2,3,4 LOW FLOW, HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___	AC SPARK PLUG DIVISION. GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN Splane DATE 7 MAY 65 CHECKED Ed [illegible] 14 MAY 65 APPROVAL [illegible] APPROVAL	MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK I SERIES 100)
DO NOT SCALE THIS DRAWING		
MATERIAL ___	NASA APPROVAL [illegible]	CODE IDENT NO / SIZE / 2900207
CONTRACT	MIT APPROVAL [illegible]	SCALE — / SHEET 2 OF 4

2900207 REV LTR D SH 2

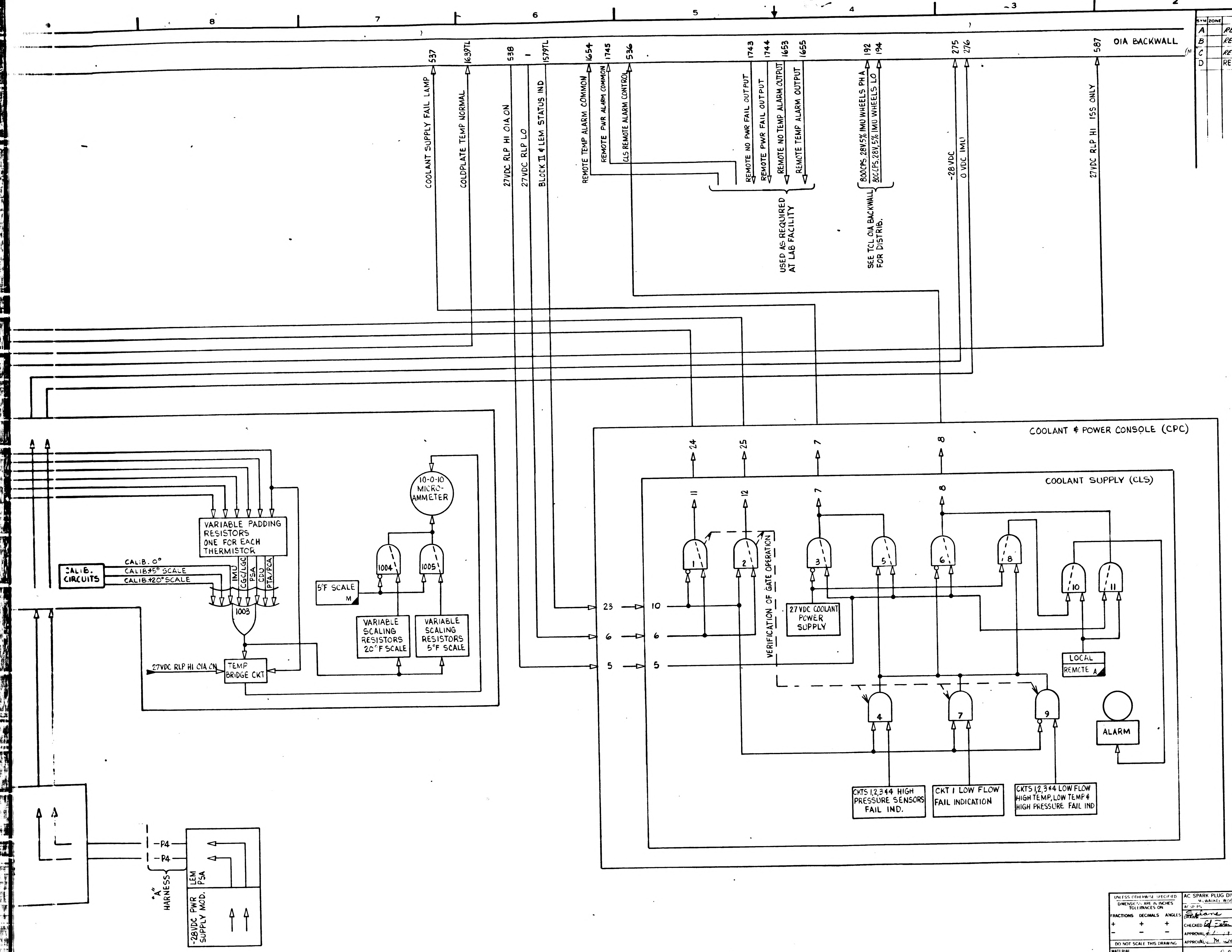
2/2900207

16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
430W
G&N ERROR LIGHT (MAIN PANEL)
1633
G&N TEST CONFIG IND
1
27VDC RLP LO BUS
375W
IMU FAIL HI
374W
IMU FAIL RET.
377W
CDU FAIL HI
376W
CDU FAIL RET.
1657
CGC/LGC PWR SUPPLY FAIL SIG
939
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR, SYSTEM TESTING ONLY
379W
ACCEL FAIL HI
378W
ACCEL FAIL RET.
1644
BLOCK I, SERIES 100 IND.
1645
NOT BLOCK I, SERIES 100 IND.
176W
0VDC IMU
175W
IMU DELAY LIGHT HI
429
GIMBAL LOCK IND.
161
COS AMG IX 53 (HI)
162
COS AMG IX 51 (LO)
SEE GPC 01A BACKWALL FOR DISTRIB.
428W
IMU TEMP LIGHT (MAIN PANEL)
1307
GIMBAL LOCK IND. HI
1308
GIMBAL LOCK IND. LO
550TW
27VDC RLP LO OSS ONLY
1419W
STAR PRESENCE HI
1420W
STAR PRESENCE LO
1423TW
OPTICS ZERO ENCODER IND.
494
27VDC RLP HI
PSA SIMULATED JUNCTION BOX(SJB)
382B
382A
SJB TEST JACKS
1
2
LOAD AND BUFFER CKT
381B
381A
3
4
388B
388A
5
6
384A
384B
7
8
TRAY 2 D6 F6
TRAY 2 D5 F5
TRAY 2 D4 F4
TRAY 10 C4 C3
375
TRAY 2 F3 G3
376
TRAY 7 M7 L3
377
3
4
445
444
OVERHEAD JUNCTION BOX (OJB)
285
295
294
ISS LO BUS
2123
1348
2115
2116
287
203
202
286
181
28VDC G&N LO
27VDC RLP LO
27VDC RLP LO
784
793
180
2122
1844
2615
2616
786
780
783
701
785
680
26
D&C ELECTRONICS
43
44
19
8
9
24
CONTROL ELECTRONICS
104
28VDC MDV
48
GUIDANCE & NAVIGATION INDICATOR CONTROL (GENIC)
2900207
REV LTR D
SH 2

1/2900207

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	RLP MEM
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISED PER TDRR 20491		8 JUL 65	RLP MEM
D		REVISED PER TDRR 21911		1 SEP 65	RLP

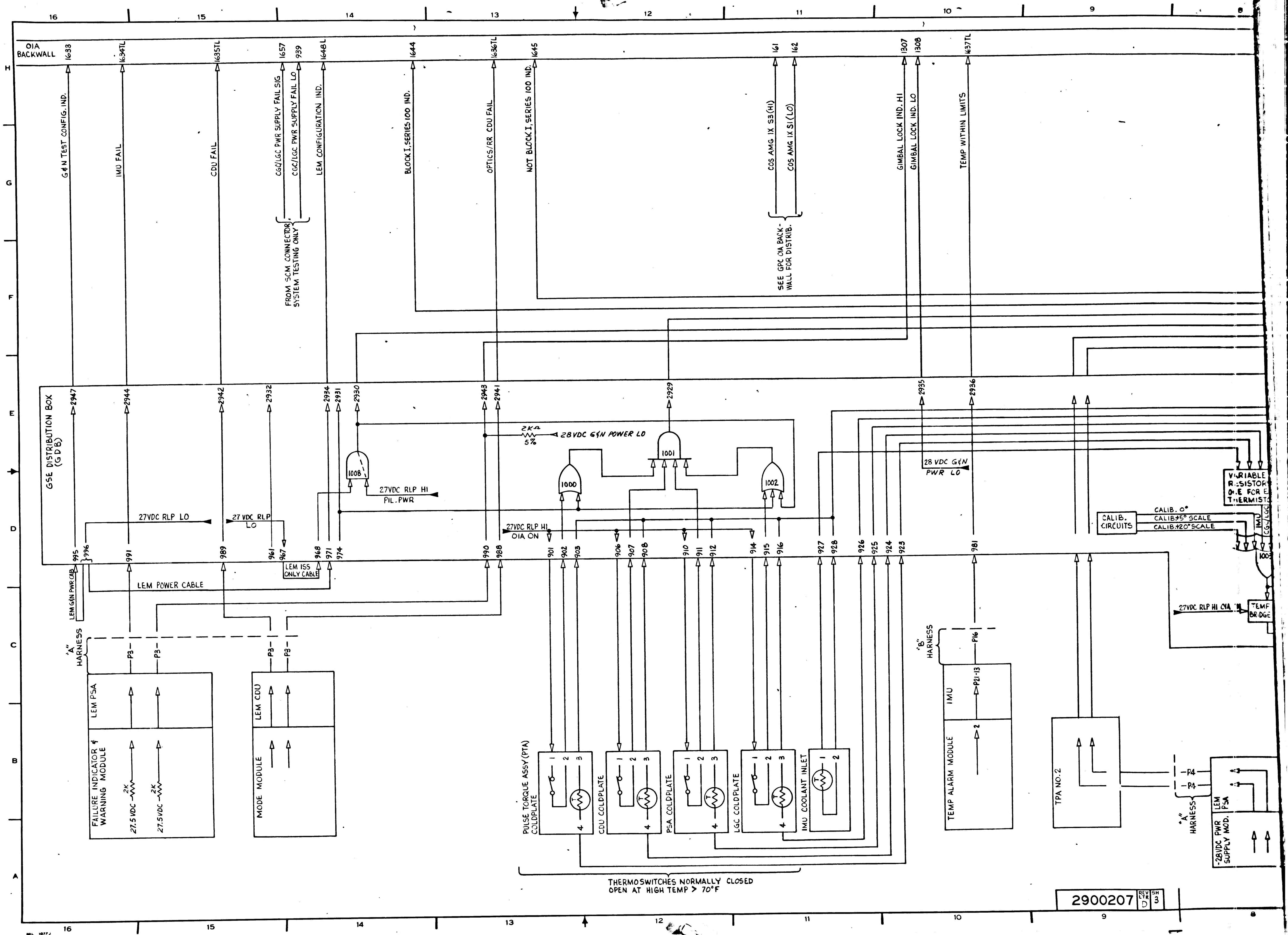
REVISIONS 19254


OIA BACKWALL
537
1639TL
538
1579TL
1654
1745
536
1743
1744
1653
1655
192
194
275
276
587
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND
REMOTE TEMP ALARM COMMON
REMOTE PWR ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
800CPS, 28V, 5% IMU WHEELS PH A
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
-28 VDC
0 VDC IMU
27VDC RLP HI ISS ONLY
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB. ±5° SCALE
CALIB. ±20° SCALE
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
1004
1005
10-0-10 MICRO-AMMETER
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
COOLANT & POWER CONSOLE (CPC)
COOLANT SUPPLY (CLS)
24
25
7
8
11
12
7
8
1
2
3
5
6
8
10
11
4
7
9
23
10
6
6
5
5
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND
P4
P4
"A" HARNESS
LEM PSA
-28VDC PWR SUPPLY MOD.
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F
G
H
LH

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	AC SPARK PLUG DIVISION. GMC MILWAUKEE WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS		
FRACTIONS ± DECIMALS ± ANGLES ±	ACSP PN			
	DRAWN Sclane DATE 7 MAY 65 CHECKED Ed Foster 4 MAY 65 APPROVAL [illegible] APPROVAL M. Watson	MECHANIZATION DIAGRAM MONITOR PANEL (LEM)		
DO NOT SCALE THIS DRAWING				
MATERIAL	NASA APPROVAL [illegible]	CODE IDENT NO	SIZE	2900207
CONTRACT	MIT APPROVAL [illegible]	SCALE		SHEET 3 OF 4

2900207 REV LTR D SH 3

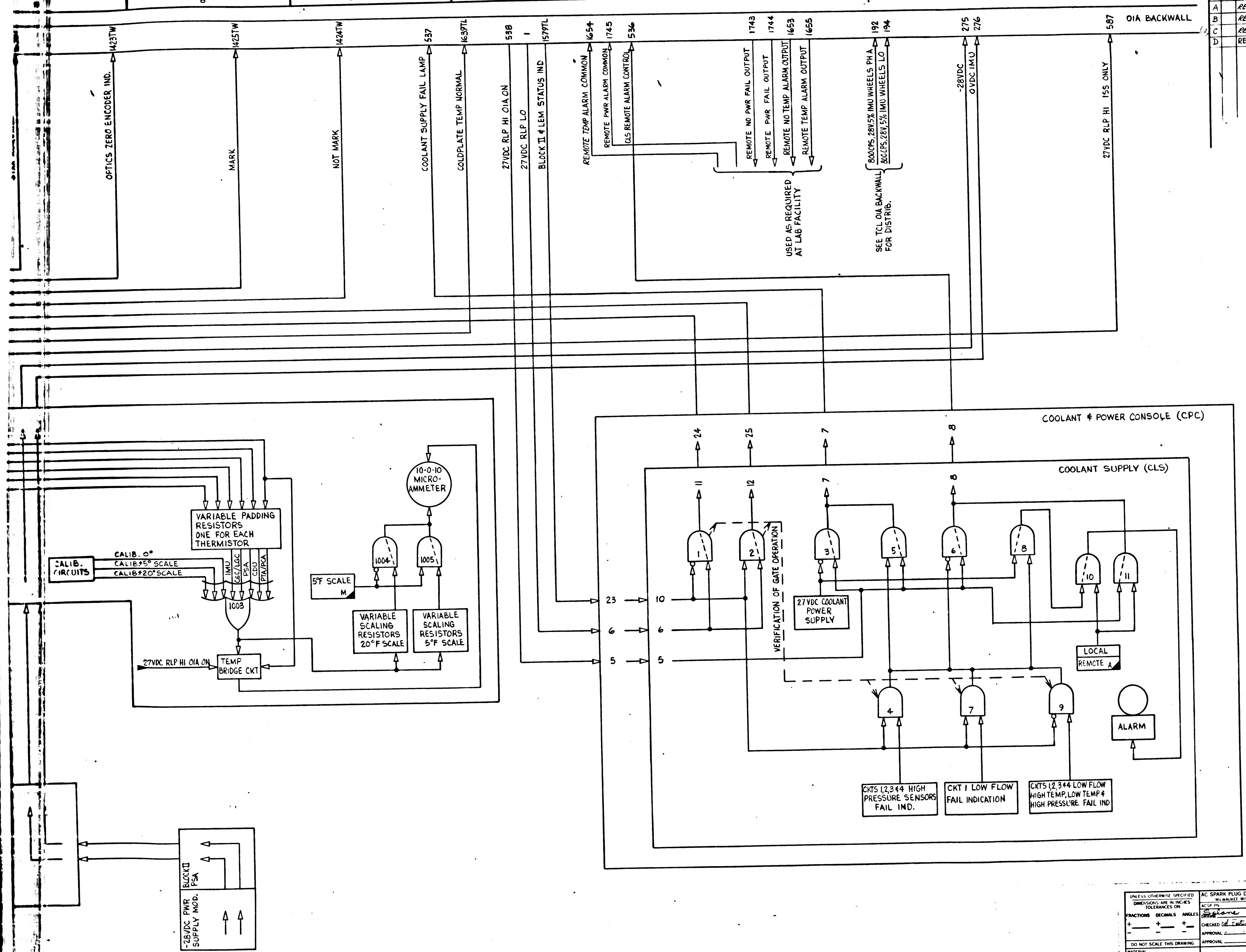
2-/-2900207


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1633
1634TL
1635TL
1657
939
1648L
1644
1636TL
1645
161
162
1307
1308
1637TL
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
LEM CONFIGURATION IND.
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG 1X S3(HI)
COS AMG 1X S1(LO)
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
TEMP WITHIN LIMITS
FROM SCM CONNECTOR SYSTEM TESTING ONLY
SEE GPC OIA BACKWALL FOR DISTRIB.
GSE DISTRIBUTION BOX (GDB)
2947
2944
2942
2932
2934
2931
2930
2943
2941
2929
2935
2936
2KΩ
5%
28VDC G&N POWER LO
1008
27VDC RLP HI
PIL. PWR
1000
1001
1002
28 VDC G&N PWR LO
27VDC RLP LO
27 VDC RLP LO
27VDC RLP HI
OIA ON
995
996
991
989
961
967
968
971
974
990
988
901
902
903
906
907
908
910
911
912
914
915
916
927
928
926
925
924
923
981
LEM ISS ONLY CABLE
LEM POWER CABLE
LEM G&N PWR CAB
"A" HARNESS
P3
P3
P3
P3
LEM PSA
FAILURE INDICATOR & WARNING MODULE
2K
2K
27.5 VDC
27.5 VDC
LEM CDU
MODE MODULE
PULSE TORQUE ASSY (PTA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
LGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
THERMOSWITCHES NORMALLY CLOSED OPEN AT HIGH TEMP > 70°F
"B" HARNESS
P16
IMU
P21-13
2
TEMP ALARM MODULE
TPA NO.2
P4
P4
"A" HARNESS
LEM PSA
-28VDC PWR SUPPLY MOD.
VARIABLE RESISTOR ONE FOR EA THERMISTO
CALIB. CIRCUITS
CALIB. 0°
CALIB.±5° SCALE
CALIB.±20° SCALE
IMU
CGC/LGC
100
27VDC RLP HI OIA
TEMP BRIDGE

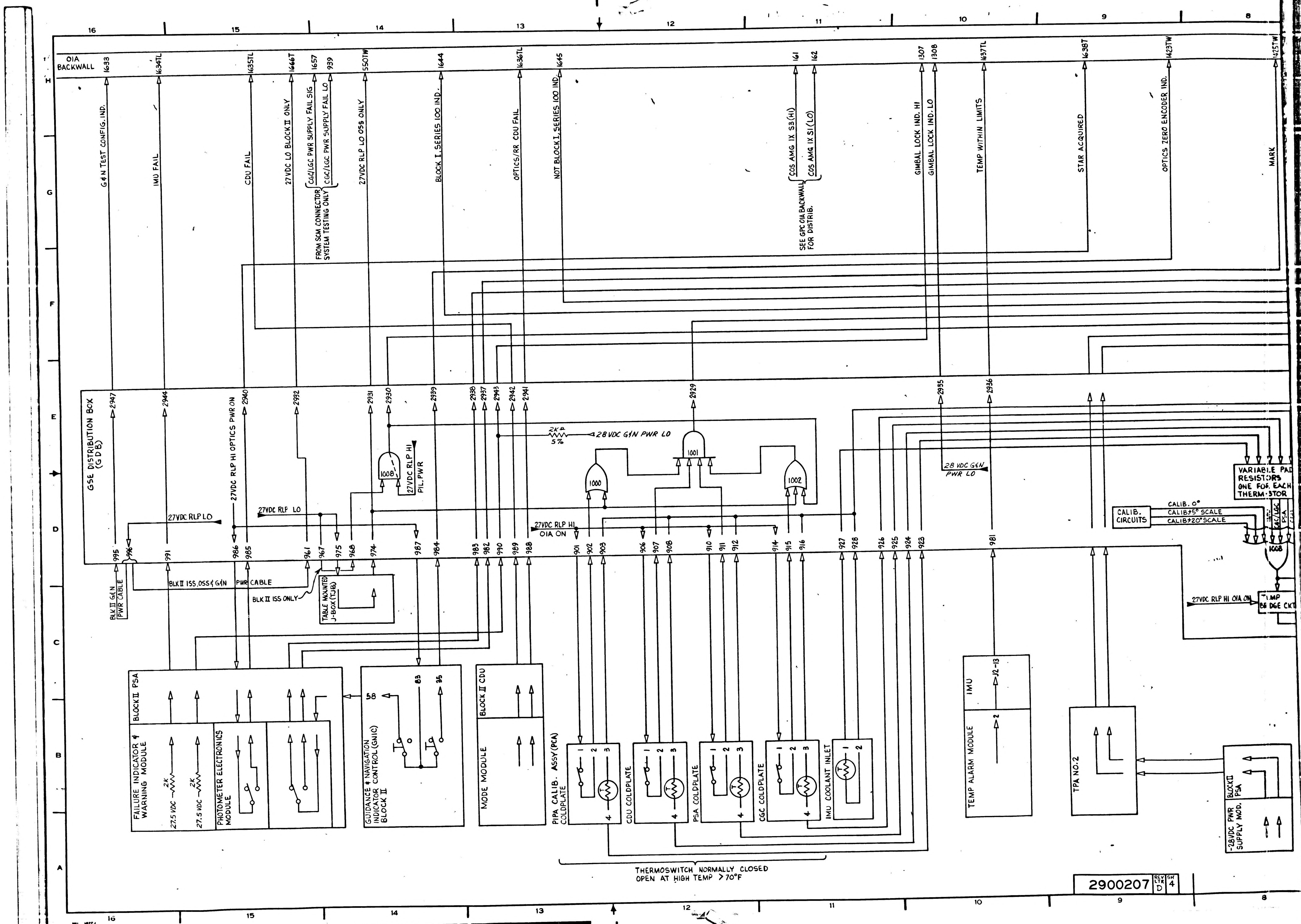
2900207 REV LTR D SH 3

1/2900207

REVISIONS 19254					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	RLP MEM
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISED PER TDRR 20491		8 JUL 65	RLP MEM
D		REVISED PER TDRR 21911		1 SEP 65	RLP


OIA BACKWALL
1423TW
OPTICS ZERO ENCODER IND.
1425TW
MARK
1424TW
NOT MARK
537
COOLANT SUPPLY FAIL LAMP
1639TL
COLDPLATE TEMP NORMAL
538
27VDC RLP HI OIA ON
27VDC RLP LO
1579TL
BLOCK II & LEM STATUS IND
1654
REMOTE TEMP ALARM COMMON
1745
REMOTE PWR ALARM COMMON
536
CLS REMOTE ALARM CONTROL
1743
REMOTE NO PWR FAIL OUTPUT
1744
REMOTE PWR FAIL OUTPUT
1653
REMOTE NO TEMP ALARM OUTPUT
1655
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
192
800CPS, 28V, 5% IMU WHEELS PH A
194
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
275
-28VDC
276
OVDC IMU
587
27VDC RLP HI ISS ONLY
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB ±5° SCALE
CALIB ±20° SCALE
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
10-0-10 MICRO-AMMETER
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
BLOCK II PSA
-28VDC PWR SUPPLY MOD.
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
1
2
3
5
6
8
10
11
VERIFICATION OF GATE OPERATION
23
10
6
6
5
5
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
4
7
9
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN Solane DATE 7 MAY 65 CHECKED Ed Foster 14 MAY 65 APPROVAL APPROVAL	MANNED SPACECRAFT CENTER HOUSTON TEXAS MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK II)
DO NOT SCALE THIS DRAWING MATERIAL	NASA APPROVAL	CODE IDENT NO SIZE 2900207
CONTRACT	MIT APPROVAL	SCALE SHEET 4 OF 4


16
15
14
13
12
11
10
9
8
OIA BACKWALL
1633
1634TL
1635TL
1666T
1657
939
550TW
1644
1636TL
1645
161
162
1307
1308
1637TL
1638T
1423TW
1425TW
G & N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
27VDC LO BLOCK II ONLY
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR SYSTEM TESTING ONLY
27VDC RLP LO OSS ONLY
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
TEMP WITHIN LIMITS
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
H
G
F
E
D
C
B
A
GSE DISTRIBUTION BOX (GDB)
2947
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2941
2929
2935
2936
27VDC RLP HI OPTICS PWR ON
27VDC RLP HI PIL. PWR
1008
2K Ω 5%
28 VDC G & N PWR LO
1001
1000
1002
28 VDC G & N PWR LO
VARIABLE PAD RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB ±5° SCALE
CALIB ±20° SCALE
CGC/LGC
PSA
1003
LAMP BRIDGE CKT
27VDC RLP HI OIA ON
27VDC RLP LO
27VDC RLF LO
27VDC RLP HI OIA ON
995
996
991
986
985
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967
975
968
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987
984
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982
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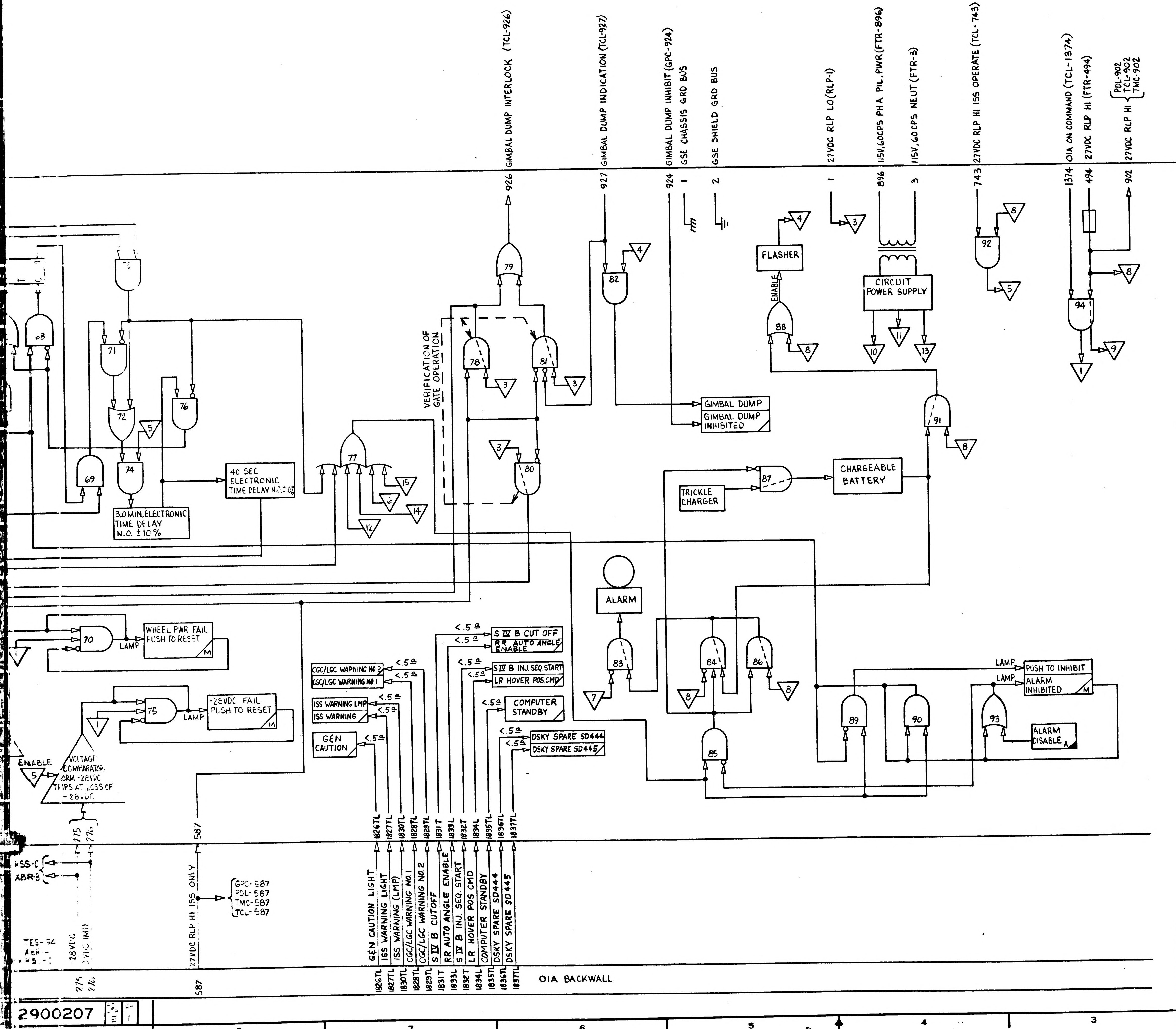
927
928
926
925
924
923
981
BLK II G & N PWR CABLE
BLK II ISS, OSS & G & N PWR CABLE
BLK II ISS ONLY
TABLE MOUNTED J-BOX (TJB)
BLOCK II PSA
FAILURE INDICATOR & WARNING MODULE
27.5 VDC
2K
27.5 VDC
2K
PHOTOMETER ELECTRONICS MODULE
58
83
85
GUIDANCE & NAVIGATION INDICATOR CONTROL (GNIC) BLOCK II
BLOCK II CDU
MODE MODULE
PIPA CALIB. ASSY (PCA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
CGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
IMU
J2-13
2
TEMP ALARM MODULE
TPA NO. 2
BLOCK II PSA
-28VDC PWR SUPPLY MOD.
THERMOSWITCH NORMALLY CLOSED OPEN AT HIGH TEMP > 70°F
2900207
REV LTR D
SH 4

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	
B		REVISED PER TDRR 20488		JUL 65	
C		REVISED PER TDRR 20491		9 JUL 65	
D		REVISED PER TDRR 21911		1 SEP 65	
E		REVISED PER TDRR 22007		9 SEP 65	



926 GIMBAL DUMP INTERLOCK (TCL-926)
927 GIMBAL DUMP INDICATION (TCL-927)
924 GIMBAL DUMP INHIBIT (GPC-924)
1 GSE CHASSIS GRD BUS
2 GSE SHIELD GRD BUS
1 27VDC RLP LO (RLP-1)
896 115V, 60CPS PHA PIL. PWR (FTR-896)
3 115V, 60CPS NEUT (FTR-3)
743 27VDC RLP HI ISS OPERATE (TCL-743)
1374 OIA ON COMMAND (TCL-1374)
494 27VDC RLP HI (FTR-494)
902 27VDC RLP HI PDL-902 TCL-902 TMC-902
FLASHER
ENABLE
CIRCUIT POWER SUPPLY
VERIFICATION OF GATE OPERATION
GIMBAL DUMP
GIMBAL DUMP INHIBITED
40 SEC ELECTRONIC TIME DELAY N.O.±10%
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
TRICKLE CHARGER
CHARGEABLE BATTERY
ALARM
WHEEL PWR FAIL PUSH TO RESET
LAMP
M
-28VDC FAIL PUSH TO RESET
1A
VOLTAGE COMPARATOR -CRM -28VDC TRIPS AT LOSS OF -28VDC
ENABLE
PUSH TO INHIBIT
ALARM INHIBITED
ALARM DISABLE
A
CGC/LGC WARNING NO.2
CGC/LGC WARNING NO.1
ISS WARNING LMP
ISS WARNING
GEN CAUTION
S IV B CUT OFF
RR AUTO ANGLE ENABLE
S IV B INJ SEQ START
LR HOVER POS. CMD
COMPUTER STANDBY
DSKY SPARE SD444
DSKY SPARE SD445
<.5Ω
68
69
70
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75
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85
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88
89
90
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93
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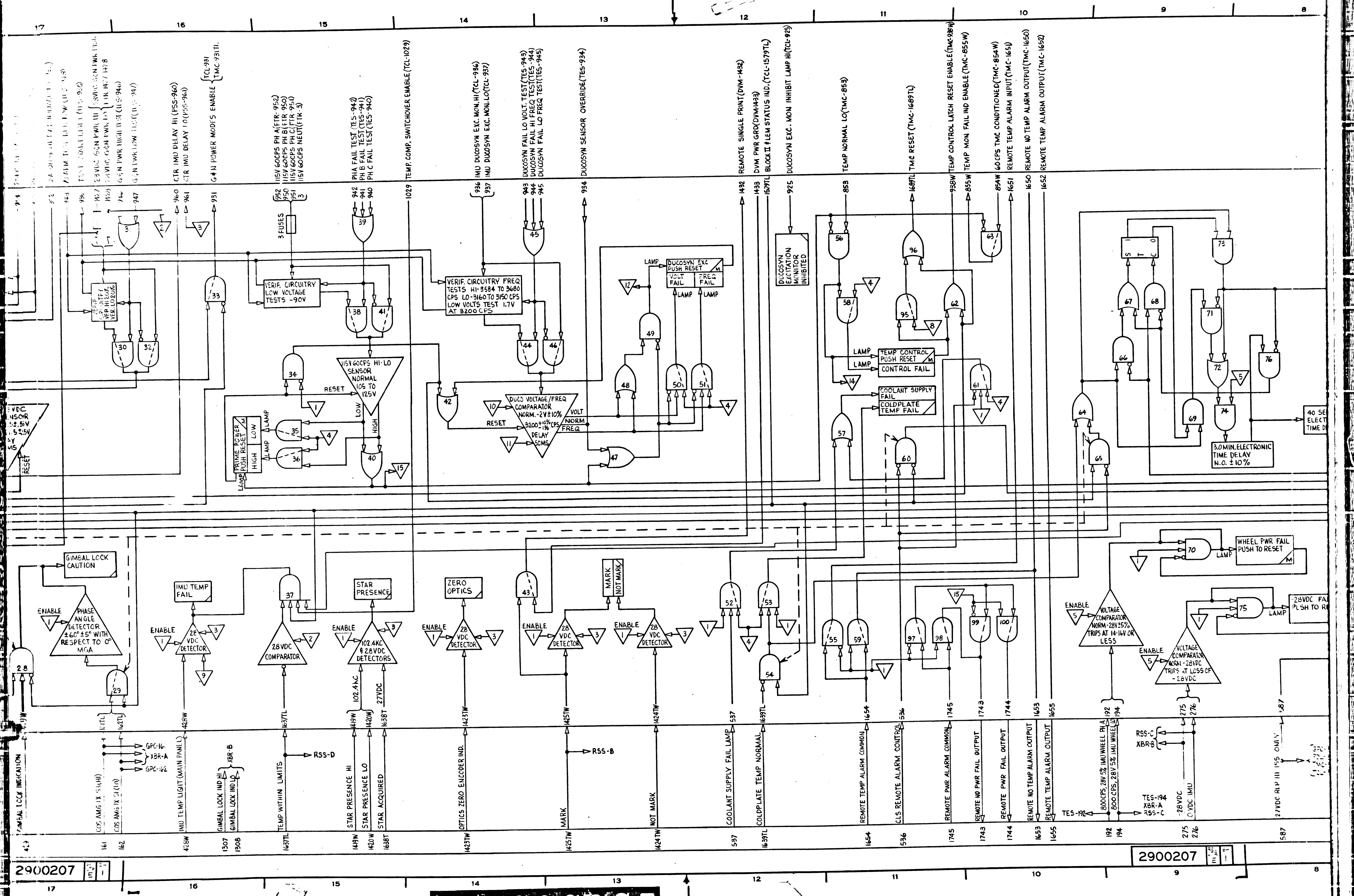
1
3
4
5
6
7
8
9
10
11
12
13
14
15
1826TL
1827TL
1830TL
1828TL
1829TL
1831T
1833L
1832T
1834L
1835TL
1836TL
1837TL
GEN CAUTION LIGHT
ISS WARNING LIGHT
ISS WARNING (LMP)
CGC/LGC WARNING NO.1
CGC/LGC WARNING NO.2
S IV B CUTOFF
RR AUTO ANGLE ENABLE
S IV B INJ. SEQ. START
LR HOVER POS CMD
COMPUTER STANDBY
DSKY SPARE SD444
DSKY SPARE SD445
OIA BACKWALL
587
27VDC RLP HI ISS ONLY
GPC-587
PDL-587
TMC-587
TCL-587
275
276
RSS-C
XBR-B
TES-34
28VDC
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	AC SP PN	
	DRAWN Splane DATE 7 MAY 65 CHECKED APPROVAL APPROVAL	MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK I SERIES 100, BLOCK II, LEM)
DO NOT SCALE THIS DRAWING		
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 | SIZE | 2900207
CONTRACT	MIT APPROVAL	SCALE — | SHEET 1 OF 4


17
16
15
14
13
12
11
10
9
8
DIA OFF ... (TES-952)
ALARM TEST ... LOW (TES-948)
TEST START ... (TES-935)
28VDC G&N PWR HI } 28VDC G&N PWR TEST
28VDC G&N PWR LO } FTR 1427 1428
G&N PWR HIGH TEST (TES-946)
G&N PWR LOW TEST (TES-947)
CTR IMU DELAY HI (PSS-960)
CTR IMU DELAY LO (PSS-961)
G&N POWER MODES ENABLE {TCL-931 TMC-931TL
115V 60CPS PH A (FTR-952)
115V 60CPS PH B (FTR 950)
115V 60CPS PH C (FTR 951)
115V 60CPS NEUT (FTR-3)
PHA FAIL TEST (TES-942)
PH B FAIL TEST (TES-941)
PH C FAIL TEST (TES-940)
TEMP. COMP. SWITCHOVER ENABLE (TCL-1029)
IMU DUCOSYN EXC. MON. HI (TCL-936)
IMU DUCOSYN EXC. MON. LO (TCL-937)
DUCOSYN FAIL LO VOLT. TEST (TES-943)
DUCOSYN FAIL HI FREQ TEST (TES-944)
DUCOSYN FAIL LO FREQ TEST (TES-945)
DUCOSYN SENSOR OVERRIDE (TES-934)
REMOTE SINGLE PRINT (DVM-1432)
DVM PWR GRD (DVM-1433)
BLOCK II & LEM STATUS IND. (TCL-1579TL)
DUCOSYN EXC. MON INHIBIT LAMP HI (TCL-925)
TEMP NORMAL LO (TMC-853)
TMC RESET (TMC-1689TL)
TEMP CONTROL LATCH RESET ENABLE (TMC-938W)
TEMP MON FAIL IND ENABLE (TMC-855W)
60 CPS TMC CONDITIONED (TMC-854W)
REMOTE TEMP ALARM INPUT (TMC-1651)
REMOTE NO TEMP ALARM OUTPUT (TMC-1650)
REMOTE TEMP ALARM OUTPUT (TMC-1652)
952 950 951 3
942 941 940
1029
936 937
943 944 945
934
1432 1433 1579TL 925 853 1689TL 938W 855W 854W 1651 1650 1652
960 961 931 947 1427 1428
3 FUSES
VERIF. CIRCUITRY LOW VOLTAGE TESTS -90V
VERIF. CIRCUITRY FREQ TESTS HI-3584 TO 3680 CPS LO-3160 TO 3150 CPS LOW VOLTS TEST 1.7V AT 3200 CPS
VERIF CIRCUITRY VER HI 28.6 VER LO 26.6
115V 60CPS HI-LO SENSOR NORMAL 105 TO 125V
LOW
HIGH
RESET
PRIME POWER PUSH RESET
LOW
HIGH
LAMP
DUCO VOLTAGE/FREQ COMPARATOR NORM. -2V ±10% 3200 +10% -1% CPS DELAY 5CMS
VOLT
NORM
FREQ
DUCOSYN EXC PUSH RESET
VOLT FAIL
FREQ FAIL
DUCOSYN EXCITATION MONITOR INHIBITED
TEMP CONTROL PUSH RESET
CONTROL FAIL
COOLANT SUPPLY FAIL
COLDPLATE TEMP FAIL
S T C O
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
40 SEC ELECT TIME D
±VDC SENSOR ... AY ... MS
GIMBAL LOCK CAUTION
ENABLE
PHASE ANGLE DETECTOR ±60° ±5° WITH RESPECT TO 0° MGA
IMU TEMP FAIL
28 VDC DETECTOR
28VDC COMPARATOR
STAR PRESENCE
102.4KC & 28VDC DETECTORS
102.4KC
27VDC
ZERO OPTICS
MARK
NOT MARK
WHEEL PWR FAIL PUSH TO RESET
VOLTAGE COMPARATOR NORM-28V±5% TRIPS AT 14-16V OR LESS
VOLTAGE COMPARATOR NORM -28VDC TRIPS AT LOSS OF -28VDC
-28VDC FAIL PUSH TO RESET
M
1 2 3 4 5 8 9 10 11 12 14 15
28 29 30 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 95 96 97 98 99 100
GIMBAL LOCK INDICATION
COS AMG IX 51 (HI)
COS AMG IX 51 (LO)
GPC-161
XBR-A
GPC-162
IMU TEMP LIGHT (MAIN PANEL)
GIMBAL LOCK IND HI
GIMBAL LOCK IND LO
XBR-B
TEMP WITHIN LIMITS
RSS-D
STAR PRESENCE HI
STAR PRESENCE LO
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
RSS-B
NOT MARK
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
REMOTE TEMP ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE PWR ALARM COMMON
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
800CPS, 28V 5% IMU WHEEL PH A
800 CPS, 28V 5% IMU WHEEL LO
TES-192
TES-194
XBR-A
RSS-C
RSS-C
XBR-B
-28VDC
0 VDC IMU
27VDC RLP III 155 ONLY
429W 161TL 162TL 428W 1637TL 1419W 1420W 1638T 1423TW 1425TW 1424TW
537 1639TL 1654 536 1745 1743 1744 1653 1655 192 194 275 276 587
429 161 162 428W 1307 1308 1637TL 1419W 1420W 1638T 1423TW 1425TW 1424TW
537 1639TL 1654 536 1745 1743 1744 1653 1655 192 194 275 276 587
2900207
2900207

27/2900207

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS:

2900210 AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR)
RLP RELAY & LAMP POWER SUPPLY
2900204 TEMPERATURE MONITOR CONTROL PANEL (BLOCK I, SERIES 100)(TMC)
2900203 TEMPERATURE MONITOR CONTROL PANEL (BLOCK II & LEM)(TMC)
2900208 POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR
GYRO CAGING FUNCTIONS (PDL)
2900223 GIMBAL POSITION CONTROL (GPC)
2900202 TEST CONTROL PANEL (BLOCK I, SERIES 100)(TCL)
2900201 TEST CONTROL PANEL (BLOCK II & LEM)(TCL)
2900206 TEST SELECTOR PANEL (TES)
2900200 GYRO CAGING PANEL (BLOCK II & LEM)(GCP)
2900218 OSCILLOGRAPH SIGNAL SELECTION
RSS-B TO FIXED DC CHANNEL, RSS-C TO SWITCHABLE AC CHANNEL,
RSS-D TO SWITCHABLE DC CHANNEL
2900217 SIGNAL SELECTION & MEASUREMENT
XBR-A CROSSBAR-AC SIGNALS
XBR-B CROSSBAR-DC SIGNALS
2900219 COUNTER SIGNAL SELECTION
PRIMARY SIGNAL SELECTOR (PSS)
2900214 GSE GROUNDING (BLOCK I SERIES 100)
2900213 GSE GROUNDING (BLOCK II & LEM)
2900209 COMPUTER SIMULATOR INTERFACE (CMS)
2900211 AUXILIARY INPUT/OUTPUT CALIBRATION (AIP)

4. NON STANDARD SYMBOLOGY:

INDICATES "AND" GATE WITH SWITCHED SIGNAL

NAME	INDICATES INDICATOR LIGHT
NAME M	INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
NAME NAME	INDICATES SPLIT SCREEN INDICATOR LIGHT
NAME NAME M	INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES UNLIGHTED PUSHBUTTON OR TOGGLE SWITCH (ALTERNATE ACTION)

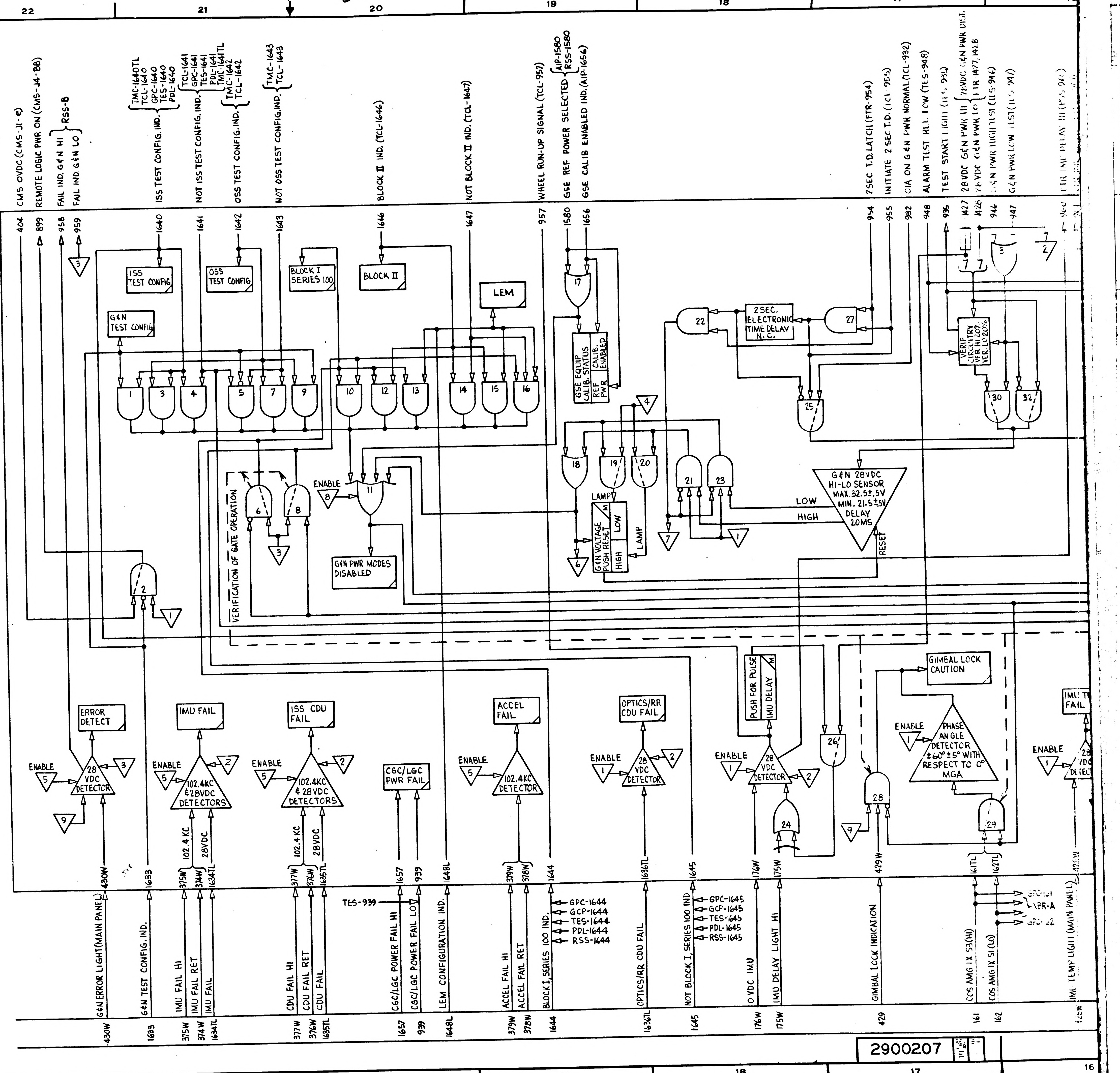
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   A. W-BLOCK I SERIES 100 ONLY
   B. T-BLOCK II ONLY
   C. L-LEM ONLY
   D. BLANK-ALL G&N CONFIGURATIONS
   E. TW, TL OR WL-USED IN MORE THAN ONE G&N CONFIGURATION AS SHOWN.

6. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK I SERIES 100	SH 1 SH 2
BLOCK II	SH 1 SH 3
LEM	SH 1 SH 4

7. SIGNAL REFERENCE:

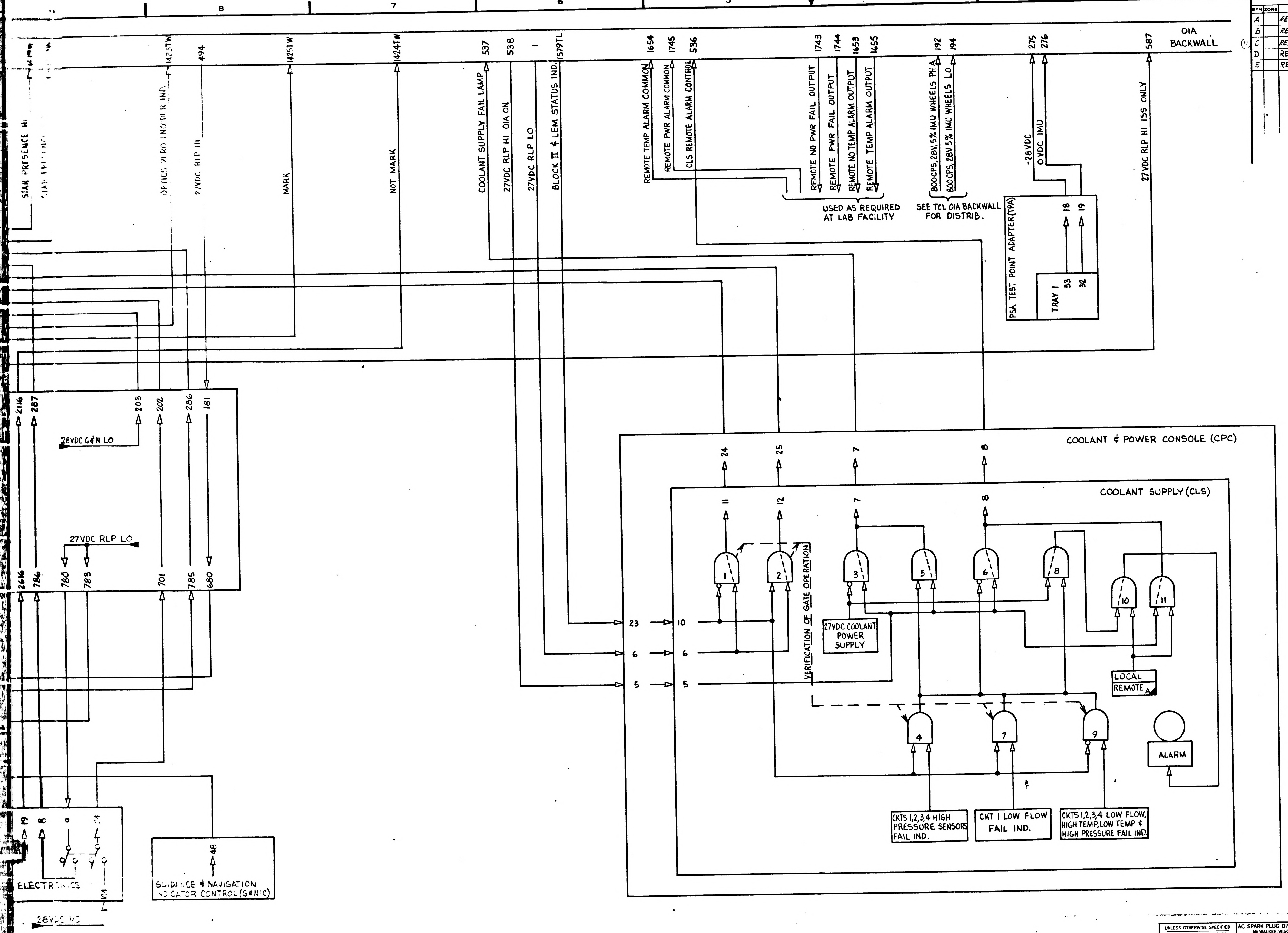
1 = OIA ON	11 = -28VDC
2 = 28VDC G&N PWR LO	12 = DUCO EXC. FAIL
3 = 27VDC RLP LO	13 = +45 VDC
4 = FLASHER	14 = TMC FAIL
5 = ISS OPER. 5SEC T.D.	15 = PRIME PWR FAIL
6 = G&N PWR FAIL	
7 = 2 SEC T.D. AT OIA ON	
8 = 27VDC PIL. PWR	
9 = 27VDC OIA ON	
10 = +28VDC	


24
23
22
21
20
19
18
17
16
H
G
F
E
D
C
B
A
CMS OVDC (CMS-J1-e)
REMOTE LOGIC PWR ON (CMS-J4-BB)
FAIL IND. G&N HI
FAIL IND. G&N LO
RSS-B
ISS TEST CONFIG. IND.
TMC-1640TL
TCL-1640
GPC-1640
TES-1640
PDL-1640
NOT ISS TEST CONFIG. IND.
TCL-1641
GPC-1641
TES-1641
PDL-1641
TMC-1641TL
OSS TEST CONFIG. IND.
TMC-1642
TCL-1642
NOT OSS TEST CONFIG. IND.
TMC-1643
TCL-1643
BLOCK II IND. (TCL-1646)
NOT BLOCK II IND. (TCL-1647)
WHEEL RUN-UP SIGNAL (TCL-957)
GSE REF POWER SELECTED
AIP-1580
RSS-1580
GSE CALIB ENABLED IND. (AIP-1656)
2SEC T.D. LATCH (FTR-954)
INITIATE 2 SEC T.D. (TCL-955)
OIA ON G&N PWR NORMAL (TCL-932)
ALARM TEST REL. LOW (TES-948)
TEST START LIGHT
28VDC G&N PWR HI
28VDC G&N PWR LO
G&N PWR DIST.
FTR 1427, 1428
G&N PWR HIGH TEST (TES-946)
G&N PWR LOW TEST
404
899
958
959
1640
1641
1642
1643
1646
1647
957
1580
1656
954
955
932
948
935
1427
1428
946
947
ISS TEST CONFIG
OSS TEST CONFIG
BLOCK I SERIES 100
BLOCK II
LEM
G&N TEST CONFIG
GSE EQUIP CALIB. STATUS
REF PWR
CALIB ENABLED
2 SEC. ELECTRONIC TIME DELAY N.C.
VERIF CIRCUITRY VER. HI 20% VER. LO 20%
G&N 28VDC HI-LO SENSOR MAX. 32.5±.5V MIN. 21.5±.5V DELAY 20MS
LOW
HIGH
RESET
LAMP
G&N VOLTAGE PUSH RESET M
LOW
HIGH
LAMP
ENABLE
VERIFICATION OF GATE OPERATION
G&N PWR MODES DISABLED
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
32
ERROR DETECT
IMU FAIL
ISS CDU FAIL
CGC/LGC PWR FAIL
ACCEL FAIL
OPTICS/RR CDU FAIL
PUSH FOR PULSE M
IMU DELAY
GIMBAL LOCK CAUTION
IMU TEMP FAIL
28 VDC DETECTOR
102.4KC & 28VDC DETECTORS
102.4KC & 28VDC DETECTORS
102.4KC DETECTOR
28 VDC DETECTOR
28 VDC DETECTOR
PHASE ANGLE DETECTOR ±60°±5° WITH RESPECT TO 0° MGA
102.4 KC
28VDC
TES-939
430W
1633
375W
374W
1634TL
377W
376W
1635TL
1657
939
1648L
379W
378W
1644
1636TL
1645
176W
175W
429W
161TL
162TL
G&N ERROR LIGHT (MAIN PANEL)
G&N TEST CONFIG. IND.
IMU FAIL HI
IMU FAIL RET
IMU FAIL
CDU FAIL HI
CDU FAIL RET
CDU FAIL
CGC/LGC POWER FAIL HI
CGC/LGC POWER FAIL LO
LEM CONFIGURATION IND.
ACCEL FAIL HI
ACCEL FAIL RET
BLOCK I, SERIES 100 IND.
GPC-1644
GCP-1644
TES-1644
PDL-1644
RSS-1644
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND
GPC-1645
GCP-1645
TES-1645
PDL-1645
RSS-1645
0 VDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK INDICATION
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
XBR-A
IMU TEMP LIGHT (MAIN PANEL)
430W
1633
375W
374W
1634TL
377W
376W
1635TL
1657
939
1648L
379W
378W
1644
1636TL
1645
176W
175W
429
161
162

2900207

MIL FORM 1050 J3

1/2900207


OIA BACKWALL
STAR PRESENCE HI
OPTICS ZERO ENCODER IND.
1423TW
494
27VDC RLP HI
MARK
1425TW
NOT MARK
1424TW
COOLANT SUPPLY FAIL LAMP
537
27VDC RLP HI OIA ON
538
27VDC RLP LO
BLOCK II ¢ LEM STATUS IND.
1579TL
REMOTE TEMP ALARM COMMON
1654
REMOTE PWR ALARM COMMON
1745
CLS REMOTE ALARM CONTROL
536
REMOTE NO PWR FAIL OUTPUT
1743
REMOTE PWR FAIL OUTPUT
1744
REMOTE NO TEMP ALARM OUTPUT
1653
REMOTE TEMP ALARM OUTPUT
1655
USED AS REQUIRED AT LAB FACILITY
800CPS,28V,5% IMU WHEELS PH A
192
800CPS,28V,5% IMU WHEELS LO
194
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
275
0 VDC IMU
276
27VDC RLP HI ISS ONLY
587
PSA TEST POINT ADAPTER (TPA)
18
19
TRAY 1
33
32
2116
287
203
202
286
181
28VDC G¢N LO
27VDC RLP LO
2616
786
780
783
701
785
680
ELECTRONICS
19
80
24
104
28VDC MD
GUIDANCE ¢ NAVIGATION INDICATOR CONTROL (G¢NIC)
48
COOLANT ¢ POWER CONSOLE (CPC)
24
25
7
8
23
6
5
COOLANT SUPPLY (CLS)
11
12
7
8
10
6
5
1
2
3
5
6
8
10
11
4
7
9
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
ALARM
CKTS 1,2,3,4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL IND.
CKTS 1,2,3,4 LOW FLOW, HIGH TEMP, LOW TEMP ¢ HIGH PRESSURE FAIL IND.

REVISIONS

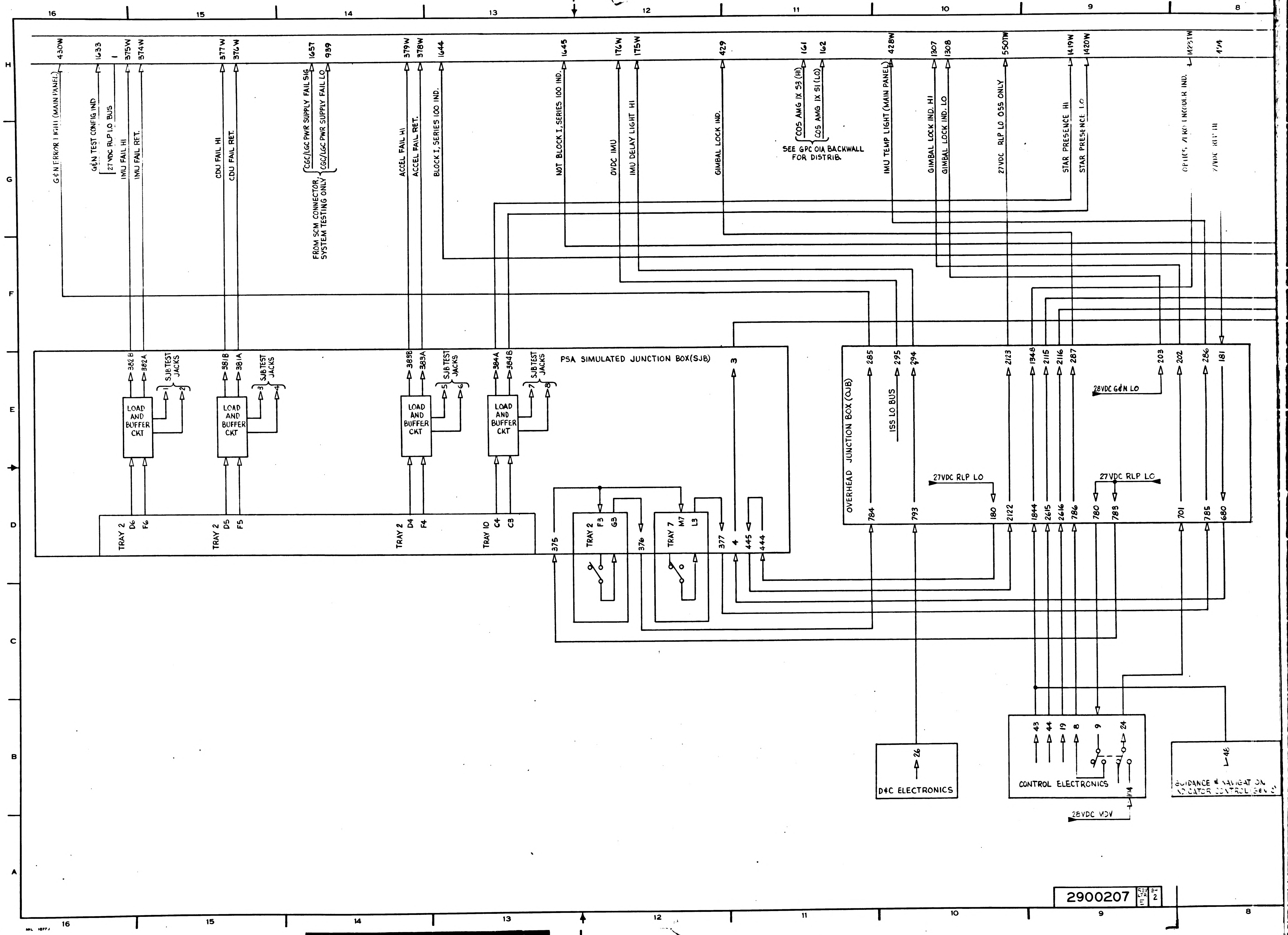
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 [illegible] 65	
B		REVISED PER TDRR 20438		JUL 65	
C		REVISION STATUS CHANGED		8 JUL 65	
D		REVISION STATUS CHANGED		SEP 65	
E		REVISION STATUS CHANGED		8 SEP 65	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + — + — + — – – –	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN Splane DATE 7 MAY 65	MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK I SERIES 100)
	CHECKED Ed Foster 4 MAY 65	
	APPROVAL	
DO NOT SCALE THIS DRAWING	APPROVAL	
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974
		SIZE
		2900207
CONTRACT	MIT APPROVAL	SCALE —
		SHEET 2 OF 4

2900207 E 2

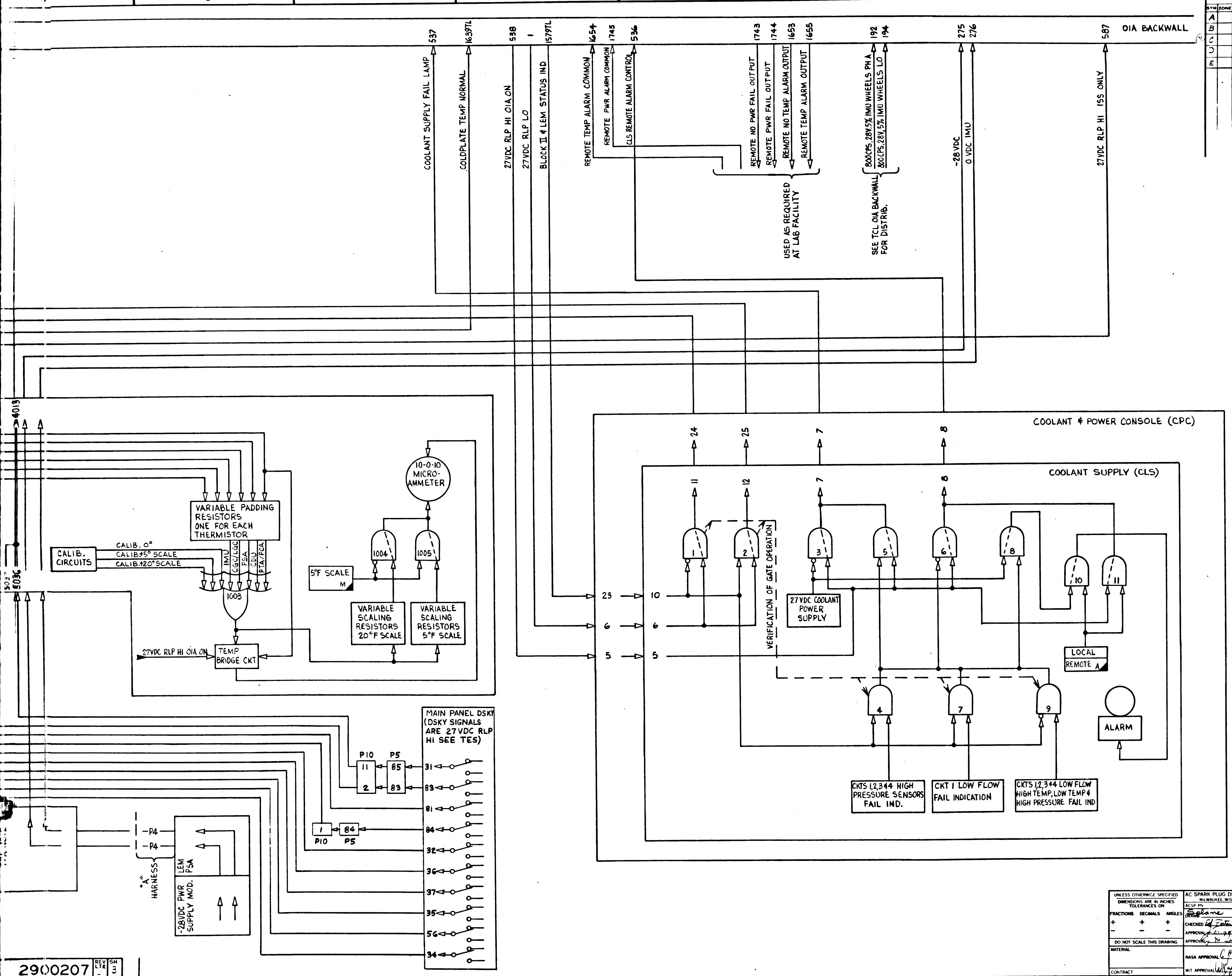
2900207 E

272900207


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
430W
1633
1
375W
374W
377W
376W
1657
939
379W
378W
1644
1645
176W
175W
429
161
162
428W
1307
1308
550TW
1419W
1420W
1423TW
494
GEN ERROR LIGHT (MAIN PANEL)
GEN TEST CONFIG IND
27VDC RLP LO BUS
IMU FAIL HI
IMU FAIL RET.
CDU FAIL HI
CDU FAIL RET.
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR, SYSTEM TESTING ONLY
ACCEL FAIL HI
ACCEL FAIL RET.
BLOCK I, SERIES 100 IND.
NOT BLOCK I, SERIES 100 IND.
OVDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK IND.
COS AMG IX 53 (HI)
COS AMG IX 51 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
IMU TEMP LIGHT (MAIN PANEL)
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
27VDC RLP LO OSS ONLY
STAR PRESENCE HI
STAR PRESENCE LO
OPTICS ZERO ENCODER IND.
27VDC RLP HI
PSA SIMULATED JUNCTION BOX (SJB)
382B
382A
SJB TEST JACKS
1
2
381B
381A
SJB TEST JACKS
3
4
383B
383A
SJB TEST JACKS
5
6
384A
384B
SJB TEST JACKS
7
8
3
LOAD AND BUFFER CKT
LOAD AND BUFFER CKT
LOAD AND BUFFER CKT
LOAD AND BUFFER CKT
TRAY 2
D6
F6
TRAY 2
D5
F5
TRAY 2
D4
F4
TRAY 10
C4
C3
375
TRAY 2
F3
G3
376
TRAY 7
M7
L3
377
4
445
444
OVERHEAD JUNCTION BOX (OJB)
285
295
294
2123
1348
2115
2116
287
203
202
286
181
155 LO BUS
28VDC GEN LO
27VDC RLP LO
27VDC RLP LO
784
793
180
2122
1844
2615
2616
786
780
783
701
785
680
26
D&C ELECTRONICS
43
44
19
8
9
24
CONTROL ELECTRONICS
104
28VDC MDV
48
GUIDANCE & NAVIGATION INDICATOR CONTROL GEN C
2900207
REV LTR
SH 2

1/2900207

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	
B		REVISED PER TDRR 20488		JUL 65	
C		REVISED PER TDRR 20491		8 JUL 65	
D		REVISED PER TDRR 2'911		SEP 65	
E		REVISED PER TDRR 22007		9 SEP 65	


537
COOLANT SUPPLY FAIL LAMP
1639TL
COLDPLATE TEMP NORMAL
538
27VDC RLP HI OIA ON
27VDC RLP LO
1579TL
BLOCK II & LEM STATUS IND
1654
REMOTE TEMP ALARM COMMON
1745
REMOTE PWR ALARM COMMON
536
CLS REMOTE ALARM CONTROL
1743
REMOTE NO PWR FAIL OUTPUT
1744
REMOTE PWR FAIL OUTPUT
1653
REMOTE NO TEMP ALARM OUTPUT
1655
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
192
800CPS, 28V, 5% IMU WHEELS PH A
194
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
275
-28VDC
276
0 VDC IMU
587
27VDC RLP HI ISS ONLY
OIA BACKWALL
4013
5037
5036
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB.±5° SCALE
CALIB.±20° SCALE
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
10-0-10 MICRO-AMMETER
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
MAIN PANEL DSKY (DSKY SIGNALS ARE 27VDC RLP HI SEE TES)
P10
P5
11
2
85
83
1
84
31
83
81
84
32
36
37
35
56
34
P4
P4
"A" HARNESS
LEM PSA
-28VDC PWR SUPPLY MOD.
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
23
10
6
6
5
5
1
2
3
5
6
8
10
11
4
7
9
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
ALARM
CKTS 1,2,3&4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3&4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND
8
7
6
5
4
3
2
1
9
H
G
F
E
D
C
B
A

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ + +
- - -
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Splane DATE 7 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL M Watson
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

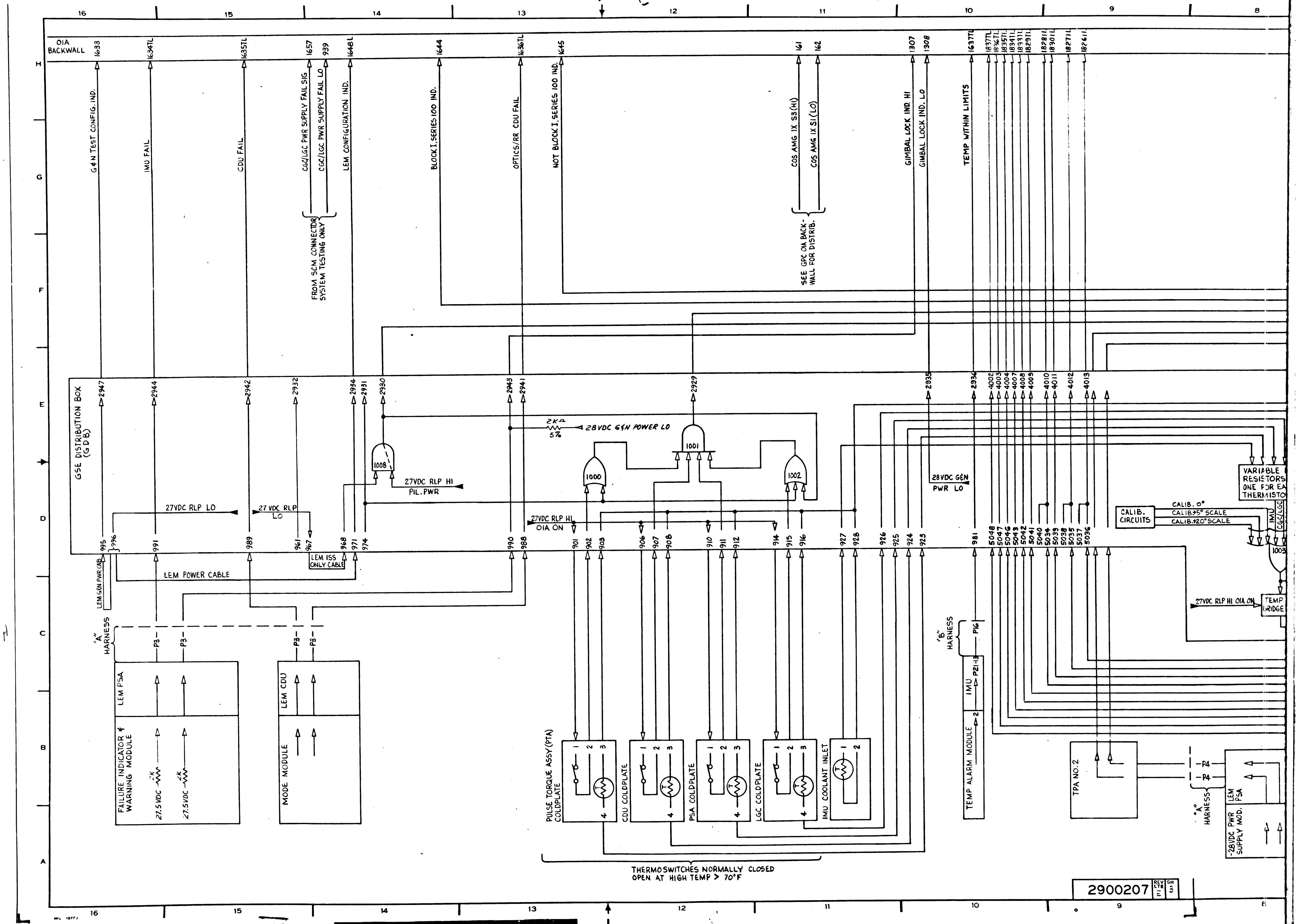
MECHANIZATION DIAGRAM MONITOR PANEL (LEM)

CODE IDENT NO 99974
SIZE
2900207
SCALE
SHEET 3 OF 4

2900207 REV LTR E SH 3

2900207 E

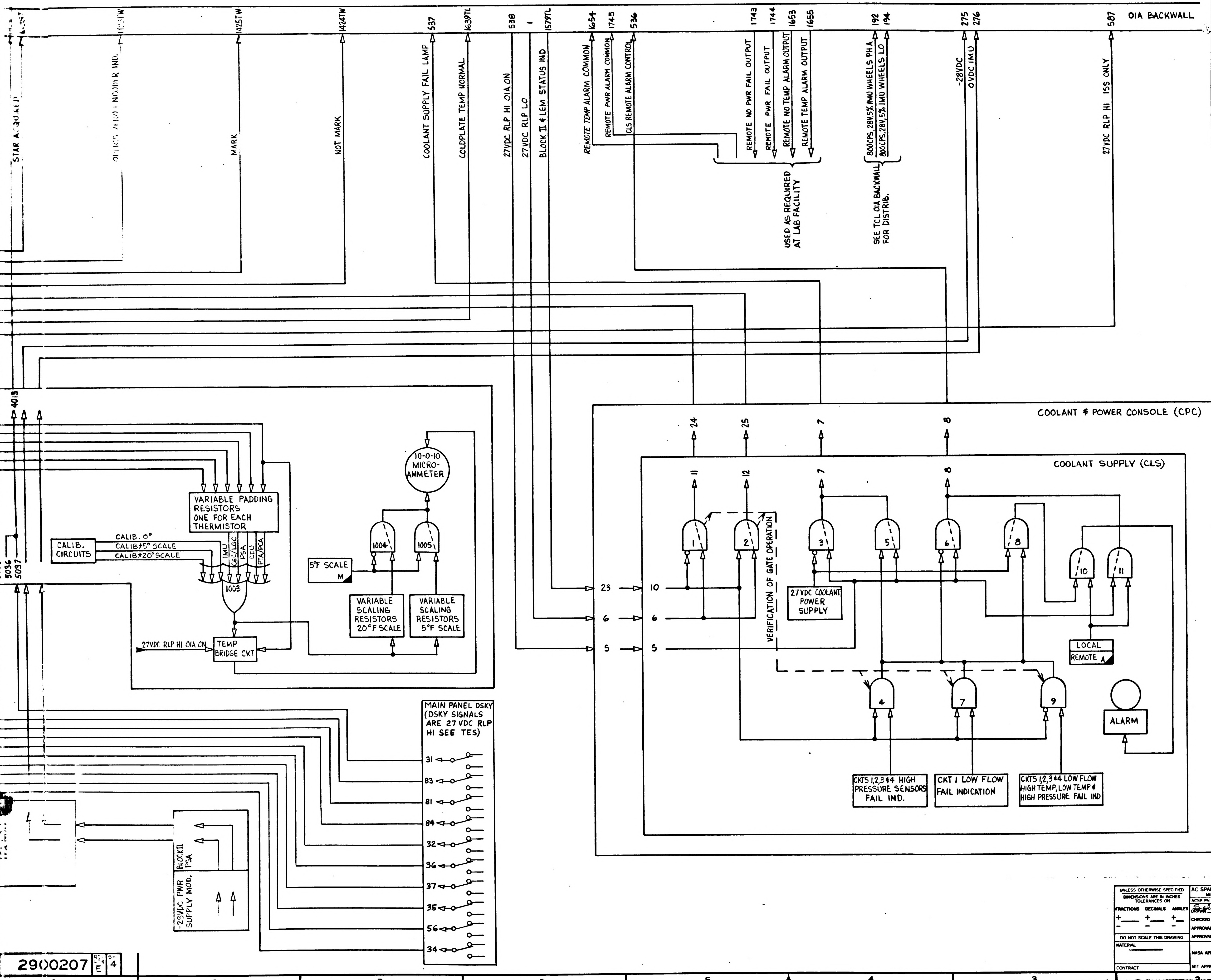
2/2900207



16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1633
1634TL
1635TL
1657
939
1648L
1644
1636TL
1645
161
162
1307
1308
1637TL
1837TL
1836TL
1835TL
1834TL
1833TL
1829TL
1828TL
1830TL
1827TL
1826TL
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
LEM CONFIGURATION IND.
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
TEMP WITHIN LIMITS
FROM SCM CONNECTOR SYSTEM TESTING ONLY
SEE GPC OIA BACKWALL FOR DISTRIB.
GSE DISTRIBUTION BOX (GDB)
2947
2944
2942
2932
2934
2931
2930
2943
2941
2929
2935
2936
4002
4003
4004
4007
4008
4009
4010
4011
4012
4013
2KΩ 5%
28VDC G&N POWER LO
1008
1000
1001
1002
27VDC RLP HI PIL. PWR
27VDC RLP LO
27 VDC RLP LO
27VDC RLP HI OIA ON
28VDC GEN PWR LO
VARIABLE RESISTORS ONE FOR EA THERMISTO
CALIB. CIRCUITS
CALIB. 0°
CALIB. +5° SCALE
CALIB. +20° SCALE
IMU
CGC/LGC
1003
TEMP BRIDGE
27VDC RLP HI OIA ON
995
996
991
989
961
967
968
971
974
990
988
901
902
903
906
907
908
910
911
912
914
915
916
927
928
926
925
924
923
981
5048
5047
5046
5043
5042
5041
5040
5039
5038
5035
5037
5036
LEM ISS ONLY CABLE
LEM POWER CABLE
LEM GEN PWR CAB.
"A" HARNESS
P3
LEM PSA
FAILURE INDICATOR & WARNING MODULE
27.5VDC 2K
27.5VDC 2K
LEM CDU
MODE MODULE
PULSE TORQUE ASSY (PTA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
LGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
THERMOSWITCHES NORMALLY CLOSED OPEN AT HIGH TEMP > 70°F
"B" HARNESS
P16
P21-13
IMU
TEMP ALARM MODULE
TPA NO. 2
P4
"A" HARNESS
LEM PSA
-28VDC PWR SUPPLY MOD. PSA
2900207
REV LTR E
SH 3

1/2900207

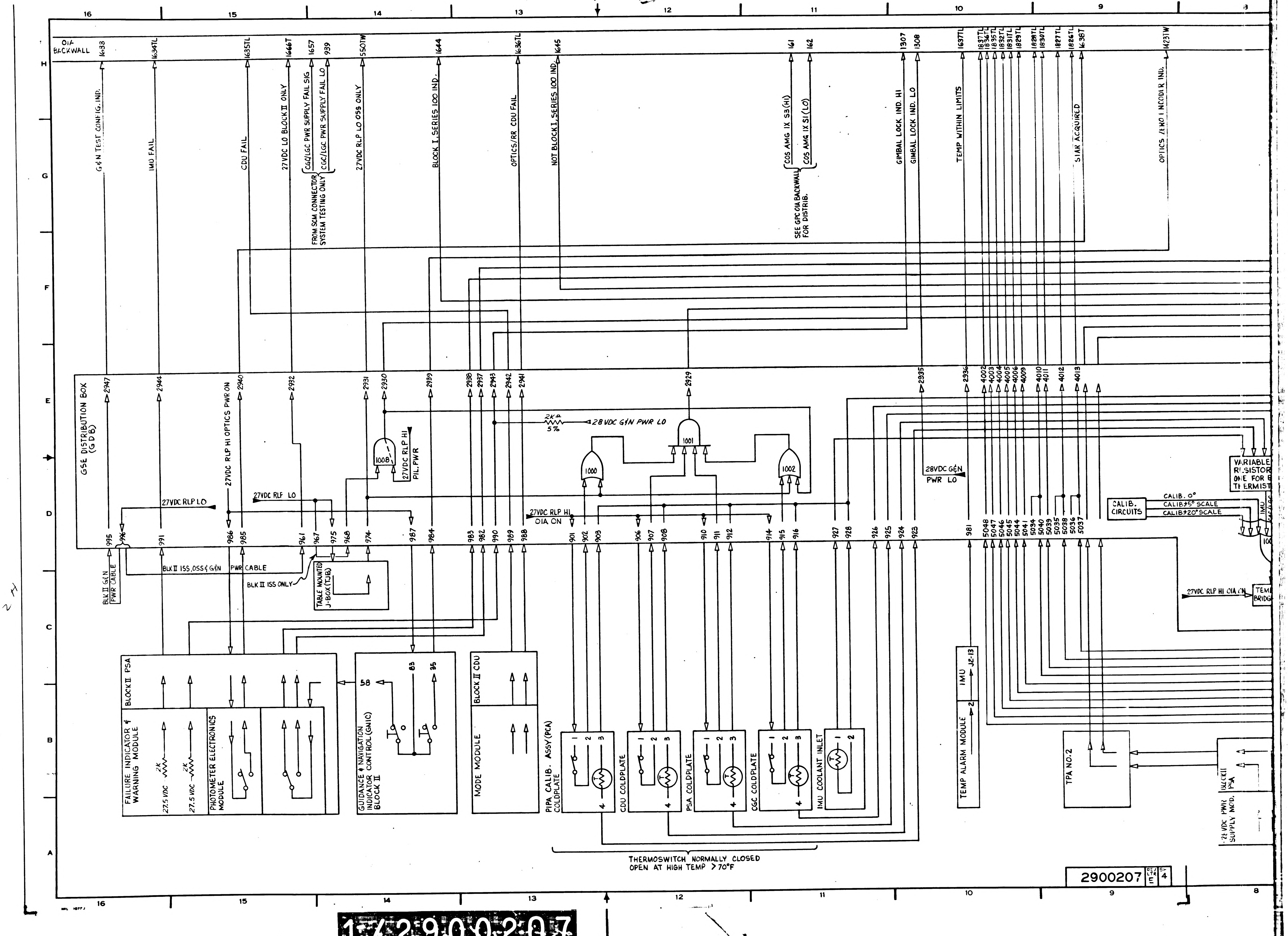
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	
B		REVISED PER TDRR 20488		7 JUL 65	
C		REVISED PER TDRR 20491		8 JUL 65	
D		REVISED PER TDRR 21011		1 SEP 65	
E		REVISED PER TDRR 22007		9 SEP 65	


9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
1425TW
MARK
1424TW
NOT MARK
537
COOLANT SUPPLY FAIL LAMP
1639TL
COLDPLATE TEMP NORMAL
538
27VDC RLP HI OIA ON
27VDC RLP LO
1579TL
BLOCK II & LEM STATUS IND
1654
REMOTE TEMP ALARM COMMON
1745
REMOTE PWR ALARM COMMON
536
CLS REMOTE ALARM CONTROL
1743
REMOTE NO PWR FAIL OUTPUT
1744
REMOTE PWR FAIL OUTPUT
1653
REMOTE NO TEMP ALARM OUTPUT
1655
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
192
800CPS, 28V, 5% IMU WHEELS PH A
194
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
275
-28VDC
276
OVDC IMU
587
27VDC RLP HI ISS ONLY
OIA BACKWALL
4013
5036
5037
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB ±5° SCALE
CALIB ±20° SCALE
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
10-0-10 MICRO-AMMETER
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
MAIN PANEL DSKY (DSKY SIGNALS ARE 27 VDC RLP HI SEE TES)
31
83
81
84
32
36
37
35
56
34
BLOCK II PSA
-23VDC PWR SUPPLY MOD.
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
23
10
6
6
5
5
1
2
3
4
5
6
7
8
9
10
11
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN Solane DATE 7 MAY 65 CHECKED Ed Foster 14 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK II)
DO NOT SCALE THIS DRAWING		
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE · 2900207
CONTRACT	MIT APPROVAL	SCALE — · SHEET 4 OF 4

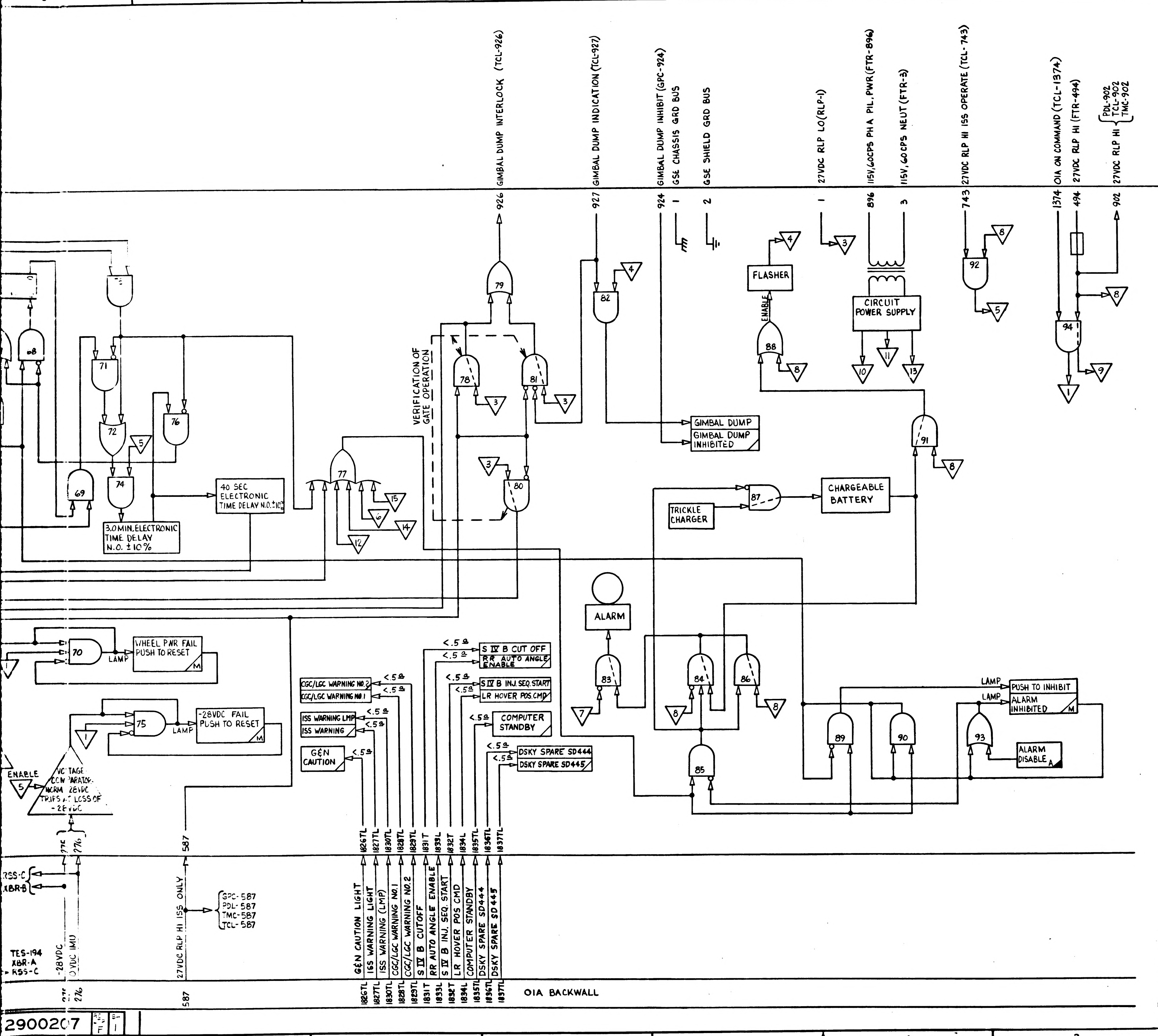
2900207 REV E SH 4

2/2900207


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1633
1634TL
1635TL
1666T
1657
939
5501W
1644
1636TL
1645
161
162
1307
1308
1637TL
1837TL
1836TL
1835TL
1832TL
1831TL
1829TL
1828TL
1830TL
1827TL
1826TL
1638T
1423TW
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
27VDC LO BLOCK II ONLY
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR SYSTEM TESTING ONLY
27VDC RLP LO 055 ONLY
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
TEMP WITHIN LIMITS
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
GSE DISTRIBUTION BOX (GDB)
2947
2944
27VDC RLP HI OPTICS PWR ON
2940
2932
2931
2930
2939
2938
2937
2943
2942
2941
2929
2935
2936
4002
4003
4004
4005
4006
4009
4010
4011
4012
4013
27VDC RLP HI PIL. PWR
1008
2Kn 5%
28VDC G&N PWR LO
1000
1001
1002
28VDC G&N PWR LO
VARIABLE RESISTOR ONE FOR EA THERMIST
CALIB. CIRCUITS
CALIB. 0°
CALIB ±5° SCALE
CALIB ±20° SCALE
IMU
27VDC RLP LO
27VDC RLP LO
27VDC RLP HI OIA ON
995
996
991
986
985
961
967
975
968
974
987
984
983
982
990
989
988
901
902
903
906
907
908
910
911
912
914
915
916
927
928
926
925
924
923
981
5048
5047
5046
5045
5044
5041
5034
5040
5039
5035
5038
5036
5037
BLK II G&N PWR CABLE
BLK II ISS, OSS & G&N PWR CABLE
BLK II ISS ONLY
TABLE MOUNTED J-BOX (TJB)
27VDC RLP HI OIA ON
TEMP BRIDGE
BLOCK II PSA
FAILURE INDICATOR & WARNING MODULE
27.5 VDC
2K
27.5 VDC
2K
PHOTOMETER ELECTRONICS MODULE
58
83
35
GUIDANCE & NAVIGATION INDICATOR CONTROL (GNIC) BLOCK II
BLOCK II CDU
MODE MODULE
PIPA CALIB. ASSY (PCA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
CGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
IMU
J2-13
2
TEMP ALARM MODULE
TPA NO. 2
28 VDC PWR SUPPLY MOD.
BLOCK II PSA
THERMOSWITCH NORMALLY CLOSED OPEN AT HIGH TEMP > 70°F
2900207
E
4

1/2900207

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
		REVISIONS 19254			
A		REVISED PER TDRR 20487		2 JUL 65	
B		REVISED PER TDRR 20488		JUL 65	
C		REVISED PER TDRR 20491		3 JUL 65	
D		REVISED PER TDRR 21911		1 SEP 65	
E		REVISED PER TDRR 22007		65	
F		REVISED PER TDRR 23763		12 NOV 65	

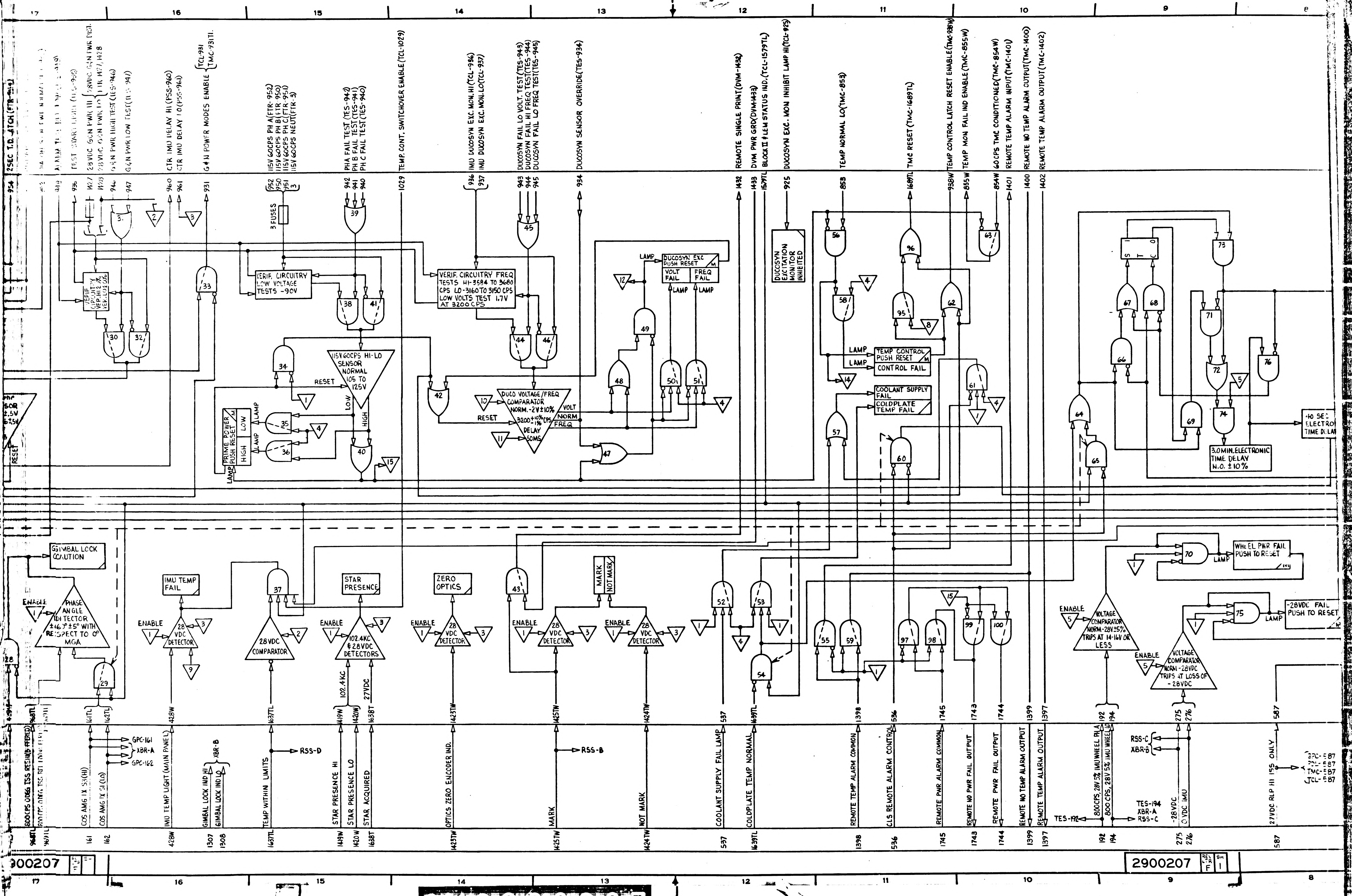

926 GIMBAL DUMP INTERLOCK (TCL-926)
927 GIMBAL DUMP INDICATION (TCL-927)
924 GIMBAL DUMP INHIBIT (GPC-924)
1 GSE CHASSIS GRD BUS
2 GSE SHIELD GRD BUS
1 27VDC RLP LO (RLP-1)
896 115V, 60CPS PH A PIL. PWR (FTR-896)
3 115V, 60CPS NEUT (FTR-3)
743 27VDC RLP HI ISS OPERATE (TCL-743)
1374 OIA ON COMMAND (TCL-1374)
494 27VDC RLP HI (FTR-494)
902 27VDC RLP HI PDL-902 TCL-902 TMC-902
FLASHER
ENABLE
CIRCUIT POWER SUPPLY
VERIFICATION OF GATE OPERATION
GIMBAL DUMP
GIMBAL DUMP INHIBITED
40 SEC ELECTRONIC TIME DELAY N.O. ±10%
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
TRICKLE CHARGER
CHARGEABLE BATTERY
ALARM
WHEEL PWR FAIL PUSH TO RESET
LAMP
-28VDC FAIL PUSH TO RESET
VOLTAGE COMPARATOR NORM 28VDC TRIPS AT LOSS OF -28VDC
ENABLE
CGC/LGC WARNING NO.2
CGC/LGC WARNING NO.1
ISS WARNING LMP
ISS WARNING
GEN CAUTION
S IV B CUT OFF
RR AUTO ANGLE ENABLE
S IV B INJ. SEQ. START
LR HOVER POS. CMD
COMPUTER STANDBY
DSKY SPARE SD444
DSKY SPARE SD445
<.5Ω
PUSH TO INHIBIT
ALARM INHIBITED
ALARM DISABLE
68 69 70 71 72 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94
RSS-C
XBR-B
TES-194 XBR-A KSS-C
-28VDC
-28VDC IMU
275 276
587
27VDC RLP HI ISS ONLY
GPC-587 PDL-587 TMC-587 TCL-587
GEN CAUTION LIGHT
ISS WARNING LIGHT
ISS WARNING (LMP)
CGC/LGC WARNING NO.1
CGC/LGC WARNING NO.2
S IV B CUTOFF
RR AUTO ANGLE ENABLE
S IV B INJ. SEQ. START
LR HOVER POS CMD
COMPUTER STANDBY
DSKY SPARE SD444
DSKY SPARE SD445
1826TL 1827TL 1830TL 1828TL 1829TL 1831T 1833L 1832T 1834L 1835TL 1836TL 1837TL
OIA BACKWALL
9 8 7 6 5 4 3 2 1
H G F E D C B A

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN Splane DATE 7 MAY 65	MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK I SERIES 100, BLOCK II, LEM)
	CHECKED Ed Foster 14 MAY 65	
	APPROVAL	
DO NOT SCALE THIS DRAWING	APPROVAL	
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 SIZE 2900207
CONTRACT	MIT APPROVAL	SCALE — SHEET 1 OF 4

2900207 F

2900207 F 1

37 2900207



17
16
15
14
13
12
11
10
9
8
25EC T.D. LATCH (FTR-914)
TEST START LIGHT (TES-936)
28VDC G&N PWR III (TES-946)
G&N PWR HIGH TEST (TES-946)
G&N PWR LOW TEST (TES-947)
CTR IMU DELAY HI (PSS-960)
CTR IMU DELAY LO (PSS-961)
G&N POWER MODES ENABLE (TCL-931 TMC-931TL)
115V 60CPS PH A (FTR-952)
115V 60CPS PH B (FTR 950)
115V 60CPS PH C (FTR 951)
115V 60CPS NEUT (FTR-3)
PH A FAIL TEST (TES-942)
PH B FAIL TEST (TES-941)
PH C FAIL TEST (TES-940)
TEMP. CONT. SWITCHOVER ENABLE (TCL-1029)
IMU DUCOSYN EXC. MON. HI (TCL-936)
IMU DUCOSYN EXC. MON. LO (TCL-937)
DUCOSYN FAIL LO VOLT. TEST (TES-943)
DUCOSYN FAIL HI FREQ TEST (TES-944)
DUCOSYN FAIL LO FREQ TEST (TES-945)
DUCOSYN SENSOR OVERRIDE (TES-934)
REMOTE SINGLE PRINT (DVM-1432)
DVM PWR GRD (DVM-1433)
BLOCK II & LEM STATUS IND. (TCL-1579TL)
DUCOSYN EXC. MON INHIBIT LAMP HI (TCL-925)
TEMP NORMAL LO (TMC-853)
TMC RESET (TMC-1689TL)
TEMP CONTROL LATCH RESET ENABLE (TMC-938W)
TEMP MON FAIL IND ENABLE (TMC-855W)
60CPS TMC CONDITIONED (TMC-854W)
REMOTE TEMP ALARM INPUT (TMC-1401)
REMOTE NO TEMP ALARM OUTPUT (TMC-1400)
REMOTE TEMP ALARM OUTPUT (TMC-1402)
954
960
961
931
952 950 951 3
942 941 940
1029
936 937
943 944 945
934
1432
1433
1579TL
925
853
1689TL
938W
855W
854W
1401
1400
1402
3 FUSES
VERIF. CIRCUITRY VOLTAGE ±2%
VERIF. CIRCUITRY LOW VOLTAGE TESTS -90V
VERIF. CIRCUITRY FREQ TESTS HI-3584 TO 3680 CPS LO-3160 TO 3150 CPS LOW VOLTS TEST 1.7V AT 3200 CPS
115V 60CPS HI-LO SENSOR NORMAL 105 TO 125V
RESET
LOW
HIGH
LAMP
PRIME POWER PUSH RESET
M
DUCO VOLTAGE/FREQ COMPARATOR NORM. -2V ±10% 3200 +10% -1% CPS DELAY 50MS
VOLT
NORM
FREQ
DUCOSYN EXC PUSH RESET
VOLT FAIL
FREQ FAIL
DUCOSYN EXCITATION MONITOR INHIBITED
TEMP CONTROL PUSH RESET
CONTROL FAIL
COOLANT SUPPLY FAIL
COLDPLATE TEMP FAIL
S T C D
3.0MIN. ELECTRONIC TIME DELAY N.O. ±10%
+10 SEC ELECTRO TIME DELAY
GIMBAL LOCK CAUTION
ENABLE
PHASE ANGLE DETECTOR ±16.5° ±5° WITH RESPECT TO 0° MGA
IMU TEMP FAIL
28 VDC DETECTOR
28VDC COMPARATOR
STAR PRESENCE
102.4KC & 28VDC DETECTORS
102.4KC
27VDC
ZERO OPTICS
MARK
NOT MARK
WHEEL PWR FAIL PUSH TO RESET
VOLTAGE COMPARATOR NORM-28V±5% TRIPS AT 14-16V OR LESS
VOLTAGE COMPARATOR NORM -28VDC TRIPS AT LOSS OF -28VDC
-28VDC FAIL PUSH TO RESET
28
29
30
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
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62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
95
96
97
98
99
100
800CPS 0DEG TSS RESING FEED
800CPS 0DEG TSS RET
COS AMG IX SI (HI)
COS AMG IX SI (LO)
GPC-161
XBR-A
GPC-162
IMU TEMP LIGHT (MAIN PANEL)
GIMBAL LOCK IND HI
GIMBAL LOCK IND LO
XBR-B
TEMP WITHIN LIMITS
RSS-D
STAR PRESENCE HI
STAR PRESENCE LO
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
RSS-B
NOT MARK
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
REMOTE TEMP ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE PWR ALARM COMMON
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
TES-192
800CPS, 28V 5% IMU WHEEL PH A
800 CPS, 28V 5% IMU WHEEL
RSS-C
XBR-B
TES-194
XBR-A
RSS-C
-28VDC
0VDC IMU
27VDC RLP HI ISS ONLY
GPC-587
PPL-587
TMC-587
TCL-587
161TL
162TL
428W
1637TL
1419W
1420W
1638T
1423TW
1425TW
1424TW
537
1639TL
1398
536
1745
1743
1744
1399
1397
192
194
275
276
587
161
162
428W
1307
1308
1637TL
1419W
1420W
1638T
1423TW
1425TW
1424TW
537
1639TL
1398
536
1745
1743
1744
1399
1397
2900207
REV F
SH 1

2/29,002,07

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS:

2900210 AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR)
RLP RELAY & LAMP POWER SUPPLY
2900204 TEMPERATURE MONITOR CONTROL PANEL (BLOCK I, SERIES 100)(TMC)
2900203 TEMPERATURE MONITOR CONTROL PANEL (BLOCK II & LEM)(TMC)
2900208 POWER & DUMMY LOAD PANEL-PRIMARY SIGNAL SELECTOR
GYRO CAGING FUNCTIONS (PDL)
2900223 GIMBAL POSITION CONTROL (GPC)
2900202 TEST CONTROL PANEL (BLOCK I, SERIES 100)(TCL)
2900201 TEST CONTROL PANEL (BLOCK II & LEM)(TCL)
2900206 TEST SELECTOR PANEL (TES)
2900200 GYRO CAGING PANEL (BLOCK II & LEM)(GCP)
29002[illegible] OSCILLOGRAPH SIGNAL SELECTION
RSS-B TO FIXED DC CHANNEL, RSS-C TO SWITCHABLE AC CHANNEL,
RSS-D TO SWITCHABLE DC CHANNEL
29002[illegible] SIGNAL SELECTION & MEASUREMENT
XBR-A CROSSBAR-AC SIGNALS
XBR-B CROSSBAR-DC SIGNALS
2900219 COUNTER SIGNAL SELECTION
PRIMARY SIGNAL SELECTOR (PSS)
2900214 GSE GROUNDING (BLOCK I SERIES 100)
2900213 GSE GROUNDING (BLOCK II & LEM)
2900209 COMPUTER SIMULATOR INTERFACE (CMS)
2900211 AUXILIARY INPUT/OUTPUT CALIBRATION (AIP)

4. NON STANDARD SYMBOLOGY:

INDICATES "AND" GATE WITH SWITCHED SIGNAL
NAME INDICATES INDICATOR LIGHT
NAME INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
NAME / NAME INDICATES SPLIT SCREEN INDICATOR LIGHT
NAME / NAME INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME INDICATES UNLIGHTED PUSHBUTTON OR TOGGLE SWITCH (ALTERNATE ACTION)

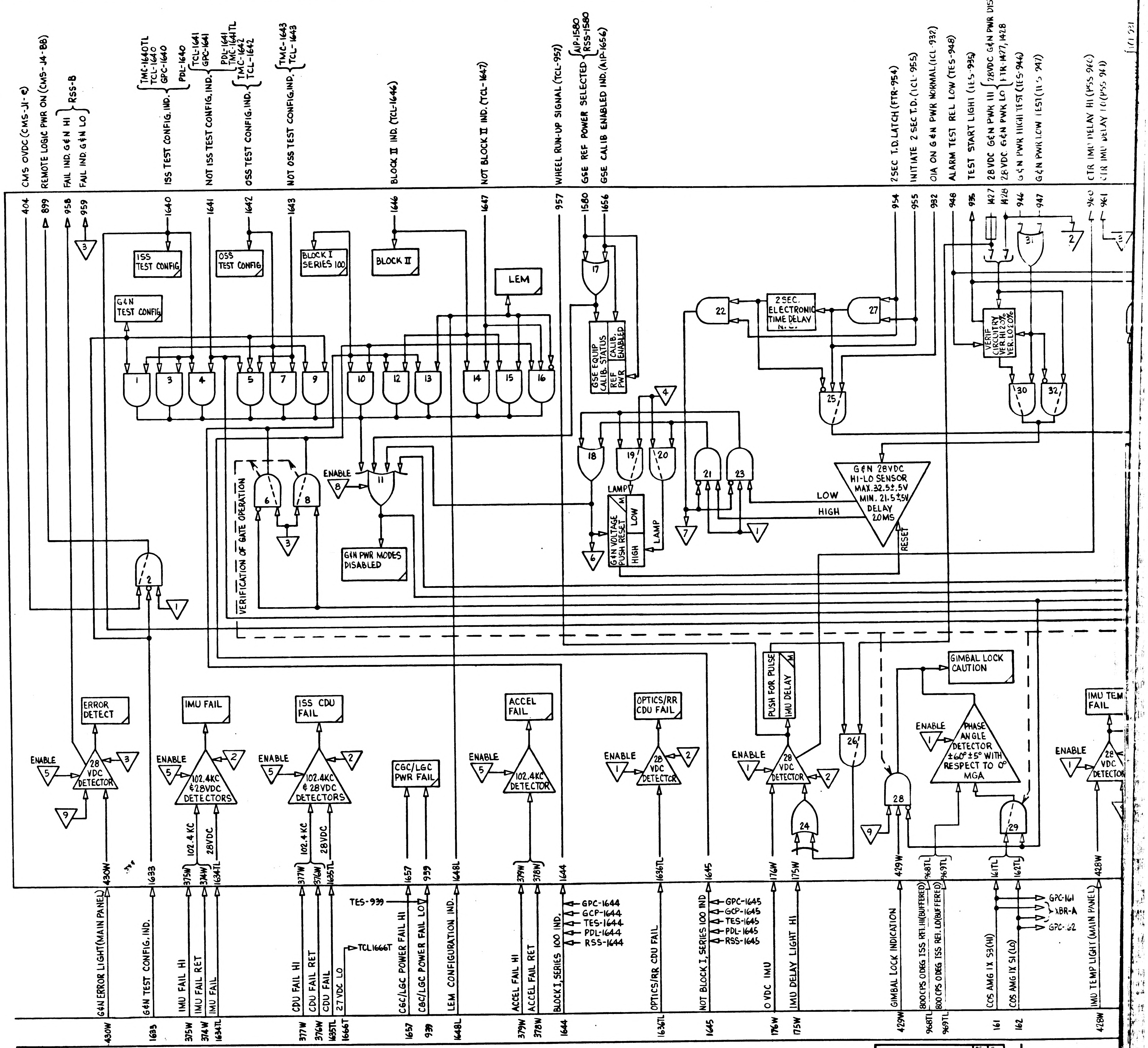
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
- A. W-BLOCK I SERIES 100 ONLY
- B. T-BLOCK II ONLY
- C. L-LEM ONLY
- D. BLANK-ALL G&N CONFIGURATIONS
- E. TW, TL OR WL-USED IN MORE THAN ONE G&N CONFIGURATION AS SHOWN.

6. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK I SERIES 100	SH 1 SH 2
BLOCK II	SH 1 SH 3
LEM	SH 1 SH 4

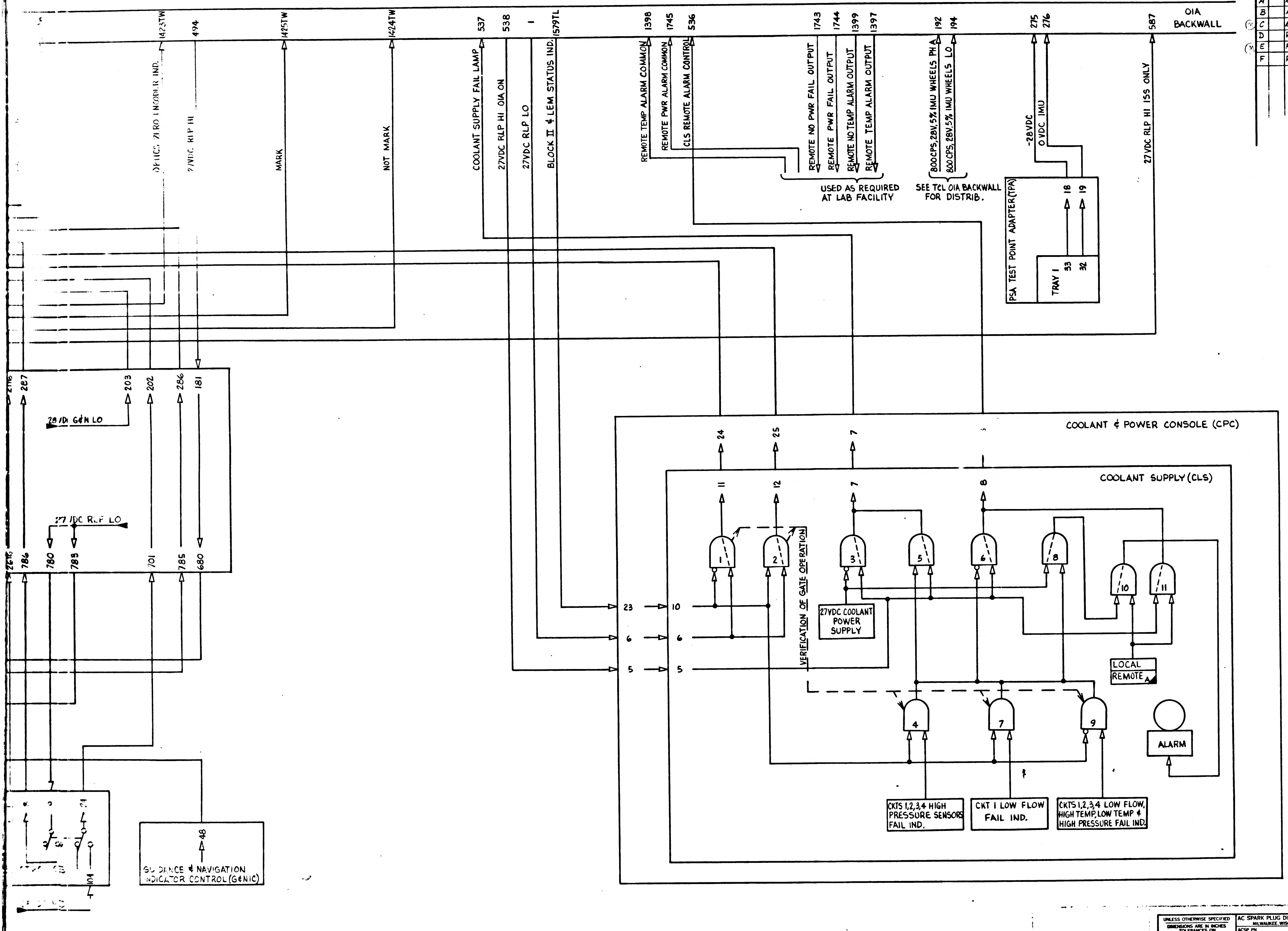
7. SIGNAL REFERENCE:

1 = OIA ON
2 = 28VDC G&N PWR LO
3 = 27 VDC RLP LO
4 = FLASHER
5 = ISS OPER. 5SEC T.D.
6 = G&N PWR FAIL
7 = 2 SEC T.D. AT OIA ON
8 = 27 VDC PIL. PWR
9 = 27VDC OIA ON
10 = +28VDC
11 = -28VDC
12 = DUCO EXC. FAIL
13 = +45 VDC
14 = TMC FAIL
15 = PRIME PWR FAIL


CMS OVDC (CMS-J1-e)
REMOTE LOGIC PWR ON (CMS-J4-BB)
FAIL IND. G&N HI
FAIL IND. G&N LO
RSS-B
ISS TEST CONFIG. IND.
TMC-1640TL
TCL-1640
GPC-1640
PDL-1640
NOT ISS TEST CONFIG. IND.
TCL-1641
GPC-1641
PDL-1641
TMC-1641TL
OSS TEST CONFIG. IND.
TMC-1642
TCL-1642
NOT OSS TEST CONFIG. IND.
TMC-1643
TCL-1643
BLOCK II IND. (TCL-1646)
NOT BLOCK II IND. (TCL-1647)
WHEEL RUN-UP SIGNAL (TCL-957)
GSE REF POWER SELECTED
AIP-1580
RSS-1580
GSE CALIB ENABLED IND. (AIP-1656)
2SEC T.D. LATCH (FTR-954)
INITIATE 2 SEC T.D. (TCL-955)
OIA ON G&N PWR NORMAL (TCL-932)
ALARM TEST REL LOW (TES-948)
TEST START LIGHT (TES-935)
28VDC G&N PWR HI
28VDC G&N PWR LO
28VDC G&N PWR DIST.
FTR-1427, 1428
G&N PWR HIGH TEST (TES-946)
G&N PWR LOW TEST (TES-947)
CTR IMU DELAY HI (PSS-960)
CTR IMU DELAY LO (PSS-961)
404
899
958
959
1640
1641
1642
1643
1646
1647
957
1580
1656
954
955
932
948
935
1427
1428
946
947
960
961
ISS TEST CONFIG
OSS TEST CONFIG
BLOCK I SERIES 100
BLOCK II
LEM
G&N TEST CONFIG
GSE EQUIP CALIB. STATUS
REF PWR
CALIB. ENABLED
2 SEC. ELECTRONIC TIME DELAY N.C.
VERIF CIRCUITRY VER. HI 29.6 VER. LO 20.6
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
ENABLE
VERIFICATION OF GATE OPERATION
G&N PWR MODES DISABLED
LAMP
G&N VOLTAGE PUSH RESET
HIGH
LOW
LAMP
M
G&N 28VDC HI-LO SENSOR MAX. 32.5±.5V MIN. 21.5±.5V DELAY 20MS
LOW
HIGH
RESET
GIMBAL LOCK CAUTION
ERROR DETECT
28 VDC DETECTOR
IMU FAIL
102.4KC & 28VDC DETECTORS
ISS CDU FAIL
102.4KC & 28VDC DETECTORS
CGC/LGC PWR FAIL
ACCEL FAIL
102.4KC DETECTOR
OPTICS/RR CDU FAIL
28 VDC DETECTOR
PUSH FOR PULSE
IMU DELAY
28 VDC DETECTOR
PHASE ANGLE DETECTOR ±60°±5° WITH RESPECT TO 0° MGA
IMU TEMP FAIL
28 VDC DETECTOR
102.4 KC
28VDC
102.4 KC
28VDC
430W
1633
375W
374W
1634TL
377W
376W
1635TL
1657
939
1648L
379W
378W
1644
1636TL
1645
176W
175W
429W
968TL
969TL
161TL
162TL
428W
G&N ERROR LIGHT (MAIN PANEL)
G&N TEST CONFIG. IND.
IMU FAIL HI
IMU FAIL RET
IMU FAIL
CDU FAIL HI
CDU FAIL RET
CDU FAIL
27 VDC LO
TCL1666T
TES-939
CGC/LGC POWER FAIL HI
CGC/LGC POWER FAIL LO
LEM CONFIGURATION IND.
ACCEL FAIL HI
ACCEL FAIL RET
BLOCK I, SERIES 100 IND.
GPC-1644
GCP-1644
TES-1644
PDL-1644
RSS-1644
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND
GPC-1645
GCP-1645
TES-1645
PDL-1645
RSS-1645
0 VDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK INDICATION
800CPS 0DEG ISS REF. HI (BUFFERED)
800CPS 0DEG ISS REF. LO (BUFFERED)
COS AMG 1X S3 (HI)
COS AMG 1X S1 (LO)
GPC-161
XBR-A
GPC-162
IMU TEMP LIGHT (MAIN PANEL)
430W
1633
375W
374W
1634TL
377W
376W
1635TL
1666T
1657
939
1648L
379W
378W
1644
1636TL
1645
176W
175W
429W
968TL
969TL
161
162
428W

2900207 REV LTR F SH 1

1/2900207


OIA BACKWALL
1423TW
494
1425TW
1424TW
537
538
1579TL
1398
1745
536
1743
1744
1399
1397
192
194
275
276
587
OPTICS ZERO ENCODER IND.
27VDC RLP HI
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND.
REMOTE TEMP ALARM COMMON
REMOTE PWR ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
800CPS, 28V, 5% IMU WHEELS PH A
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
0VDC IMU
27VDC RLP HI ISS ONLY
PSA TEST POINT ADAPTER (TPA)
TRAY 1
18
19
33
32
287
203
202
286
181
28VDC G&N LO
27VDC RLP LO
786
780
788
701
785
680
GUIDANCE & NAVIGATION INDICATOR CONTROL (G&NIC)
48
104
COOLANT & POWER CONSOLE (CPC)
24
25
7
COOLANT SUPPLY (CLS)
11
12
7
8
1
2
3
5
6
8
10
11
4
7
9
23
6
5
10
6
5
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
ALARM
CKTS 1,2,3,4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL IND.
CKTS 1,2,3,4 LOW FLOW, HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	
B		REVISED PER TDRR 20428		JUL 65	
C		REVISION STATUS CHANGED		8 JUL 65	
D		REVISION STATUS CHANGED		1 SEP 65	
E		REVISION STATUS CHANGED		SEP 65	
F		REVISED PER TDRR 23763		12 NOV 65	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Splane DATE 7 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

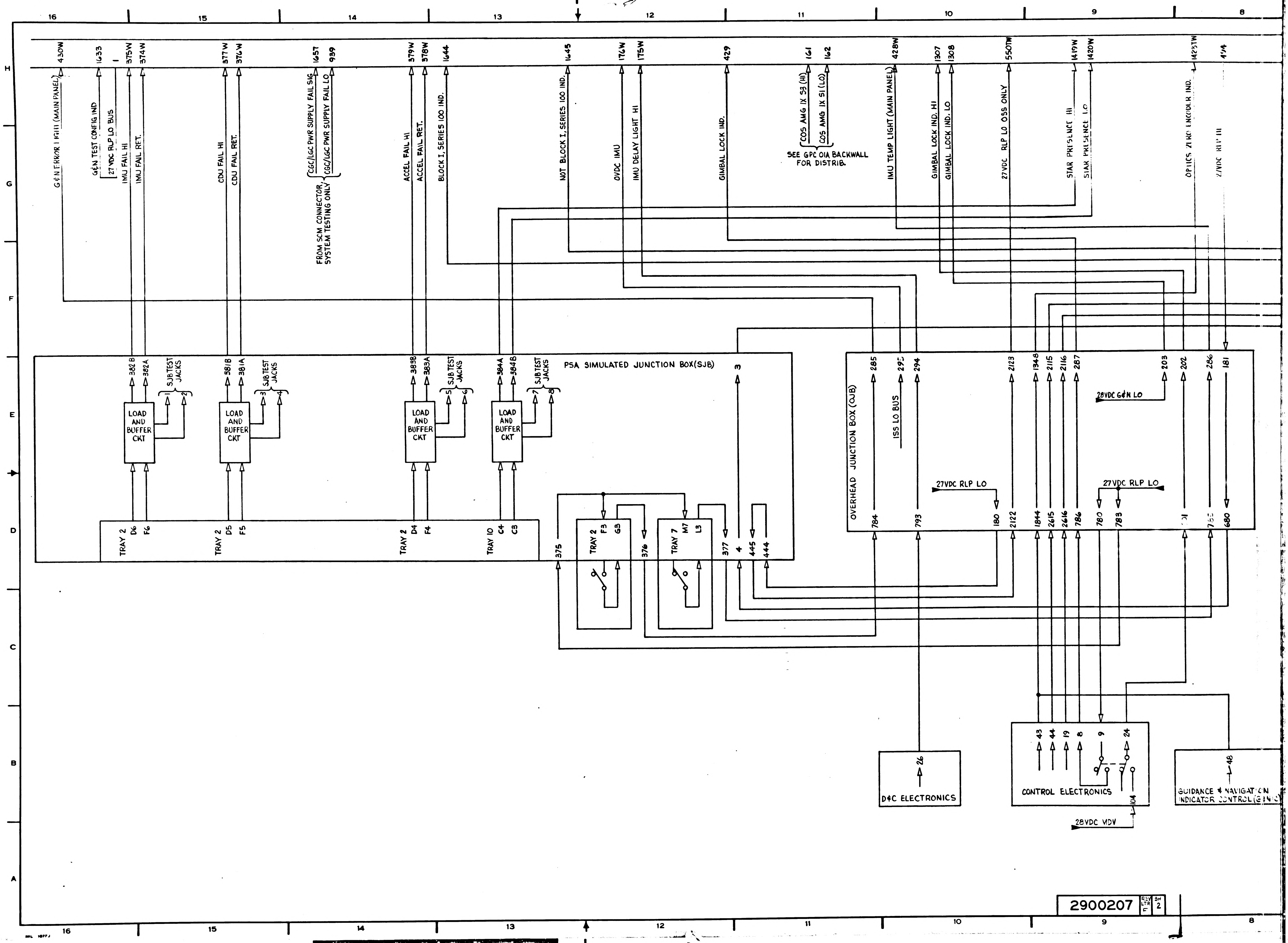
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
MONITOR PANEL
(BLOCK I SERIES 100)

CODE IDENT NO. 99974
SIZE
2900207
SCALE —
SHEET 2 OF 4

2900207 REV F SH 2

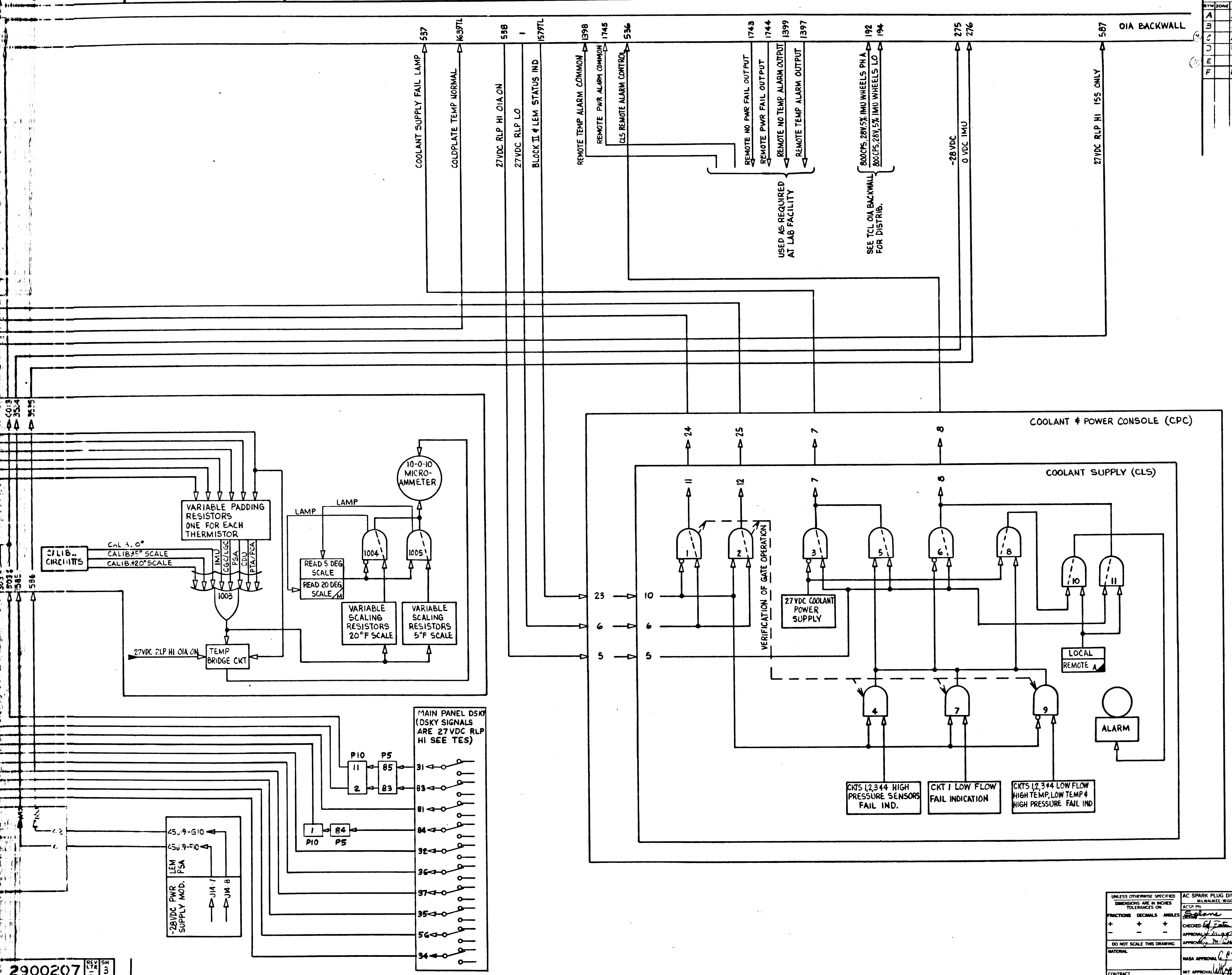
2/2900207


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
430W
1633
1
375W
374W
377W
376W
1657
939
379W
378W
1644
1645
176W
175W
429
161
162
428W
1307
1308
550TW
1419W
1420W
1423TW
494
G&N ERROR LIGHT (MAIN PANEL)
G&N TEST CONFIG IND
27 VDC RLP LO BUS
IMU FAIL HI
IMU FAIL RET.
CDU FAIL HI
CDU FAIL RET.
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR, SYSTEM TESTING ONLY
ACCEL FAIL HI
ACCEL FAIL RET.
BLOCK I, SERIES 100 IND.
NOT BLOCK I, SERIES 100 IND.
OVDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK IND.
COS AMG IX 53 (HI)
COS AMG IX 51 (LO)
SEE GPC 01A BACKWALL FOR DISTRIB.
IMU TEMP LIGHT (MAIN PANEL)
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
27VDC RLP LO OSS ONLY
STAR PRESENCE HI
STAR PRESENCE LO
OPTICS ZERO ENCODER IND.
27VDC RLP HI
PSA SIMULATED JUNCTION BOX (SJB)
382B
382A
SJB TEST JACKS
1
2
381B
381A
3
4
383B
383A
5
6
384A
384B
7
8
LOAD AND BUFFER CKT
TRAY 2
D6
F6
D5
F5
D4
F4
TRAY 10
C4
C3
375
TRAY 2
F3
G3
376
TRAY 7
M7
L3
377
4
445
444
3
OVERHEAD JUNCTION BOX (OJB)
285
293
294
ISS LO BUS
2123
1348
2115
2116
287
203
202
286
181
28VDC G&N LO
27VDC RLP LO
27VDC RLP LO
784
793
180
2122
1844
2615
2616
786
780
783
01
750
680
26
D&C ELECTRONICS
43
44
19
8
9
24
CONTROL ELECTRONICS
104
28VDC VDV
48
GUIDANCE & NAVIGATION INDICATOR CONTROL (G&N)

2900207 REV LTR F SH 2

1/2900207

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	
B		REVISED PER TDRR 20488		JUL 65	
C		REVISED PER TDRR 20491		8 JUL 65	
D		REVISED PER TDRR 21911		SEP 65	
E		REVISED PER TDRR 22007		9 SEP 65	
F		REVISED PER TDRR 23763		2 NOV 65	

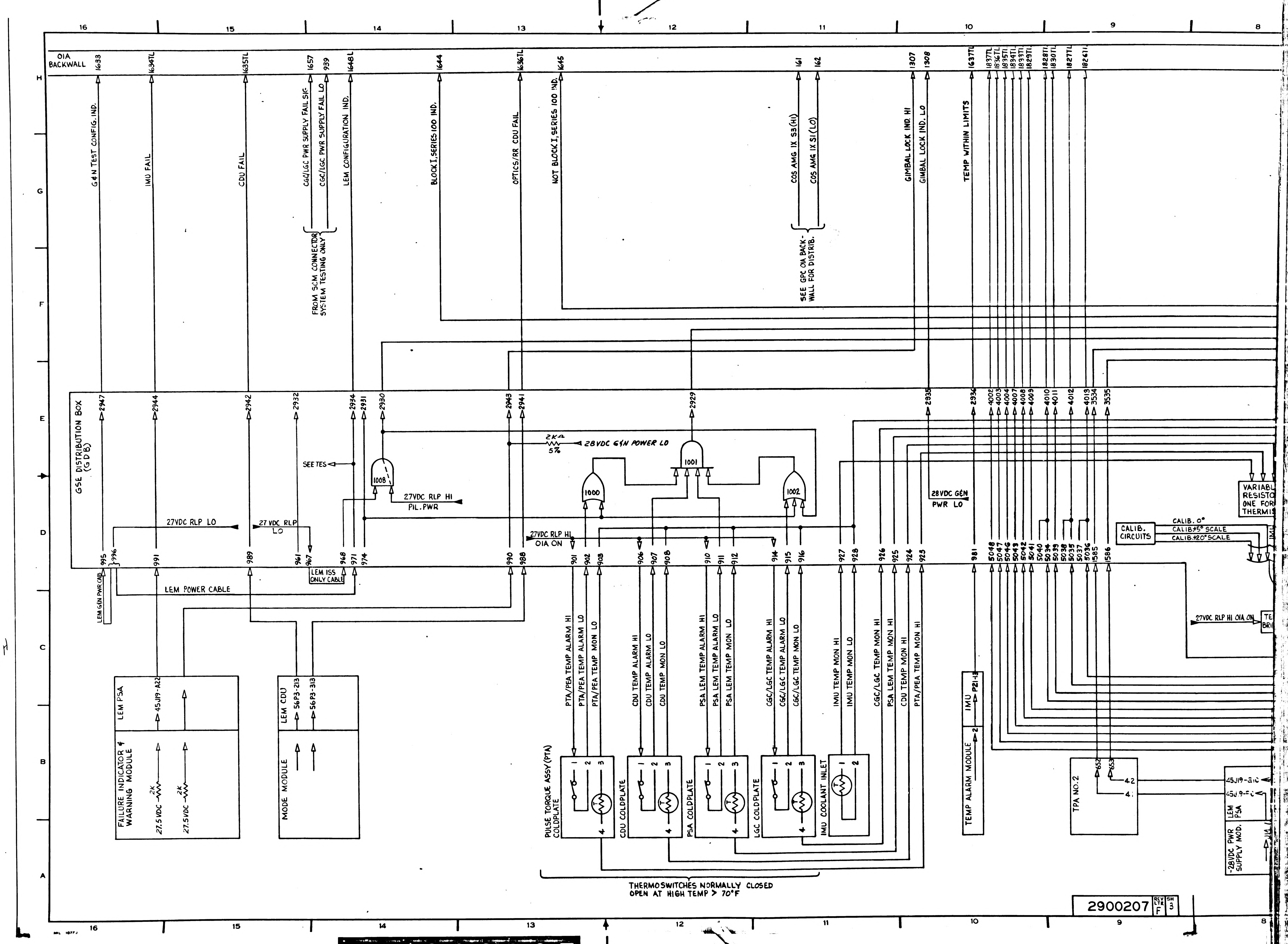

OIA BACKWALL
537
COOLANT SUPPLY FAIL LAMP
1639TL
COLDPLATE TEMP NORMAL
538
27VDC RLP HI OIA ON
1
27VDC RLP LO
1579TL
BLOCK II & LEM STATUS IND
1398
REMOTE TEMP ALARM COMMON
1745
REMOTE PWR ALARM COMMON
536
CLS REMOTE ALARM CONTROL
1743
REMOTE NO PWR FAIL OUTPUT
1744
REMOTE PWR FAIL OUTPUT
1399
REMOTE NO TEMP ALARM OUTPUT
1397
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
192
800CPS, 28V, 5% IMU WHEELS PH A
194
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
275
-28VDC
276
0 VDC IMU
587
27VDC RLP HI ISS ONLY
4013
3534
3535
5034
3585
586
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CAL 3.0°
CALIB.±5° SCALE
CALIB.±20° SCALE
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
LAMP
LAMP
READ 5 DEG SCALE
READ 20 DEG SCALE
M
1004
1005
10-0-10 MICRO-AMMETER
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
MAIN PANEL DSKY (DSKY SIGNALS ARE 27VDC RLP HI SEE TES)
P10
P5
11
85
31
2
83
83
81
1
84
84
P10
P5
32
36
37
35
56
34
42
4
4509-G10
4509-F10
LEM PSA
-28VDC PWR SUPPLY MOD.
J14-7
J14-8
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
1
2
3
5
6
8
10
11
23
10
6
6
5
5
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
4
7
9
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Solane DATE 7 MAY 65 CHECKED Ed Foster 14 MAY 65 APPROVAL APPROVAL M. Watson	MECHANIZATION DIAGRAM MONITOR PANEL (LEM)
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE · 2900207
CONTRACT	MIT APPROVAL	SCALE · SHEET 3 OF 4

2900207 REV LTR – SH 3

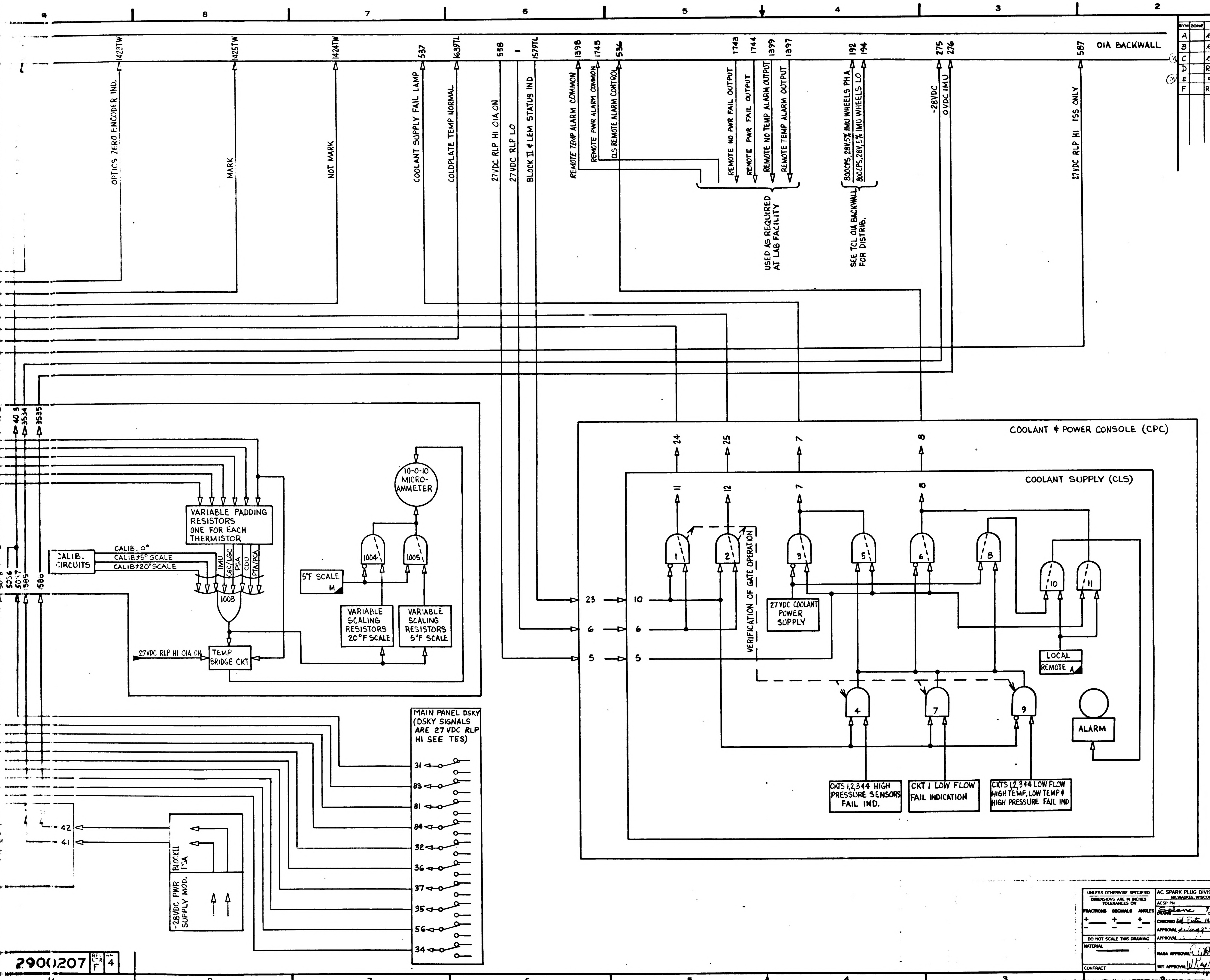
2/4 2900207

2H


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1633
1634TL
1635TL
1657
939
1648L
1644
1636TL
1645
161
162
1307
1308
1637TL
1837TL
1836TL
1835TL
1834TL
1833TL
1829TL
1828TL
1830TL
1827TL
1826TL
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
LEM CONFIGURATION IND.
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG 1X S3 (HI)
COS AMG 1X S1 (LO)
GIMBAL LOCK IND HI
GIMBAL LOCK IND. LO
TEMP WITHIN LIMITS
FROM SCM CONNECTOR SYSTEM TESTING ONLY
SEE GPC OIA BACKWALL FOR DISTRIB.
GSE DISTRIBUTION BOX (GDB)
2947
2944
2942
2932
2934
2931
2930
2943
2941
2929
2935
2936
4002
4003
4004
4007
4008
4009
4010
4011
4012
4013
3534
3535
2KΩ 5%
28VDC G&N POWER LO
SEE TES
1008
27VDC RLP HI PIL. PWR
1000
1001
1002
28VDC G&N PWR LO
VARIABLE RESISTOR ONE FOR THERMIS
27VDC RLP LO
27 VDC RLP LO
27VDC RLP HI OIA ON
CALIB. CIRCUITS
CALIB. 0°
CALIB. 75° SCALE
CALIB. 120° SCALE
995
996
991
989
961
967
968
971
974
990
988
901
902
903
906
907
908
910
911
912
914
915
916
927
928
926
925
924
923
981
5048
5047
5046
5043
5042
5041
5040
5034
5039
5038
5035
5037
5036
585
1586
LEM G&N PWR CAB.
LEM POWER CABLE
LEM ISS ONLY CABLE
PTA/PEA TEMP ALARM HI
PTA/PEA TEMP ALARM LO
PTA/PEA TEMP MON LO
CDU TEMP ALARM HI
CDU TEMP ALARM LO
CDU TEMP MON LO
PSA LEM TEMP ALARM HI
PSA LEM TEMP ALARM LO
PSA LEM TEMP MON LO
CGC/LGC TEMP ALARM HI
CGC/LGC TEMP ALARM LO
CGC/LGC TEMP MON LO
IMU TEMP MON HI
IMU TEMP MON LO
CGC/LGC TEMP MON HI
PSA LEM TEMP MON HI
CDU TEMP MON HI
PTA/PEA TEMP MON HI
27VDC RLP HI OIA ON
LEM PSA
45J19-A22
FAILURE INDICATOR & WARNING MODULE
27.5 VDC
2K
LEM CDU
56P3-213
56P3-313
MODE MODULE
PULSE TORQUE ASSY (PTA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
LGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
IMU
P21-3
TEMP ALARM MODULE
TPA NO. 2
652
653
42
41
45J19-B10
45J19-F6
LEM PSA
28VDC PWR SUPPLY MOD.
THERMOSWITCHES NORMALLY CLOSED OPEN AT HIGH TEMP > 70°F
2900207
REV LTR F
SH 3

1729 00207

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 2046		2 JUL 65	
B		REVISED PER TDRR 20488		7 JUL 65	
C		REVISED PER TDRR 2049		8 JUL 65	
D		REVISED PER TDRR 21911		1 SEP 65	
E		REVISED PER TDRR 22[illegible]		9 SEP 65	
F		REVISED PER TDRR 23[illegible]63		2 NOV 65	


OIA BACKWALL
1423TW
OPTICS ZERO ENCODER IND.
1425TW
MARK
1424TW
NOT MARK
537
COOLANT SUPPLY FAIL LAMP
1639TL
COLDPLATE TEMP NORMAL
538
27VDC RLP HI OIA ON
1
27VDC RLP LO
1579TL
BLOCK II & LEM STATUS IND
1398
REMOTE TEMP ALARM COMMON
1745
REMOTE PWR ALARM COMMON
536
CLS REMOTE ALARM CONTROL
1743
REMOTE NO PWR FAIL OUTPUT
1744
REMOTE PWR FAIL OUTPUT
1399
REMOTE NO TEMP ALARM OUTPUT
1397
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
192
800CPS,28V,5% IMU WHEELS PH A
194
800CPS,28V,5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
275
-28VDC
276
OVDC IMU
587
27VDC RLP HI ISS ONLY
40
3534
3535
5036
5037
1585
1586
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB ± 5° SCALE
CALIB ± 20° SCALE
IMU
GGC/LGC
PSA
CDU
PTA/PCA
1003
TEMP BRIDGE CKT
27VDC RLP HI OIA ON
10-0-10 MICRO-AMMETER
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
23
6
5
10
6
5
1
2
3
5
6
8
10
11
4
7
9
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND
MAIN PANEL DSKY (DSKY SIGNALS ARE 27 VDC RLP HI SEE TES)
31
83
81
84
32
36
37
35
56
34
42
41
BLOCK II PSA
-28VDC PWR SUPPLY MOD.
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

2900207 REV LTR F SH 4

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Solane DATE 7 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL W Kapl 20 May 65

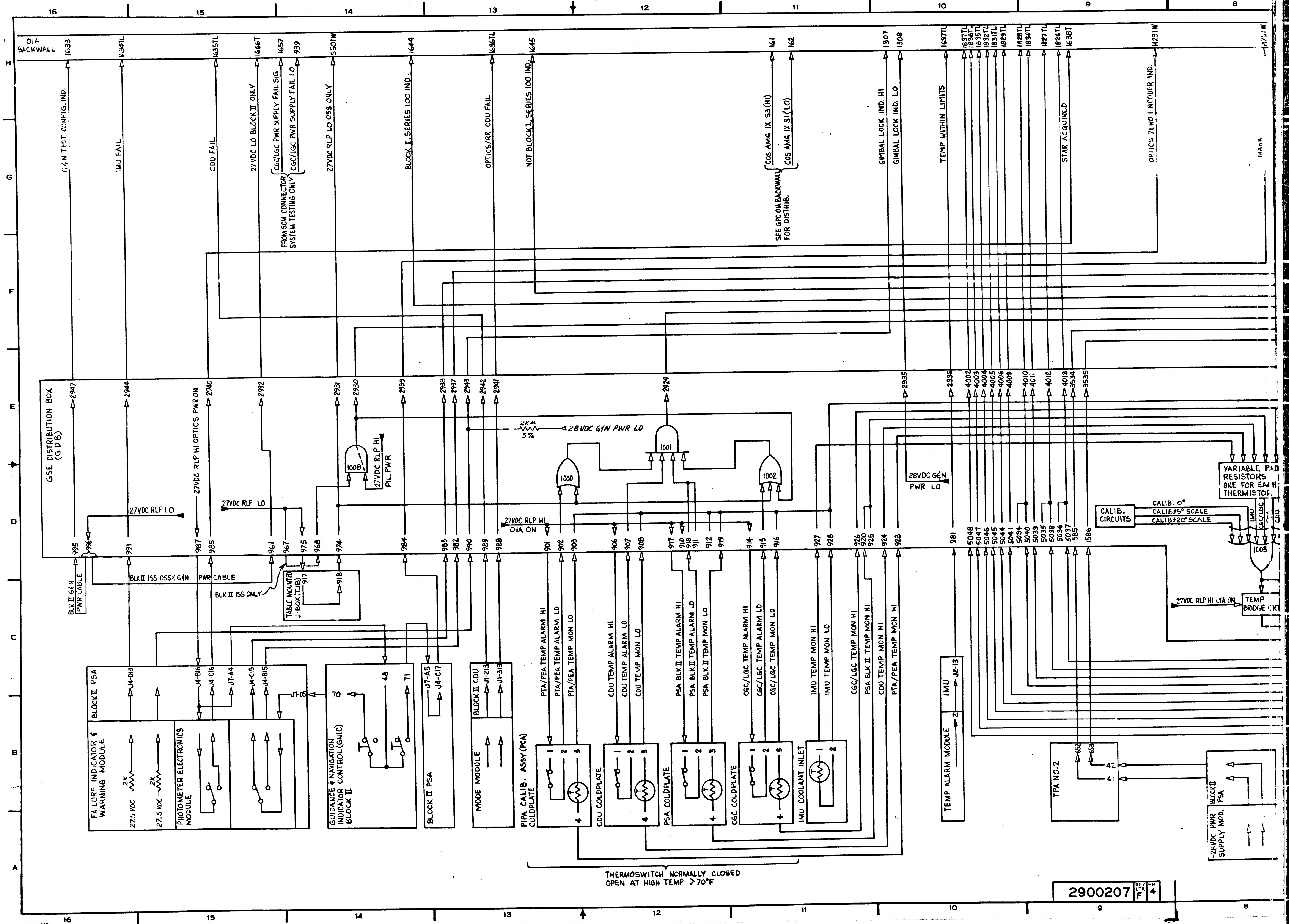
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
MONITOR PANEL
(BLOCK II)

CODE IDENT NO. 99974
SIZE
2900207
SCALE
SHEET 4 OF 4

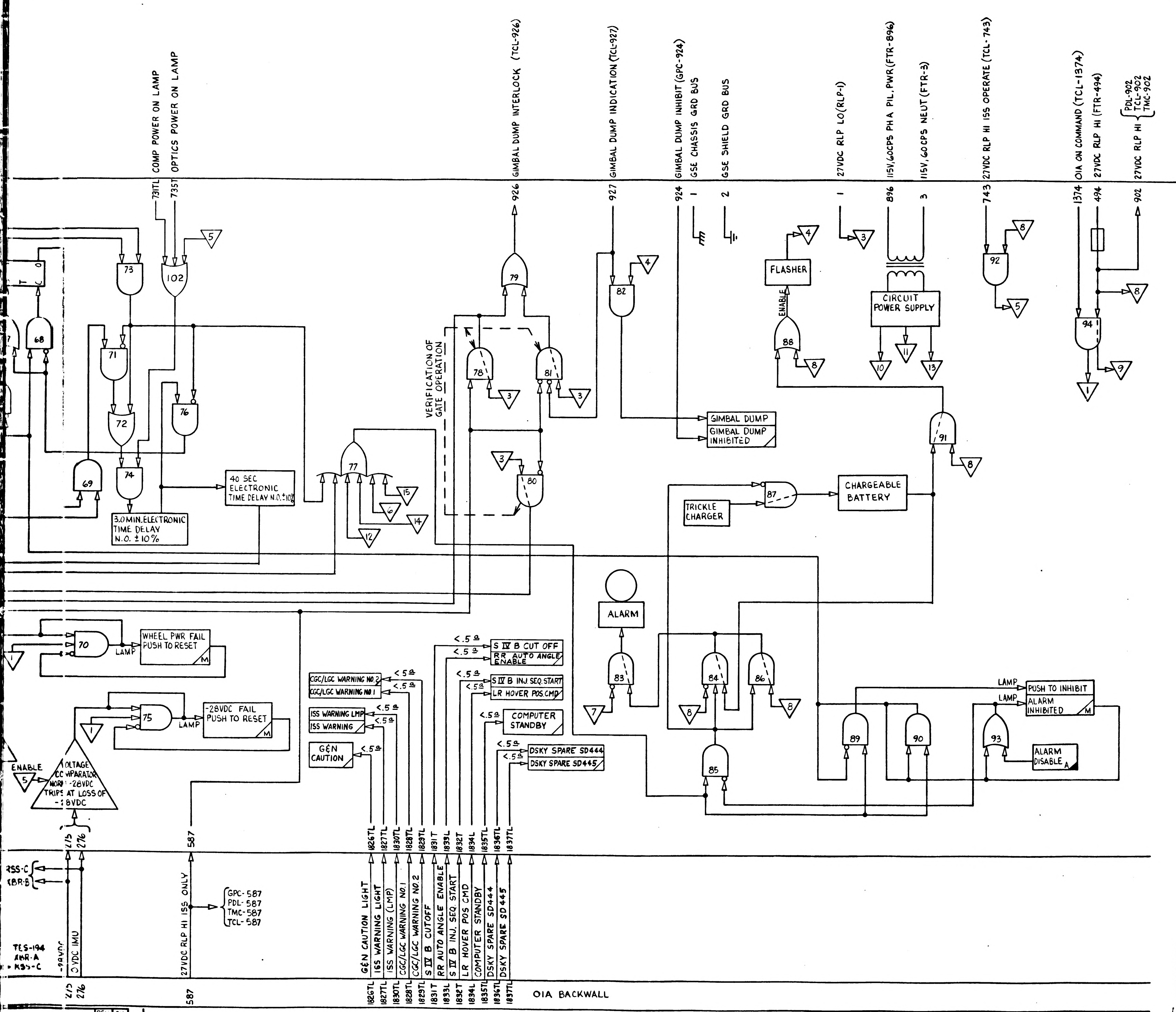
2900207 F

27 2900207


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1633
1634TL
1635TL
1666T
1657
939
5501W
1644
1636TL
1645
161
162
1307
1308
1637TL
1837TL
1836TL
1835TL
1832TL
1831TL
1829TL
1828TL
1830TL
1827TL
1826TL
1638T
1423IW
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
27VDC LO BLOCK II ONLY
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR SYSTEM TESTING ONLY
27VDC RLP LO OSS ONLY
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
TEMP WITHIN LIMITS
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
GSE DISTRIBUTION BOX (GDB)
2947
2944
27VDC RLP HI OPTICS PWR ON
2940
2932
2931
2930
2939
2938
2937
2943
2942
2941
2929
2935
2936
4002
4003
4004
4005
4006
4009
4010
4011
4012
4013
3534
3535
2KΩ 5%
28VDC G&N PWR LO
1001
1000
1002
1008
27VDC RLP HI PIL. PWR
27VDC RLP LO
27VDC RLP LO
28VDC G&N PWR LO
27VDC RLP HI OIA ON
VARIABLE PAD RESISTORS ONE FOR EACH THERMISTOR.
CALIB. CIRCUITS
CALIB. 0°
CALIB ±5° SCALE
CALIB ±20° SCALE
IMU
CGC/LGC
CDU
1C03
995
996
991
987
985
961
967
975
968
974
984
983
982
990
989
988
901
902
903
906
907
908
917
910
918
911
912
919
914
915
916
927
928
926
920
925
924
923
981
5048
5047
5046
5045
5044
5041
5034
5040
5039
5035
5038
5036
5037
1585
1586
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
BLK II G&N PWR CABLE
BLK II ISS, OSS & G&N PWR CABLE
BLK II ISS ONLY
TABLE MOUNTED J-BOX (TJB)
917
918
BLOCK II PSA
J4-D13
J4-B16
J4-C16
J7-A4
J4-C15
J4-B15
J7-D5
70
48
71
J7-A5
J4-C17
BLOCK II CDU
J1-213
J1-313
FAILURE INDICATOR & WARNING MODULE
2K
27.5VDC
2K
27.5VDC
PHOTOMETER ELECTRONICS MODULE
GUIDANCE & NAVIGATION INDICATOR CONTROL (GNIC) BLOCK II
BLOCK II PSA
MODE MODULE
PTA/PEA TEMP ALARM HI
PTA/PEA TEMP ALARM LO
PTA/PEA TEMP MON LO
CDU TEMP ALARM HI
CDU TEMP ALARM LO
CDU TEMP MON LO
PSA BLK II TEMP ALARM HI
PSA BLK II TEMP ALARM LO
PSA BLK II TEMP MON LO
CGC/LGC TEMP ALARM HI
CGC/LGC TEMP ALARM LO
CGC/LGC TEMP MON LO
IMU TEMP MON HI
IMU TEMP MON LO
CGC/LGC TEMP MON HI
PSA BLK II TEMP MON HI
CDU TEMP MON HI
PTA/PEA TEMP MON HI
PIPA CALIB. ASSY (PCA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
CGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
IMU
J2-13
TEMP ALARM MODULE
TPA NO. 2
62
63
42
41
BLOCK II PSA
+28VDC PWR SUPPLY MOD.
THERMOSWITCH NORMALLY CLOSED OPEN AT HIGH TEMP >70°F
2900207
REV LTR F
SH 4

1/2900207

REVISIONS 19254					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	RLP MLM
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISED PER TDRR 20491		8 JUL 65	RLP MEM
D		REVISED PER TDRR 21911		1 SEP 65	RLP
E		REVISED PER TDRR 22007		9 SEP 65	RTP
F		REVISED PER TDRR 23763		12 NOV 65	RLP
G		REVISED PER TDRR-24054		24 NOV 65	B.


731TL COMP POWER ON LAMP
735T OPTICS POWER ON LAMP
926 GIMBAL DUMP INTERLOCK (TCL-926)
927 GIMBAL DUMP INDICATION (TCL-927)
924 GIMBAL DUMP INHIBIT (GPC-924)
1 GSE CHASSIS GRD BUS
2 GSE SHIELD GRD BUS
1 27VDC RLP LO (RLP-1)
896 115V,400CPS PH A PIL. PWR (FTR-896)
3 115V,400CPS NEUT (FTR-3)
743 27VDC RLP HI ISS OPERATE (TCL-743)
1374 OIA ON COMMAND (TCL-1374)
494 27VDC RLP HI (FTR-494)
902 27VDC RLP HI {PDL-902 TCL-902 TMC-902
73
102
68
71
72
76
74
69
77
79
78
81
80
82
VERIFICATION OF GATE OPERATION
FLASHER
ENABLE
88
CIRCUIT POWER SUPPLY
92
94
91
GIMBAL DUMP
GIMBAL DUMP INHIBITED
87
TRICKLE CHARGER
CHARGEABLE BATTERY
40 SEC ELECTRONIC TIME DELAY N.O. ±10%
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
ALARM
83
84
86
85
89
90
93
70
LAMP
WHEEL PWR FAIL PUSH TO RESET
M
75
LAMP
-28VDC FAIL PUSH TO RESET
M
ENABLE
VOLTAGE COMPARATOR NORM -28VDC TRIPS AT LOSS OF -28VDC
LAMP
PUSH TO INHIBIT
LAMP
ALARM INHIBITED
M
ALARM DISABLE
A
CGC/LGC WARNING NO.2
CGC/LGC WARNING NO 1
ISS WARNING LMP
ISS WARNING
GEN CAUTION
<.5 S
S IV B CUT OFF
RR AUTO ANGLE ENABLE
S IV B INJ SEQ. START
LR HOVER POS CMD
COMPUTER STANDBY
DSKY SPARE SD444
DSKY SPARE SD445
1
3
4
5
6
7
8
9
10
11
12
13
14
15
RSS-C
KBR-B
TES-194
ABR-A
KSS-C
-28VDC
0VDC IMU
275 276
587
27VDC RLP HI ISS ONLY
GPC-587
PDL-587
TMC-587
TCL-587
1826TL GEN CAUTION LIGHT
1827TL ISS WARNING LIGHT
1830TL ISS WARNING (LMP)
1828TL CGC/LGC WARNING NO.1
1829TL CGC/LGC WARNING NO.2
1831T S IV B CUTOFF
1833L RR AUTO ANGLE ENABLE
1832T S IV B INJ. SEQ. START
1834L LR HOVER POS CMD
1835TL COMPUTER STANDBY
1836TL DSKY SPARE SD444
1837TL DSKY SPARE SD445
OIA BACKWALL

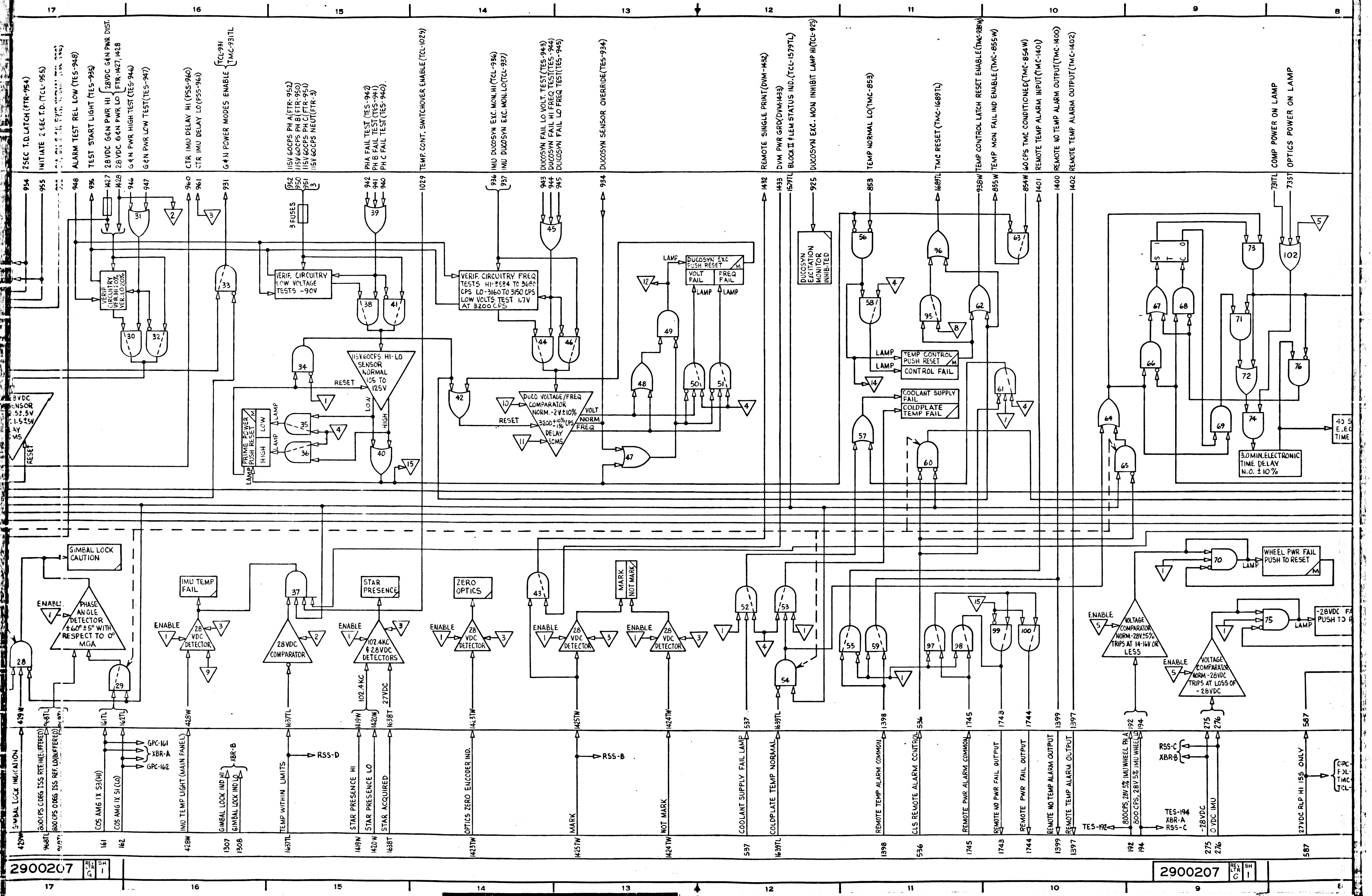
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN Splane DATE 7 MAY 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
MONITOR PANEL
(BLOCK I SERIES 100, BLOCK II, LEM)

CODE IDENT NO. 99974
SIZE
2900207
SCALE —
SHEET 1 OF 4


17
16
15
14
13
12
11
10
9
8
2SEC T.D. LATCH (FTR-954)
INITIATE 2 SEC T.D. (TCL-955)
ALARM TEST REL LOW (TES-948)
TEST START LIGHT (TES-935)
28VDC G&N PWR HI
28VDC G&N PWR LO
28VDC G&N PWR DIST. FTR-1427, 1428
G&N PWR HIGH TEST (TES-946)
G&N PWR LOW TEST (TES-947)
CTR IMU DELAY HI (PSS-960)
CTR IMU DELAY LO (PSS-961)
G&N POWER MODES ENABLE
TCL-931
TMC-931TL
115V 60CPS PH A (FTR-952)
115V 60CPS PH B (FTR-950)
115V 60CPS PH C (FTR-951)
115V 60CPS NEUT (FTR-3)
PHA FAIL TEST (TES-942)
PH B FAIL TEST (TES-941)
PH C FAIL TEST (TES-940).
TEMP. CONT. SWITCHOVER ENABLE (TCL-1029)
IMU DUCOSYN EXC. MON. HI (TCL-936)
IMU DUCOSYN EXC. MON. LO (TCL-937)
DUCOSYN FAIL LO VOLT. TEST (TES-943)
DUCOSYN FAIL HI FREQ TEST (TES-944)
DUCOSYN FAIL LO FREQ TEST (TES-945)
DUCOSYN SENSOR OVERRIDE (TES-934)
REMOTE SINGLE PRINT (DVM-1432)
DVM PWR GRD (DVM-1433)
BLOCK II & LEM STATUS IND. (TCL-1579TL)
DUCOSYN EXC. MON INHIBIT LAMP HI (TCL-925)
TEMP NORMAL LO (TMC-853)
TMC RESET (TMC-1689TL)
TEMP CONTROL LATCH RESET ENABLE (TMC-938W)
TEMP MON FAIL IND ENABLE (TMC-855W)
60CPS TMC CONDITIONED (TMC-854W)
REMOTE TEMP ALARM INPUT (TMC-1401)
REMOTE NO TEMP ALARM OUTPUT (TMC-1400)
REMOTE TEMP ALARM OUTPUT (TMC-1402)
COMP POWER ON LAMP
OPTICS POWER ON LAMP
954
955
948
935
1427
1428
946
947
960
961
931
952
950
951
3
942
941
940
1029
936
937
943
944
945
934
1432
1433
1579TL
925
853
1689TL
938W
855W
854W
1401
1400
1402
731TL
735T
3 FUSES
VERIF CIRCUITRY VER. HI 32V VER. LO 20V
VERIF. CIRCUITRY LOW VOLTAGE TESTS -90V
VERIF. CIRCUITRY FREQ TESTS HI-3584 TO 3680 CPS LO-3160 TO 3150 CPS LOW VOLTS TEST 1.7V AT 3200 CPS
115V 60CPS HI-LO SENSOR NORMAL 105 TO 125V
RESET
LOW
HIGH
PRIME POWER PUSH RESET
LAMP
DUCO VOLTAGE/FREQ COMPARATOR NORM. -2V ±10% 3200 +10% -1% CPS DELAY 50MS
VOLT
NORM
FREQ
DUCOSYN EXC PUSH RESET
VOLT FAIL
FREQ FAIL
DUCOSYN EXCITATION MONITOR INHIBITED
TEMP CONTROL PUSH RESET
CONTROL FAIL
COOLANT SUPPLY FAIL
COLDPLATE TEMP FAIL
S T C
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
3VDC SENSOR
RESET
GIMBAL LOCK CAUTION
ENABLE
PHASE ANGLE DETECTOR ±60° ±5° WITH RESPECT TO 0° MGA
IMU TEMP FAIL
28 VDC DETECTOR
28VDC COMPARATOR
STAR PRESENCE
102.4KC & 28VDC DETECTORS
102.4KC
27VDC
ZERO OPTICS
MARK
NOT MARK
WHEEL PWR FAIL PUSH TO RESET
VOLTAGE COMPARATOR NORM-28V ±5% TRIPS AT 14-16V OR LESS
VOLTAGE COMPARATOR NORM -28VDC TRIPS AT LOSS OF -28VDC
-28VDC FA
PUSH TO R
40 S
E.EC
TIME
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
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56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
95
96
97
98
99
100
102
1
2
3
4
5
8
9
10
11
12
14
15
429W
968TL
161TL
162TL
428W
1637TL
1419W
1420W
1638T
1423TW
1425TW
1424TW
537
1639TL
1398
536
1745
1743
1744
1399
1397
192
194
275
276
587
GIMBAL LOCK INDICATION
800CPS 0DEG ISS REF. HI (BUFFERED)
800CPS 0DEG ISS REF. LO (BUFFERED)
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
GPC-161
XBR-A
GPC-162
IMU TEMP LIGHT (MAIN PANEL)
GIMBAL LOCK IND HI
GIMBAL LOCK IND LO
XBR-B
TEMP WITHIN LIMITS
RSS-D
STAR PRESENCE HI
STAR PRESENCE LO
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
RSS-B
NOT MARK
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
REMOTE TEMP ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE PWR ALARM COMMON
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
800CPS, 28V 5% IMU WHEEL PH A
800 CPS, 28V 5% IMU WHEEL LO
TES-192
TES-194
XBR-A
RSS-C
XBR-B
-28VDC
0 VDC IMU
27VDC RLP HI ISS ONLY
GPC-
FDL-
TMC-
TCL-
429W
968TL
161
162
428W
1307
1308
1637TL
1419W
1420W
1638T
1423TW
1425TW
1424TW
537
1639TL
1398
536
1745
1743
1744
1399
1397
192
194
275
276
587
2900207
REV LTR G
SH 1

2/2900207

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS:

2900210	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RLP RELAY & LAMP POWER SUPPLY
2900204	TEMPERATURE MONITOR CONTROL PANEL (BLOCK I, SERIES 100)(TMC)
2900203	TEMPERATURE MONITOR CONTROL PANEL (BLOCK II & LEM)(TMC)
2900208	POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL)
2900223	GIMBAL POSITION CONTROL (GPC)
2900202	TEST CONTROL PANEL (BLOCK I, SERIES 100)(TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM)(TCL)
2900206	TEST SELECTOR PANEL (TES)
2900200	GYRO CAGING PANEL (BLOCK II & LEM)(GCP)
2900218	OSCILLOGRAPH SIGNAL SELECTION RSS-B TO FIXED DC CHANNEL, RSS-C TO SWITCHABLE AC CHANNEL, RSS-D TO SWITCHABLE DC CHANNEL
2900217	SIGNAL SELECTION & MEASUREMENT XBR-A CROSSBAR-AC SIGNALS XBR-B CROSSBAR-DC SIGNALS
2900219	COUNTER SIGNAL SELECTION PRIMARY SIGNAL SELECTOR (PSS)
2900214	GSE GROUNDING (BLOCK I SERIES 100)
2900213	GSE GROUNDING (BLOCK II & LEM)
2900209	COMPUTER SIMULATOR INTERFACE (CMS)
2900211	AUXILIARY INPUT/OUTPUT CALIBRATION (AIP)

4. NON STANDARD SYMBOLOGY:

INDICATES "AND" GATE WITH SWITCHED SIGNAL

NAME INDICATES INDICATOR LIGHT

NAME M INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME A INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

NAME / NAME INDICATES SPLIT SCREEN INDICATOR LIGHT

NAME / NAME M INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)

NAME A INDICATES UNLIGHTED PUSHBUTTON OR TOGGLE SWITCH (ALTERNATE ACTION)

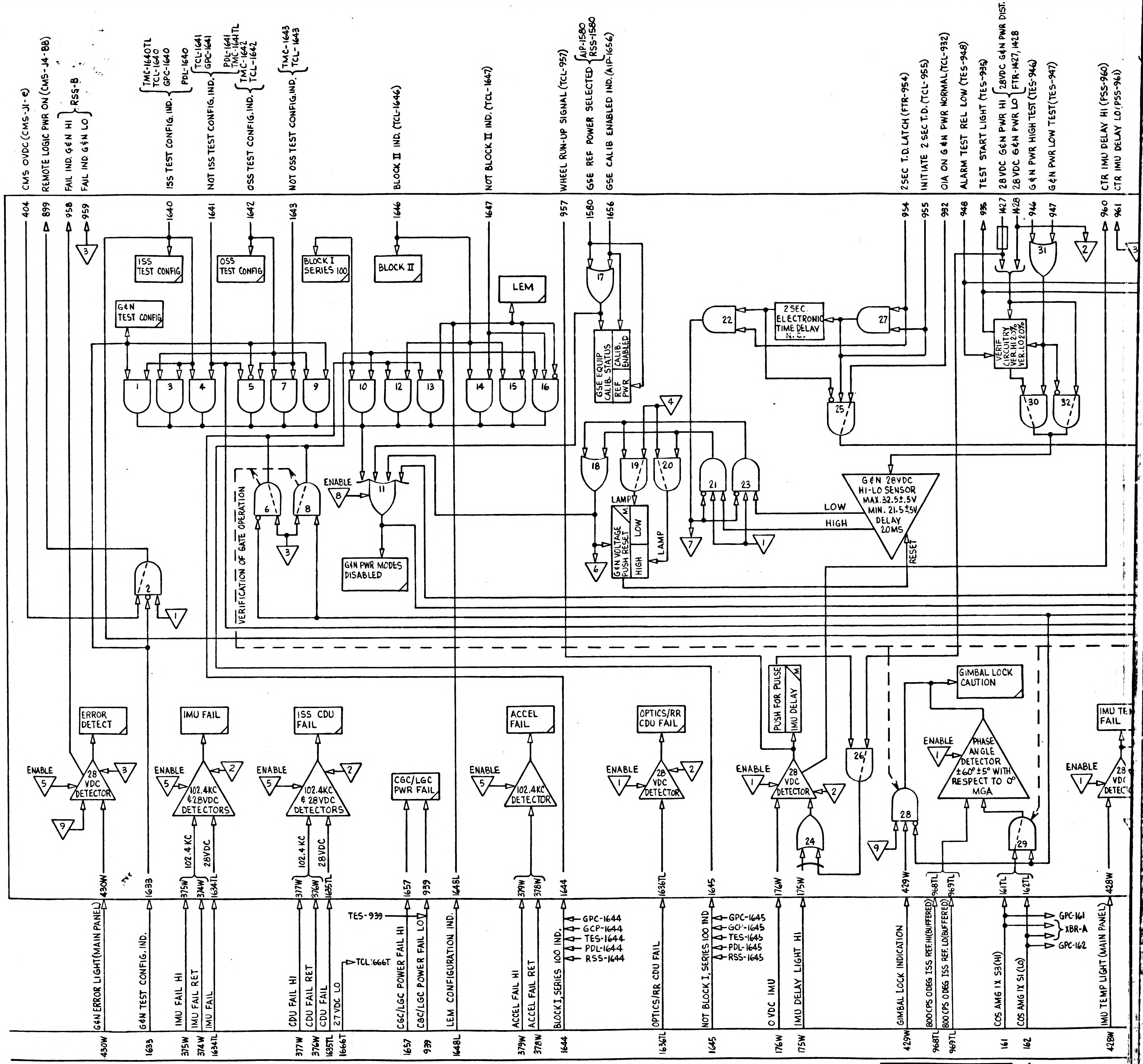
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   - A. W-BLOCK I SERIES 100 ONLY
   - B. T-BLOCK II ONLY
   - C. L-LEM ONLY
   - D. BLANK - ALL G&N CONFIGURATIONS
   - E. TW, TL OR WL - USED IN MORE THAN ONE G&N CONFIGURATION AS SHOWN.

6. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK I SERIES 100	SH 1 SH 2
BLOCK II	SH 1 SH 3
LEM	SH 1 SH 4

7. SIGNAL REFERENCE:

1 = OIA ON
2 = 28VDC G&N PWR LO
3 = 27 VDC RLP LO
4 = FLASHER
5 = ISS OPER. 5SEC T.D.
6 = G&N PWR FAIL
7 = 2 SEC T.D. AT OIA ON
8 = 27 VDC PIL. PWR
9 = 27VDC OIA ON
10 = +28VDC
11 = -28VDC
12 = DUCO EXC. FAIL
13 = +45 VDC
14 = TMC FAIL
15 = PRIME PWR FAIL



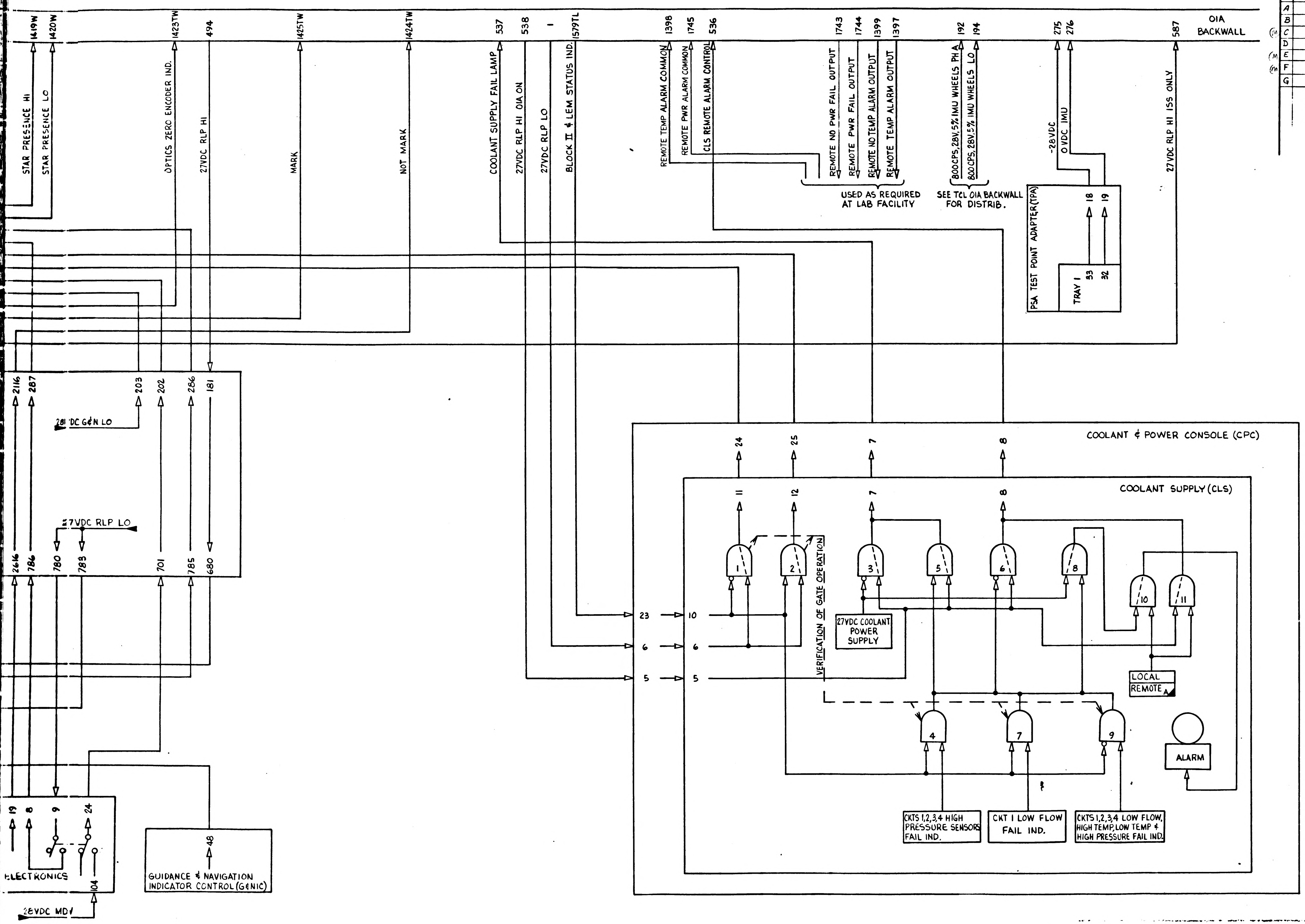
CMS OVDC (CMS-J1-e)
REMOTE LOGIC PWR ON (CMS-J4-BB)
FAIL IND. G&N HI
FAIL IND G&N LO
RSS-B
ISS TEST CONFIG. IND.
TMC-1640TL
TCL-1640
GPC-1640
PDL-1640
NOT ISS TEST CONFIG. IND.
TCL-1641
GPC-1641
PDL-1641
TMC-1641TL
OSS TEST CONFIG. IND.
TMC-1642
TCL-1642
NOT OSS TEST CONFIG. IND.
TMC-1643
TCL-1643
BLOCK II IND. (TCL-1646)
NOT BLOCK II IND. (TCL-1647)
WHEEL RUN-UP SIGNAL (TCL-957)
GSE REF POWER SELECTED
AIP-1580
RSS-1580
GSE CALIB ENABLED IND. (AIP-1656)
2SEC T.D. LATCH (FTR-954)
INITIATE 2 SEC T.D. (TCL-955)
OIA ON G&N PWR NORMAL (TCL-932)
ALARM TEST REL LOW (TES-948)
TEST START LIGHT (TES-935)
28VDC G&N PWR HI
28VDC G&N PWR LO
28VDC G&N PWR DIST.
FTR-1427, 1428
G&N PWR HIGH TEST (TES-946)
G&N PWR LOW TEST (TES-947)
CTR IMU DELAY HI (PSS-960)
CTR IMU DELAY LO (PSS-961)
404
899
958
959
1640
1641
1642
1643
1646
1647
957
1580
1656
954
955
932
948
935
1427
1428
946
947
960
961
ISS TEST CONFIG
OSS TEST CONFIG
BLOCK I SERIES 100
BLOCK II
LEM
G&N TEST CONFIG
GSE EQUIP CALIB. STATUS
REF PWR
CALIB. ENABLED
2 SEC. ELECTRONIC TIME DELAY N.C.
VERIF CIRCUITRY VER. HI 20% VER. LO 20%
ENABLE
G&N PWR MODES DISABLED
VERIFICATION OF GATE OPERATION
LAMP
M
G&N VOLTAGE PUSH RESET
LOW
HIGH
G&N 28VDC HI-LO SENSOR MAX. 32.5±.5V MIN. 21.5±.5V DELAY 20MS
RESET
ERROR DETECT
IMU FAIL
ISS CDU FAIL
CGC/LGC PWR FAIL
ACCEL FAIL
OPTICS/RR CDU FAIL
PUSH FOR PULSE
IMU DELAY
GIMBAL LOCK CAUTION
IMU TEMP FAIL
28 VDC DETECTOR
102.4KC & 28VDC DETECTORS
102.4KC DETECTOR
PHASE ANGLE DETECTOR ±60°±5° WITH RESPECT TO 0° MGA
102.4 KC
28VDC
G&N ERROR LIGHT (MAIN PANEL)
G&N TEST CONFIG. IND.
IMU FAIL HI
IMU FAIL RET
IMU FAIL
CDU FAIL HI
CDU FAIL RET
CDU FAIL
27 VDC LO
TCL-1666T
TES-939
CGC/LGC POWER FAIL HI
CGC/LGC POWER FAIL LO
LEM CONFIGURATION IND.
ACCEL FAIL HI
ACCEL FAIL RET
BLOCK I, SERIES 100 IND.
GPC-1644
GCP-1644
TES-1644
PDL-1644
RSS-1644
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND
GPC-1645
GCP-1645
TES-1645
PDL-1645
RSS-1645
0 VDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK INDICATION
800CPS 0DEG ISS REF. HI (BUFFERED)
800CPS 0DEG ISS REF. LO (BUFFERED)
COS AMG 1X S3 (HI)
COS AMG 1X S1 (LO)
GPC-161
XBR-A
GPC-162
IMU TEMP LIGHT (MAIN PANEL)
430W
1633
375W
374W
1634TL
377W
376W
1635TL
1666T
1657
939
1648L
379W
378W
1644
1636TL
1645
176W
175W
429W
968TL
969TL
161TL
162TL
161
162
428W

2900207 REV LTR G SH 1

MIL FORM 1050 J3

17 2900207

REVISIONS 19254					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP MCM
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISION STATUS CHANGED		8 JUL 65	RLP MCM
D		REVISION STATUS CHANGED		1 SEP 65	RLP
E		REVISION STATUS CHANGED		9 SEPT 65	RTP
F		REVISED PER TDRR 23763		12 NOV 65	RLP
G		REVISION STATUS CHANGED		24 NOV 65	B. EF

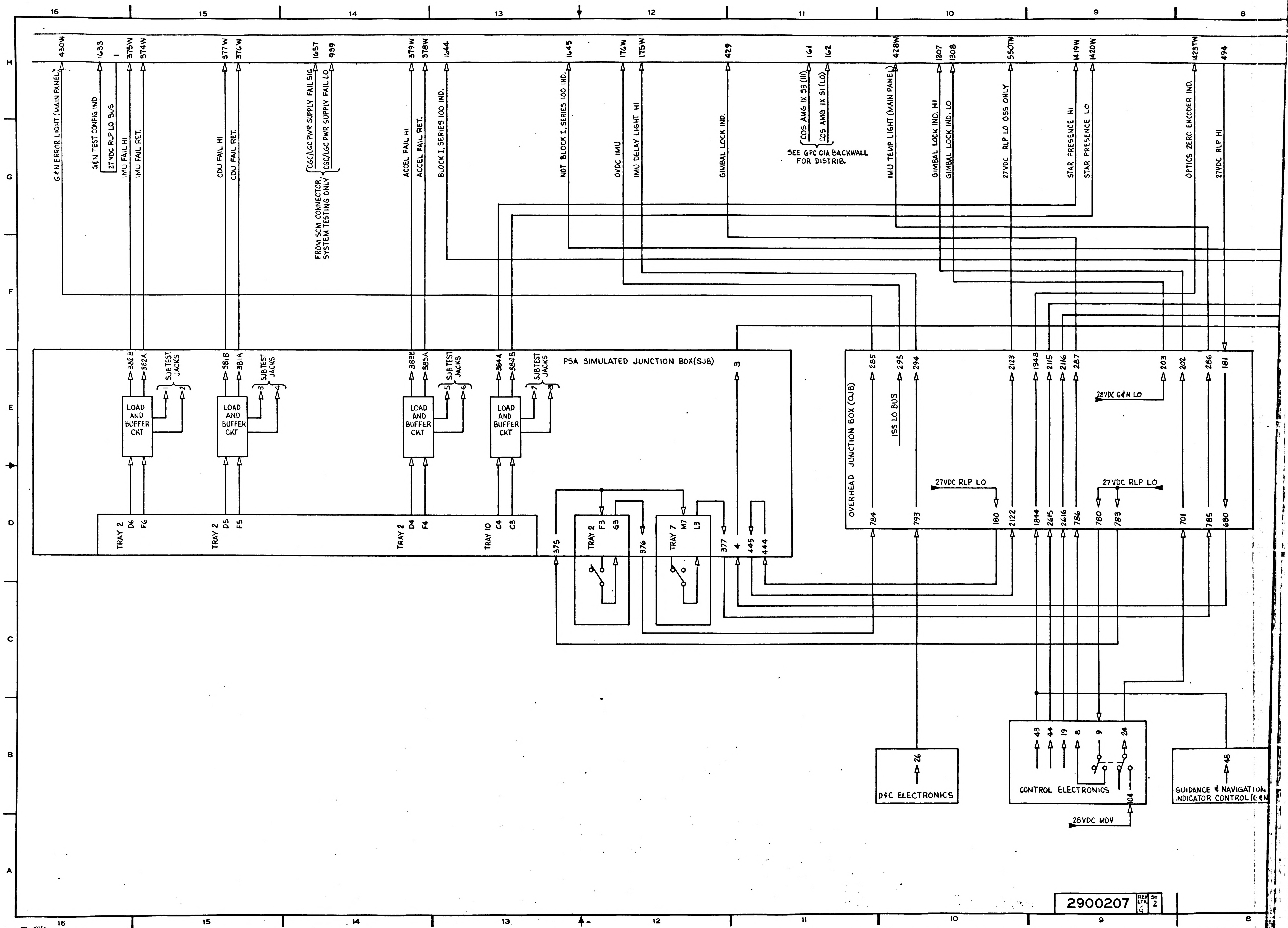


OIA BACKWALL
1419W
1420W
STAR PRESENCE HI
STAR PRESENCE LO
1423TW
494
OPTICS ZERO ENCODER IND.
27VDC RLP HI
1425TW
MARK
1424TW
NOT MARK
537
538
1579TL
COOLANT SUPPLY FAIL LAMP
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND.
1398
1745
536
REMOTE TEMP ALARM COMMON
REMOTE PWR ALARM COMMON
CLS REMOTE ALARM CONTROL
1743
1744
1399
1397
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
192
194
800CPS, 28V, 5% IMU WHEELS PHA
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
275
276
-28VDC
0VDC IMU
PSA TEST POINT ADAPTER (TPA)
18
19
TRAY I
33
32
587
27VDC RLP HI ISS ONLY
2116
287
203
202
266
181
28VDC G&N LO
27VDC RLP LO
2616
786
780
783
701
785
680
19
8
9
24
104
ELECTRONICS
28VDC MDV
48
GUIDANCE & NAVIGATION INDICATOR CONTROL (G&NIC)
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
23
6
5
COOLANT SUPPLY (CLS)
11
12
7
8
10
6
5
1
2
3
4
5
6
7
8
9
10
11
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
ALARM
CKTS 1,2,3,4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL IND.
CKTS 1,2,3,4 LOW FLOW, HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Splane DATE 7 MAY 65 CHECKED Ed Foster 4 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK I SERIES 100)
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974
CONTRACT	MIT APPROVAL	SIZE
		2900207
		SCALE —
		SHEET 2 OF 4

2900207 REV LTR G SH 2

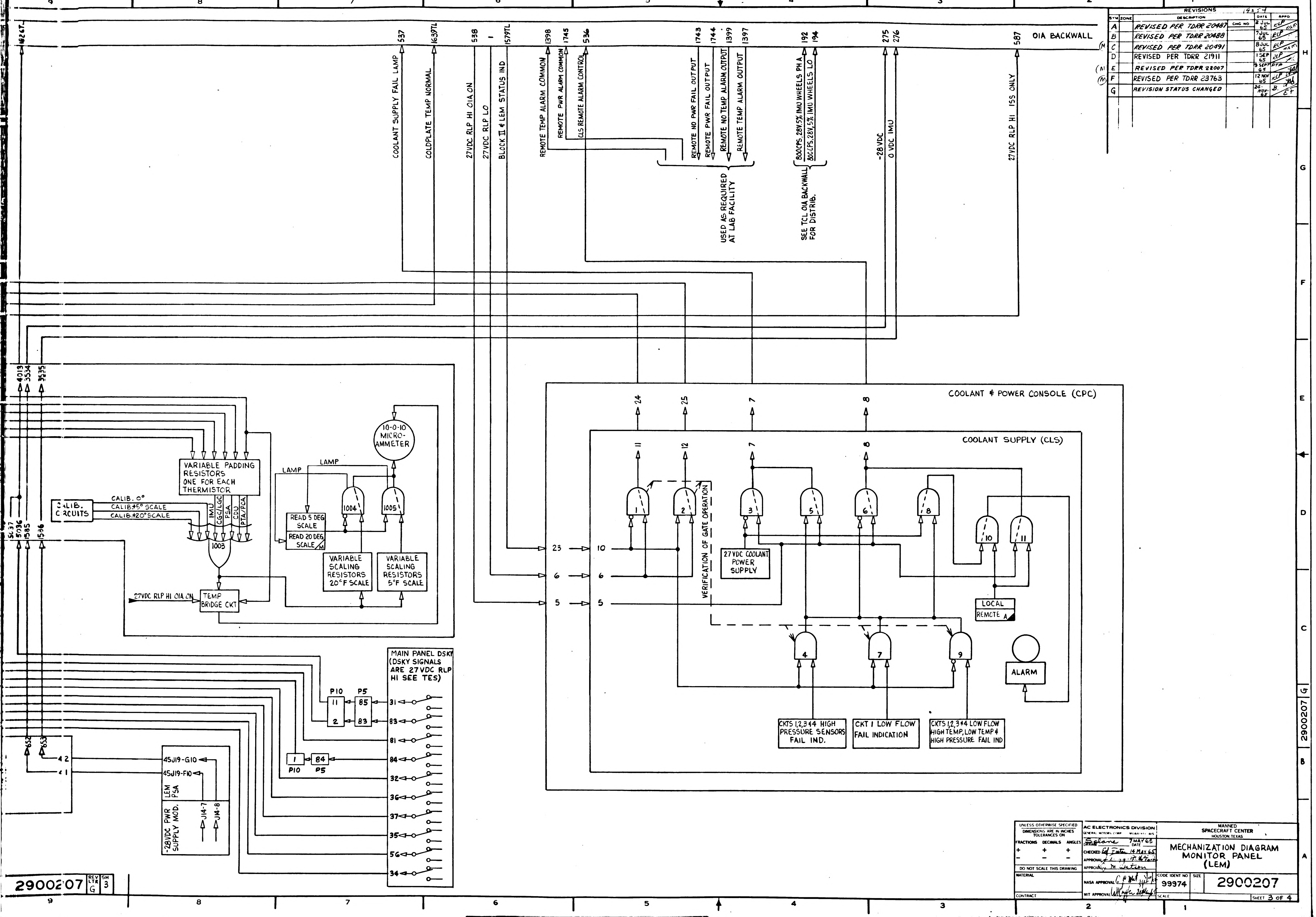
2729002O7


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
430W
1633
1
375W
374W
377W
376W
1657
939
379W
378W
1644
1645
176W
175W
429
161
162
428W
1307
1308
550TW
1419W
1420W
1423TW
494
G&N ERROR LIGHT (MAIN PANEL)
G&N TEST CONFIG IND
27VDC RLP LO BUS
IMU FAIL HI
IMU FAIL RET.
CDU FAIL HI
CDU FAIL RET.
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR, SYSTEM TESTING ONLY
ACCEL FAIL HI
ACCEL FAIL RET.
BLOCK I, SERIES 100 IND.
NOT BLOCK I, SERIES 100 IND.
OVDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK IND.
COS AMG IX 53 (HI)
COS AMG IX 51 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
IMU TEMP LIGHT (MAIN PANEL)
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
27VDC RLP LO OSS ONLY
STAR PRESENCE HI
STAR PRESENCE LO
OPTICS ZERO ENCODER IND.
27VDC RLP HI
PSA SIMULATED JUNCTION BOX (SJB)
382B
382A
SJB TEST JACKS
1
2
LOAD AND BUFFER CKT
381B
381A
3
4
383B
383A
5
6
384A
384B
7
8
TRAY 2
D6
F6
TRAY 2
D5
F5
TRAY 2
D4
F4
TRAY 10
C4
C3
375
TRAY 2
F3
G3
376
TRAY 7
M7
L3
377
4
445
444
3
OVERHEAD JUNCTION BOX (OJB)
285
295
294
2123
1348
2115
2116
287
203
202
286
181
ISS LO BUS
28VDC G&N LO
27VDC RLP LO
27VDC RLP LO
784
793
180
2122
1844
2615
2616
786
780
783
701
785
680
26
D&C ELECTRONICS
43
44
19
8
9
24
104
CONTROL ELECTRONICS
28VDC MDV
48
GUIDANCE & NAVIGATION INDICATOR CONTROL (G&N

2900207 REV LTR G SH 2

H2

172900207


OIA BACKWALL
1626TL
537
1639TL
538
1
1579TL
1398
1745
536
1743
1744
1399
1397
192
194
275
276
587
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND
REMOTE TEMP ALARM COMMON
REMOTE PWR ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
800CPS, 28V5% IMU WHEELS PH A
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
0 VDC IMU
27VDC RLP HI ISS ONLY
4013
3534
3535
5037
5036
3585
3586
CALIB. CIRCUITS
CALIB. 0°
CALIB. ±5° SCALE
CALIB. ±20° SCALE
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
LAMP
LAMP
READ 5 DEG SCALE
READ 20 DEG SCALE
1004
1005
10-0-10 MICRO-AMMETER
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
COOLANT & POWER CONSOLE (CPC)
COOLANT SUPPLY (CLS)
24
25
7
8
11
12
7
8
23
10
6
6
5
5
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
1
2
3
5
6
8
10
11
4
7
9
LOCAL
REMOTE
ALARM
CKTS 1,2,3&4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3&4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND
MAIN PANEL DSKY (DSKY SIGNALS ARE 27VDC RLP HI SEE TES)
P10
P5
11
85
2
83
1
84
P10
P5
31
83
81
84
32
36
37
35
56
34
652
653
4 2
4 1
45J19-G10
45J19-F10
LEM PSA
-28VDC PWR SUPPLY MOD.
J14-7
J14-8
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	RLP MEM
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISED PER TDRR 20491		8 JUL 65	RLP MEM
D		REVISED PER TDRR 21911		1 SEP 65	RLP
E		REVISED PER TDRR 22007		9 SEPT 65	PTP
F		REVISED PER TDRR 23763		12 NOV 65	RLP
G		REVISION STATUS CHANGED		24-NOV-65	B. ET

REVISIONS 19254

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN Splane DATE 7 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL M Watson
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

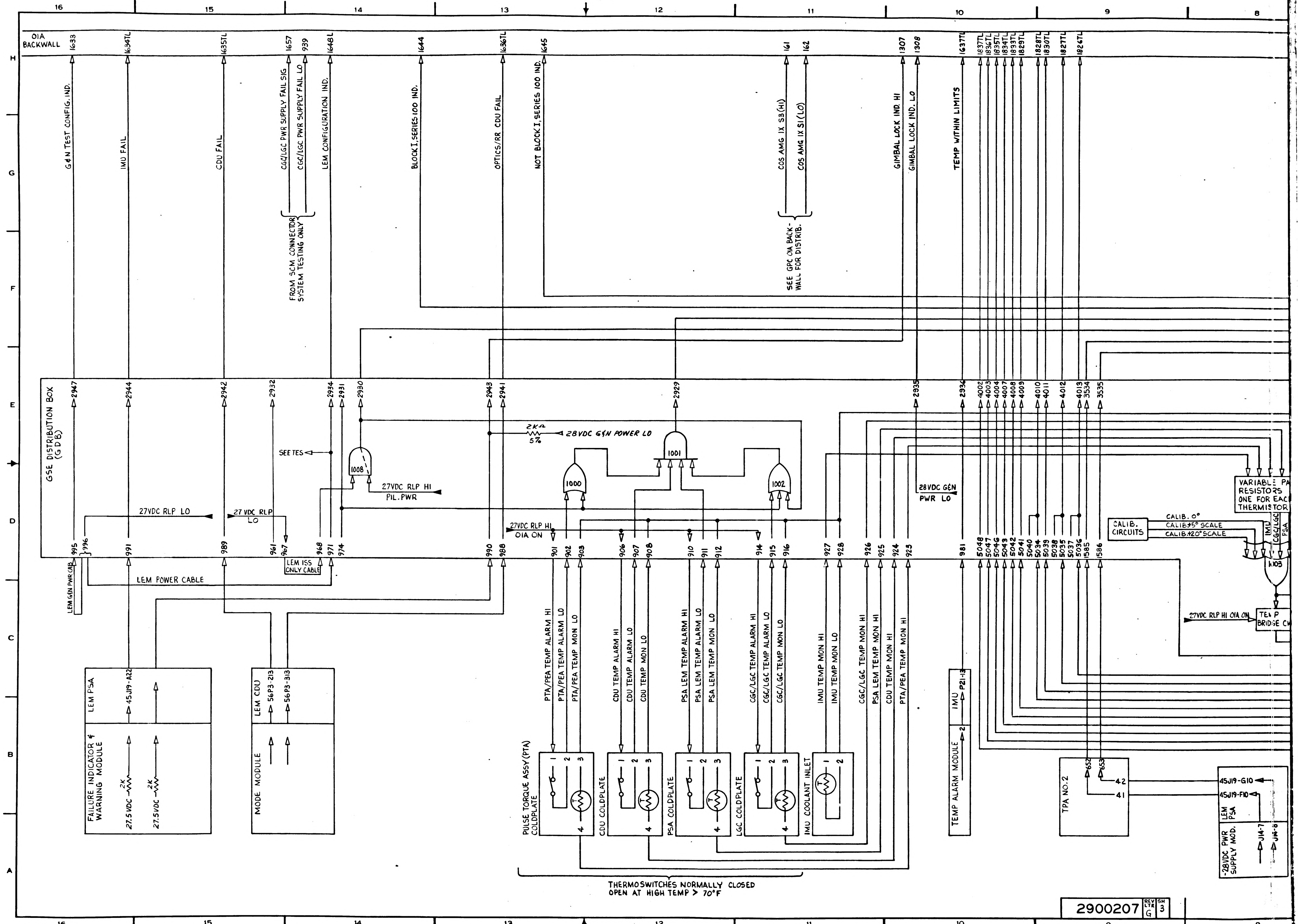
MECHANIZATION DIAGRAM
MONITOR PANEL
(LEM)

CODE IDENT NO 99974
SIZE
2900207
SCALE
SHEET 3 OF 4

2900207 REV LTR G SH 3

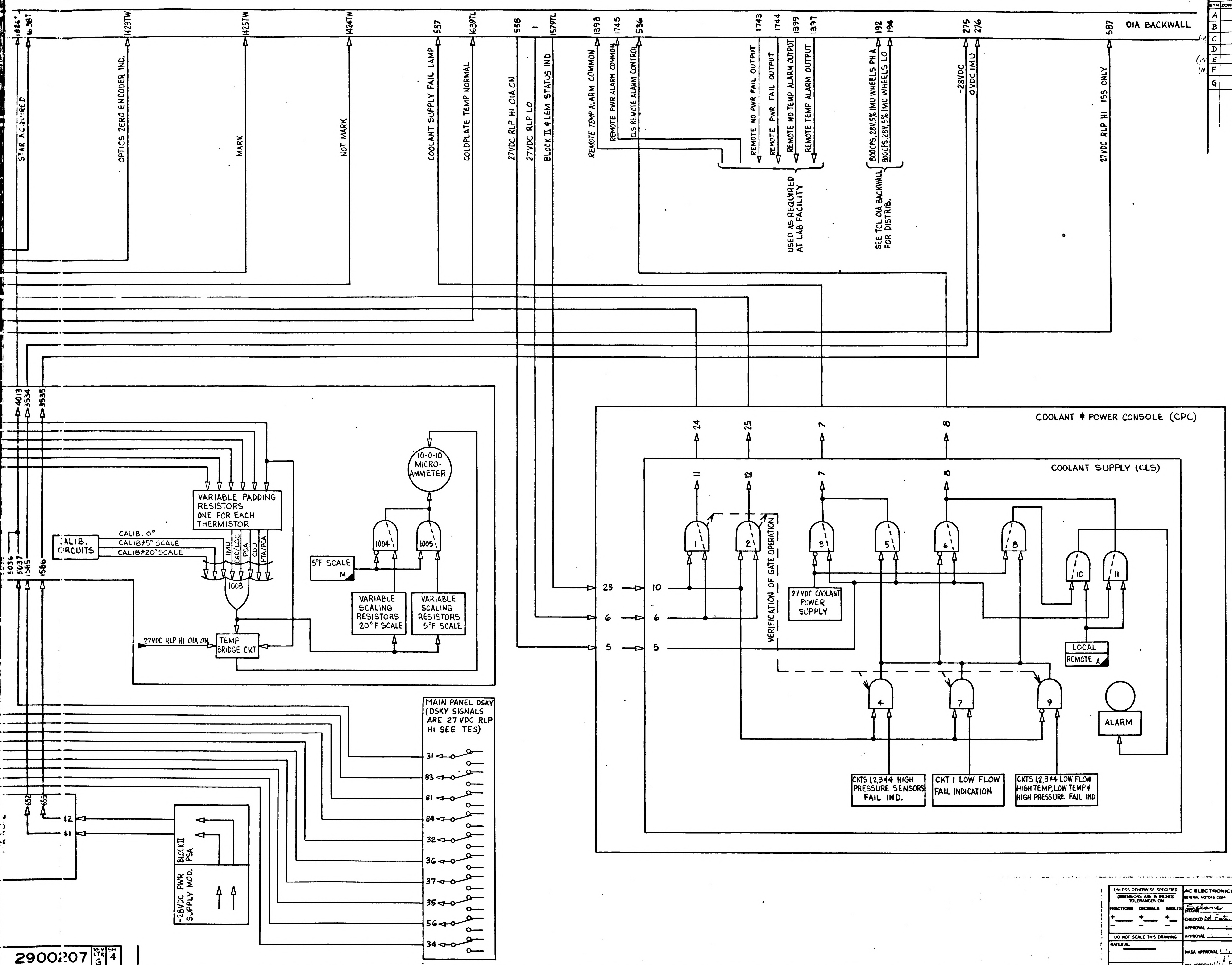
2900207 G

27 2900207

16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1633
1634TL
1635TL
1657
939
1648L
1644
1636TL
1645
161
162
1307
1308
1637TL
1837TL
1836TL
1835TL
1834TL
1833TL
1829TL
1828TL
1830TL
1827TL
1826TL
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
LEM CONFIGURATION IND.
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
TEMP WITHIN LIMITS
FROM SCM CONNECTOR SYSTEM TESTING ONLY
SEE GPC OIA BACKWALL FOR DISTRIB.
GSE DISTRIBUTION BOX (GDB)
2947
2944
2942
2932
2934
2931
2930
2943
2941
2929
2935
2936
4002
4003
4004
4007
4008
4009
4010
4011
4012
4013
3534
3535
SEE TES
1008
27VDC RLP HI PIL. PWR
2KΩ 5%
28VDC G&N POWER LO
1001
1000
1002
28VDC GEN PWR LO
27VDC RLP LO
27 VDC RLP LO
27VDC RLP HI OIA ON
995
996
991
989
961
967
968
971
974
990
988
901
902
903
906
907
908
910
911
912
914
915
916
927
928
926
925
924
923
981
5048
5047
5046
5043
5042
5041
5040
5039
5038
5035
5037
5036
1585
1586
LEM ISS ONLY CABLE
LEM G&N PWR CAB
LEM POWER CABLE
VARIABLE PA RESISTORS ONE FOR EAC THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB. ±5° SCALE
CALIB. ±20° SCALE
IMU
CGC/LGC
PSA
K103
27VDC RLP HI OIA ON
TEMP BRIDGE C
PTA/PEA TEMP ALARM HI
PTA/PEA TEMP ALARM LO
PTA/PEA TEMP MON LO
CDU TEMP ALARM HI
CDU TEMP ALARM LO
CDU TEMP MON LO
PSA LEM TEMP ALARM HI
PSA LEM TEMP ALARM LO
PSA LEM TEMP MON LO
CGC/LGC TEMP ALARM HI
CGC/LGC TEMP ALARM LO
CGC/LGC TEMP MON LO
IMU TEMP MON HI
IMU TEMP MON LO
CGC/LGC TEMP MON HI
PSA LEM TEMP MON HI
CDU TEMP MON HI
PTA/PEA TEMP MON HI
LEM PSA
45J19-A22
FAILURE INDICATOR & WARNING MODULE
2K
27.5 VDC
2K
27.5 VDC
LEM CDU
56P3-213
56P3-313
MODE MODULE
PULSE TORQUE ASSY (PTA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
LGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
IMU
P21-13
TEMP ALARM MODULE
TPA NO. 2
652
653
42
41
45J19-G10
45J19-F10
LEM PSA
-28VDC PWR SUPPLY MOD.
J14-7
J14-8
THERMOSWITCHES NORMALLY CLOSED OPEN AT HIGH TEMP > 70°F
2900207
REV LTR G
SH 3

17 2900207

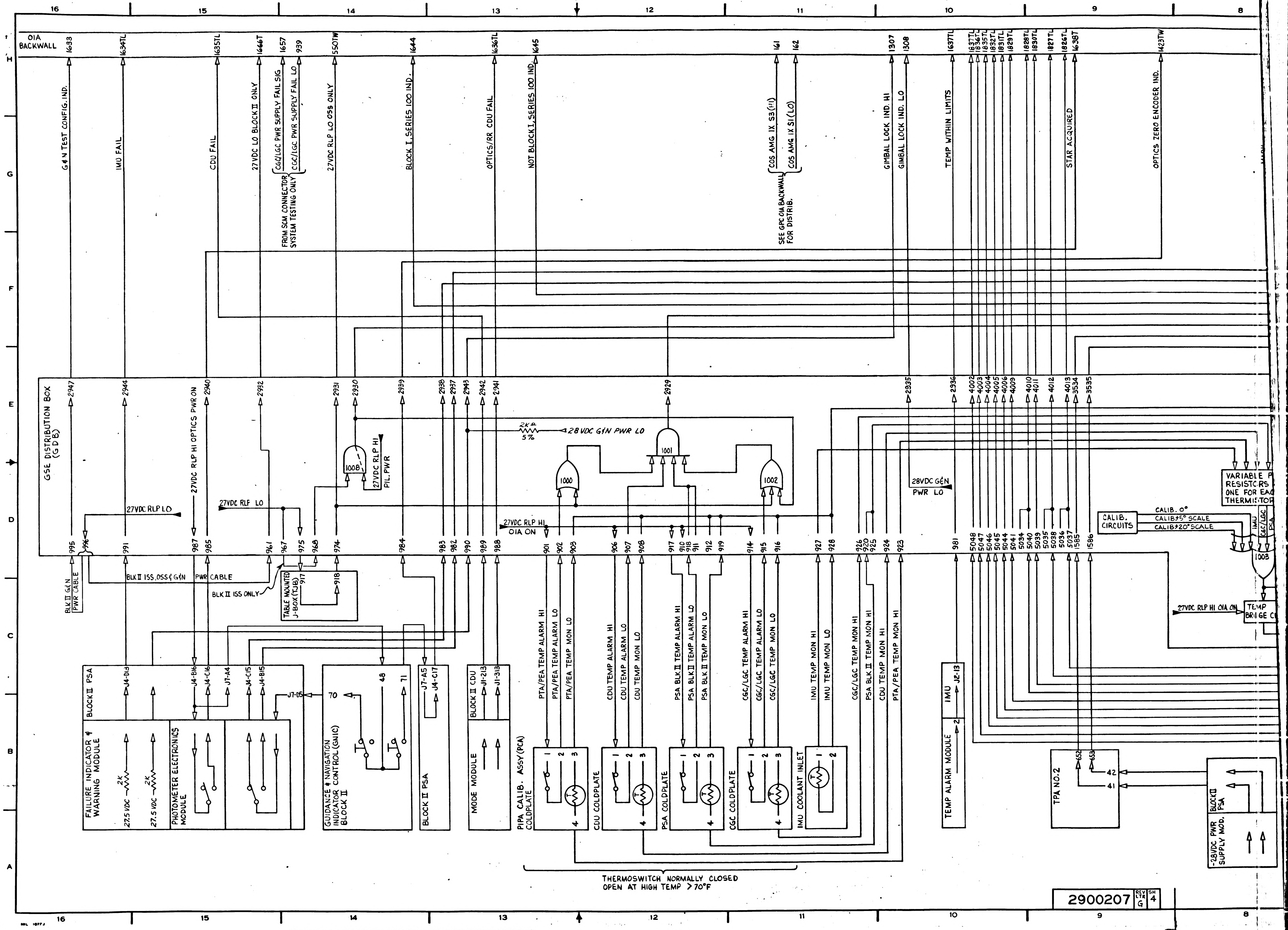
REVISIONS		19254			
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	RLP MEM
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISED PER TDRR 20491		8 JUL 65	RLP MEM
D		REVISED PER TDRR 21911		1 SEP 65	RLP
E		REVISED PER TDRR 22007		9 SEPT 65	RTP
F		REVISED PER TDRR 23763		12 NOV 65	RLP
G		REVISION STATUS CHANGED		24-NOV-65	B. EF


STAR ACQUIRED
1826*
1638*
OPTICS ZERO ENCODER IND.
1423TW
MARK
1425TW
NOT MARK
1424TW
COOLANT SUPPLY FAIL LAMP
537
COLDPLATE TEMP NORMAL
1639TL
27VDC RLP HI OIA ON
538
27VDC RLP LO
1
BLOCK II & LEM STATUS IND
1579TL
REMOTE TEMP ALARM COMMON
1398
REMOTE PWR ALARM COMMON
1745
CLS REMOTE ALARM CONTROL
536
REMOTE NO PWR FAIL OUTPUT
1743
REMOTE PWR FAIL OUTPUT
1744
REMOTE NO TEMP ALARM OUTPUT
1399
REMOTE TEMP ALARM OUTPUT
1397
USED AS REQUIRED AT LAB FACILITY
800CPS, 28V, 5% IMU WHEELS PH A
800CPS, 28V, 5% IMU WHEELS LO
192
194
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
0VDC IMU
275
276
27VDC RLP HI ISS ONLY
587
OIA BACKWALL
4013
3534
3535
5036
5037
1565
1586
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB±5° SCALE
CALIB±20° SCALE
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
10-0-10 MICRO-AMMETER
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
MAIN PANEL DSKY (DSKY SIGNALS ARE 27 VDC RLP HI SEE TES)
31
83
81
84
32
36
37
35
56
34
652
653
42
41
BLOCK II PSA
-28VDC PWR SUPPLY MOD.
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
23
10
6
6
5
5
1
2
3
5
6
8
10
11
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE A
4
7
9
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND

2900207 G

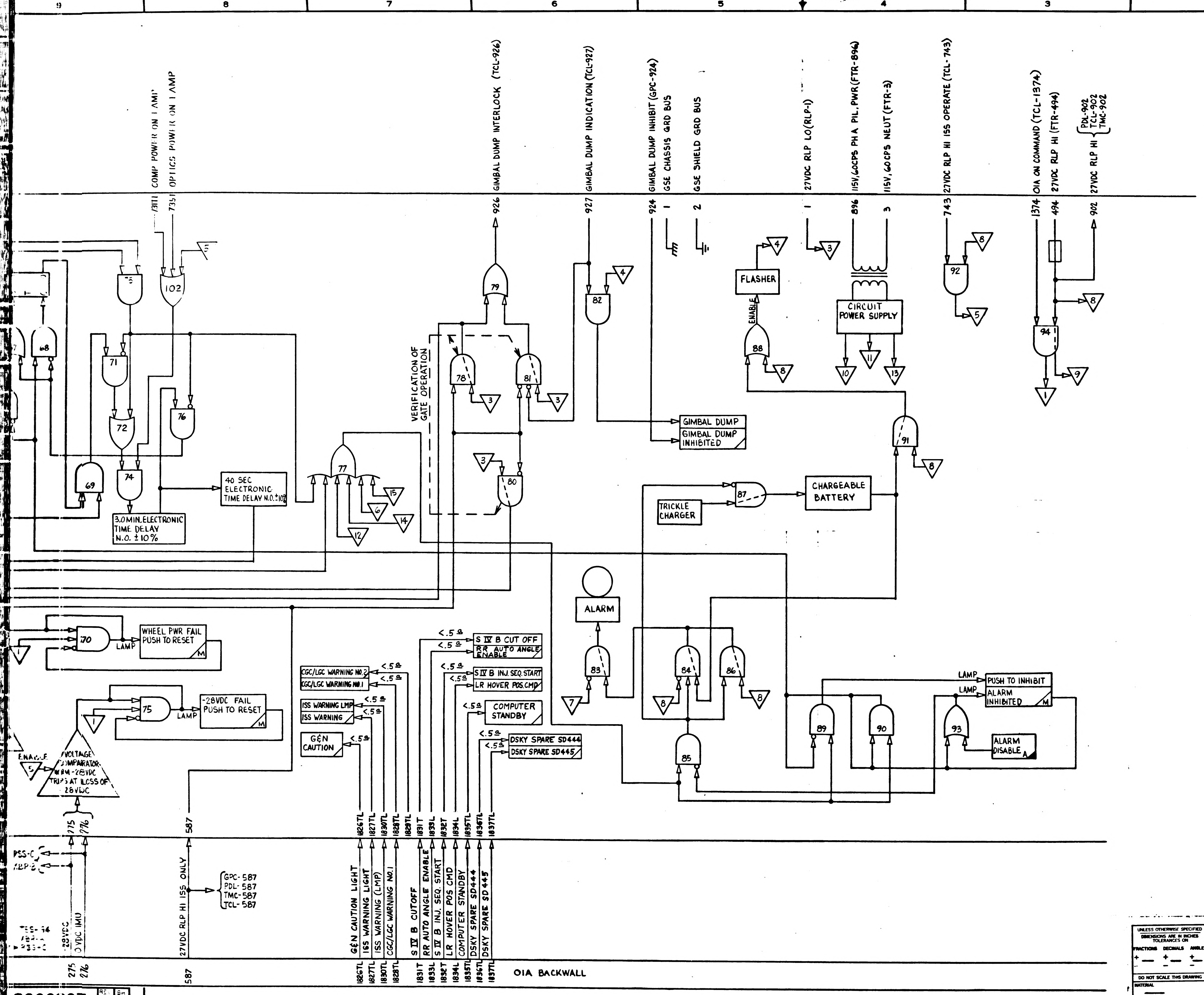
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Solane DATE 7 MAY 65 CHECKED Ed Foster 14 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK II)
MATERIAL	NASA APPROVAL	CODE IDENT NO 99374 | SIZE | 2900207
CONTRACT	MIT APPROVAL	SCALE | SHEET 4 OF 4

27 2900207


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1633
1634TL
1635TL
1666T
1657
939
5507W
1644
1636TL
1645
161
162
1307
1308
1637TL
1837TL
1836T
1835TL
1832T
1831TL
1829TL
1828TL
1830TL
1827TL
1826TL
1638T
1423TW
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
27VDC LO BLOCK II ONLY
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR SYSTEM TESTING ONLY
27VDC RLP LO OSS ONLY
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
TEMP WITHIN LIMITS
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
GSE DISTRIBUTION BOX (GDB)
2947
2944
2940
2932
2931
2930
2939
2938
2937
2943
2942
2941
2929
2935
2936
4002
4003
4004
4005
4006
4009
4010
4011
4012
4013
3534
3535
27VDC RLP HI OPTICS PWR ON
27VDC RLP LO
27VDC RLF LO
1008
27VDC RLP HI PIL. PWR
2K Ω 5%
28 VDC G&N PWR LO
1000
1001
1002
28VDC G&N PWR LO
27VDC RLP HI OIA ON
995
996
991
987
985
961
967
975
968
974
984
983
982
990
989
988
901
902
903
906
907
908
917
910
918
911
912
919
914
915
916
927
928
926
920
925
924
923
981
5048
5047
5046
5045
5044
5041
5034
5040
5039
5035
5038
5036
5037
1585
1586
BLK II G&N PWR CABLE
BLK II ISS, OSS & G&N PWR CABLE
BLK II ISS ONLY
TABLE MOUNTED J-BOX (TJB)
917
918
BLOCK II PSA
J4-B13
J4-B16
J4-C16
J7-A4
J4-C15
J4-B15
J7-D5
FAILURE INDICATOR & WARNING MODULE
2K
27.5 VDC
2K
27.5 VDC
PHOTOMETER ELECTRONICS MODULE
GUIDANCE & NAVIGATION INDICATOR CONTROL (GNIC) BLOCK II
70
48
71
J7-A5
J4-C17
BLOCK II PSA
BLOCK II CDU
J1-213
J1-313
MODE MODULE
PTA/PEA TEMP ALARM HI
PTA/PEA TEMP ALARM LO
PTA/PEA TEMP MON LO
CDU TEMP ALARM HI
CDU TEMP ALARM LO
CDU TEMP MON LO
PSA BLK II TEMP ALARM HI
PSA BLK II TEMP ALARM LO
PSA BLK II TEMP MON LO
CGC/LGC TEMP ALARM HI
CGC/LGC TEMP ALARM LO
CGC/LGC TEMP MON LO
IMU TEMP MON HI
IMU TEMP MON LO
CGC/LGC TEMP MON HI
PSA BLK II TEMP MON HI
CDU TEMP MON HI
PTA/PEA TEMP MON HI
1
2
3
4
PIPA CALIB. ASSY (PCA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
CGC COLDPLATE
IMU COOLANT INLET
THERMOSWITCH NORMALLY CLOSED OPEN AT HIGH TEMP >70°F
IMU
J2-13
TEMP ALARM MODULE
2
TPA NO.2
652
653
42
41
BLOCK II PSA
-28VDC PWR SUPPLY MOD.
VARIABLE RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB ±5° SCALE
CALIB ±20° SCALE
IMU
CGC/LGC
PSA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE C
ML 1077J

2900207 REV LTR G SH 4

1/2900207


COMP POWER ON LAMP
OPTICS POWER ON LAMP
7311
7351
926 GIMBAL DUMP INTERLOCK (TCL-926)
927 GIMBAL DUMP INDICATION (TCL-927)
924 GIMBAL DUMP INHIBIT (GPC-924)
1 GSE CHASSIS GRD BUS
2 GSE SHIELD GRD BUS
1 27VDC RLP LO (RLP-1)
896 115V, 60CPS PH A PIL. PWR (FTR-896)
3 115V, 60CPS NEUT (FTR-3)
743 27VDC RLP HI ISS OPERATE (TCL-743)
1374 OIA ON COMMAND (TCL-1374)
494 27VDC RLP HI (FTR-494)
902 27VDC RLP HI PDL-902 TCL-902 TMC-902
102
71
72
74
76
68
69
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
70
75
FLASHER
ENABLE
CIRCUIT POWER SUPPLY
VERIFICATION OF GATE OPERATION
GIMBAL DUMP
GIMBAL DUMP INHIBITED
40 SEC ELECTRONIC TIME DELAY N.O. ±10%
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
CHARGEABLE BATTERY
TRICKLE CHARGER
ALARM
WHEEL PWR FAIL PUSH TO RESET
-28VDC FAIL PUSH TO RESET
LAMP
M
VOLTAGE COMPARATOR WHM -28VDC TRIPS AT LOSS OF 28VDC
ENABLE
PUSH TO INHIBIT
ALARM INHIBITED
ALARM DISABLE
CGC/LGC WARNING NO. 2
CGC/LGC WARNING NO. 1
ISS WARNING LMP
ISS WARNING
GEN CAUTION
S IV B CUT OFF
RR AUTO ANGLE ENABLE
S IV B INJ. SEQ. START
LR HOVER POS. CMD
COMPUTER STANDBY
DSKY SPARE SD444
DSKY SPARE SD445
<.5Ω
275
276
28VDC
0VDC IMU
PSS-C
RLP-3
TSS-34
587
27VDC RLP HI ISS ONLY
GPC-587
PDL-587
TMC-587
TCL-587
1826TL GEN CAUTION LIGHT
1827TL ISS WARNING LIGHT
1830TL ISS WARNING (LMP)
1828TL CGC/LGC WARNING NO. 1
1829TL
1831T S IV B CUTOFF
1833L RR AUTO ANGLE ENABLE
1832T S IV B INJ. SEQ. START
1834L LR HOVER POS CMD
1835TL COMPUTER STANDBY
1836TL DSKY SPARE SD444
1837TL DSKY SPARE SD445
OIA BACKWALL
1
3
4
5
6
7
8
9
10
11
12
13
14
15
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	MLM
B		REVISED PER TDRR 20488		JUL 65	
C		REVISED PER TDRR 20491		8 JUL 65	MEM
D		REVISED PER TDRR 21911		1 SEP 65	
E		REVISED PER TDRR 22007		SEP 65	
F		REVISED PER TDRR 23763		12 NOV 65	
G		REVISED PER TDRR-24054		24 NOV 65	
H		REVISED PER TDRR 24059		29 NOV 65	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN Solano DATE 7 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

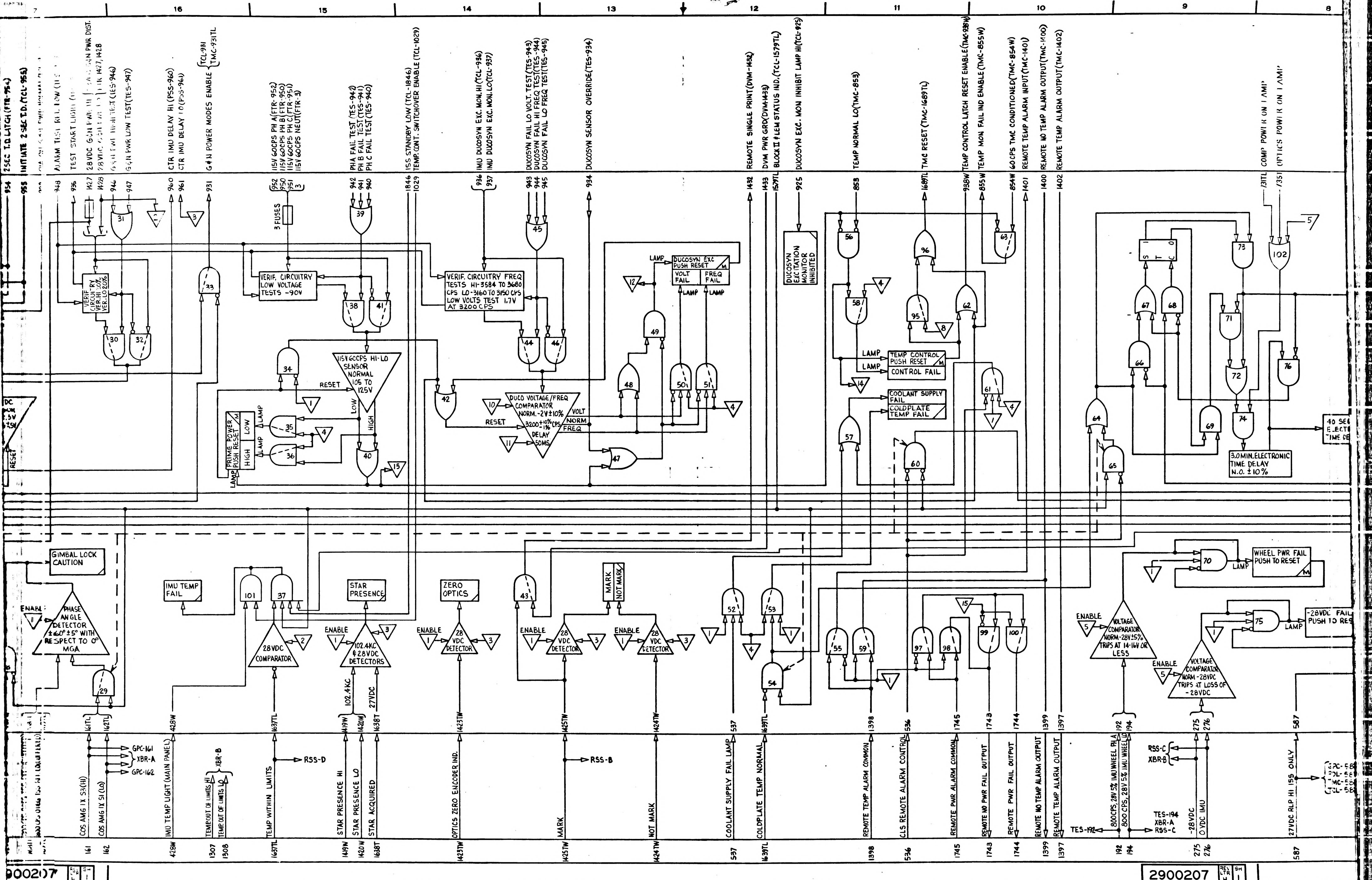
MECHANIZATION DIAGRAM
MONITOR PANEL
(BLOCK I SERIES 100, BLOCK II, LEM)

CODE IDENT NO. 99974
SIZE
2900207
SCALE —
SHEET 1 OF 4

2900207

2900207

3/2900207


2 SEC T.D. LATCH (FTR-954)
INITIATE 2 SEC T.D. (TCL-955)
ALARM TEST REL LOW
TEST START LIGHT
28VDC G&N PWR HI } G&N PWR DIST. FTR 1427, 1428
28VDC G&N PWR LO
G&N PWR HIGH TEST (TES-946)
G&N PWR LOW TEST (TES-947)
CTR IMU DELAY HI (PSS-960)
CTR IMU DELAY LO (PSS-961)
G&N POWER MODES ENABLE {TCL-931 TMC-931TL
115V 60CPS PH A (FTR-952)
115V 60CPS PH B (FTR-950)
115V 60CPS PH C (FTR-951)
115V 60CPS NEUT (FTR-3)
PHA FAIL TEST (TES-942)
PH B FAIL TEST (TES-941)
PH C FAIL TEST (TES-940)
ISS STANDBY LOW (TCL-1846)
TEMP. CONT. SWITCHOVER ENABLE (TCL-1029)
IMU DUCOSYN EXC. MON. HI (TCL-936)
IMU DUCOSYN EXC. MON. LO (TCL-937)
DUCOSYN FAIL LO VOLT. TEST (TES-943)
DUCOSYN FAIL HI FREQ TEST (TES-944)
DUCOSYN FAIL LO FREQ TEST (TES-945)
DUCOSYN SENSOR OVERRIDE (TES-934)
REMOTE SINGLE PRINT (DVM-1432)
DVM PWR GRD (DVM-1433)
BLOCK II & LEM STATUS IND. (TCL-1579TL)
DUCOSYN EXC. MON INHIBIT LAMP HI (TCL-925)
TEMP NORMAL LO (TMC-853)
TMC RESET (TMC-1689TL)
TEMP CONTROL LATCH RESET ENABLE (TMC-938W)
TEMP MON FAIL IND ENABLE (TMC-855W)
60CPS TMC CONDITIONED (TMC-854W)
REMOTE TEMP ALARM INPUT (TMC-1401)
REMOTE NO TEMP ALARM OUTPUT (TMC-1400)
REMOTE TEMP ALARM OUTPUT (TMC-1402)
COMP POWER ON LAMP
OPTICS POWER ON LAMP
954
955
948
935
1427
1428
946
947
960
961
931
952
950
951
3
942
941
940
1846
1029
936
937
943
944
945
934
1432
1433
1579TL
925
853
1689TL
938W
855W
854W
1401
1400
1402
131TL
1351
3 FUSES
VERIF. CIRCUITRY VER. HI 20% VER. LO 20%
VERIF. CIRCUITRY LOW VOLTAGE TESTS -90V
VERIF. CIRCUITRY FREQ TESTS HI-3584 TO 3680 CPS LO-3160 TO 3150 CPS LOW VOLTS TEST 1.7V AT 3200 CPS
115V 60CPS HI-LO SENSOR NORMAL 105 TO 125V
RESET
LOW
HIGH
LAMP
PRIME POWER PUSH RESET
DUCO VOLTAGE/FREQ COMPARATOR NORM. -2V ±10% 3200 +10% -1% CPS DELAY 50MS
VOLT
NORM
FREQ
DUCOSYN EXC PUSH RESET
VOLT FAIL
FREQ FAIL
DUCOSYN EXCITATION MONITOR INHIBITED
TEMP CONTROL PUSH RESET
CONTROL FAIL
COOLANT SUPPLY FAIL
COLDPLATE TEMP FAIL
S T C O
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
40 SEC ELECTRONIC TIME DE
DC ±.5V ±.5V
RESET
GIMBAL LOCK CAUTION
ENABLE
PHASE ANGLE DETECTOR ±60° ±5° WITH RESPECT TO 0° MGA
IMU TEMP FAIL
28VDC COMPARATOR
STAR PRESENCE
102.4KC & 28VDC DETECTORS
ZERO OPTICS
28 VDC DETECTOR
MARK
NOT MARK
WHEEL PWR FAIL PUSH TO RESET
VOLTAGE COMPARATOR NORM-28V±5% TRIPS AT 14-16V OR LESS
VOLTAGE COMPARATOR NORM -28VDC TRIPS AT LOSS OF -28VDC
-28VDC FAIL PUSH TO RES
102.4KC
27VDC
161TL
162TL
428W
1637TL
1419W
1420W
1638T
1423TW
1425TW
1424TW
537
1639TL
1398
536
1745
1743
1744
1399
1397
192
194
275
276
587
GPC-161
XBR-A
GPC-162
XBR-B
RSS-D
RSS-B
RSS-C
TES-192
TES-194
COS AMG 1X S3 (HI)
COS AMG 1X S1 (LO)
IMU TEMP LIGHT (MAIN PANEL)
TEMP OUT OF LIMITS HI
TEMP OUT OF LIMITS LO
TEMP WITHIN LIMITS
STAR PRESENCE HI
STAR PRESENCE LO
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
REMOTE TEMP ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE PWR ALARM COMMON
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
800CPS, 28V 5% IMU WHEEL PH A
800 CPS, 28V 5% IMU WHEEL LO
-28VDC
0 VDC IMU
27VDC RLP HI ISS ONLY
161
162
1307
1308
17
16
15
14
13
12
11
10
9
8

900207 REV LTR H SH 1

2900207 REV LTR H SH 1

2722900207

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS:

2900210	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RLP RELAY & LAMP POWER SUPPLY
2900204	TEMPERATURE MONITOR CONTROL PANEL (BLOCK I, SERIES 100)(TMC)
2900203	TEMPERATURE MONITOR CONTROL PANEL (BLOCK II & LEM)(TMC)
2900208	POWER & DUMMY LOAD PANEL–PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL)
2900223	GIMBAL POSITION CONTROL (GPC)
2900202	TEST CONTROL PANEL (BLOCK I, SERIES 100)(TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM)(TCL)
2900206	TEST SELECTOR PANEL (TES)
2900200	GYRO CAGING PANEL (BLOCK II & LEM)(GCP)
2900218	OSCILLOGRAPH SIGNAL SELECTION RSS-B TO FIXED DC CHANNEL, RSS-C TO SWITCHABLE AC CHANNEL, RSS-D TO SWITCHABLE DC CHANNEL
2900217	SIGNAL SELECTION & MEASUREMENT XBR-A CROSSBAR-AC SIGNALS XBR-B CROSSBAR-DC SIGNALS
2900219	COUNTER SIGNAL SELECTION PRIMARY SIGNAL SELECTOR (PSS)
2900214	GSE GROUNDING (BLOCK I SERIES 100)
2900213	GSE GROUNDING (BLOCK II & LEM)
2900209	COMPUTER SIMULATOR INTERFACE (CMS)
2900211	AUXILIARY INPUT/OUTPUT CALIBRATION (AIP)

4. NON STANDARD SYMBOLOGY:

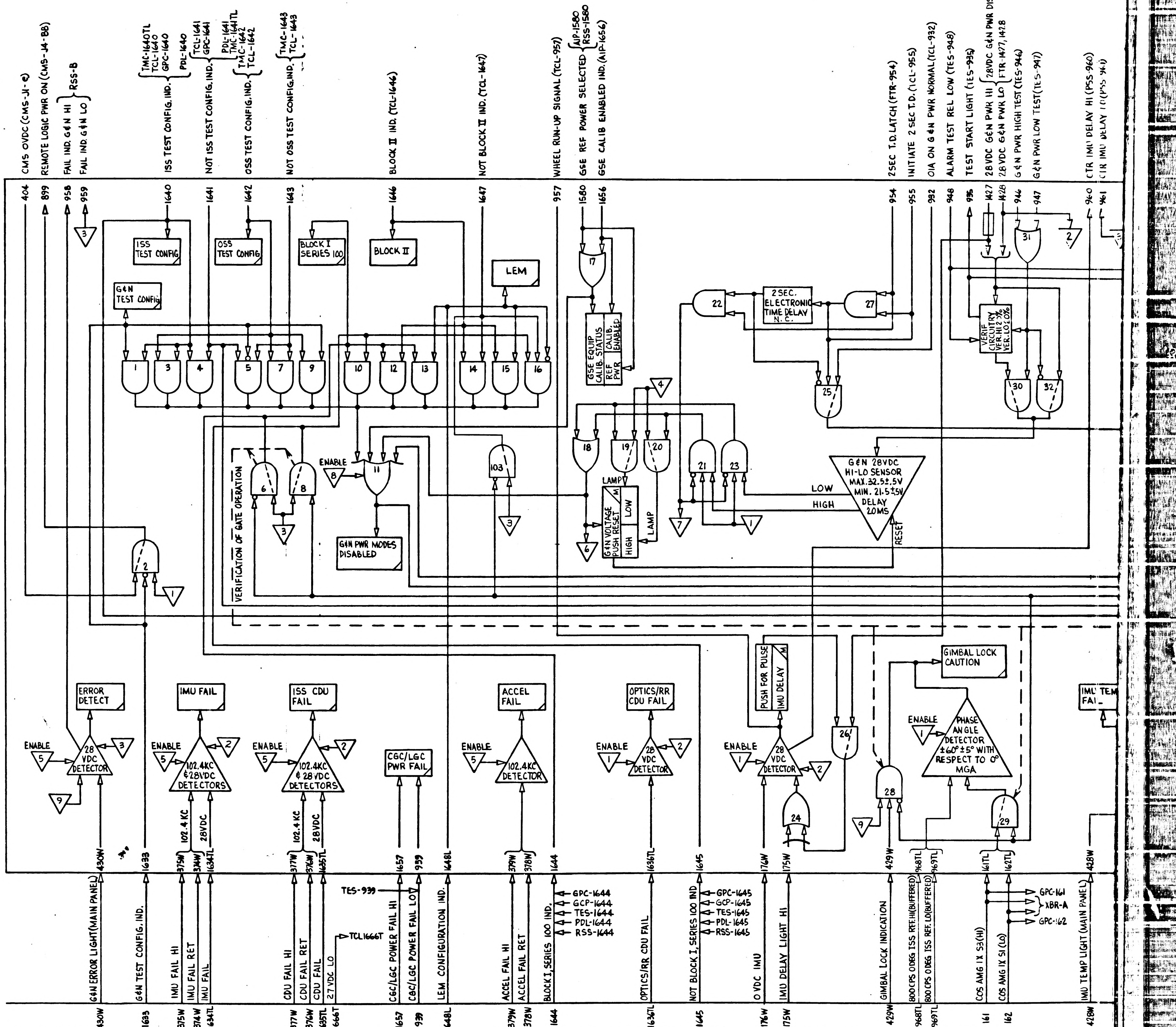
=D-	INDICATES "AND" GATE WITH SWITCHED SIGNAL
NAME	INDICATES INDICATOR LIGHT
NAME M	INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
NAME / NAME	INDICATES SPLIT SCREEN INDICATOR LIGHT
NAME / NAME M	INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES UNLIGHTED PUSHBUTTON OR TOGGLE SWITCH (ALTERNATE ACTION)

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   - A. W-BLOCK I SERIES 100 ONLY
   - B. T-BLOCK II ONLY
   - C. L-LEM ONLY
   - D. BLANK-ALL G&N CONFIGURATIONS
   - E. TW, TL OR WL-USED IN MORE THAN ONE G&N CONFIGURATION AS SHOWN.
6. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK I SERIES 100	SH 1 SH 2
BLOCK II	SH 1 SH 3
LEM	SH 1 SH 4

7. SIGNAL REFERENCE:

1 = OIA ON	11 = -28VDC
2 = 28VDC G&N PWR LO	12 = DUCO EXC. FAIL
3 = 27VDC RLP LO	13 = +45 VDC
4 = FLASHER	14 = TMC FAIL
5 = ISS OPER. 5SEC T.D.	15 = PRIME PWR FAIL
6 = G&N PWR FAIL	
7 = 2 SEC T.D. AT OIA ON	
8 = 27VDC PIL. PWR	
9 = 27VDC OIA ON	
10 = +28VDC	

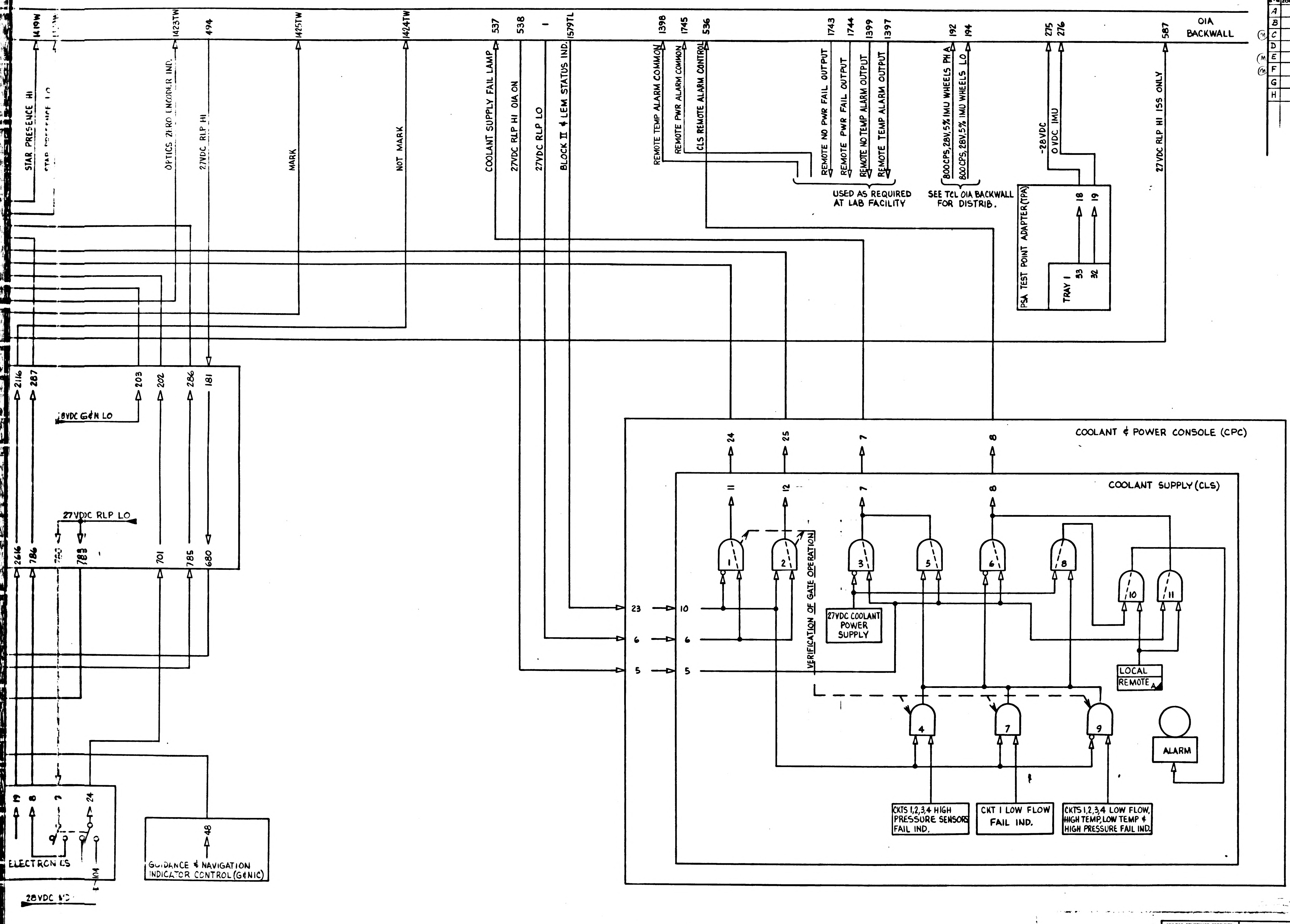

CMS OVDC (CMS-J1-e)
REMOTE LOGIC PWR ON (CMS-J4-BB)
FAIL IND. G&N HI
FAIL IND. G&N LO
RSS-B
ISS TEST CONFIG. IND.
TMC-1640TL
TCL-1640
GPC-1640
PDL-1640
NOT ISS TEST CONFIG. IND.
TCL-1641
GPC-1641
PDL-1641
TMC-1641TL
OSS TEST CONFIG. IND.
TMC-1642
TCL-1642
NOT OSS TEST CONFIG. IND.
TMC-1643
TCL-1643
BLOCK II IND. (TCL-1646)
NOT BLOCK II IND. (TCL-1647)
WHEEL RUN-UP SIGNAL (TCL-957)
GSE REF POWER SELECTED
AIP-1580
RSS-1580
GSE CALIB ENABLED IND. (AIP-1656)
2SEC T.D. LATCH (FTR-954)
INITIATE 2 SEC T.D. (TCL-955)
OIA ON G&N PWR NORMAL (TCL-932)
ALARM TEST REL LOW (TES-948)
TEST START LIGHT (TES-935)
28VDC G&N PWR HI
28VDC G&N PWR LO
28VDC G&N PWR DIST.
FTR-1427, 1428
G&N PWR HIGH TEST (TES-946)
G&N PWR LOW TEST (TES-947)
CTR IMU DELAY HI (PSS-960)
CTR IMU DELAY LO (PSS-961)
404
899
958
959
1640
1641
1642
1643
1646
1647
957
1580
1656
954
955
932
948
935
1427
1428
946
947
960
961
ISS TEST CONFIG
OSS TEST CONFIG
BLOCK I SERIES 100
BLOCK II
LEM
G&N TEST CONFIG
GSE EQUIP CALIB. STATUS
REF PWR
CALIB. ENABLED
2 SEC. ELECTRONIC TIME DELAY N.C.
VERIF CIRCUITRY VER. HI 2% VER. LO 2%
ENABLE
G&N PWR MODES DISABLED
VERIFICATION OF GATE OPERATION
LAMP
G&N VOLTAGE PUSH RESET
LOW
HIGH
LAMP
G&N 28VDC HI-LO SENSOR MAX. 32.5±.5V MIN. 21.5±.5V DELAY 20MS
LOW
HIGH
RESET
GIMBAL LOCK CAUTION
PUSH FOR PULSE
IMU DELAY
ERROR DETECT
IMU FAIL
ISS CDU FAIL
CGC/LGC PWR FAIL
ACCEL FAIL
OPTICS/RR CDU FAIL
IMU TEMP FAIL
ENABLE
28 VDC DETECTOR
102.4KC & 28VDC DETECTORS
102.4KC DETECTOR
PHASE ANGLE DETECTOR ±60°±5° WITH RESPECT TO 0° MGA
102.4 KC
28VDC
G&N ERROR LIGHT (MAIN PANEL)
G&N TEST CONFIG. IND.
IMU FAIL HI
IMU FAIL RET
IMU FAIL
CDU FAIL HI
CDU FAIL RET
CDU FAIL
27 VDC LO
TCL1666T
TES-939
CGC/LGC POWER FAIL HI
CGC/LGC POWER FAIL LO
LEM CONFIGURATION IND.
ACCEL FAIL HI
ACCEL FAIL RET
BLOCK I, SERIES 100 IND.
GPC-1644
GCP-1644
TES-1644
PDL-1644
RSS-1644
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND
GPC-1645
GCP-1645
TES-1645
PDL-1645
RSS-1645
O VDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK INDICATION
800CPS ODEG ISS REF. HI (BUFFERED)
800CPS ODEG ISS REF. LO (BUFFERED)
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
GPC-161
XBR-A
GPC-162
IMU TEMP LIGHT (MAIN PANEL)
430W
1633
375W
374W
1634TL
377W
376W
1635TL
1666T
1657
939
1648L
379W
378W
1644
1636TL
1645
176W
175W
429W
968TL
969TL
161TL
162TL
161
162
428W

2900207	REV LTR	SH
	T	1

MIL FORM 1050 J3

1/2900207

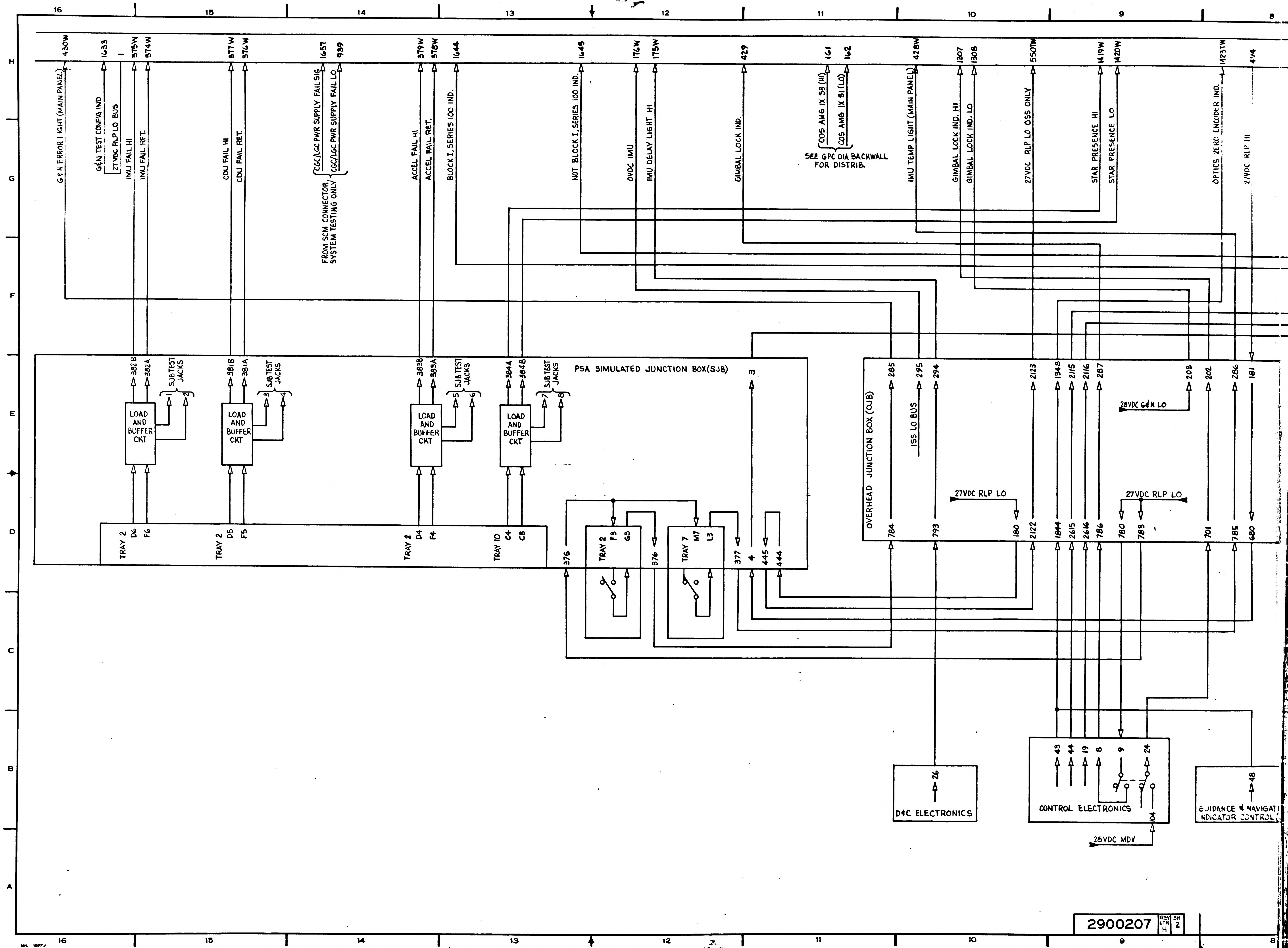
REVISIONS 1925					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	
B		REVISED PER TDRR 20488		7 JUL 65	
C		REVISION STATUS CHANGED		8 JUL 65	
D		REVISION STATUS CHANGED		1 SEP 65	
E		REVISION STATUS CHANGED		8 SEP 65	
F		REVISED PER TDRR 23763		12 NOV 65	
G		REVISION STATUS CHANGED		24 NOV 65	
H		REVISION STATUS CHANGED		29 NOV 65	


OIA BACKWALL
1419W
1423TW
494
1425TW
1424TW
537
538
1579TL
1398
1745
536
1743
1744
1399
1397
192
194
275
276
587
STAR PRESENCE HI
STAR PRESENCE LO
OPTICS ZERO ENCODER IND.
27VDC RLP HI
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND.
REMOTE TEMP ALARM COMMON
REMOTE PWR ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
800CPS, 28V, 5% IMU WHEELS PH A
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
0 VDC IMU
27VDC RLP HI ISS ONLY
PSA TEST POINT ADAPTER (TPA)
18
19
TRAY I
53
32
2116
287
203
202
286
181
18VDC G&N LO
27VDC RLP LO
2616
786
783
701
785
680
19
8
24
104
ELECTRONICS
28VDC
48
GUIDANCE & NAVIGATION INDICATOR CONTROL (G&NIC)
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
23
6
5
COOLANT SUPPLY (CLS)
11
12
7
8
10
6
5
1
2
3
5
6
8
10
11
4
7
9
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
ALARM
CKTS 1,2,3,4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL IND.
CKTS 1,2,3,4 LOW FLOW, HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND.
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

2900207 REV H SH 2

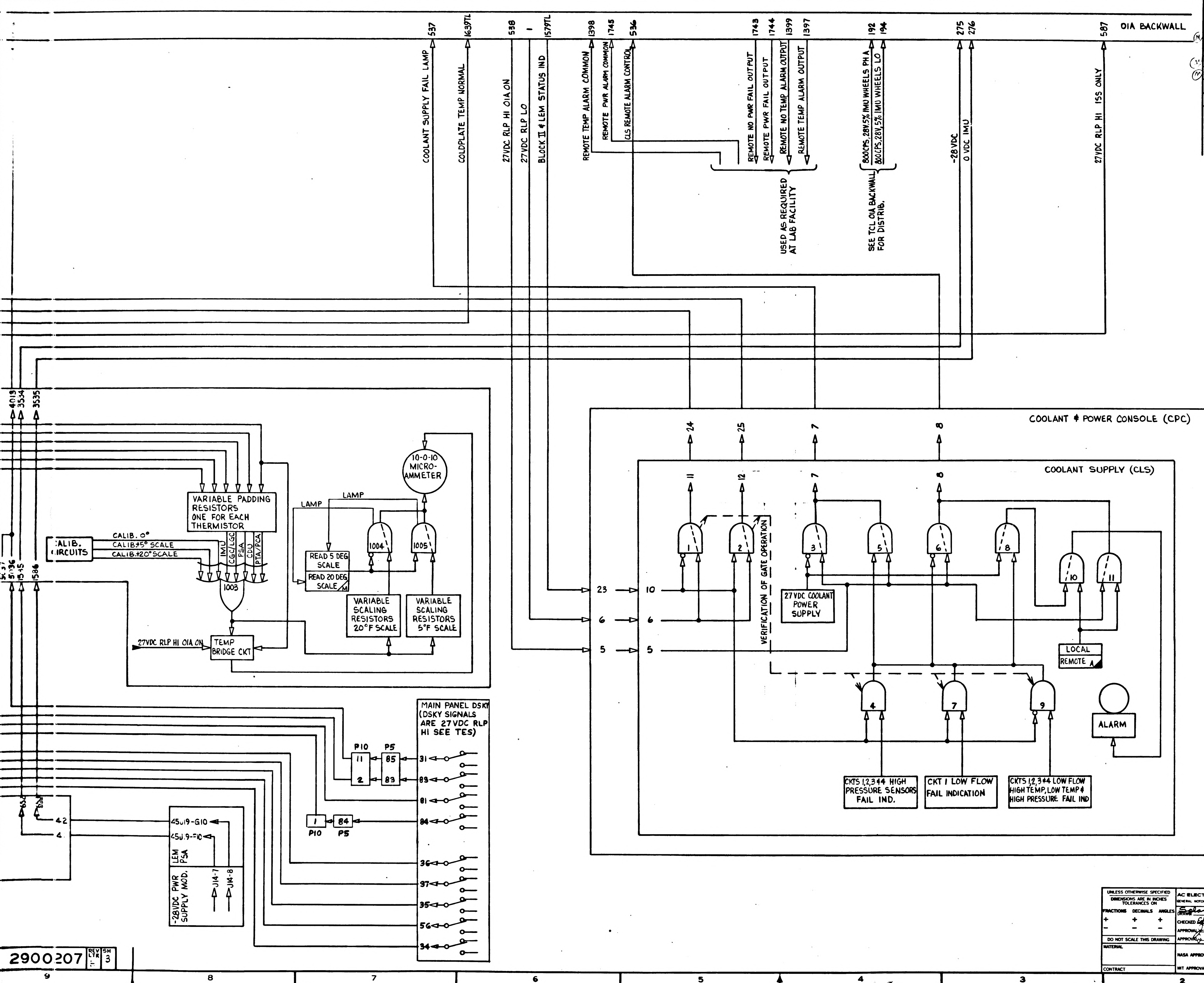
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Solane DATE 7 MAY 65 CHECKED Ed Foster 14 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK I SERIES 100)
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 SIZE 2900207
CONTRACT	MIT APPROVAL	SCALE — SHEET 2 OF 4

27 2900207


430W
G&N ERROR LIGHT (MAIN PANEL)
1633
G&N TEST CONFIG IND
27 VDC RLP LO BUS
375W
IMU FAIL HI
374W
IMU FAIL RET.
377W
CDU FAIL HI
376W
CDU FAIL RET.
1657
CGC/LGC PWR SUPPLY FAIL SIG
939
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR, SYSTEM TESTING ONLY
379W
ACCEL FAIL HI
378W
ACCEL FAIL RET.
1644
BLOCK I, SERIES 100 IND.
1645
NOT BLOCK I, SERIES 100 IND.
176W
OVDC IMU
175W
IMU DELAY LIGHT HI
429
GIMBAL LOCK IND.
161
C05 AMG 1X 53 (HI)
162
C05 AMG 1X 51 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
428W
IMU TEMP LIGHT (MAIN PANEL)
1307
GIMBAL LOCK IND. HI
1308
GIMBAL LOCK IND. LO
550TW
27VDC RLP LO OSS ONLY
1419W
STAR PRESENCE HI
1420W
STAR PRESENCE LO
1423TW
OPTICS ZERO ENCODER IND.
414
27VDC RLP HI
PSA SIMULATED JUNCTION BOX (SJB)
382B
382A
SJB TEST JACKS
1
2
LOAD AND BUFFER CKT
381B
381A
3
4
383B
383A
5
6
384A
384B
7
8
TRAY 2
D6
F6
D5
F5
D4
F4
TRAY 10
C4
C8
375
TRAY 2
F3
G5
376
TRAY 7
M7
L3
377
3
4
445
444
OVERHEAD JUNCTION BOX (OJB)
285
295
294
ISS LO BUS
2123
1348
2115
2116
287
203
202
286
181
28VDC G&N LO
27VDC RLP LO
784
793
180
2122
1844
2615
2616
786
780
783
701
785
680
26
D&C ELECTRONICS
43
44
19
8
9
24
104
CONTROL ELECTRONICS
28VDC MDV
48
GUIDANCE & NAVIGAT
INDICATOR CONTROL
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
2900207
REV LTR
H
SH
2

H2

1772900207


OIA BACKWALL
537
1639TL
538
1579TL
1398
1745
536
1743
1744
1399
1397
192
194
275
276
587
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND
REMOTE TEMP ALARM COMMON
REMOTE PWR ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
800CPS, 28V, 5% IMU WHEELS PH A
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
0 VDC IMU
27VDC RLP HI ISS ONLY
4013
3534
3535
5037
5036
1545
1586
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB.±5° SCALE
CALIB.±20° SCALE
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
10-0-10 MICRO-AMMETER
LAMP
LAMP
1004
1005
READ 5 DEG SCALE
READ 20 DEG SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
MAIN PANEL DSKY (DSKY SIGNALS ARE 27VDC RLP HI SEE TES)
P10
P5
11
85
2
83
31
83
81
84
1
84
P10
P5
36
37
35
56
34
653
638
42
4
45J19-G10
45J19-F10
LEM PSA
-28VDC PWR SUPPLY MOD.
J14-7
J14-8
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
23
10
6
6
5
5
VERIFICATION OF GATE OPERATION
1
2
3
5
6
8
10
11
4
7
9
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND

REVISIONS 925

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	
B		REVISED PER TDRR 20488		JUL 65	
C		REVISED PER TDRR 20491		8 JUL 65	
D		REVISED PER TDRR 21911		1 SEP 65	
E		REVISED PER TDRR 22007		9 SEPT 65	
F		REVISED PER TDRR 23763		12 NOV 65	
G		REVISION STATUS CHANGED		24-NOV-65	
H		REVISED PER TDRR 24059		29 NOV 65	

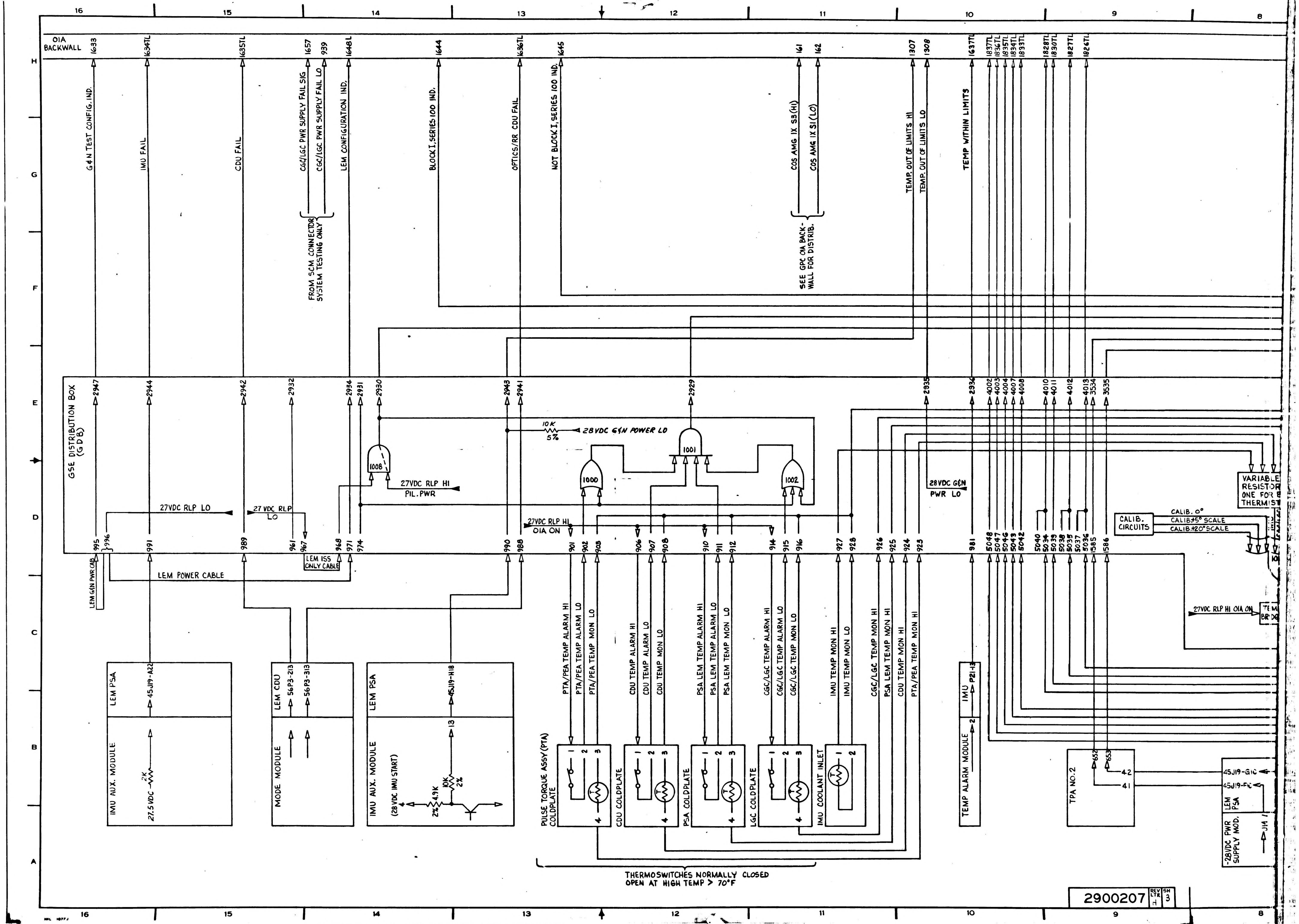
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN Solane DATE 7 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
MONITOR PANEL
(LEM)

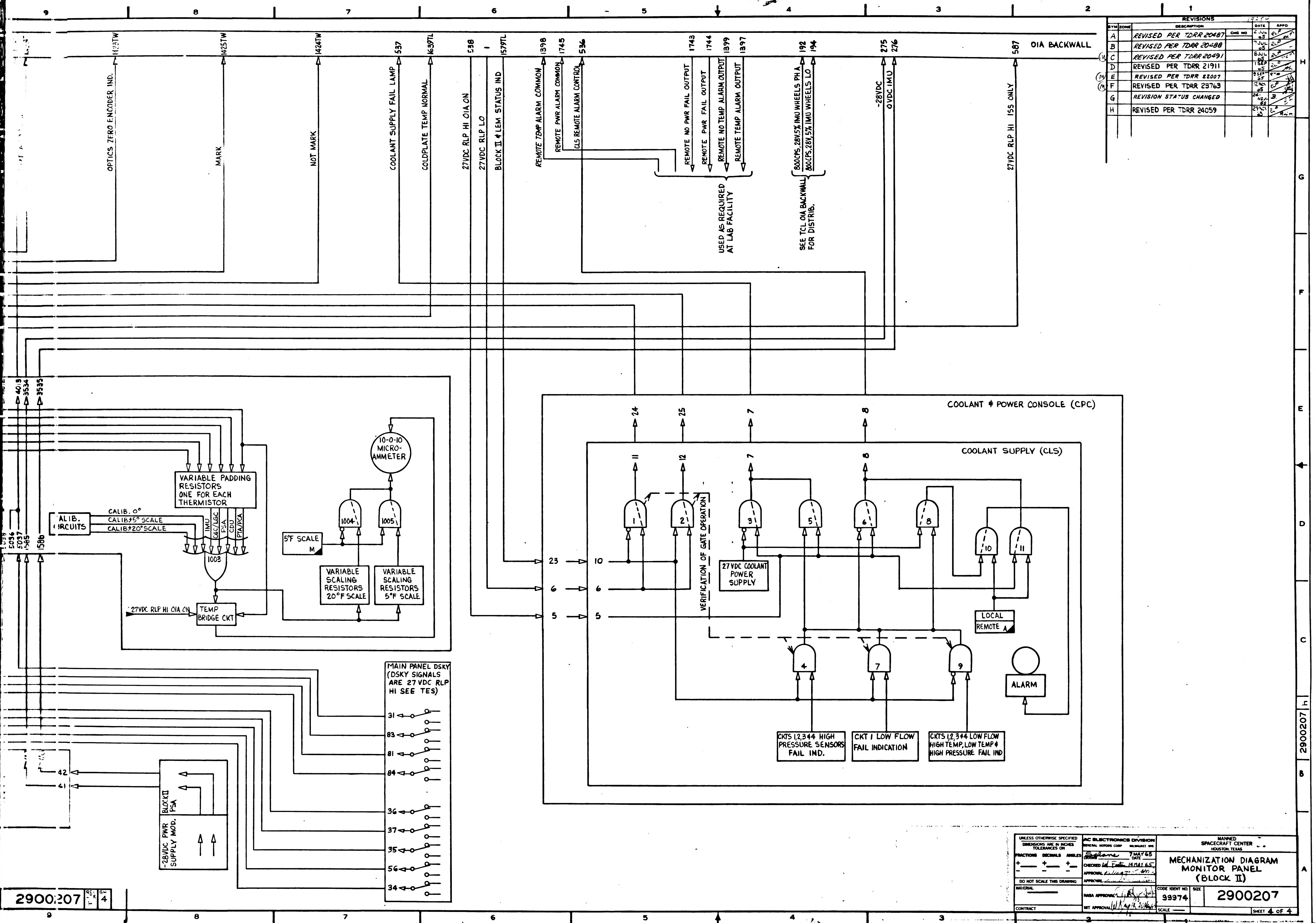
CODE IDENT NO. 99974
SIZE
2900207
SCALE
SHEET 3 OF 4


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1633
1634TL
1635TL
1657
939
1648L
1644
1636TL
1645
161
162
1307
1308
1637TL
1837TL
1836TL
1835TL
1834TL
1833TL
1828TL
1830TL
1827TL
1826TL
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
LEM CONFIGURATION IND.
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
TEMP. OUT OF LIMITS HI
TEMP. OUT OF LIMITS LO
TEMP WITHIN LIMITS
FROM SCM CONNECTOR SYSTEM TESTING ONLY
SEE GPC OIA BACKWALL FOR DISTRIB.
GSE DISTRIBUTION BOX (GDB)
2947
2944
2942
2932
2934
2931
2930
2943
2941
2929
2935
2936
4002
4003
4004
4007
4008
4010
4011
4012
4013
3534
3535
10K
5%
28VDC G&N POWER LO
1008
1000
1001
1002
27VDC RLP HI
PIL. PWR
27VDC RLP LO
27 VDC RLP LO
27VDC RLP HI
OIA ON
28VDC GEN PWR LO
VARIABLE RESISTOR ONE FOR E THERMIST
CALIB. CIRCUITS
CALIB. 0°
CALIB.±5° SCALE
CALIB.±20° SCALE
995
996
991
989
961
967
968
971
974
990
988
901
902
903
906
907
908
910
911
912
914
915
916
927
928
926
925
924
923
981
5048
5047
5046
5043
5042
5040
5034
5039
5038
5035
5037
5036
1585
1586
LEM G&N PWR CAB.
LEM POWER CABLE
LEM ISS ONLY CABLE
PTA/PEA TEMP ALARM HI
PTA/PEA TEMP ALARM LO
PTA/PEA TEMP MON LO
CDU TEMP ALARM HI
CDU TEMP ALARM LO
CDU TEMP MON LO
PSA LEM TEMP ALARM HI
PSA LEM TEMP ALARM LO
PSA LEM TEMP MON LO
CGC/LGC TEMP ALARM HI
CGC/LGC TEMP ALARM LO
CGC/LGC TEMP MON LO
IMU TEMP MON HI
IMU TEMP MON LO
CGC/LGC TEMP MON HI
PSA LEM TEMP MON HI
CDU TEMP MON HI
PTA/PEA TEMP MON HI
27VDC RLP HI OIA ON
TEM BRIDG
LEM PSA
45J19-A22
IMU AUX. MODULE
2K
27.5VDC
LEM CDU
56P3-213
56P3-313
MODE MODULE
LEM PSA
45J19-H18
13
IMU AUX. MODULE
(28 VDC IMU START)
10K 2%
4.9K 2%
PULSE TORQUE ASSY (PTA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
LGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
IMU
P21-13
2
TEMP ALARM MODULE
TPA NO. 2
652
653
42
41
45J19-G1C
45J19-F1C
LEM PSA
-28VDC PWR SUPPLY MOD.
J14 1
THERMOSWITCHES NORMALLY CLOSED OPEN AT HIGH TEMP > 70°F

2900207 REV LTR H SH 3

1729 00207

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	RLP
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISED PER TDRR 20491		8 JUL 65	RLP
D		REVISED PER TDRR 21911		1 SEP 65	RLP
E		REVISED PER TDRR 22007		9 SEP 65	RLP
F		REVISED PER TDRR 23763		12 NOV 65	RLP
G		REVISION STATUS CHANGED		24 NOV 65	B.
H		REVISED PER TDRR 24059		29 NOV 65	RLP


9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
OIA BACKWALL
1423TW
1425TW
1424TW
537
1639TL
538
1579TL
1398
1745
536
1743
1744
1399
1397
192
194
275
276
587
OPTICS ZERO ENCODER IND.
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND
REMOTE TEMP ALARM COMMON
REMOTE PWR ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
800CPS, 28V, 5% IMU WHEELS PH A
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
0VDC IMU
27VDC RLP HI ISS ONLY
4013
3534
3535
5036
5037
1585
1586
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB ± 5° SCALE
CALIB ± 20° SCALE
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
TEMP BRIDGE CKT
27VDC RLP HI OIA ON
10-0-10 MICRO-AMMETER
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
MAIN PANEL DSKY (DSKY SIGNALS ARE 27 VDC RLP HI SEE TES)
31
83
81
84
36
37
35
56
34
42
41
BLOCK II PSA
-28VDC PWR SUPPLY MOD.
COOLANT & POWER CONSOLE (CPC)
COOLANT SUPPLY (CLS)
24
25
7
8
11
12
7
8
23
6
5
10
6
5
1
2
3
5
6
8
10
11
4
7
9
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

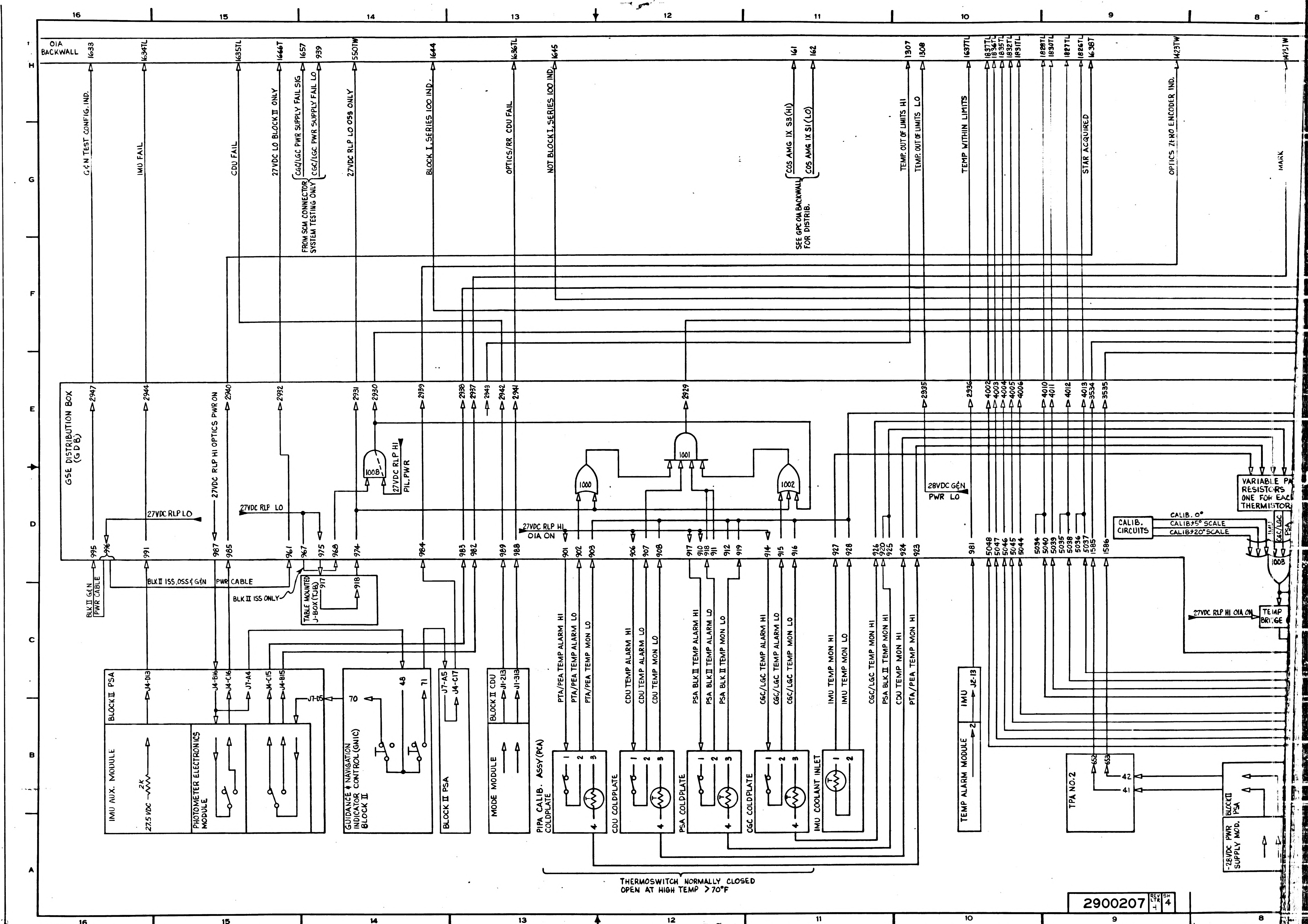
AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN Solane DATE 7 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 20 May 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

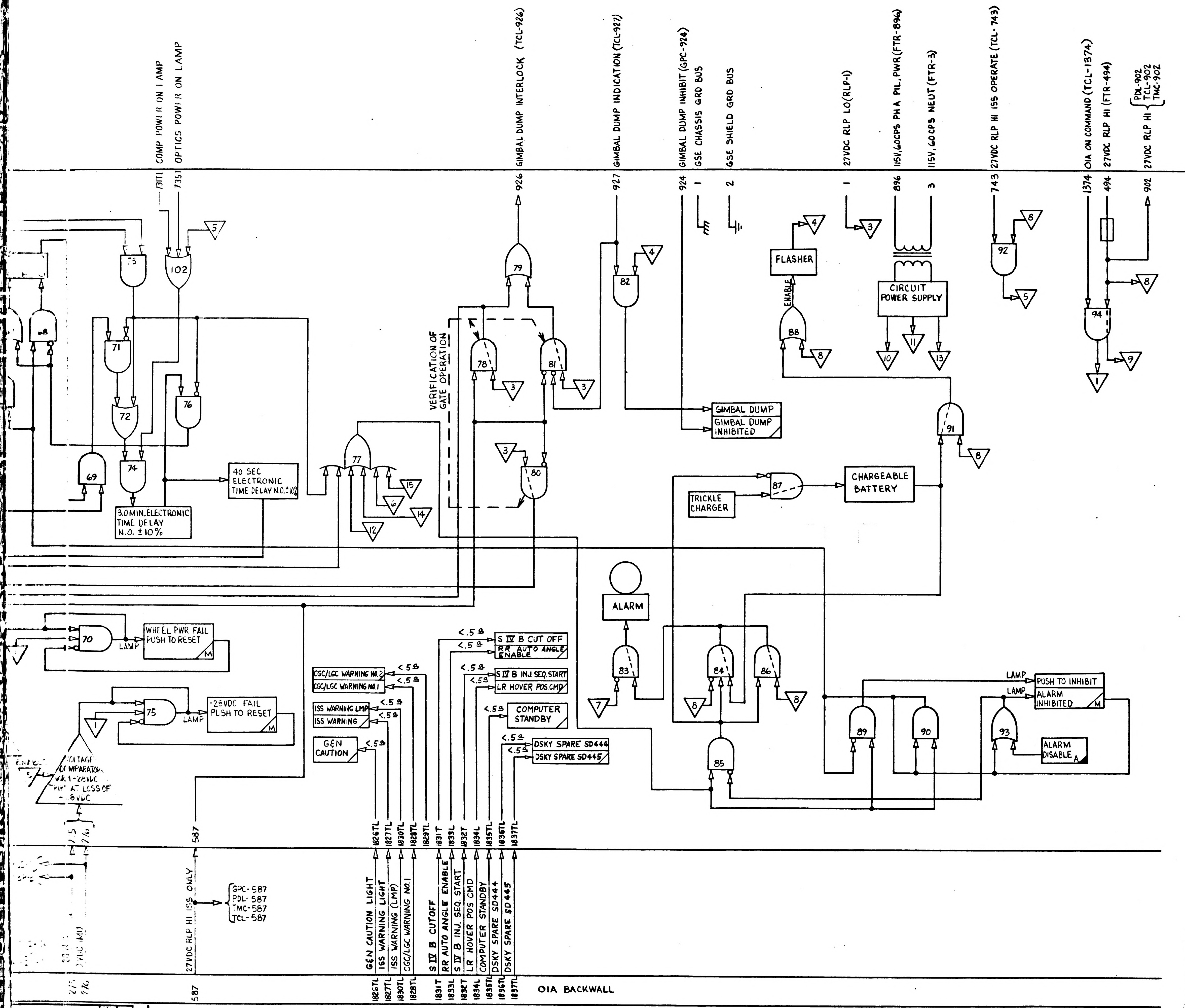
MECHANIZATION DIAGRAM
MONITOR PANEL
(BLOCK II)

CODE IDENT NO. 99974
SIZE
2900207
SCALE —
SHEET 4 OF 4

2900207 REV H SH 4


OIA BACKWALL
1633
1634TL
1635TL
1666T
1657
939
550TW
1644
1636TL
1645
161
162
1307
1308
1637TL
1837TL
1836TL
1835TL
1832TL
1831TL
1828TL
1830TL
1826TL
1638T
1423TW
1425TW
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
27VDC LO BLOCK II ONLY
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR SYSTEM TESTING ONLY
27VDC RLP LO OSS ONLY
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG 1X S3(HI)
COS AMG 1X S1(LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
TEMP. OUT OF LIMITS HI
TEMP. OUT OF LIMITS LO
TEMP WITHIN LIMITS
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
GSE DISTRIBUTION BOX (GDB)
2947
2944
2940
2932
2931
2930
2939
2938
2937
2943
2942
2941
2929
2935
2936
4002
4003
4004
4005
4006
4010
4011
4012
4013
3534
3535
27VDC RLP LO
27VDC RLP HI OPTICS PWR ON
27VDC RLP LO
1008
27VDC RLP HI PIL. PWR
1000
1001
1002
27VDC RLP HI OIA ON
28VDC G&N PWR LO
VARIABLE PA RESISTORS ONE FOR EAC THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB.±5° SCALE
CALIB.±20° SCALE
IMU
CGC/LGC
PSA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE
995
996
991
987
985
961
967
975
968
974
984
983
982
989
988
901
902
903
906
907
908
917
910
918
911
912
919
914
915
916
927
928
926
920
925
924
923
981
5048
5047
5046
5045
5044
5034
5040
5039
5035
5038
5036
5037
1585
1586
BLK II G&N PWR CABLE
BLK II ISS, OSS & G&N PWR CABLE
BLK II ISS ONLY
TABLE MOUNTED J-BOX (TJB)
917
918
PTA/PEA TEMP ALARM HI
PTA/PEA TEMP ALARM LO
PTA/PEA TEMP MON LO
CDU TEMP ALARM HI
CDU TEMP ALARM LO
CDU TEMP MON LO
PSA BLK II TEMP ALARM HI
PSA BLK II TEMP ALARM LO
PSA BLK II TEMP MON LO
CGC/LGC TEMP ALARM HI
CGC/LGC TEMP ALARM LO
CGC/LGC TEMP MON LO
IMU TEMP MON HI
IMU TEMP MON LO
CGC/LGC TEMP MON HI
PSA BLK II TEMP MON HI
CDU TEMP MON HI
PTA/PEA TEMP MON HI
BLOCK II PSA
J4-D13
J4-B16
J4-C16
J7-A4
J4-C15
J4-B15
J7-D5
IMU AUX. MODULE
2K
27.5 VDC
PHOTOMETER ELECTRONICS MODULE
70
48
71
GUIDANCE & NAVIGATION INDICATOR CONTROL (GNIC) BLOCK II
J7-A5
J4-C17
BLOCK II PSA
BLOCK II CDU
J1-213
J1-313
MODE MODULE
PIPA CALIB. ASSY (PCA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
CGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
IMU
J2-13
TEMP ALARM MODULE
2
TPA NO.2
652
653
42
41
BLOCK II PSA
28VDC PWR SUPPLY MOD.
THERMOSWITCH NORMALLY CLOSED OPEN AT HIGH TEMP >70°F
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
2900207
REV LTR
SH 4

1/2900207


1311 COMP POWER ON LAMP
7351 OPTICS POWER ON LAMP
926 GIMBAL DUMP INTERLOCK (TCL-926)
927 GIMBAL DUMP INDICATION (TCL-927)
924 GIMBAL DUMP INHIBIT (GPC-924)
1 GSE CHASSIS GRD BUS
2 GSE SHIELD GRD BUS
1 27VDC RLP LO (RLP-1)
896 115V,400CPS PH A PIL. PWR (FTR-896)
3 115V,400CPS NEUT (FTR-3)
743 27VDC RLP HI ISS OPERATE (TCL-743)
1374 OIA ON COMMAND (TCL-1374)
494 27VDC RLP HI (FTR-494)
902 27VDC RLP HI PDL-902 TCL-902 TMC-902
VERIFICATION OF GATE OPERATION
FLASHER
ENABLE
CIRCUIT POWER SUPPLY
GIMBAL DUMP
GIMBAL DUMP INHIBITED
40 SEC ELECTRONIC TIME DELAY N.O. ±10%
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
TRICKLE CHARGER
CHARGEABLE BATTERY
ALARM
WHEEL PWR FAIL PUSH TO RESET
LAMP
M
-28VDC FAIL PUSH TO RESET
VOLTAGE COMPARATOR WR. 1-28VDC TRIP AT LOSS OF -.8VDC
ENABLE
CGC/LGC WARNING NO.2
CGC/LGC WARNING NO.1
ISS WARNING LMP
ISS WARNING
G&N CAUTION
<.5a
S IV B CUT OFF
RR AUTO ANGLE ENABLE
S IV B INJ. SEQ. START
LR HOVER POS. CMD
COMPUTER STANDBY
DSKY SPARE SD444
DSKY SPARE SD445
PUSH TO INHIBIT
ALARM INHIBITED
ALARM DISABLE
69 70 71 72 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 102
587
27VDC RLP HI ISS ONLY
GPC-587
PDL-587
TMC-587
TCL-587
275
276
28VDC
VDC IMU
1826TL 1827TL 1830TL 1828TL 1829TL 1831T 1833L 1832T 1834L 1835TL 1836TL 1837TL
G&N CAUTION LIGHT
ISS WARNING LIGHT
ISS WARNING (LMP)
CGC/LGC WARNING NO.1
S IV B CUTOFF
RR AUTO ANGLE ENABLE
S IV B INJ. SEQ. START
LR HOVER POS CMD
COMPUTER STANDBY
DSKY SPARE SD444
DSKY SPARE SD445
OIA BACKWALL

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	
B		REVISED PER TDRR 20488		7 JUL 65	
C		REVISED PER TDRR 20491		8 JUL 65	
D		REVISED PER TDRR 21911		1 SEP 65	
E		REVISED PER TDRR 22007		65	
F		REVISED PER TDRR 23763		12 NOV 65	
G		REVISED PER TDRR-24054		24 NOV 65	
H		REVISED PER TDRR 24059		29 NOV 65	
J		REVISED PER TDRR 24924		JAN 66	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN Solano DATE 7 MAY 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

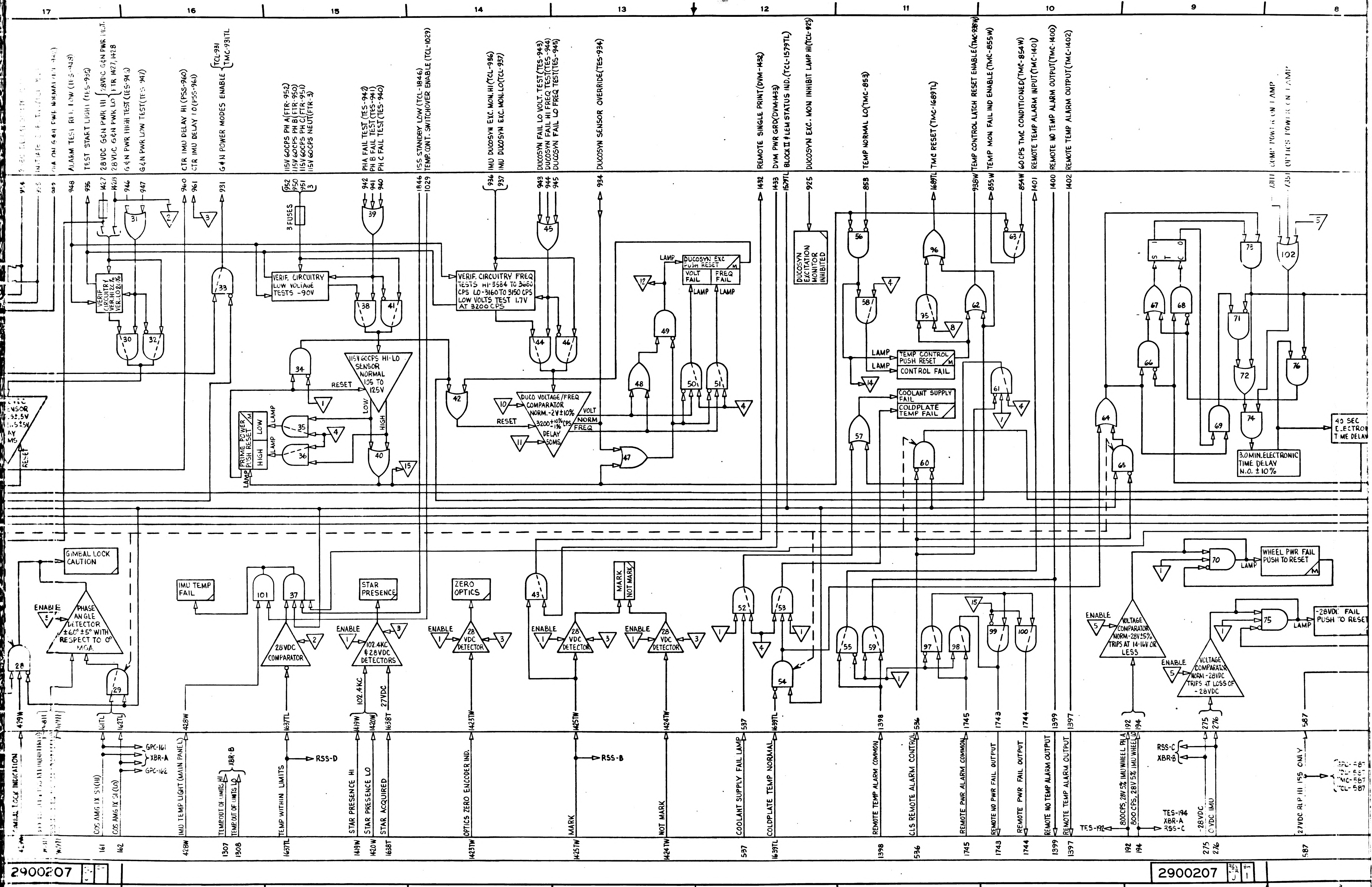
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
MONITOR PANEL
(BLOCK I SERIES 100, BLOCK II, LEM)

CODE IDENT NO. 99974 SIZE J 2900207
SCALE — SHEET OF 4

2900207

3/2900207


17
16
15
14
13
12
11
10
9
8
ALARM TEST REL LOW (TES-949)
TEST START LIGHT (TES-955)
28VDC G&N PWR HI / 28VDC G&N PWR HI-T.
28VDC G&N PWR LO FTR 1427, 1428
G&N PWR HIGH TEST (TES-946)
G&N PWR LOW TEST (TES-947)
CTR IMU DELAY HI (PSS-960)
CTR IMU DELAY LO (PSS-961)
G&N POWER MODES ENABLE TCL-931 TMC-931TL
115V 60CPS PH A (FTR-952)
115V 60CPS PH B (FTR-950)
115V 60CPS PH C (FTR-951)
115V 60CPS NEUT (FTR-3)
PHA FAIL TEST (TES-942)
PH B FAIL TEST (TES-941)
PH C FAIL TEST (TES-940)
ISS STANDBY LOW (TCL-1846)
TEMP. CONT. SWITCHOVER ENABLE (TCL-1029)
IMU DUCOSYN EXC. MON. HI (TCL-936)
IMU DUCOSYN EXC. MON. LO (TCL-937)
DUCOSYN FAIL LO VOLT. TEST (TES-943)
DUCOSYN FAIL HI FREQ TEST (TES-944)
DUCOSYN FAIL LO FREQ TEST (TES-945)
DUCOSYN SENSOR OVERRIDE (TES-934)
REMOTE SINGLE PRINT (DVM-1432)
DVM PWR GRD (DVM-1433)
BLOCK II # LEM STATUS IND. (TCL-1579TL)
DUCOSYN EXC. MON INHIBIT LAMP HI (TCL-925)
TEMP NORMAL LO (TMC-853)
TMC RESET (TMC-1689TL)
TEMP CONTROL LATCH RESET ENABLE (TMC-938W)
TEMP MON FAIL IND ENABLE (TMC-855W)
60CPS TMC CONDITIONED (TMC-854W)
REMOTE TEMP ALARM INPUT (TMC-1401)
REMOTE NO TEMP ALARM OUTPUT (TMC-1400)
REMOTE TEMP ALARM OUTPUT (TMC-1402)
COMP POWER ON LAMP
OPTICS POWER ON LAMP
3 FUSES
VERIF CIRCUITRY VER. HI 20.6% VER. LO 20.9%
VERIF. CIRCUITRY LOW VOLTAGE TESTS -90V
VERIF. CIRCUITRY FREQ TESTS HI-3584 TO 3650 CPS LO-3160 TO 3150 CPS LOW VOLTS TEST 1.7V AT 3200 CPS
115V 60CPS HI-LO SENSOR NORMAL 105 TO 125V
RESET
LOW
HIGH
PRIME POWER PUSH RESET
LAMP
DUCO VOLTAGE/FREQ COMPARATOR NORM. -2V ±10% 3200 +10% -1% CPS DELAY 50MS
VOLT
NORM
FREQ
DUCOSYN EXC PUSH RESET
VOLT FAIL
FREQ FAIL
DUCOSYN EXCITATION MONITOR INHIBITED
TEMP CONTROL PUSH RESET
CONTROL FAIL
COOLANT SUPPLY FAIL
COLDPLATE TEMP FAIL
40 SEC ELECTRO TIME DELAY
3.0 MIN. ELECTRONIC TIME DELAY N.O. ± 10%
SENSOR
RESET
GIMBAL LOCK CAUTION
ENABLE
PHASE ANGLE DETECTOR ±60° ±5° WITH RESPECT TO 0° MGA
IMU TEMP FAIL
28VDC COMPARATOR
STAR PRESENCE
102.4KC & 28VDC DETECTORS
ZERO OPTICS
28 VDC DETECTOR
MARK
NOT MARK
WHEEL PWR FAIL PUSH TO RESET
VOLTAGE COMPARATOR NORM -28V ±5% TRIPS AT 14-16V OR LESS
VOLTAGE COMPARATOR NORM -28VDC TRIPS AT LOSS OF -28VDC
-28VDC FAIL PUSH TO RESET
GPC-161
XBR-A
GPC-162
XBR-B
RSS-D
RSS-B
RSS-C
TES-192
TES-194
GIMBAL LOCK INDICATION
COS AMG IX SX (HI)
COS AMG IX SX (LO)
IMU TEMP LIGHT (MAIN PANEL)
TEMP OUT OF LIMITS HI
TEMP OUT OF LIMITS LO
TEMP WITHIN LIMITS
STAR PRESENCE HI
STAR PRESENCE LO
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
REMOTE TEMP ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE PWR ALARM COMMON
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
800CPS 28V 5% IMU WHEEL PWR
800 CPS, 28V 5% IMU WHEEL LO
-28VDC
C VDC IMU
27VDC RLP III ISS ONLY
GPC-587
TMC-587
TCL-587
102.4KC
27VDC
2900207
2900207

27/2900207

NOTES:

1. INTERPPET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS:

2900210	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RLP RELAY & LAMP POWER SUPPLY
2900204	TEMPERATURE MONITOR CONTROL PANEL (BLOCK I, SERIES 100)(TMC)
2900203	TEMPERATURE MONITOR CONTROL PANEL (BLOCK II & LEM)(TMC)
2900208	POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL)
2900223	GIMBAL POSITION CONTROL (GPC)
2900202	TEST CONTROL PANEL (BLOCK I, SERIES 100)(TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM)(TCL)
2900206	TEST SELECTOR PANEL (TES)
2900200	GYRO CAGING PANEL (BLOCK II & LEM)(GCP)
2900218	OSCILLOGRAPH SIGNAL SELECTION RSS-B TO FIXED DC CHANNEL, RSS-C TO SWITCHABLE AC CHANNEL, RSS-D TO SWITCHABLE DC CHANNEL
2900217	SIGNAL SELECTION & MEASUREMENT XBR-A CROSSBAR-AC SIGNALS XBR-B CROSSBAR-DC SIGNALS
2900219	COUNTER SIGNAL SELECTION PRIMARY SIGNAL SELECTOR (PSS)
2900214	GSE GROUNDING (BLOCK I SERIES 100)
2900213	GSE GROUNDING (BLOCK II & LEM)
2900209	COMPUTER SIMULATOR INTERFACE (CMS)
2900211	AUXILIARY INPUT/OUTPUT CALIBRATION (AIP)

4. NON STANDARD SYMBOLOGY:

	INDICATES "AND" GATE WITH SWITCHED SIGNAL
NAME	INDICATES INDICATOR LIGHT
NAME M	INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
NAME / NAME	INDICATES SPLIT SCREEN INDICATOR LIGHT
NAME / NAME M	INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES UNLIGHTED PUSHBUTTON OR TOGGLE SWITCH (ALTERNATE ACTION)

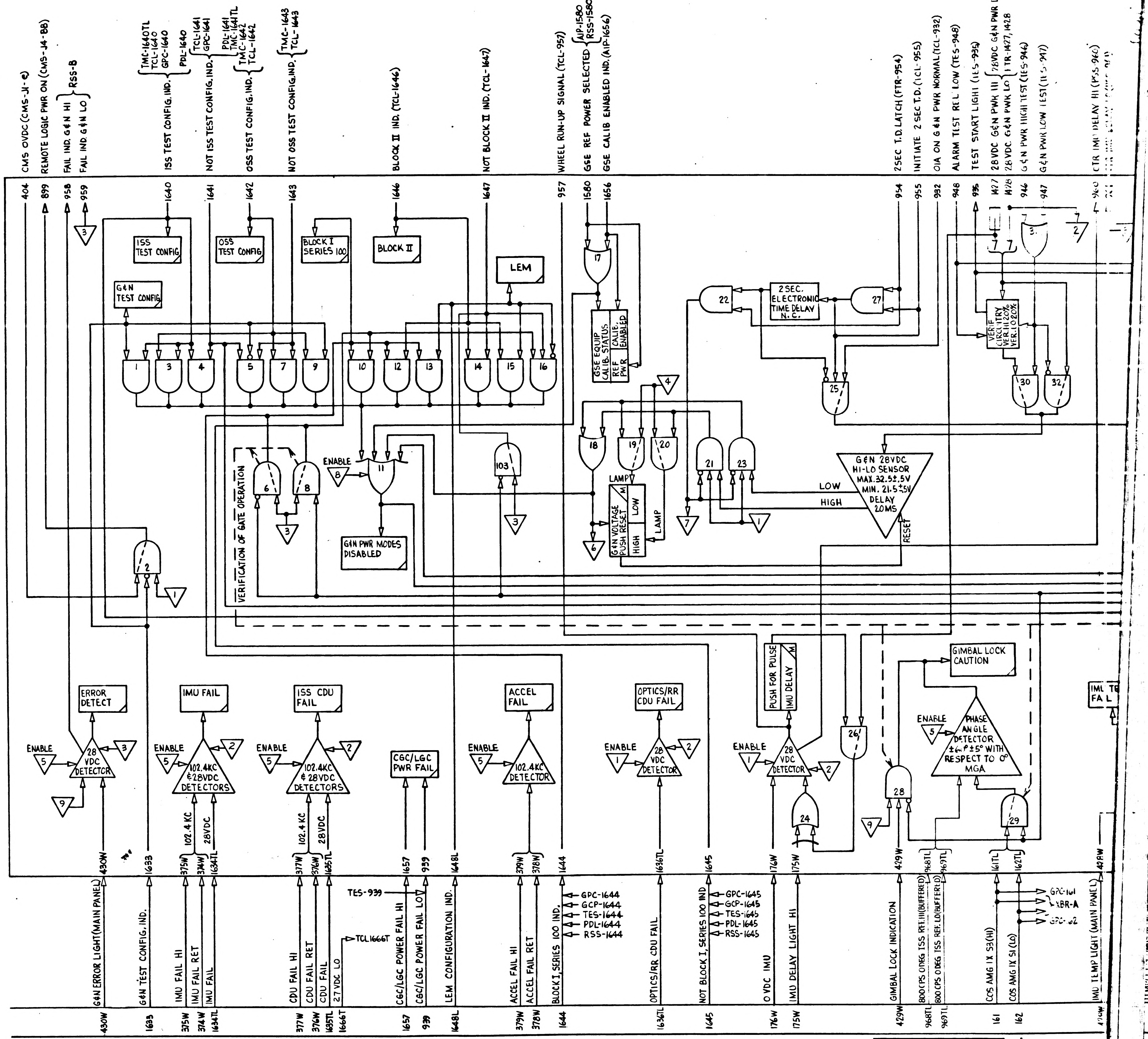
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G&N CONFIGURATIONS
   - E. TW, TL OR WL - USED IN MORE THAN ONE G&N CONFIGURATION AS SHOWN.

6. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK I SERIES 100	SH 1 SH 2
BLOCK II	SH 1 SH 3
LEM	SH 1 SH 4

7. SIGNAL REFERENCE:

1 = OIA ON
2 = 28VDC G&N PWR LO
3 = 27 VDC RLP LO
4 = FLASHER
5 = ISS OPER. 5SEC T.D.
6 = G&N PWR FAIL
7 = 2 SEC T.D. AT OIA ON
8 = 27 VDC PIL. PWR
9 = 27VDC OIA ON
10 = +28VDC
11 = -28VDC
12 = DUCO EXC. FAIL
13 = +45 VDC
14 = TMC FAIL
15 = PRIME PWR FAIL

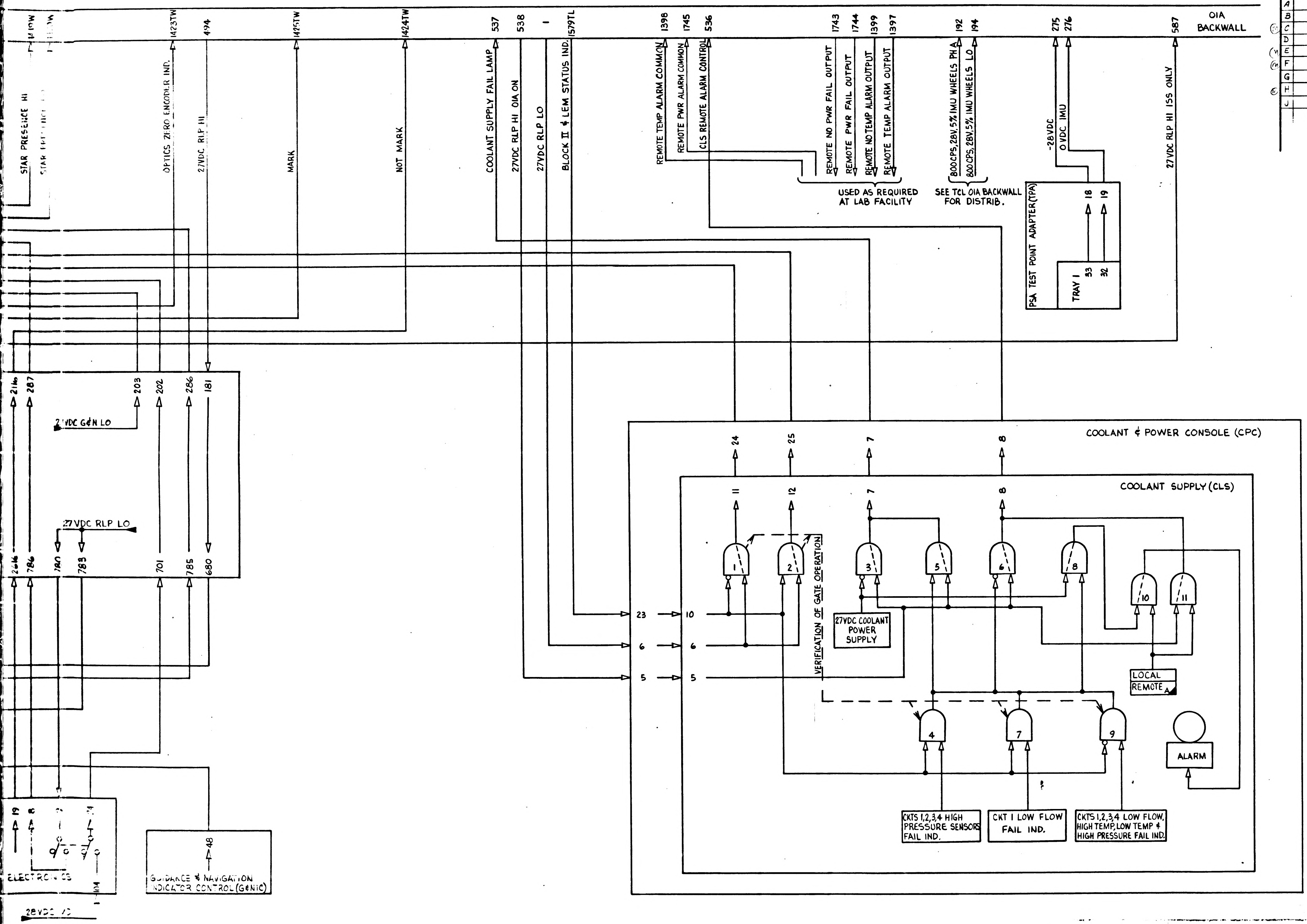


CMS OVDC (CMS-J1-e)
REMOTE LOGIC PWR ON (CMS-J4-BB)
FAIL IND. G&N HI
FAIL IND. G&N LO
RSS-B
TMC-1640TL
TCL-1640
GPC-1640
PDL-1640
ISS TEST CONFIG. IND.
TCL-1641
GPC-1641
NOT ISS TEST CONFIG. IND.
PDL-1641
TMC-1641TL
TMC-1642
TCL-1642
OSS TEST CONFIG. IND.
TMC-1643
TCL-1643
NOT OSS TEST CONFIG. IND.
BLOCK II IND. (TCL-1646)
NOT BLOCK II IND. (TCL-1647)
WHEEL RUN-UP SIGNAL (TCL-957)
GSE REF POWER SELECTED
AIP-1580
RSS-1580
GSE CALIB ENABLED IND. (AIP-1656)
2SEC T.D. LATCH (FTR-954)
INITIATE 2 SEC T.D. (TCL-955)
OIA ON G&N PWR NORMAL (TCL-932)
ALARM TEST REL LOW (TES-948)
TEST START LIGHT (TES-935)
28VDC G&N PWR HI
28VDC G&N PWR LO
28VDC G&N PWR DIST.
FTR-1427, 1428
G&N PWR HIGH TEST (TES-946)
G&N PWR LOW TEST (TES-947)
CTR IMU DELAY HI (PSS-960)
404
899
958
959
1640
1641
1642
1643
1646
1647
957
1580
1656
954
955
932
948
935
1427
1428
946
947
960
ISS TEST CONFIG
OSS TEST CONFIG
BLOCK I SERIES 100
BLOCK II
LEM
G&N TEST CONFIG
GSE EQUIP CALIB. STATUS
REF PWR
CALIB. ENABLED
2 SEC. ELECTRONIC TIME DELAY N.C.
VERIF CIRCUITRY VER.1(1206) VER.2(1206)
ENABLE
G&N PWR MODES DISABLED
LAMP
G&N VOLTAGE PUSH RESET
LOW
HIGH
G&N 28VDC HI-LO SENSOR MAX. 32.5±.5V MIN. 21.5±.5V DELAY 20MS
RESET
VERIFICATION OF GATE OPERATION
PUSH FOR PULSE
IMU DELAY
GIMBAL LOCK CAUTION
ERROR DETECT
IMU FAIL
ISS CDU FAIL
ACCEL FAIL
OPTICS/RR CDU FAIL
IMU TEMP FAIL
28 VDC DETECTOR
102.4KC & 28VDC DETECTORS
CGC/LGC PWR FAIL
102.4KC DETECTOR
PHASE ANGLE DETECTOR ±6.0°±5° WITH RESPECT TO 0° MGA
102.4 KC
28VDC
430W
1633
375W
374W
1634TL
377W
376W
1635TL
1666T
1657
939
1648L
379W
378W
1644
1636TL
1645
176W
175W
429W
968TL
969TL
161TL
162TL
161
162
428W
G&N ERROR LIGHT (MAIN PANEL)
G&N TEST CONFIG. IND.
IMU FAIL HI
IMU FAIL RET
IMU FAIL
CDU FAIL HI
CDU FAIL RET
CDU FAIL
27 VDC LO
TCL 1666T
TES-939
CGC/LGC POWER FAIL HI
CGC/LGC POWER FAIL LO
LEM CONFIGURATION IND.
ACCEL FAIL HI
ACCEL FAIL RET
BLOCK I, SERIES 100 IND.
GPC-1644
GCP-1644
TES-1644
PDL-1644
RSS-1644
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND
GPC-1645
GCP-1645
TES-1645
PDL-1645
RSS-1645
0 VDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK INDICATION
800CPS 0DEG ISS REF. HI (BUFFERED)
800CPS 0DEG ISS REF. LO (BUFFERED)
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
GPC-161
XBR-A
GPC-162
IMU TEMP LIGHT (MAIN PANEL)

2900207

1/2900207

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
REVISIONS					
A		REVISION STATUS CHANGED		2 JUL 65	
B		REVISED PER TDRR 20428		7 JUL 65	
C		REVISION STATUS CHANGED		8 JUL 65	
D		REVISION STATUS CHANGED		1 SEP 65	
E		REVISION STATUS CHANGED		65	
F		REVISED PER TDRR 23763		12 NOV 65	
G		REVISION STATUS CHANGED		65	
H		REVISION STATUS CHANGED		29 NOV 65	
J		REVISION STATUS CHANGED		66	

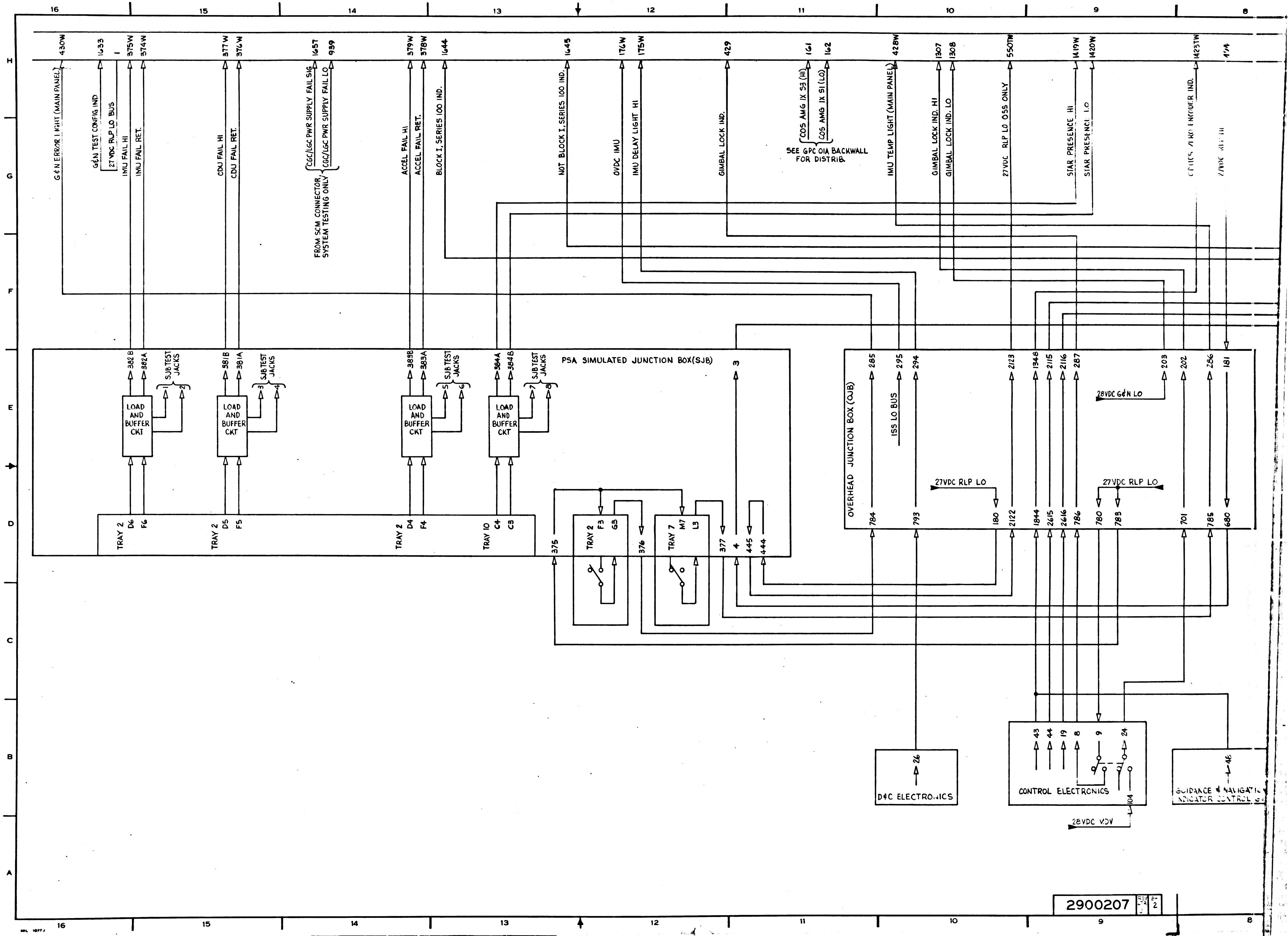


OIA BACKWALL
STAR PRESENCE HI
OPTICS ZERO ENCODER IND.
1423TW
494
27VDC RLP HI
1425TW
MARK
1424TW
NOT MARK
537
COOLANT SUPPLY FAIL LAMP
538
27VDC RLP HI OIA ON
27VDC RLP LO
1579TL
BLOCK II & LEM STATUS IND.
1398
REMOTE TEMP ALARM COMMON
1745
REMOTE PWR ALARM COMMON
536
CLS REMOTE ALARM CONTROL
1743
REMOTE NO PWR FAIL OUTPUT
1744
REMOTE PWR FAIL OUTPUT
1399
REMOTE NO TEMP ALARM OUTPUT
1397
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
192
800CPS,28V,5% IMU WHEELS PH A
194
800CPS,28V,5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
275
-28VDC
276
0VDC IMU
PSA TEST POINT ADAPTER (TPA)
18
19
TRAY 1
33
32
587
27VDC RLP HI ISS ONLY
216
287
203
202
286
181
27VDC G&N LO
27VDC RLP LO
216
786
780
783
701
785
680
19
8
24
ELECTRONICS
104
28VDC
48
GUIDANCE & NAVIGATION INDICATOR CONTROL (G&NIC)
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
23
10
6
6
5
5
1
2
3
5
6
8
10
11
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
4
7
9
ALARM
CKTS 1,2,3,4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL IND.
CKTS 1,2,3,4 LOW FLOW, HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Solane DATE 7 MAY 65 CHECKED Ed Foster 4 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK I SERIES 100)
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 SIZE 2900207
CONTRACT	MIT APPROVAL	SCALE — SHEET 2 OF 4

2900207 2/2

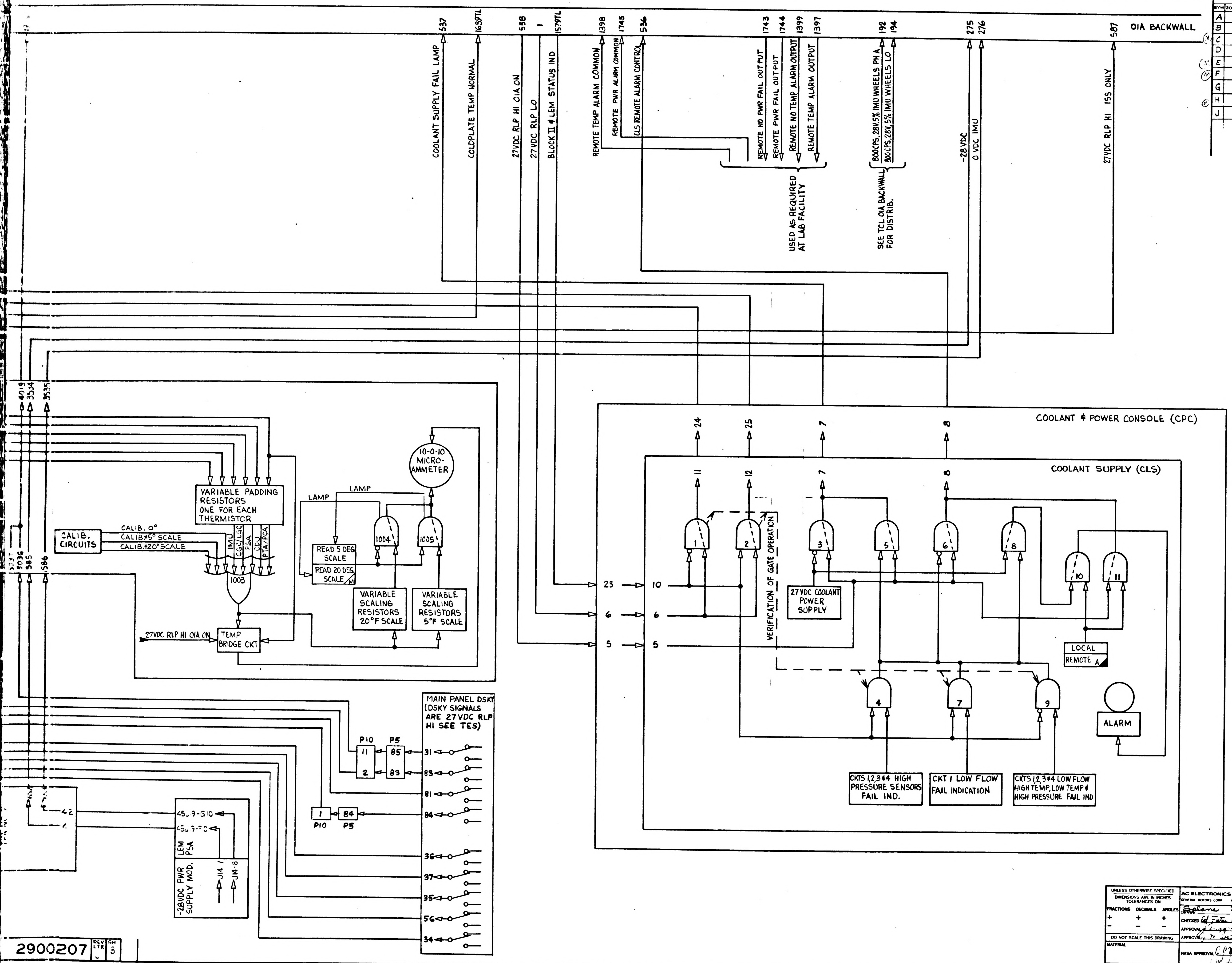
2/2900207


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
430W
G&N ERROR LIGHT (MAIN PANEL)
1633
G&N TEST CONFIG IND
1
27 VDC RLP LO BUS
375W
IMU FAIL HI
374W
IMU FAIL RET.
377W
CDU FAIL HI
376W
CDU FAIL RET.
1657
CGC/LGC PWR SUPPLY FAIL SIG
939
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR, SYSTEM TESTING ONLY
379W
ACCEL FAIL HI
378W
ACCEL FAIL RET.
1644
BLOCK I, SERIES 100 IND.
1645
NOT BLOCK I, SERIES 100 IND.
176W
0VDC IMU
175W
IMU DELAY LIGHT HI
429
GIMBAL LOCK IND.
161
COS AMG IX 53 (HI)
162
COS AMG IX 51 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
428W
IMU TEMP LIGHT (MAIN PANEL)
1307
GIMBAL LOCK IND. HI
1308
GIMBAL LOCK IND. LO
550TW
27VDC RLP LO OSS ONLY
1419W
STAR PRESENCE HI
1420W
STAR PRESENCE LO
1423TW
OPTICS ZERO ENCODER IND.
1?4
27VDC RET HI
PSA SIMULATED JUNCTION BOX (SJB)
382B
382A
SJB TEST JACKS
1
2
LOAD AND BUFFER CKT
TRAY 2
D6
F6
381B
381A
SJB TEST JACKS
3
4
LOAD AND BUFFER CKT
TRAY 2
D5
F5
383B
383A
SJB TEST JACKS
5
6
LOAD AND BUFFER CKT
TRAY 2
D4
F4
384A
384B
SJB TEST JACKS
7
8
LOAD AND BUFFER CKT
TRAY 10
C4
C3
3
375
TRAY 2
F3
G3
376
TRAY 7
M7
L3
377
4
445
444
OVERHEAD JUNCTION BOX (OJB)
285
295
294
ISS LO BUS
27VDC RLP LO
2123
1348
2115
2116
287
203
28VDC G&N LO
202
286
181
27VDC RLP LO
784
793
180
2122
1844
2615
2616
786
780
783
701
785
680
26
D&C ELECTRONICS
43
44
19
8
9
24
CONTROL ELECTRONICS
104
28VDC VDV
46
GUIDANCE & NAVIGATION INDICATOR CONTROL

2900207 REV 2

17 29002 07

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	
B		REVISED PER TDRR 20488		7 JUL 65	
C		REVISED PER TDRR 20491		8 JUL 65	
D		REVISED PER TDRR 21911		1 SEP 65	
E		REVISED PER TDRR 22007		9 SEP 65	
F		REVISED PER TDRR 23763		2 NOV 65	
G		REVISION STATUS CHANGED		24 NOV 65	
H		REVISED PER TDRR 24059		29 NOV 65	
J		REVISION STATUS CHANGED		[illegible] JAN 66	


OIA BACKWALL
537
COOLANT SUPPLY FAIL LAMP
1639TL
COLDPLATE TEMP NORMAL
538
27VDC RLP HI OIA ON
1
27VDC RLP LO
1579TL
BLOCK II & LEM STATUS IND
1398
REMOTE TEMP ALARM COMMON
1745
REMOTE PWR ALARM COMMON
536
CLS REMOTE ALARM CONTROL
1743
REMOTE NO PWR FAIL OUTPUT
1744
REMOTE PWR FAIL OUTPUT
1399
REMOTE NO TEMP ALARM OUTPUT
1397
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
192
800CPS, 28V, 5% IMU WHEELS PH A
194
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
275
-28VDC
276
0 VDC IMU
587
27VDC RLP HI ISS ONLY
4019
3534
3535
5037
5036
585
586
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB. ±5° SCALE
CALIB. ±20° SCALE
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
LAMP
LAMP
READ 5 DEG SCALE
READ 20 DEG SCALE
M
1004
1005
10-0-10 MICRO-AMMETER
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
MAIN PANEL DSKY (DSKY SIGNALS ARE 27 VDC RLP HI SEE TES)
P10
P5
11
85
31
2
83
83
81
1
84
84
P10
P5
36
37
35
56
34
42
4
4509-G10
4509-F0
LEM PSA
-28VDC PWR SUPPLY MOD.
J14-1
J14-8
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
1
2
3
5
6
8
10
11
23
10
6
6
5
5
VERIFICATION OF GATE OPERATION
27 VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
4
7
9
ALARM
CKTS 1,2,3&4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3&4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND

2900207 REV LTR J SH 3

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ + +
- - -
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

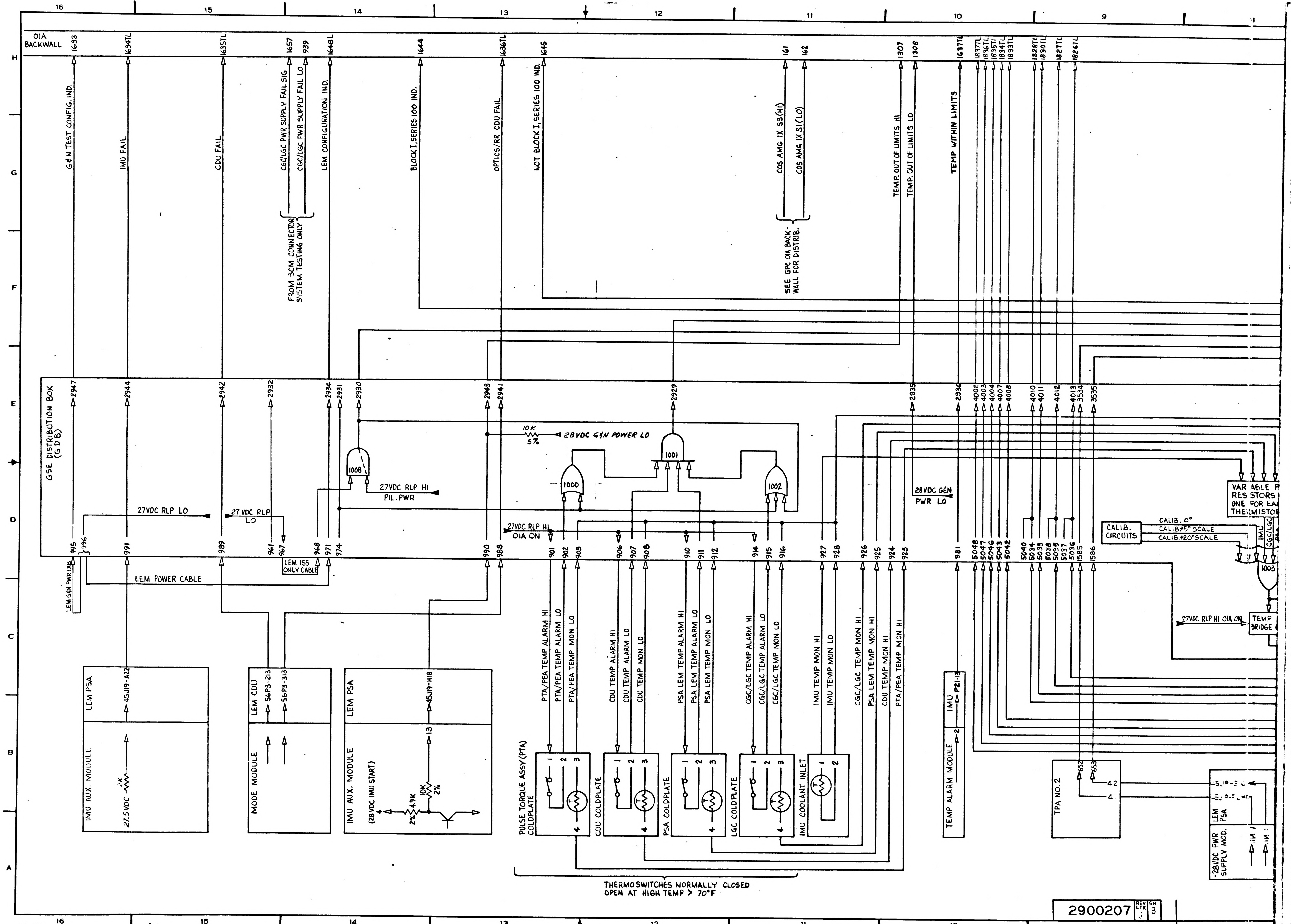
AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN Solane DATE 7 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
MONITOR PANEL
(LEM)

CODE IDENT NO 99974
SIZE J
2900207
SCALE
SHEET 3 OF 4

2/2900207

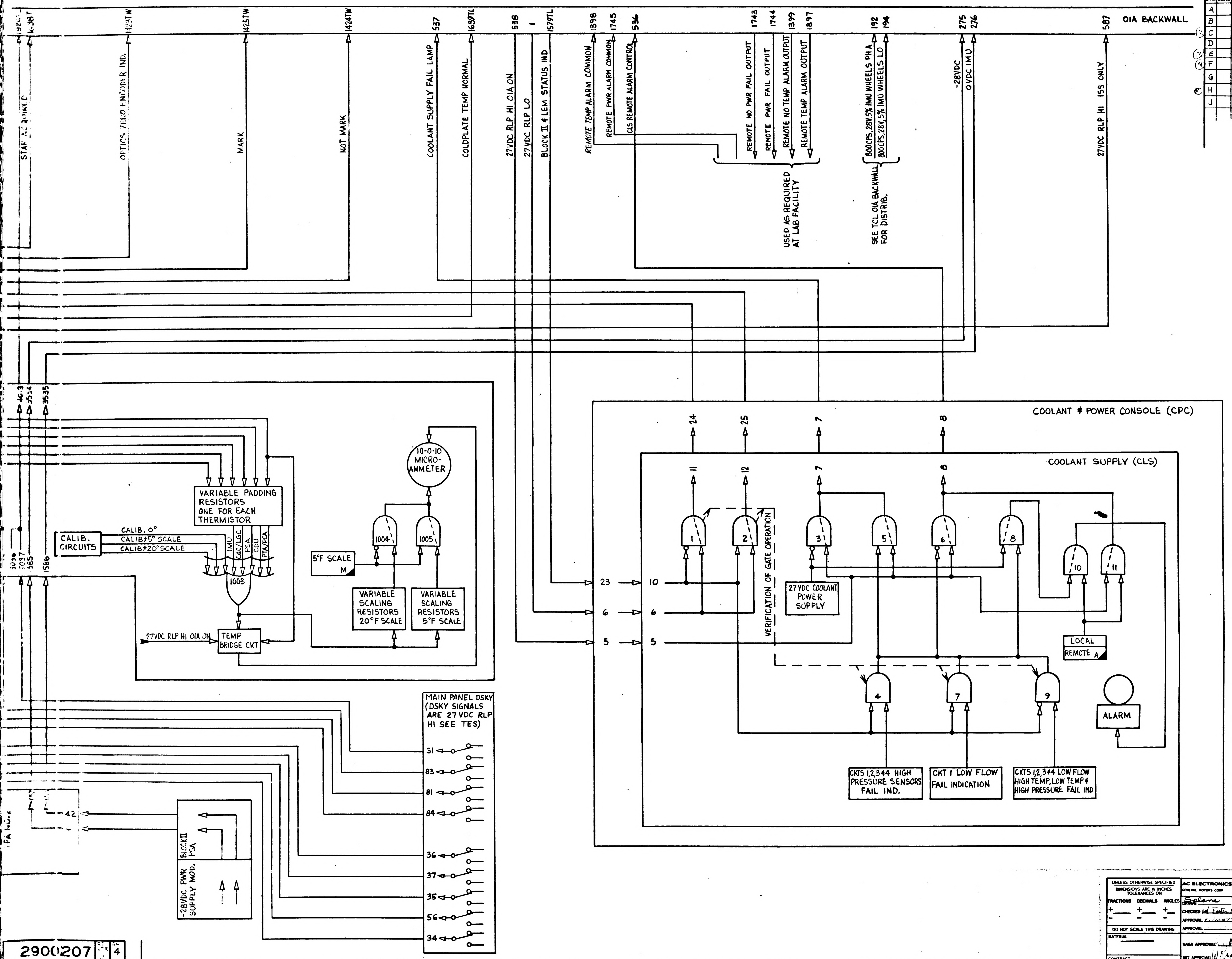


16
15
14
13
12
11
10
9
H
G
F
E
D
C
B
A
OIA BACKWALL
1633
1634TL
1635TL
1657
939
1648L
1644
1636TL
1645
161
162
1307
1308
1637TL
1837TL
1836TL
1835TL
1834TL
1833TL
1828TL
1830TL
1827TL
1824TL
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
LEM CONFIGURATION IND.
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
TEMP. OUT OF LIMITS HI
TEMP. OUT OF LIMITS LO
TEMP WITHIN LIMITS
FROM SCM CONNECTOR SYSTEM TESTING ONLY
SEE GPC OIA BACKWALL FOR DISTRIB.
GSE DISTRIBUTION BOX (GDB)
2947
2944
2942
2932
2934
2931
2930
2943
2941
2929
2935
2936
4002
4003
4004
4007
4008
4010
4011
4012
4013
3534
3535
10K 5%
28VDC G&N POWER LO
1008
1000
1001
1002
27VDC RLP HI PIL. PWR
27VDC RLP LO
27 VDC RLP LO
28VDC GEN PWR LO
27VDC RLP HI OIA ON
VARIABLE RESISTORS ONE FOR EA THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB. 35° SCALE
CALIB. 120° SCALE
IMU
CGC/LGC
1003
27VDC RLP HI OIA ON
TEMP BRIDGE
995
996
991
989
961
967
968
971
974
990
988
901
902
903
906
907
908
910
911
912
914
915
916
927
928
926
925
924
923
981
5048
5047
5046
5043
5042
5040
5034
5039
5038
5035
5037
5036
1585
1586
LEM GEN PWR CAB
LEM POWER CABLE
LEM ISS ONLY CABLE
PTA/PEA TEMP ALARM HI
PTA/PEA TEMP ALARM LO
PTA/PEA TEMP MON LO
CDU TEMP ALARM HI
CDU TEMP ALARM LO
CDU TEMP MON LO
PSA LEM TEMP ALARM HI
PSA LEM TEMP ALARM LO
PSA TEMP MON LO
CGC/LGC TEMP ALARM HI
CGC/LGC TEMP ALARM LO
CGC/LGC TEMP MON LO
IMU TEMP MON HI
IMU TEMP MON LO
CGC/LGC TEMP MON HI
PSA LEM TEMP MON HI
CDU TEMP MON HI
PTA/PEA TEMP MON HI
LEM PSA
45J19-A22
IMU AUX. MODULE
2K
27.5 VDC
LEM CDU
56P3-213
56P3-313
MODE MODULE
LEM PSA
45J19-H18
13
IMU AUX. MODULE (28 VDC IMU START)
4.9K 2%
10K 2%
PULSE TORQUE ASSY (PTA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
LGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
IMU P21-13
TEMP ALARM MODULE
2
TPA NO. 2
652
653
42
41
LEM PSA
-28VDC PWR SUPPLY MOD.
THERMOSWITCHES NORMALLY CLOSED OPEN AT HIGH TEMP > 70°F

2900207 REV LTR SH 3

1/29002 07

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	
B		REVISED PER TDRR 20488		7 JUL 65	
C		REVISED PER TDRR 20491		8 JUL 65	
D		REVISED PER TDRR 21911		1 SEP 65	
E		REVISED PER TDRR 22007		9 SEP 65	
F		REVISED PER TDRR 23763		12 NOV 65	
G		REVISION STATUS CHANGED		24 NOV 65	
H		REVISED PER TDRR 24059		29 NOV 65	
J		REVISION STATUS CHANGED		4 JAN 66	


OIA BACKWALL
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
1423TW
MARK
1425TW
NOT MARK
1424TW
COOLANT SUPPLY FAIL LAMP
537
COLDPLATE TEMP NORMAL
1639TL
27VDC RLP HI OIA ON
538
27VDC RLP LO
1579TL
BLOCK II & LEM STATUS IND
REMOTE TEMP ALARM COMMON
1398
REMOTE PWR ALARM COMMON
1745
CLS REMOTE ALARM CONTROL
536
REMOTE NO PWR FAIL OUTPUT
1743
REMOTE PWR FAIL OUTPUT
1744
REMOTE NO TEMP ALARM OUTPUT
1399
REMOTE TEMP ALARM OUTPUT
1397
USED AS REQUIRED AT LAB FACILITY
800CPS, 28V, 5% IMU WHEELS PH A
192
800CPS, 28V, 5% IMU WHEELS LO
194
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
275
OVDC IMU
276
27VDC RLP HI ISS ONLY
587
3535
1586
585
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB ±5° SCALE
CALIB ±20° SCALE
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
10-0-10 MICRO-AMMETER
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
MAIN PANEL DSKY (DSKY SIGNALS ARE 27 VDC RLP HI SEE TES)
31
83
81
84
36
37
35
56
34
42
BLOCK II PSA
-28VDC PWR SUPPLY MOD.
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
23
6
5
COOLANT SUPPLY (CLS)
11
12
10
VERIFICATION OF GATE OPERATION
1
2
3
4
5
6
7
8
9
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND

2900207 | 4

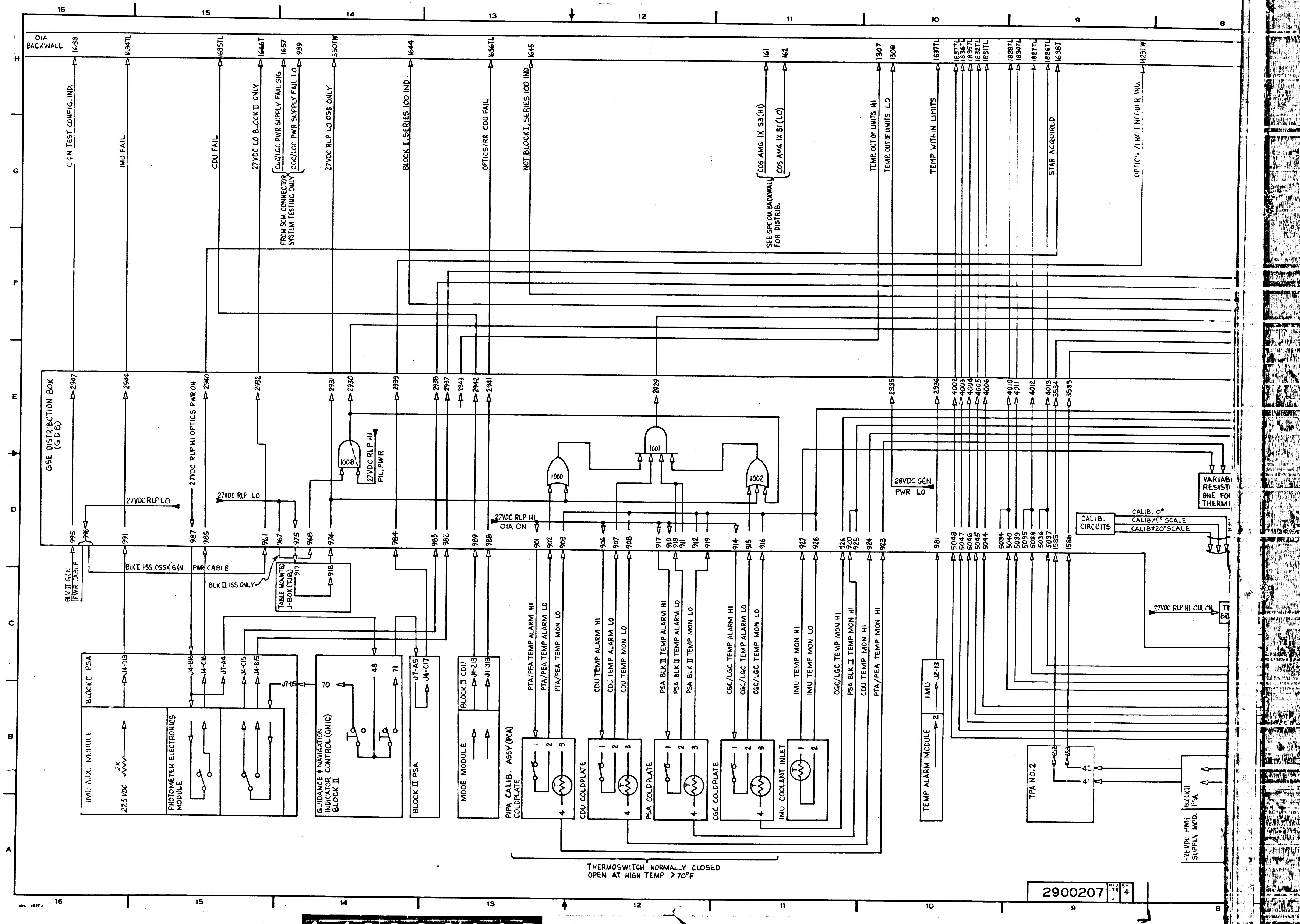
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN Solane DATE 7 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK II)

CODE IDENT NO. 99974
SIZE
2900207
SCALE
SHEET 4 OF 4


OIA BACKWALL
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
27VDC LO BLOCK II ONLY
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR SYSTEM TESTING ONLY
27VDC RLP LO OSS ONLY
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
TEMP. OUT OF LIMITS HI
TEMP. OUT OF LIMITS LO
TEMP WITHIN LIMITS
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
1633
1634TL
1635TL
1666T
1657
939
550TW
1644
1636TL
1645
161
162
1307
1308
1637TL
1837TL
1834TL
1835TL
1832TL
1831TL
1828TL
1830TL
1827TL
1826TL
1638T
1423TW
GSE DISTRIBUTION BOX (GDB)
2947
2944
27VDC RLP HI OPTICS PWR ON
2940
2932
2931
2930
2939
2938
2937
2943
2942
2941
2929
2935
2936
4002
4003
4004
4005
4006
4010
4011
4012
4013
3534
3535
1008
27VDC RLP HI PIL. PWR
1000
1001
1002
28VDC GEN PWR LO
VARIABLE RESISTOR ONE FOR THERMI
27VDC RLP LO
27VDC RLP LO
27VDC RLP HI OIA ON
CALIB. CIRCUITS
CALIB. 0°
CALIB. 5° SCALE
CALIB. 20° SCALE
995
996
991
987
985
961
967
975
968
974
984
983
982
989
988
901
902
903
906
907
908
917
910
918
911
912
919
914
915
916
927
928
926
920
925
924
923
981
5048
5047
5046
5045
5044
5034
5040
5039
5038
5036
5037
1585
1586
BLK II GEN PWR CABLE
BLK II ISS, OSS & G&N PWR CABLE
BLK II ISS ONLY
TABLE MOUNTED J-BOX (TJB)
917
918
27VDC RLP HI OIA ON
PTA/PEA TEMP ALARM HI
PTA/PEA TEMP ALARM LO
PTA/PEA TEMP MON LO
CDU TEMP ALARM HI
CDU TEMP ALARM LO
CDU TEMP MON LO
PSA BLK II TEMP ALARM HI
PSA BLK II TEMP ALARM LO
PSA BLK II TEMP MON LO
CGC/LGC TEMP ALARM HI
CGC/LGC TEMP ALARM LO
CGC/LGC TEMP MON LO
IMU TEMP MON HI
IMU TEMP MON LO
CGC/LGC TEMP MON HI
PSA BLK II TEMP MON HI
CDU TEMP MON HI
PTA/PEA TEMP MON HI
BLOCK II PSA
J4-D13
J4-B16
J4-C16
J7-A4
J4-C15
J4-B15
J7-D5
IMU AUX. MODULE
27.5 VDC
2K
PHOTOMETER ELECTRONICS MODULE
70
48
71
GUIDANCE & NAVIGATION INDICATOR CONTROL (GNIC) BLOCK II
J7-A5
J4-C17
BLOCK II PSA
BLOCK II CDU
J1-213
J1-313
MODE MODULE
PIPA CALIB. ASSY (PCA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
CGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
IMU
J2-13
TEMP ALARM MODULE
TPA NO. 2
652
653
42
41
BLK II PSA
28 VDC PWR SUPPLY MOD.
THERMOSWITCH NORMALLY CLOSED OPEN AT HIGH TEMP >70°F
2900207
4
16
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12
11
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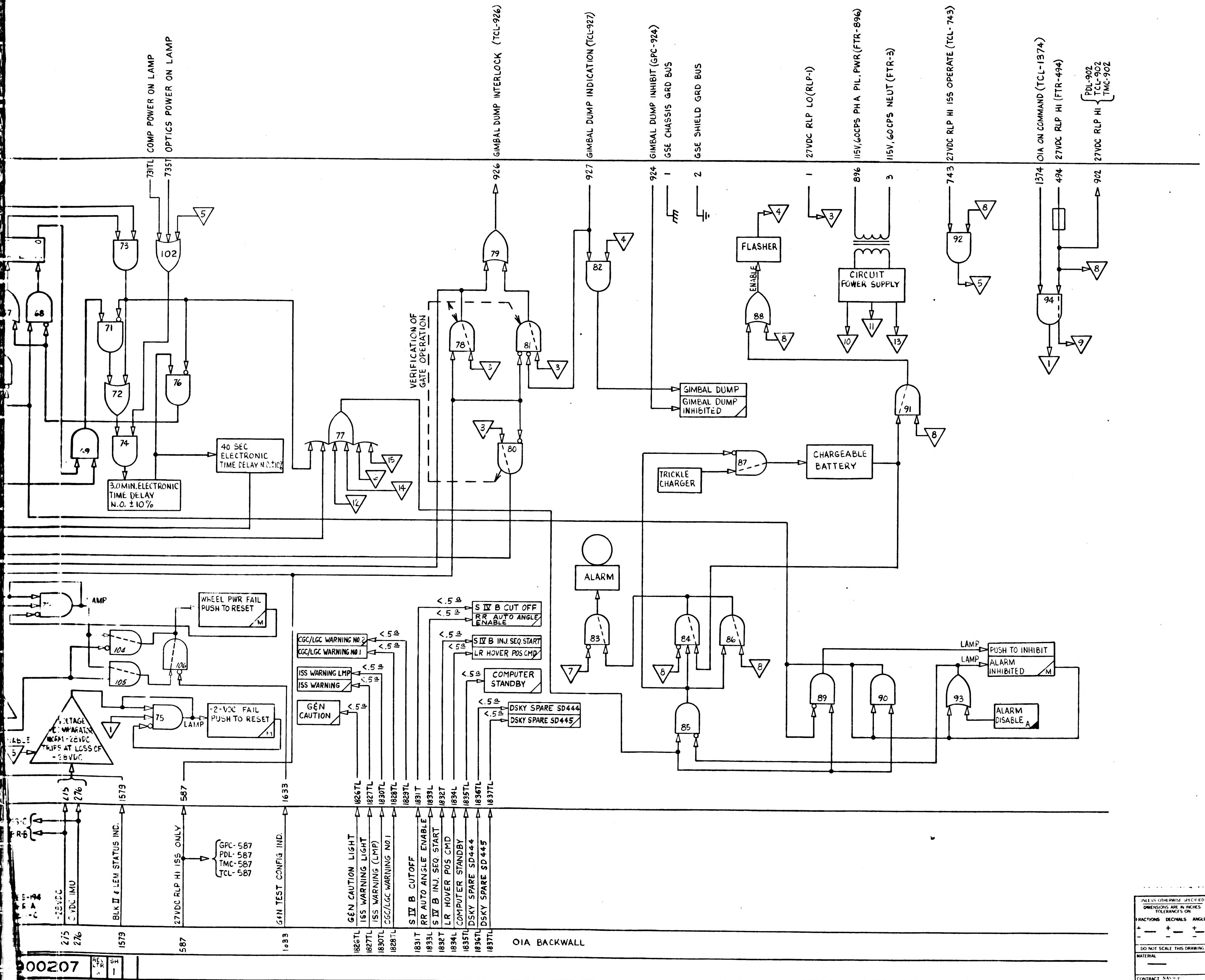
9
8
I
H
G
F
E
D
C
B
A

1Z2900207


73TL COMP POWER ON LAMP
735T OPTICS POWER ON LAMP
926 GIMBAL DUMP INTERLOCK (TCL-926)
927 GIMBAL DUMP INDICATION (TCL-927)
924 GIMBAL DUMP INHIBIT (GPC-924)
1 GSE CHASSIS GRD BUS
2 GSE SHIELD GRD BUS
1 27VDC RLP LO (RLP-1)
896 115V, 400CPS PHA PIL. PWR (FTR-896)
3 115V, 400CPS NEUT (FTR-3)
743 27VDC RLP HI ISS OPERATE (TCL-743)
1374 OIA ON COMMAND (TCL-1374)
494 27VDC RLP HI (FTR-494)
902 27VDC RLP HI PDL-902 TCL-902 TMC-902
73
102
68
71
72
76
74
49
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
40 SEC ELECTRONIC TIME DELAY N.O. ±10%
77
79
78
81
80
VERIFICATION OF GATE OPERATION
82
GIMBAL DUMP
GIMBAL DUMP INHIBITED
FLASHER
ENABLE
88
CIRCUIT POWER SUPPLY
92
94
91
TRICKLE CHARGER
87
CHARGEABLE BATTERY
ALARM
83
84
86
85
89
90
93
LAMP
PUSH TO INHIBIT
ALARM INHIBITED
ALARM DISABLE
WHEEL PWR FAIL PUSH TO RESET
AMP
104
105
106
75
-2-VDC FAIL PUSH TO RESET
VOLTAGE COMPARATOR +28VDC TRIPS AT LOSS OF +26VDC
CGC/LGC WARNING NO. 2
CGC/LGC WARNING NO 1
ISS WARNING LMP
ISS WARNING
GEN CAUTION
S IV B CUT OFF
RR AUTO ANGLE ENABLE
S IV B INJ. SEQ. START
LR HOVER POS CMD
COMPUTER STANDBY
DSKY SPARE SD444
DSKY SPARE SD445
<.5a
275
276
1579
587
1633
1826TL
1827TL
1830TL
1828TL
1829TL
1831T
1833L
1832T
1834L
1835TL
1836TL
1837TL
BLK II & LEM STATUS INC.
27VDC RLP HI ISS ONLY
GPC-587
PDL-587
TMC-587
TCL-587
GEN TEST CONFIG IND.
GEN CAUTION LIGHT
ISS WARNING LIGHT
ISS WARNING (LMP)
CGC/LGC WARNING NO. 1
S IV B CUTOFF
RR AUTO ANGLE ENABLE
S IV B INJ. SEQ. START
LR HOVER POS CMD
COMPUTER STANDBY
DSKY SPARE SD444
DSKY SPARE SD445
OIA BACKWALL
900207
REV
SH 1
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

REVISIONS 19254

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	RLP MLM
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISED PER TDRR 20491		8 JUL 65	RLP MEM
D		REVISED PER TDRR 21911		1 SEP 65	RLP
E		REVISED PER TDRR 22007		9 SEP 65	RTP
F		REVISED PER TDRR 23763		12 NOV 65	RLP
G		REVISED PER TDRR-24054		24 NOV 65	B.
H		REVISED PER TDRR 24059		29 NOV 65	RLP RWH
J		REVISED PER TDRR 24924		4 JAN 66	J. PAT
K		REVISED PER TDRR 26333		23 FEB 66	JAC

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN Sylane DATE 7 MAY 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

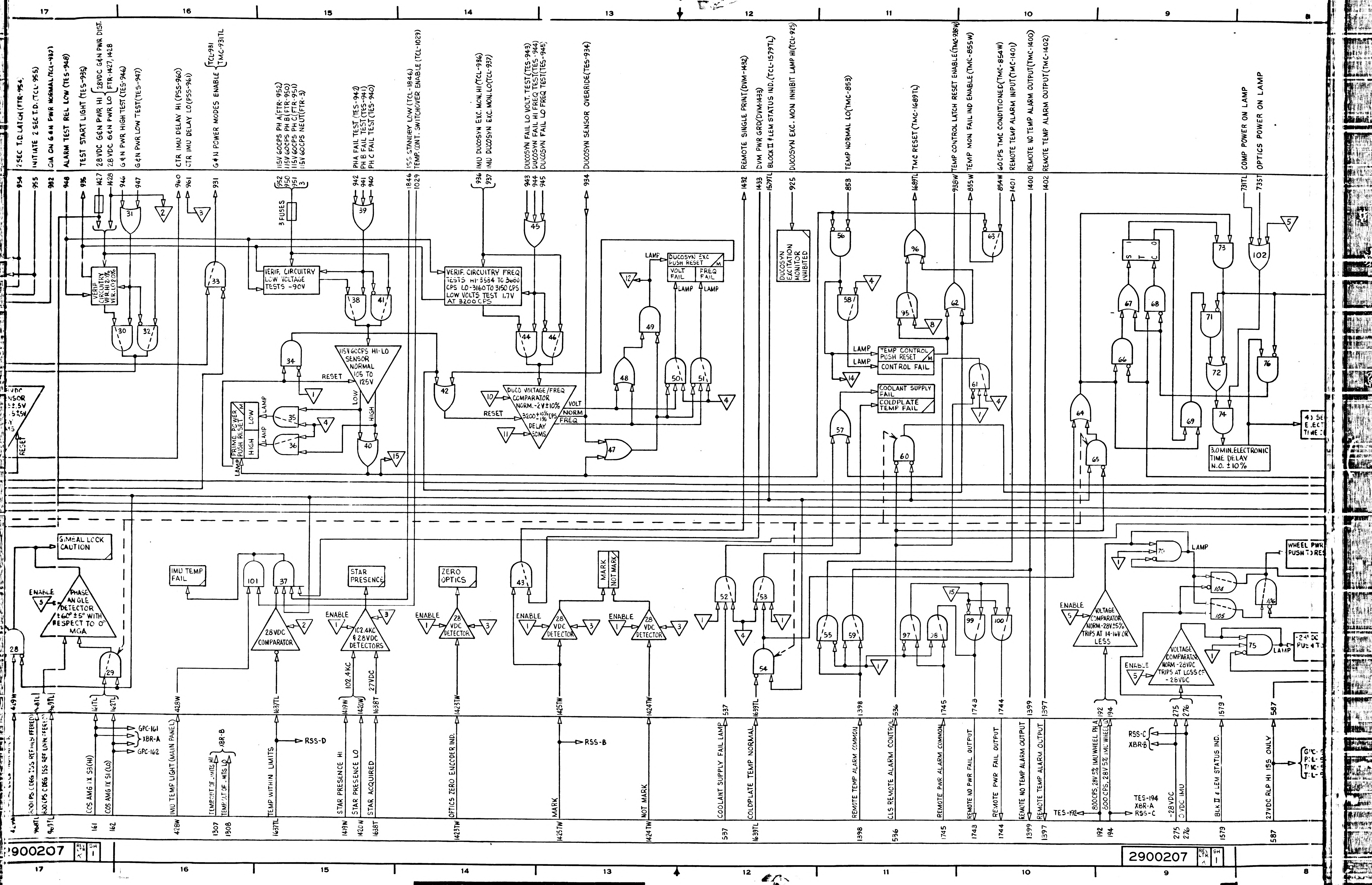
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM
MONITOR PANEL
(BLOCK I SERIES 100, BLOCK II, LEM)

CODE IDENT NO 99974 SIZE J 2900207
SCALE — SHEET 1 OF 4

2900207

3/2900207


17
16
15
14
13
12
11
10
9
8
2 SEC T.D. LATCH (FTR-954)
INITIATE 2 SEC T.D. (TCL-955)
CIA ON G&N PWR NORMAL (TCL-982)
ALARM TEST REL LOW (TES-948)
TEST START LIGHT (TES-935)
28VDC G&N PWR HI
28VDC G&N PWR LO
28VDC G&N PWR DIST. FTR-1427, 1428
G&N PWR HIGH TEST (TES-946)
G&N PWR LOW TEST (TES-947)
CTR IMU DELAY HI (PSS-960)
CTR IMU DELAY LO (PSS-961)
G&N POWER MODES ENABLE (TCL-931 TMC-931TL)
115V 60CPS PH A (FTR-952)
115V 60CPS PH B (FTR-950)
115V 60CPS PH C (FTR-951)
115V 60CPS NEUT (FTR-3)
PHA FAIL TEST (TES-942)
PH B FAIL TEST (TES-941)
PH C FAIL TEST (TES-940)
ISS STANDBY LOW (TCL-1846)
TEMP CONT. SWITCHOVER ENABLE (TCL-1029)
IMU DUCOSYN EXC. MON. HI (TCL-936)
IMU DUCOSYN EXC. MON. LO (TCL-937)
DUCOSYN FAIL LO VOLT. TEST (TES-943)
DUCOSYN FAIL HI FREQ TEST (TES-944)
DUCOSYN FAIL LO FREQ TEST (TES-945)
DUCOSYN SENSOR OVERRIDE (TES-934)
REMOTE SINGLE PRINT (DVM-1432)
DVM PWR GRD (DVM-1433)
BLOCK II & LEM STATUS IND. (TCL-1579TL)
DUCOSYN EXC. MON INHIBIT LAMP HI (TCL-925)
TEMP NORMAL LO (TMC-853)
TMC RESET (TMC-1689TL)
TEMP CONTROL LATCH RESET ENABLE (TMC-938W)
TEMP MON FAIL IND ENABLE (TMC-855W)
60CPS TMC CONDITIONED (TMC-854W)
REMOTE TEMP ALARM INPUT (TMC-1401)
REMOTE NO TEMP ALARM OUTPUT (TMC-1400)
REMOTE TEMP ALARM OUTPUT (TMC-1402)
COMP POWER ON LAMP
OPTICS POWER ON LAMP
954
955
982
948
935
1427
1428
946
947
960
961
931
952
950
951
3
942
941
940
1846
1029
936
937
943
944
945
934
1432
1433
1579TL
925
853
1689TL
938W
855W
854W
1401
1400
1402
731TL
735T
3 FUSES
VERIF. CIRCUITRY VER. HI 2% VER. LO 2%
VERIF. CIRCUITRY LOW VOLTAGE TESTS -90V
VERIF. CIRCUITRY FREQ TESTS HI-3584 TO 3660 CPS LO-3160 TO 3150 CPS LOW VOLTS TEST 1.7V AT 3200 CPS
115V 60CPS HI-LO SENSOR NORMAL 105 TO 125V
RESET
LOW
HIGH
LAMP
PRIME POWER PUSH RESET
M
DUCO VOLTAGE/FREQ COMPARATOR NORM. -2V ±10% 3200 +10% -1% CPS DELAY 50MS
VOLT
NORM
FREQ
DUCOSYN EXC PUSH RESET
VOLT FAIL
FREQ FAIL
DUCOSYN EXCITATION MONITOR INHIBITED
TEMP CONTROL PUSH RESET
CONTROL FAIL
COOLANT SUPPLY FAIL
COLDPLATE TEMP FAIL
S
T
C
O
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
4) SE ELECT TIME
28VDC SENSOR
RESET
GIMBAL LOCK CAUTION
ENABLE
PHASE ANGLE DETECTOR ±60° ±5° WITH RESPECT TO 0° MGA
IMU TEMP FAIL
28VDC COMPARATOR
STAR PRESENCE
102.4KC & 28VDC DETECTORS
ZERO OPTICS
28 VDC DETECTOR
MARK
NOT MARK
VOLTAGE COMPARATOR NORM-28V ±5% TRIPS AT 14-16V OR LESS
VOLTAGE COMPARATOR NORM -28VDC TRIPS AT LOSS OF -28VDC
WHEEL PWR PUSH TO RES
-24 DC PUSH T
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
95
96
97
98
99
100
101
102
104
105
106
102.4KC
27VDC
429W
4081TL
4097TL
161TL
162TL
428W
1637TL
1419W
1420W
1638T
1423TW
1425TW
1424TW
537
1639TL
1398
536
1745
1743
1744
1399
1397
192
194
275
276
1573
587
800CPS 0 DEG TSS REF
800CPS 0 DEG TSS REF LOW
GPC-161
XBR-A
GPC-162
COS AMG 1X S3 (HI)
COS AMG 1X S1 (LO)
IMU TEMP LIGHT (MAIN PANEL)
XBR-B
TEMP OUT OF LIMITS HI
TEMP OUT OF LIMITS LO
RSS-D
TEMP WITHIN LIMITS
STAR PRESENCE HI
STAR PRESENCE LO
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
RSS-B
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
REMOTE TEMP ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE PWR ALARM COMMON
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
TES-192
800CPS, 28V 5% IMU WHEEL PWR
800CPS, 28V 5% IMU WHEEL
RSS-C
XBR-B
TES-194
XBR-A
RSS-C
-28VDC
0VDC IMU
BLK II & LEM STATUS IND.
27VDC RLP HI ISS ONLY
161
162
428W
1307
1308
1637TL
1419W
1420W
1638T
1423TW
1425TW
1424TW
537
1639TL
1398
536
1745
1743
1744
1399
1397
192
194
275
276
1573
587
2900207
REV LTR
SH 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS:

2900210	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RLP RELAY & LAMP POWER SUPPLY
2900204	TEMPERATURE MONITOR CONTROL PANEL (BLOCK I, SERIES 100)(TMC)
2900203	TEMPERATURE MONITOR CONTROL PANEL (BLOCK II & LEM)(TMC)
2900208	POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL)
2900223	GIMBAL POSITION CONTROL (GPC)
2900202	TEST CONTROL PANEL (BLOCK I, SERIES 100)(TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM)(TCL)
2900206	TEST SELECTOR PANEL (TES)
2900200	GYRO CAGING PANEL (BLOCK II & LEM)(GCP)
2900218	OSCILLOGRAPH SIGNAL SELECTION RSS-B TO FIXED DC CHANNEL, RSS-C TO SWITCHABLE AC CHANNEL, RSS-D TO SWITCHABLE DC CHANNEL
2900217	SIGNAL SELECTION & MEASUREMENT XBR-A CROSSBAR-AC SIGNALS XBR-B CROSSBAR-DC SIGNALS
2900219	COUNTER SIGNAL SELECTION PRIMARY SIGNAL SELECTOR (PSS)
2900214	GSE GROUNDING (BLOCK I SERIES 100)
2900213	GSE GROUNDING (BLOCK II & LEM)
2900209	COMPUTER SIMULATOR INTERFACE (CMS)
2900211	AUXILIARY INPUT/OUTPUT CALIBRATION (AIP)

4. NCN STANDARD SYMBOLOGY:

⊐D-	INDICATES "AND" GATE WITH SWITCHED SIGNAL
NAME	INDICATES INDICATOR LIGHT
NAME M	INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
NAME NAME	INDICATES SPLIT SCREEN INDICATOR LIGHT
NAME NAME M	INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES UNLIGHTED PUSHBUTTON OR TOGGLE SWITCH (ALTERNATE ACTION)

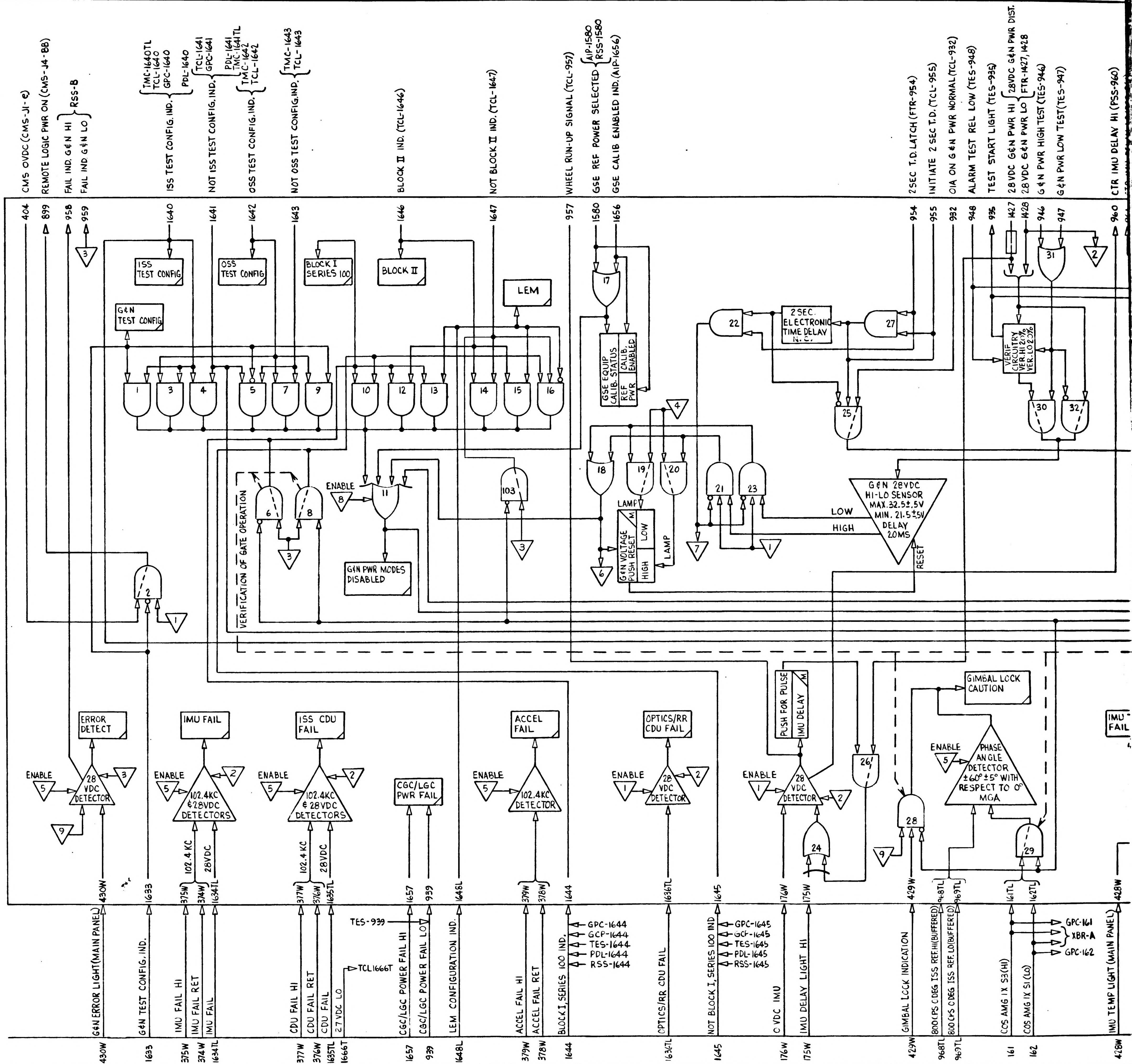
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   - A. W-BLOCK I SERIES 100 ONLY
   - B. T-BLOCK II ONLY
   - C. L-LEM ONLY
   - D. BLANK-ALL G&N CONFIGURATIONS
   - E. TW, TL OR WL-USED IN MORE THAN ONE G&N CONFIGURATION AS SHOWN.

6. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK I SERIES 100	SH 1 SH 2
BLOCK II	SH 1 SH 3
LEM	SH 1 SH 4

7. SIGNAL REFERENCE:

▽1 = OIA ON
▽2 = 28VDC G&N PWR LO
▽3 = 27VDC RLP LO
▽4 = FLASHER
▽5 = ISS OPER. 5SEC T.D.
▽6 = G&N PWR FAIL
▽7 = 2 SEC T.D. AT OIA ON
▽8 = 27VDC PIL. PWR
▽9 = 27VDC OIA ON
▽10 = +28VDC
▽11 = -28VDC
▽12 = DUCO EXC. FAIL
▽13 = +45VDC
▽14 = TMC FAIL
▽15 = PRIME PWR FAIL



CMS OVDC (CMS-J1-e)
REMOTE LOGIC PWR ON (CMS-J4-BB)
FAIL IND. G&N HI
FAIL IND G&N LO
RSS-B
ISS TEST CONFIG. IND.
TMC-1640TL
TCL-1640
GPC-1640
PDL-1640
NOT ISS TEST CONFIG. IND.
TCL-1641
GPC-1641
PDL-1641
TMC-1641TL
OSS TEST CONFIG. IND.
TMC-1642
TCL-1642
NOT OSS TEST CONFIG. IND.
TMC-1643
TCL-1643
BLOCK II IND. (TCL-1646)
NOT BLOCK II IND. (TCL-1647)
WHEEL RUN-UP SIGNAL (TCL-957)
GSE REF POWER SELECTED
AIP-1580
RSS-1580
GSE CALIB ENABLED IND. (AIP-1656)
2 SEC T.D. LATCH (FTR-954)
INITIATE 2 SEC T.D. (TCL-955)
OIA ON G&N PWR NORMAL (TCL-932)
ALARM TEST REL LOW (TES-948)
TEST START LIGHT (TES-935)
28VDC G&N PWR HI
28VDC G&N PWR LO
28VDC G&N PWR DIST. FTR-1427, 1428
G&N PWR HIGH TEST (TES-946)
G&N PWR LOW TEST (TES-947)
CTR IMU DELAY HI (PSS-960)
404
899
958
959
1640
1641
1642
1643
1646
1647
957
1580
1656
954
955
932
948
935
1427
1428
946
947
960
ISS TEST CONFIG
OSS TEST CONFIG
BLOCK I SERIES 100
BLOCK II
LEM
G&N TEST CONFIG
GSE EQUIP CALIB. STATUS
CALIB. ENABLED
REF PWR
2 SEC. ELECTRONIC TIME DELAY N.C.
VERIF CIRCUITRY VER. HI 2.9% VER. LO 2.7%
ENABLE
G&N PWR MODES DISABLED
VERIFICATION OF GATE OPERATION
G&N VOLTAGE PUSH RESET
LAMP
LOW
HIGH
G&N 28VDC HI-LO SENSOR MAX. 32.5±.5V MIN. 21.5±.5V DELAY 20MS
RESET
ERROR DETECT
IMU FAIL
ISS CDU FAIL
ACCEL FAIL
OPTICS/RR CDU FAIL
CGC/LGC PWR FAIL
PUSH FOR PULSE
IMU DELAY
GIMBAL LOCK CAUTION
PHASE ANGLE DETECTOR ±60°±5° WITH RESPECT TO 0° MGA
28 VDC DETECTOR
102.4KC & 28VDC DETECTORS
102.4KC DETECTOR
IMU FAIL
102.4 KC
28VDC
TES-939
TCL1666T
GPC-1644
GCP-1644
TES-1644
PDL-1644
RSS-1644
GPC-1645
GCP-1645
TES-1645
PDL-1645
RSS-1645
GPC-161
XBR-A
GPC-162
G&N ERROR LIGHT (MAIN PANEL)
G&N TEST CONFIG. IND.
IMU FAIL HI
IMU FAIL RET
IMU FAIL
CDU FAIL HI
CDU FAIL RET
CDU FAIL
27VDC LO
CGC/LGC POWER FAIL HI
CGC/LGC POWER FAIL LO
LEM CONFIGURATION IND.
ACCEL FAIL HI
ACCEL FAIL RET
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND
C VDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK INDICATION
800 CPS 0 DEG ISS REF HI (BUFFERED)
800 CPS 0 DEG ISS REF LO (BUFFERED)
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
IMU TEMP LIGHT (MAIN PANEL)
430W
1633
375W
374W
1634TL
377W
376W
1635TL
1666T
1657
939
1648L
379W
378W
1644
1636TL
1645
176W
175W
429W
968TL
969TL
161
162
428W

2900207

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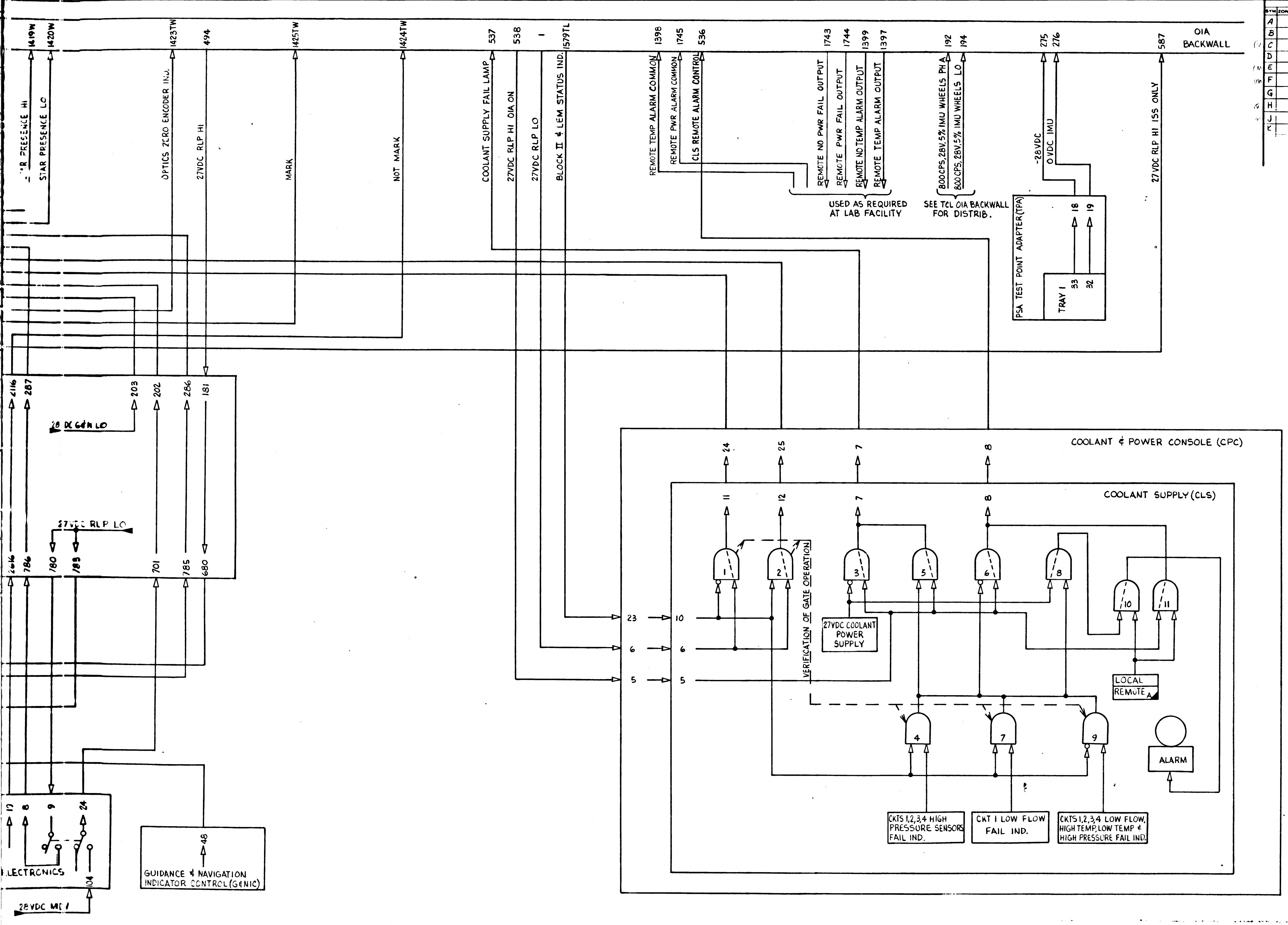
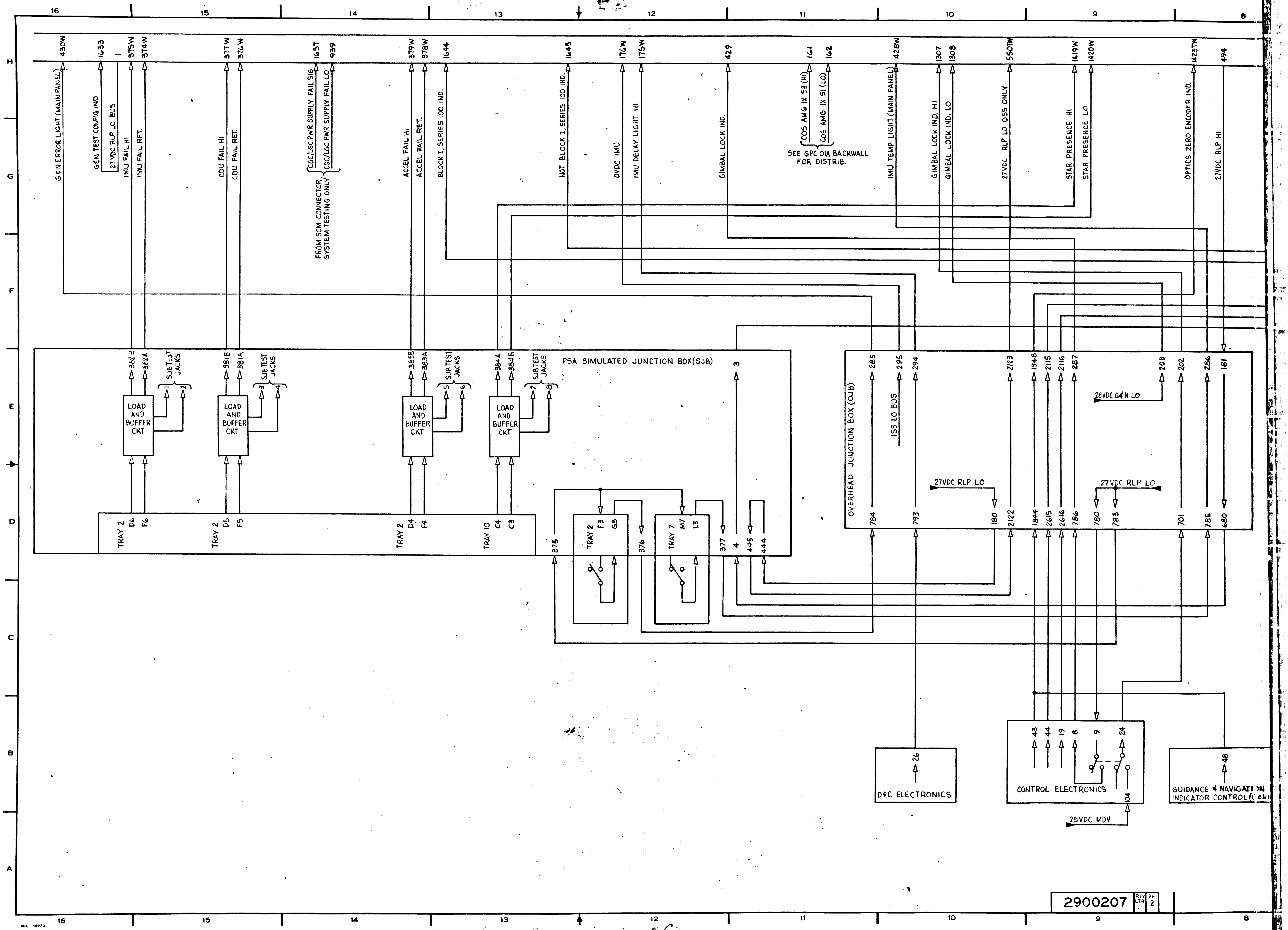
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISION STATUS CHANGED		8 JUL 65	RLP
D		REVISION STATUS CHANGED		1 SEP 65	RLP
E		REVISION STATUS CHANGED		3 SEPT 65	RTP
F		REVISED PER TDRR 23763		12 NOV 65	RLP
G		REVISION STATUS CHANGED		24 NOV 65	B. EF
H		REVISION STATUS CHANGED		29 NOV 65	RLP RWH
J		REVISION STATUS CHANGED		4 JAN 66	J PAT
K		REVISION STATUS CHANGED		[illegible] 66	JAC


9
8
7
6
5
4
3
2
1
OIA BACKWALL
1419W
1420W
1423TW
494
1425TW
1424TW
537
538
1579TL
1398
1745
536
1743
1744
1399
1397
192
194
275
276
587
STAR PRESENCE HI
STAR PRESENCE LO
OPTICS ZERO ENCODER INJ.
27VDC RLP HI
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND.
REMOTE TEMP ALARM COMMON
REMOTE PWR ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
800CPS, 28V, 5% IMU WHEELS PH A
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
0VDC IMU
27VDC RLP HI ISS ONLY
PSA TEST POINT ADAPTER (TPA)
TRAY I
18
19
33
32
2116
287
203
202
286
181
28 DC G&N LO
27VDC RLP LO
2616
786
780
789
701
785
680
13
8
9
24
104
ELECTRONICS
28VDC MD 1
48
GUIDANCE & NAVIGATION INDICATOR CONTROL (G&NIC)
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
1
2
3
5
6
8
10
11
4
7
9
23
10
6
6
5
5
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
ALARM
CKTS 1,2,3,4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL IND.
CKTS 1,2,3,4 LOW FLOW, HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND.
H
G
F
E
D
C
B
A
K
2900207

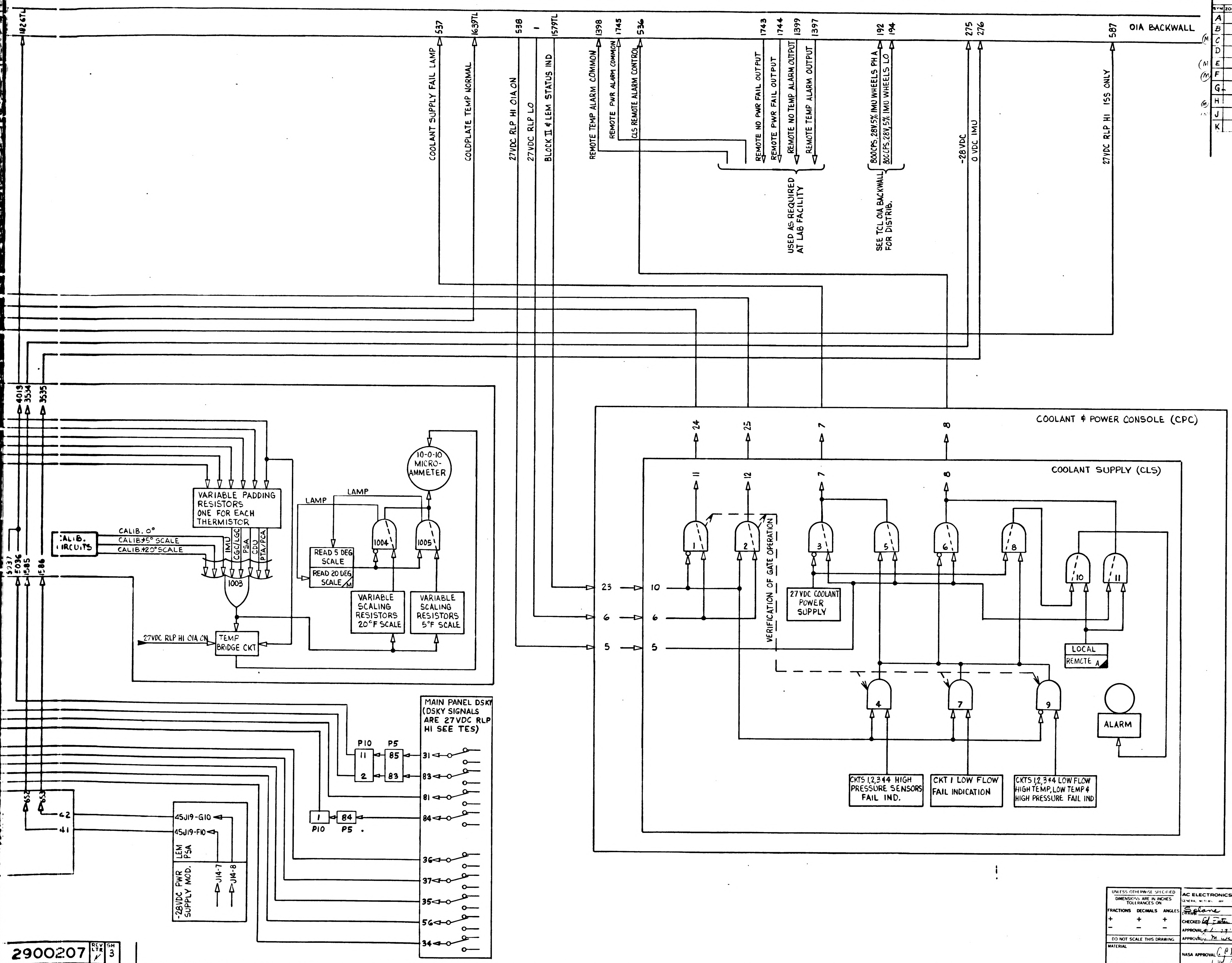
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN [illegible] DATE 7 MAY 65 CHECKED [illegible] APPROVAL APPROVAL	MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK I SERIES 100)
MATERIAL	NASA APPROVAL [illegible]	CODE IDENT NO 99974 SIZE 2900207
CONTRACT	MIT APPROVAL [illegible]	SCALE — SHEET 2 OF 4

2900207	REV LTR	SH 2

272900207


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
430W
1633
1
375W
374W
377W
376W
1657
939
379W
378W
1644
1645
176W
175W
429
161
162
428W
1307
1308
550TW
1419W
1420W
1423TW
494
G&N ERROR LIGHT (MAIN PANEL)
G&N TEST CONFIG IND
27VDC RLP LO BUS
IMU FAIL HI
IMU FAIL RET.
CDU FAIL HI
CDU FAIL RET.
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR, SYSTEM TESTING ONLY
ACCEL FAIL HI
ACCEL FAIL RET.
BLOCK I, SERIES 100 IND.
NOT BLOCK I, SERIES 100 IND.
OVDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK IND.
COS AMG IX 53 (HI)
COS AMG IX 51 (LO)
SEE GPC 01A BACKWALL FOR DISTRIB.
IMU TEMP LIGHT (MAIN PANEL)
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
27VDC RLP LO OSS ONLY
STAR PRESENCE HI
STAR PRESENCE LO
OPTICS ZERO ENCODER IND.
27VDC RLP HI
PSA SIMULATED JUNCTION BOX (SJB)
382B
382A
381B
381A
383B
383A
384A
384B
SJB TEST JACKS
1
2
3
4
5
6
7
8
LOAD AND BUFFER CKT
LOAD AND BUFFER CKT
LOAD AND BUFFER CKT
LOAD AND BUFFER CKT
TRAY 2
D6
F6
TRAY 2
D5
F5
TRAY 2
D4
F4
TRAY 10
C4
C3
375
TRAY 2
F3
G3
376
TRAY 7
M7
L3
377
3
4
445
444
OVERHEAD JUNCTION BOX (OJB)
285
295
294
2123
1348
2115
2116
287
203
202
286
181
ISS LO BUS
28VDC G&N LO
27VDC RLP LO
27VDC RLP LO
784
793
180
2122
1844
2615
2616
786
780
783
701
785
680
26
D&C ELECTRONICS
43
44
19
8
9
24
CONTROL ELECTRONICS
104
28VDC MDV
48
GUIDANCE & NAVIGATION INDICATOR CONTROL (CENI
2900207
REV LTR
SH 2
MIL 1077J

1/2900207


OIA BACKWALL
1826TL
537
1639TL
538
1579TL
1398
1745
536
1743
1744
1399
1397
192
194
275
276
587
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND
REMOTE TEMP ALARM COMMON
REMOTE PWR ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
800CPS, 28V, 5% IMU WHEELS PH A
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
0 VDC IMU
27VDC RLP HI ISS ONLY
4013
3534
3535
5037
5036
1585
1586
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB.+5° SCALE
CALIB.+20° SCALE
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
LAMP
LAMP
READ 5 DEG SCALE
READ 20 DEG SCALE
M
1004
1005
10-0-10 MICRO-AMMETER
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
MAIN PANEL DSKY (DSKY SIGNALS ARE 27VDC RLP HI SEE TES)
P10
P5
11
85
2
83
1
84
P10
P5
31
83
81
84
36
37
35
56
34
52
53
42
41
45J19-G10
45J19-F10
LEM PSA
-28VDC PWR SUPPLY MOD.
J14-7
J14-8
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
1
2
3
5
6
8
10
11
VERIFICATION OF GATE OPERATION
23
6
5
10
6
5
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE A
4
7
9
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

SYM	ZONE	REVISIONS 19254 DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	RLP MEM
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISED PER TDRR 20491		8 JUL 65	RLP MEM
D		REVISED PER TDRR 21911		1 SEP 65	RLP
E		REVISED PER TDRR 22007		9 SEPT 65	PTP
F		REVISED PER TDRR 23763		12 NOV 65	RLP
G		REVISION STATUS CHANGED		24-NOV-65	B. ET
H		REVISED PER TDRR 24059		29 NOV 65	RLP RWH
J		REVISION STATUS CHANGED		4 JAN 66	J. PAT
K		REVISION STATUS CHANGED		23 FEB 66	JAC

2900207 REV LTR K SH 3

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ + +
- - -
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

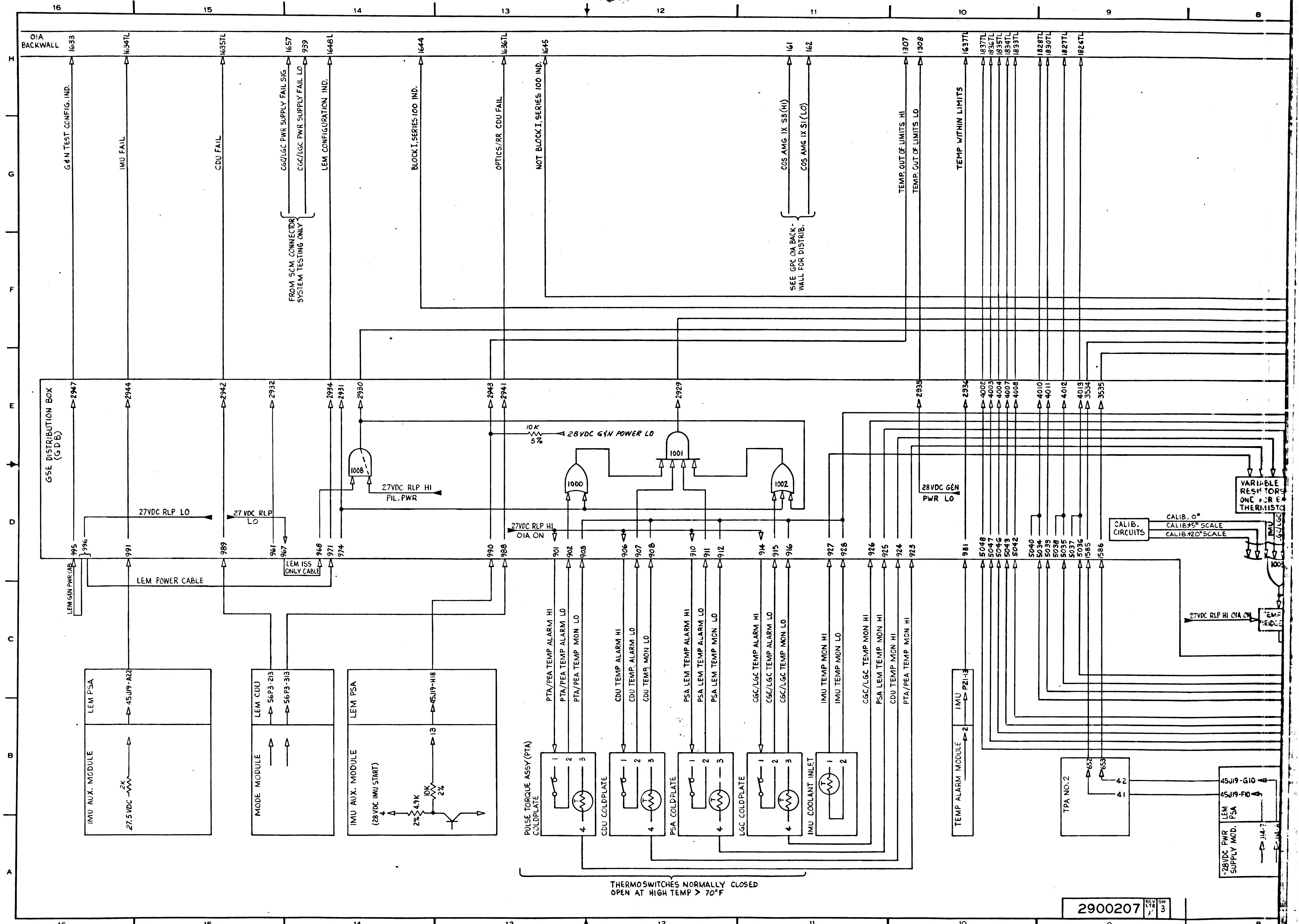
AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN Splane DATE 7 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL M Watson
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
MONITOR PANEL
(LEM)

CODE IDENT NO 99974
SIZE J
2900207
SCALE
SHEET 3 OF 4

2729002207

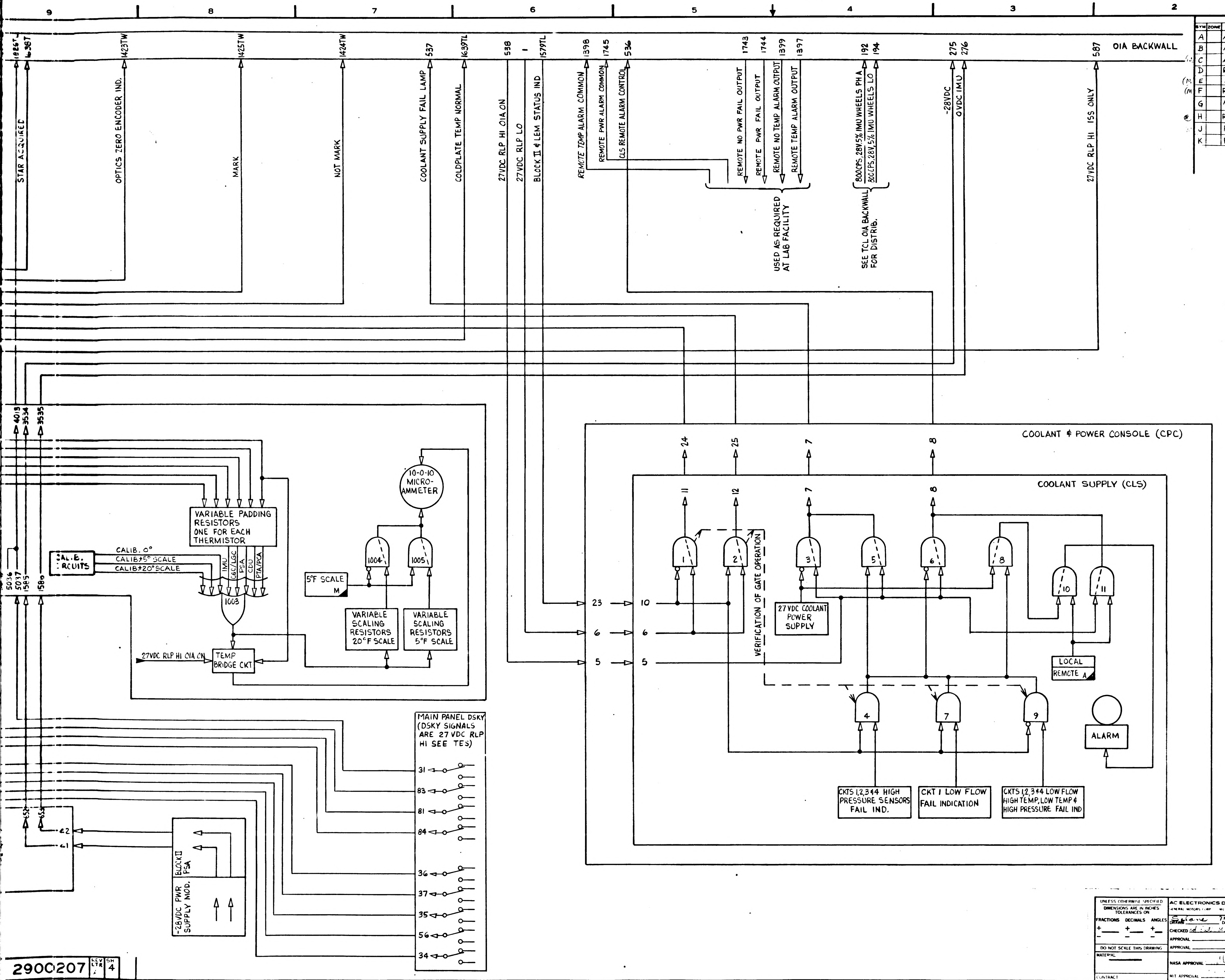

16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1633
1634TL
1635TL
1657
939
1648TL
1644
1636TL
1645
161
162
1307
1308
1637TL
1837TL
1836TL
1835TL
1834TL
1833TL
1828TL
1830TL
1827TL
1826TL
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
LEM CONFIGURATION IND.
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
TEMP. OUT OF LIMITS HI
TEMP. OUT OF LIMITS LO
TEMP WITHIN LIMITS
FROM SCM CONNECTOR SYSTEM TESTING ONLY
SEE GPS OIA BACKWALL FOR DISTRIB.
GSE DISTRIBUTION BOX (GDB)
2947
2944
2942
2932
2934
2931
2930
2943
2941
2929
2935
2936
4002
4003
4004
4007
4008
4010
4011
4012
4013
3534
3535
10K 5%
28VDC G&N POWER LO
1008
1000
1001
1002
27VDC RLP HI
PIL. PWR
27VDC RLP LO
27 VDC RLP LO
28VDC G&N PWR LO
27VDC RLP HI
OIA ON
VARIABLE RESISTORS ONE FOR EA THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB. 75° SCALE
CALIB. 120° SCALE
IMU
CGC/LGC
1003
995
996
991
989
961
967
968
971
974
990
988
901
902
903
906
907
908
910
911
912
914
915
916
927
928
926
925
924
923
981
5048
5047
5046
5043
5042
5040
5034
5039
5038
5035
5037
5036
585
586
LEM ISS ONLY CABLE
LEM G&N PWR CAB.
LEM POWER CABLE
27VDC RLP HI OIA ON
TEMP BRIDGE
PTA/PEA TEMP ALARM HI
PTA/PEA TEMP ALARM LO
PTA/PEA TEMP MON LO
CDU TEMP ALARM HI
CDU TEMP ALARM LO
CDU TEMP MON LO
PSA LEM TEMP ALARM HI
PSA LEM TEMP ALARM LO
PSA LEM TEMP MON LO
CGC/LGC TEMP ALARM HI
CGC/LGC TEMP ALARM LO
CGC/LGC TEMP MON LO
IMU TEMP MON HI
IMU TEMP MON LO
CGC/LGC TEMP MON HI
PSA LEM TEMP MON HI
CDU TEMP MON HI
PTA/PEA TEMP MON HI
LEM PSA
45J19-A22
IMU AUX. MODULE
2K
27.5VDC
LEM CDU
56P3-213
56P3-313
MODE MODULE
LEM PSA
45J19-H18
IMU AUX. MODULE
(28VDC IMU START)
13
10K 2%
4.9K 2%
4
PULSE TORQUE ASSY (PTA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
LGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
IMU
P21-13
2
TEMP ALARM MODULE
TPA NO. 2
652
653
42
41
45J19-G10
45J19-F10
LEM PSA
28VDC PWR SUPPLY MOD.
J14-7
THERMOSWITCHES NORMALLY CLOSED OPEN AT HIGH TEMP > 70°F

2900207 REV LTR 1 SH 3

1/2900207

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	RLP MEM
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISED PER TDRR 20491		8 JUL 65	RLP MEM
D		REVISED PER TDRR 21911		1 SEP 65	RLP
E		REVISED PER TDRR 22007		9 SEPT 65	RTP
F		REVISED PER TDRR 23763		12 NOV 65	RLP
G		REVISION STATUS CHANGED		24-NOV-65	JB. EF
H		REVISED PER TDRR 24059		29 NOV 65	RLP RWH
J		REVISION STATUS CHANGED		4 JAN 66	J. PAT W.L.
K		REVISION STATUS CHANGED		23 FEB 66	JAC

19254



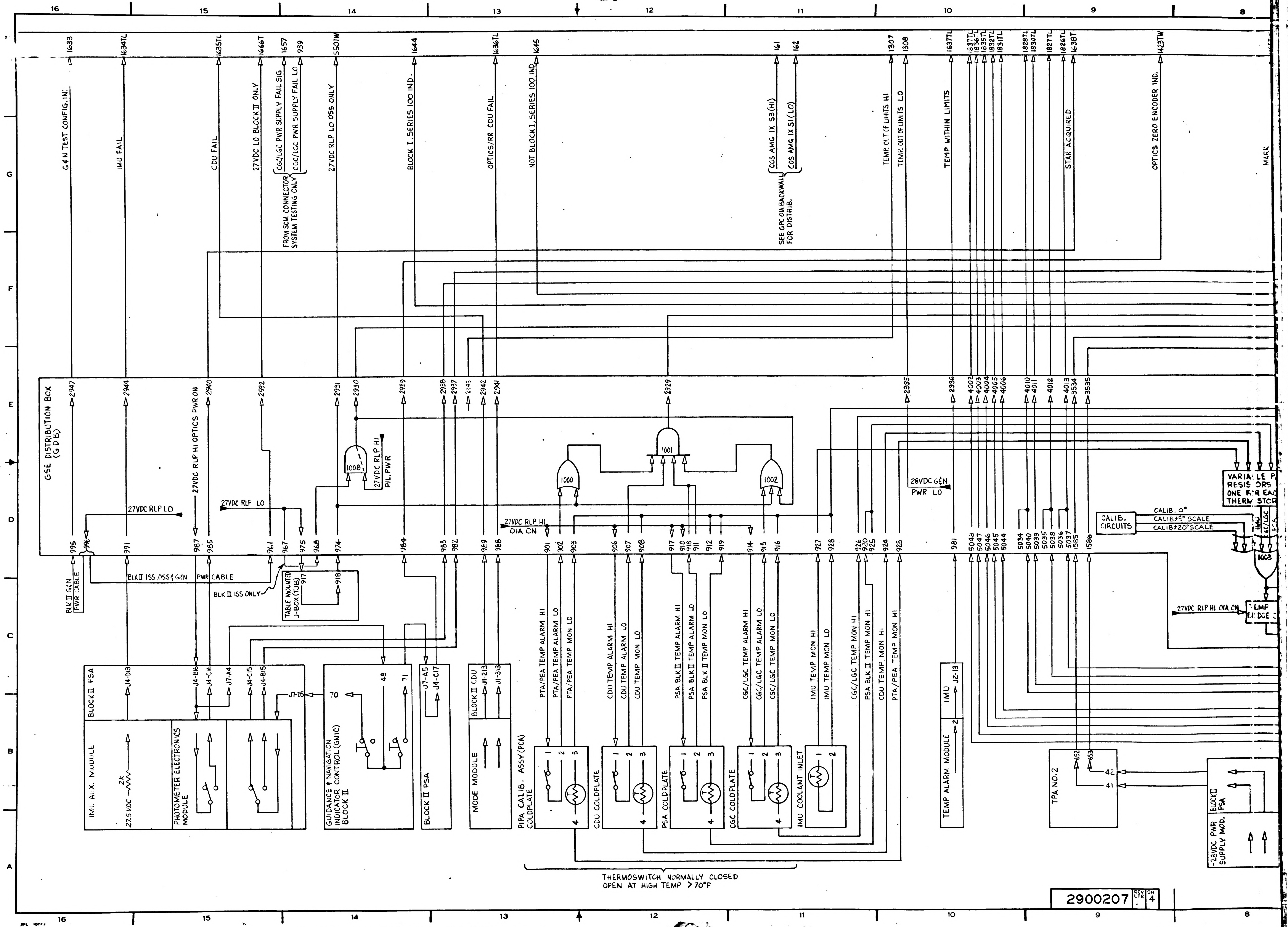
OIA BACKWALL
1086T
1087T
1423TW
1425TW
1424TW
537
1639TL
538
1579TL
1398
1745
536
1743
1744
1399
1397
192
194
275
276
587
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND
REMOTE TEMP ALARM COMMON
REMOTE PWR ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
800CPS,28V5% IMU WHEELS PH A
800CPS,28V,5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
0VDC IMU
27VDC RLP HI 1SS ONLY
4013
3534
3535
5036
5037
1585
1586
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
IMU
CGC/LGC
PSA
CDU
PTA/PCA
CALIB. 0°
CALIB.±5° SCALE
CALIB.±20° SCALE
CAL.E. CIRCUITS
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
10-0-10 MICRO-AMMETER
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
MAIN PANEL DSKY (DSKY SIGNALS ARE 27 VDC RLP HI SEE TES)
31
83
81
84
36
37
35
56
34
652
653
42
41
BLOCK II PSA
-28VDC PWR SUPPLY MOD.
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
1
2
3
5
6
8
10
11
23
6
5
10
6
5
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
4
7
9
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC ELECTRONICS DIVISION GENERAL MOTORS CORP. MILWAUKEE WIS.	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Sloane DATE 7 MAY 65 CHECKED APPROVAL APPROVAL	MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK II)
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99374 SIZE 2900207
CONTRACT	MIT APPROVAL	SCALE — SHEET 4 OF 4

2900207 REV LTR SH 4

2900207

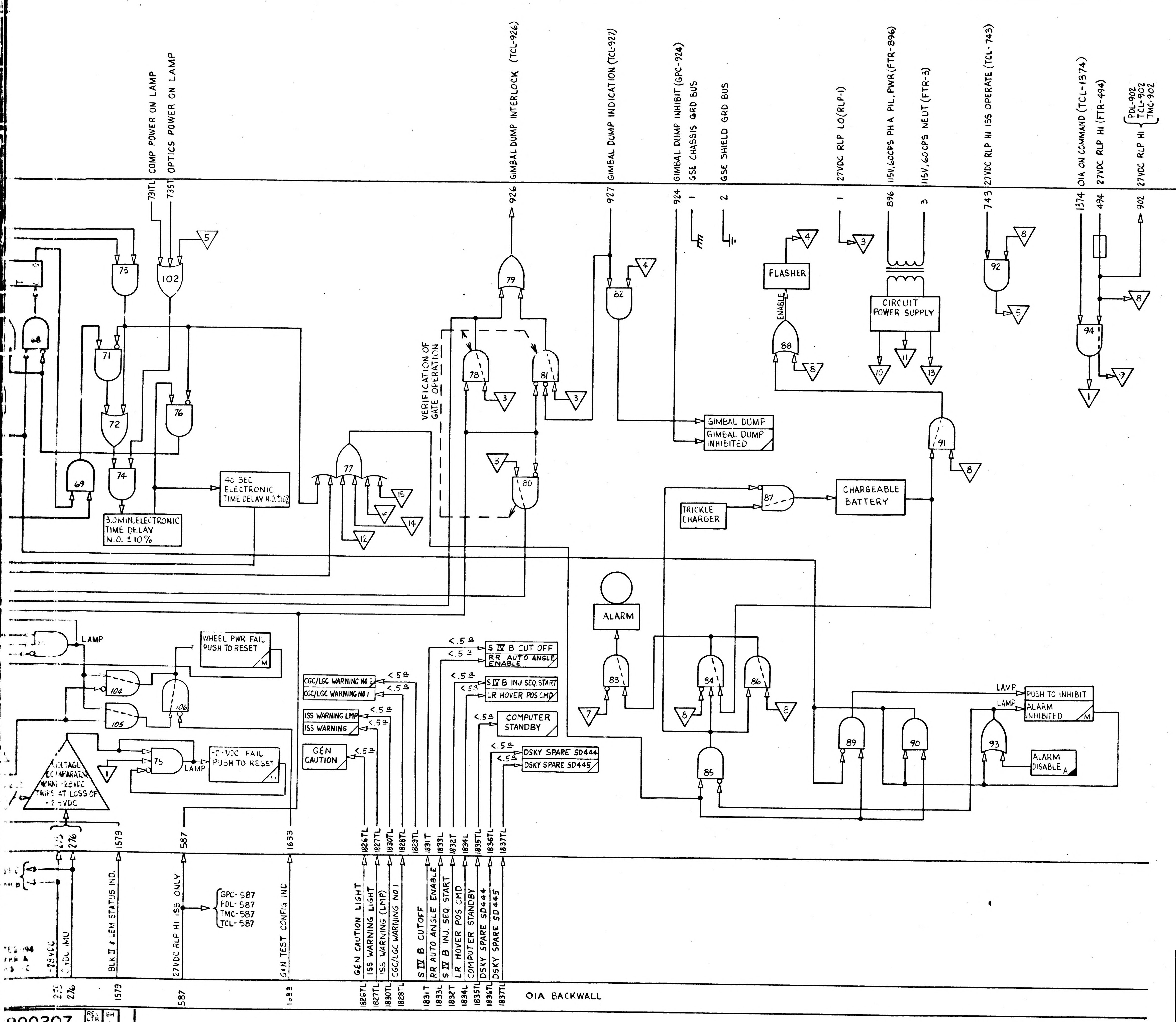
2/2900207


16
15
14
13
12
11
10
9
8
G
F
E
D
C
B
A
1633
1634TL
1635TL
1666T
1657
939
5501W
1644
1636TL
1645
161
162
1307
1308
1637TL
1833TL
1836TL
1835TL
1832TL
1831TL
1828TL
1830TL
1827TL
1826TL
1638T
1423TW
G & N TEST CONFIG. IN.
IMU FAIL
CDU FAIL
27VDC LO BLOCK II ONLY
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR SYSTEM TESTING ONLY
27VDC RLP LO OSS ONLY
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
SEE GPC 011 BACKWALL FOR DISTRIB.
TEMP OUT OF LIMITS HI
TEMP OUT OF LIMITS LO
TEMP WITHIN LIMITS
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
GSE DISTRIBUTION BOX (GDB)
2947
2944
27VDC RLP HI OPTICS PWR ON
2940
2932
2931
2930
2939
2938
2937
2943
2942
2941
2929
2935
2936
4002
4003
4004
4005
4006
4010
4011
4012
4013
3534
3535
1008
27VDC RLP HI PIL. PWR
1000
1001
1002
28VDC GSN PWR LO
27VDC RLP LO
27VDC RLP LO
27VDC RLP HI OIA ON
995
996
991
987
985
961
967
975
968
974
984
983
982
989
988
901
902
903
906
907
908
917
910
918
911
912
919
914
915
916
927
928
926
920
925
924
923
981
5046
5047
5046
5045
5044
5034
5040
5039
5035
5038
5036
5037
1585
1586
VARIABLE P RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB.±5° SCALE
CALIB.±20° SCALE
IMU
CGC/LGC
1003
27VDC RLP HI OIA ON
TEMP BRIDGE
BLK II G&N PWR CABLE
BLK II ISS, OSS & G&N PWR CABLE
BLK II ISS ONLY
TABLE MOUNTED J-BOX (TJB)
917
918
PTA/PEA TEMP ALARM HI
PTA/PEA TEMP ALARM LO
PTA/PEA TEMP MON LO
CDU TEMP ALARM HI
CDU TEMP ALARM LO
CDU TEMP MON LO
PSA BLK II TEMP ALARM HI
PSA BLK II TEMP ALARM LO
PSA BLK II TEMP MON LO
CGC/LGC TEMP ALARM HI
CGC/LGC TEMP ALARM LO
CGC/LGC TEMP MON LO
IMU TEMP MON HI
IMU TEMP MON LO
CGC/LGC TEMP MON HI
PSA BLK II TEMP MON HI
CDU TEMP MON HI
PTA/PEA TEMP MON HI
BLOCK II PSA
J4-D13
J4-B16
J4-C16
J7-A4
J4-C15
J4-B15
J7-D5
70
48
71
J7-A5
J4-C17
BLOCK II CDU
J1-213
J1-313
IMU
J2-13
IMU AUX. MODULE
2K
27.5 VDC
PHOTOMETER ELECTRONICS MODULE
GUIDANCE & NAVIGATION INDICATOR CONTROL (GNIC) BLOCK II
BLOCK II PSA
MODE MODULE
PIPA CALIB. ASSY (PCA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
CGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
TEMP ALARM MODULE
2
TPA NO. 2
652
653
42
41
BLOCK II PSA
-28VDC PWR SUPPLY MOD.
THERMOSWITCH NORMALLY CLOSED OPEN AT HIGH TEMP >70°F

2900207	REV LTR	SH 4

1/2900207

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	RLP
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISED PER TDRR 20491		8 JUL 65	RLP MEM
D		REVISED PER TDRR 21911		1 SEP 65	RLP
E		REVISED PER TDRR 22007		9 SEP 65	RTP
F		REVISED PER TDRR 23763		12 NOV 65	RLP
G		REVISED PER TDRR-24054		24 NOV 65	B
H		REVISED PER TDRR 24059		29 NOV 65	RLP RWH
J		REVISED PER TDRR 24924		4 JAN 66	J. PAT
K		REVISED PER TDRR 26333		[illegible]	JHC
L		REVISED PER TDRR 26344		25 FEB 66	JHP JAC



731TL COMP POWER ON LAMP
7351 OPTICS POWER ON LAMP
926 GIMBAL DUMP INTERLOCK (TCL-926)
927 GIMBAL DUMP INDICATION (TCL-927)
924 GIMBAL DUMP INHIBIT (GPC-924)
1 GSE CHASSIS GRD BUS
2 GSE SHIELD GRD BUS
1 27VDC RLP LO (RLP-1)
896 115V, 60CPS PH A PIL. PWR (FTR-896)
3 115V, 60CPS NEUT (FTR-3)
743 27VDC RLP HI ISS OPERATE (TCL-743)
1374 OIA ON COMMAND (TCL-1374)
494 27VDC RLP HI (FTR-494)
902 27VDC RLP HI PDL-902 TCL-902 TMC-902
73
102
71
72
76
69
74
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
104
105
106
75
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
40 SEC ELECTRONIC TIME DELAY N.O. ±10%
VERIFICATION OF GATE OPERATION
FLASHER
ENABLE
CIRCUIT POWER SUPPLY
GIMBAL DUMP
GIMBAL DUMP INHIBITED
TRICKLE CHARGER
CHARGEABLE BATTERY
ALARM
LAMP
WHEEL PWR FAIL PUSH TO RESET
M
VOLTAGE COMPARATOR NORM -28VDC TRIPS AT LOSS OF -2.5VDC
-28VDC FAIL PUSH TO RESET
CGC/LGC WARNING NO 2
CGC/LGC WARNING NO 1
ISS WARNING LMP
ISS WARNING
GEN CAUTION
S IV B CUT OFF
RR AUTO ANGLE ENABLE
S IV B INJ SEQ START
LR HOVER POS CMD
COMPUTER STANDBY
DSKY SPARE SD444
DSKY SPARE SD445
<.5 a
PUSH TO INHIBIT
ALARM INHIBITED
ALARM DISABLE
A
1
3
4
5
6
8
9
10
11
12
13
14
15
275 276 -28VDC
0 VDC IMU
1579 BLK II & LEM STATUS IND.
587 27VDC RLP HI ISS ONLY
GPC-587 PDL-587 TMC-587 TCL-587
1633 G&N TEST CONFIG IND
1826TL G&N CAUTION LIGHT
1827TL ISS WARNING LIGHT
1830TL ISS WARNING (LMP)
1828TL CGC/LGC WARNING NO 1
1829TL
1831T S IV B CUTOFF
1833L RR AUTO ANGLE ENABLE
1832T S IV B INJ. SEQ. START
1834L LR HOVER POS CMD
1835TL COMPUTER STANDBY
1836TL DSKY SPARE SD444
1837TL DSKY SPARE SD445
OIA BACKWALL
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.
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MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

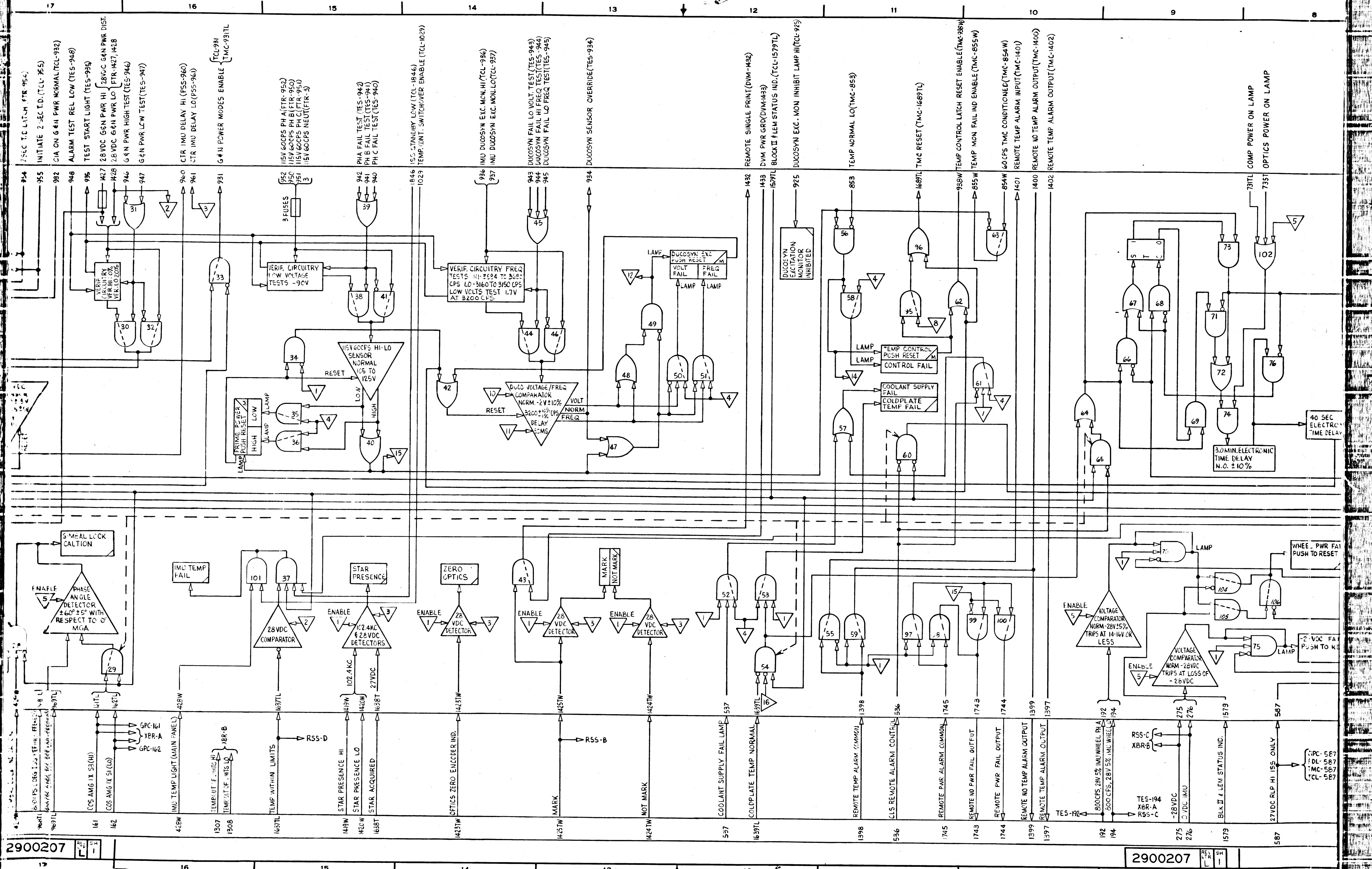
MECHANIZATION DIAGRAM
MONITOR PANEL
(BLOCK I SERIES 100, BLOCK II, LEM)

CODE IDENT NO 99974
SIZE J
2900207
SCALE —
SHEET 1 OF 4

2900207 L

900207 REV LTR L SH 1

372900207


17
16
15
14
13
12
11
10
9
8
954 2 SEC T.D. LATCH FTR 954
955 INITIATE 2 SEC T.D. (TCL-955)
932 C/A ON G&N PWR NORMAL (TCL-932)
948 ALARM TEST REL LOW (TES-948)
935 TEST START LIGHT (TES-935)
1427 28 VDC G&N PWR HI
1428 28 VDC G&N PWR LO
28VDC G&N PWR DIST. FTR-1427, 1428
946 G&N PWR HIGH TEST (TES-946)
947 G&N PWR LOW TEST (TES-947)
960 CTR IMU DELAY HI (PSS-960)
961 CTR IMU DELAY LO (PSS-961)
931 G&N POWER MODES ENABLE (TCL-931 TMC-931TL)
952 115V 60CPS PH A (FTR-952)
950 115V 60CPS PH B (FTR-950)
951 115V 60CPS PH C (FTR-951)
3 115V 60CPS NEUT (FTR-3)
942 PHA FAIL TEST (TES-942)
941 PH B FAIL TEST (TES-941)
940 PH C FAIL TEST (TES-940)
1846 ISS STANDBY LOW (TCL-1846)
1029 TEMP CONT. SWITCHOVER ENABLE (TCL-1029)
936 IMU DUCOSYN EXC. MON. HI (TCL-936)
937 IMU DUCOSYN EXC. MON. LO (TCL-937)
943 DUCOSYN FAIL LO VOLT TEST (TES-943)
944 DUCOSYN FAIL HI FREQ TEST (TES-944)
945 DUCOSYN FAIL LO FREQ TEST (TES-945)
934 DUCOSYN SENSOR OVERRIDE (TES-934)
1432 REMOTE SINGLE PRINT (DVM-1432)
1433 DVM PWR GRD (DVM-1433)
1579TL BLOCK II & LEM STATUS IND. (TCL-1579TL)
925 DUCOSYN EXC. MON INHIBIT LAMP HI (TCL-925)
853 TEMP NORMAL LO (TMC-853)
1689TL TMC RESET (TMC-1689TL)
938W TEMP CONTROL LATCH RESET ENABLE (TMC-938W)
855W TEMP MON FAIL IND ENABLE (TMC-855W)
854W 60 CPS TMC CONDITIONED (TMC-854W)
1401 REMOTE TEMP ALARM INPUT (TMC-1401)
1400 REMOTE NO TEMP ALARM OUTPUT (TMC-1400)
1402 REMOTE TEMP ALARM OUTPUT (TMC-1402)
73TL COMP POWER ON LAMP
73ST OPTICS POWER ON LAMP
3 FUSES
VERIF. CIRCUITRY HI 10% VER. LO 20%
VERIF. CIRCUITRY LOW VOLTAGE TESTS -90V
VERIF. CIRCUITRY FREQ TESTS HI-3584 TO 3680 CPS LO-3160 TO 3150 CPS LOW VOLTS TEST 1.7V AT 3200 CPS
115V 60CPS HI-LO SENSOR NORMAL 105 TO 125V
RESET
LOW
HIGH
PRIME POWER PUSH RESET
LAMP
DUCOSYN EXC PUSH RESET
VOLT FAIL
FREQ FAIL
DUCO VOLTAGE/FREQ COMPARATOR NORM. -2V ±10% 3200 ±10% CPS DELAY 6CMS
VOLT
NORM
FREQ
DUCOSYN EXCITATION MONITOR INHIBITED
TEMP CONTROL PUSH RESET
CONTROL FAIL
COOLANT SUPPLY FAIL
COLDPLATE TEMP FAIL
40 SEC ELECTRONIC TIME DELAY
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
S T C
GIMBAL LOCK CAUTION
ENABLE
PHASE ANGLE DETECTOR ±60° ±5° WITH RESPECT TO 0° MGA
IMU TEMP FAIL
28VDC COMPARATOR
STAR PRESENCE
102.4KC & 28VDC DETECTORS
102.4KC
27VDC
ZERO OPTICS
28 VDC DETECTOR
MARK
NOT MARK
VOLTAGE COMPARATOR NORM-28V ±5% TRIPS AT 14-16V OR LESS
VOLTAGE COMPARATOR NORM -28VDC TRIPS AT LOSS OF -28VDC
WHEEL PWR FAIL PUSH TO RESET
-28 VDC FAIL PUSH TO RESET
800CPS 28V 5% IMU WHEEL PH A
800 CPS 28V 5% IMU WHEEL
COS AMG 1X S3 (HI)
COS AMG 1X S1 (LO)
IMU TEMP LIGHT (MAIN PANEL)
TEMP OUT OF LIMITS HI
TEMP OUT OF LIMITS LO
TEMP WITHIN LIMITS
STAR PRESENCE HI
STAR PRESENCE LO
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
REMOTE TEMP ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE PWR ALARM COMMON
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
-28VDC
-28VDC IMU
BLK II & LEM STATUS IND.
27VDC RLP HI ISS ONLY
GPC-161
XBR-A
GPC-162
XBR-B
RSS-D
RSS-B
RSS-C
TES-192
TES-194
GPC-587
FDL-587
TMC-587
TCL-587

2900207 REV LTR L SH 1

2900207 REV LTR L SH 1

2/2900207

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS:

2900210	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RLP RELAY & LAMP POWER SUPPLY
2900204	TEMPERATURE MONITOR CONTROL PANEL (BLOCK I, SERIES 100)(TMC)
2900203	TEMPERATURE MONITOR CONTROL PANEL (BLOCK II & LEM)(TMC)
2900208	POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL)
2900223	GIMBAL POSITION CONTROL (GPC)
2900202	TEST CONTROL PANEL (BLOCK I, SERIES 100)(TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM)(TCL)
2900206	TEST SELECTOR PANEL (TES)
2900200	GYRO CAGING PANEL (BLOCK II & LEM)(GCP)
2900218	OSCILLOGRAPH SIGNAL SELECTION RSS-B TO FIXED DC CHANNEL, RSS-C TO SWITCHABLE AC CHANNEL, RSS-D TO SWITCHABLE DC CHANNEL
2900217	SIGNAL SELECTION & MEASUREMENT XBR-A CROSSBAR-AC SIGNALS XBR-B CROSSBAR-DC SIGNALS
2900219	COUNTER SIGNAL SELECTION PRIMARY SIGNAL SELECTOR (PSS)
2900214	GSE GROUNDING (BLOCK I SERIES 100)
2900213	GSE GROUNDING (BLOCK II & LEM)
2900209	COMPUTER SIMULATOR INTERFACE (CMS)
2900211	AUXILIARY INPUT/OUTPUT CALIBRATION (AIP)

4. NON STANDARD SYMBOLOGY:

	INDICATES "AND" GATE WITH SWITCHED SIGNAL
NAME	INDICATES INDICATOR LIGHT
NAME M	INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
NAME NAME	INDICATES SPLIT SCREEN INDICATOR LIGHT
NAME NAME M	INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES UNLIGHTED PUSHBUTTON OR TOGGLE SWITCH (ALTERNATE ACTION)

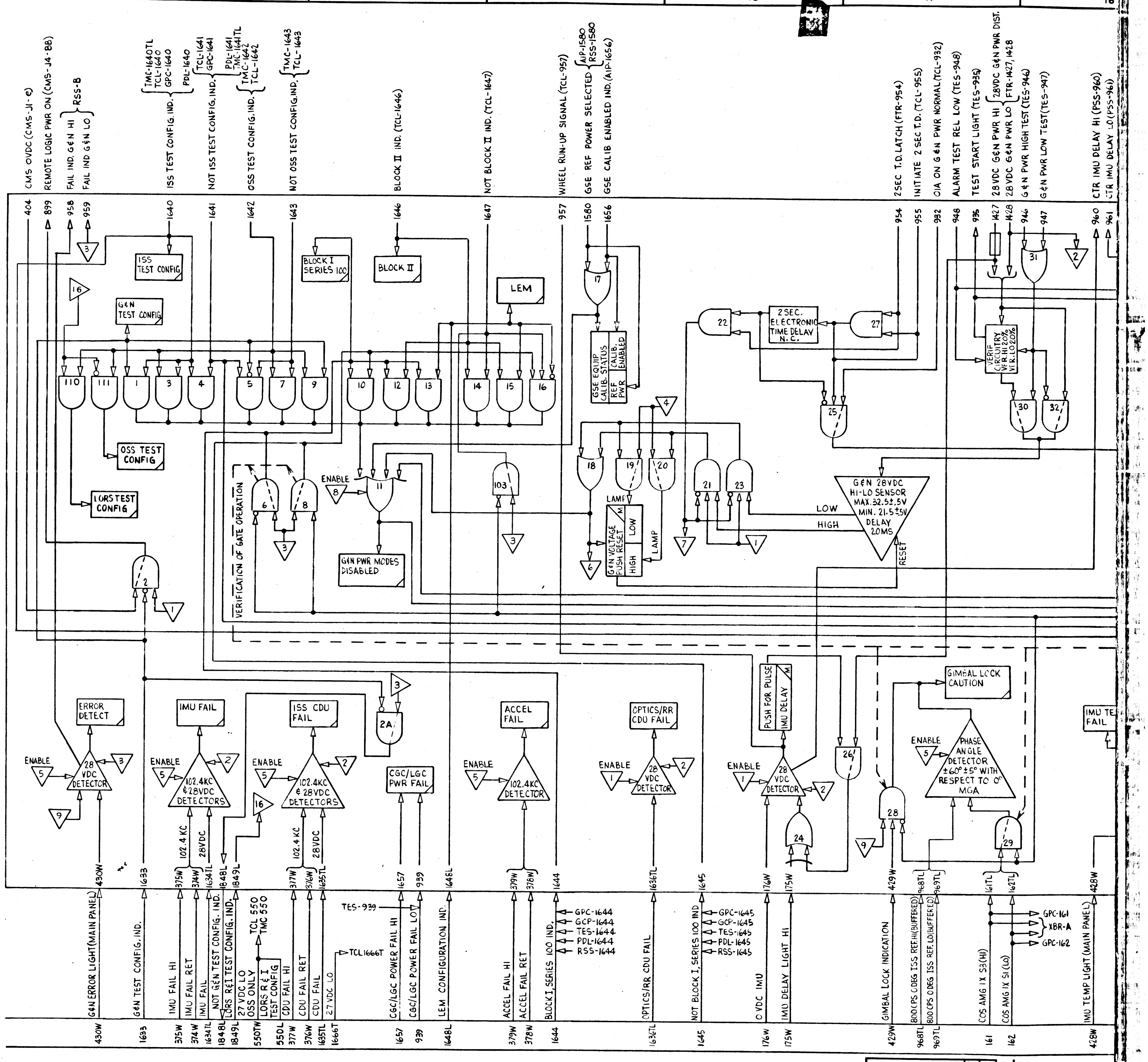
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   - A. W-BLOCK I SERIES 100 ONLY
   - B. T-BLOCK II ONLY
   - C. L-LEM ONLY
   - D. BLANK - ALL G&N CONFIGURATIONS
   - E. TW, TL OR WL - USED IN MORE THAN ONE G&N CONFIGURATION AS SHOWN.

6. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK I SERIES 100	SH 1 SH 2
BLOCK II	SH 1 SH 3
LEM	SH 1 SH 4

7. SIGNAL REFERENCE:

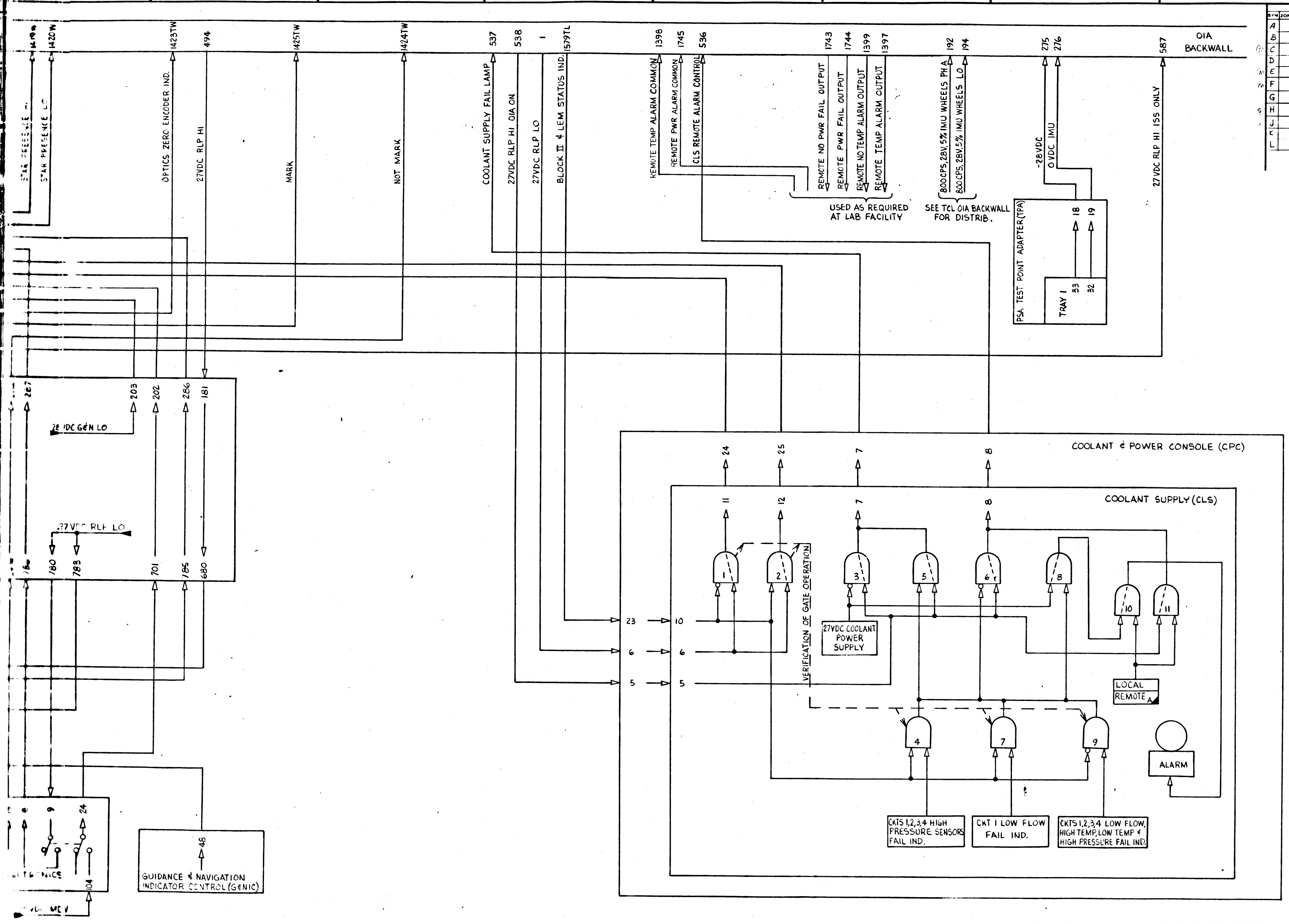
1 = OIA ON	11 = -28VDC
2 = 28VDC G&N PWR LO	12 = DUCO EXC. FAIL
3 = 27 VDC RLP LO	13 = +45 VDC
4 = FLASHER	14 = TMC FAIL
5 = ISS OPER. 5SEC T.D.	15 = PRIME PWR FAIL
6 = G&N PWR FAIL	16 = LORS R&I TEST CONFIG.
7 = 2 SEC T.D. AT OIA ON	
8 = 27VDC PIL. PWR	
9 = 27VDC OIA ON	
10 = +28VDC	


CMS OVDC (CMS-J1-e) 404
REMOTE LOGIC PWR ON (CMS-J4-BB) 899
FAIL IND. G&N HI 958
FAIL IND G&N LO 959
RSS-B
ISS TEST CONFIG. IND. 1640
TMC-1640TL
TCL-1640
GPC-1640
PDL-1640
NOT ISS TEST CONFIG. IND. 1641
TCL-1641
GPC-1641
PDL-1641
TMC-1641TL
OSS TEST CONFIG. IND. 1642
TMC-1642
TCL-1642
NOT OSS TEST CONFIG. IND. 1643
TMC-1643
TCL-1643
BLOCK II IND. (TCL-1646) 1646
NOT BLOCK II IND. (TCL-1647) 1647
WHEEL RUN-UP SIGNAL (TCL-957) 957
GSE REF POWER SELECTED 1580
AIP-1580
RSS-1580
GSE CALIB ENABLED IND. (AIP-1656) 1656
2SEC T.D. LATCH (FTR-954) 954
INITIATE 2 SEC T.D. (TCL-955) 955
OIA ON G&N PWR NORMAL (TCL-932) 932
ALARM TEST REL LOW (TES-948) 948
TEST START LIGHT (TES-935) 935
28VDC G&N PWR HI 1427
28VDC G&N PWR LO 1428
28VDC G&N PWR DIST.
FTR-1427, 1428
G&N PWR HIGH TEST (TES-946) 946
G&N PWR LOW TEST (TES-947) 947
CTR IMU DELAY HI (PSS-960) 960
CTR IMU DELAY LO (PSS-961) 961
ISS TEST CONFIG
BLOCK I SERIES 100
BLOCK II
LEM
G&N TEST CONFIG
OSS TEST CONFIG
LORS TEST CONFIG
VERIFICATION OF GATE OPERATION
ENABLE
G&N PWR MODES DISABLED
GSE EQUIP CALIB. STATUS
REF PWR
CALIB. ENABLED
LAMP
G&N VOLTAGE PUSH RESET
LOW
HIGH
M
2SEC. ELECTRONIC TIME DELAY N.C.
VERIF CIRCUITRY VFR HI 20% VFR LO 20%
G&N 28VDC HI-LO SENSOR MAX. 32.5±.5V MIN. 21.5±.5V DELAY 20MS
RESET
110
111
1
2
2A
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
103
ERROR DETECT
IMU FAIL
ISS CDU FAIL
CGC/LGC PWR FAIL
ACCEL FAIL
OPTICS/RR CDU FAIL
PUSH FOR PULSE
IMU DELAY
GIMBAL LOCK CAUTION
IMU TEMP FAIL
28 VDC DETECTOR
102.4KC & 28VDC DETECTORS
102.4KC DETECTOR
PHASE ANGLE DETECTOR ±60°±5° WITH RESPECT TO 0° MGA
102.4 KC
28VDC
G&N ERROR LIGHT (MAIN PANEL) 430W
G&N TEST CONFIG. IND. 1633
IMU FAIL HI 375W
IMU FAIL RET 374W
IMU FAIL 1634TL
NOT G&N TEST CONFIG. IND. 1848L
LORS R&I TEST CONFIG. IND. 1849L
27 VDC LO OSS ONLY 550TW
TCL 550
TMC 550
LORS R&I TEST CONFIG 550L
CDU FAIL HI 377W
CDU FAIL RET 376W
CDU FAIL 1635TL
27 VDC LO 1666T
TCL1666T
TES-939
CGC/LGC POWER FAIL HI 1657
CGC/LGC POWER FAIL LO 939
LEM CONFIGURATION IND. 1648L
ACCEL FAIL HI 379W
ACCEL FAIL RET 378W
BLOCK I, SERIES 100 IND. 1644
GPC-1644
GCP-1644
TES-1644
PDL-1644
RSS-1644
OPTICS/RR CDU FAIL 1636TL
NOT BLOCK I, SERIES 100 IND 1645
GPC-1645
GCP-1645
TES-1645
PDL-1645
RSS-1645
0 VDC IMU 176W
IMU DELAY LIGHT HI 175W
GIMBAL LOCK INDICATION 429W
800CPS 0DEG ISS REF. HI (BUFFERED) 968TL
800CPS 0DEG ISS REF. LO (BUFFERED) 969TL
COS AMG IX S3 (HI) 161
COS AMG IX S1 (LO) 162
GPC-161
XBR-A
GPC-162
IMU TEMP LIGHT (MAIN PANEL) 428W

2900207 REV LTR L SH 1

MIL FORM 1050 J3

172900207


9
8
7
6
5
4
3
2
1
1419W
1420W
STAR PRESENCE HI
STAR PRESENCE LO
1423TW
OPTICS ZERO ENCODER IND.
494
27VDC RLP HI
1425TW
MARK
1424TW
NOT MARK
537
COOLANT SUPPLY FAIL LAMP
538
27VDC RLP HI OIA ON
27VDC RLP LO
1579TL
BLOCK II & LEM STATUS IND.
1398
REMOTE TEMP ALARM COMMON
1745
REMOTE PWR ALARM COMMON
536
CLS REMOTE ALARM CONTROL
1743
REMOTE NO PWR FAIL OUTPUT
1744
REMOTE PWR FAIL OUTPUT
1399
REMOTE NO TEMP ALARM OUTPUT
1397
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
192
800CPS, 28V, 5% IMU WHEELS PH A
194
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
275
-28VDC
276
0 VDC IMU
587
27VDC RLP HI ISS ONLY
OIA BACKWALL
PSA TEST POINT ADAPTER (TPA)
18
19
TRAY I
33
32
287
203
202
286
181
28 VDC GEN LO
27VDC RLP LO
180
783
701
785
680
COOLANT & POWER CONSOLE (CPC)
COOLANT SUPPLY (CLS)
24
25
7
8
11
12
1
2
3
5
6
8
10
11
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
23
10
6
5
LOCAL
REMOTE
4
7
9
ALARM
CKTS 1,2,3,4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL IND.
CKTS 1,2,3,4 LOW FLOW, HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND.
24
104
GENICS
GUIDANCE & NAVIGATION INDICATOR CONTROL (GENIC)
48
H
G
F
E
D
C
B
A

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISION STATUS CHANGED		8 JUL 65	RLP
D		REVISION STATUS CHANGED		1 SEP 65	RLP
E		REVISION STATUS CHANGED		9 SEPT 65	RTP
F		REVISED PER TDRR 23763		12 NOV 65	RLP
G		REVISION STATUS CHANGED		24 NOV 65	B.
H		REVISION STATUS CHANGED		29 NOV 65	RLP RWH
J		REVISION STATUS CHANGED		4 JAN 66	PAT
K		REVISION STATUS CHANGED		66	JAC
L		REVISION STATUS CHANGED		25 FEB 66	JNP JAC

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT

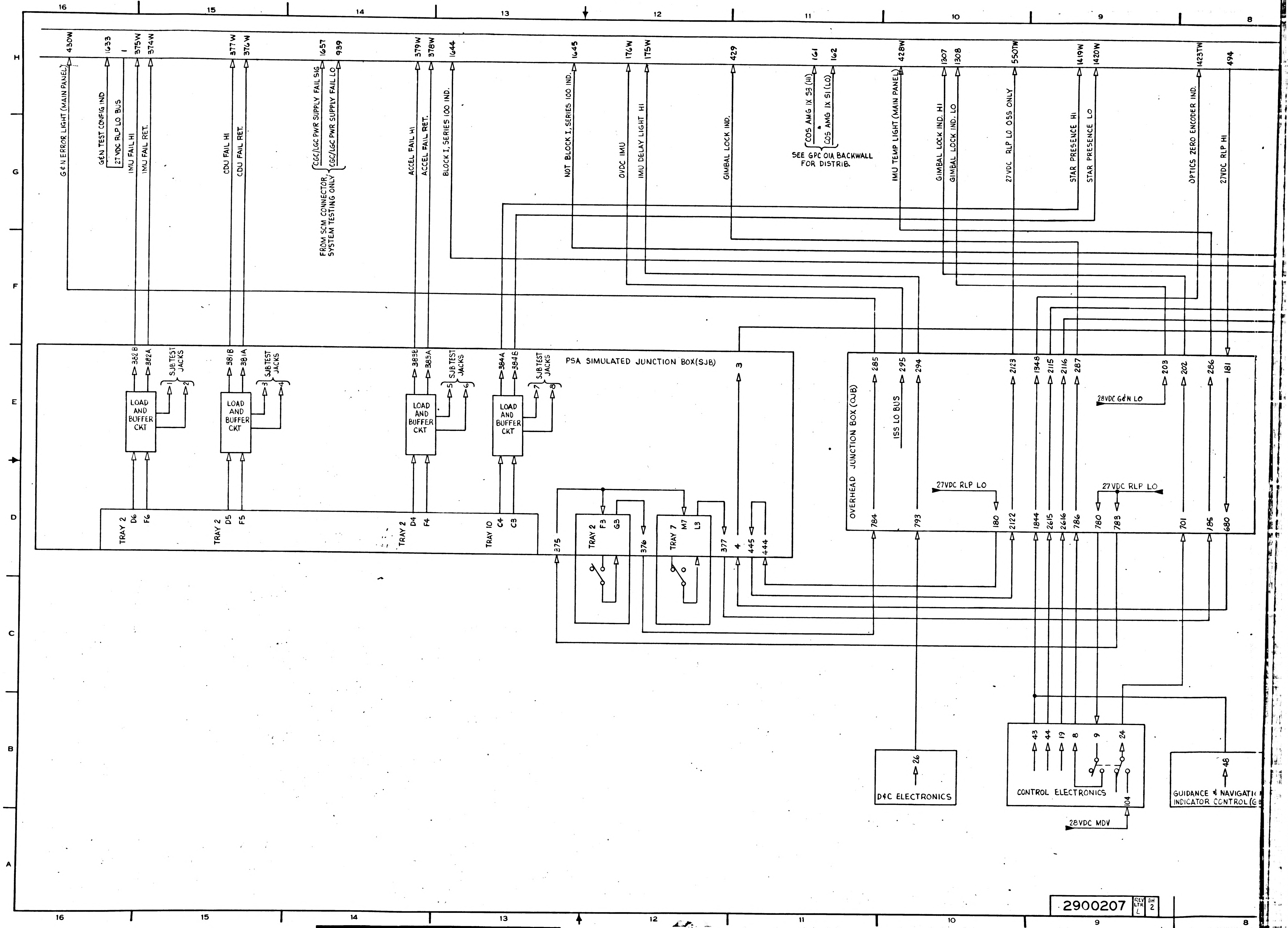
AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN DATE 7 MAY 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
MONITOR PANEL
(BLOCK I SERIES 100)

CODE IDENT NO 99974
SIZE
2900207
SCALE —
SHEET 2 OF 4

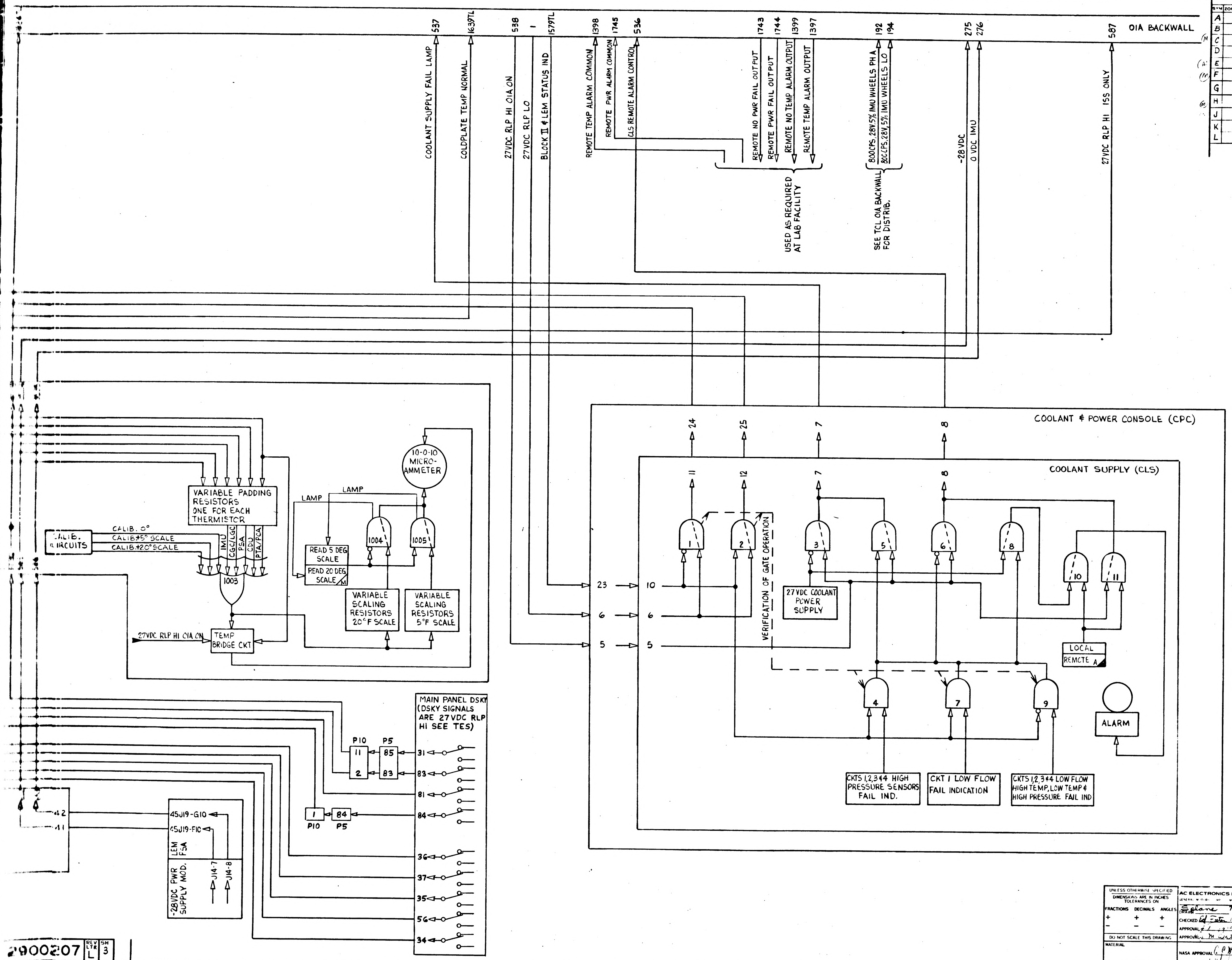
2900207 L


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
430W
1633
375W
374W
377W
376W
1657
939
379W
378W
1644
1645
176W
175W
429
161
162
428W
1307
1308
550TW
1419W
1420W
1423TW
494
G&N ERROR LIGHT (MAIN PANEL)
G&N TEST CONFIG IND
27 VDC RLP LO BUS
IMU FAIL HI
IMU FAIL RET.
CDU FAIL HI
CDU FAIL RET.
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR, SYSTEM TESTING ONLY
ACCEL FAIL HI
ACCEL FAIL RET.
BLOCK I, SERIES 100 IND.
NOT BLOCK I, SERIES 100 IND.
OVDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK IND.
COS AMG IX 53 (HI)
COS AMG IX 51 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
IMU TEMP LIGHT (MAIN PANEL)
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
27VDC RLP LO OSS ONLY
STAR PRESENCE HI
STAR PRESENCE LO
OPTICS ZERO ENCODER IND.
27VDC RLP HI
PSA SIMULATED JUNCTION BOX (SJB)
382B
382A
SJB TEST JACKS
1
2
LOAD AND BUFFER CKT
381B
381A
3
4
383B
383A
5
6
384A
384B
7
8
TRAY 2 D6 F6
TRAY 2 D5 F5
TRAY 2 D4 F4
TRAY 10 C4 C3
375
TRAY 2 F3 G3
376
TRAY 7 M7 L3
377
3
4
445
444
OVERHEAD JUNCTION BOX (OJB)
285
295
294
2123
1348
2115
2116
287
203
202
286
181
ISS LO BUS
28VDC G&N LO
27VDC RLP LO
784
793
180
2122
1844
2615
2616
786
780
783
701
185
680
26
D&C ELECTRONICS
43
44
19
8
9
24
104
CONTROL ELECTRONICS
28VDC MDV
48
GUIDANCE & NAVIGATI
INDICATOR CONTROL (G

2900207	REV LTR L	SH 2

1/2900207

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
REVISIONS 19254					
A		REVISED PER TDRR 20487		2 JUL 65	RLP MLM
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISED PER TDRR 20491		8 JUL 65	RLP MEM
D		REVISED PER TDRR 21911		1 SEP 65	RLP
E		REVISED PER TDRR 22007		9 SEPT 65	PTP JAL
F		REVISED PER TDRR 23763		12 NOV 65	RLP
G		REVISION STATUS CHANGED		24-NOV-65	B. ET
H		REVISED PER TDRR 24059		29 NOV 65	RLP RWH
J		REVISION STATUS CHANGED		4 JAN 66	J PAT
K		REVISION STATUS CHANGED		[illegible]	JAC
L		REVISED PER TDRR 26344		25 FEB 66	HP JAC


OIA BACKWALL
537
1639TL
538
1
1579TL
1398
1745
536
1743
1744
1399
1397
192
194
275
276
587
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND
REMOTE TEMP ALARM COMMON
REMOTE PWR ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
800CPS, 28V, 5% IMU WHEELS PH A
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
0 VDC IMU
27VDC RLP HI ISS ONLY
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB. ±5° SCALE
CALIB. ±20° SCALE
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
10-0-10 MICRO-AMMETER
LAMP
LAMP
READ 5 DEG SCALE
READ 20 DEG SCALE
M
1004
1005
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
MAIN PANEL DSKY (DSKY SIGNALS ARE 27VDC RLP HI SEE TES)
P10
P5
11
2
85
83
1
84
P10
P5
31
83
81
84
36
37
35
56
34
42
41
45J19-G10
45J19-F10
LEM FSA
-28VDC PWR SUPPLY MOD.
J14-7
J14-8
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
1
2
3
5
6
8
10
11
4
7
9
VERIFICATION OF GATE OPERATION
23
6
5
10
6
5
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
ALARM
CKTS 1,2,3&4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3&4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

2900207 REV LTR L SH 3

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

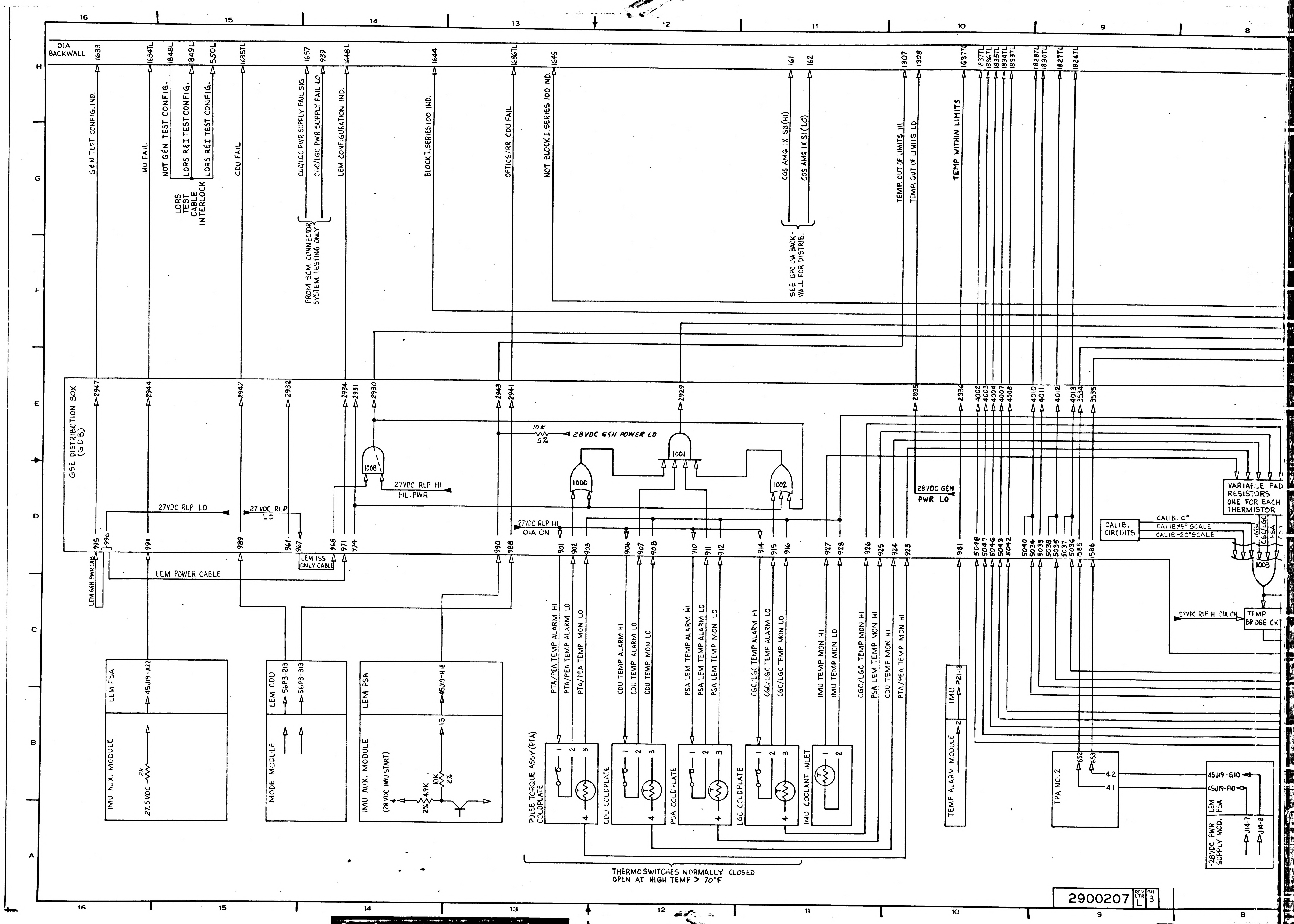
AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.
DRAWN Splane DATE 7 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL M Watson
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

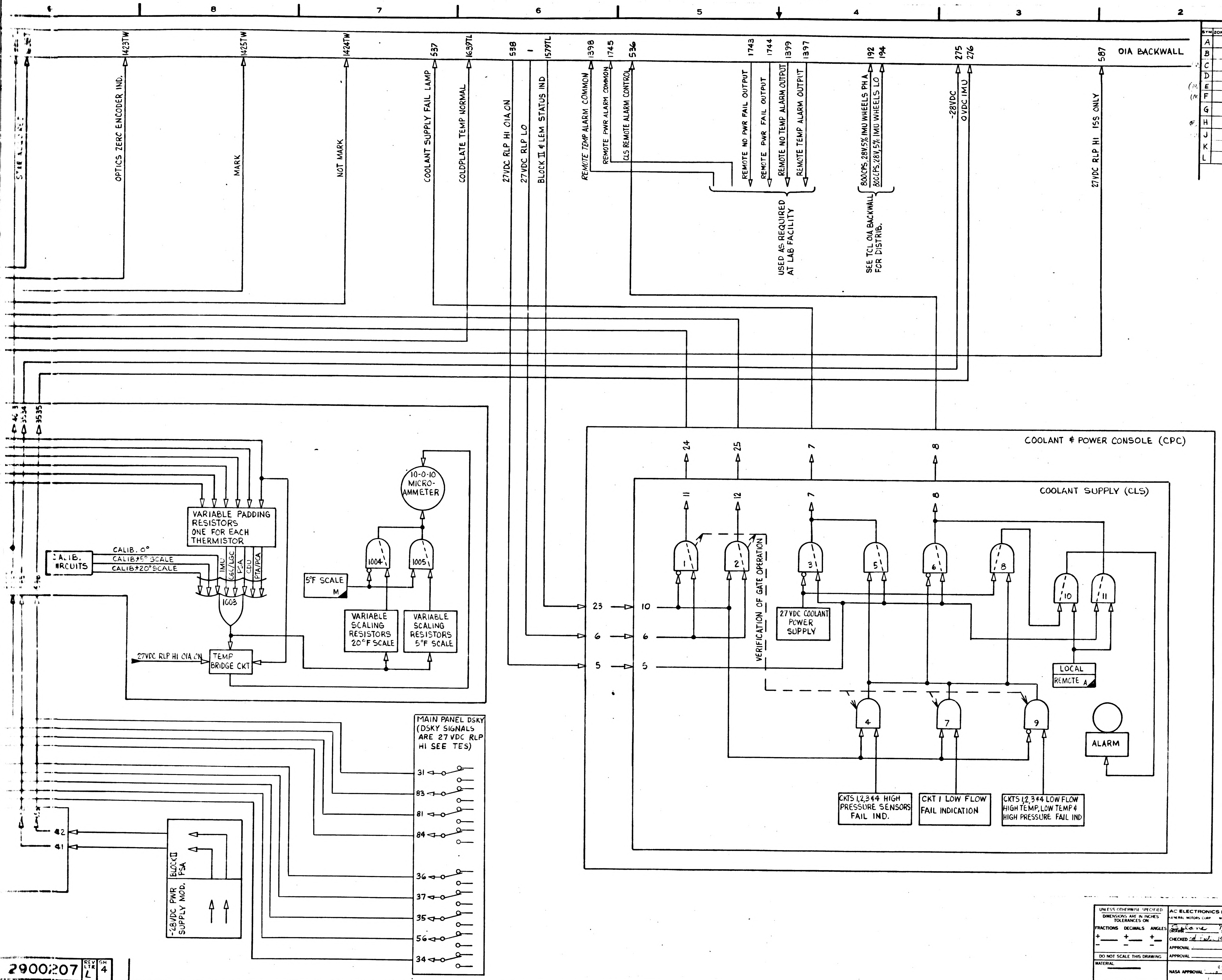
MECHANIZATION DIAGRAM
MONITOR PANEL
(LEM)

CODE IDENT NO	SIZE	
99974	J	2900207
SCALE		SHEET 3 OF 4

2/2900207


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1633
1634TL
1848L
1849L
550L
1635TL
1657
939
1648L
1644
1636TL
1645
161
162
1307
1308
1637TL
1837TL
1836TL
1835TL
1834TL
1833TL
1828TL
1830TL
1827TL
1826TL
G&N TEST CONFIG. IND.
IMU FAIL
NOT G&N TEST CONFIG.
LORS R&I TEST CONFIG.
LORS R&I TEST CONFIG.
LORS TEST CABLE INTERLOCK
CDU FAIL
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR SYSTEM TESTING ONLY
LEM CONFIGURATION IND.
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
TEMP. OUT OF LIMITS HI
TEMP. OUT OF LIMITS LO
TEMP WITHIN LIMITS
GSE DISTRIBUTION BOX (GDB)
2947
2944
2942
2932
2934
2931
2930
2943
2941
2929
2935
2936
4002
4003
4004
4007
4008
4010
4011
4012
4013
3534
3535
10K 5%
28VDC G&N POWER LO
1008
1000
1001
1002
27VDC RLP HI
PIL. PWR
27VDC RLP LO
27 VDC RLP LO
27VDC RLP HI
OIA ON
28VDC GEN PWR LO
VARIABLE PAD RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB.+5° SCALE
CALIB.+20° SCALE
IMU
CGC/LGC
PSA
CDU
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
995
996
991
989
961
967
968
971
974
990
988
901
902
903
906
907
908
910
911
912
914
915
916
927
928
926
925
924
923
981
5048
5047
5046
5043
5042
5040
5034
5039
5038
5035
5037
5036
1585
1586
LEM GEN PWR CAB
LEM POWER CABLE
LEM ISS ONLY CABLE
PTA/PEA TEMP ALARM HI
PTA/PEA TEMP ALARM LO
PTA/PEA TEMP MON LO
CDU TEMP ALARM HI
CDU TEMP ALARM LO
CDU TEMP MON LO
PSA LEM TEMP ALARM HI
PSA LEM TEMP ALARM LO
PSA LEM TEMP MON LO
CGC/LGC TEMP ALARM HI
CGC/LGC TEMP ALARM LO
CGC/LGC TEMP MON LO
IMU TEMP MON HI
IMU TEMP MON LO
CGC/LGC TEMP MON HI
PSA LEM TEMP MON HI
CDU TEMP MON HI
PTA/PEA TEMP MON HI
LEM PSA
45J19-A22
IMU AUX. MODULE
2K
27.5 VDC
LEM CDU
56P3-213
56P3-313
MODE MODULE
LEM PSA
45J19-H18
13
IMU AUX. MODULE
(28 VDC IMU START)
10K 2%
4.9K 2%
4
PULSE TORQUE ASSY (PTA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
LGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
IMU
P21-13
2
TEMP ALARM MODULE
TPA NO. 2
652
653
42
41
45J19-G10
45J19-F10
LEM PSA
J14-7
J14-8
-28VDC PWR SUPPLY MOD.
THERMOSWITCHES NORMALLY CLOSED OPEN AT HIGH TEMP > 70°F
2900207
REV LTR L
SH 3

1729002 07


OIA BACKWALL
1423TW
1425TW
1424TW
537
1639TL
538
1579TL
1398
1745
536
1743
1744
1399
1397
192
194
275
276
587
OPTICS ZERO ENCODER IND.
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND
REMOTE TEMP ALARM COMMON
REMOTE PWR ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
800CPS, 28V 5% IMU WHEELS PH A
800CPS, 28V 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
OVDC IMU
27VDC RLP HI ISS ONLY
3533
3534
3535
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CAL IB. CIRCUITS
CALIB. 0°
CALIB + 5° SCALE
CALIB + 20° SCALE
IMU
LGC/LGC
PSA
CDU
PTA/PEA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
10-0-10 MICRO-AMMETER
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
MAIN PANEL DSKY (DSKY SIGNALS ARE 27 VDC RLP HI SEE TES)
31
83
81
84
36
37
35
56
34
42
41
BLOCK II PSA
-28VDC PWR SUPPLY MOD.
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
23
10
6
5
1
2
3
4
9
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
ALARM
CKTS 1,2,3&4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3&4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

REVISIONS					19259
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	RLP mem
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISED PER TDRR 20491		8 JUL 65	RLP mem
D		REVISED PER TDRR 21911		1 SEP 65	RLP
E		REVISED PER TDRR 22007		9 SEPT 65	RTP
F		REVISED PER TDRR 23763		12 NOV 65	RLP
G		REVISION STATUS CHANGED		24-NOV-65	B. E
H		REVISED PER TDRR 24059		29 NOV 65	RLP RWH
J		REVISION STATUS CHANGED		4 JAN 66	J. PAT
K		REVISION STATUS CHANGED		23 FEB 66	JAC
L		REVISION STATUS CHANGED		25 FEB 66	J.H.P. JAC

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN Splane DATE 7 MAY 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

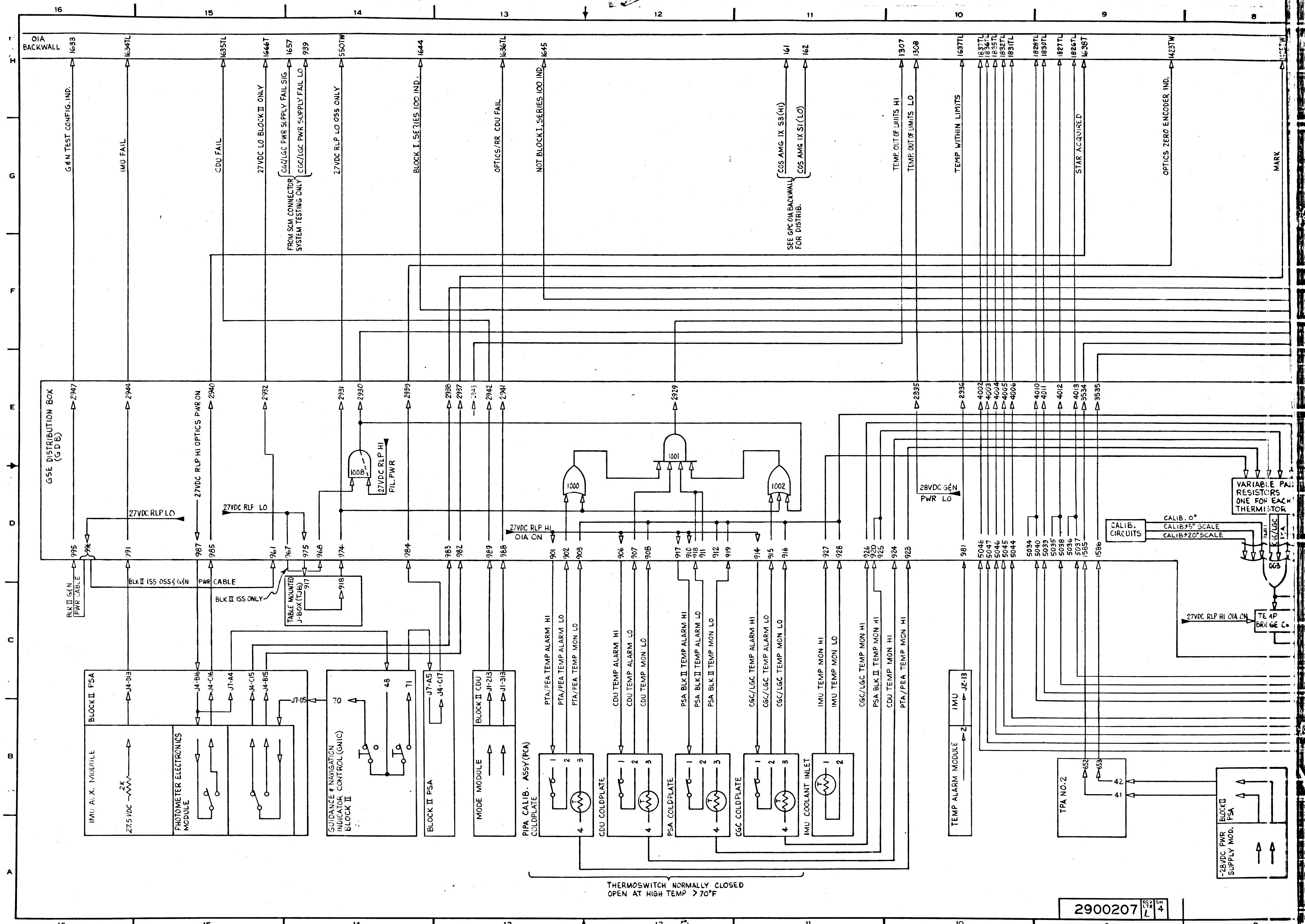
MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK II)

CODE IDENT NO 99374
SIZE J_2
2900207
SCALE
SHEET 4 OF 4

2900207 REV LTR L SH 4

2900207 L

27 2900207


OIA BACKWALL
1633
1634TL
1635TL
1666T
1657
939
550TW
1644
1636TL
1645
161
162
1307
1308
1637TL
1837TL
1836TL
1835TL
1832TL
1831TL
1828TL
1830TL
1827TL
1826TL
1638T
1423TW
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
27VDC LO BLOCK II ONLY
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR SYSTEM TESTING ONLY
27VDC RLP LO 055 ONLY
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
TEMP. OUT OF LIMITS HI
TEMP. OUT OF LIMITS LO
TEMP WITHIN LIMITS
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
GSE DISTRIBUTION BOX (GDB)
2947
2944
2940
2932
2931
2930
2939
2938
2937
2943
2942
2941
2929
2935
2936
4002
4003
4004
4005
4006
4010
4011
4012
4013
3534
3535
27VDC RLP HI OPTICS PWR ON
27VDC RLP HI FIL. PWR
1008
1000
1001
1002
27VDC RLP LO
27VDC RLF LO
27VDC RLP HI OIA ON
28VDC GEN PWR LO
VARIABLE PA RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB.±5° SCALE
CALIB.±20° SCALE
CGC/LGC
PSA
003
27VDC RLP HI OIA ON
TEMP BRIDGE C
995
994
991
987
985
961
767
975
968
974
984
983
982
989
988
901
902
903
906
907
908
917
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912
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925
920
924
923
981
5048
5047
5046
5045
5044
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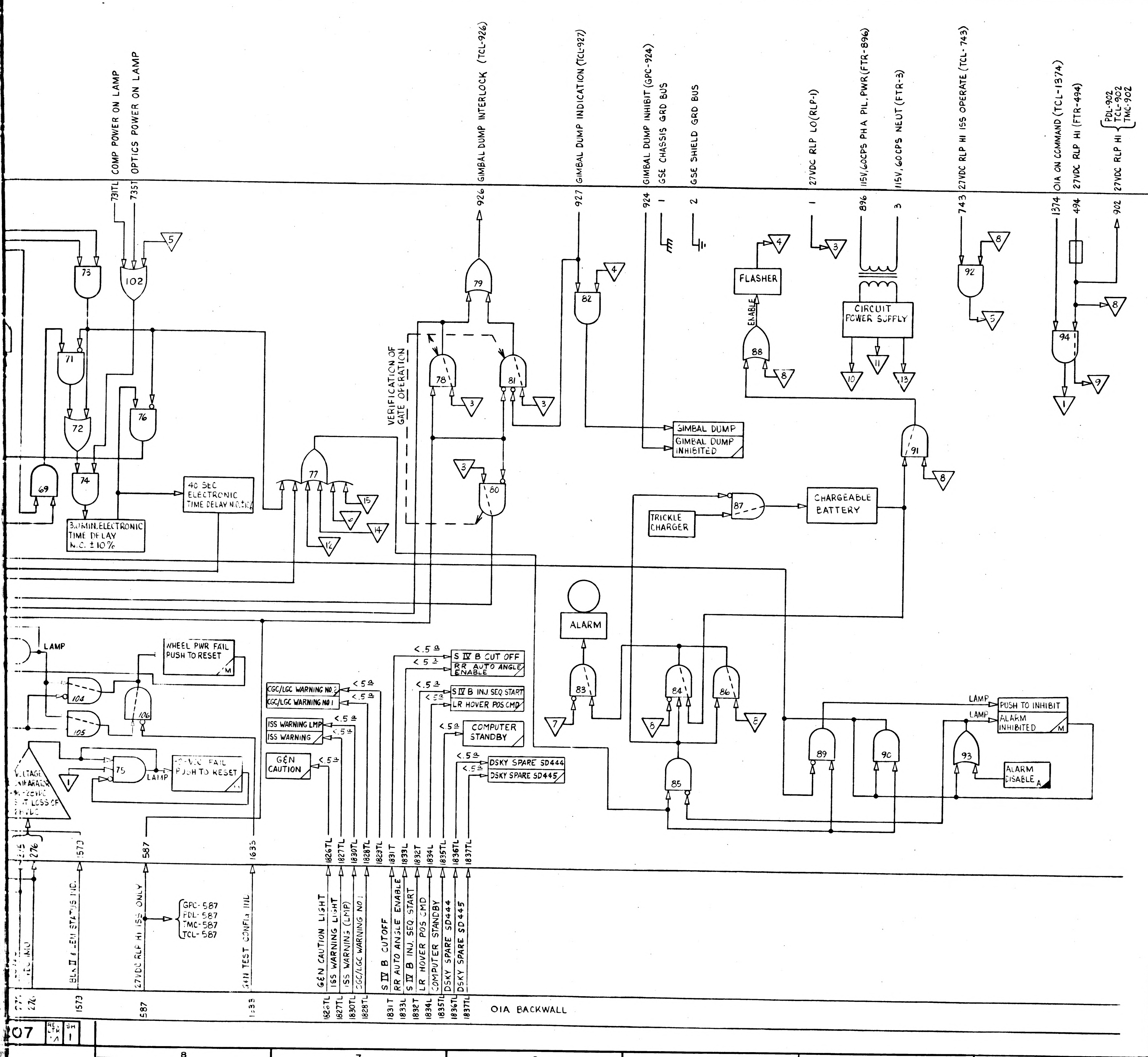
5040
5039
5035
5038
5036
5037
1585
1586
BLK II G&N PWR CABLE
BLK II ISS OSS & G&N PWR CABLE
BLK II ISS ONLY
TABLE MOUNTED J-BOX (TJB)
917
918
BLOCK II PSA
J4-D13
J4-B16
J4-C16
J7-A4
J4-C15
J4-B15
J7-D5
IMU AUX. MODULE
2K
27.5 VDC
PHOTOMETER ELECTRONICS MODULE
70
48
71
GUIDANCE & NAVIGATION INDICATOR CONTROL (GNIC) BLOCK II
J7-A5
J4-C17
BLOCK II PSA
BLOCK II CDU
J1-213
J1-313
MODE MODULE
PTA/PEA TEMP ALARM HI
PTA/PEA TEMP ALARM LO
PTA/PEA TEMP MON LO
CDU TEMP ALARM HI
CDU TEMP ALARM LO
CDU TEMP MON LO
PSA BLK II TEMP ALARM HI
PSA BLK II TEMP ALARM LO
PSA BLK II TEMP MON LO
CGC/LGC TEMP ALARM HI
CGC/LGC TEMP ALARM LO
CGC/LGC TEMP MON LO
IMU TEMP MON HI
IMU TEMP MON LO
CGC/LGC TEMP MON HI
PSA BLK II TEMP MON HI
CDU TEMP MON HI
PTA/PEA TEMP MON HI
PIPA CALIB. ASSY (PCA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
CGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
IMU
J2-13
TEMP ALARM MODULE
TPA NO. 2
652
653
42
41
BLOCK II PSA
-28VDC PWR SUPPLY MOD.
THERMOSWITCH NORMALLY CLOSED OPEN AT HIGH TEMP >70°F
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
2900207
REV LTR L
SH 4

1/2900207

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APP
A		REVISED PER TDRR 20487		2 JUL 65	RLP
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISED PER TDRR 20491		8 JUL 65	RLP MEM
D		REVISED PER TDRR 21911		1 SEP 65	RLP
E		REVISED PER TDRR 22007		9 SEP 65	RTP
F		REVISED PER TDRR 23763		12 NOV 65	RLP
G		REVISED PER TDRR-24054		24 NOV 65	B.
H		REVISED PER TDRR 24059		23 NOV 65	RLP RWH
J		REVISED PER TDRR 24924		4 JAN 66	
K		REVISED PER TDRR 26335			JAC
L		REVISED PER TDRR 26344		25 FEB 66	JHP JAC
M		REVISION STATUS CHANGED		1 MAR 66	RLP

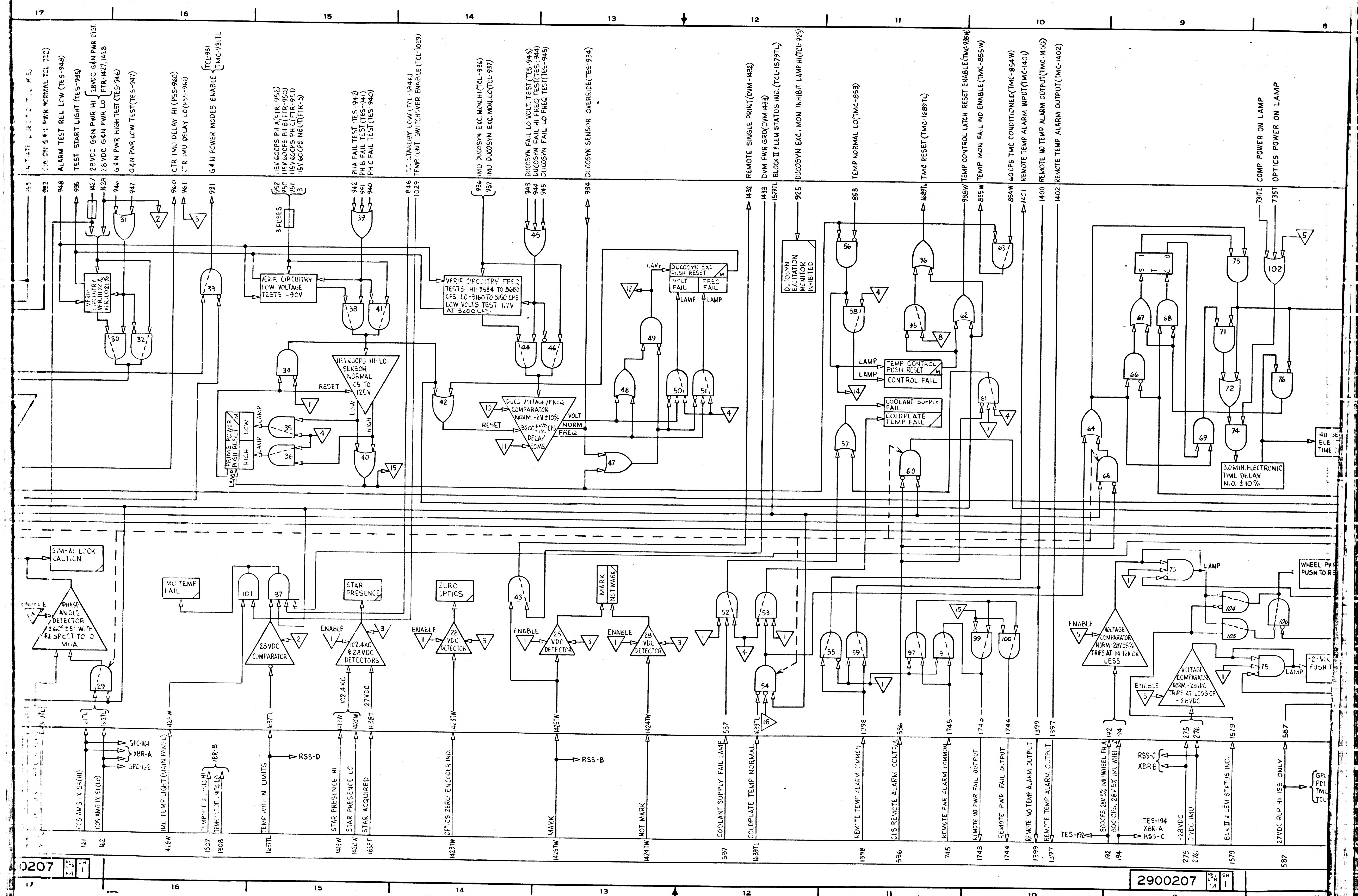

731TL COMP POWER ON LAMP
735T OPTICS POWER ON LAMP
926 GIMBAL DUMP INTERLOCK (TCL-926)
927 GIMBAL DUMP INDICATION (TCL-927)
924 GIMBAL DUMP INHIBIT (GPC-924)
1 GSE CHASSIS GRD BUS
2 GSE SHIELD GRD BUS
1 27VDC RLP LO (RLP-1)
896 115V, 60CPS PHA PIL. PWR (FTR-896)
3 115V, 60CPS NEUT (FTR-3)
743 27VDC RLP HI ISS OPERATE (TCL-743)
1374 OIA ON COMMAND (TCL-1374)
494 27VDC RLP HI (FTR-494)
902 27VDC RLP HI
PDL-902
TCL-902
TMC-902
73
102
79
82
92
94
71
72
76
69
74
77
78
81
80
88
91
87
FLASHER
ENABLE
CIRCUIT POWER SUPPLY
VERIFICATION OF GATE OPERATION
GIMBAL DUMP
GIMBAL DUMP INHIBITED
40 SEC ELECTRONIC TIME DELAY N.O. ±10%
3.0 MIN. ELECTRONIC TIME DELAY N.C. ±10%
TRICKLE CHARGER
CHARGEABLE BATTERY
ALARM
LAMP
WHEEL PWR FAIL PUSH TO RESET
M
104
105
106
75
LAMP
VOLTAGE COMPARATOR
PUSH TO RESET
83
84
86
85
89
90
93
PUSH TO INHIBIT
ALARM INHIBITED
ALARM DISABLE
CGC/LGC WARNING NO 2
CGC/LGC WARNING NO 1
ISS WARNING LMP
ISS WARNING
GEN CAUTION
S IV B CUT OFF
RR AUTO ANGLE ENABLE
S IV B INJ SEQ START
LR HOVER POS CMD
COMPUTER STANDBY
DSKY SPARE SD444
DSKY SPARE SD445
<.5Ω
1
3
4
5
7
8
9
10
11
12
13
14
15
275
276
1573
587
1633
1826TL
1827TL
1830TL
1828TL
1831T
1833L
1832T
1834L
1835TL
1836TL
1837TL
BLK II & LEM STATUS IND.
27VDC RLP HI ISS ONLY
GPC-587
PDL-587
TMC-587
TCL-587
GEN TEST CONFIG IND.
GEN CAUTION LIGHT
ISS WARNING LIGHT
ISS WARNING (LMP)
CGC/LGC WARNING NO. 1
S IV B CUTOFF
RR AUTO ANGLE ENABLE
S IV B INJ. SEQ START
LR HOVER POS CMD
COMPUTER STANDBY
DSKY SPARE SD444
DSKY SPARE SD445
OIA BACKWALL
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± — DO NOT SCALE THIS DRAWING	AC ELECTRONICS DIVISION GENERAL MOTORS CORP. MILWAUKEE, WIS. DRAWN [illegible] DATE 7 MAY 65 CHECKED APPROVAL APPROVAL	MANNED SPACECRAFT CENTER HOUSTON TEXAS MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK I SERIES 100, BLOCK II, LEM)
MATERIAL — CONTRACT NAS	NASA APPROVAL MIT APPROVAL	CODE IDENT NO 99974 SIZE 2900207 SCALE — SHEET 1 OF 4

2900207 B

07 REV A SH 1

3/2900207



17
16
15
14
13
12
11
10
9
8
ALARM TEST REL LOW (TES-946)
TEST START LIGHT (TES-935)
28VDC G&N PWR HI
28VDC G&N PWR LO
28VDC G&N PWR DIST. FTR-1427, 1428
G&N PWR HIGH TEST (TES-946)
G&N PWR LOW TEST (TES-947)
CTR IMU DELAY HI (PSS-960)
CTR IMU DELAY LO (PSS-961)
G&N POWER MODES ENABLE (TCL-931, TMC-931TL)
115V 600CPS PH A (FTR-952)
115V 600CPS PH B (FTR-950)
115V 600CPS PH C (FTR-951)
115V 600CPS NEUT (FTR-3)
PH A FAIL TEST (TES-942)
PH B FAIL TEST (TES-941)
PH C FAIL TEST (TES-940)
TSS STANDBY LOW (TCL-1846)
TEMP. CONT. SWITCHOVER ENABLE (TCL-1029)
IMU DUCOSYN EXC. MON. HI (TCL-936)
IMU DUCOSYN EXC. MON. LO (TCL-937)
DUCOSYN FAIL LO VOLT. TEST (TES-943)
DUCOSYN FAIL HI FREQ TEST (TES-944)
DUCOSYN FAIL LO FREQ TEST (TES-945)
DUCOSYN SENSOR OVERRIDE (TES-934)
REMOTE SINGLE PRINT (DVM-1432)
DVM PWR GRD (DVM-1433)
BLOCK II & LEM STATUS IND. (TCL-1579TL)
DUCOSYN EXC. MON INHIBIT LAMP HI (TCL-925)
TEMP NORMAL LO (TMC-853)
TMC RESET (TMC-1689TL)
TEMP CONTROL LATCH RESET ENABLE (TMC-938W)
TEMP MON FAIL IND ENABLE (TMC-855W)
600CPS TMC CONDITIONED (TMC-854W)
REMOTE TEMP ALARM INPUT (TMC-1401)
REMOTE NO TEMP ALARM OUTPUT (TMC-1400)
REMOTE TEMP ALARM OUTPUT (TMC-1402)
COMP POWER ON LAMP
OPTICS POWER ON LAMP
VERIF CIRCUITRY VER. 1102% VER. 1021%
3 FUSES
VERIF CIRCUITRY LOW VOLTAGE TESTS -90V
VERIF CIRCUITRY FREQ TESTS HI-3594 TO 3680 CPS LO-3160 TO 3150 CPS LOW VOLTS TEST 1.7V AT 3200 CPS
115V 600CPS HI-LO SENSOR NORMAL 105 TO 125V
LOW
HIGH
RESET
PRIME POWER PUSH RESET
LOW
HIGH
LAMP
DUCOSYN EXC PUSH RESET
VOLT FAIL
FREQ FAIL
DUCOSYN EXCITATION MONITOR INHIBITED
DUC VOLTAGE/FREQ COMPARATOR NORM. -2V±10% 3200 +10% -1% CPS DELAY 50MS
VOLT NORM
FREQ
TEMP CONTROL PUSH RESET
CONTROL FAIL
COOLANT SUPPLY FAIL
COLDPLATE TEMP FAIL
S T C
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
40 SEC ELECTRONIC TIME
GIMBAL LOCK CAUTION
PHASE ANGLE DETECTOR ±60°±5° WITH RESPECT TO 0 MGA
ENABLE
IMU TEMP FAIL
28VDC COMPARATOR
STAR PRESENCE
102.4KC & 28VDC DETECTORS
102.4KC
27VDC
ZERO OPTICS
28VDC DETECTOR
MARK
NOT MARK
WHEEL PWR PUSH TO RESET
VOLTAGE COMPARATOR NORM-28V±5% TRIPS AT 14-16V OR LESS
VOLTAGE COMPARATOR NORM -28VDC TRIPS AT LOSS OF -28VDC
2-VDC PUSH TO
LAMP
COS AMG 1X SA (HI)
COS AMG 1X S1 (LO)
GPC-161
XBR-A
GPC-162
IMU TEMP LIGHT (MAIN PANEL)
TEMP IT FAIL (HI)
TEMP IT FAIL (LO)
XBR-B
TEMP WITHIN LIMITS
RSS-D
STAR PRESENCE HI
STAR PRESENCE LO
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
RSS-B
NOT MARK
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
REMOTE TEMP ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE PWR ALARM COMMON
REMOTE NO PWR FAIL OUTPUT
REMOTE PWR FAIL OUTPUT
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
TES-192
800CPS, 28V 5% IMU WHEEL PH A
800CPS, 28V 5% IMU WHEEL
TES-194
XBR-A
RSS-C
RSS-C
XBR-B
-28VDC
-28VDC IMU
BLK II & LEM STATUS IND.
27VDC RLP HI ISS ONLY
GPC
PDL
TMC
TCL
161
162
428W
1307
1308
1637TL
1419W
1420W
1638T
1423TW
1425TW
1424TW
537
1639TL
1398
536
1745
1743
1744
1399
1397
192
194
275
276
1573
587

0207

2900207 REV 1 SH 1

27-2900207

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS:

2900210	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RLP RELAY & LAMP POWER SUPPLY
2900204	TEMPERATURE MONITOR CONTROL PANEL (BLOCK I, SERIES 100)(TMC)
2900203	TEMPERATURE MONITOR CONTROL PANEL (BLOCK II & LEM)(TMC)
2900208	POWER & DUMMY LOAD PANEL-PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL)
2900223	GIMBAL POSITION CONTROL (GPC)
2900202	TEST CONTROL PANEL (BLOCK I SERIES 100)(TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM)(TCL)
2900206	TEST SELECTOR PANEL (TES)
2900200	GYRO CAGING PANEL (BLOCK II & LEM)(GCP)
2900218	OSCILLOGRAPH SIGNAL SELECTION RSS-B TO FIXED DC CHANNEL, RSS-C TO SWITCHABLE AC CHANNEL, RSS-D TO SWITCHABLE DC CHANNEL
2900217	SIGNAL SELECTION & MEASUREMENT XBR-A CROSSBAR-AC SIGNALS XBR-B CROSSBAR-DC SIGNALS
2900219	COUNTER SIGNAL SELECTION PRIMARY SIGNAL SELECTOR (PSS)
2900214	GSE GROUNDING (BLOCK I SERIES 100)
2900213	GSE GROUNDING (BLOCK II & LEM)
2900209	COMPUTER SIMULATOR INTERFACE (CMS)
2900211	AUXILIARY INPUT/OUTPUT CALIBRATION (AIP)

4. NON STANDARD SYMBOLOGY:

⊐D	INDICATES "AND" GATE WITH SWITCHED SIGNAL
NAME	INDICATES INDICATOR LIGHT
NAME M	INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
NAME / NAME	INDICATES SPLIT SCREEN INDICATOR LIGHT
NAME / NAME M	INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES UNLIGHTED PUSHBUTTON OR TOGGLE SWITCH (ALTERNATE ACTION)

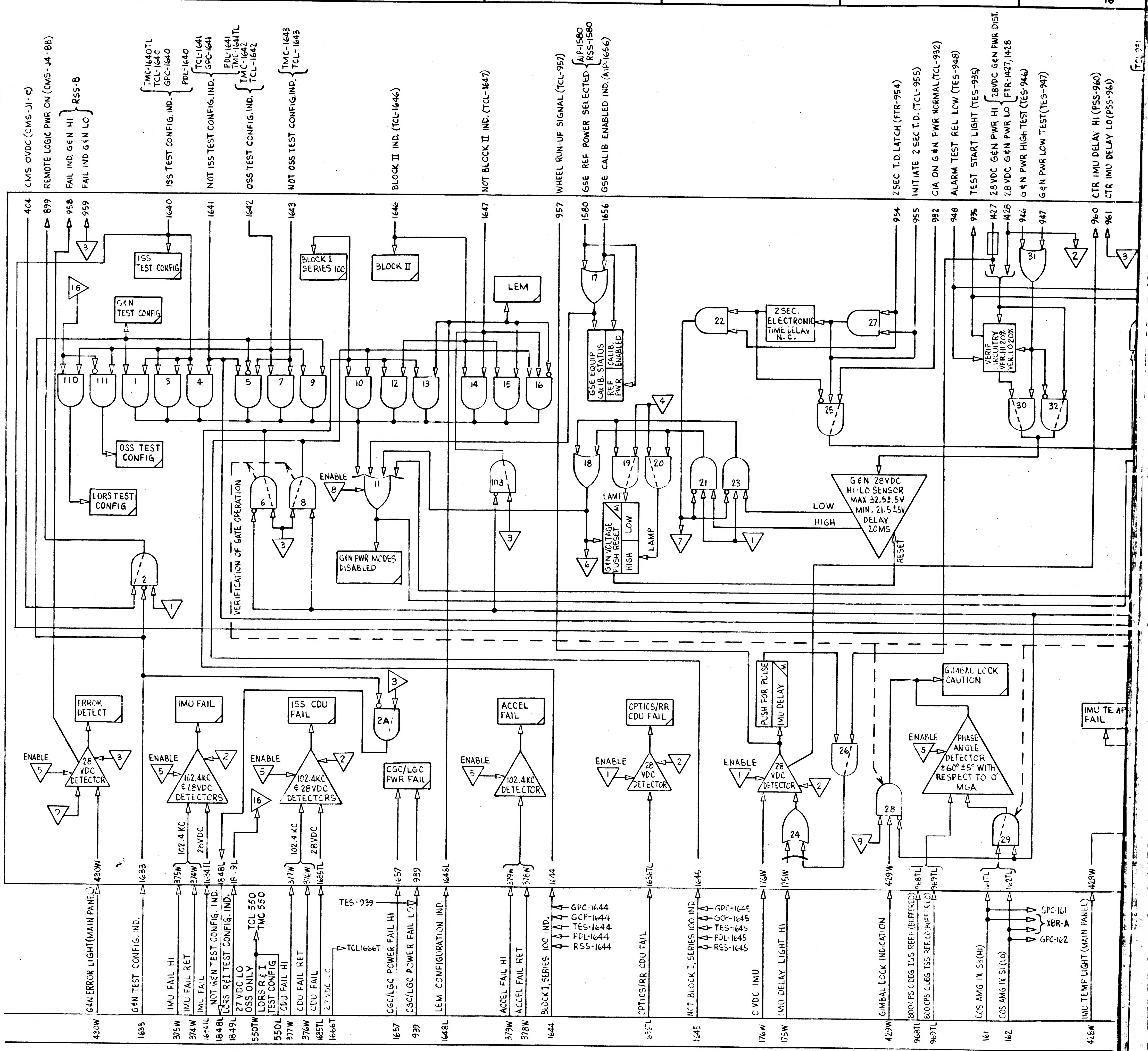
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   - A. W-BLOCK I SERIES 100 ONLY
   - B. T-BLOCK II ONLY
   - C. L-LEM ONLY
   - D. BLANK-ALL G&N CONFIGURATIONS
   - E. TW TL OR WL-USED IN MORE THAN ONE G&N CONFIGURATION AS SHOWN.

6. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK I SERIES 100	SH 1 SH 2
BLOCK II	SH 1 SH 3
LEM	SH 1 SH 4

7. SIGNAL REFERENCE:

▽1 = OIA ON	▽11 = -28VDC
▽2 = 28VDC G&N PWR LO	▽12 = DUCO EXC. FAIL
▽3 = 27VDC RLP LO	▽13 = +45 VDC
▽4 = FLASHER	▽14 = TMC FAIL
▽5 = ISS OPER. 5SEC T.D.	▽15 = PRIME PWR FAIL
▽6 = G&N PWR FAIL	▽16 = LORS R&I TEST CONFIG.
▽7 = 2 SEC T.D. AT OIA ON	
▽8 = 27VDC FIL. PWR	
▽9 = 27VDC OIA ON	
▽10 = +28VDC	

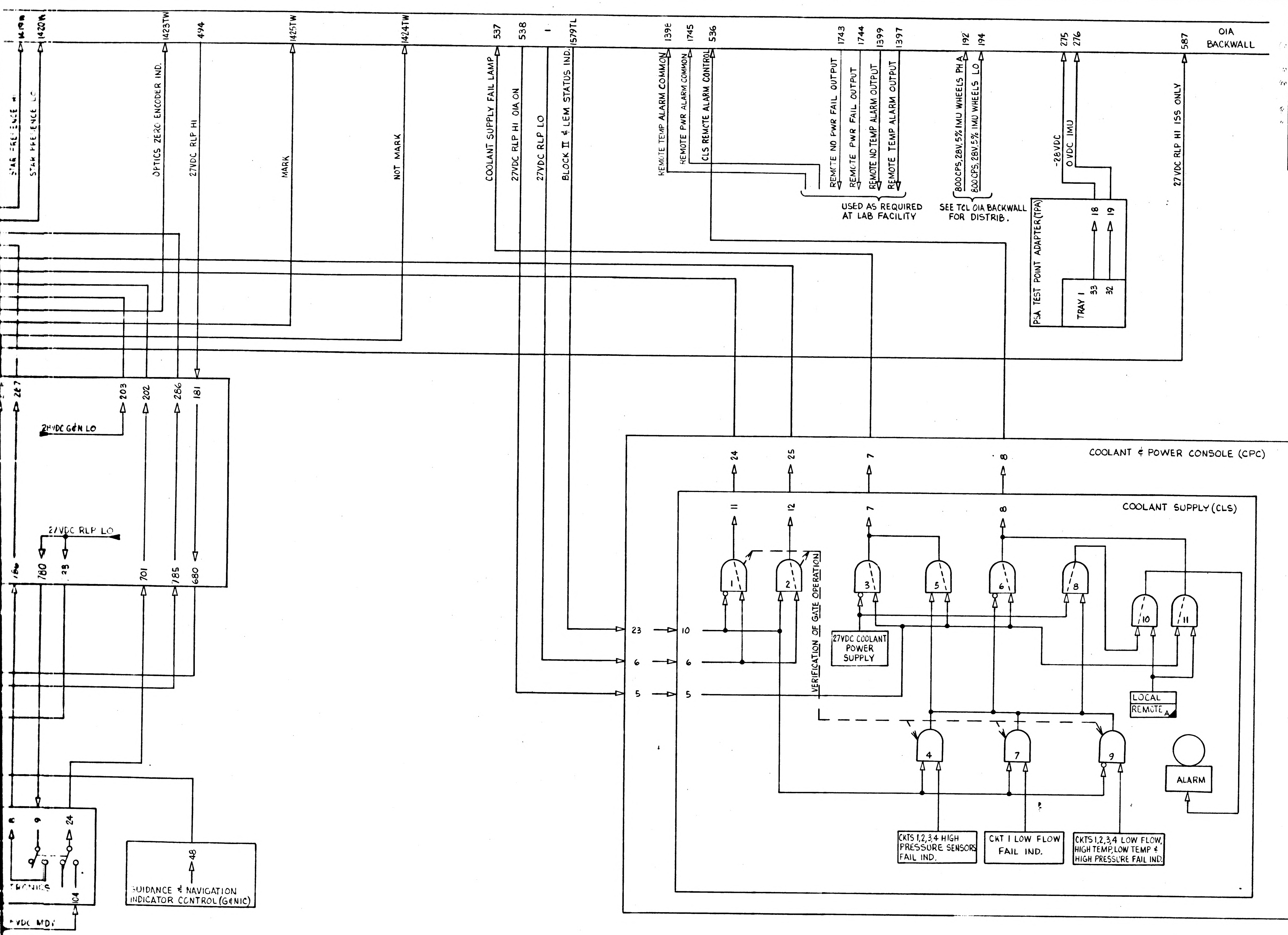


24
23
22
21
20
19
18
17
16
H
G
F
E
D
C
B
A
CMS OVDC (CMS-J1-e)
REMOTE LOGIC PWR ON (CMS-J4-BB)
FAIL IND. G&N HI
FAIL IND G&N LO
RSS-B
ISS TEST CONFIG. IND.
TMC-1640TL
TCL-1640
GPC-1640
PDL-1640
NOT ISS TEST CONFIG. IND.
TCL-1641
GPC-1641
PDL-1641
TMC-1641TL
OSS TEST CONFIG. IND.
TMC-1642
TCL-1642
NOT OSS TEST CONFIG. IND.
TMC-1643
TCL-1643
BLOCK II IND. (TCL-1646)
NOT BLOCK II IND. (TCL-1647)
WHEEL RUN-UP SIGNAL (TCL-957)
GSE REF POWER SELECTED
AIP-1580
RSS-1580
GSE CALIB ENABLED IND. (AIP-1656)
2SEC T.D. LATCH (FTR-954)
INITIATE 2 SEC T.D. (TCL-955)
OIA ON G&N PWR NORMAL (TCL-932)
ALARM TEST REL LOW (TES-948)
TEST START LIGHT (TES-935)
28VDC G&N PWR HI
28VDC G&N PWR LO
28VDC G&N PWR DIST.
FTR-1427, 1428
G&N PWR HIGH TEST (TES-946)
G&N PWR LOW TEST (TES-947)
CTR IMU DELAY HI (PSS-960)
CTR IMU DELAY LO (PSS-961)
TCL 921
404
899
958
959
1640
1641
1642
1643
1646
1647
957
1580
1656
954
955
932
948
935
1427
1428
946
947
960
961
ISS TEST CONFIG
G&N TEST CONFIG
BLOCK I SERIES 100
BLOCK II
LEM
OSS TEST CONFIG
LORS TEST CONFIG
GSE EQUIP CALIB. STATUS
REF PWR
CALIB. ENABLED
2 SEC. ELECTRONIC TIME DELAY N.C.
VERIF CIRCUITRY VER. HI 20% VER. LO 20%
VERIFICATION OF GATE OPERATION
ENABLE
G&N PWR MODES DISABLED
LAMP
G&N VOLTAGE PUSH RESET
LOW
HIGH
G&N 28VDC HI-LO SENSOR MAX. 32.5±.5V MIN. 21.5±.5V DELAY 2.0MS
RESET
110
111
1
3
4
5
7
9
10
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
2
2A
6
8
11
103
ERROR DETECT
28 VDC DETECTOR
IMU FAIL
102.4KC & 28VDC DETECTORS
ISS CDU FAIL
CGC/LGC PWR FAIL
ACCEL FAIL
102.4KC DETECTOR
OPTICS/RR CDU FAIL
28 VDC DETECTOR
PUSH FOR PULSE
IMU DELAY
M
GIMBAL LOCK CAUTION
PHASE ANGLE DETECTOR ±60°±5° WITH RESPECT TO 0° MGA
IMU TEMP FAIL
102.4 KC
26VDC
28VDC
430W
1633
375W
374W
1634TL
1848L
1849L
377W
376W
1635TL
1657
939
1648L
379W
378W
1644
1636TL
1645
176W
175W
429W
968TL
969TL
161TL
162TL
428W
G&N ERROR LIGHT (MAIN PANEL)
G&N TEST CONFIG. IND.
IMU FAIL HI
IMU FAIL RET
IMU FAIL
NOT G&N TEST CONFIG. IND.
LORS R&I TEST CONFIG. IND.
27 VDC LO OSS ONLY
TCL 550
TMC 550
LORS R&I TEST CONFIG
CDU FAIL HI
CDU FAIL RET
CDU FAIL
27 VDC LO
TCL1666T
TES-939
CGC/LGC POWER FAIL HI
CGC/LGC POWER FAIL LO
LEM CONFIGURATION IND.
ACCEL FAIL HI
ACCEL FAIL RET
BLOCK I, SERIES 100 IND.
GPC-1644
GCP-1644
TES-1644
PDL-1644
RSS-1644
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND
GPC-1645
GCP-1645
TES-1645
PDL-1645
RSS-1645
0 VDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK INDICATION
800 CPS 0 DEG ISS REF. HI (BUFFERED)
800 CPS 0 DEG ISS REF. LO (BUFFERED)
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
GPC-161
XBR-A
GPC-162
IMU TEMP LIGHT (MAIN PANEL)
550TW
550L
1666T
161
162

MIL FORM 1050 J3

2900207 REV LTR M SH 1

1/2900207


OIA BACKWALL
1419W
1420W
STAR PRESENCE HI
STAR PRESENCE LO
1423TW
OPTICS ZERO ENCODER IND.
494
27VDC RLP HI
1425TW
MARK
1424TW
NOT MARK
537
COOLANT SUPPLY FAIL LAMP
538
27VDC RLP HI OIA ON
1
27VDC RLP LO
1579TL
BLOCK II & LEM STATUS IND.
1398
REMOTE TEMP ALARM COMMON
1745
REMOTE PWR ALARM COMMON
536
CLS REMOTE ALARM CONTROL
1743
REMOTE NO PWR FAIL OUTPUT
1744
REMOTE PWR FAIL OUTPUT
1399
REMOTE NO TEMP ALARM OUTPUT
1397
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
192
800CPS, 28V, 5% IMU WHEELS PH A
194
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
275
-28VDC
276
0VDC IMU
PSA TEST POINT ADAPTER (TPA)
18
19
TRAY I
33
32
587
27VDC RLP HI ISS ONLY
287
203
202
286
181
28VDC GEN LO
27VDC RLP LO
780
23
701
785
680
9
24
104
TRONICS
VDC MDY
48
GUIDANCE & NAVIGATION INDICATOR CONTROL (GENIC)
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
1
2
3
4
5
6
7
8
9
10
11
23
10
6
6
5
5
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
ALARM
CKTS 1,2,3,4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL IND.
CKTS 1,2,3,4 LOW FLOW, HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND.

REVISIONS 192

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISION STATUS CHANGED		8 JUL 65	RLP
D		REVISION STATUS CHANGED		1 SEP 65	RLP
E		REVISION STATUS CHANGED		9 SEPT 65	PTP
F		REVISED PER TDRR 23763		12 NOV 65	RLP
G		REVISION STATUS CHANGED		24 NOV 65	B.
H		REVISION STATUS CHANGED		29 NOV 65	RLP RWH
J		REVISION STATUS CHANGED		4 JAN 66	JPAT
K		REVISION STATUS CHANGED		23 [illegible] 66	JAC
L		REVISION STATUS CHANGED		25 FEB 66	JHP JAC
M		REVISION STATUS CHANGED		1 MAR 66	RLP

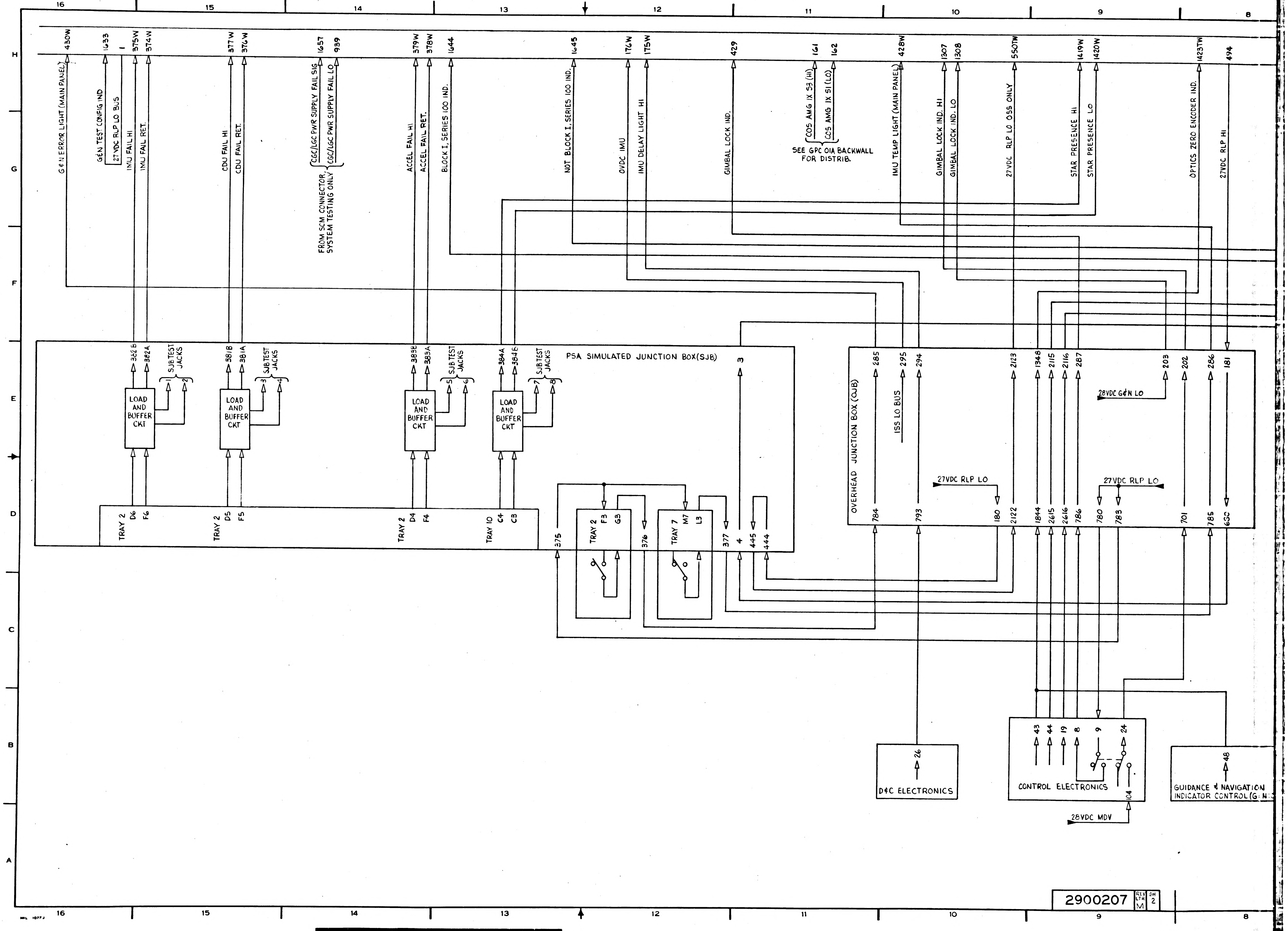
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ ± ___ ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ___
CONTRACT

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP. MILWAUKEE WIS.
DRAWN [illegible] DATE /MAY 65
CHECKED [illegible]
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK I SERIES 100)

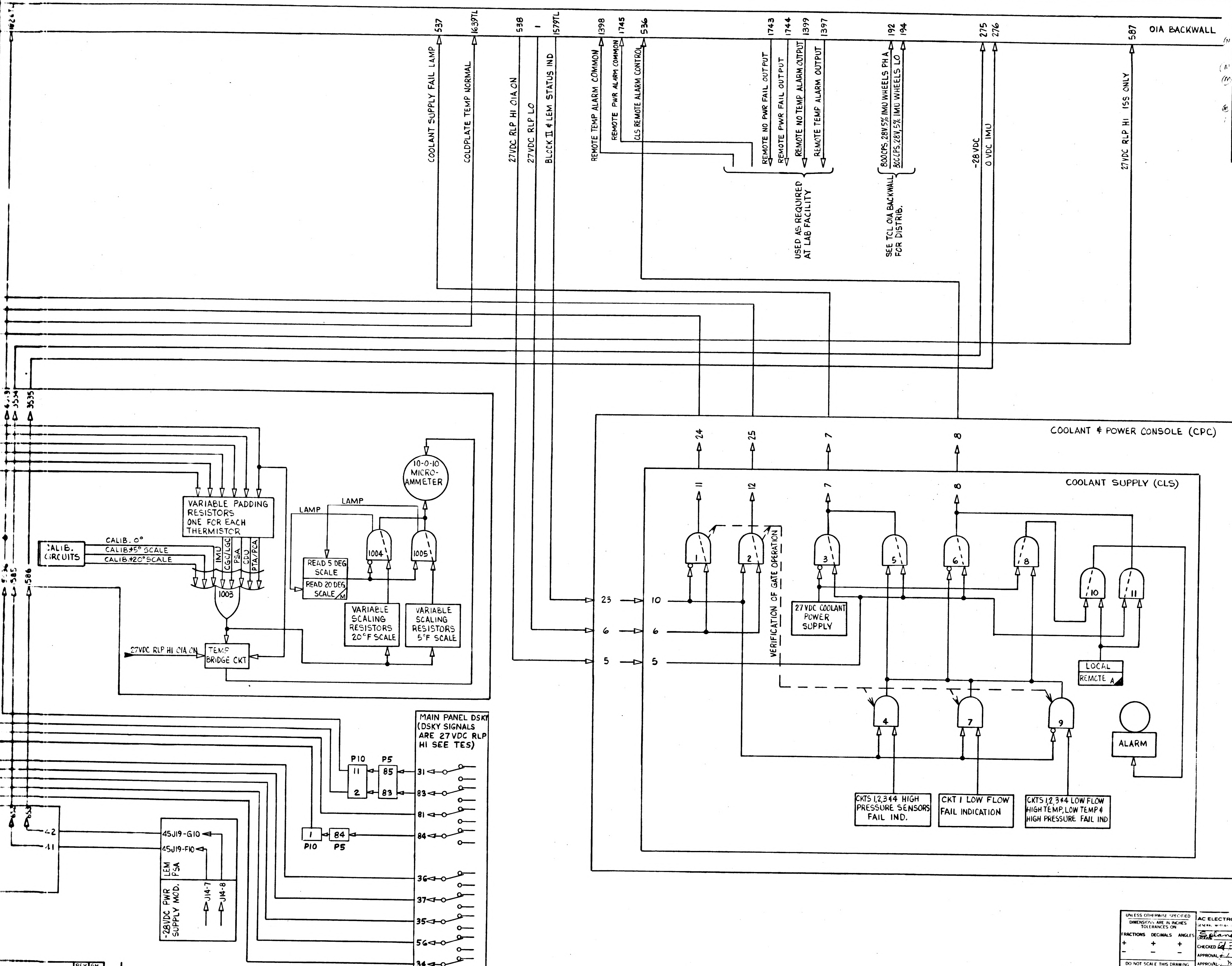
CODE IDENT NO 99974
SIZE
2900207
SCALE —
SHEET 2 OF 4


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
430W
GεN ERROR LIGHT (MAIN PANEL)
1633
GεN TEST CONFIG IND
1
27 VDC RLP LO BUS
375W
IMU FAIL HI
374W
IMU FAIL RET.
377W
CDU FAIL HI
376W
CDU FAIL RET.
1657
CGC/LGC PWR SUPPLY FAIL SIG
939
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR, SYSTEM TESTING ONLY
379W
ACCEL FAIL HI
378W
ACCEL FAIL RET.
1644
BLOCK I, SERIES 100 IND.
1645
NOT BLOCK I, SERIES 100 IND.
176W
OVDC IMU
175W
IMU DELAY LIGHT HI
429
GIMBAL LOCK IND.
161
COS AMG IX 53 (HI)
162
COS AMG IX 51 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
428W
IMU TEMP LIGHT (MAIN PANEL)
1307
GIMBAL LOCK IND. HI
1308
GIMBAL LOCK IND. LO
550TW
27VDC RLP LO OSS ONLY
1419W
STAR PRESENCE HI
1420W
STAR PRESENCE LO
1423TW
OPTICS ZERO ENCODER IND.
494
27VDC RLP HI
PSA SIMULATED JUNCTION BOX (SJB)
382B
382A
SJB TEST JACKS
1
2
LOAD AND BUFFER CKT
381B
381A
3
4
LOAD AND BUFFER CKT
383B
383A
5
6
LOAD AND BUFFER CKT
384A
384B
7
8
LOAD AND BUFFER CKT
3
TRAY 2 D6 F6
TRAY 2 D5 F5
TRAY 2 D4 F4
TRAY 10 C4 C3
375
TRAY 2 F3 G3
376
TRAY 7 M7 L3
377
4
445
444
OVERHEAD JUNCTION BOX (OJB)
285
295
294
ISS LO BUS
27VDC RLP LO
2123
1348
2115
2116
287
28VDC GεN LO
203
202
286
181
27VDC RLP LO
784
793
180
2122
1844
2615
2616
786
780
783
701
785
630
26
D&C ELECTRONICS
43
44
19
8
9
24
CONTROL ELECTRONICS
104
28VDC MDV
48
GUIDANCE & NAVIGATION INDICATOR CONTROL (G&N

2900207 REV LTR M SH 2

1729002 07

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		2 JUL 65	RLP mlm
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISED PER TDRR 20491		8 JUL 65	RLP mem
D		REVISED PER TDRR 21911		1 SEP 65	RLP
E		REVISED PER TDRR 22007		9 SEPT 65	RTP
F		REVISED PER TDRR 23763		12 NOV 65	RLP
G		REVISION STATUS CHANGED		24 NOV 65	B. ET
H		REVISED PER TDRR 24059		29 NOV 65	RLP RWH
J		REVISION STATUS CHANGED		4 JAN 66	J PAT
K		REVISION STATUS CHANGED			JAC
L		REVISED PER TDRR 26344		25 FEB 66	HP JAC
M		REVISED PER TDRR 26345		1 MAR 66	RLP



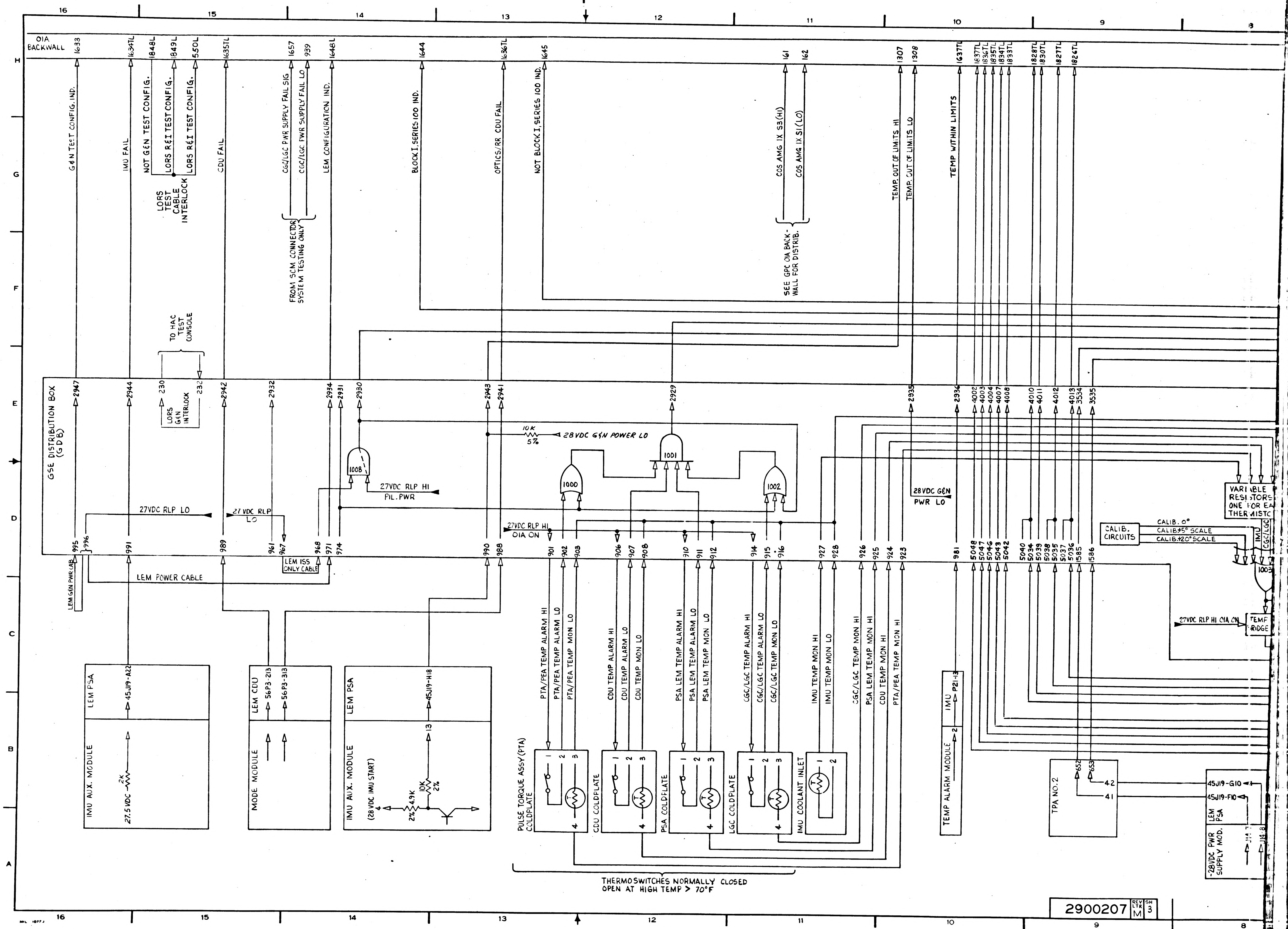
OIA BACKWALL
537 COOLANT SUPPLY FAIL LAMP
1639TL COLDPLATE TEMP NORMAL
538 27VDC RLP HI OIA ON
27VDC RLP LO
1579TL BLOCK II & LEM STATUS IND
1398 REMOTE TEMP ALARM COMMON
1745 REMOTE PWR ALARM COMMON
536 CLS REMOTE ALARM CONTROL
1743 REMOTE NO PWR FAIL OUTPUT
1744 REMOTE PWR FAIL OUTPUT
1399 REMOTE NO TEMP ALARM OUTPUT
1397 REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
192 800CPS, 28V 5% IMU WHEELS PH A
194 800CPS, 28V 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
275 -28VDC
276 0 VDC IMU
587 27VDC RLP HI ISS ONLY
COOLANT & POWER CONSOLE (CPC)
COOLANT SUPPLY (CLS)
24
25
7
8
11
12
7
8
1
2
3
4
5
6
7
8
9
10
11
23
6
5
10
6
5
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE A
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND
3533
3534
3535
585
586
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
IMU
CSG/LGC
PSA
CDU
PTA/PCA
CALIB. CIRCUITS
CALIB. 0°
CALIB.±5° SCALE
CALIB.±20° SCALE
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
LAMP
LAMP
1004
1005
10-0-10 MICRO-AMMETER
READ 5 DEG SCALE
READ 20 DEG SCALE M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
MAIN PANEL DSKY (DSKY SIGNALS ARE 27VDC RLP HI SEE TES)
P10
P5
11
2
85
83
31
83
81
84
1
84
P10
P5
36
37
35
56
34
42
41
45J19-G10
45J19-F10
LEM PSA
28VDC PWR SUPPLY MOD.
J14-7
J14-8

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC ELECTRONICS DIVISION GENERAL MOTORS CORP. MILWAUKEE, WIS.	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Splane DATE 7 MAY 65 CHECKED Ed Foster 14 MAY 65 APPROVAL APPROVAL M. Watson	MECHANIZATION DIAGRAM MONITOR PANEL (LEM)
MATERIAL	NASA APPROVAL	CODE IDENT NO 99974 SIZE J 2900207
CONTRACT	MIT APPROVAL	SCALE SHEET 3 OF 4

2900207 M

2900207 REV LTR M SH 3

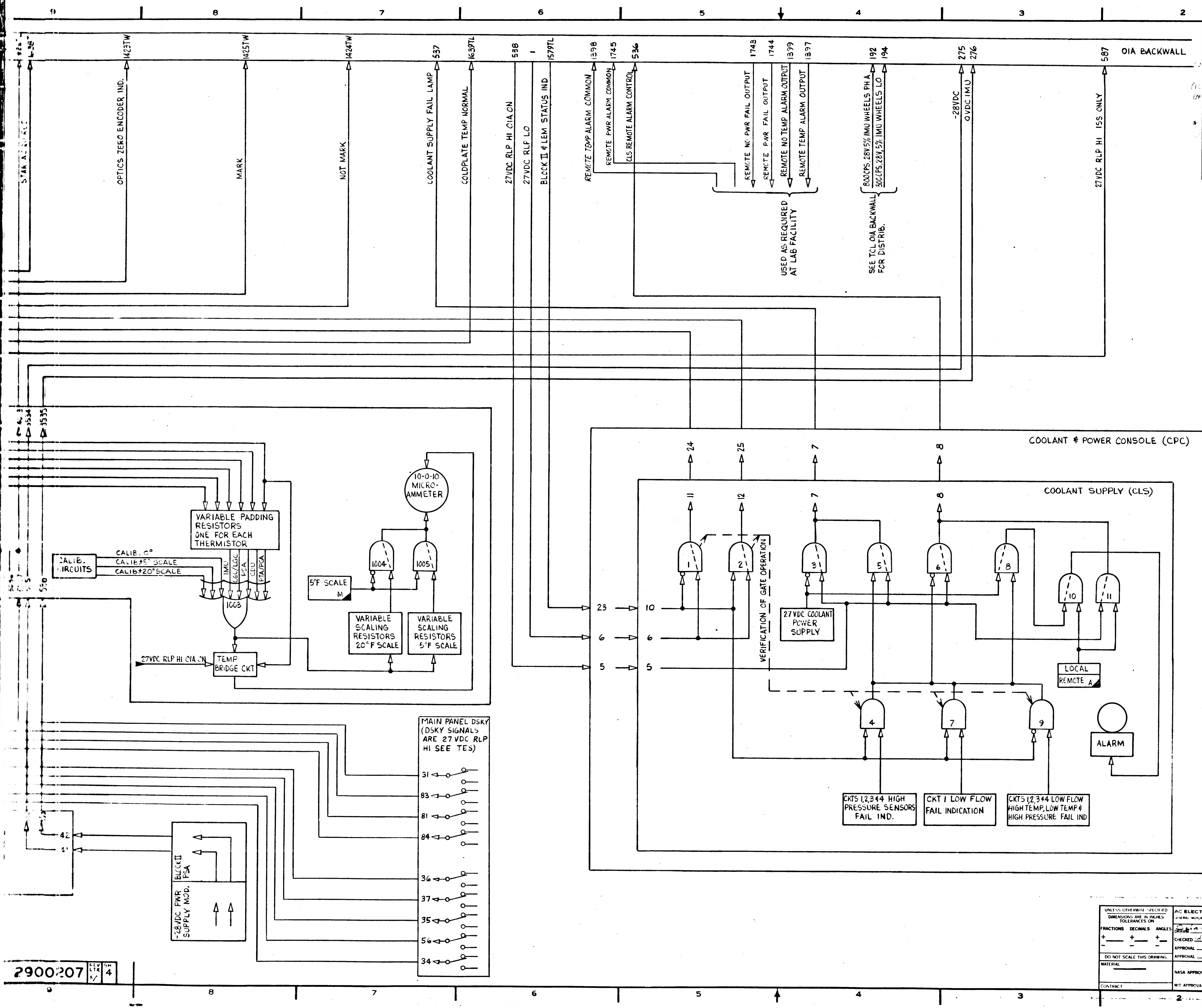
27 2900207



16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1633
1634TL
1848L
1849L
1550L
1635TL
1657
939
1648L
1644
1636TL
1645
161
162
1307
1308
1637TL
1837TL
1836TL
1835TL
1834TL
1833TL
1828TL
1830TL
1827TL
1826TL
G&N TEST CONFIG. IND.
IMU FAIL
NOT G&N TEST CONFIG.
LORS R&I TEST CONFIG.
LORS R&I TEST CONFIG.
LORS TEST CABLE INTERLOCK
CDU FAIL
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR SYSTEM TESTING ONLY
LEM CONFIGURATION IND.
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
SEE GPC ON BACKWALL FOR DISTRIB.
TEMP. OUT OF LIMITS HI
TEMP. OUT OF LIMITS LO
TEMP WITHIN LIMITS
TO HAC TEST CONSOLE
GSE DISTRIBUTION BOX (GDB)
2947
2944
230
232
LORS G&N INTERLOCK
2942
2932
2934
2931
2930
2943
2941
2929
2935
2936
4002
4003
4004
4007
4008
4010
4011
4012
4013
3534
3535
10K 5%
28VDC G&N POWER LO
1008
1000
1001
1002
27VDC RLP HI PIL. PWR
28VDC G&N PWR LO
VARIABLE RESISTORS ONE FOR EA THERMISTO
CALIB. CIRCUITS
CALIB. 0°
CALIB.±5° SCALE
CALIB.±20° SCALE
IMU
CGC/LGC
1003
27VDC RLP LO
27VDC RLP LO
27VDC RLP HI OIA ON
995
996
991
989
961
967
968
971
974
990
988
901
902
903
906
907
908
910
911
912
914
915
916
927
928
926
925
924
923
981
5048
5047
5046
5043
5042
5040
5034
5039
5038
5035
5037
5036
585
586
LEM G&N PWR CAB
LEM POWER CABLE
LEM ISS ONLY CABLE
PTA/PEA TEMP ALARM HI
PTA/PEA TEMP ALARM LO
PTA/PEA TEMP MON LO
CDU TEMP ALARM HI
CDU TEMP ALARM LO
CDU TEMP MON LO
PSA LEM TEMP ALARM HI
PSA LEM TEMP ALARM LO
PSA LEM TEMP MON LO
CGC/LGC TEMP ALARM HI
CGC/LGC TEMP ALARM LO
CGC/LGC TEMP MON LO
IMU TEMP MON HI
IMU TEMP MON LO
CGC/LGC TEMP MON HI
PSA LEM TEMP MON HI
CDU TEMP MON HI
PTA/PEA TEMP MON HI
27VDC RLP HI OIA ON
TEMP BRIDGE
LEM PSA
45J19-A22
IMU AUX. MODULE
2K
27.5 VDC
LEM CDU
56P3-213
56P3-313
MODE MODULE
LEM PSA
45J19-H18
13
IMU AUX. MODULE
(28 VDC IMU START)
4
2% 4.9K
10K 2%
PULSE TORQUE ASSY (PTA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
LGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
IMU
P21-13
2
TEMP ALARM MODULE
TPA NO. 2
652
653
42
41
45J19-G10
45J19-F10
LEM PSA
-28VDC PWR SUPPLY MOD.
THERMOSWITCHES NORMALLY CLOSED OPEN AT HIGH TEMP > 70°F

2900207 REV LTR M SH 3

17/2900207



OIA BACKWALL
STAK A[illegible]
OPTICS ZERO ENCODER IND.
1423TW
MARK
1425TW
NOT MARK
1424TW
COOLANT SUPPLY FAIL LAMP
537
COLDPLATE TEMP NORMAL
1639TL
27VDC RLP HI CIA ON
538
27VDC RLP LO
BLOCK II & LEM STATUS IND
1579TL
REMOTE TEMP ALARM COMMON
1398
REMOTE PWR ALARM COMMON
1745
CLS REMOTE ALARM CONTROL
536
REMOTE NO PWR FAIL OUTPUT
1743
REMOTE PWR FAIL OUTPUT
1744
REMOTE NO TEMP ALARM OUTPUT
1399
REMOTE TEMP ALARM OUTPUT
1397
USED AS REQUIRED AT LAB FACILITY
800CPS, 28V 5% IMU WHEELS PH A
192
800CPS, 28V 5% IMU WHEELS LO
194
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
275
0VDC IMU
276
27VDC RLP HI ISS ONLY
587
3534
3535
550
COOLANT & POWER CONSOLE (CPC)
COOLANT SUPPLY (CLS)
24
25
7
8
11
12
VERIFICATION OF GATE OPERATION
1
2
3
5
6
8
10
11
4
7
9
23
10
6
5
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
ALARM
CKTS 1,2,3&4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3&4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND
10-0-10 MICRO-AMMETER
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB ±5° SCALE
CALIB ±20° SCALE
IMU
LGC/LGC
PSA
CDU
PTA/PCA
1003
27VDC RLP HI CIA ON
TEMP BRIDGE CKT
MAIN PANEL DSKY (DSKY SIGNALS ARE 27 VDC RLP HI SEE TES)
31
83
81
84
36
37
35
56
34
42
41
BLOCK II PSA
-28VDC PWR SUPPLY MOD.

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20487		6 JUL 65	RLP
B		REVISED PER TDRR 20488		7 JUL 65	RLP
C		REVISED PER TDRR 20491		8 JUL 65	RLP
D		REVISED PER TDRR 21911		1 SEP 65	RLP
E		REVISED PER TDRR 22007		9 SEPT 65	RTP
F		REVISED PER TDRR 23763		12 NOV 65	RLP
G		REVISION STATUS CHANGED		24 NOV 65	B.
H		REVISED PER TDRR 24059		29 NOV 65	RLP RWH
J		REVISION STATUS CHANGED		4 JAN 66	J PAT
K		REVISION STATUS CHANGED		23 FEB 66	JAC
L		REVISION STATUS CHANGED		25 FEB 66	JHP JAC
M		REVISION STATUS CHANGED		MAR 66	RLP

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN 7 MAY 65 DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

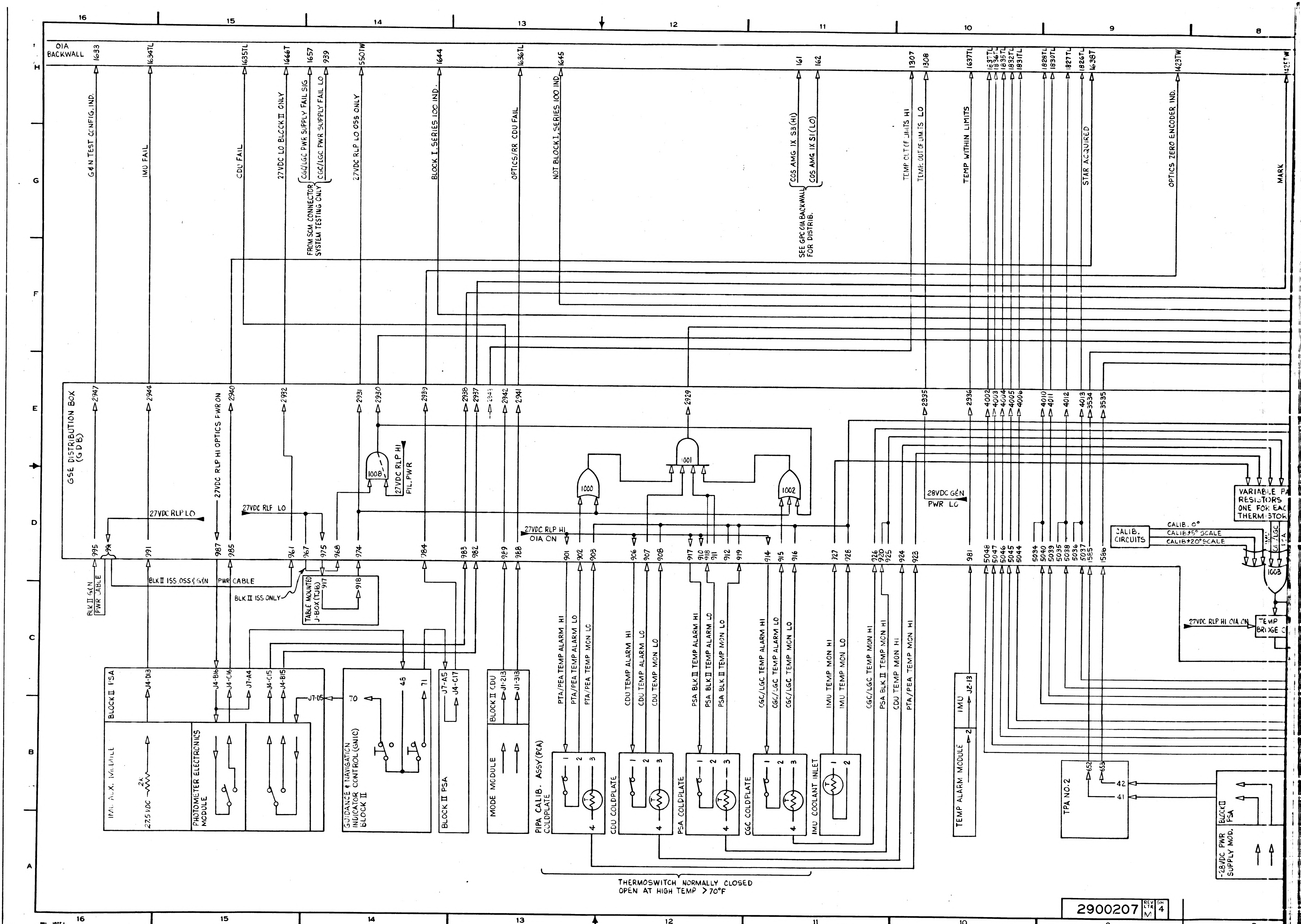
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK II)

CODE IDENT NO 99974 | SIZE J2 | 2900207
SCALE — | SHEET 4 OF 4

2900207 | REV LTR M | SH 4

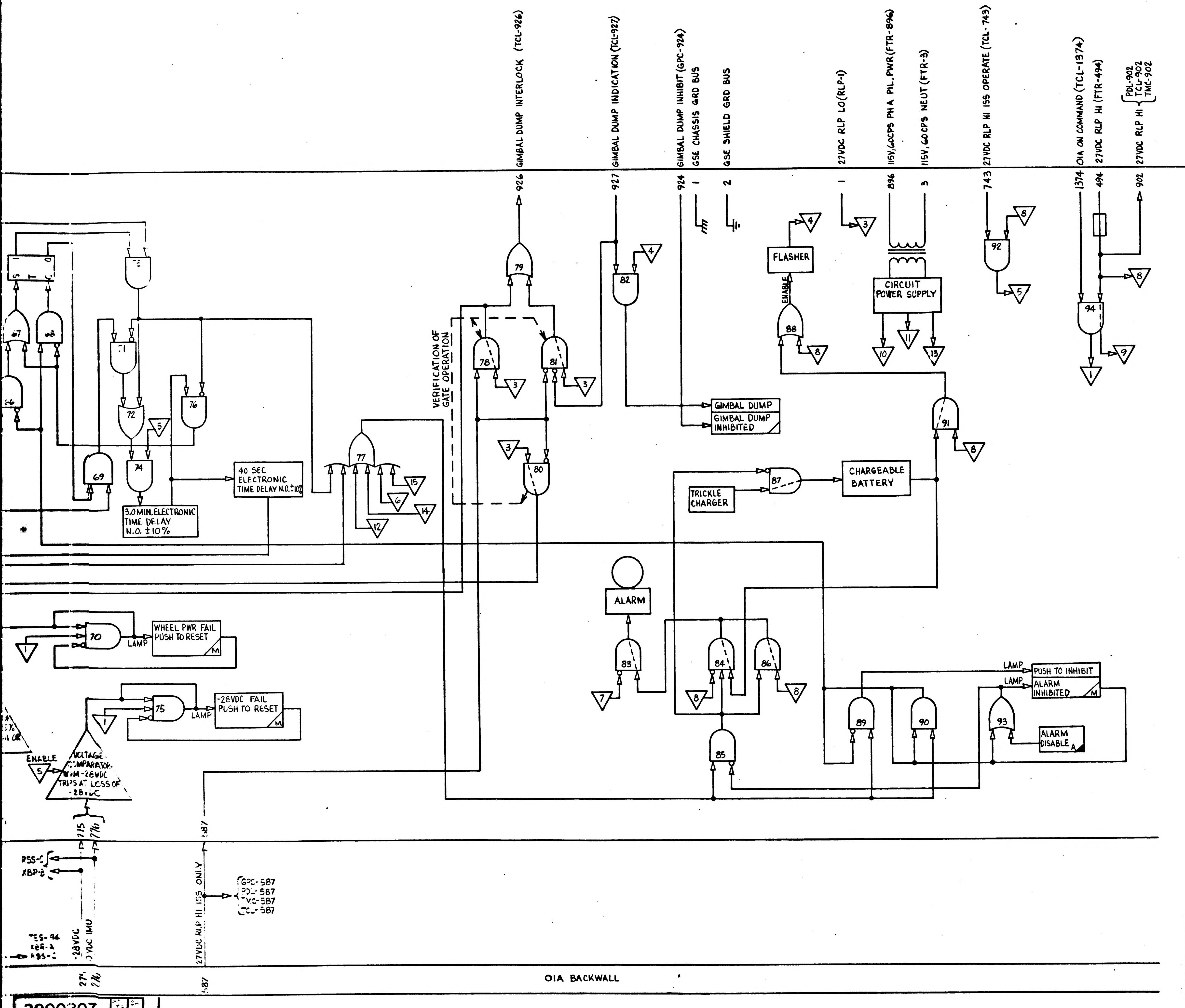
27/2900207



OIA BACKWALL
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
27VDC LO BLOCK II ONLY
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR SYSTEM TESTING ONLY
27VDC RLP LO OSS ONLY
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG 1X S3 (HI)
COS AMG 1X S1 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
TEMP OUT OF LIMITS HI
TEMP OUT OF LIMITS LO
TEMP WITHIN LIMITS
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
GSE DISTRIBUTION BOX (GDB)
27VDC RLP LO
27VDC RLP HI OPTICS PWR ON
27VDC RLF LO
27VDC RLP HI PIL. PWR
1008
1000
1001
1002
1003
27VDC RLP HI OIA ON
28VDC GEN PWR LO
VARIABLE PA RESISTORS ONE FOR EAC THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB ±5° SCALE
CALIB ±20° SCALE
27VDC RLP HI OIA ON
TEMP BRIDGE C
BLK II GEN PWR CABLE
BLK II ISS, OSS & GEN PWR CABLE
BLK II ISS ONLY
TABLE MOUNTED J-BOX (T316)
BLOCK II PSA
IMU AUX MODULE
27.5 VDC
2K
PHOTOMETER ELECTRONICS MODULE
GUIDANCE & NAVIGATION INDICATOR CONTROL (GNIC) BLOCK II
BLOCK II PSA
BLOCK II CDU
MODE MODULE
PTA/PEA TEMP ALARM HI
PTA/PEA TEMP ALARM LO
PTA/PEA TEMP MON LO
CDU TEMP ALARM HI
CDU TEMP ALARM LO
CDU TEMP MON LO
PSA BLK II TEMP ALARM HI
PSA BLK II TEMP ALARM LO
PSA BLK II TEMP MON LO
CGC/LGC TEMP ALARM HI
CGC/LGC TEMP ALARM LO
CGC/LGC TEMP MON LO
IMU TEMP MON HI
IMU TEMP MON LO
CGC/LGC TEMP MON HI
PSA BLK II TEMP MON HI
CDU TEMP MON HI
PTA/PEA TEMP MON HI
PIPA CALIB. ASSY (PCA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
CGC COLDPLATE
IMU COOLANT INLET
IMU
TEMP ALARM MODULE
TPA NO.2
BLOCK II PSA
+28VDC PWR SUPPLY MOD.
THERMOSWITCH NORMALLY CLOSED OPEN AT HIGH TEMP >70°F
2900207
REV LTR M
SH 4

1/2900207

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD



926 GIMBAL DUMP INTERLOCK (TCL-926)
927 GIMBAL DUMP INDICATION (TCL-927)
924 GIMBAL DUMP INHIBIT (GPC-924)
1 GSE CHASSIS GRD BUS
2 GSE SHIELD GRD BUS
1 27VDC RLP LO (RLP-1)
896 115V,400CPS PH A PIL. PWR (FTR-896)
3 115V,400CPS NEUT (FTR-3)
743 27VDC RLP HI 155 OPERATE (TCL-743)
1374 OIA ON COMMAND (TCL-1374)
494 27VDC RLP HI (FTR-494)
902 27VDC RLP HI PDL-902 TCL-902 TMC-902
FLASHER
ENABLE
CIRCUIT POWER SUPPLY
GIMBAL DUMP
GIMBAL DUMP INHIBITED
VERIFICATION OF GATE OPERATION
40 SEC ELECTRONIC TIME DELAY N.O. ±10%
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
TRICKLE CHARGER
CHARGEABLE BATTERY
ALARM
WHEEL PWR FAIL PUSH TO RESET
LAMP
M
-28VDC FAIL PUSH TO RESET
LAMP
PUSH TO INHIBIT
ALARM INHIBITED
ALARM DISABLE
VOLTAGE COMPARATOR WITH -28VDC TRIPS AT LOSS OF -28VDC
ENABLE
RSS-C
XBP-B
GPC-587
PDL-587
TMC-587
TCL-587
27VDC RLP HI 155 ONLY
587
-28VDC
27VDC IMU
TES-96
XBE-A
ABS-C
775
776
OIA BACKWALL
67 68 71 72 74 69 76 77 70 75 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94
1 3 4 5 6 7 8 9 10 11 12 13 14 15
9 8 7 6 5 4 3 2 1
H G F E D C B A

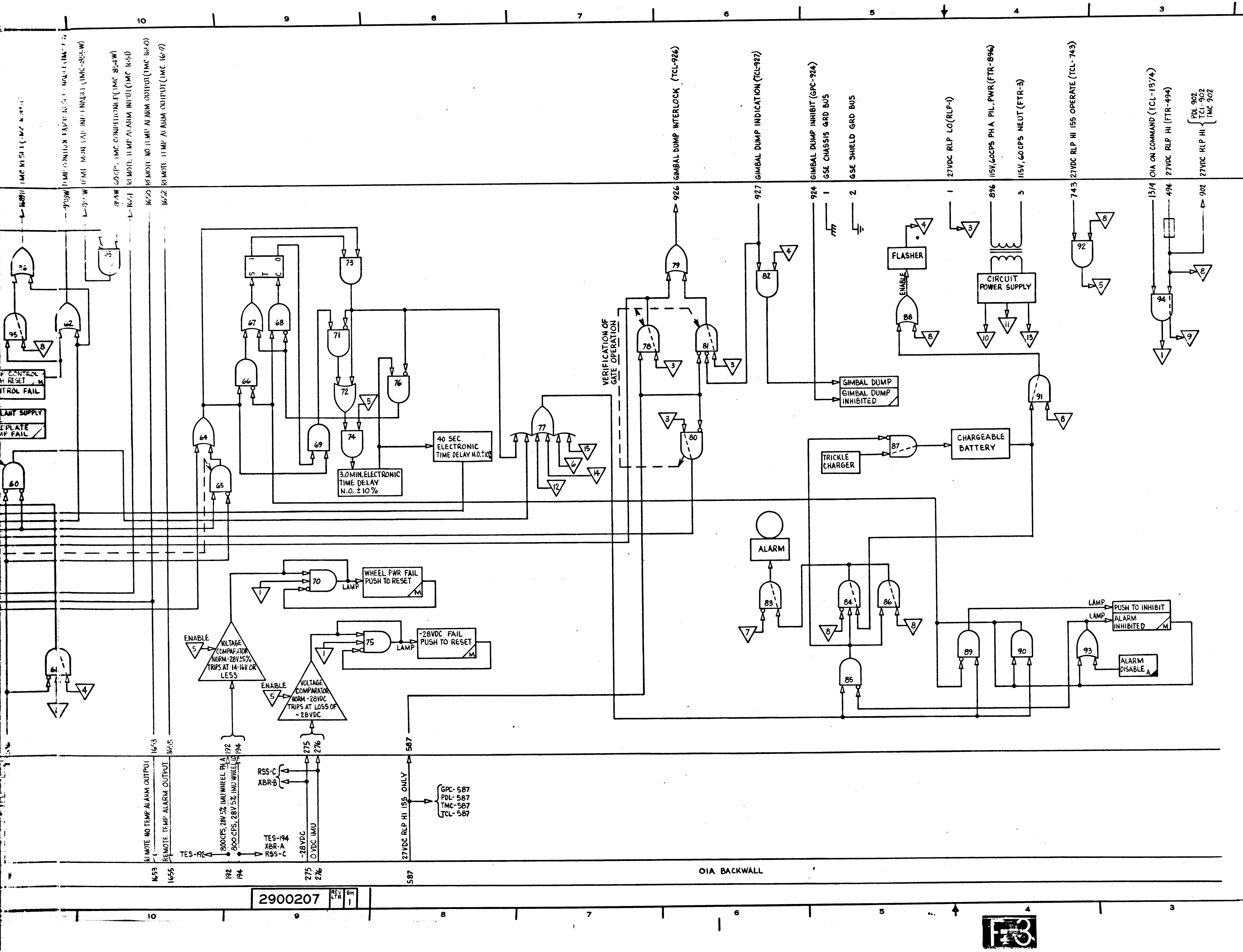
4H

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN	MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK I SERIES 100, BLOCK II, LEM)
MATERIAL —	DRAWN Solane DATE 7 MAY 65 CHECKED Ed Fitz [illegible] APPROVAL [illegible] APPROVAL [illegible]	CODE IDENT NO. SIZE 2900207
CONTRACT	NASA APPROVAL [illegible] MIT APPROVAL [illegible]	SCALE — SHEET 1 OF 4

2900207

2900207

F-4


10
9
8
7
6
5
4
3
2
SYM
ZONE
1689
IMC RESET (IMC
TEMP CONTROL FAIL RESET ENABLE (IMC
TEMP MON FAIL IND ENABLE (IMC-354 W)
60CPS, IMC CONDITIONED (IMC 854 W)
REMOTE TEMP ALARM INPUT (IMC 1651)
REMOTE NO TEMP ALARM OUTPUT (IMC 1650)
REMOTE TEMP ALARM OUTPUT (IMC 1652)
854W
1651
1650
1652
GIMBAL DUMP INTERLOCK (TCL-926)
GIMBAL DUMP INDICATION (TCL-927)
GIMBAL DUMP INHIBIT (GPC-924)
GSE CHASSIS GRD BUS
GSE SHIELD GRD BUS
27VDC RLP LO (RLP-1)
115V, 60CPS PH A PIL. PWR (FTR-896)
115V, 60CPS NEUT (FTR-3)
27VDC RLP HI ISS OPERATE (TCL-743)
OIA ON COMMAND (TCL-1374)
27VDC RLP HI (FTR-494)
27VDC RLP HI
PDL 902
TCL 902
TMC 902
926
927
924
1
2
1
896
3
743
1374
494
902
CONTROL
H RESET
M
NTROL FAIL
LANT SUPPLY
E PLATE
MP FAIL
S
T
C
O
FLASHER
ENABLE
CIRCUIT POWER SUPPLY
VERIFICATION OF GATE OPERATION
GIMBAL DUMP
GIMBAL DUMP INHIBITED
40 SEC ELECTRONIC TIME DELAY N.O. ±10%
3.0 MIN. ELECTRONIC TIME DELAY N.O. ±10%
TRICKLE CHARGER
CHARGEABLE BATTERY
ALARM
WHEEL PWR FAIL PUSH TO RESET
M
LAMP
-28VDC FAIL PUSH TO RESET
M
LAMP
PUSH TO INHIBIT
LAMP
ALARM INHIBITED
M
LAMP
ALARM DISABLE
A
ENABLE
VOLTAGE COMPARATOR NORM-28V±5% TRIPS AT 14-16V OR LESS
ENABLE
VOLTAGE COMPARATOR NORM -28VDC TRIPS AT LOSS OF -28VDC
36
35
95
62
60
61
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
1
3
4
5
6
7
8
9
10
11
12
13
14
15
1653
1655
192
194
275
276
587
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
800CPS, 28V 5% IMU WHEEL PH A
800 CPS, 28V 5% IMU WHEEL LO
TES-192
TES-194
XBR-A
RSS-C
RSS-C
XBR-B
-28VDC
0 VDC IMU
27VDC RLP HI ISS ONLY
GPC-587
PDL-587
TMC-587
TCL-587
OIA BACKWALL
2900207
REV LTR
SH
1

UNLESS OTHERWISE SPECIFIED

DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ ___	+ ___	+ ___
−	−	−

DO NOT SCALE THIS DRAWING

MATERIAL ___

CONTRACT

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN Solana DATE 7 MAY 66

CHECKED

APPROVAL

APPROVAL

NASA APPROVAL

MIT APPROVAL

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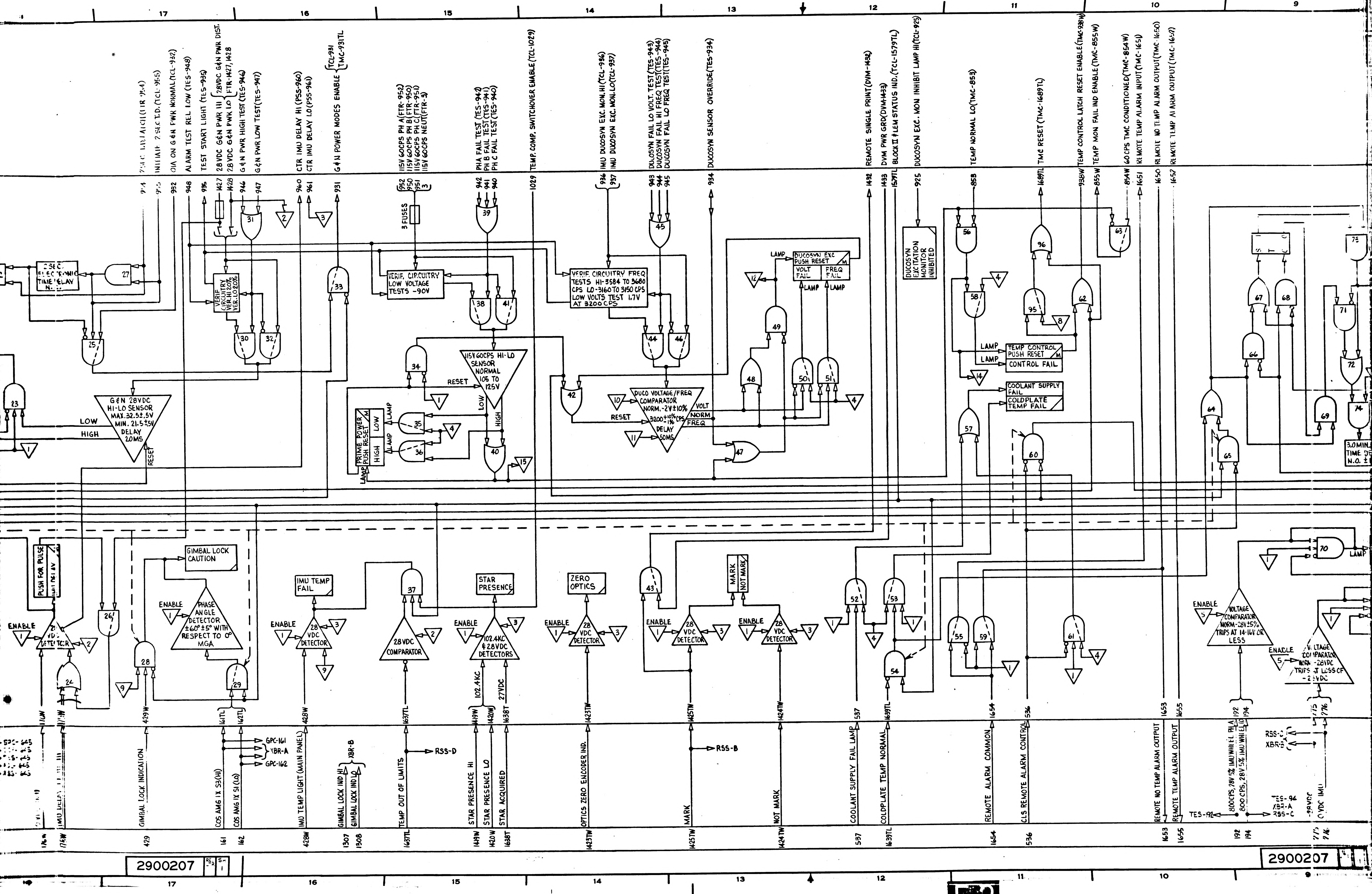
17
16
15
14
13
12
11
10
9
2SEC T.D. LATCH (FTR 954)
INITIATE 2 SEC T.D. (TCL-955)
OIA ON G&N PWR NORMAL (TCL-932)
ALARM TEST REL LOW (TES-948)
TEST START LIGHT (TES-935)
28VDC G&N PWR HI
28VDC G&N PWR LO
28VDC G&N PWR DIST. FTR-1427, 1428
G&N PWR HIGH TEST (TES-946)
G&N PWR LOW TEST (TES-947)
CTR IMU DELAY HI (PSS-960)
CTR IMU DELAY LO (PSS-961)
G&N POWER MODES ENABLE
TCL-931
TMC-931TL
115V 60CPS PH A (FTR-952)
115V 60CPS PH B (FTR-950)
115V 60CPS PH C (FTR-951)
115V 60CPS NEUT (FTR-3)
PHA FAIL TEST (TES-942)
PH B FAIL TEST (TES-941)
PH C FAIL TEST (TES-940)
TEMP. COMP. SWITCHOVER ENABLE (TCL-1029)
IMU DUCOSYN EXC. MON. HI (TCL-936)
IMU DUCOSYN EXC. MON. LO (TCL-937)
DUCOSYN FAIL LO VOLT. TEST (TES-943)
DUCOSYN FAIL HI FREQ TEST (TES-944)
DUCOSYN FAIL LO FREQ TEST (TES-945)
DUCOSYN SENSOR OVERRIDE (TES-934)
REMOTE SINGLE PRINT (DVM-1432)
DVM PWR GRD (DVM-1433)
BLOCK II & LEM STATUS IND. (TCL-1579TL)
DUCOSYN EXC. MON INHIBIT LAMP HI (TCL-925)
TEMP NORMAL LO (TMC-853)
TMC RESET (TMC-1689TL)
TEMP CONTROL LATCH RESET ENABLE (TMC-938W)
TEMP MON FAIL IND ENABLE (TMC-855W)
60CPS TMC CONDITIONED (TMC-854W)
REMOTE TEMP ALARM INPUT (TMC-1651)
REMOTE NO TEMP ALARM OUTPUT (TMC-1650)
REMOTE TEMP ALARM OUTPUT (TMC-1652)
954
955
932
948
935
1427
1428
946
947
960
961
931
952
950
951
3
3 FUSES
942
941
940
1029
936
937
943
944
945
934
1432
1433
1579TL
925
853
1689TL
938W
855W
854W
1651
1650
1652
2SEC. ELECTRONIC TIME DELAY N.O.
VERIF CIRCUITRY VER. HI 20% VER. LO 20%
VERIF. CIRCUITRY LOW VOLTAGE TESTS -90V
VERIF. CIRCUITRY FREQ TESTS HI-3584 TO 3680 CPS LO-3160 TO 3150 CPS LOW VOLTS TEST 1.7V AT 3200 CPS
LAMP
DUCOSYN EXC PUSH RESET M
VOLT FAIL
FREQ FAIL
DUCOSYN EXCITATION MONITOR INHIBITED
TEMP CONTROL PUSH RESET M
CONTROL FAIL
COOLANT SUPPLY FAIL
COLDPLATE TEMP FAIL
G&N 28VDC HI-LO SENSOR MAX. 32.5±.5V MIN. 21.5±.5V DELAY 20MS
LOW
HIGH
RESET
115V 60CPS HI-LO SENSOR NORMAL 105 TO 125V
PRIME POWER PUSH RESET M
LOW
HIGH
DUCO VOLTAGE/FREQ COMPARATOR NORM. -2V±10% 3200 +10% -1% CPS DELAY 50MS
VOLT
NORM
FREQ
3.0 MIN TIME DE N.O.
S T C
PUSH FOR PULSE
IMU DELAY
GIMBAL LOCK CAUTION
ENABLE
28 VDC DETECTOR
PHASE ANGLE DETECTOR ±60° ±5° WITH RESPECT TO 0° MGA
IMU TEMP FAIL
28VDC COMPARATOR
STAR PRESENCE
102.4KC & 28VDC DETECTORS
102.4KC
27VDC
ZERO OPTICS
MARK NOT MARK
VOLTAGE COMPARATOR NORM-28V±5% TRIPS AT 14-16V OR LESS
VOLTAGE COMPARATOR NORM -28VDC TRIPS AT LOSS OF -28VDC
23
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71
72
73
74
95
96
176W
175W
429W
161TL
162TL
428W
1637TL
1419W
1420W
1638T
1423TW
1425TW
1424TW
537
1639TL
1654
536
1653
1655
192
194
775
776
GPC-161
XBR-A
GPC-162
XBR-B
RSS-D
RSS-B
RSS-C
XBR-B
TES-192
TES-94
XBR-A
RSS-C
GPC-645
IMU DELAY
GIMBAL LOCK INDICATION
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
IMU TEMP LIGHT (MAIN PANEL)
GIMBAL LOCK IND HI
GIMBAL LOCK IND LO
TEMP OUT OF LIMITS
STAR PRESENCE HI
STAR PRESENCE LO
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
REMOTE ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
800CPS, 28V 5% IMU WHEEL PH A
800 CPS, 28V 5% IMU WHEEL LO
-28VDC
0VDC IMU
176W
175W
429
161
162
428W
1307
1308
1637TL
1419W
1420W
1638T
1423TW
1425TW
1424TW
537
1639TL
1654
536
1653
1655
192
194
775
776
2900207
2900207
E2

NOTES:

1. INTEPPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS:

2900210	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR) RLP RELAY & LAMP POWER SUPPLY
2900204	TEMPERATURE MONITOR CONTROL PANEL (BLOCK I, SERIES 100)(TMC)
2900203	TEMPERATURE MONITOR CONTROL PANEL (BLOCK II & LEM)(TMC)
2900208	POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL)
2900223	GIMBAL POSITION CONTROL (GPC)
2900202	TEST CONTROL PANEL (BLOCK I, SERIES 100)(TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM)(TCL)
2900206	TEST SELECTOR PANEL (TES)
2900200	GYRO CAGING PANEL (BLOCK II & LEM)(GCP)
2900218	OSCILLOGRAPH SIGNAL SELECTION RSS-B TO FIXED DC CHANNEL, RSS-C TO SWITCHABLE AC CHANNEL, RSS-D TO SWITCHABLE DC CHANNEL
2900217	SIGNAL SELECTION & MEASUREMENT XBR-A CROSSBAR-AC SIGNALS XBR-B CROSSBAR-DC SIGNALS
2900219	COUNTER SIGNAL SELECTION PRIMARY SIGNAL SELECTOR (PSS)
2900214	GSE GROUNDING (BLOCK I SERIES 100)
2900213	GSE GROUNDING (BLOCK II & LEM)
2900209	COMPUTER SIMULATOR INTERFACE (CMS)
2900211	AUXILIARY INPUT/OUTPUT CALIBRATION (AIP)

4. NON STANDARD SYMBOLOGY:

INDICATES "AND" GATE WITH SWITCHED SIGNAL

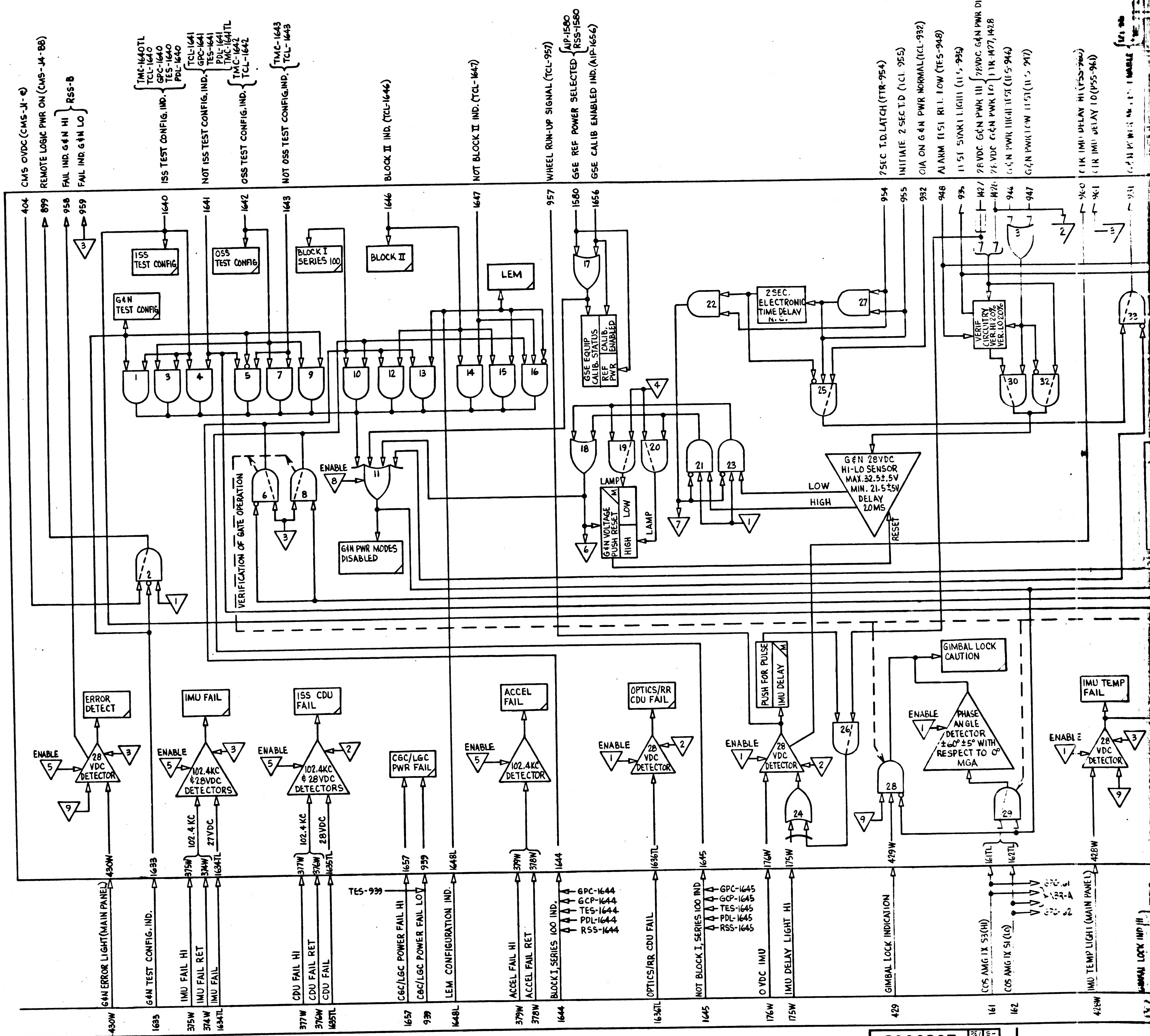
NAME	INDICATES INDICATOR LIGHT
NAME M	INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
NAME NAME	INDICATES SPLIT SCREEN INDICATOR LIGHT
NAME NAME M	INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (MOMENTARY ACTION)
NAME A	INDICATES UNLIGHTED PUSHBUTTON OR TOGGLE SWITCH (ALTERNATE ACTION)

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   - A. W-BLOCK I SERIES 100 ONLY
   - B. T-BLOCK II ONLY
   - C. L-LEM ONLY
   - D. BLANK-ALL G&N CONFIGURATIONS
   - E. TW, TL OR WL-USED IN MORE THAN ONE G&N CONFIGURATION AS SHOWN.
6. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK I SERIES 100	SH 1 SH 2
BLOCK II	SH 1 SH 3
LEM	SH 1 SH 4

7. SIGNAL REFERENCE:

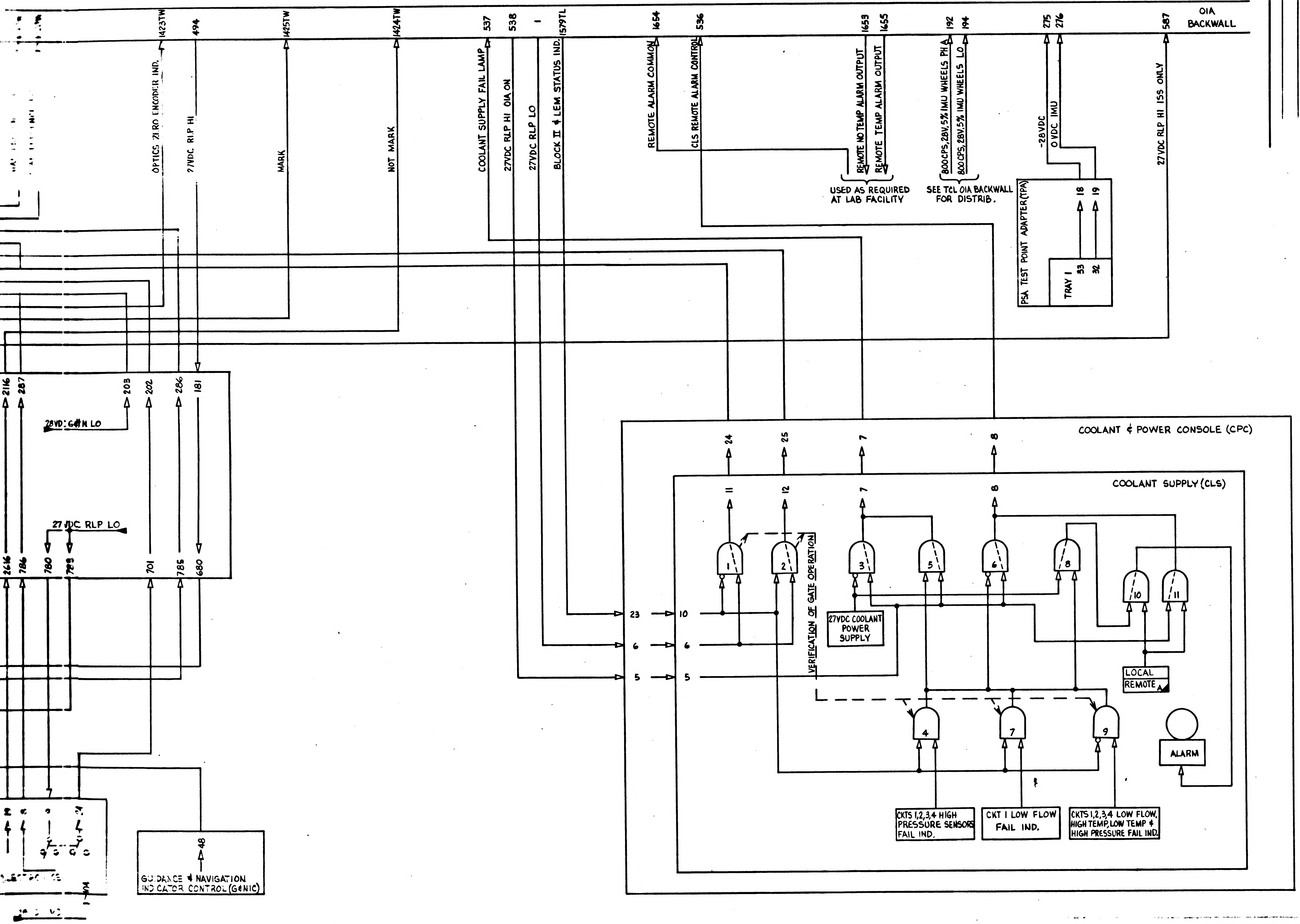
1 = OIA ON
2 = 28VDC G&N PWR LO
3 = 27 VDC RLP LO
4 = FLASHER
5 = ISS OPER. 5SEC T.D.
6 = G&N PWR FAIL
7 = 2 SEC T.D. AT OIA ON
8 = 27 VDC PIL. PWR
9 = 27VDC OIA ON
10 = +28VDC
11 = -28VDC
12 = DUCO EXC. FAIL
13 = +45 VDC
14 = TMC FAIL
15 = PRIME PWR FAIL



CMS OVDC (CMS-J1-e)
REMOTE LOGIC PWR ON (CMS-J4-BB)
FAIL IND. G&N HI
FAIL IND. G&N LO
RSS-B
404
899
958
959
TMC-1640TL
TCL-1640
GPC-1640
TES-1640
PDL-1640
ISS TEST CONFIG. IND.
1640
TCL-1641
GPC-1641
TES-1641
PDL-1641
TMC-1641TL
NOT ISS TEST CONFIG. IND.
1641
TMC-1642
TCL-1642
OSS TEST CONFIG. IND.
1642
TMC-1643
TCL-1643
NOT OSS TEST CONFIG. IND.
1643
BLOCK II IND. (TCL-1646)
1646
NOT BLOCK II IND. (TCL-1647)
1647
WHEEL RUN-UP SIGNAL (TCL-957)
957
AIP-1580
RSS-1580
GSE REF POWER SELECTED
GSE CALIB ENABLED IND. (AIP-1656)
1580
1656
2SEC T.D. LATCH (FTR-954)
INITIATE 2 SEC T.D (TCL 955)
OIA ON G&N PWR NORMAL (TCL-932)
ALARM TEST REL LOW (TES-948)
TEST START LIGHT
28VDC G&N PWR HI
28VDC G&N PWR LO
G&N PWR DIST.
FTR-1427, 1428
G&N PWR HIGH TEST (TES-944)
G&N PWR LOW TEST
954
955
932
948
1427
1428
944
947
CLK IMU DELAY HI (PSS-960)
CLK IMU DELAY LO (PSS-961)
ISS TEST CONFIG
OSS TEST CONFIG
BLOCK I SERIES 100
BLOCK II
LEM
G&N TEST CONFIG
GSE EQUIP CALIB. STATUS
REF. PWR
CALIB. ENABLED
2SEC. ELECTRONIC TIME DELAY
VERIF CIRCUITRY
VER. HI 20%
VER. LO 20%
ENABLE
G&N PWR MODES DISABLED
VERIFICATION OF GATE OPERATION
LAMP
G&N VOLTAGE PUSH RESET
HIGH
LOW
G&N 28VDC HI-LO SENSOR
MAX. 32.5±.5V
MIN. 21.5±.5V
DELAY 2.0MS
RESET
LOW
HIGH
ERROR DETECT
28 VDC DETECTOR
IMU FAIL
102.4KC & 28VDC DETECTORS
ISS CDU FAIL
CGC/LGC PWR FAIL
ACCEL FAIL
102.4KC DETECTOR
OPTICS/RR CDU FAIL
PUSH FOR PULSE
IMU DELAY
GIMBAL LOCK CAUTION
PHASE ANGLE DETECTOR ±60°±5° WITH RESPECT TO 0° MGA
IMU TEMP FAIL
102.4 KC
27VDC
28VDC
430W
1633
375W
374W
1634TL
377W
376W
1635TL
1657
939
1648L
379W
378W
1644
1636TL
1645
176W
175W
429W
161TL
162TL
428W
TES-939
GPC-1644
GCP-1644
TES-1644
PDL-1644
RSS-1644
GPC-1645
GCP-1645
TES-1645
PDL-1645
RSS-1645
GPC-01
XBR-A
GPC-02
G&N ERROR LIGHT (MAIN PANEL)
G&N TEST CONFIG. IND.
IMU FAIL HI
IMU FAIL RET
IMU FAIL
CDU FAIL HI
CDU FAIL RET
CDU FAIL
CGC/LGC POWER FAIL HI
CGC/LGC POWER FAIL LO
LEM CONFIGURATION IND.
ACCEL FAIL HI
ACCEL FAIL RET
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND
O VDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK INDICATION
COS AMG IX S3(HI)
COS AMG IX S1(LO)
IMU TEMP LIGHT (MAIN PANEL)
GIMBAL LOCK IND
430W
1633
375W
374W
1634TL
377W
376W
1635TL
1657
939
1648L
379W
378W
1644
1636TL
1645
176W
175W
429
161
162
428W
2900207

MIL FORM 1050 J3

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

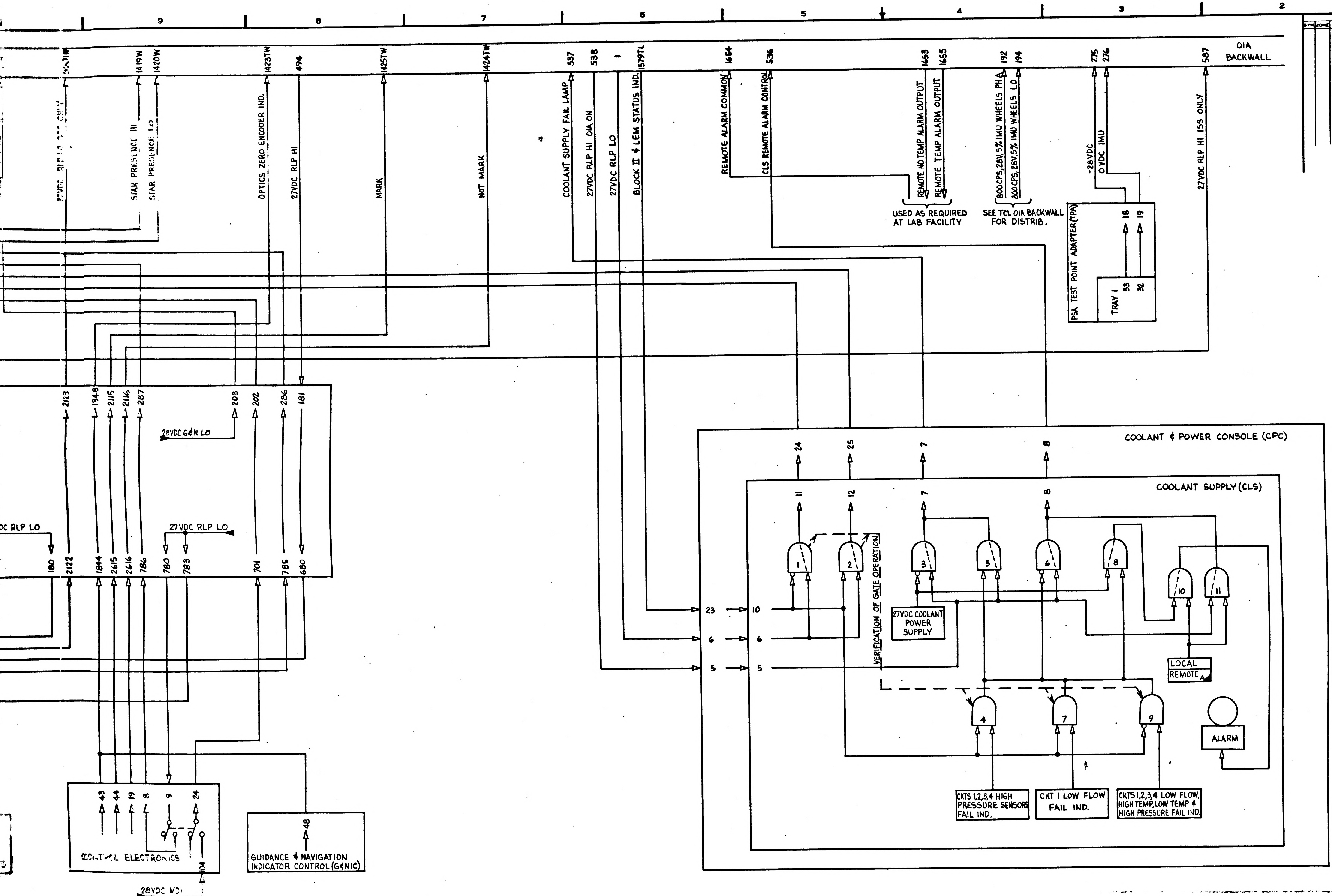

OIA BACKWALL
1423TW
494
1425TW
1424TW
537
538
1579TL
1654
536
1653
1655
192
194
275
276
587
OPTICS ZERO ENCODER IND.
27VDC RLP HI
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND.
REMOTE ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
800CPS, 28V, 5% IMU WHEELS PH A
800CPS, 28V, 5% IMU WHEELS LO
-28VDC
0VDC IMU
27VDC RLP HI ISS ONLY
USED AS REQUIRED AT LAB FACILITY
SEE TCL OIA BACKWALL FOR DISTRIB.
PSA TEST POINT ADAPTER (TPA)
18
19
TRAY I
53
32
2116
287
203
202
286
181
28VDC G&N LO
27VDC RLP LO
2616
786
780
789
701
785
680
48
GUIDANCE & NAVIGATION INDICATOR CONTROL (G&NIC)
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
1
2
3
5
6
8
10
11
4
7
9
23
10
6
6
5
5
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE A
ALARM
CKTS 1,2,3,4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL IND.
CKTS 1,2,3,4 LOW FLOW, HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND.

2H

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± __ DECIMALS ± __ ANGLES ± __	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN Solane DATE 7 MAY 65	MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK I SERIES 100)
	CHECKED Ed Foster 14 MAY 65	
	APPROVAL	
DO NOT SCALE THIS DRAWING	APPROVAL	
MATERIAL __	NASA APPROVAL	CODE IDENT NO. / SIZE / 2900207
CONTRACT	MIT APPROVAL	SCALE — / SHEET 2 OF 4

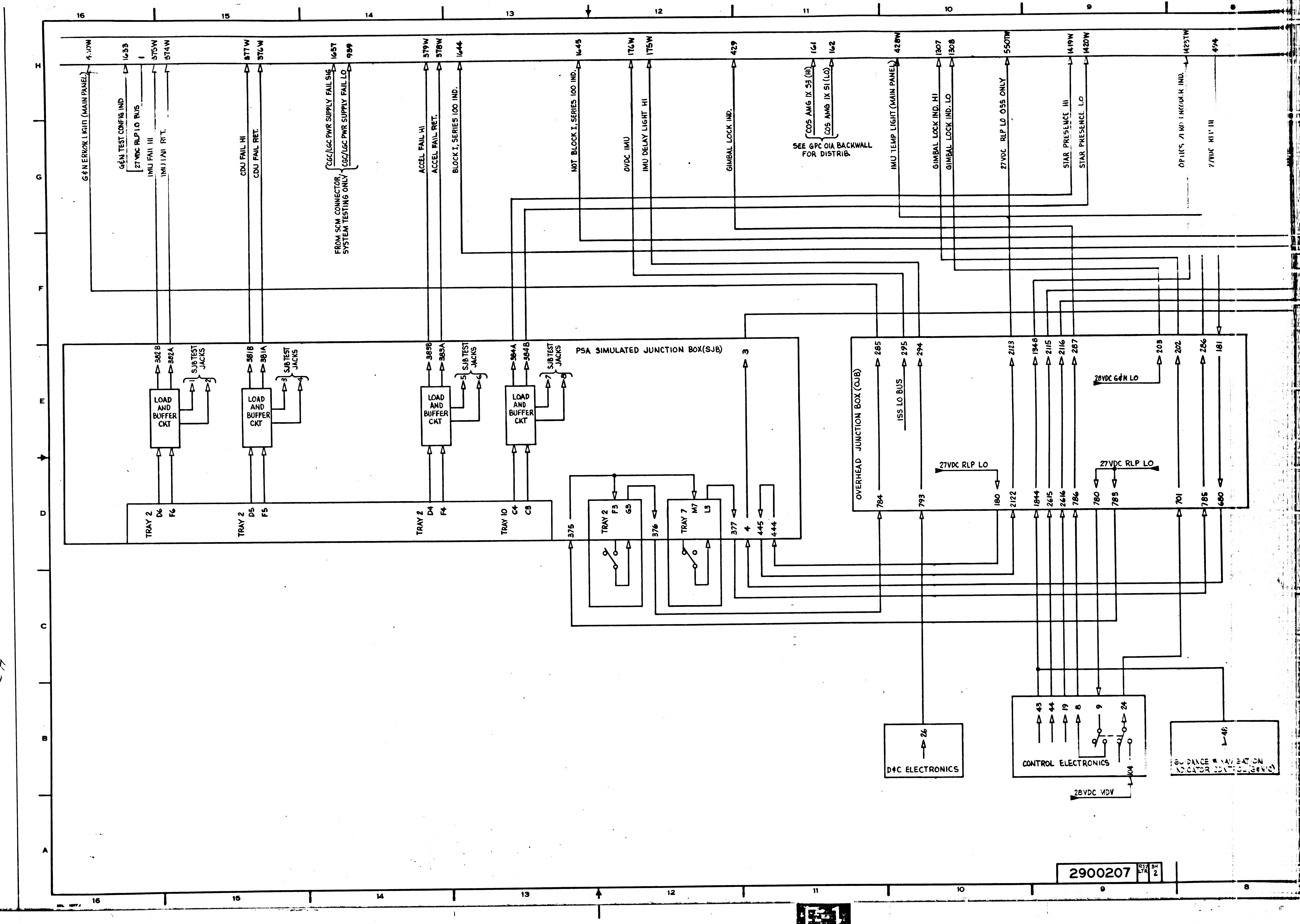
2900207 REV LTR SH 2

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPD
		CHG NO		


9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
OIA
BACKWALL
1419W
1420W
1423TW
494
1425TW
1424TW
537
538
1579TL
1654
536
1653
1655
192
194
275
276
587
STAR PRESENCE HI
STAR PRESENCE LO
OPTICS ZERO ENCODER IND.
27VDC RLP HI
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND.
REMOTE ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
800CPS,28V,5% IMU WHEELS PH A
800CPS,28V,5% IMU WHEELS LO
-28VDC
0VDC IMU
27VDC RLP HI ISS ONLY
USED AS REQUIRED AT LAB FACILITY
SEE TCL OIA BACKWALL FOR DISTRIB.
PSA TEST POINT ADAPTER (TPA)
TRAY 1
18
19
33
32
2123
1348
2115
2116
287
203
202
286
181
28VDC G&N LO
DC RLP LO
27VDC RLP LO
180
2122
1844
2615
2616
786
780
783
701
785
680
43
44
19
8
9
24
CONTROL ELECTRONICS
104
28VDC MDI
48
GUIDANCE & NAVIGATION INDICATOR CONTROL (G&NIC)
COOLANT & POWER CONSOLE (CPC)
24
25
7
8
COOLANT SUPPLY (CLS)
11
12
7
8
23
10
6
6
5
5
1
2
3
5
6
8
10
11
4
7
9
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
ALARM
CKTS 1,2,3,4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL IND.
CKTS 1,2,3,4 LOW FLOW, HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND.

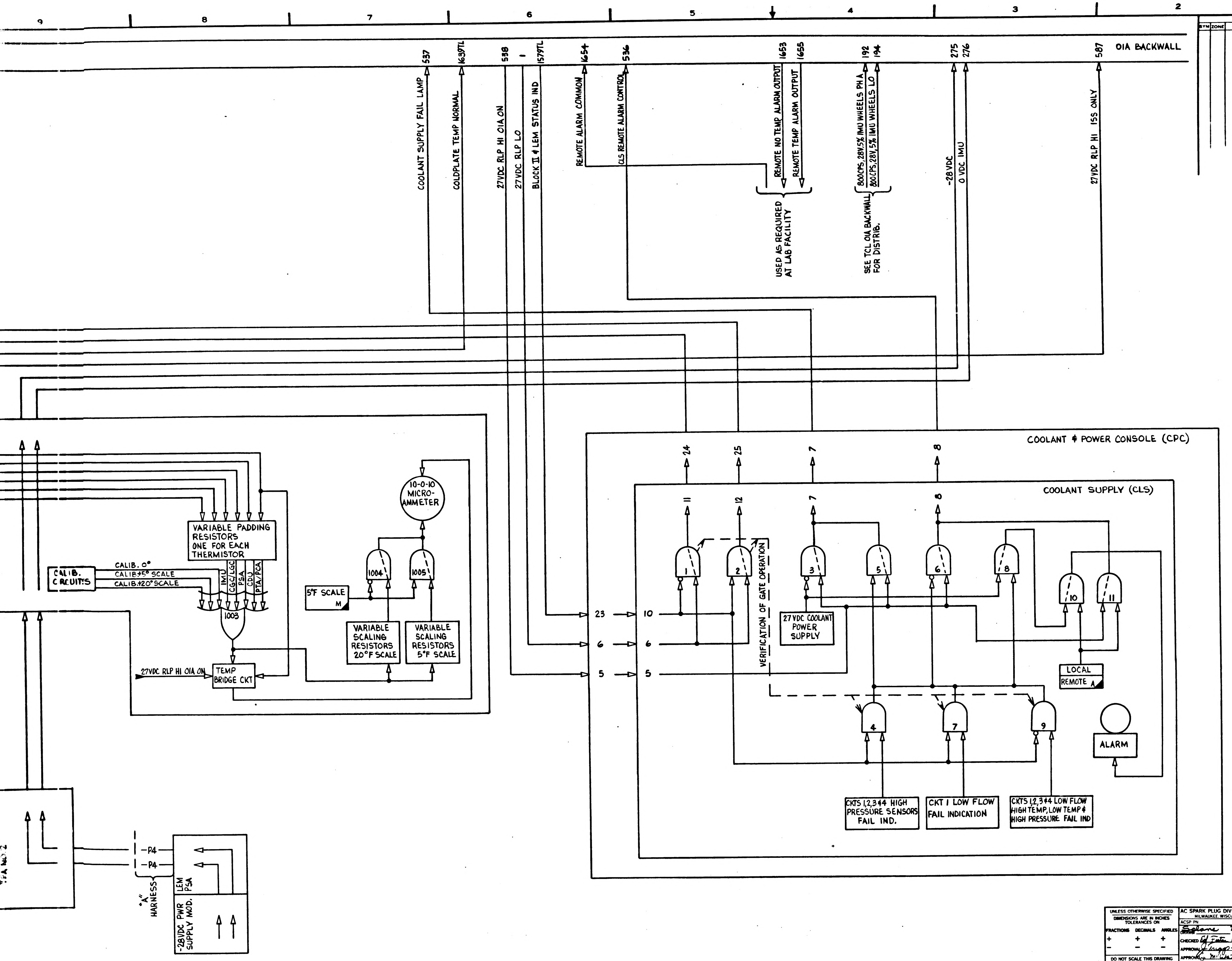
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ___ ± ___ ± ___	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN Solane DATE 7 MAY 65 CHECKED Ed Foster 4 MAY 65 APPROVAL APPROVAL	MANNED SPACECRAFT CENTER HOUSTON, TEXAS MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK I SERIES 100)
DO NOT SCALE THIS DRAWING MATERIAL ___ CONTRACT	NASA APPROVAL MIT APPROVAL	CODE IDENT NO. SIZE 2900207 SCALE — SHEET 2 OF 4

2900207	REV LTR	SH 2



16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
G&N ERROR LIGHT (MAIN PANEL)
G&N TEST CONFIG IND
27 VDC RLP LO BUS
IMU FAIL HI
IMU FAIL RET.
CDU FAIL HI
CDU FAIL RET.
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR, SYSTEM TESTING ONLY
ACCEL FAIL HI
ACCEL FAIL RET.
BLOCK I, SERIES 100 IND.
NOT BLOCK I, SERIES 100 IND.
OVDC IMU
IMU DELAY LIGHT HI
GIMBAL LOCK IND.
COS AMG IX 53 (HI)
COS AMG IX 51 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
IMU TEMP LIGHT (MAIN PANEL)
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
27VDC RLP LO OSS ONLY
STAR PRESENCE HI
STAR PRESENCE LO
OPTICS ZERO ENCODER IND.
27VDC RLP HI
1430W
1633
375W
374W
377W
376W
1657
939
379W
378W
1644
1645
176W
175W
429
161
162
428W
1307
1308
550TW
1419W
1420W
1423TW
494
PSA SIMULATED JUNCTION BOX (SJB)
LOAD AND BUFFER CKT
LOAD AND BUFFER CKT
LOAD AND BUFFER CKT
LOAD AND BUFFER CKT
SJB TEST JACKS
SJB TEST JACKS
SJB TEST JACKS
SJB TEST JACKS
382B
382A
381B
381A
383B
383A
384A
384B
1
2
3
4
5
6
7
8
TRAY 2
D6
F6
TRAY 2
D5
F5
TRAY 2
D4
F4
TRAY 10
C4
C3
375
TRAY 2
F3
G3
376
TRAY 7
M7
L3
377
4
445
444
3
OVERHEAD JUNCTION BOX (OJB)
285
295
294
ISS LO BUS
2123
1348
2115
2116
287
28VDC G&N LO
203
202
286
181
27VDC RLP LO
27VDC RLP LO
784
793
180
2122
1844
2615
2616
786
780
783
701
785
680
26
D&C ELECTRONICS
43
44
19
8
9
24
CONTROL ELECTRONICS
104
28VDC VIDV
48
GUIDANCE & NAVIGATION INDICATOR CONTROL (G&N C)

2900207 REV LTR SH 2


9
8
7
6
5
4
3
2
1
OIA BACKWALL
537
1639TL
538
1
1579TL
1654
536
1653
1655
192
194
275
276
587
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND
REMOTE ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
800CPS, 28V, 5% IMU WHEELS PH A
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
-28 VDC
0 VDC IMU
27VDC RLP HI ISS ONLY
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB. ±5° SCALE
CALIB. ±20° SCALE
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
10-0-10 MICRO-AMMETER
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
COOLANT & POWER CONSOLE (CPC)
COOLANT SUPPLY (CLS)
24
25
7
8
11
12
7
8
23
6
5
10
6
5
VERIFICATION OF GATE OPERATION
1
2
3
5
6
8
10
11
4
7
9
27 VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND
-P4
-P4
"A" HARNESS
LEM PSA
-28VDC PWR SUPPLY MOD.
H
G
F
E
D
C
B
A

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

2H

2900207 REV LTR SH 3

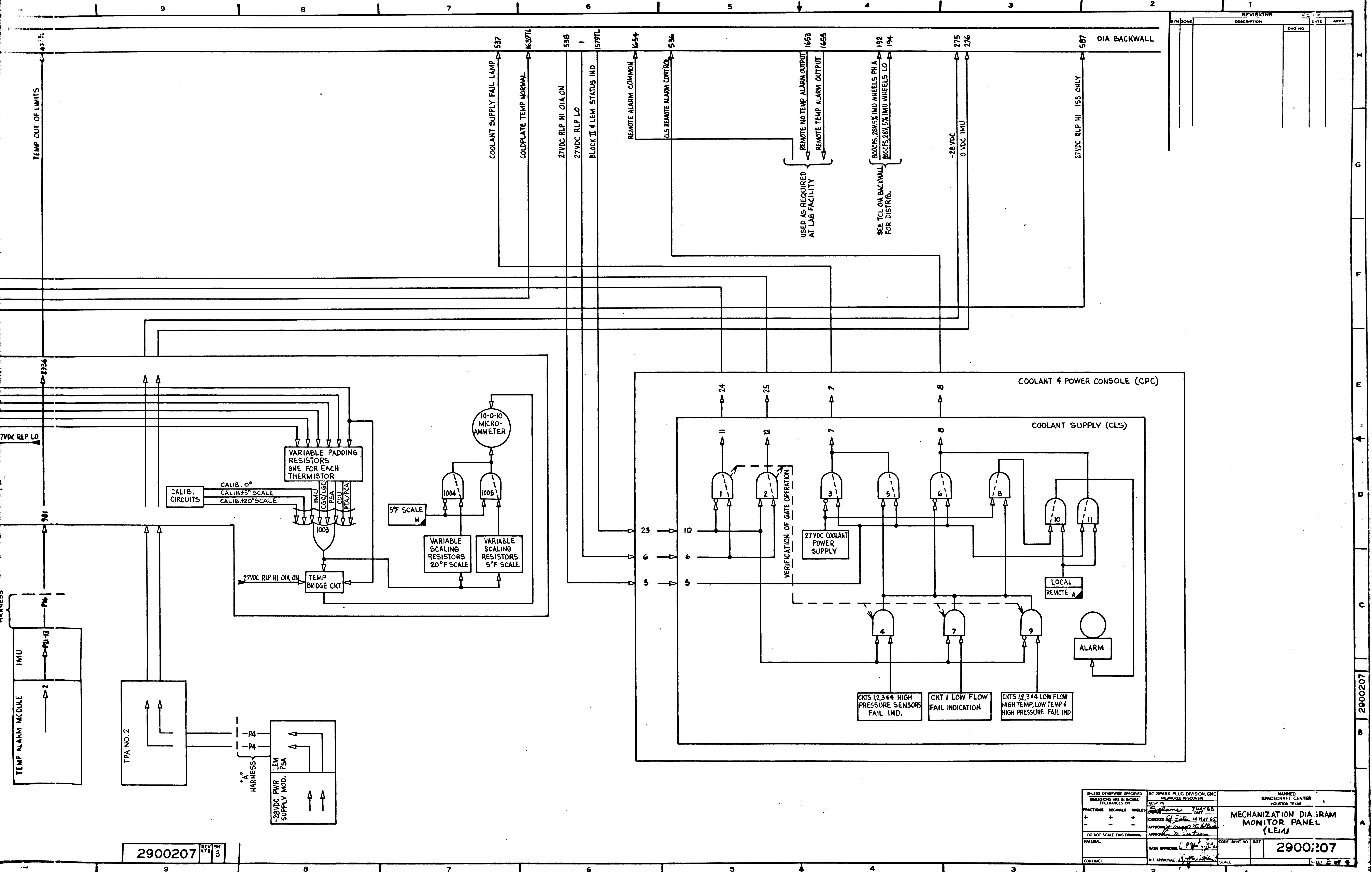
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Splane DATE 7 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
MONITOR PANEL
(LEM)

CODE IDENT NO. SIZE 2900207
SCALE SHEET 3 OF 4


REVISIONS
SYM
ZONE
DESCRIPTION
CHG NO
DATE
APPD
OIA BACKWALL
TEMP OUT OF LIMITS
2936
981
7VDC RLP LO
COOLANT SUPPLY FAIL LAMP
537
COLDPLATE TEMP NORMAL
1639TL
27VDC RLP HI OIA ON
538
27VDC RLP LO
1
BLOCK II & LEM STATUS IND
1579TL
REMOTE ALARM COMMON
1654
CLS REMOTE ALARM CONTROL
536
REMOTE NO TEMP ALARM OUTPUT
1653
REMOTE TEMP ALARM OUTPUT
1655
USED AS REQUIRED AT LAB FACILITY
800CPS, 28V, 5% IMU WHEELS PH A
192
800CPS, 28V, 5% IMU WHEELS LO
194
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
275
0 VDC IMU
276
27VDC RLP HI 155 ONLY
587
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB.±5° SCALE
CALIB.±20° SCALE
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
10-0-10 MICRO-AMMETER
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
COOLANT & POWER CONSOLE (CPC)
COOLANT SUPPLY (CLS)
24
25
7
8
11
12
7
8
23
6
5
10
6
5
1
2
3
5
6
8
10
11
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
4
7
9
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND
HARNESS
P16
P21-13
IMU
2
TEMP ALARM MODULE
TPA NO. 2
P4
P4
"A" HARNESS
LEM PSA
-28VDC PWR SUPPLY MOD.
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

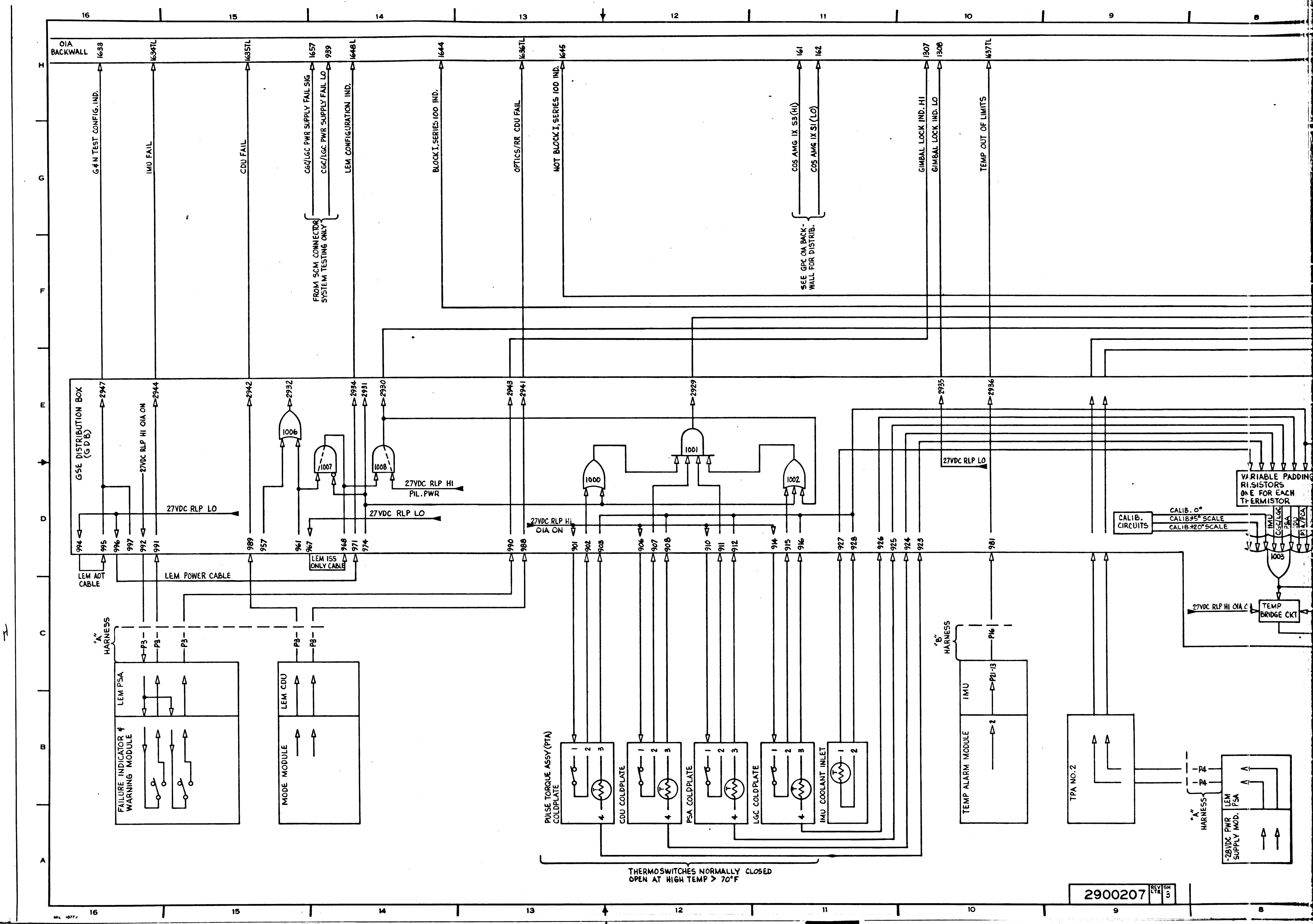
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Solane DATE 7 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

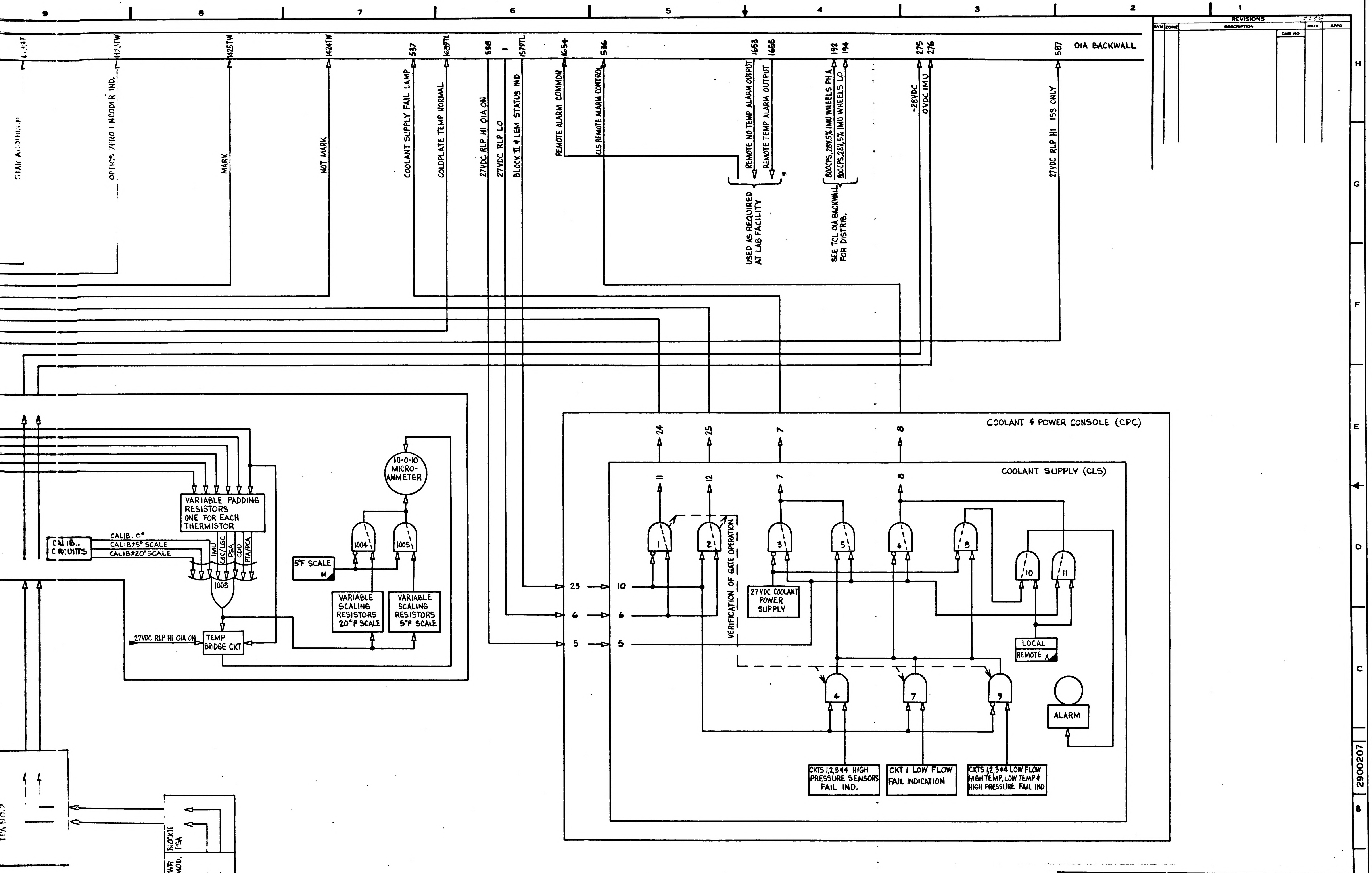
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
MONITOR PANEL
(LEM)

CODE IDENT NO. SIZE 2900207
SCALE SHEET 3 OF 4

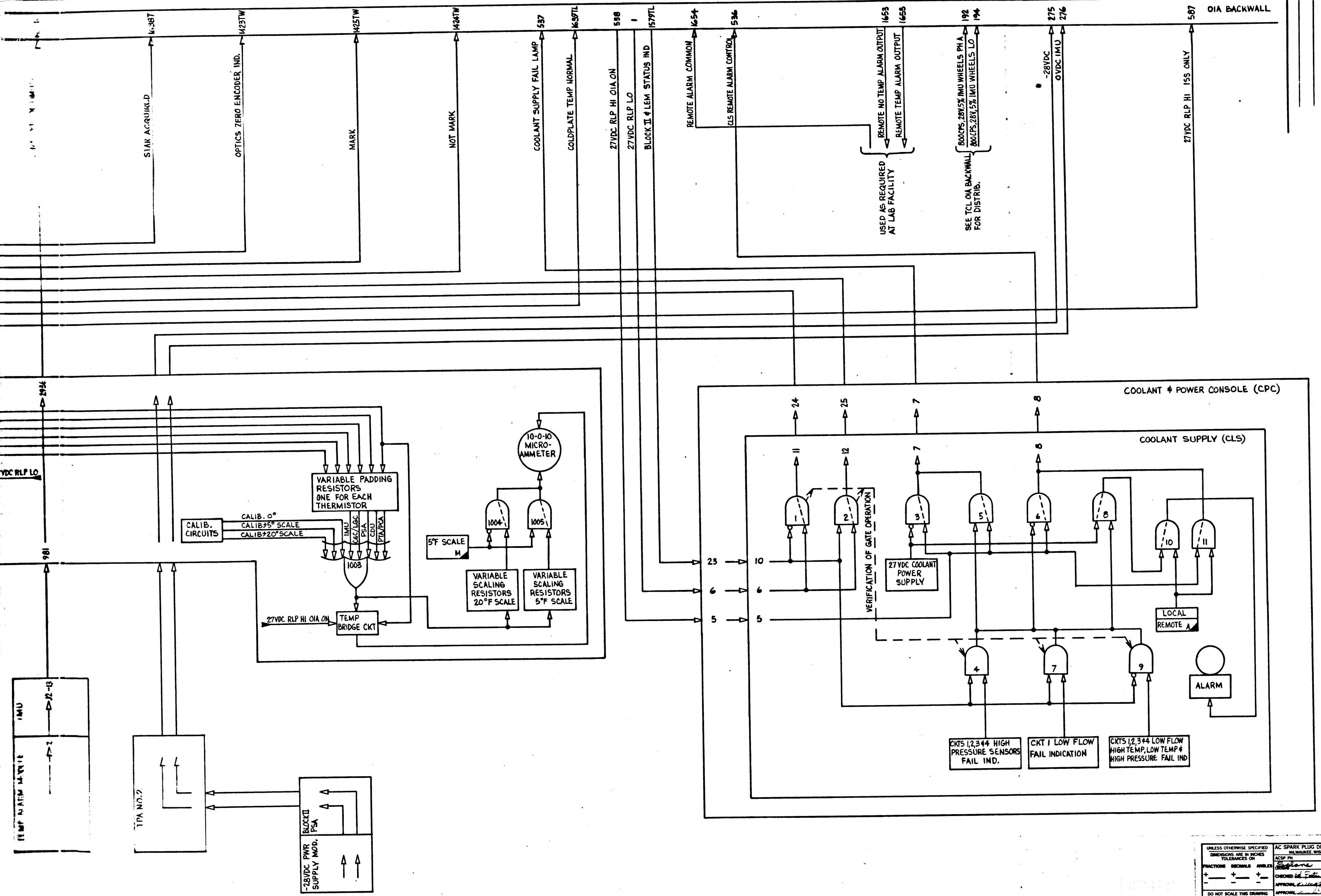
2900207 REV LTR SH 3


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1633
1634TL
1635TL
1657
939
1648L
1644
1636TL
1645
161
162
1307
1308
1637TL
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
LEM CONFIGURATION IND.
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
TEMP OUT OF LIMITS
FROM SCM CONNECTOR SYSTEM TESTING ONLY
SEE GPC OIA BACKWALL FOR DISTRIB.
GSE DISTRIBUTION BOX (GDB)
2947
2944
2942
2932
2934
2931
2930
2943
2941
2929
2935
2936
27VDC RLP HI OIA ON
1006
1007
1008
1000
1001
1002
27VDC RLP HI PIL. PWR
27VDC RLP LO
27VDC RLP LO
27VDC RLP HI OIA ON
27VDC RLP LO
994
995
996
997
992
991
989
957
961
967
968
971
974
990
988
901
902
903
906
907
908
910
911
912
914
915
916
927
928
926
925
924
923
981
LEM AOT CABLE
LEM POWER CABLE
LEM ISS ONLY CABLE
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB. ±5° SCALE
CALIB. ±20° SCALE
IMU
CGC/LGC
PSA
PDU
PTA/PCA
1003
27VDC RLP HI OIA C
TEMP BRIDGE CKT
"A" HARNESS
P3
P3
P3
P3
P3
LEM PSA
FAILURE INDICATOR & WARNING MODULE
LEM CDU
MODE MODULE
"B" HARNESS
P16
IMU
P21-13
2
TEMP ALARM MODULE
PULSE TORQUE ASSY (PTA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
LGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
THERMOSWITCHES NORMALLY CLOSED OPEN AT HIGH TEMP > 70°F
TPA NO. 2
P4
P4
"A" HARNESS
LEM PSA
-28VDC PWR SUPPLY MOD.
2900207
REV LTR
SH 3
ML 1077J


OIA BACKWALL
1423TW
1425TW
1424TW
537
1639TL
538
1579TL
1654
536
1653
1655
192
194
275
276
587
OPTICS ZERO ENCODER IND.
MARK
NOT MARK
COOLANT SUPPLY FAIL LAMP
COLDPLATE TEMP NORMAL
27VDC RLP HI OIA ON
27VDC RLP LO
BLOCK II & LEM STATUS IND
REMOTE ALARM COMMON
CLS REMOTE ALARM CONTROL
REMOTE NO TEMP ALARM OUTPUT
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
800CPS, 28V, 5% IMU WHEELS PH A
800CPS, 28V, 5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
-28VDC
0VDC IMU
27VDC RLP HI ISS ONLY
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB ± 5° SCALE
CALIB ± 20° SCALE
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
10-0-10 MICRO-AMMETER
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
BLOCK II PSA
-28VDC PWR SUPPLY MOD.
COOLANT & POWER CONSOLE (CPC)
COOLANT SUPPLY (CLS)
24
25
7
8
11
12
7
8
23
6
5
10
6
5
1
2
3
5
6
8
10
11
4
7
9
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
LOCAL
REMOTE
A
ALARM
CKTS 1,2,3 & 4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3 & 4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND
REVISIONS
SYM
ZONE
DESCRIPTION
CHG NO
DATE
APPD
2900207

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN Solano DATE 7 MAY 65 CHECKED Ed Foster 14 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM MONITOR PANEL (BLOCK II)
DO NOT SCALE THIS DRAWING		
MATERIAL	NASA APPROVAL	CODE IDENT NO. SIZE 2900207
CONTRACT	MIT APPROVAL 20 May 65	SCALE — SHEET 4 OF 4

2900207 4


OIA BACKWALL
1638T
STAR ACQUIRED
1423TW
OPTICS ZERO ENCODER IND.
1425TW
MARK
1424TW
NOT MARK
537
COOLANT SUPPLY FAIL LAMP
1639TL
COLDPLATE TEMP NORMAL
558
27VDC RLP HI OIA ON
27VDC RLP LO
1579TL
BLOCK II & LEM STATUS IND
1654
REMOTE ALARM COMMON
536
CLS REMOTE ALARM CONTROL
1653
REMOTE NO TEMP ALARM OUTPUT
1655
REMOTE TEMP ALARM OUTPUT
USED AS REQUIRED AT LAB FACILITY
192
194
800CPS,28V,5% IMU WHEELS PH A
800CPS,28V,5% IMU WHEELS LO
SEE TCL OIA BACKWALL FOR DISTRIB.
275
276
-28VDC
OVDC IMU
587
27VDC RLP HI ISS ONLY
2936
981
27VDC RLP LO
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB±5° SCALE
CALIB±20° SCALE
IMU
CGC/LGC
PSA
CDU
PTA/PCA
1003
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
10-0-10 MICRO-AMMETER
1004
1005
5°F SCALE
M
VARIABLE SCALING RESISTORS 20°F SCALE
VARIABLE SCALING RESISTORS 5°F SCALE
IMU
J2-13
2
TEMP ALARM MATRIX
TPA NO.2
BLOCK II PSA
-28VDC PWR SUPPLY MOD.
COOLANT & POWER CONSOLE (CPC)
COOLANT SUPPLY (CLS)
24
25
7
8
11
12
7
8
1
2
3
5
6
8
10
11
VERIFICATION OF GATE OPERATION
27VDC COOLANT POWER SUPPLY
23
10
6
6
5
5
LOCAL
REMOTE
A
4
7
9
ALARM
CKTS 1,2,3&4 HIGH PRESSURE SENSORS FAIL IND.
CKT 1 LOW FLOW FAIL INDICATION
CKTS 1,2,3&4 LOW FLOW HIGH TEMP, LOW TEMP & HIGH PRESSURE FAIL IND
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ___
CONTRACT

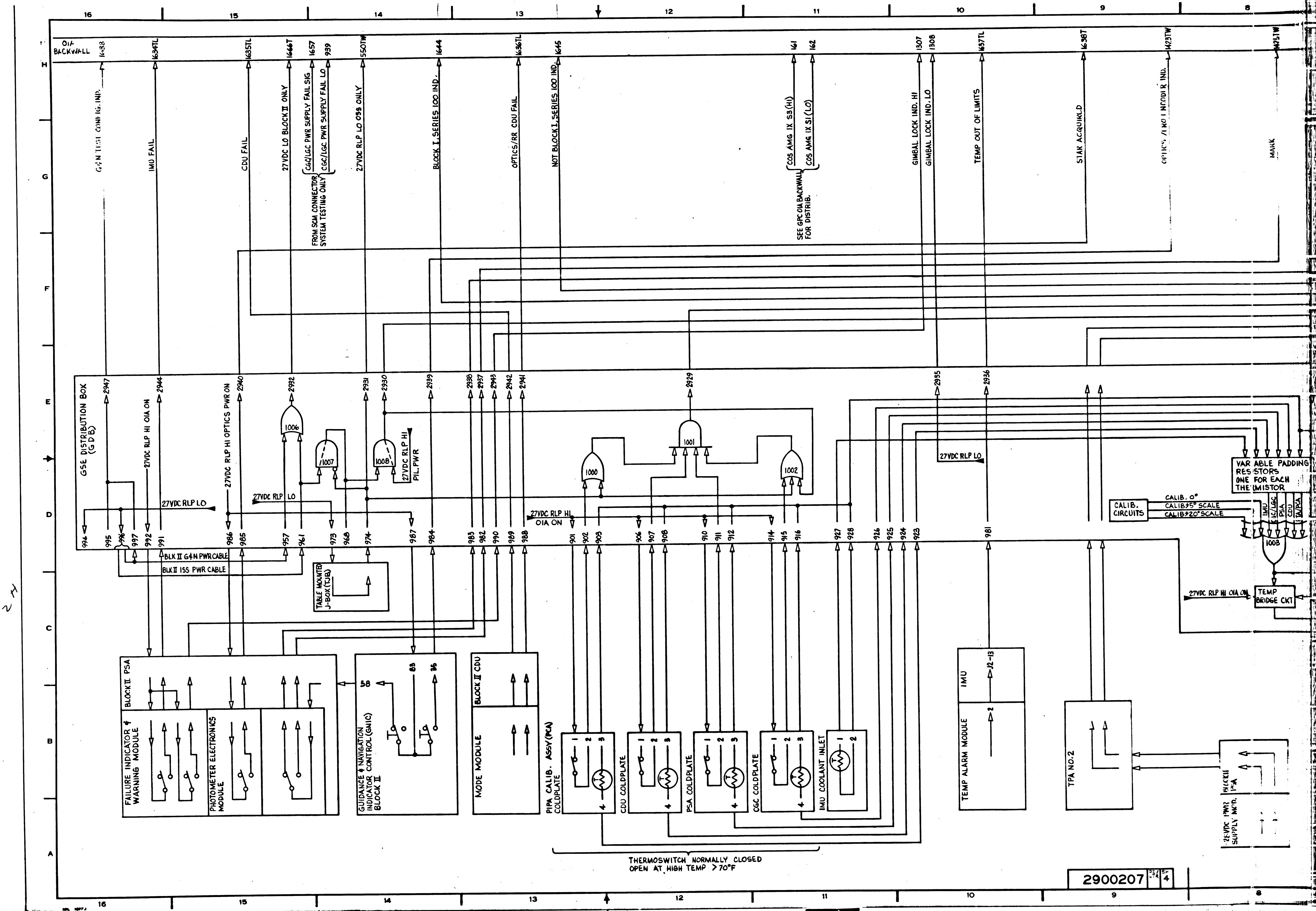
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Solane DATE 7 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

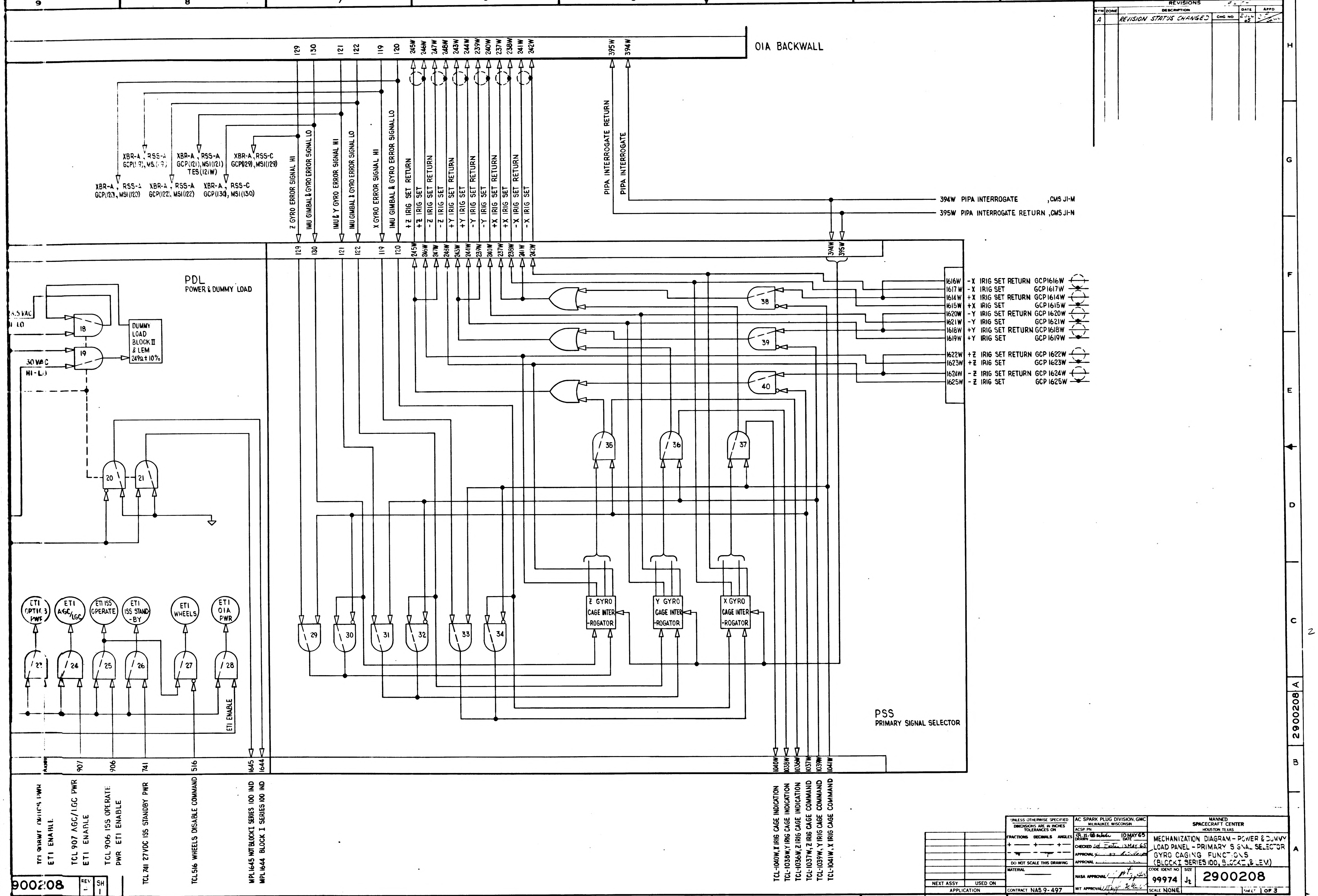
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
MONITOR PANEL
(BLOCK II)

CODE IDENT NO.
SIZE
2900207
SCALE ___
SHEET 4 OF 4

2900207 REV LTR SH 4


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
1633
1634TL
1635TL
1666T
1657
939
5501W
1644
1636TL
1645
161
162
1307
1308
1637TL
1638T
1423TW
1425TW
G&N TEST CONFIG. IND.
IMU FAIL
CDU FAIL
27VDC LO BLOCK II ONLY
CGC/LGC PWR SUPPLY FAIL SIG
CGC/LGC PWR SUPPLY FAIL LO
FROM SCM CONNECTOR SYSTEM TESTING ONLY
27VDC RLP LO OSS ONLY
BLOCK I, SERIES 100 IND.
OPTICS/RR CDU FAIL
NOT BLOCK I, SERIES 100 IND.
COS AMG IX S3 (HI)
COS AMG IX S1 (LO)
SEE GPC OIA BACKWALL FOR DISTRIB.
GIMBAL LOCK IND. HI
GIMBAL LOCK IND. LO
TEMP OUT OF LIMITS
STAR ACQUIRED
OPTICS ZERO ENCODER IND.
MARK
GSE DISTRIBUTION BOX (GDB)
2947
27VDC RLP HI OIA ON
2944
27VDC RLP HI OPTICS PWR ON
2940
2932
1006
1007
1008
2931
2930
27VDC RLP HI PIL. PWR
2939
2938
2937
2943
2942
2941
2929
1000
1001
1002
2935
2936
27VDC RLP LO
27VDC RLP LO
27VDC RLP LO
27VDC RLP HI OIA ON
VARIABLE PADDING RESISTORS ONE FOR EACH THERMISTOR
CALIB. CIRCUITS
CALIB. 0°
CALIB+5° SCALE
CALIB+20° SCALE
IMU
CGC/LGC
PSA
CDU
TA/PCA
1003
994
995
996
997
992
991
986
985
957
961
973
968
974
987
984
983
982
990
989
988
901
902
903
906
907
908
910
911
912
914
915
916
927
928
926
925
924
923
981
BLK II G&N PWR CABLE
BLK II ISS PWR CABLE
TABLE MOUNTED J-BOX (TJB)
27VDC RLP HI OIA ON
TEMP BRIDGE CKT
BLOCK II PSA
FAILURE INDICATOR & WARNING MODULE
PHOTOMETER ELECTRONICS MODULE
58
83
35
GUIDANCE & NAVIGATION INDICATOR CONTROL (GNIC) BLOCK II
BLOCK II CDU
MODE MODULE
PIPA CALIB. ASSY (PCA) COLDPLATE
CDU COLDPLATE
PSA COLDPLATE
CGC COLDPLATE
IMU COOLANT INLET
1
2
3
4
T
THERMOSWITCH NORMALLY CLOSED OPEN AT HIGH TEMP >70°F
IMU
J2-13
2
TEMP ALARM MODULE
TPA NO. 2
BLOCK II PSA
28VDC PWR SUPPLY MK'D.
2900207
4



9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
OIA BACKWALL
129
130
121
122
119
120
245W
246W
247W
248W
243W
244W
239W
240W
237W
238W
241W
242W
395W
394W
XBR-A , RSS-A
GCP(119), MSI(119)
XBR-A , RSS-A
GCP(121), MSI(121)
TES(121W)
XBR-A , RSS-C
GCP(129), MSI(129)
XBR-A , RSS-A
GCP(120), MSI(120)
XBR-A , RSS-A
GCP(122), MSI(122)
XBR-A , RSS-C
GCP(130), MSI(130)
Z GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
IMU & Y GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
+Z IRIG SET RETURN
+Z IRIG SET
-Z IRIG SET RETURN
-Z IRIG SET
+Y IRIG SET RETURN
+Y IRIG SET
-Y IRIG SET RETURN
-Y IRIG SET
+X IRIG SET RETURN
+X IRIG SET
-X IRIG SET RETURN
-X IRIG SET
PIPA INTERROGATE RETURN
PIPA INTERROGATE
394W PIPA INTERROGATE ,CMS J1-M
395W PIPA INTERROGATE RETURN ,CMS J1-N
394W
395W
PDL
POWER & DUMMY LOAD
28.5 VAC
HI LO
30 VAC
HI-LO
18
19
DUMMY LOAD BLOCK II & LEM 249Ω ± 10%
20
21
1616W -X IRIG SET RETURN GCP1616W
1617W -X IRIG SET GCP1617W
1614W +X IRIG SET RETURN GCP1614W
1615W +X IRIG SET GCP1615W
1620W -Y IRIG SET RETURN GCP1620W
1621W -Y IRIG SET GCP1621W
1618W +Y IRIG SET RETURN GCP1618W
1619W +Y IRIG SET GCP1619W
1622W +Z IRIG SET RETURN GCP1622W
1623W +Z IRIG SET GCP1623W
1624W -Z IRIG SET RETURN GCP1624W
1625W -Z IRIG SET GCP1625W
38
39
40
35
36
37
Z GYRO CAGE INTER-ROGATOR
Y GYRO CAGE INTER-ROGATOR
X GYRO CAGE INTER-ROGATOR
29
30
31
32
33
34
ETI OPTICS PWR
ETI AGC/LGC
ETI ISS OPERATE
ETI ISS STAND-BY
ETI WHEELS
ETI OIA PWR
23
24
25
26
27
28
ETI ENABLE
PSS
PRIMARY SIGNAL SELECTOR
907
906
741
516
1645
1644
1040W
1038W
1036W
1037W
1039W
1041W
TCL 908WI OPTICS PWR ETI ENABLE
TCL 907 AGC/LGC PWR ETI ENABLE
TCL 906 ISS OPERATE PWR ETI ENABLE
TCL 741 27VDC ISS STANDBY PWR
TCL516 WHEELS DISABLE COMMAND
MPL1645 NOT BLOCK I SERIES 100 IND
MPL1644 BLOCK I SERIES 100 IND
TCL-1040W, X IRIG CAGE INDICATION
TCL-1038W, Y IRIG CAGE INDICATION
TCL-1036W, Z IRIG CAGE INDICATION
TCL-1037W, Z IRIG CAGE COMMAND
TCL-1039W, Y IRIG CAGE COMMAND
TCL-1041W, X IRIG CAGE COMMAND
2900208 A
2H

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. A. Becker DATE 10 MAY 65
CHECKED Ed Foster 13 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM - POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (BLOCK I SERIES 100, BLOCK II, & LEM)

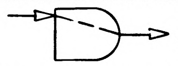
CODE IDENT NO. 99974
SIZE J2
2900208
SCALE NONE
SHEET OF 3

2900208 REV A SH 1

2/2900208

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. STANDARD LOGIC SYMBOLOGY PER MIL STANDARD 806
3. NONSTANDARD LOGIC SYMBOLOGY



INDICATES AN "AND" GATE WITH A SWITCHED SIGNAL

4. REFERENCE MECHANIZATION DIAGRAMS

2900210 - AC POWER PROTECTION PANEL AND POWER DISTRIBUTION (FTR)

2900223 - GIMBAL POSITION CONTROL PANEL (GPC)

2900207 - MONITOR PANEL (MPL)

2900201 - TEST CONTROL PANEL (TCL) BLOCK I SERIES 100

2900202 - TEST CONTROL PANEL (TCL) BLOCK II

2900206 - TEST SELECTOR PANEL (TES)

2900217 - SIGNAL SELECTION AND MEASUREMENT CROSS BAR - AC SIGNAL (XBR-A)

2900218 - OSCILLOGRAPH SIGNAL SELECTION
TO A FIXED AC CHANNEL (RSS-A)
TO A SWITCHABLE AC CHANNEL (RSS-C)

2900219 - COUNTER SIGNAL SELECTION
PRIMARY SIGNAL SELECTOR (PSS)

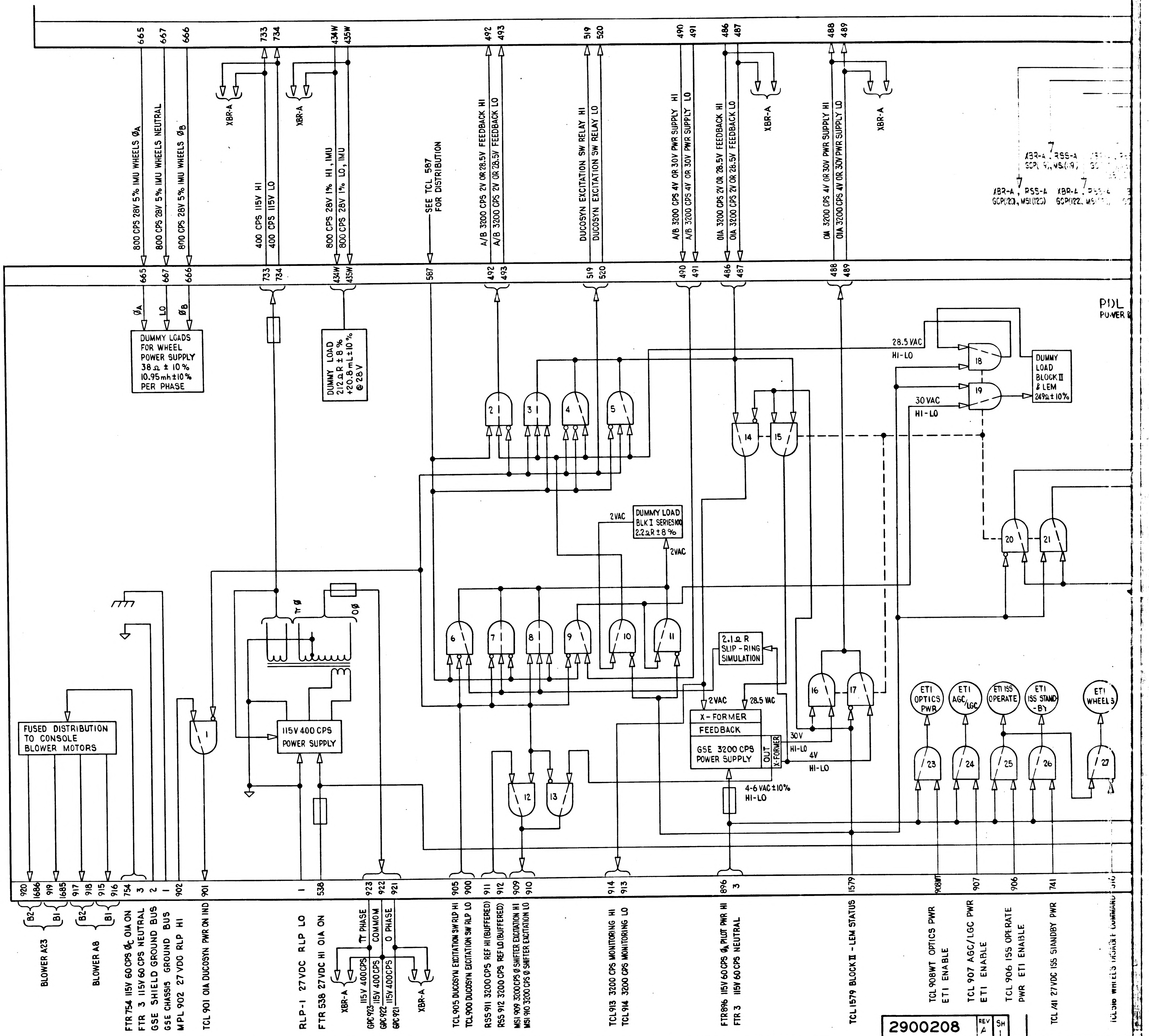
2900215 - MEASUREMENT REFERENCE POWER SUPPLIED OSCILLOGRAPH SIGNAL SELECTOR (PARTIAL) (RSS)

2900213 - GSE GROUNDING

2900212 - PIPA AND IRIG MONITORING PHASE SHIFT PANEL (MSI)

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   a. W - BLOCK I SERIES 100 ONLY
   b. T - BLACK II ONLY
   c. L - LEM ONLY
   d. BLANK - ALL G/N CONFIGURATIONS
   e. TW, TL, OR WL - USED IN MORE THAN ONE G/N CONFIGURATION AS SHOWN

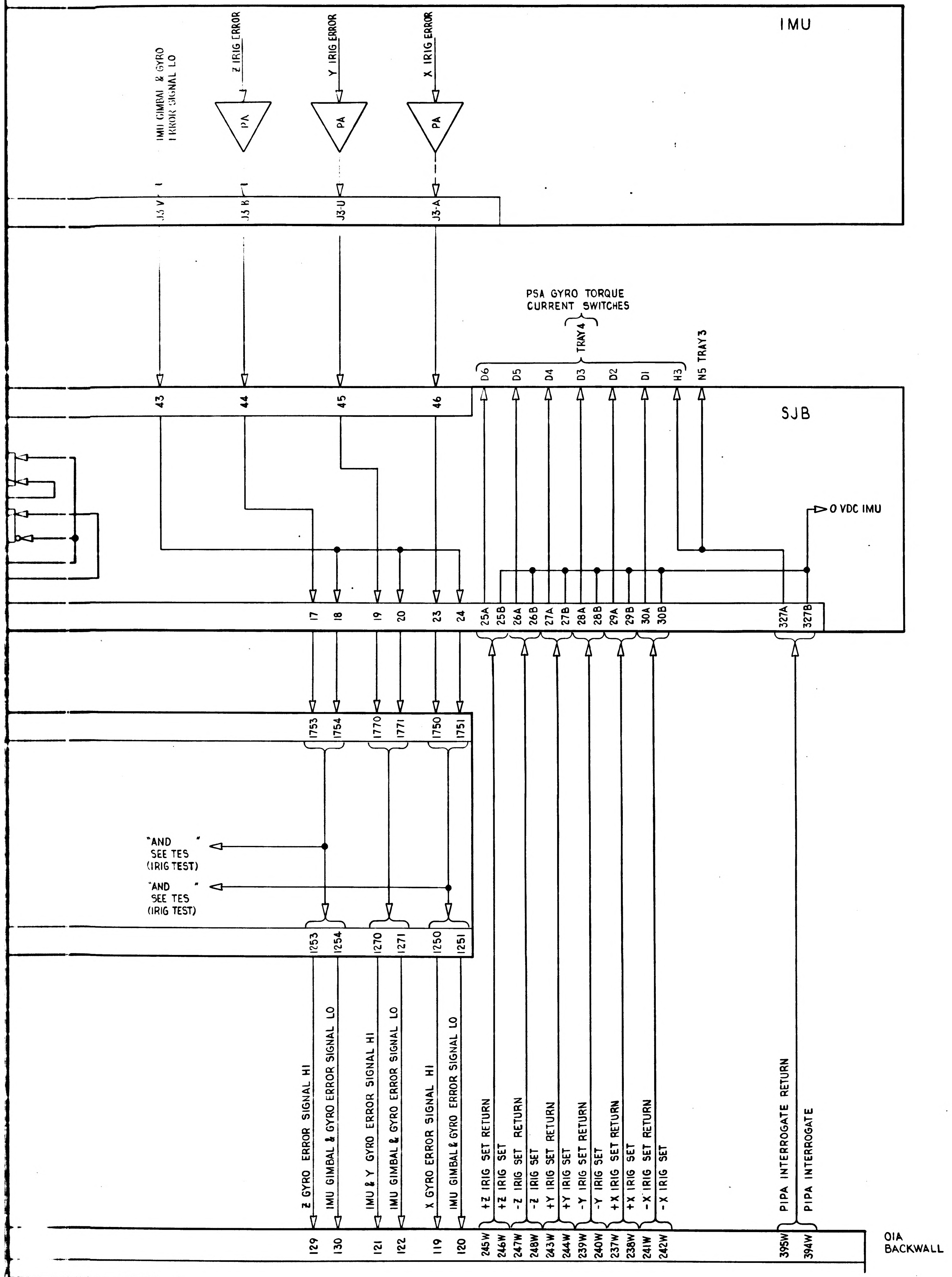
6. ALL ELAPSED TIME INDICATORS READ IN HOURS AND TENTHS OF HOURS TO 9999.9 HRS


665
667
666
733
734
434W
435W
492
493
519
520
490
491
486
487
488
489
XBR-A
800 CPS 28V 5% IMU WHEELS ØA
800 CPS 28V 5% IMU WHEELS NEUTRAL
800 CPS 28V 5% IMU WHEELS ØB
400 CPS 115V HI
400 CPS 115V LO
800 CPS 28V 1% HI, IMU
800 CPS 28V 1% LO, IMU
SEE TCL 587 FOR DISTRIBUTION
A/B 3200 CPS 2V OR 28.5V FEEDBACK HI
A/B 3200 CPS 2V OR 28.5V FEEDBACK LO
DUCOSYN EXCITATION SW RELAY HI
DUCOSYN EXCITATION SW RELAY LO
A/B 3200 CPS 4V OR 30V PWR SUPPLY HI
A/B 3200 CPS 4V OR 30V PWR SUPPLY LO
OIA 3200 CPS 2V OR 28.5V FEEDBACK HI
OIA 3200 CPS 2V OR 28.5V FEEDBACK LO
OIA 3200 CPS 4V OR 30V PWR SUPPLY HI
OIA 3200 CPS 4V OR 30V PWR SUPPLY LO
XBR-A RSS-A
GCP(121), MSI(12)
XBR-A RSS-A XBR-A
GCP(121), MSI(120) GCP(122), MSI
587
ØA
LO
ØB
DUMMY LOADS FOR WHEEL POWER SUPPLY 38Ω ± 10% 10.95mh ±10% PER PHASE
DUMMY LOAD 212Ω R ± 8% +20.8 mL ± 10% @ 28V
PDL
POWER
28.5 VAC
HI-LO
30 VAC
HI-LO
DUMMY LOAD BLOCK II & LEM 249Ω ± 10%
DUMMY LOAD BLK I SERIES 100 2.2Ω R ± 8%
2VAC
2VAC
TØ
OØ
115V 400 CPS POWER SUPPLY
FUSED DISTRIBUTION TO CONSOLE BLOWER MOTORS
2.1Ω R SLIP-RING SIMULATION
2VAC
28.5 VAC
X-FORMER FEEDBACK
GSE 3200 CPS POWER SUPPLY
OUT X-FORMER
30V
HI-LO
4V
HI-LO
4-6 VAC ±10% HI-LO
ETI OPTICS PWR
ETI AGC/LGC
ETI ISS OPERATE
ETI ISS STAND-BY
ETI WHEELS
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
23
24
25
26
27
920
1686
919
1685
917
918
915
916
754
3
2
1
902
901
1
538
923
922
921
905
900
911
912
909
910
914
913
896
3
1579
908WT
907
906
741
B2
B1
B2
B1
BLOWER A23
BLOWER A8
FTR 754 115V 60 CPS ØC OIA ON
FTR 3 115V 60 CPS NEUTRAL
GSE SHIELD GROUND BUS
GSE CHASSIS GROUND BUS
MPL 902 27 VDC RLP HI
TCL 901 OIA DUCOSYN PWR ON IND
RLP-1 27 VDC RLP LO
FTR 538 27 VDC HI OIA ON
XBR-A
π PHASE
COMMOM
O PHASE
GPC 923 115V 400 CPS
GPC 922 115V 400 CPS
GPC 921 115V 400 CPS
XBR-A
TCL 905 DUCOSYN EXCITATION SW RLP HI
TCL 900 DUCOSYN EXCITATION SW RLP LO
RSS 911 3200 CPS REF HI (BUFFERED)
RSS 912 3200 CPS REF LO (BUFFERED)
MSI 909 3200 CPS Ø SHIFTER EXCITATION HI
MSI 910 3200 CPS Ø SHIFTER EXCITATION LO
TCL 913 3200 CPS MONITORING HI
TCL 914 3200 CPS MONITORING LO
FTR 896 115V 60 CPS ØA PILOT PWR HI
FTR 3 115V 60 CPS NEUTRAL
TCL 1579 BLOCK II - LEM STATUS
TCL 908WT OPTICS PWR ETI ENABLE
TCL 907 AGC/LGC PWR ETI ENABLE
TCL 906 ISS OPERATE PWR ETI ENABLE
TCL 741 27VDC ISS STANDBY PWR

2900208	REV A	SH 1

1/2900208

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 5	



IMU
IMU GIMBAL & GYRO ERROR SIGNAL LO
Z IRIG ERROR
Y IRIG ERROR
X IRIG ERROR
PA
PA
PA
J3 V
J3 B
J3-U
J3-A
PSA GYRO TORQUE CURRENT SWITCHES
TRAY4
D6
D5
D4
D3
D2
D1
H3
N5 TRAY3
43
44
45
46
SJB
O VDC IMU
17
18
19
20
23
24
25A
25B
26A
26B
27A
27B
28A
28B
29A
29B
30A
30B
327A
327B
1753
1754
1770
1771
1750
1751
"AND " SEE TES (IRIG TEST)
"AND " SEE TES (IRIG TEST)
1253
1254
1270
1271
1250
1251
Z GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
IMU & Y GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
+Z IRIG SET RETURN
+Z IRIG SET
-Z IRIG SET RETURN
-Z IRIG SET
+Y IRIG SET RETURN
+Y IRIG SET
-Y IRIG SET RETURN
-Y IRIG SET
+X IRIG SET RETURN
+X IRIG SET
-X IRIG SET RETURN
-X IRIG SET
PIPA INTERROGATE RETURN
PIPA INTERROGATE
129
130
121
122
119
120
245W
246W
247W
248W
243W
244W
239W
240W
237W
238W
241W
242W
395W
394W
OIA BACKWALL

2H

2900208 A

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Q.M. Bell DATE 8 MAY 65
CHECKED 13 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

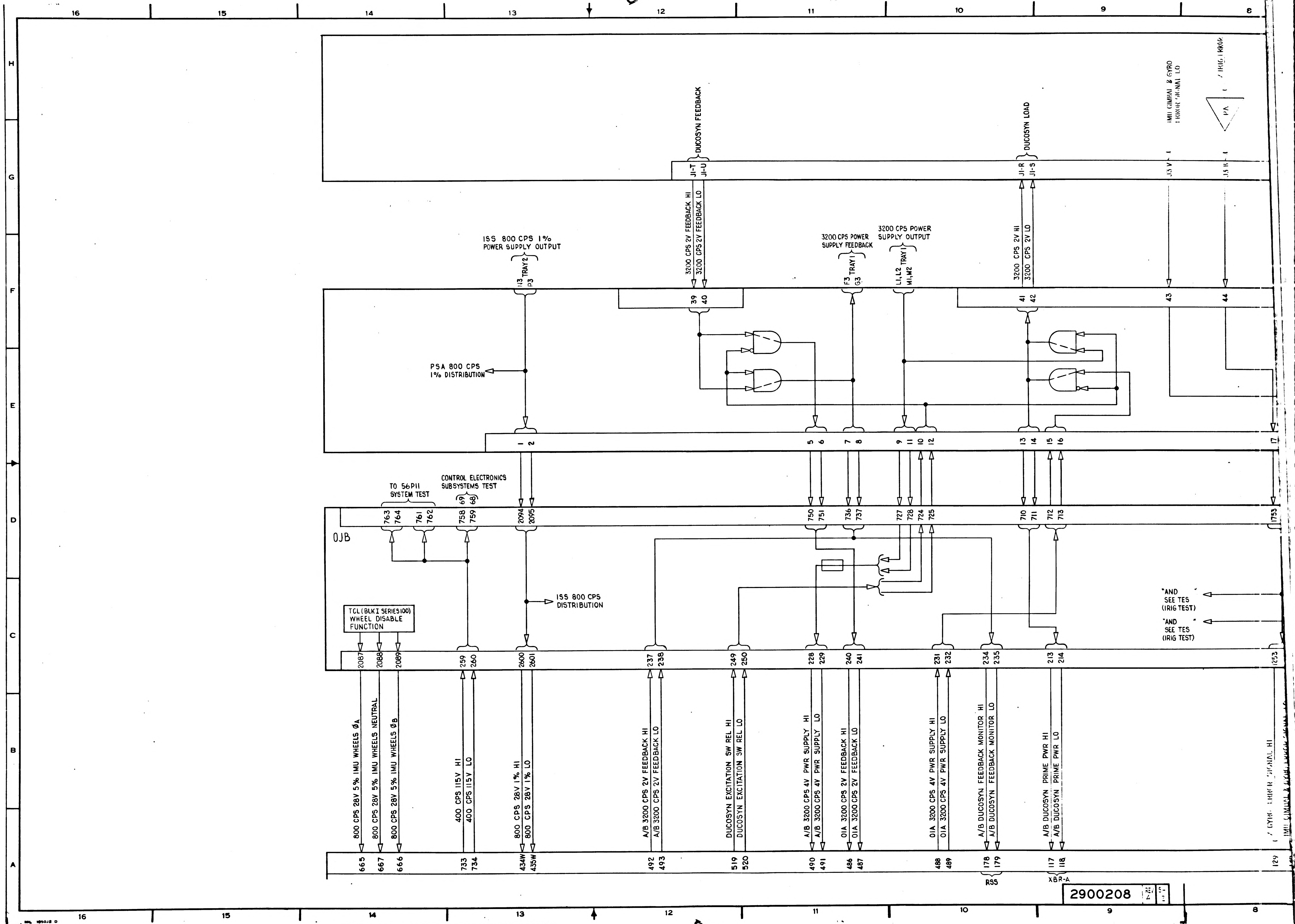
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM - POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (BLOCK I SERIES CO)

CODE IDENT NO. 99974
SIZE J2
2900208
SCALE NONE
SHEET 2 OF 3

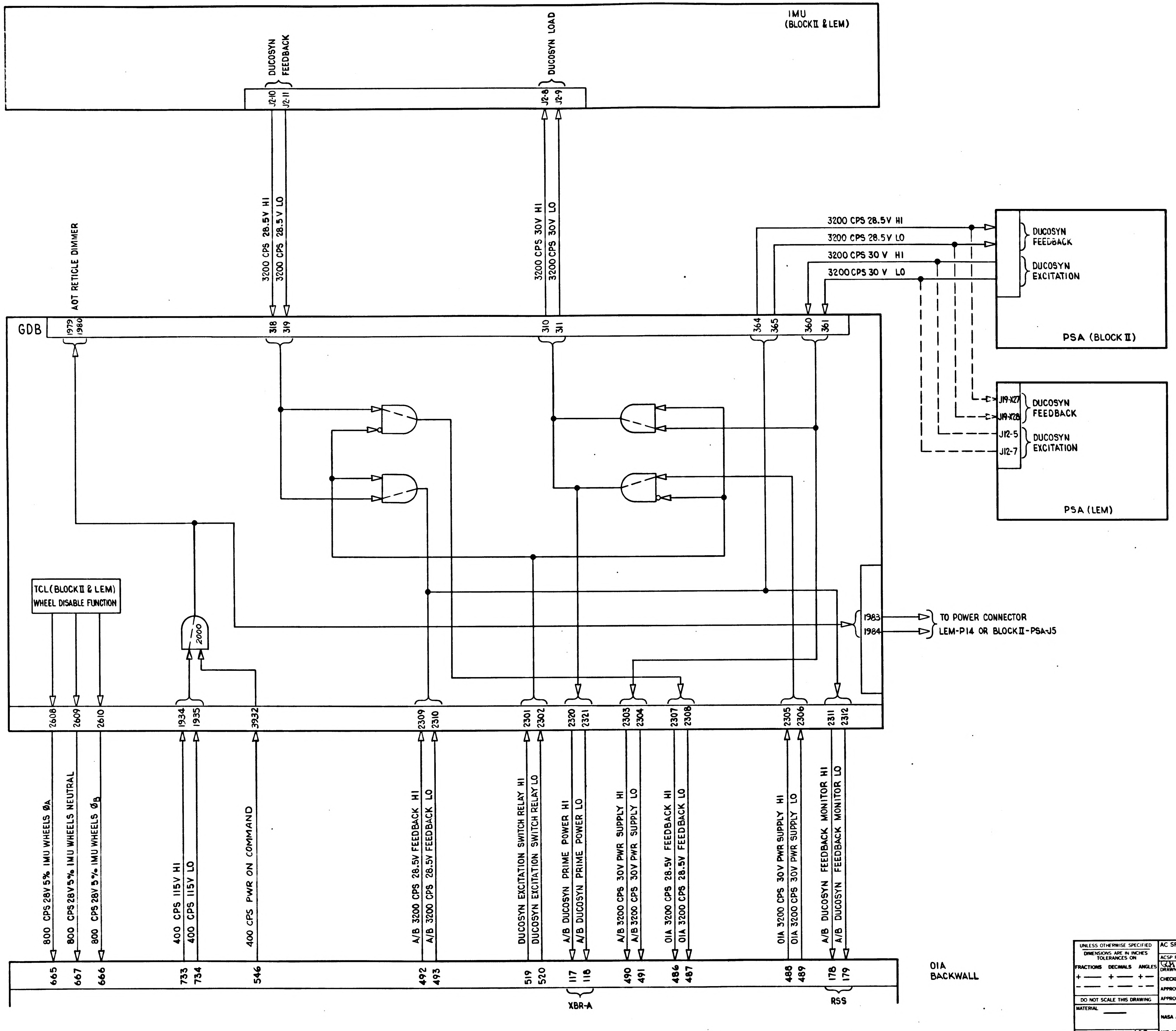
2900208

2/2900208


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
DUCOSYN FEEDBACK
J1-T
J1-U
DUCOSYN LOAD
J1-R
J1-S
IMU GIMBAL & GYRO ERROR SIGNAL LO
J3 V
IRIG ERROR
PA
J3 R
ISS 800 CPS 1%
POWER SUPPLY OUTPUT
113 TRAY2
P3
3200 CPS 2V FEEDBACK HI
3200 CPS 2V FEEDBACK LO
3200 CPS POWER
SUPPLY FEEDBACK
F3 TRAY1
G3
3200 CPS POWER
SUPPLY OUTPUT
L1, L2 TRAY1
M1, M2
3200 CPS 2V HI
3200 CPS 2V LO
39
40
41
42
43
44
PSA 800 CPS
1% DISTRIBUTION
1
2
5
6
7
8
9
11
10
12
13
14
15
16
17
TO 56P11
SYSTEM TEST
CONTROL ELECTRONICS
SUBSYSTEMS TEST
69
68
763
764
761
762
758
759
2094
2095
750
751
736
737
727
728
724
725
710
711
712
713
1753
0JB
ISS 800 CPS
DISTRIBUTION
TCL (BLK I SERIES 100)
WHEEL DISABLE
FUNCTION
"AND "
SEE TES
(IRIG TEST)
"AND "
SEE TES
(IRIG TEST)
2087
2088
2089
259
260
2600
2601
237
238
249
250
228
229
240
241
231
232
234
235
213
214
1253
800 CPS 28V 5% IMU WHEELS ØA
800 CPS 28V 5% IMU WHEELS NEUTRAL
800 CPS 28V 5% IMU WHEELS ØB
400 CPS 115V HI
400 CPS 115V LO
800 CPS 28V 1% HI
800 CPS 28V 1% LO
A/B 3200 CPS 2V FEEDBACK HI
A/B 3200 CPS 2V FEEDBACK LO
DUCOSYN EXCITATION SW REL HI
DUCOSYN EXCITATION SW REL LO
A/B 3200 CPS 4V PWR SUPPLY HI
A/B 3200 CPS 4V PWR SUPPLY LO
01A 3200 CPS 2V FEEDBACK HI
01A 3200 CPS 2V FEEDBACK LO
01A 3200 CPS 4V PWR SUPPLY HI
01A 3200 CPS 4V PWR SUPPLY LO
A/B DUCOSYN FEEDBACK MONITOR HI
A/B DUCOSYN FEEDBACK MONITOR LO
A/B DUCOSYN PRIME PWR HI
A/B DUCOSYN PRIME PWR LO
IMU GIMBAL & GYRO ERROR SIGNAL HI
665
667
666
733
734
434W
435W
492
493
519
520
490
491
486
487
488
489
178
179
117
118
129
RSS
XBR-A
2900208
REV 4

1/2900208

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20495		2 JUL 65	


IMU
(BLOCK II & LEM)
DUCOSYN FEEDBACK
J2-10
J2-11
DUCOSYN LOAD
J2-8
J2-9
3200 CPS 28.5V HI
3200 CPS 28.5V LO
3200 CPS 30V HI
3200 CPS 30V LO
AOT RETICLE DIMMER
GDB
1979
1980
318
319
310
311
364
365
360
361
3200 CPS 28.5V HI
3200 CPS 28.5V LO
3200 CPS 30 V HI
3200 CPS 30 V LO
DUCOSYN FEEDBACK
DUCOSYN EXCITATION
PSA (BLOCK II)
J19-X27
J19-X28
J12-5
J12-7
DUCOSYN FEEDBACK
DUCOSYN EXCITATION
PSA (LEM)
TCL (BLOCK II & LEM)
WHEEL DISABLE FUNCTION
2000
1983
1984
TO POWER CONNECTOR
LEM-P14 OR BLOCK II-PSA-J5
2608
2609
2610
1934
1935
3932
2309
2310
2301
2302
2320
2321
2303
2304
2307
2308
2305
2306
2311
2312
800 CPS 28V 5% IMU WHEELS ØA
800 CPS 28V 5% IMU WHEELS NEUTRAL
800 CPS 28V 5% IMU WHEELS ØB
400 CPS 115V HI
400 CPS 115V LO
400 CPS PWR ON COMMAND
A/B 3200 CPS 28.5V FEEDBACK HI
A/B 3200 CPS 28.5V FEEDBACK LO
DUCOSYN EXCITATION SWITCH RELAY HI
DUCOSYN EXCITATION SWITCH RELAY LO
A/B DUCOSYN PRIME POWER HI
A/B DUCOSYN PRIME POWER LO
A/B 3200 CPS 30V PWR SUPPLY HI
A/B 3200 CPS 30V PWR SUPPLY LO
01A 3200 CPS 28.5V FEEDBACK HI
01A 3200 CPS 28.5V FEEDBACK LO
01A 3200 CPS 30V PWR SUPPLY HI
01A 3200 CPS 30V PWR SUPPLY LO
A/B DUCOSYN FEEDBACK MONITOR HI
A/B DUCOSYN FEEDBACK MONITOR LO
665
667
666
733
734
546
492
493
519
520
117
118
490
491
486
487
488
489
178
179
XBR-A
RSS
01A
BACKWALL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ——— ± ——— ± —— DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION. GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN R.H. Baker DATE 8 MAY 65 CHECKED Ed Foster 13 MAY 65 APPROVAL APPROVAL J. M. Watson	MANNED SPACECRAFT CENTER HOUSTON, TEXAS MECH..NIZATION DIAGRAM - POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (BLOCK II & LEM)
MATERIAL ———	NASA APPROVAL	CODE IDENT NO 99974 SIZE E 2900208
CONTRACT NAS 9-497	MIT APPROVAL	SCALE NONE SHEET 3 OF 3

SYM	ZONE	REVISIONS DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RLP
B		REPLACED WITH CHANGE BY REV "C" PER TDRR 21999		8 SEP 65	JWP AU

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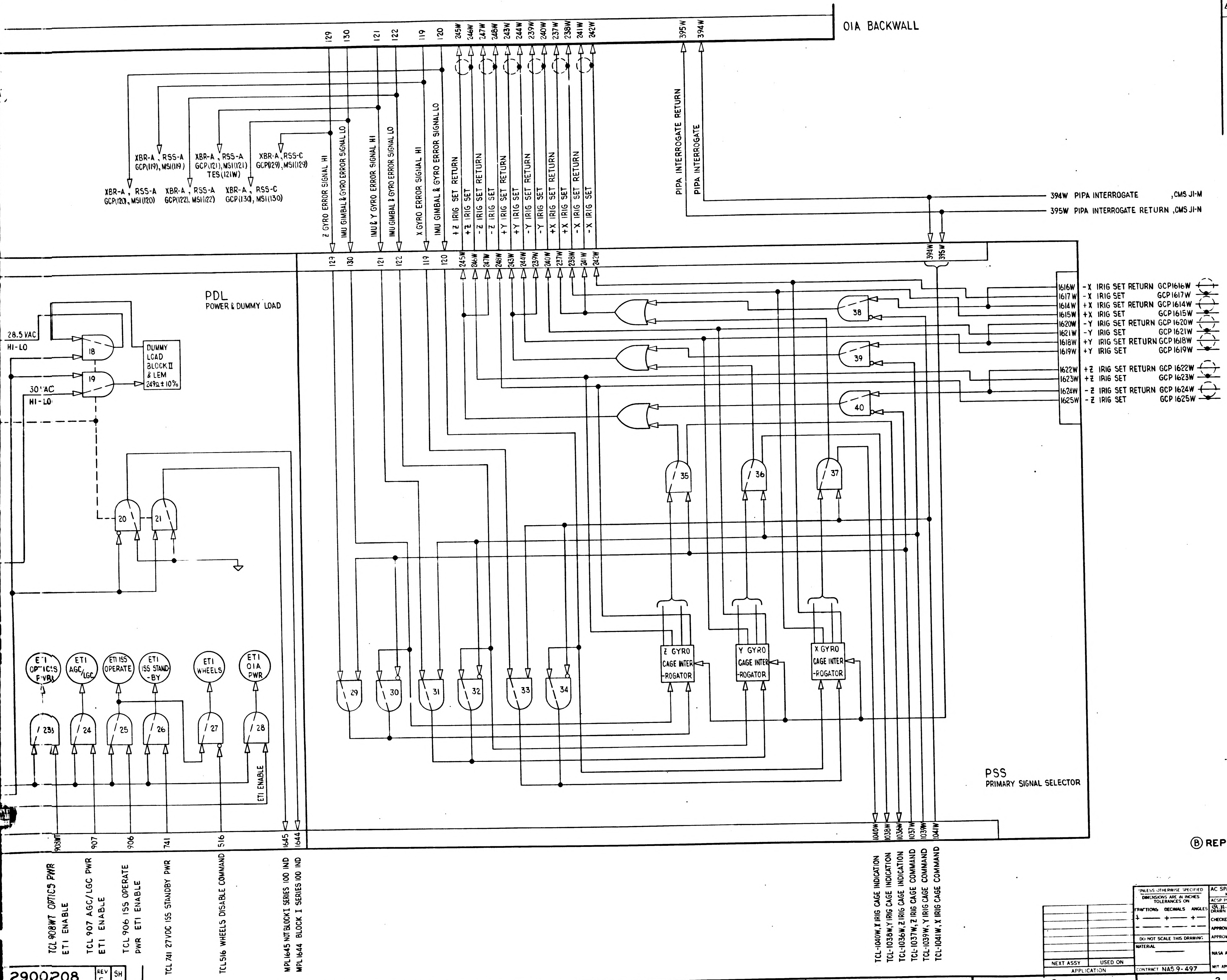
M


OIA BACKWALL
129
130
121
122
119
120
245W
246W
247W
248W
243W
244W
239W
240W
237W
238W
241W
242W
395W
394W
XBR-A , RSS-A GCP(119), MSI(119)
XBR-A , RSS-A GCP(121), MSI(121) TES(121W)
XBR-A , RSS-C GCP(129), MSI(129)
XBR-A , RSS-A GCP(120), MSI(120)
XBR-A , RSS-A GCP(122), MSI(122)
XBR-A , RSS-C GCP(130), MSI(130)
Z GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
IMU & Y GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
+Z IRIG SET RETURN
+Z IRIG SET
-Z IRIG SET RETURN
-Z IRIG SET
+Y IRIG SET RETURN
+Y IRIG SET
-Y IRIG SET RETURN
-Y IRIG SET
+X IRIG SET RETURN
+X IRIG SET
-X IRIG SET RETURN
-X IRIG SET
PIPA INTERROGATE RETURN
PIPA INTERROGATE
394W PIPA INTERROGATE ,CMS J1-M
395W PIPA INTERROGATE RETURN ,CMS J1-N
394W
395W
PDL
POWER & DUMMY LOAD
28.5 VAC
HI-LO
30 VAC
HI-LO
18
19
DUMMY LOAD BLOCK II & LEM 249Ω ± 10%
20
21
1616W -X IRIG SET RETURN GCP1616W
1617W -X IRIG SET GCP1617W
1614W +X IRIG SET RETURN GCP1614W
1615W +X IRIG SET GCP1615W
1620W -Y IRIG SET RETURN GCP1620W
1621W -Y IRIG SET GCP1621W
1618W +Y IRIG SET RETURN GCP1618W
1619W +Y IRIG SET GCP1619W
1622W +Z IRIG SET RETURN GCP 1622W
1623W +Z IRIG SET GCP 1623W
1624W -Z IRIG SET RETURN GCP 1624W
1625W -Z IRIG SET GCP 1625W
38
39
40
35
36
37
Z GYRO CAGE INTER-ROGATOR
Y GYRO CAGE INTER-ROGATOR
X GYRO CAGE INTER-ROGATOR
29
30
31
32
33
34
ETI OPTICS PWR
ETI AGC/LGC
ETI ISS OPERATE
ETI ISS STAND-BY
ETI WHEELS
ETI OIA PWR
23
24
25
26
27
28
ETI ENABLE
PSS
PRIMARY SIGNAL SELECTOR
908WT
907
906
741
516
1645
1644
1040W
1038W
1036W
1037W
1039W
1041W
TCL 908WT OPTICS PWR ETI ENABLE
TCL 907 AGC/LGC PWR ETI ENABLE
TCL 906 ISS OPERATE PWR ETI ENABLE
TCL 741 27VDC ISS STANDBY PWR
TCL516 WHEELS DISABLE COMMAND
MPL1645 NOT BLOCK I SERIES 100 IND
MPL1644 BLOCK I SERIES 100 IND
TCL-1040W, X IRIG CAGE INDICATION
TCL-1038W, Y IRIG CAGE INDICATION
TCL-1036W, Z IRIG CAGE INDICATION
TCL-1037W, Z IRIG CAGE COMMAND
TCL-1039W, Y IRIG CAGE COMMAND
TCL-1041W, X IRIG CAGE COMMAND

Ⓑ REPLACED WITH CHANGE BY REV "C"

2H

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. A. Becker DATE 10 MAY 65
CHECKED Foster 13 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM - POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (BLOCK I SERIES 100, BLOCK II, & LEM)

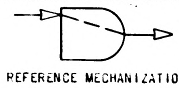
CODE IDENT NO 99974
SIZE J2
2900208
SCALE NONE
SHEET OF 3

2900208 REV B SH 1

2/2900208

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. STANDARD LOGIC SYMBOLOGY PER MIL STANDARD 806
3. NONSTANDARD LOGIC SYMBOLOGY



INDICATES AN "AND" GATE WITH A SWITCHED SIGNAL

4. REFERENCE MECHANIZATION DIAGRAMS

2900210 - AC POWER PROTECTION PANEL AND POWER DISTRIBUTION (FTR)

2900223 - GIMBAL POSITION CONTROL PANEL (GPC)

2900207 - MONITOR PANEL (MPL)

2900201 - TEST CONTROL PANEL (TCL) BLOCK I SERIES 100

2900202 - TEST CONTROL PANEL (TCL) BLOCK II

2900206 - TEST SELECTOR PANEL (TES)

2900217 - SIGNAL SELECTION AND MEASUREMENT CROSS BAR - AC SIGNAL (XBR-A)

2900218 - OSCILLOGRAPH SIGNAL SELECTION
TO A FIXED AC CHANNEL (RSS-A)
TO A SWITCHABLE AC CHANNEL (RSS-C)

2900219 - COUNTER SIGNAL SELECTION
PRIMARY SIGNAL SELECTOR (PSS)

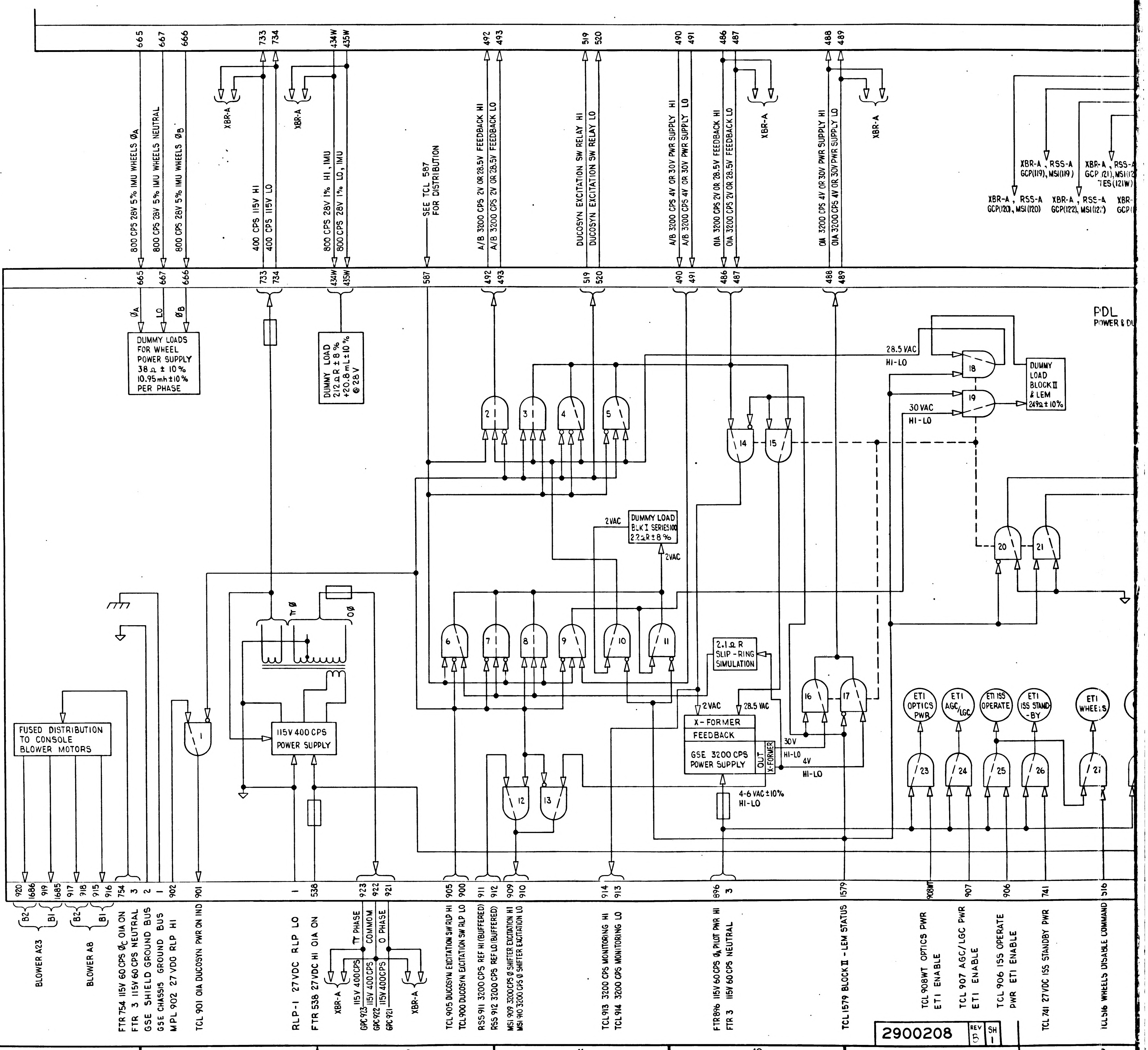
2900215 - MEASUREMENT REFERENCE POWER [illegible] OSCILLOGRAPH SIGNAL SELECTOR (PARTIAL) (RSS)

2900213 - GSE GROUNDING

2900212 - PIPA AND IRIG MONITORING PHASE SHIFT PANEL (MSI)

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   a. W - BLOCK I SERIES 100 ONLY
   b. T - BLACK II ONLY
   c. L - LEM ONLY
   d. BLANK - ALL G/N CONFIGURATIONS
   e. TW, TL, OR WL - USED IN MORE THAN ONE G/N CONFIGURATION AS SHOWN

6. ALL ELAPSED TIME INDICATORS READ IN HOURS AND TENTHS OF HOURS TO 9999.9 HRS

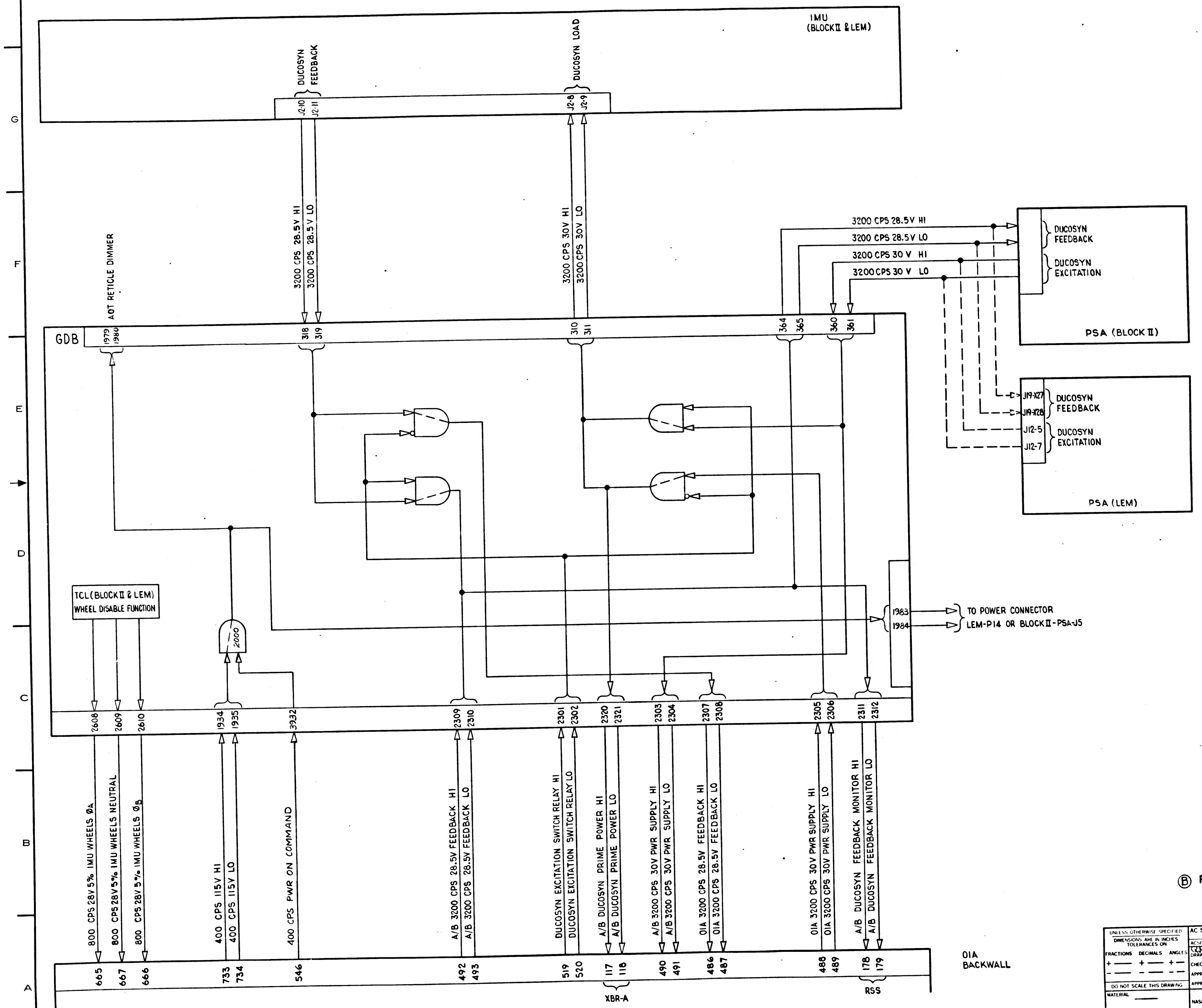

665
667
666
733
734
434W
435W
587
492
493
519
520
490
491
486
487
488
489
800 CPS 28V 5% IMU WHEELS ØA
800 CPS 28V 5% IMU WHEELS NEUTRAL
800 CPS 28V 5% IMU WHEELS ØB
XBR-A
400 CPS 115V HI
400 CPS 115V LO
XBR-A
800 CPS 28V 1% HI, IMU
800 CPS 28V 1% LO, IMU
SEE TCL 587 FOR DISTRIBUTION
A/B 3200 CPS 2V OR 28.5V FEEDBACK HI
A/B 3200 CPS 2V OR 28.5V FEEDBACK LO
DUCOSYN EXCITATION SW RELAY HI
DUCOSYN EXCITATION SW RELAY LO
A/B 3200 CPS 4V OR 30V PWR SUPPLY HI
A/B 3200 CPS 4V OR 30V PWR SUPPLY LO
OIA 3200 CPS 2V OR 28.5V FEEDBACK HI
OIA 3200 CPS 2V OR 28.5V FEEDBACK LO
XBR-A
OIA 3200 CPS 4V OR 30V PWR SUPPLY HI
OIA 3200 CPS 4V OR 30V PWR SUPPLY LO
XBR-A
XBR-A, RSS-A GCP(119), MSI(119)
XBR-A, RSS-A GCP(121), MSI(12 TES(121W)
XBR-A, RSS-A GCP(120), MSI(120)
XBR-A, RSS-A GCP(122), MSI(122)
XBR- GCP(
ØA
LO
ØB
DUMMY LOADS FOR WHEEL POWER SUPPLY 38Ω ± 10% 10.95mh ±10% PER PHASE
DUMMY LOAD 212ΩR ± 8% +20.8mL ±10% @28V
PDL
POWER & DI
28.5 VAC HI-LO
30 VAC HI-LO
DUMMY LOAD BLOCK II & LEM 249Ω ± 10%
2VAC
DUMMY LOAD BLK I SERIES100 22ΩR ± 8%
2VAC
πØ
OØ
FUSED DISTRIBUTION TO CONSOLE BLOWER MOTORS
115V 400 CPS POWER SUPPLY
2.1Ω R SLIP-RING SIMULATION
2VAC
28.5 VAC
X-FORMER
FEEDBACK
GSE 3200 CPS POWER SUPPLY
OUT
X-FORMER
30V HI-LO
4V HI-LO
4-6 VAC ±10% HI-LO
ETI OPTICS PWR
ETI AGC/LGC
ETI ISS OPERATE
ETI ISS STAND-BY
ETI WHEELS
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
23
24
25
26
27
920
1686
919
1685
917
918
915
916
754
3
2
1
902
901
1
538
923
922
921
905
900
911
912
909
910
914
913
896
3
1579
908WT
907
906
741
516
B2
B1
B2
B1
BLOWER A23
BLOWER A8
FTR 754 115V 60 CPS ØC OIA ON
FTR 3 115V 60 CPS NEUTRAL
GSE SHIELD GROUND BUS
GSE CHASSIS GROUND BUS
MPL 902 27 VDC RLP HI
TCL 901 OIA DUCOSYN PWR ON IND
RLP-1 27 VDC RLP LO
FTR 538 27 VDC HI OIA ON
π PHASE
COMMOM
O PHASE
XBR-A
GPC923 115V 400CPS
GPC922 115V 400CPS
GPC921 115V 400CPS
XBR-A
TCL 905 DUCOSYN EXCITATION SW RLP HI
TCL 900 DUCOSYN EXCITATION SW RLP LO
RSS 911 3200 CPS REF HI (BUFFERED)
RSS 912 3200 CPS REF LO (BUFFERED)
MSI 909 3200 CPS Ø SHIFTER EXCITATION HI
MSI 910 3200 CPS Ø SHIFTER EXCITATION LO
TCL 913 3200 CPS MONITORING HI
TCL 914 3200 CPS MONITORING LO
FTR 896 115V 60 CPS ØA PILOT PWR HI
FTR 3 115V 60 CPS NEUTRAL
TCL 1579 BLOCK II - LEM STATUS
TCL 908WT OPTICS PWR ETI ENABLE
TCL 907 AGC/LGC PWR ETI ENABLE
TCL 906 ISS OPERATE PWR ETI ENABLE
TCL 741 27 VDC ISS STANDBY PWR
TCL 516 WHEELS DISABLE COMMAND

2900208 REV B SH 1

1/2900208

2900208 SH 3 OF 3

REVISIONS 19154					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20495		2 JUL 65	RLP
B		REPLACED WITH CHANGE BY REV "C" PER TDRR 21999		8 SEP 65	JWP AU

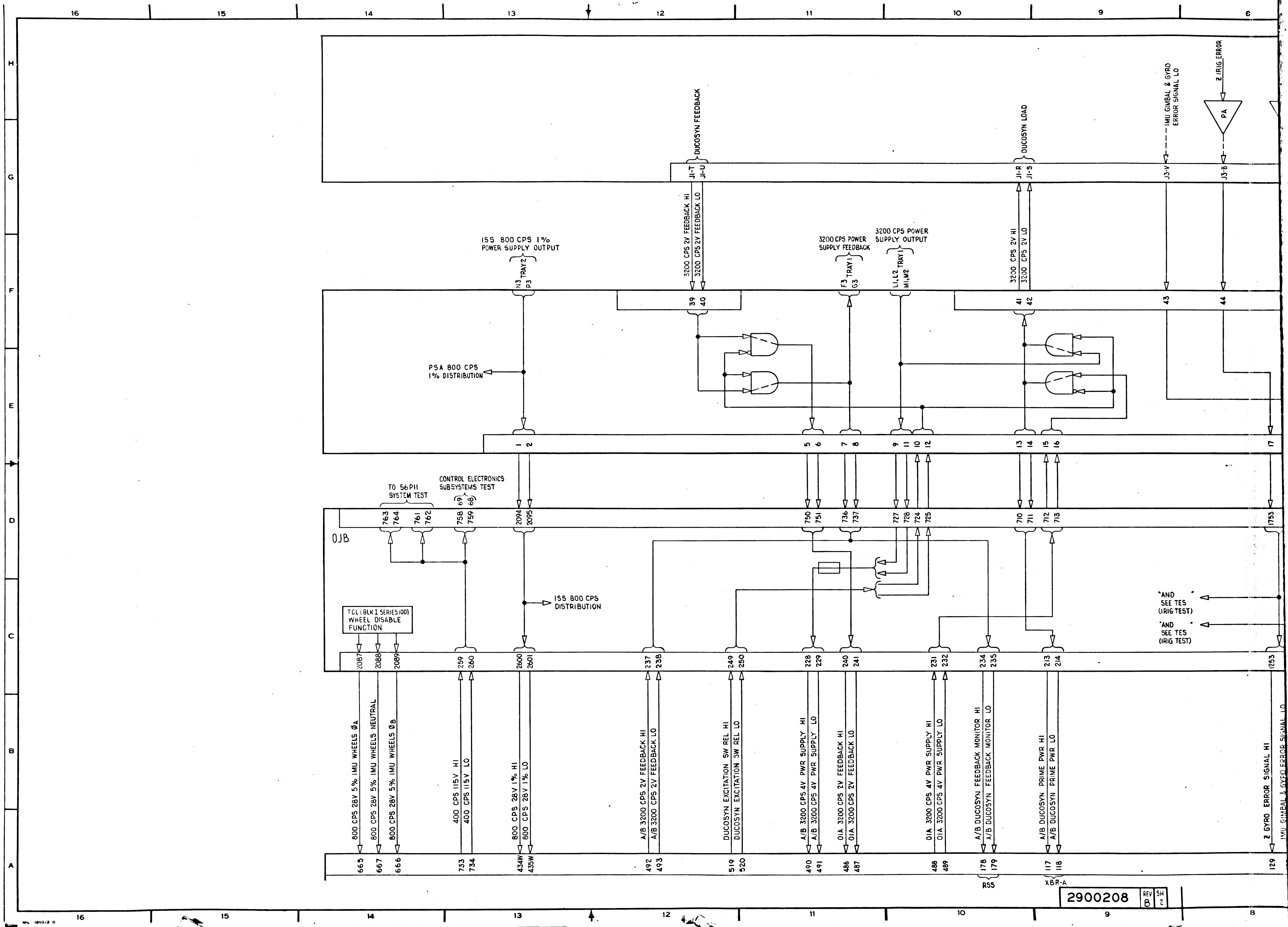

IMU
(BLOCK II & LEM)
J2-10
J2-11
DUCOSYN FEEDBACK
J2-8
J2-9
DUCOSYN LOAD
3200 CPS 28.5V HI
3200 CPS 28.5 V LO
3200 CPS 30V HI
3200 CPS 30V LO
AOT RETICLE DIMMER
GDB
1979
1980
318
319
310
311
364
365
360
361
3200 CPS 28.5V HI
3200 CPS 28.5V LO
3200 CPS 30 V HI
3200 CPS 30 V LO
DUCOSYN FEEDBACK
DUCOSYN EXCITATION
PSA (BLOCK II)
J19-X27
J19-X28
J12-5
J12-7
DUCOSYN FEEDBACK
DUCOSYN EXCITATION
PSA (LEM)
TCL (BLOCK II & LEM)
WHEEL DISABLE FUNCTION
2000
1983
1984
TO POWER CONNECTOR
LEM-P14 OR BLOCK II-PSA-J5
2608
2609
2610
1934
1935
3932
2309
2310
2301
2302
2320
2321
2303
2304
2307
2308
2305
2306
2311
2312
800 CPS 28V 5% IMU WHEELS ØA
800 CPS 28V 5% IMU WHEELS NEUTRAL
800 CPS 28V 5% IMU WHEELS ØB
400 CPS 115V HI
400 CPS 115V LO
400 CPS PWR ON COMMAND
A/B 3200 CPS 28.5V FEEDBACK HI
A/B 3200 CPS 28.5V FEEDBACK LO
DUCOSYN EXCITATION SWITCH RELAY HI
DUCOSYN EXCITATION SWITCH RELAY LO
A/B DUCOSYN PRIME POWER HI
A/B DUCOSYN PRIME POWER LO
A/B 3200 CPS 30V PWR SUPPLY HI
A/B 3200 CPS 30V PWR SUPPLY LO
01A 3200 CPS 28.5V FEEDBACK HI
01A 3200 CPS 28.5V FEEDBACK LO
01A 3200 CPS 30V PWR SUPPLY HI
01A 3200 CPS 30V PWR SUPPLY LO
A/B DUCOSYN FEEDBACK MONITOR HI
A/B DUCOSYN FEEDBACK MONITOR LO
665
667
666
733
734
546
492
493
519
520
117
118
490
491
486
487
488
489
178
179
XBR-A
RSS
01A BACKWALL

Ⓑ REPLACED WITH CHANGE BY REV C

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN R.H. Baker DATE 8 MAY 65 CHECKED Ed Foster 13 MAY 65 APPROVAL APPROVAL J. M. Watson	MECHANIZATION DIAGRAM - POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (BLOCK II & LEM)
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974 SIZE E 2900208
CONTRACT NAS 9-497	MIT APPROVAL	SCALE NONE SHEET 3 OF 3

2900208 B

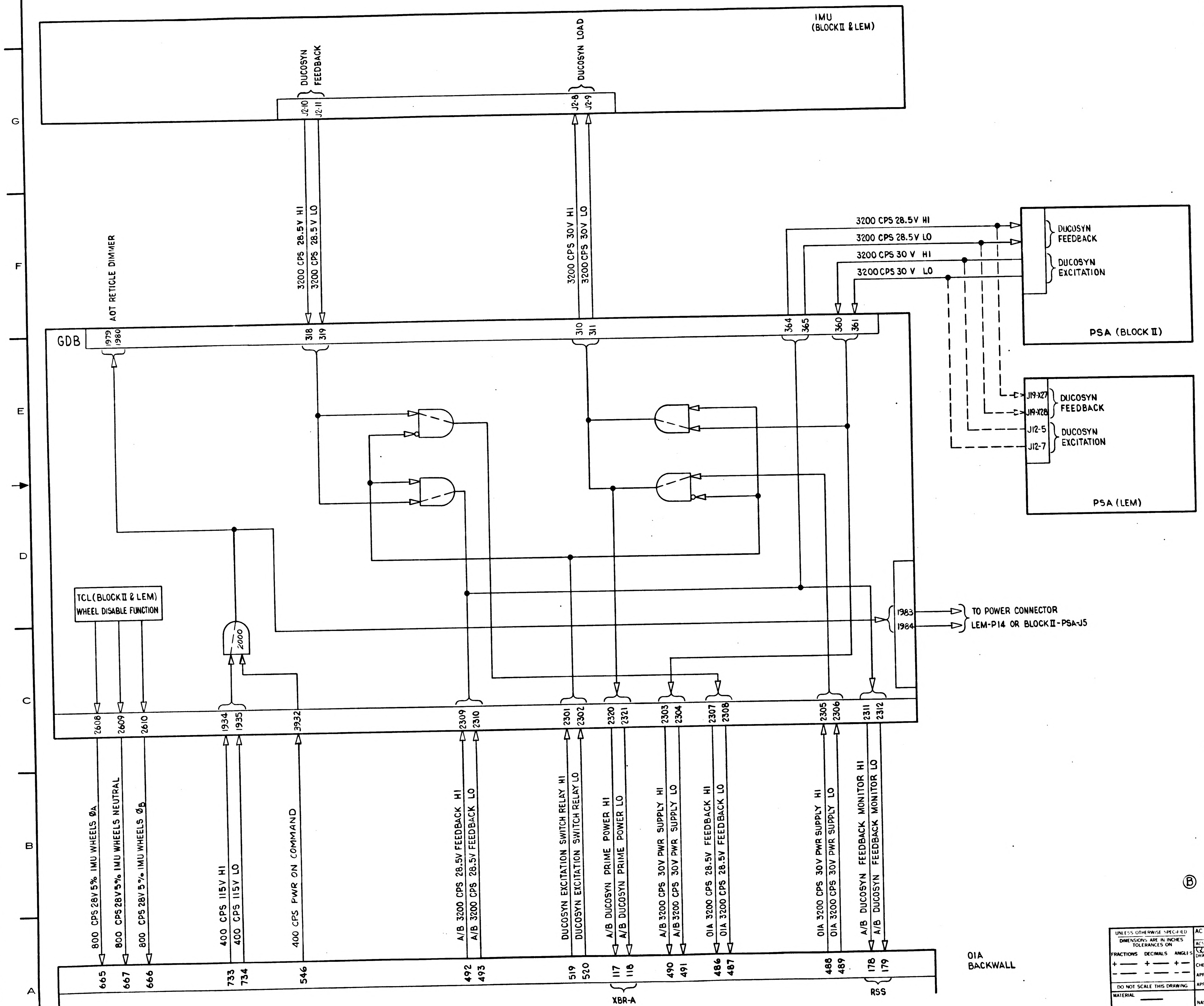
2900208
SH 2 OF 3



16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
DUCOSYN FEEDBACK
J1-T
J1-U
DUCOSYN LOAD
J1-R
J1-S
IMU GIMBAL & GYRO ERROR SIGNAL LO
J3-V
Z IRIG ERROR
PA
J3-B
3200 CPS 2V FEEDBACK HI
3200 CPS 2V FEEDBACK LO
ISS 800 CPS 1% POWER SUPPLY OUTPUT
N3
P3
TRAY 2
3200 CPS POWER SUPPLY FEEDBACK
F3
G3
TRAY 1
3200 CPS POWER SUPPLY OUTPUT
L1, L2
M1, M2
TRAY 1
3200 CPS 2V HI
3200 CPS 2V LO
39
40
41
42
43
44
PSA 800 CPS 1% DISTRIBUTION
1
2
5
6
7
8
9
11
10
12
13
14
15
16
17
TO 56P11 SYSTEM TEST
CONTROL ELECTRONICS SUBSYSTEMS TEST
69
68
763
764
761
762
758
759
2094
2095
750
751
736
737
727
728
724
725
710
711
712
713
1753
OJB
ISS 800 CPS DISTRIBUTION
"AND " SEE TES (IRIG TEST)
"AND " SEE TES (IRIG TEST)
TCL (BLK I SERIES 100) WHEEL DISABLE FUNCTION
2087
2088
2089
259
260
2600
2601
237
238
249
250
228
229
240
241
231
232
234
235
213
214
1253
800 CPS 28V 5% IMU WHEELS ØA
800 CPS 28V 5% IMU WHEELS NEUTRAL
800 CPS 28V 5% IMU WHEELS ØB
400 CPS 115V HI
400 CPS 115V LO
800 CPS 28V 1% HI
800 CPS 28V 1% LO
A/B 3200 CPS 2V FEEDBACK HI
A/B 3200 CPS 2V FEEDBACK LO
DUCOSYN EXCITATION SW REL HI
DUCOSYN EXCITATION SW REL LO
A/B 3200 CPS 4V PWR SUPPLY HI
A/B 3200 CPS 4V PWR SUPPLY LO
OIA 3200 CPS 2V FEEDBACK HI
OIA 3200 CPS 2V FEEDBACK LO
OIA 3200 CPS 4V PWR SUPPLY HI
OIA 3200 CPS 4V PWR SUPPLY LO
A/B DUCOSYN FEEDBACK MONITOR HI
A/B DUCOSYN FEEDBACK MONITOR LO
A/B DUCOSYN PRIME PWR HI
A/B DUCOSYN PRIME PWR LO
Z GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
665
667
666
733
734
434W
435W
492
493
519
520
490
491
486
487
488
489
178
179
117
118
129
RSS
XBR-A
2900208
REV B
SH 2

1/2900208

REVISIONS					9154
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 20495		2 JUL 65	RLP
B		REPLACED WITH CHANGE BY REV "C" PER TDRR 21999		8 SEP 65	JWP / AU



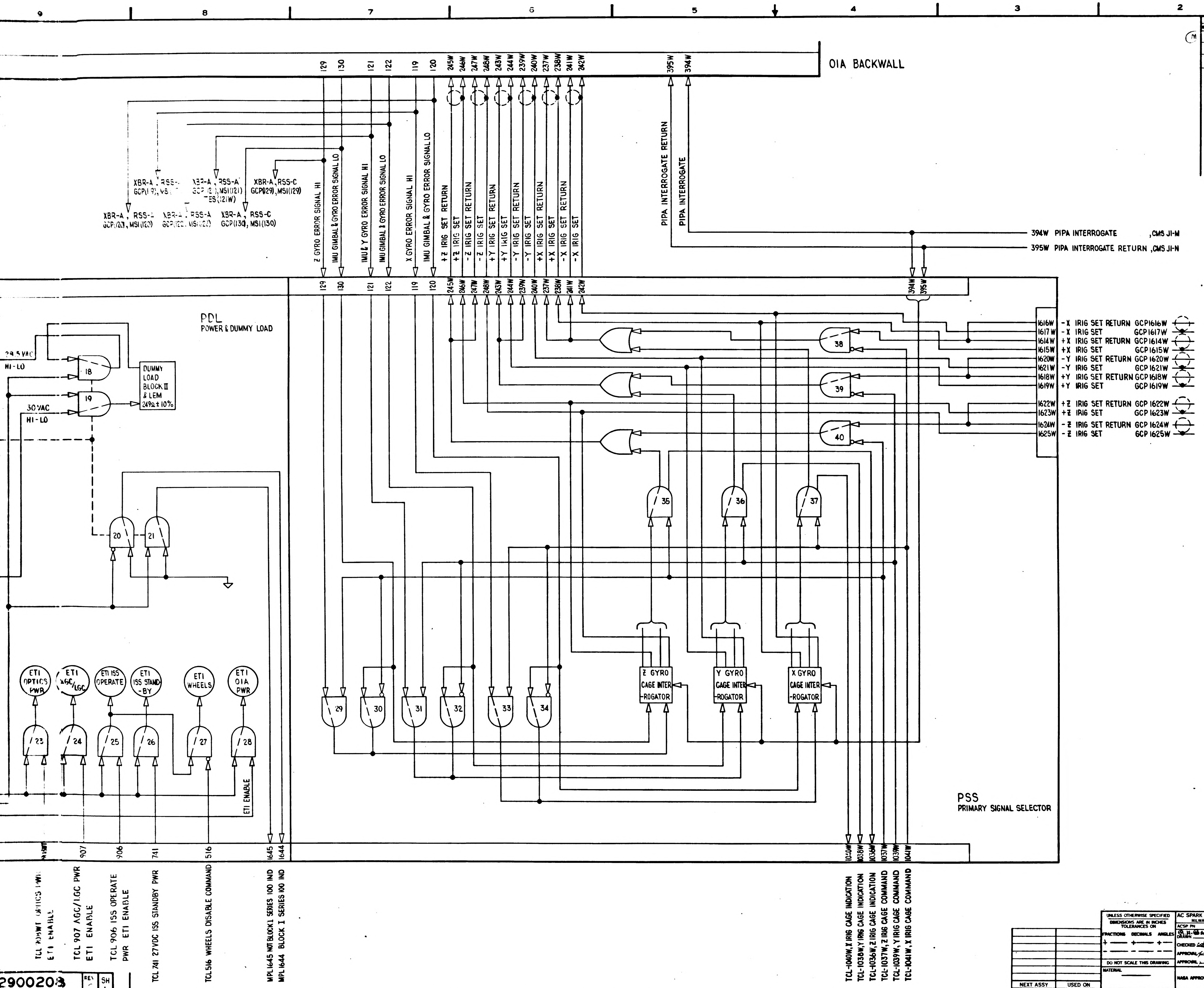
IMU (BLOCK II & LEM)
DUCOSYN FEEDBACK
DUCOSYN LOAD
J2-10
J2-11
J2-8
J2-9
3200 CPS 28.5V HI
3200 CPS 28.5V LO
3200 CPS 30V HI
3200 CPS 30V LO
AOT RETICLE DIMMER
GDB
1979
1980
318
319
310
311
364
365
360
361
3200 CPS 28.5V HI
3200 CPS 28.5V LO
3200 CPS 30 V HI
3200 CPS 30 V LO
DUCOSYN FEEDBACK
DUCOSYN EXCITATION
PSA (BLOCK II)
J19-X27
J19-X28
J12-5
J12-7
DUCOSYN FEEDBACK
DUCOSYN EXCITATION
PSA (LEM)
TCL (BLOCK II & LEM) WHEEL DISABLE FUNCTION
2000
1983
1984
TO POWER CONNECTOR LEM-P14 OR BLOCK II-PSA-J5
2608
2609
2610
1934
1935
3932
2309
2310
2301
2302
2320
2321
2303
2304
2307
2308
2305
2306
2311
2312
800 CPS 28V 5% IMU WHEELS ØA
800 CPS 28V 5% IMU WHEELS NEUTRAL
800 CPS 28V 5% IMU WHEELS ØB
400 CPS 115V HI
400 CPS 115V LO
400 CPS PWR ON COMMAND
A/B 3200 CPS 28.5V FEEDBACK HI
A/B 3200 CPS 28.5V FEEDBACK LO
DUCOSYN EXCITATION SWITCH RELAY HI
DUCOSYN EXCITATION SWITCH RELAY LO
A/B DUCOSYN PRIME POWER HI
A/B DUCOSYN PRIME POWER LO
A/B 3200 CPS 30V PWR SUPPLY HI
A/B 3200 CPS 30V PWR SUPPLY LO
01A 3200 CPS 28.5V FEEDBACK HI
01A 3200 CPS 28.5V FEEDBACK LO
01A 3200 CPS 30V PWR SUPPLY HI
01A 3200 CPS 30V PWR SUPPLY LO
A/B DUCOSYN FEEDBACK MONITOR HI
A/B DUCOSYN FEEDBACK MONITOR LO
665
667
666
733
734
546
492
493
519
520
117
118
490
491
486
487
488
489
178
179
XBR-A
RSS
01A BACKWALL

Ⓑ REPLACED WITH CHANGE BY REV C

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + —— + —— + —— – —— – —— – ——	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN R.H. Baker DATE 8 MAY 65 CHECKED Ed Foster 13 MAY 65 APPROVAL APPROVAL J. M. Watson	MECHANIZATION DIAGRAM - POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (BLOCK II & LEM)
MATERIAL ——	NASA APPROVAL	CODE IDENT NO 99974 SIZE E 2900208
CONTRACT NAS 9-497	MIT APPROVAL	SCALE NONE SHEET 3 OF 3

2900208 B

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	
B		REVISION STATUS CHANGED		8 SEP 65	JWP
C		REVISION STATUS CHANGED TDRR 21999		20 SEP 65	



OIA BACKWALL
129
130
121
122
119
120
245W
246W
247W
248W
243W
244W
239W
240W
237W
238W
241W
242W
395W
394W
XBR-A, RSS-A GCP(119), MSI(119)
XBR-A, RSS-A GCP(121), MSI(121) TES(121W)
XBR-A, RSS-C GCP(129), MSI(129)
XBR-A, RSS-A GCP(120), MSI(120)
XBR-A, RSS-A GCP(122), MSI(122)
XBR-A, RSS-C GCP(130), MSI(130)
Z GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
IMU & Y GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
+Z IRIG SET RETURN
+Z IRIG SET
-Z IRIG SET RETURN
-Z IRIG SET
+Y IRIG SET RETURN
+Y IRIG SET
-Y IRIG SET RETURN
-Y IRIG SET
+X IRIG SET RETURN
+X IRIG SET
-X IRIG SET RETURN
-X IRIG SET
PIPA INTERROGATE RETURN
PIPA INTERROGATE
394W PIPA INTERROGATE ,CMS J1-M
395W PIPA INTERROGATE RETURN ,CMS J1-N
PDL
POWER & DUMMY LOAD
29.5 VAC
HI-LO
30 VAC
HI-LO
18
19
DUMMY LOAD BLOCK II & LEM 249Ω ± 10%
20
21
1616W -X IRIG SET RETURN GCP1616W
1617W -X IRIG SET GCP1617W
1614W +X IRIG SET RETURN GCP1614W
1615W +X IRIG SET GCP1615W
1620W -Y IRIG SET RETURN GCP1620W
1621W -Y IRIG SET GCP1621W
1618W +Y IRIG SET RETURN GCP1618W
1619W +Y IRIG SET GCP1619W
1622W +Z IRIG SET RETURN GCP1622W
1623W +Z IRIG SET GCP1623W
1624W -Z IRIG SET RETURN GCP1624W
1625W -Z IRIG SET GCP1625W
38
39
40
35
36
37
Z GYRO CAGE INTER-ROGATOR
Y GYRO CAGE INTER-ROGATOR
X GYRO CAGE INTER-ROGATOR
29
30
31
32
33
34
ETI OPTICS PWR
ETI AGC/LGC
ETI ISS OPERATE
ETI ISS STAND-BY
ETI WHEELS
ETI OIA PWR
23
24
25
26
27
28
ETI ENABLE
PSS
PRIMARY SIGNAL SELECTOR
907
906
741
516
1645
1644
1040W
1038W
1036W
1037W
1039W
1041W
OPTICS PWR ETI ENABLE
TCL 907 AGC/LGC PWR ETI ENABLE
TCL 906 ISS OPERATE PWR ETI ENABLE
TCL 741 27VDC ISS STANDBY PWR
TCL 516 WHEELS DISABLE COMMAND
MPL1645 NOT BLOCK I SERIES 100 IND
MPL1644 BLOCK I SERIES 100 IND
TCL-1040W, X IRIG CAGE INDICATION
TCL-1038W, Y IRIG CAGE INDICATION
TCL-1036W, Z IRIG CAGE INDICATION
TCL-1037W, Z IRIG CAGE COMMAND
TCL-1039W, Y IRIG CAGE COMMAND
TCL-1041W, X IRIG CAGE COMMAND
2H

2900208 | REV C | SH 1

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R.H. Grebe DATE 10 MAY 65
CHECKED Ed Foster 13 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM - POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (BLOCK I SERIES 100,

CODE IDENT NO. 99974 | SIZE J2 | 2900208
SCALE NONE | SHEET 1 OF 3

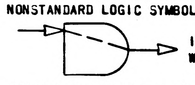
2900208 C

2H 1 OF 3

2-7 2900208

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. STANDARD LOGIC SYMBOLOGY PER MIL STANDARD 806
3. NONSTANDARD LOGIC SYMBOLOGY



INDICATES AN "AND" GATE WITH A SWITCHED SIGNAL

4. REFERENCE MECHANIZATION DIAGRAMS

2900210 - AC POWER PROTECTION PANEL AND POWER DISTRIBUTION (FTR)

2900223 - GIMBAL POSITION CONTROL PANEL (GPC)

2900207 - MONITOR PANEL (MPL)

2900201 - TEST CONTROL PANEL (TCL) BLOCK I SERIES 100

2900202 - TEST CONTROL PANEL (TCL) BLOCK II

2900206 - TEST SELECTOR PANEL (TES)

2900217 - SIGNAL SELECTION AND MEASUREMENT CROSS BAR - AC SIGNAL (XBR-A)

2900218 - OSCILLOGRAPH SIGNAL SELECTION
TO A FIXED AC CHANNEL (RSS-A)
TO A SWITCHABLE AC CHANNEL (RSS-C)

2900219 - COUNTER SIGNAL SELECTION
PRIMARY SIGNAL SELECTOR (PSS)

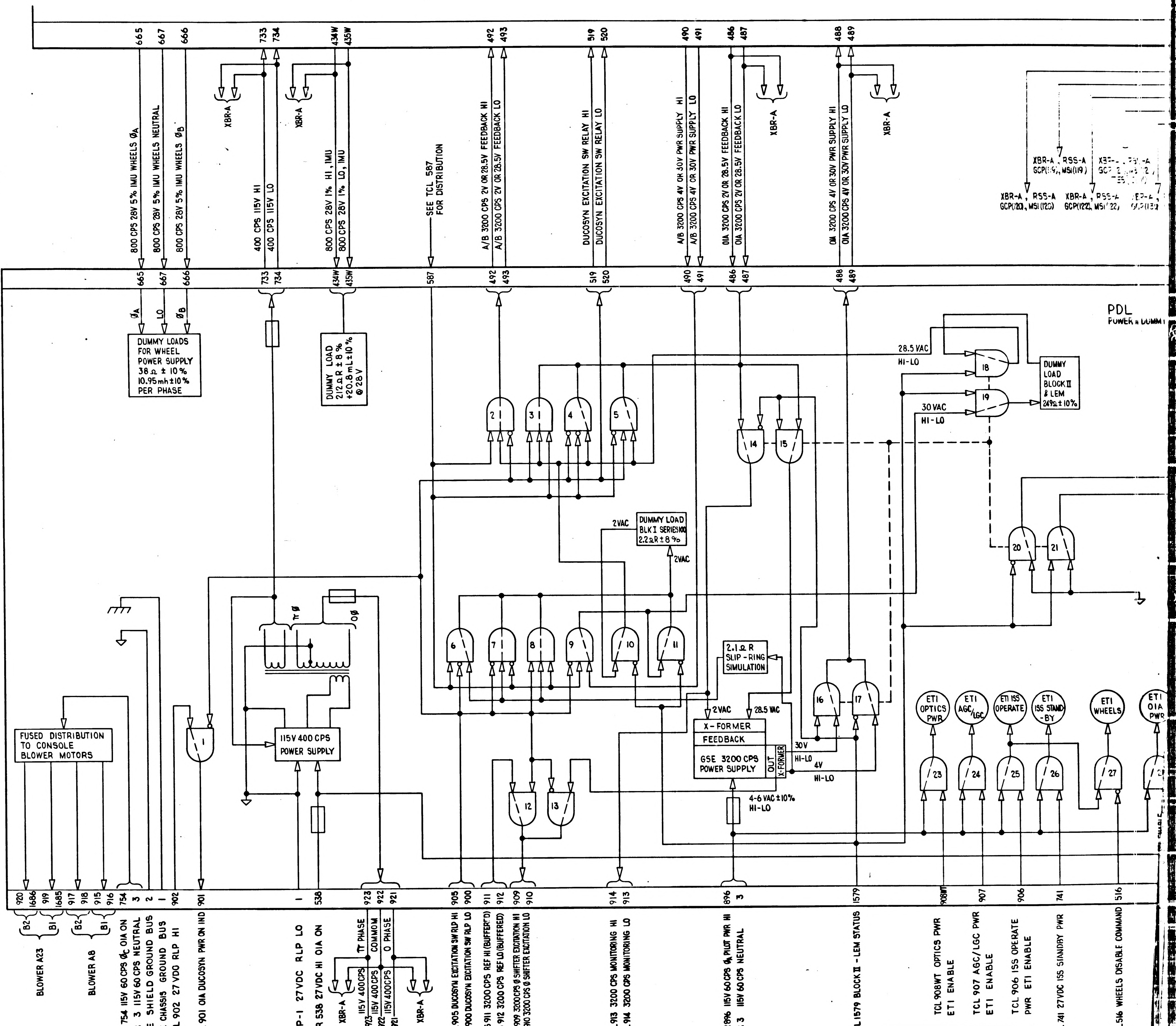
2900215 - MEASUREMENT REFERENCE POWER SUPPLIED OSCILLOGRAPH SIGNAL SELECTOR (PARTIAL) (RSS)

2900213 - GSE GROUNDING

2900212 - PIPA AND IRIG MONITORING PHASE SHIFT PANEL (MSI)

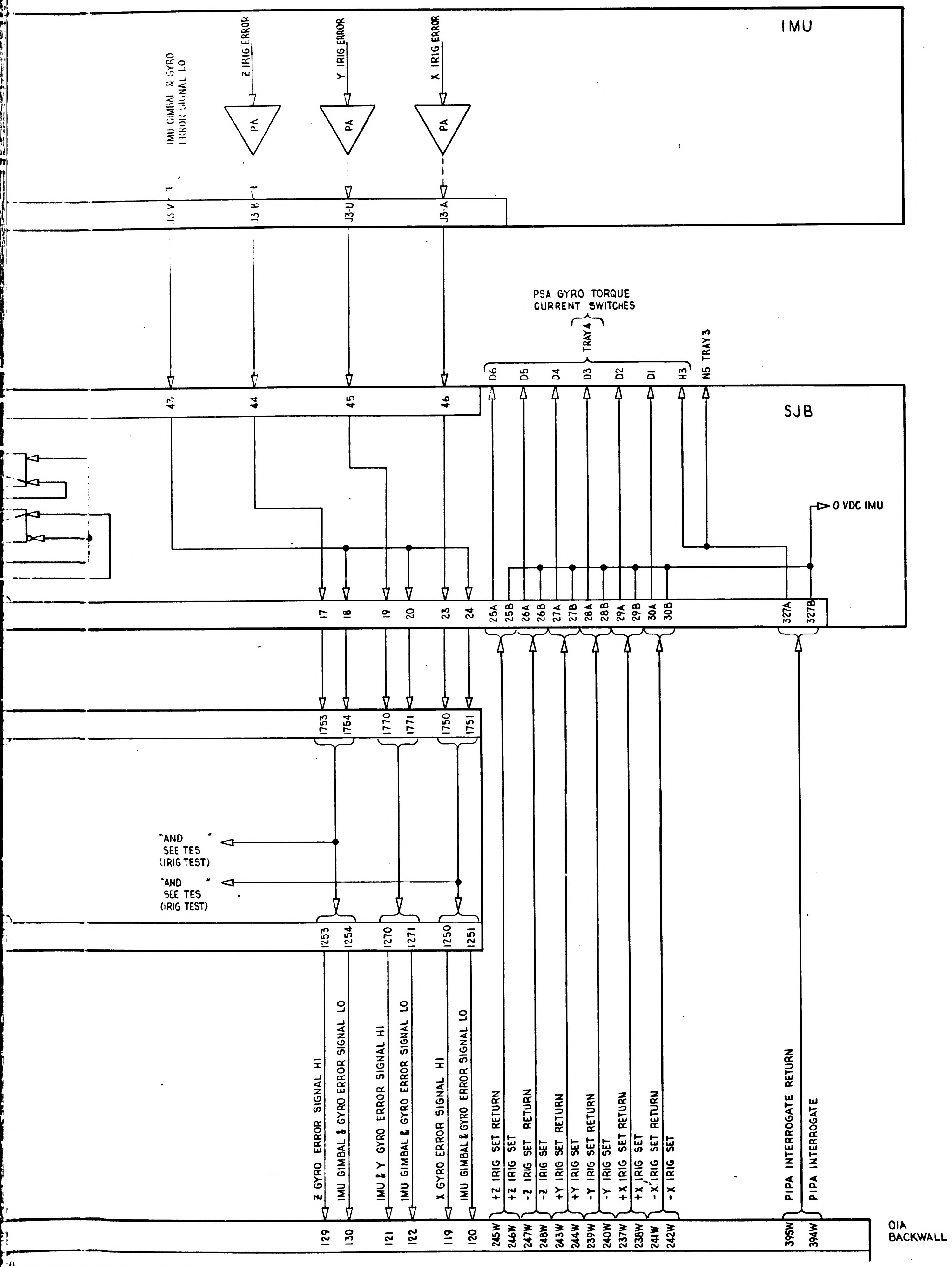
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   - a. W - BLOCK I SERIES 100 ONLY
   - b. T - BLACK II ONLY
   - c. L - LEM ONLY
   - d. BLANK - ALL G/N CONFIGURATIONS
   - e. TW, TL, OR WL - USED IN MORE THAN ONE G/N CONFIGURATION AS SHOWN

6. ALL ELAPSED TIME INDICATORS READ IN HOURS AND TENTHS OF HOURS TO 9999.9 HRS


665
667
666
733
734
434W
435W
492
493
519
520
490
491
486
487
488
489
800 CPS 28V 5% IMU WHEELS ØA
800 CPS 28V 5% IMU WHEELS NEUTRAL
800 CPS 28V 5% IMU WHEELS ØB
XBR-A
400 CPS 115V HI
400 CPS 115V LO
XBR-A
800 CPS 28V 1% HI, IMU
800 CPS 28V 1% LO, IMU
SEE TCL 587 FOR DISTRIBUTION
A/B 3200 CPS 2V OR 28.5V FEEDBACK HI
A/B 3200 CPS 2V OR 28.5V FEEDBACK LO
DUCOSYN EXCITATION SW RELAY HI
DUCOSYN EXCITATION SW RELAY LO
A/B 3200 CPS 4V OR 30V PWR SUPPLY HI
A/B 3200 CPS 4V OR 30V PWR SUPPLY LO
OIA 3200 CPS 2V OR 28.5V FEEDBACK HI
OIA 3200 CPS 2V OR 28.5V FEEDBACK LO
XBR-A
OIA 3200 CPS 4V OR 30V PWR SUPPLY HI
OIA 3200 CPS 4V OR 30V PWR SUPPLY LO
XBR-A
XBR-A , RSS-A
GCP(119), MSI(119)
XBR-A , RSS-A
GCP(120), MSI(120)
XBR-A , RSS-A
GCP(122), MSI(122)
665
667
666
733
734
434W
435W
587
492
493
519
520
490
491
486
487
488
489
ØA
LO
ØB
DUMMY LOADS FOR WHEEL POWER SUPPLY 38 Ω ± 10% 10.95 mh ± 10% PER PHASE
DUMMY LOAD 212 Ω ± 8% +20.8 mL ± 10% @ 28V
PDL
POWER & DUMM
28.5 VAC
HI-LO
30 VAC
HI-LO
DUMMY LOAD BLOCK II & LEM 249Ω ± 10%
2
3
4
5
14
15
18
19
2VAC
DUMMY LOAD BLK I SERIES 100 2.2ΩR ± 8%
2VAC
20
21
πØ
OØ
6
7
8
9
10
11
2.1 Ω R SLIP-RING SIMULATION
16
17
2VAC
28.5 VAC
X-FORMER
FEEDBACK
GSE 3200 CPS POWER SUPPLY
OUT X-FORMER
30V
HI-LO
4V
HI-LO
4-6 VAC ± 10%
HI-LO
1
115V 400 CPS POWER SUPPLY
FUSED DISTRIBUTION TO CONSOLE BLOWER MOTORS
12
13
ETI OPTICS PWR
ETI AGC/LGC
ETI ISS OPERATE
ETI ISS STAND-BY
ETI WHEELS
ETI OIA PWR
23
24
25
26
27
920
1686
919
1685
917
918
915
916
754
3
2
1
902
901
1
538
923
922
921
905
900
911
912
909
910
914
913
896
3
1579
908WT
907
906
741
516
B2
B1
B2
B1
BLOWER A23
BLOWER A8
FTR 754 115V 60 CPS ØC OIA ON
FTR 3 115V 60 CPS NEUTRAL
GSE SHIELD GROUND BUS
GSE CHASSIS GROUND BUS
MPL 902 27 VDO RLP HI
TCL 901 OIA DUCOSYN PWR ON IND
RLP-1 27VDC RLP LO
FTR 538 27VDC HI OIA ON
XBR-A
π PHASE
COMMOM
O PHASE
GPC 923 115V 400 CPS
GPC 922 115V 400 CPS
GPC 921 115V 400 CPS
XBR-A
TCL 905 DUCOSYN EXCITATION SW RLP HI
TCL 900 DUCOSYN EXCITATION SW RLP LO
RSS 911 3200 CPS REF HI (BUFFERED)
RSS 912 3200 CPS REF LO (BUFFERED)
MSI 909 3200 CPS Ø SHIFTER EXCITATION HI
MSI 910 3200 CPS Ø SHIFTER EXCITATION LO
TCL 913 3200 CPS MONITORING HI
TCL 914 3200 CPS MONITORING LO
FTR 896 115V 60 CPS ØA PILOT PWR HI
FTR 3 115V 60 CPS NEUTRAL
TCL 1579 BLOCK II - LEM STATUS
TCL 908WT OPTICS PWR ETI ENABLE
TCL 907 AGC/LGC PWR ETI ENABLE
TCL 906 ISS OPERATE PWR ETI ENABLE
TCL 741 27VDC ISS STANDBY PWR
TCL 516 WHEELS DISABLE COMMAND

2900208	REV C	SH 1

1/29002.0.8


IMU
IMU GIMBAL & GYRO ERROR SIGNAL LO
Z IRIG ERROR
Y IRIG ERROR
X IRIG ERROR
PA
PA
PA
J3-V
J3-B
J3-U
J3-A
PSA GYRO TORQUE CURRENT SWITCHES
TRAY4
N5 TRAY3
D6
D5
D4
D3
D2
D1
H3
43
44
45
46
SJB
O VDC IMU
17
18
19
20
23
24
25A
25B
26A
26B
27A
27B
28A
28B
29A
29B
30A
30B
327A
327B
1753
1754
1770
1771
1750
1751
"AND " SEE TES (IRIG TEST)
"AND " SEE TES (IRIG TEST)
1253
1254
1270
1271
1250
1251
Z GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
IMU & Y GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
+Z IRIG SET RETURN
+Z IRIG SET
-Z IRIG SET RETURN
-Z IRIG SET
+Y IRIG SET RETURN
+Y IRIG SET
-Y IRIG SET RETURN
-Y IRIG SET
+X IRIG SET RETURN
+X IRIG SET
-X IRIG SET RETURN
-X IRIG SET
PIPA INTERROGATE RETURN
PIPA INTERROGATE
129
130
121
122
119
120
245W
246W
247W
248W
243W
244W
239W
240W
237W
238W
241W
242W
395W
394W
OIA BACKWALL

REVISIONS	19254				
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		2 JUL 65	RP
B		REVISION STATUS CHANGED		8 SEP 65	
C		REVISION STATUS CHANGED ~~TDRR 21999~~		2? SEP 65	

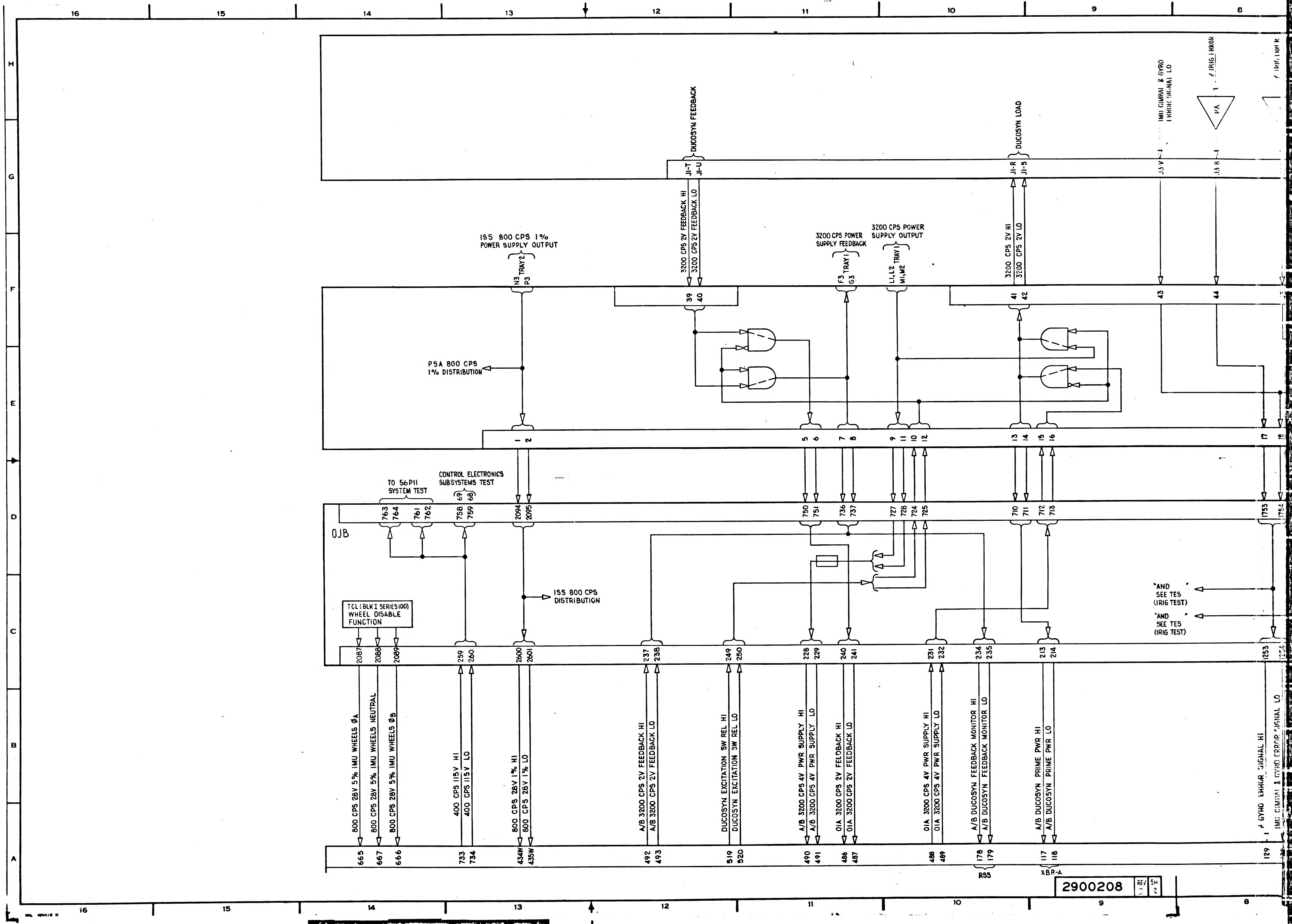
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± — ± — ± — DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN G.M. Becker DATE 8 MAY 65 CHECKED Ed Foster 13 MAY 65 APPROVAL APPROVAL	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	MECHANIZATION DIAGRAM - POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974	SIZE J2 — 2900208
CONTRACT NAS 9-497	MIT APPROVAL	SCALE NONE	SHEET 2 OF 3

NEXT ASSY	USED ON
APPLICATION	

2900208 REV C SH 2

2H

2/2900208

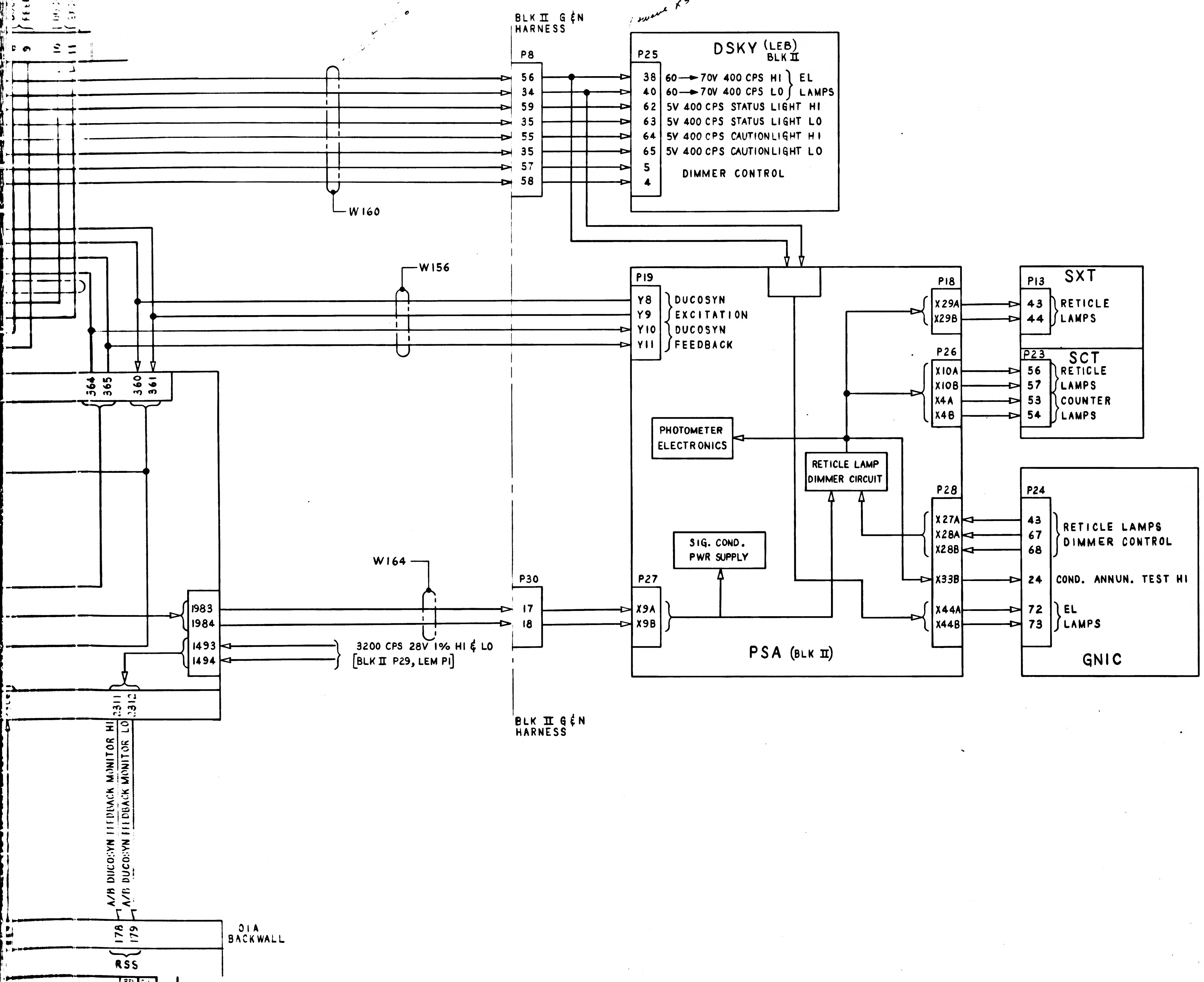


DUCOSYN FEEDBACK
J1-T
J1-U
DUCOSYN LOAD
J1-R
J1-S
IMU GIMBAL & GYRO ERROR SIGNAL LO
PA
ISS 800 CPS 1% POWER SUPPLY OUTPUT
N3
P3
TRAY 2
3200 CPS 2V FEEDBACK HI
3200 CPS 2V FEEDBACK LO
3200 CPS POWER SUPPLY FEEDBACK
F3
G3
TRAY 1
3200 CPS POWER SUPPLY OUTPUT
L1, L2
M1, M2
3200 CPS 2V HI
3200 CPS 2V LO
39
40
41
42
43
44
PSA 800 CPS 1% DISTRIBUTION
1
2
5
6
7
8
9
11
10
12
13
14
15
16
17
18
TO 56P11 SYSTEM TEST
CONTROL ELECTRONICS SUBSYSTEMS TEST
69
68
763
764
761
762
758
759
2094
2095
750
751
736
737
727
728
724
725
710
711
712
713
1753
1754
OJB
ISS 800 CPS DISTRIBUTION
TCL (BLK I SERIES 100) WHEEL DISABLE FUNCTION
"AND SEE TES (IRIG TEST)
"AND SEE TES (IRIG TEST)
2087
2088
2089
259
260
2600
2601
237
238
249
250
228
229
240
241
231
232
234
235
213
214
1253
800 CPS 28V 5% IMU WHEELS ØA
800 CPS 28V 5% IMU WHEELS NEUTRAL
800 CPS 28V 5% IMU WHEELS ØB
400 CPS 115V HI
400 CPS 115V LO
800 CPS 28V 1% HI
800 CPS 28V 1% LO
A/B 3200 CPS 2V FEEDBACK HI
A/B 3200 CPS 2V FEEDBACK LO
DUCOSYN EXCITATION SW REL HI
DUCOSYN EXCITATION SW REL LO
A/B 3200 CPS 4V PWR SUPPLY HI
A/B 3200 CPS 4V PWR SUPPLY LO
OIA 3200 CPS 2V FEEDBACK HI
OIA 3200 CPS 2V FEEDBACK LO
OIA 3200 CPS 4V PWR SUPPLY HI
OIA 3200 CPS 4V PWR SUPPLY LO
A/B DUCOSYN FEEDBACK MONITOR HI
A/B DUCOSYN FEEDBACK MONITOR LO
A/B DUCOSYN PRIME PWR HI
A/B DUCOSYN PRIME PWR LO
GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
665
667
666
733
734
434W
435W
492
493
519
520
490
491
486
487
488
489
178
179
117
118
129
RSS
XBR-A
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

2900208 REV 2 SH 2

1/2900208

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
C		REPLACES REV. B WITH CHG PER TDRR 21999		22 SEP 65	JNP



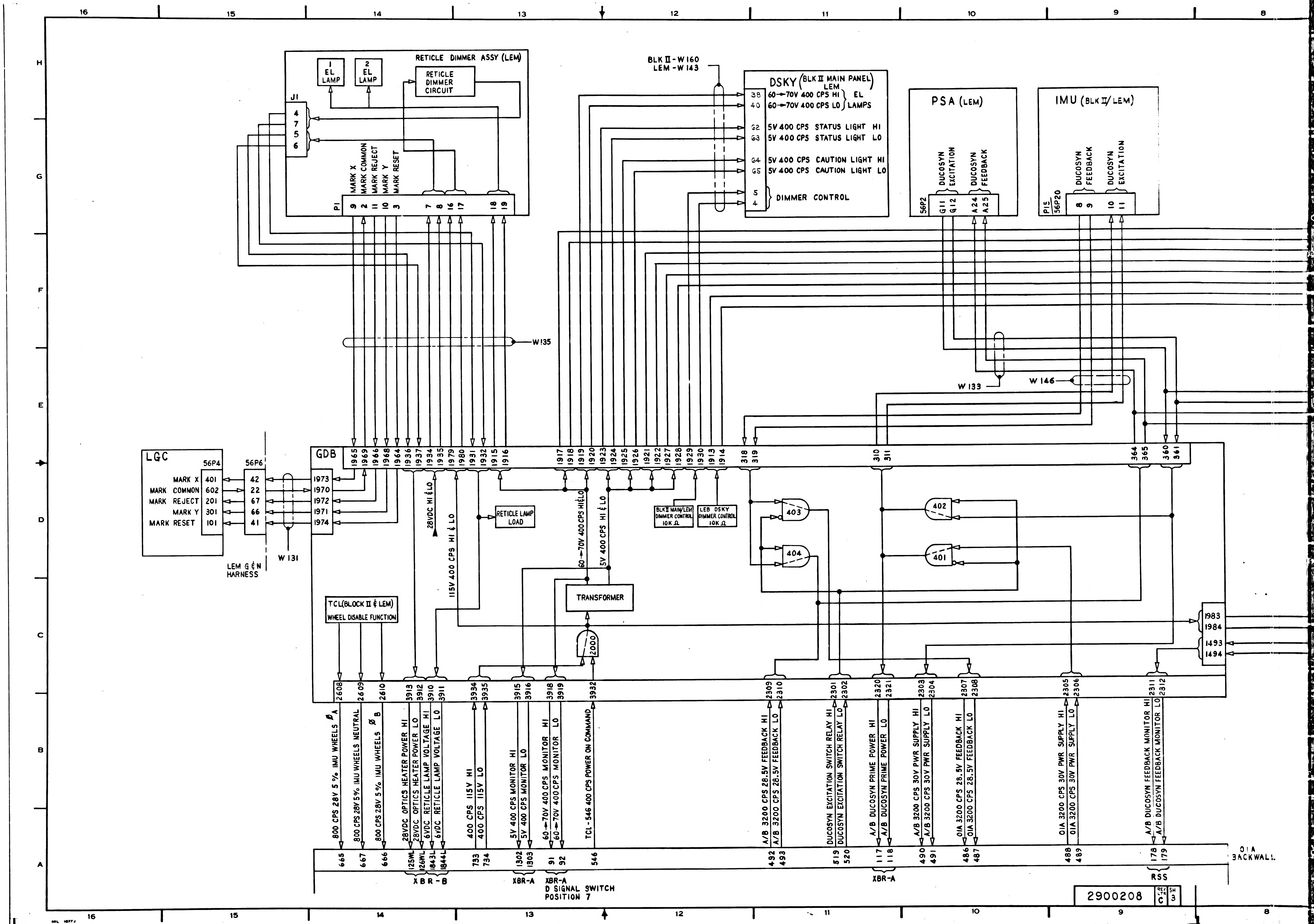
BLK II G&N HARNESS
P8
56
34
59
35
55
35
57
58
W160
P25
DSKY (LEB) BLK II
38 60 → 70V 400 CPS HI
40 60 → 70V 400 CPS LO
EL LAMPS
62 5V 400 CPS STATUS LIGHT HI
63 5V 400 CPS STATUS LIGHT LO
64 5V 400 CPS CAUTIONLIGHT HI
65 5V 400 CPS CAUTIONLIGHT LO
5
4
DIMMER CONTROL
W156
P19
Y8
Y9
Y10
Y11
DUCOSYN EXCITATION
DUCOSYN FEEDBACK
364
365
360
361
P18
X29A
X29B
P13
SXT
43
44
RETICLE LAMPS
P26
X10A
X10B
X4A
X4B
P23
SCT
56
57
53
54
RETICLE LAMPS
COUNTER LAMPS
PHOTOMETER ELECTRONICS
RETICLE LAMP DIMMER CIRCUIT
P28
X27A
X28A
X28B
X33B
X44A
X44B
P24
43
67
68
RETICLE LAMPS DIMMER CONTROL
24
COND. ANNUN. TEST HI
72
73
EL LAMPS
GNIC
SIG. COND. PWR SUPPLY
W164
P30
17
18
P27
X9A
X9B
PSA (BLK II)
1983
1984
1493
1494
3200 CPS 28V 1% HI & LO
[BLK II P29, LEM P1]
2311
2312
A/B DUCOSYN FEEDBACK MONITOR HI
A/B DUCOSYN FEEDBACK MONITOR LO
178
179
RSS
01A BACKWALL
BLK II G&N HARNESS

Ⓒ REPLACES REV(B)WITH CHANGE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN R. BAKER DATE 8 MAY 65 CHECKED E. FOSTER 13 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM - POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS
MATERIAL —	NASA APPROVAL MIT APPROVAL	CODE IDENT NO 99974 SIZE J_2 2900208
CONTRACT NAS9-497		SCALE NONE SHEET 3 OF 3

2900208 REV C SH 3

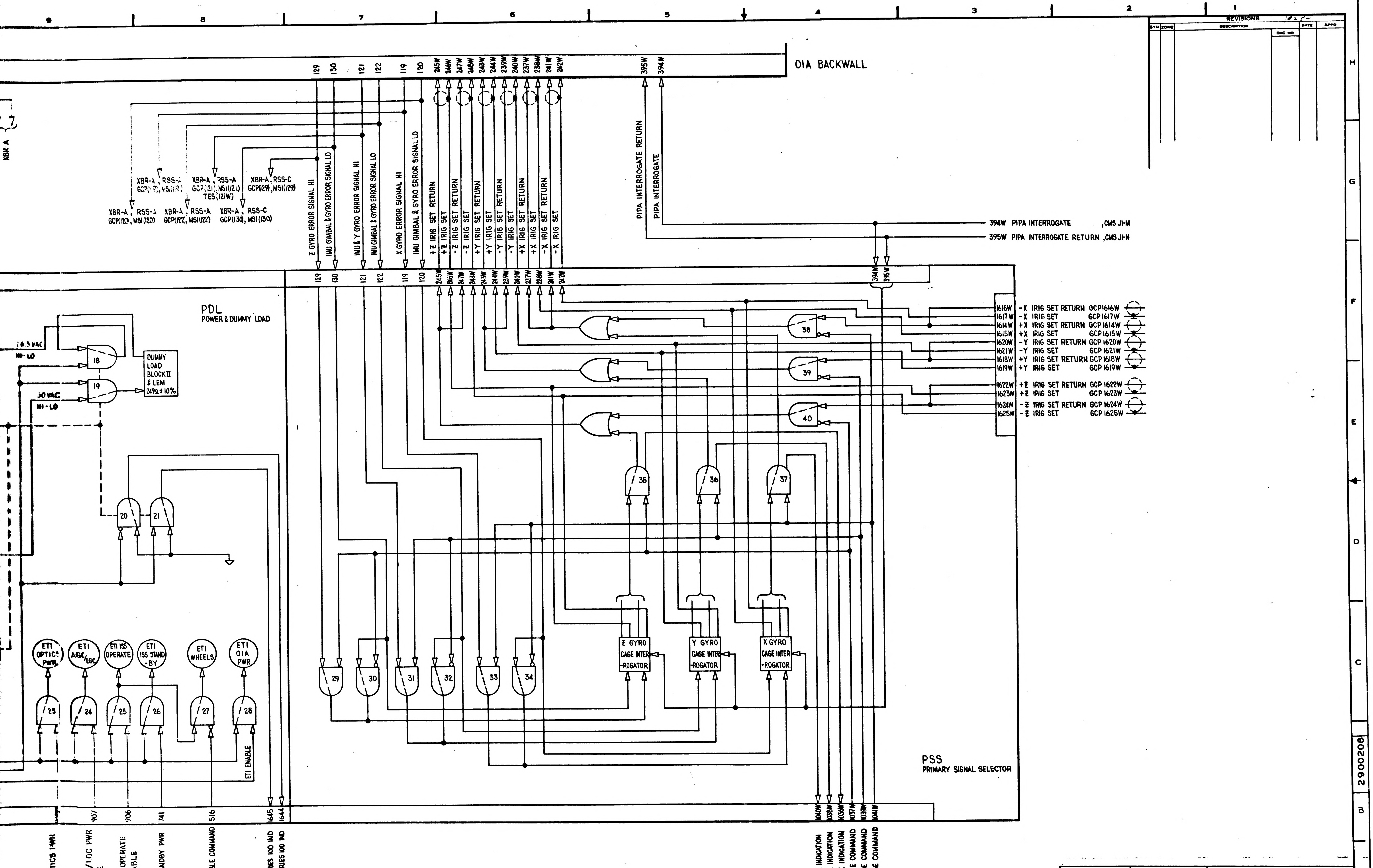
27 2900208



RETICLE DIMMER ASSY (LEM)
1 EL LAMP
2 EL LAMP
RETICLE DIMMER CIRCUIT
J1
4 7 5 6
P1
MARK X
MARK COMMON
MARK REJECT
MARK Y
MARK RESET
9 2 11 10 3 7 8 16 17 18 19
BLK II - W160
LEM - W143
DSKY (BLK II MAIN PANEL LEM)
38 60→70V 400 CPS HI
40 60→70V 400 CPS LO
EL LAMPS
G2 5V 400 CPS STATUS LIGHT HI
G3 5V 400 CPS STATUS LIGHT LO
G4 5V 400 CPS CAUTION LIGHT HI
G5 5V 400 CPS CAUTION LIGHT LO
5 4 DIMMER CONTROL
PSA (LEM)
DUCOSYN EXCITATION
DUCOSYN FEEDBACK
56P2
G11 G12 A24 A25
IMU (BLK II/LEM)
DUCOSYN FEEDBACK
DUCOSYN EXCITATION
P15 56P20
8 9 10 11
W135
W 133
W 146
LGC
56P4
MARK X 401
MARK COMMON 602
MARK REJECT 201
MARK Y 301
MARK RESET 101
56P6
42 22 67 66 41
W 131
LEM G & N HARNESS
GDB
1973 1970 1972 1971 1974
1965 1969 1966 1968 1964 1936 1937 1934 1935 1979 1980 1931 1932 1915 1916
1917 1918 1919 1920 1923 1924 1925 1926 1921 1922 1927 1928 1929 1930 1913 1914
318 319 310 311 364 365 360 361
28VDC HI & LO
115V 400 CPS HI & LO
RETICLE LAMP LOAD
60→70V 400 CPS HI & LO
5V 400 CPS HI & LO
BLK II MAIN/LEM DIMMER CONTROL 10K Ω
LEB DSKY DIMMER CONTROL 10K Ω
TRANSFORMER
2000
403 404 402 401
1983 1984 1493 1494
TCL (BLOCK II & LEM) WHEEL DISABLE FUNCTION
2608 2609 2610 3913 3912 3910 3911 3934 3935 3915 3916 3918 3919 3932
2309 2310 2301 2302 2320 2321 2303 2304 2307 2308 2305 2306 2311 2312
800 CPS 28V 5% IMU WHEELS ØA
800 CPS 28V 5% IMU WHEELS NEUTRAL
800 CPS 28V 5% IMU WHEELS ØB
28VDC OPTICS HEATER POWER HI
28VDC OPTICS HEATER POWER LO
6VDC RETICLE LAMP VOLTAGE HI
6VDC RETICLE LAMP VOLTAGE LO
400 CPS 115V HI
400 CPS 115V LO
5V 400 CPS MONITOR HI
5V 400 CPS MONITOR LO
60→70V 400 CPS MONITOR HI
60→70V 400 CPS MONITOR LO
TCL-546 400 CPS POWER ON COMMAND
A/B 3200 CPS 28.5V FEEDBACK HI
A/B 3200 CPS 28.5V FEEDBACK LO
DUCOSYN EXCITATION SWITCH RELAY HI
DUCOSYN EXCITATION SWITCH RELAY LO
A/B DUCOSYN PRIME POWER HI
A/B DUCOSYN PRIME POWER LO
A/B 3200 CPS 30V PWR SUPPLY HI
A/B 3200 CPS 30V PWR SUPPLY LO
OIA 3200 CPS 28.5V FEEDBACK HI
OIA 3200 CPS 28.5V FEEDBACK LO
OIA 3200 CPS 30V PWR SUPPLY HI
OIA 3200 CPS 30V PWR SUPPLY LO
A/B DUCOSYN FEEDBACK MONITOR HI
A/B DUCOSYN FEEDBACK MONITOR LO
665 667 666 125WL 126WL 1843L 1844L 733 734 1302 1303 91 92 546
492 493 519 520 117 118 490 491 486 487 488 489 178 179
XBR-B
XBR-A
XBR-A D SIGNAL SWITCH POSITION 7
XBR-A
RSS
OIA BACKWALL
16 15 14 13 12 11 10 9 8
H G F E D C B A

2900208 REV LTR C SH 3

17 2900208


XBR A
OIA BACKWALL
129
130
121
122
119
120
245W
246W
247W
248W
243W
244W
239W
240W
237W
238W
241W
242W
395W
394W
XBR-A , RSS-A
GCP(119), MSI(119)
XBR-A , RSS-A
GCP(121), MSI(121)
TES (121W)
XBR-A , RSS-C
GCP(129), MSI(129)
XBR-A , RSS-A
GCP(120), MSI(120)
XBR-A , RSS-A
GCP(122), MSI(122)
XBR-A , RSS-C
GCP(130), MSI(130)
Z GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
IMU & Y GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
+Z IRIG SET RETURN
+Z IRIG SET
-Z IRIG SET RETURN
-Z IRIG SET
+Y IRIG SET RETURN
+Y IRIG SET
-Y IRIG SET RETURN
-Y IRIG SET
+X IRIG SET RETURN
+X IRIG SET
-X IRIG SET RETURN
-X IRIG SET
PIPA INTERROGATE RETURN
PIPA INTERROGATE
394W PIPA INTERROGATE ,CMS J1-M
395W PIPA INTERROGATE RETURN ,CMS J1-N
PDL
POWER & DUMMY LOAD
20.5 VAC
HI-LO
30 VAC
HI-LO
18
19
DUMMY LOAD BLOCK II & LEM 249Ω ± 10%
20
21
1616W -X IRIG SET RETURN GCP1616W
1617W -X IRIG SET GCP1617W
1614W +X IRIG SET RETURN GCP1614W
1615W +X IRIG SET GCP1615W
1620W -Y IRIG SET RETURN GCP1620W
1621W -Y IRIG SET GCP1621W
1618W +Y IRIG SET RETURN GCP1618W
1619W +Y IRIG SET GCP1619W
1622W +Z IRIG SET RETURN GCP1622W
1623W +Z IRIG SET GCP1623W
1624W -Z IRIG SET RETURN GCP1624W
1625W -Z IRIG SET GCP1625W
38
39
40
35
36
37
Z GYRO CAGE INTER-ROGATOR
Y GYRO CAGE INTER-ROGATOR
X GYRO CAGE INTER-ROGATOR
29
30
31
32
33
34
ETI OPTICS PWR
ETI AGC/LGC
ETI ISS OPERATE
ETI ISS STAND-BY
ETI WHEELS
ETI OIA PWR
23
24
25
26
27
28
ETI ENABLE
PSS
PRIMARY SIGNAL SELECTOR
907
906
741
516
1645
1644
1040W
1038W
1036W
1037W
1039W
1041W
TCL 908W1 OPTICS PWR ETI ENABLE
TCL 907 AGC/LGC PWR ETI ENABLE
TCL 906 ISS OPERATE PWR ETI ENABLE
TCL 741 27VDC ISS STANDBY PWR
TCL516 WHEELS DISABLE COMMAND
MPL1645 NOT BLOCK I SERIES 100 IND
MPL1644 BLOCK I SERIES 100 IND
TCL-1040W, X IRIG CAGE INDICATION
TCL-1038W, Y IRIG CAGE INDICATION
TCL-1036W, Z IRIG CAGE INDICATION
TCL-1037W, Z IRIG CAGE COMMAND
TCL-1039W, Y IRIG CAGE COMMAND
TCL-1041W, X IRIG CAGE COMMAND
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

2900208

2H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

NEXT ASSY | USED ON
APPLICATION

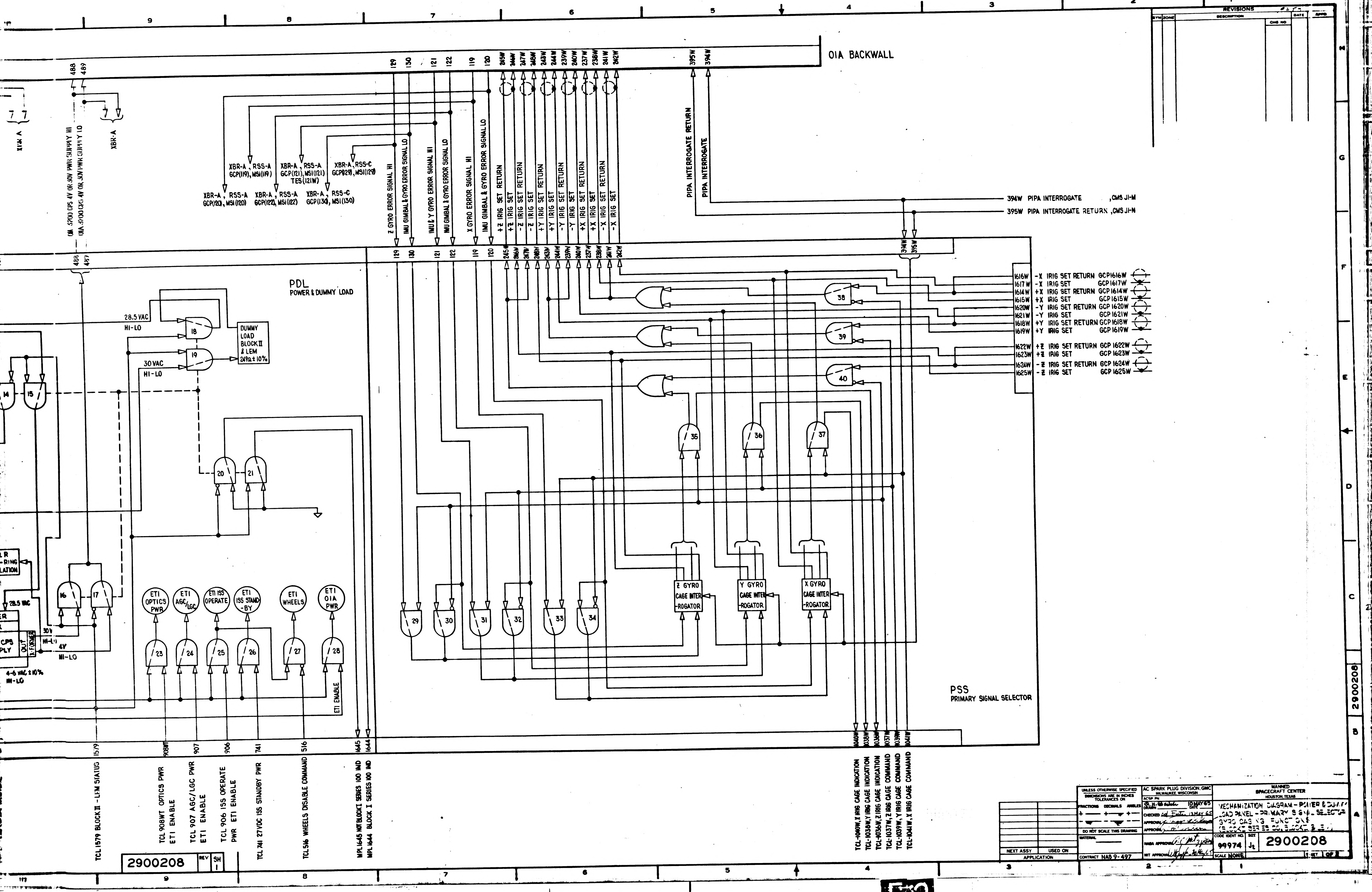
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. H. Gabelo DATE 10 MAY 65
CHECKED Ed Foster 13 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 20 May 65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM - POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (BLOCK I SERIES 100, BLOCK II, & LEV)

CODE IDENT NO. 99974 | SIZE J2 | 2900208
SCALE NONE | SHEET 1 OF 3

2900208 | REV | SH 1


OIA BACKWALL
129
130
121
122
119
120
245W
246W
247W
248W
243W
244W
239W
240W
237W
238W
241W
242W
395W
394W
488
489
XIRK A
OIA 3200 CPS 4V OR 30V PWR SUPPLY HI
OIA 3200 CPS 4V OR 30V PWR SUPPLY LO
XBR-A
XBR-A, RSS-A GCP(119), MSI(119)
XBR-A, RSS-A GCP(121), MSI(121) TES(121W)
XBR-A, RSS-C GCP(129), MSI(129)
XBR-A, RSS-A GCP(120), MSI(120)
XBR-A, RSS-A GCP(122), MSI(122)
XBR-A, RSS-C GCP(130), MSI(130)
Z GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
IMU & Y GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
+Z IRIG SET RETURN
+Z IRIG SET
-Z IRIG SET RETURN
-Z IRIG SET
+Y IRIG SET RETURN
+Y IRIG SET
-Y IRIG SET RETURN
-Y IRIG SET
+X IRIG SET RETURN
+X IRIG SET
-X IRIG SET RETURN
-X IRIG SET
PIPA INTERROGATE RETURN
PIPA INTERROGATE
394W PIPA INTERROGATE ,CMS J1-M
395W PIPA INTERROGATE RETURN ,CMS J1-N
394W
395W
PDL
POWER & DUMMY LOAD
28.5 VAC
HI-LO
30 VAC
HI-LO
18
19
DUMMY LOAD BLOCK II & LEM 249Ω ± 10%
14
15
20
21
LR -RING LATION
28.5 VAC
ER
CPS PLY
OUT
X-FORMER
30V
HI-LO
4V
HI-LO
4-6 VAC ± 10%
HI-LO
16
17
ETI OPTICS PWR
ETI AGC/LGC
ETI ISS OPERATE
ETI ISS STAND-BY
ETI WHEELS
ETI OIA PWR
23
24
25
26
27
28
ETI ENABLE
1616W -X IRIG SET RETURN GCP1616W
1617W -X IRIG SET GCP1617W
1614W +X IRIG SET RETURN GCP1614W
1615W +X IRIG SET GCP1615W
1620W -Y IRIG SET RETURN GCP1620W
1621W -Y IRIG SET GCP1621W
1618W +Y IRIG SET RETURN GCP1618W
1619W +Y IRIG SET GCP1619W
1622W +Z IRIG SET RETURN GCP 1622W
1623W +Z IRIG SET GCP 1623W
1624W -Z IRIG SET RETURN GCP 1624W
1625W -Z IRIG SET GCP 1625W
38
39
40
35
36
37
Z GYRO CAGE INTER-ROGATOR
Y GYRO CAGE INTER-ROGATOR
X GYRO CAGE INTER-ROGATOR
29
30
31
32
33
34
PSS
PRIMARY SIGNAL SELECTOR
1579
908WT
907
906
741
516
1645
1644
1040W
1038W
1036W
1037W
1039W
1041W
TCL 1579 BLOCK II -LEM STATUS
TCL 908WT OPTICS PWR ETI ENABLE
TCL 907 AGC/LGC PWR ETI ENABLE
TCL 906 ISS OPERATE PWR ETI ENABLE
TCL 741 27VDC ISS STANDBY PWR
TCL516 WHEELS DISABLE COMMAND
MPL1645 NOT BLOCK I SERIES 100 IND
MPL1644 BLOCK I SERIES 100 IND
TCL-1040W, X IRIG CAGE INDICATION
TCL-1038W, Y IRIG CAGE INDICATION
TCL-1036W, Z IRIG CAGE INDICATION
TCL-1037W, Z IRIG CAGE COMMAND
TCL-1039W, Y IRIG CAGE COMMAND
TCL-1041W, X IRIG CAGE COMMAND
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A
REVISIONS
SYM
ZONE
DESCRIPTION
CHG NO
DATE
APPD

2900208	REV	SH 1

NEXT ASSY | USED ON
APPLICATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN G. H. Goetsch DATE 10 MAY 65
CHECKED Ed Foster 13 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 20 May 65

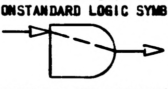
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM – POWER & DUMMY
LOAD PANEL – PRIMARY SIGNAL SELECTOR
GYRO CAGING FUNCTIONS
(BLOCK I SERIES 00, BLOCK II & LEM)

CODE IDENT NO. 99974 SIZE J2 2900208
SCALE NONE SHEET OF

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327
2. STANDARD LOGIC SYMBOLOGY PER MIL STANDARD 806
3. NONSTANDARD LOGIC SYMBOLOGY


INDICATES AN "AND" GATE WITH A SWITCHED SIGNAL

4. REFERENCE MECHANIZATION DIAGRAMS

2900210 - AC POWER PROTECTION PANEL AND POWER DISTRIBUTION (FTR)

2900223 - GIMBAL POSITION CONTROL PANEL (GPC)

2900207 - MONITOR PANEL (MPL)

2900201 - TEST CONTROL PANEL (TCL) BLOCK I SERIES 100

2900202 - TEST CONTROL PANEL (TCL) BLOCK II

2900206 - TEST SELECTOR PANEL (TES)

2900217 - SIGNAL SELECTION AND MEASUREMENT CROSS BAR - AC SIGNAL (XBR-A)

2900218 - OSCILLOGRAPH SIGNAL SELECTION
TO A FIXED AC CHANNEL (RSS-A)
TO A SWITCHABLE AC CHANNEL (RSS-C)

2900219 - COUNTER SIGNAL SELECTION
PRIMARY SIGNAL SELECTOR (PSS)

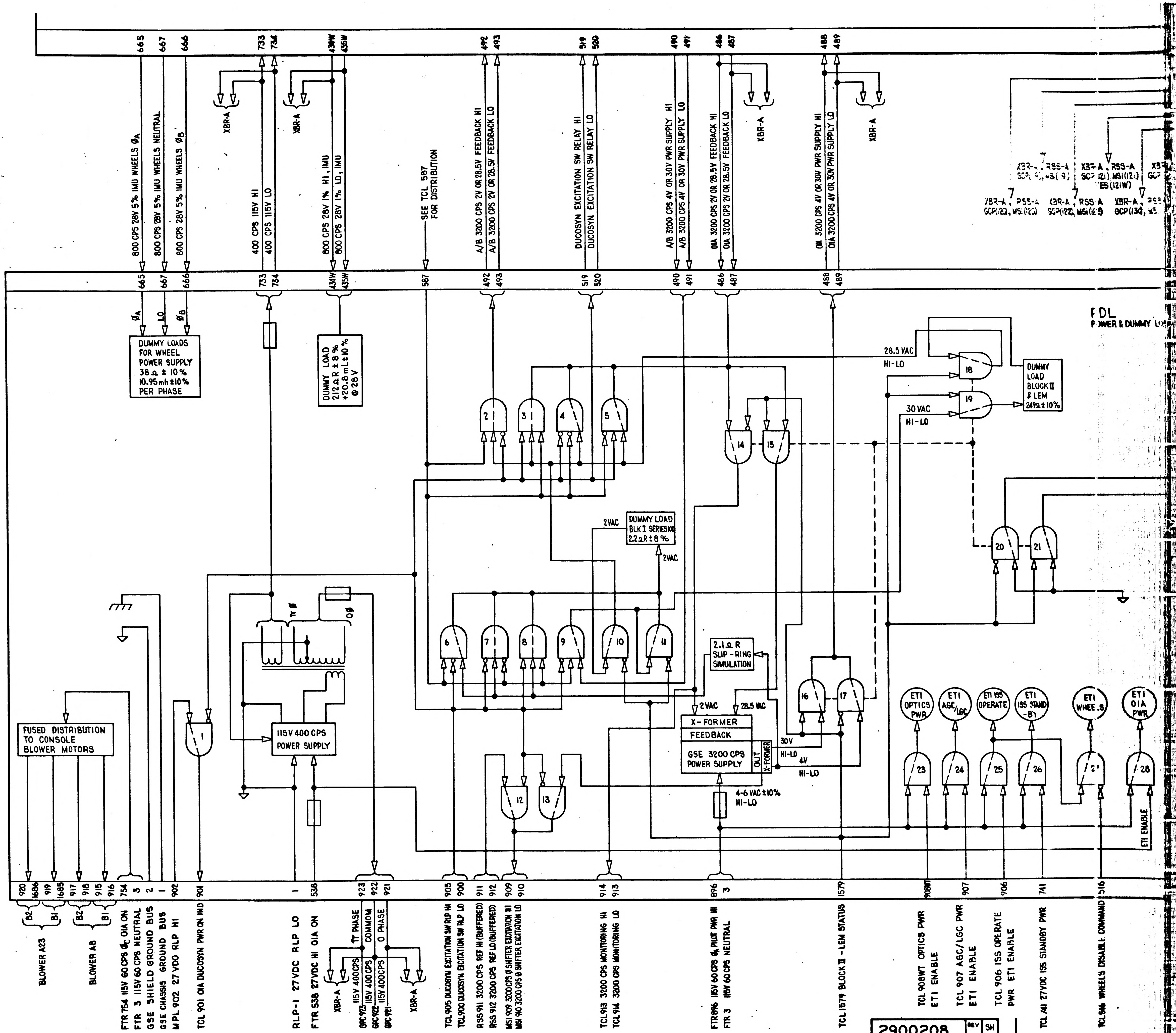
2900215 - MEASUREMENT REFERENCE POWER SUPPLIED OSCILLOGRAPH SIGNAL SELECTOR (PARTIAL) (RSS)

2900213 - GSE GROUNDING

2900212 - PIPA AND IRIG MONITORING PHASE SHIFT PANEL (MSI)

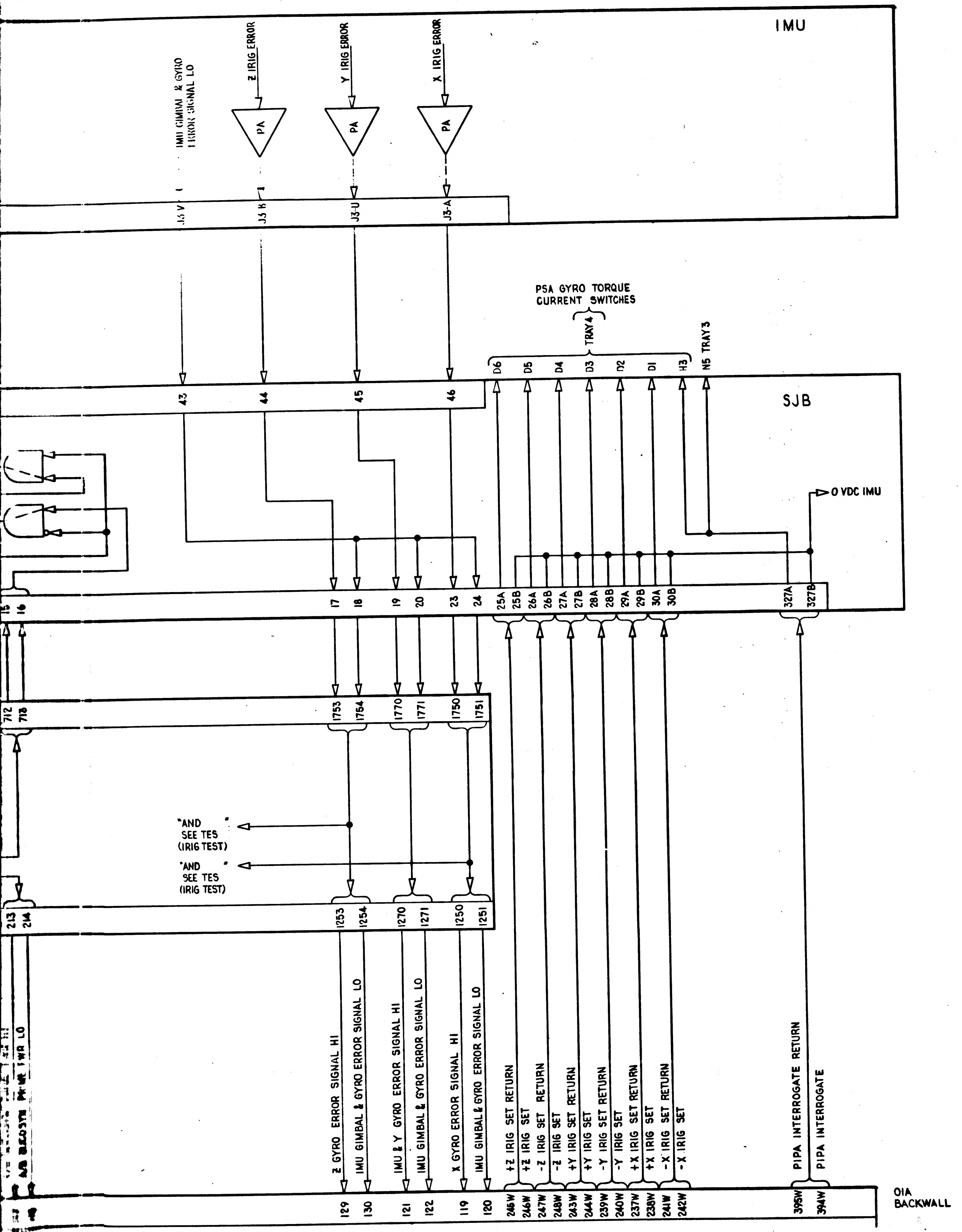
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   a. W - BLOCK I SERIES 100 ONLY
   b. T - BLACK II ONLY
   c. L - LEM ONLY
   d. BLANK - ALL G/N CONFIGURATIONS
   e. TW, TL, OR WL - USED IN MORE THAN ONE G/N CONFIGURATION AS SHOWN

6. ALL ELAPSED TIME INDICATORS READ IN HOURS AND TENTHS OF HOURS TO 9999.9 HRS


665
667
666
800 CPS 28V 5% IMU WHEELS ØA
800 CPS 28V 5% IMU WHEELS NEUTRAL
800 CPS 28V 5% IMU WHEELS ØB
733
734
XBR-A
400 CPS 115V HI
400 CPS 115V LO
434W
435W
800 CPS 28V 1% HI, IMU
800 CPS 28V 1% LO, IMU
SEE TCL 587 FOR DISTRIBUTION
587
492
493
A/B 3200 CPS 2V OR 28.5V FEEDBACK HI
A/B 3200 CPS 2V OR 28.5V FEEDBACK LO
519
520
DUCOSYN EXCITATION SW RELAY HI
DUCOSYN EXCITATION SW RELAY LO
490
491
A/B 3200 CPS 4V OR 30V PWR SUPPLY HI
A/B 3200 CPS 4V OR 30V PWR SUPPLY LO
486
487
OIA 3200 CPS 2V OR 28.5V FEEDBACK HI
OIA 3200 CPS 2V OR 28.5V FEEDBACK LO
488
489
OIA 3200 CPS 4V OR 30V PWR SUPPLY HI
OIA 3200 CPS 4V OR 30V PWR SUPPLY LO
XBR-A, RSS-A GCP(120), MSI(120)
XBR-A, RSS-A GCP(122), MSI(122)
XBR-A, RSS-A GCP(121), MSI(121) TES(121W)
XBR-A, RSS-A GCP(130)
FDL
POWER & DUMMY LO
ØA
LO
ØB
DUMMY LOADS FOR WHEEL POWER SUPPLY 38Ω ± 10% 10.95mh ±10% PER PHASE
DUMMY LOAD 21/2Ω R ± 8% +20.8mL ±10% @ 28V
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
23
24
25
26
28
28.5 VAC HI-LO
30 VAC HI-LO
DUMMY LOAD BLOCK II & LEM 249Ω ± 10%
2VAC
DUMMY LOAD BLK I SERIES 100 2.2Ω R ± 8%
2VAC
πØ
OØ
115V 400 CPS POWER SUPPLY
FUSED DISTRIBUTION TO CONSOLE BLOWER MOTORS
2.1Ω R SLIP-RING SIMULATION
2VAC
28.5 VAC
X-FORMER
FEEDBACK
GSE 3200 CPS POWER SUPPLY
OUT
X-FORMER
30V
HI-LO
4V
HI-LO
4-6 VAC ± 10% HI-LO
ETI OPTICS PWR
ETI AGC/LGC
ETI ISS OPERATE
ETI ISS STAND-BY
ETI WHEELS
ETI OIA PWR
ETI ENABLE
920
1686
919
1685
917
918
915
916
754
3
2
1
902
901
B2
B1
B2
B1
BLOWER A23
BLOWER A8
FTR 754 115V 60 CPS ØC OIA ON
FTR 3 115V 60 CPS NEUTRAL
GSE SHIELD GROUND BUS
GSE CHASSIS GROUND BUS
MPL 902 27 VDC RLP HI
TCL 901 OIA DUCOSYN PWR ON IND
1
538
RLP-1 27VDC RLP LO
FTR 538 27VDC HI OIA ON
923
922
921
XBR-A
π PHASE
COMMOM
O PHASE
GPC 923 115V 400CPS
GPC 922 115V 400CPS
GPC 921 115V 400CPS
XBR-A
905
900
TCL 905 DUCOSYN EXCITATION SW RLP HI
TCL 900 DUCOSYN EXCITATION SW RLP LO
911
912
RSS 911 3200 CPS REF HI (BUFFERED)
RSS 912 3200 CPS REF LO (BUFFERED)
909
910
MSI 909 3200 CPS Ø SHIFTER EXCITATION HI
MSI 910 3200 CPS Ø SHIFTER EXCITATION LO
914
913
TCL 913 3200 CPS MONITORING HI
TCL 914 3200 CPS MONITORING LO
896
3
FTR 896 115V 60 CPS ØA PILOT PWR HI
FTR 3 115V 60 CPS NEUTRAL
1579
TCL 1579 BLOCK II - LEM STATUS
908WT
TCL 908WT OPTICS PWR ETI ENABLE
907
TCL 907 AGC/LGC PWR ETI ENABLE
906
TCL 906 ISS OPERATE PWR ETI ENABLE
741
TCL 741 27VDC ISS STANDBY PWR
516
TCL 516 WHEELS DISABLE COMMAND

2900208 REV SH 1

REVISIONS 19254					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD


IMU
IMU GIMBAL & GYRO ERROR SIGNAL LO
Z IRIG ERROR
Y IRIG ERROR
X IRIG ERROR
PA
PA
PA
J3 V
J3 K
J3-U
J3-A
PSA GYRO TORQUE CURRENT SWITCHES
TRAY 4
N5 TRAY 3
D6
D5
D4
D3
D2
D1
H3
SJB
43
44
45
46
0 VDC IMU
15
16
17
18
19
20
23
24
25A
25B
26A
26B
27A
27B
28A
28B
29A
29B
30A
30B
327A
327B
712
713
1753
1754
1770
1771
1750
1751
"AND" SEE TES (IRIG TEST)
"AND" SEE TES (IRIG TEST)
213
214
1253
1254
1270
1271
1250
1251
PWR LO
Z GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
IMU & Y GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
X GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
+Z IRIG SET RETURN
+Z IRIG SET
-Z IRIG SET RETURN
-Z IRIG SET
+Y IRIG SET RETURN
+Y IRIG SET
-Y IRIG SET RETURN
-Y IRIG SET
+X IRIG SET RETURN
+X IRIG SET
-X IRIG SET RETURN
-X IRIG SET
PIPA INTERROGATE RETURN
PIPA INTERROGATE
129
130
121
122
119
120
245W
246W
247W
248W
243W
244W
239W
240W
237W
238W
241W
242W
395W
394W
01A BACKWALL

2H

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN G.H. Bell DATE 6 MAY 65
CHECKED Ed Foster 13 MAY 65
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MIT APPROVAL 26 May 65

MANNED
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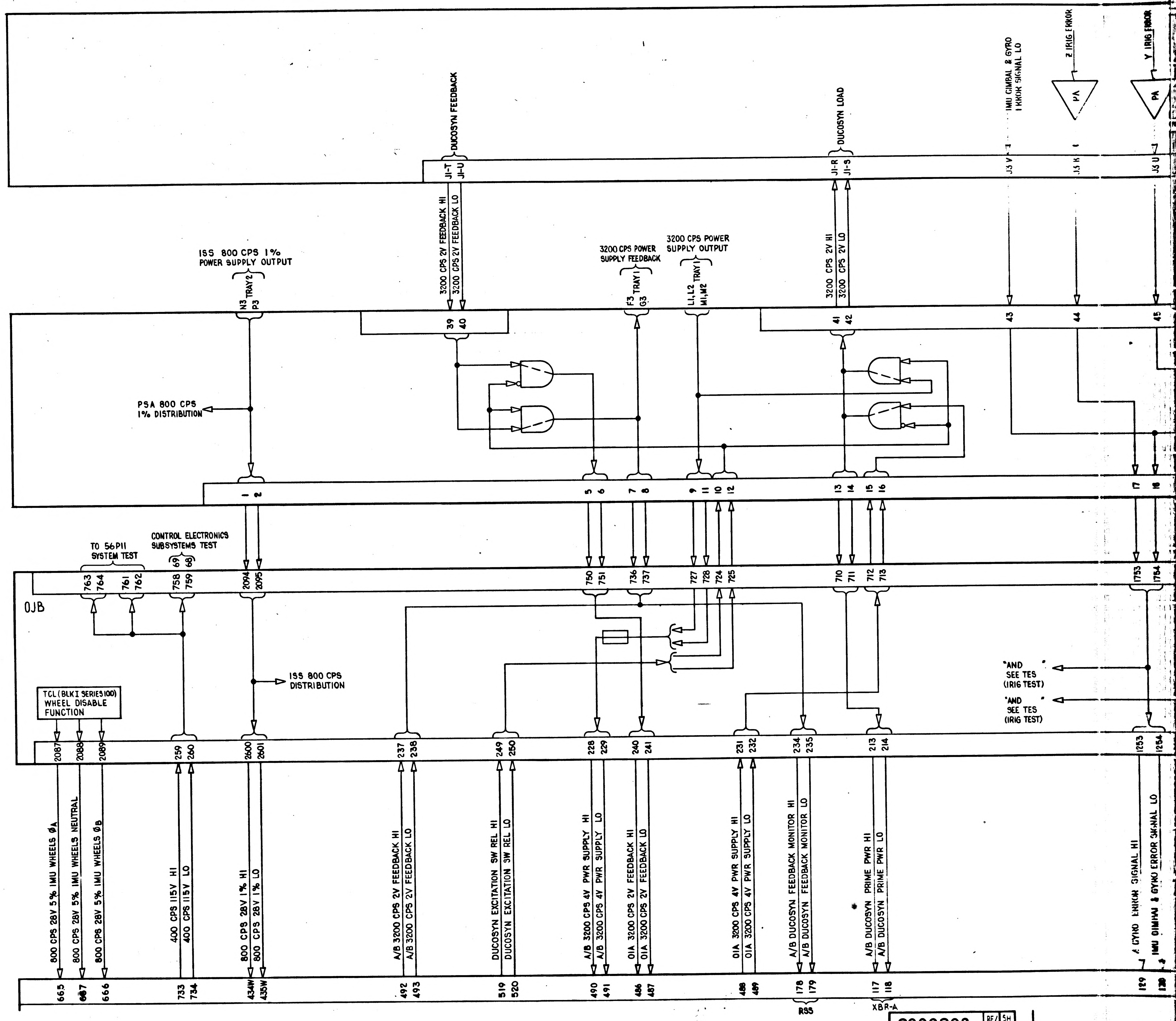
HOUSTON, TEXAS

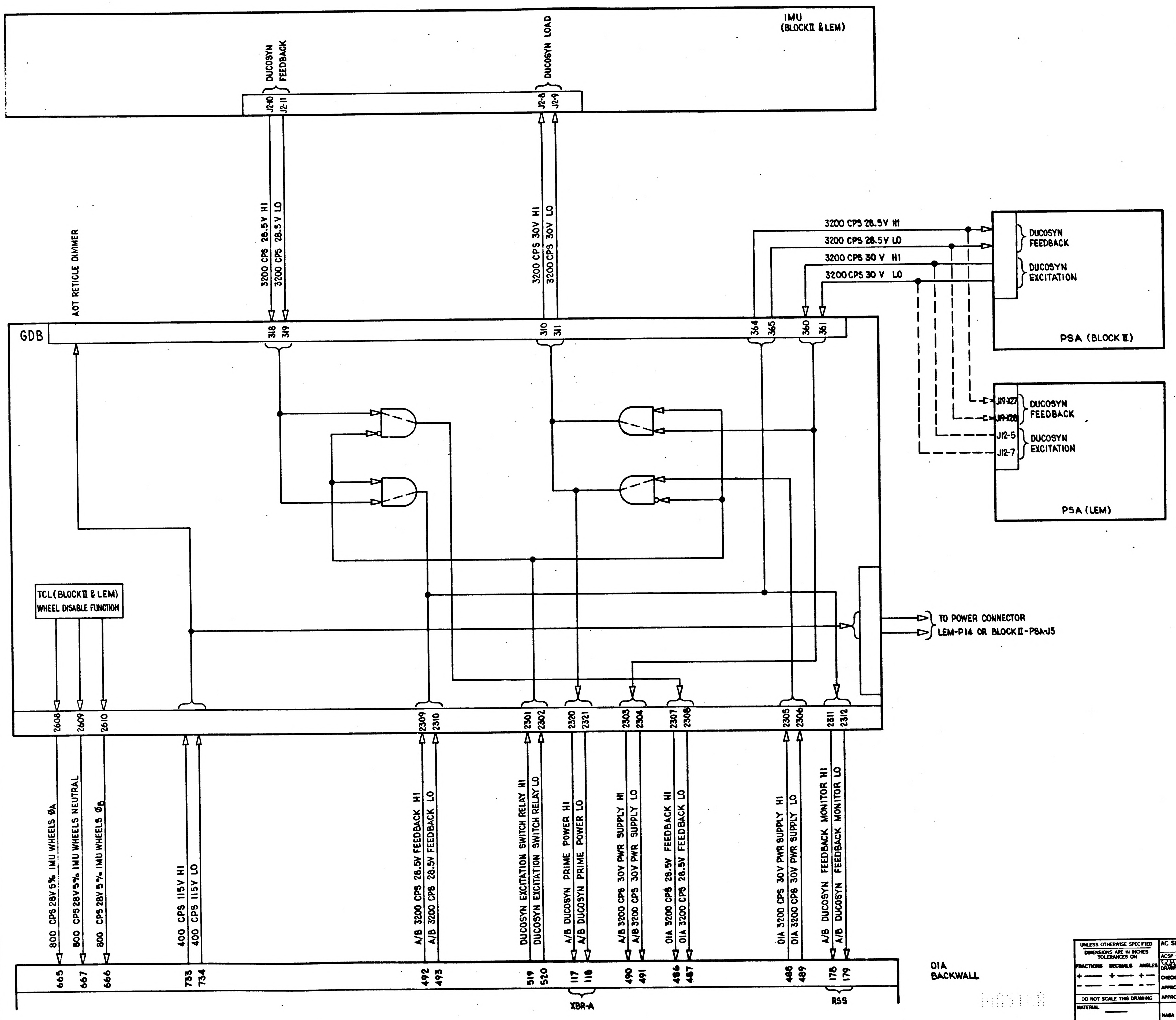
MECHANIZATION DIAGRAM - POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CASING FUNCTIONS (BLOCK I SERIES 100)

CODE IDENT NO. 99974
SIZE J2
2900208
SCALE NONE
SHEET 2 OF 3


DUCOSYN FEEDBACK
J1-T
J1-U
DUCOSYN LOAD
J1-R
J1-S
IMU GIMBAL & GYRO
ERROR SIGNAL LO
Z IRIG ERROR
Y IRIG ERROR
PA
PA
J3 V
J3 K
J3 U
ISS 800 CPS 1%
POWER SUPPLY OUTPUT
N3
P3
TRAY 2
3200 CPS 2V FEEDBACK HI
3200 CPS 2V FEEDBACK LO
3200 CPS POWER
SUPPLY FEEDBACK
F3
G3
TRAY 1
3200 CPS POWER
SUPPLY OUTPUT
L1, L2
M1, M2
TRAY 1
3200 CPS 2V HI
3200 CPS 2V LO
39
40
41
42
43
44
45
PSA 800 CPS
1% DISTRIBUTION
1
2
5
6
7
8
9
11
10
12
13
14
15
16
17
18
TO 56P11
SYSTEM TEST
CONTROL ELECTRONICS
SUBSYSTEMS TEST
69
68
763
764
761
762
758
759
2094
2095
750
751
736
737
727
728
724
725
710
711
712
713
1753
1754
OJB
ISS 800 CPS
DISTRIBUTION
TCL (BLK I SERIES 100)
WHEEL DISABLE
FUNCTION
*AND
SEE TES
(IRIG TEST)
*AND
SEE TES
(IRIG TEST)
2087
2088
2089
259
260
2600
2601
237
238
249
250
228
229
240
241
231
232
234
235
213
214
1253
1254
800 CPS 28V 5% IMU WHEELS ØA
800 CPS 28V 5% IMU WHEELS NEUTRAL
800 CPS 28V 5% IMU WHEELS ØB
400 CPS 115V HI
400 CPS 115V LO
800 CPS 28V 1% HI
800 CPS 28V 1% LO
A/B 3200 CPS 2V FEEDBACK HI
A/B 3200 CPS 2V FEEDBACK LO
DUCOSYN EXCITATION SW REL HI
DUCOSYN EXCITATION SW REL LO
A/B 3200 CPS 4V PWR SUPPLY HI
A/B 3200 CPS 4V PWR SUPPLY LO
OIA 3200 CPS 2V FEEDBACK HI
OIA 3200 CPS 2V FEEDBACK LO
OIA 3200 CPS 4V PWR SUPPLY HI
OIA 3200 CPS 4V PWR SUPPLY LO
A/B DUCOSYN FEEDBACK MONITOR HI
A/B DUCOSYN FEEDBACK MONITOR LO
A/B DUCOSYN PRIME PWR HI
A/B DUCOSYN PRIME PWR LO
A GYRO ERROR SIGNAL HI
IMU GIMBAL & GYRO ERROR SIGNAL LO
665
667
666
733
734
434W
435W
492
493
519
520
490
491
486
487
488
489
178
179
117
118
129
130
RSS
XBR-A

2900208 RE/ SH 2

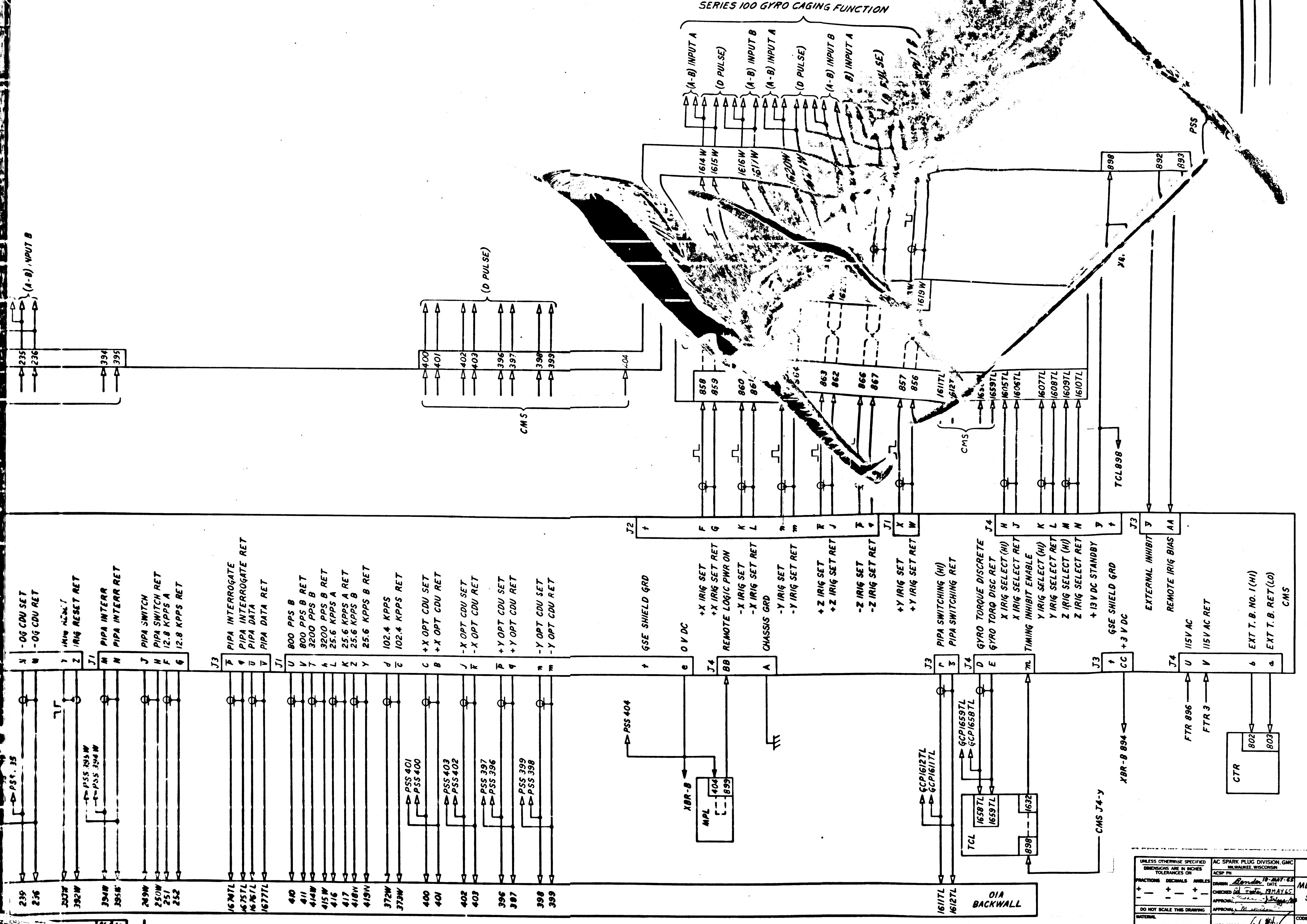
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.


IMU
(BLOCK II & LEM)
DUCOSYN FEEDBACK
J2-10
J2-11
DUCOSYN LOAD
J2-8
J2-9
3200 CPS 28.5V HI
3200 CPS 28.5V LO
3200 CPS 30V HI
3200 CPS 30V LO
AOT RETICLE DIMMER
GDB
318
319
310
311
364
365
360
361
3200 CPS 28.5V HI
3200 CPS 28.5V LO
3200 CPS 30 V HI
3200 CPS 30 V LO
DUCOSYN FEEDBACK
DUCOSYN EXCITATION
PSA (BLOCK II)
J19-X27
J19-X28
J12-5
J12-7
DUCOSYN FEEDBACK
DUCOSYN EXCITATION
PSA (LEM)
TCL (BLOCK II & LEM)
WHEEL DISABLE FUNCTION
TO POWER CONNECTOR
LEM-P14 OR BLOCK II-PSA-J5
2608
2609
2610
2309
2310
2301
2302
2320
2321
2303
2304
2307
2308
2305
2306
2311
2312
800 CPS 28V 5% IMU WHEELS ØA
800 CPS 28V 5% IMU WHEELS NEUTRAL
800 CPS 28V 5% IMU WHEELS ØB
400 CPS 115V HI
400 CPS 115V LO
A/B 3200 CPS 28.5V FEEDBACK HI
A/B 3200 CPS 28.5V FEEDBACK LO
DUCOSYN EXCITATION SWITCH RELAY HI
DUCOSYN EXCITATION SWITCH RELAY LO
A/B DUCOSYN PRIME POWER HI
A/B DUCOSYN PRIME POWER LO
A/B 3200 CPS 30V PWR SUPPLY HI
A/B 3200 CPS 30V PWR SUPPLY LO
OIA 3200 CPS 28.5V FEEDBACK HI
OIA 3200 CPS 28.5V FEEDBACK LO
OIA 3200 CPS 30V PWR SUPPLY HI
OIA 3200 CPS 30V PWR SUPPLY LO
A/B DUCOSYN FEEDBACK MONITOR HI
A/B DUCOSYN FEEDBACK MONITOR LO
665
667
666
733
734
492
493
519
520
117
118
490
491
486
487
488
489
178
179
XBR-A
RSS
OIA BACKWALL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + —— + —— + — - —— - —— - —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN G.H. Baker DATE 8 MAY 65 CHECKED Ed Foster 13 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM - POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (BLOCK II & LEM)
MATERIAL ——	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE E · 2900208
CONTRACT NAS 9-497	MIT APPROVAL	SCALE NONE · SHEET 3 OF 3

2900208

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
		REVISIONS 2C4E6			
A		REVISED PER D.O. 60553		28-MAY-65	M.G. / EF
B		REVISED PER TDRR 22423		2 SEP 65	BP / EF



SERIES 100 GYRO CAGING FUNCTION
(A-B) INPUT A
(D PULSE)
(A-B) INPUT B
(A-B) INPUT A
(D PULSE)
(A-B) INPUT B
B) INPUT A
(D PULSE)
1614W
1615W
1616W
1617W
1620W
1619W
898
892
893
PSS
TCL898
(A-B) INPUT B
235
236
394
395
(D PULSE)
400
401
402
403
396
397
398
399
404
CMS
858
859
860
863
862
866
867
857
856
1611TL
1612TL
1659TL
1605TL
1606TL
1607TL
1608TL
1609TL
1610TL
CMS
J2
J1
J4
J3
-OG CDU SET
-OG CDU RET
IRIG RESET
IRIG RESET RET
PIPA INTERR
PIPA INTERR RET
PIPA SWITCH
PIPA SWITCH RET
12.8 KPPS A
12.8 KPPS RET
PIPA INTERROGATE
PIPA INTERROGATE RET
PIPA DATA
PIPA DATA RET
800 PPS B
800 PPS B RET
3200 PPS B
3200 PPS B RET
25.6 KPPS A
25.6 KPPS A RET
25.6 KPPS B
25.6 KPPS B RET
102.4 KPPS
102.4 KPPS RET
+X OPT CDU SET
+X OPT CDU RET
-X OPT CDU SET
-X OPT CDU RET
+Y OPT CDU SET
+Y OPT CDU RET
-Y OPT CDU SET
-Y OPT CDU RET
GSE SHIELD GRD
0 V DC
+X IRIG SET
+X IRIG SET RET
REMOTE LOGIC PWR ON
-X IRIG SET
-X IRIG SET RET
CHASSIS GRD
-Y IRIG SET
-Y IRIG SET RET
+Z IRIG SET
+Z IRIG SET RET
-Z IRIG SET
-Z IRIG SET RET
+Y IRIG SET
+Y IRIG SET RET
PIPA SWITCHING (HI)
PIPA SWITCHING RET
GYRO TORQUE DISCRETE
GYRO TORQ DISC RET
X IRIG SELECT (HI)
X IRIG SELECT RET
TIMING INHIBIT ENABLE
Y IRIG SELECT (HI)
Y IRIG SELECT RET
Z IRIG SELECT (HI)
Z IRIG SELECT RET
+13 V DC STANDBY
GSE SHIELD GRD
+3 V DC
EXTERNAL INHIBIT
REMOTE IRIG BIAS
115V AC
115V AC RET
EXT T.B. NO. 1 (HI)
EXT T.B. RET (LO)
CMS
PSS 235
PSS 395W
PSS 394W
PSS 401
PSS 400
PSS 403
PSS 402
PSS 397
PSS 396
PSS 399
PSS 398
PSS 404
XBR-B
MPL
404
899
GCP1612TL
GCP1611TL
GCP1659TL
GCP1658TL
1658TL
1659TL
1632
898
TCL
CMS J4-y
XBR-B 894
FTR 896
FTR 3
CTR
802
803
239
236
393W
392W
394W
395W
249W
250W
251
252
1674TL
1675TL
1676TL
1677TL
410
411
414W
415W
416
417
418W
419W
372W
373W
400
401
402
403
396
397
398
399
1611TL
1612TL
OIA BACKWALL
2900209
2/2900209

3A

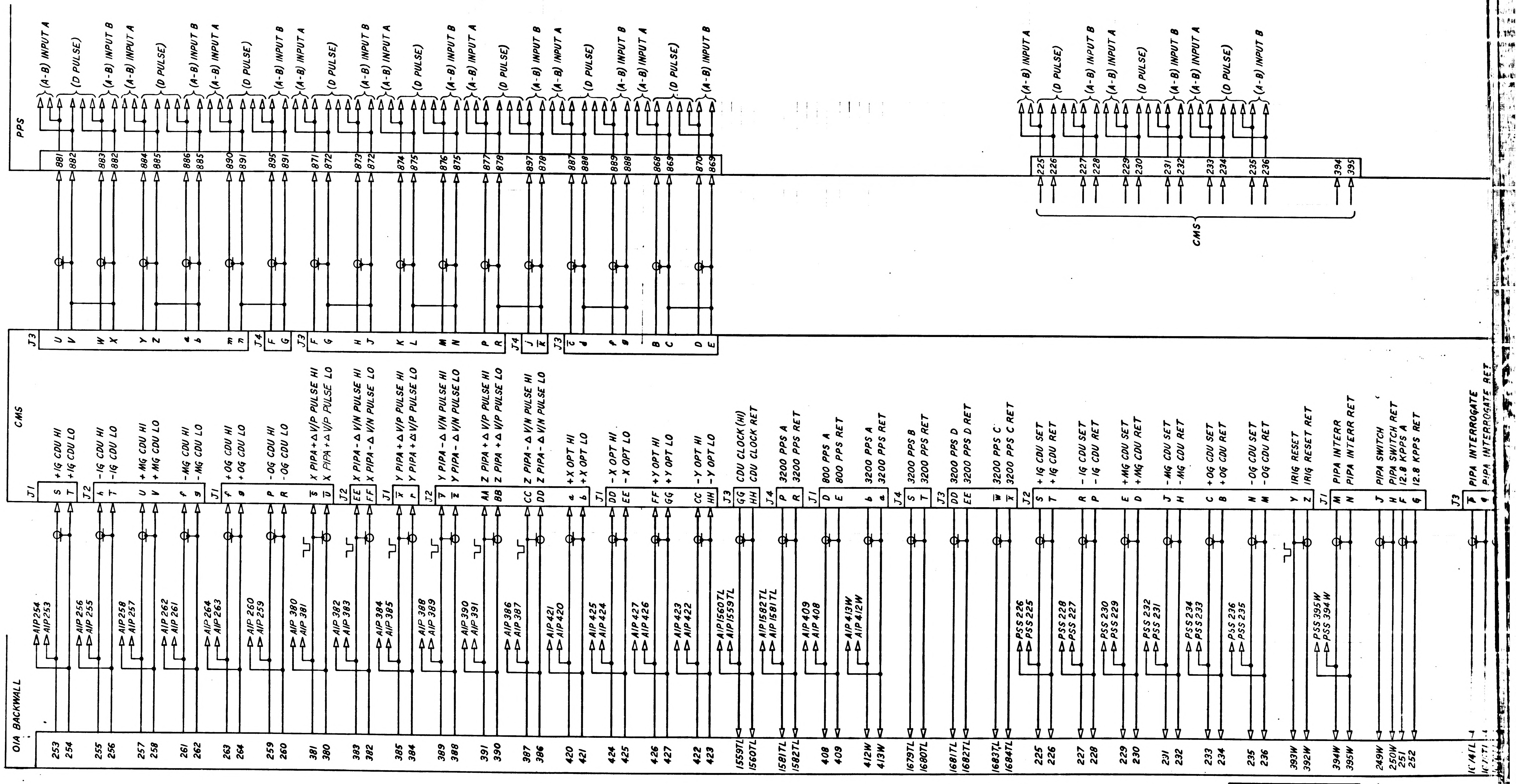
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN Bender DATE 18-MAY-65 CHECKED Ed Foster 19MAY65 APPROVAL J. Briggs APPROVAL	MECHANIZATION DIAGRAM-COMPUTER SIMULATOR (BLOCK I SERIES 100, BLOCK II AND LEM)
DO NOT SCALE THIS DRAWING		CODE IDENT NO. 99974 · SIZE J · 2900209
MATERIAL ——	NASA APPROVAL	SCALE NONE · SHEET 1 OF 2
CONTRACT NAS 9-497	MIT APPROVAL	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. REFERENCE MECHANIZATION DIAGRAMS:
   2900219 COUNTER SIGNAL SELECT
   CTR - COUNTER
   PSS - PRIMARY SIGNAL SELECT
   2900201 TEST CONTROL (BLOCK II AND LEM)
   2900202 TEST CONTROL (BLOCK I SERIES 100)
   2900210 AC POWER PROTECTION (FTR)
   2900217 SIGNAL SELECT AND MEASUREMENT
   XBR-B-CROSSBAR-DC SIGNAL
   2900211 AUXILIARY INPUT/OUTPUT AND CALIBRATION (AIP)
   2900213 GSE GROUNDING (BLOCK II AND LEM)
   2900214 GSE GROUNDING (BLOCK I SERIES 100)
   2900200 GYRO CAGING PANEL (GCP)
   2900207 MONITOR PANEL
3. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   A. W-BLOCK I SERIES 100
   B. BLANK-ALL G/N CONFIGURATIONS
   C. T-BLOCK II
   D. L-LEM

NOTES: (CONTINUED)

4. THE COMPUTER SIMULATOR FUNCTIONS WITH POSITIVE PULSES. ASSOCIATED NEGATIVE PULSES ARE INDICATED BY ⊔⊓ AND AN APPARENT REVERSAL OF HI-LO ON THE COAX.
5. BACKWALL INTERFACE (SHEET 2) SHOULD BE CONSIDERED AS CONNECTING WITH ANY ONE OF THE THREE AIRBORNE CONFIGURATIONS.
6. BARS PLACED OVER LETTERS ARE FOR REFERENCE ONLY AND SIGNIFY LOWER CASE.


PPS
(A-B) INPUT A
(D PULSE)
(A-B) INPUT B
881 882 883 882 884 885 886 885 890 891 895 891 871 872 873 872 874 875 876 875 877 878 897 878 887 888 889 888 868 869 870 869
225 226 227 228 229 230 231 232 233 234 235 236 394 395
CMS
J3 U V W X Y Z a b m n
J4 F G
J3 F G H J K L M N P R
J4 j k
J3 c d f g B C D E
J1 S T
+IG CDU HI
+IG CDU LO
J2 h T
-IG CDU HI
-IG CDU LO
U V
+MG CDU HI
+MG CDU LO
f g
-MG CDU HI
-MG CDU LO
J1 f g
+OG CDU HI
+OG CDU LO
P R
-OG CDU HI
-OG CDU LO
s u
X PIPA +Δ V/P PULSE HI
X PIPA +Δ V/P PULSE LO
J2 EE FF
X PIPA -Δ V/N PULSE HI
X PIPA -Δ V/N PULSE LO
J1 x r
Y PIPA +Δ V/P PULSE HI
Y PIPA +Δ V/P PULSE LO
J2 y z
Y PIPA -Δ V/N PULSE HI
Y PIPA -Δ V/N PULSE LO
AA BB
Z PIPA +Δ V/P PULSE HI
Z PIPA +Δ V/P PULSE LO
CC DD
Z PIPA -Δ V/N PULSE HI
Z PIPA -Δ V/N PULSE LO
a b
+X OPT HI
+X OPT LO
J1 DD EE
-X OPT HI
-X OPT LO
FF GG
+Y OPT HI
+Y OPT LO
CC HH
-Y OPT HI
-Y OPT LO
J3 GG HH
CDU CLOCK (HI)
CDU CLOCK RET
J4 P R
3200 PPS A
3200 PPS RET
J1 D E
800 PPS A
800 PPS RET
b a
3200 PPS A
3200 PPS RET
J4 S T
3200 PPS B
3200 PPS RET
J3 DD EE
3200 PPS D
3200 PPS D RET
w x
3200 PPS C
3200 PPS C RET
J2 S T
+IG CDU SET
+IG CDU RET
R P
-IG CDU SET
-IG CDU RET
E D
+MG CDU SET
+MG CDU RET
J H
-MG CDU SET
-MG CDU RET
C B
+OG CDU SET
+OG CDU RET
N M
-OG CDU SET
-OG CDU RET
Y Z
IRIG RESET
IRIG RESET RET
J1 M N
PIPA INTERR
PIPA INTERR RET
J H F G
PIPA SWITCH
PIPA SWITCH RET
12.8 KPPS A
12.8 KPPS RET
J3
PIPA INTERROGATE
PIPA INTERROGATE RET
AIP 254 AIP 253
AIP 256 AIP 255
AIP 258 AIP 257
AIP 262 AIP 261
AIP 264 AIP 263
AIP 260 AIP 259
AIP 380 AIP 381
AIP 382 AIP 383
AIP 384 AIP 385
AIP 388 AIP 389
AIP 390 AIP 391
AIP 386 AIP 387
AIP 421 AIP 420
AIP 425 AIP 424
AIP 427 AIP 426
AIP 423 AIP 422
AIP 1560TL AIP 1559TL
AIP 1582TL AIP 1581TL
AIP 409 AIP 408
AIP 413W AIP 412W
PSS 226 PSS 225
PSS 228 PSS 227
PSS 230 PSS 229
PSS 232 PSS 231
PSS 234 PSS 233
PSS 236 PSS 235
PSS 395W PSS 394W
OIA BACKWALL
253 254 255 256 257 258 261 262 263 264 259 260 381 380 383 382 385 384 389 388 391 390 387 386 420 421 424 425 426 427 422 423
1559TL 1560TL 1581TL 1582TL 408 409 412W 413W 1679TL 1680TL 1681TL 1682TL 1683TL 1684TL
225 226 227 228 229 230 231 232 233 234 235 236 393W 392W 394W 395W 249W 250W 251 252

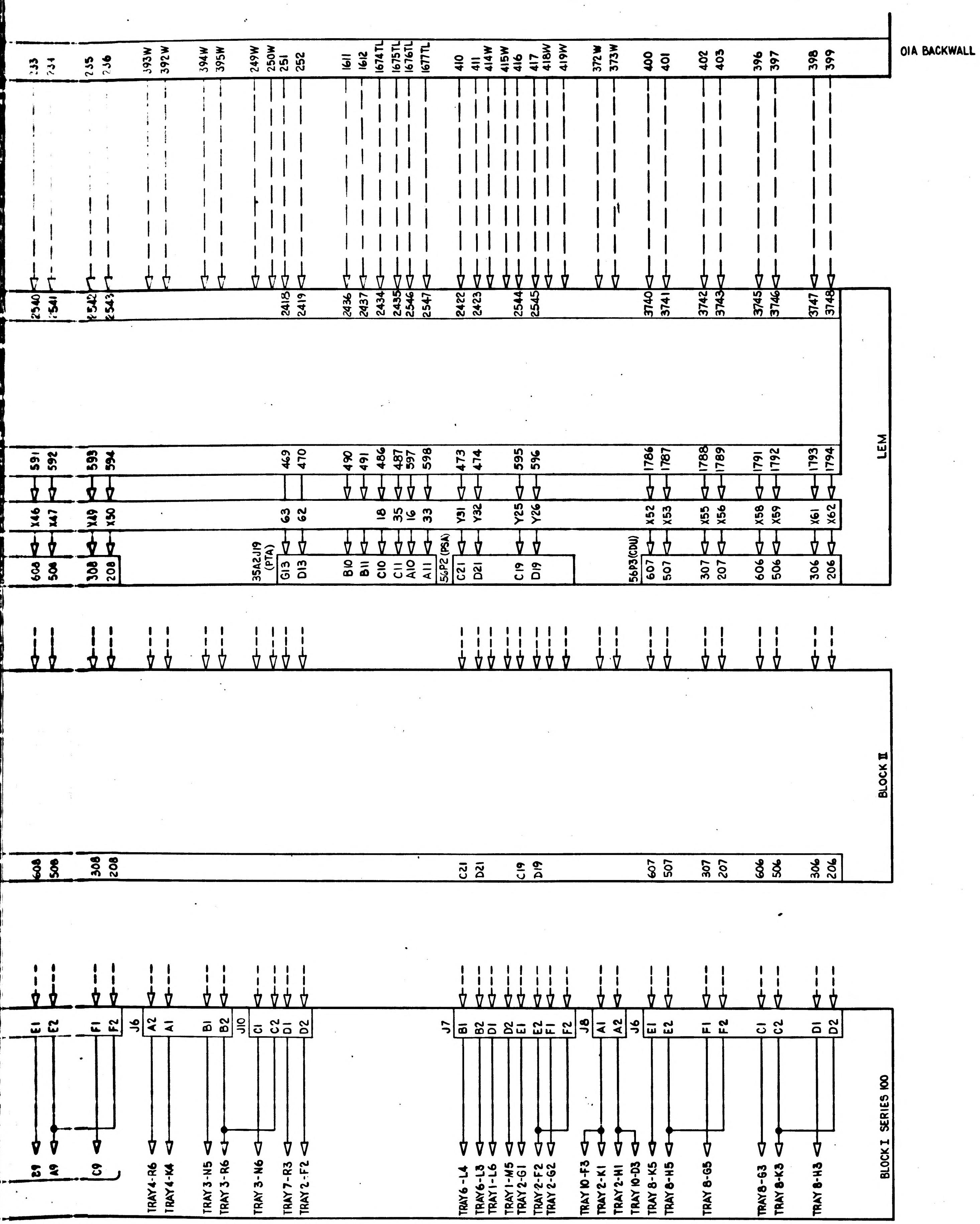
16 15 14 13 12 11 10 9 8

H G F E D C B A

2900209	REV LTR B	SH 1

1/2900209

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
		REVISIONS 20486			
A		REVISED PER D.O. 60553		28-MAY 65	M.G.
B		REVISED PER TDRR 22423		21 SEP 65	R.



OIA BACKWALL
LEM
BLOCK II
BLOCK I SERIES 100
35A2J19 (PTA)
56P2 (PSA)
56P3 (CDU)
J6
J7
J8
J10
TRAY4-R6
TRAY4-K4
TRAY3-N5
TRAY3-R6
TRAY3-N6
TRAY7-R3
TRAY2-F2
TRAY6-L4
TRAY6-L3
TRAY1-L6
TRAY1-M5
TRAY2-G1
TRAY2-F2
TRAY2-G2
TRAY10-F3
TRAY2-K1
TRAY2-H1
TRAY10-D3
TRAY8-K5
TRAY8-H5
TRAY8-G5
TRAY8-G3
TRAY8-K3
TRAY8-H3

3#

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN
FRACTIONS ± DECIMALS ± ANGLES ±	ACSP PN
	DRAWN Blake DATE 14 MAY 65
	CHECKED Ed Foster 19 MAY 65
	APPROVAL Kuehne - J. Triggs
DO NOT SCALE THIS DRAWING	APPROVAL
MATERIAL	NASA APPROVAL
CONTRACT NAS 9-497	MIT APPROVAL 20 Jun 65

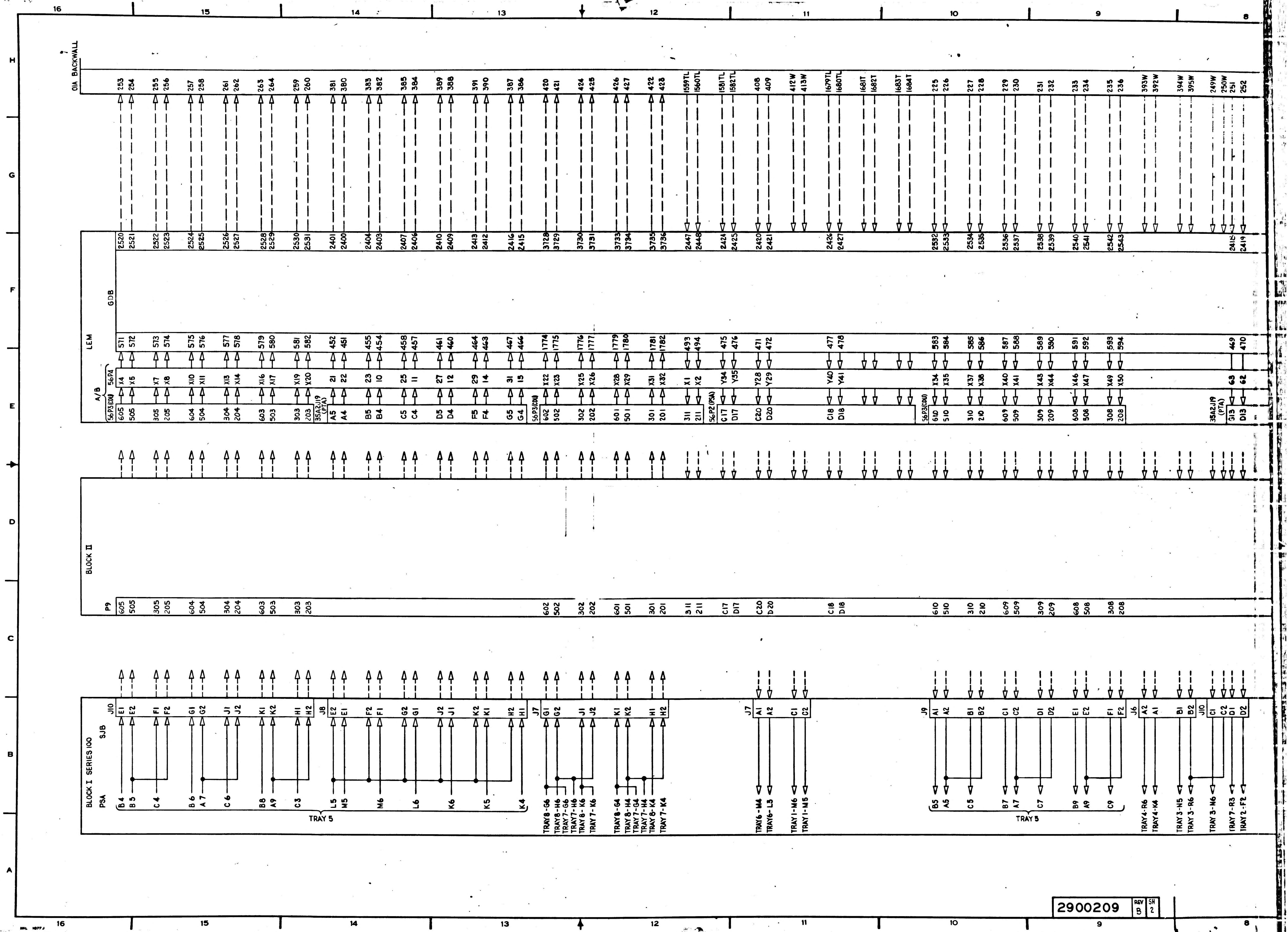
NEXT ASSY	USED ON
APPLICATION	

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM- COMPUTER SIMULATOR (BLOCK I SERIES 100, BLOCK II, & LEM)

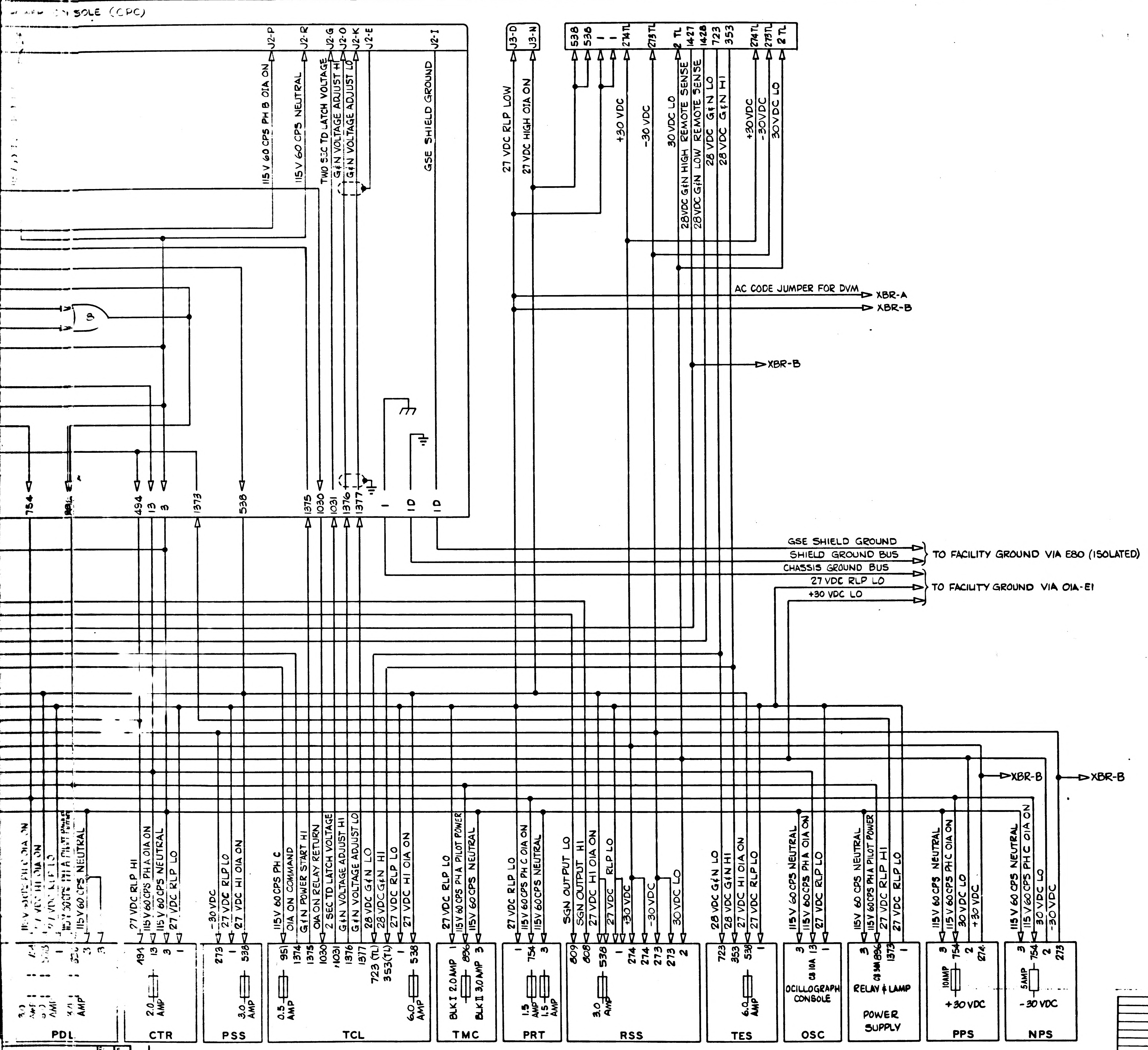
CODE IDENT NO.	SIZE	
99974	J2	2900209
SCALE NONE		SHEET 2 OF 2

3H


OIA BACKWALL
LEM
GDB
A/B
56P4
56P3(CDU)
35A2J19 (PTA)
56P2 (PSA)
BLOCK II
P9
BLOCK I SERIES 100
SJB
PSA
J10
J8
J7
J9
J6
TRAY 5
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

2900209 REV B SH 2

17 2900209


...ONSOLE (CPC)
J2-P
J2-R
J2-G
J2-O
J2-K
J2-E
J2-I
115 V 60 CPS PH B OIA ON
115 V 60 CPS NEUTRAL
TWO SEC TD LATCH VOLTAGE
G&N VOLTAGE ADJUST HI
G&N VOLTAGE ADJUST LO
GSE SHIELD GROUND
J3-D
J3-N
27 VDC RLP LOW
27 VDC HIGH OIA ON
538 536 1 1 274TL 273TL 2TL 1427 1428 723 353 274TL 273TL 2TL
+30 VDC
-30 VDC
30 VDC LO
28VDC G&N HIGH REMOTE SENSE
28VDC G&N LOW REMOTE SENSE
28 VDC G&N LO
28 VDC G&N HI
+30VDC
-30VDC
30VDC LO
AC CODE JUMPER FOR DVM
XBR-A
XBR-B
XBR-B
8
754
886
494
13
3
1373
538
1375
1030
1031
1376
1377
1
1D
1D
GSE SHIELD GROUND
SHIELD GROUND BUS
CHASSIS GROUND BUS
TO FACILITY GROUND VIA E80 (ISOLATED)
27 VDC RLP LO
+30 VDC LO
TO FACILITY GROUND VIA OIA-E1
XBR-B
XBR-B
115 V 500CPS PH C OIA ON
27 VDC HI OIA ON
27 VDC RLP LO
115V 500CPS PH A PILOT POWER
115V 60 CPS NEUTRAL
3 3
3.0 AMP
AMP
AMP
PDL
27 VDC RLP HI
115V 60CPS PH A OIA ON
115V 60CPS NEUTRAL
27 VDC RLP LO
494 13 3 1
2.0 AMP
CTR
-30 VDC
27 VDC RLP LO
27 VDC HI OIA ON
273 1 538
3.0 AMP
PSS
115V 60CPS PH C
OIA ON COMMAND
G&N POWER START HI
OIA ON RELAY RETURN
2 SEC TD LATCH VOLTAGE
G&N VOLTAGE ADJUST HI
G&N VOLTAGE ADJUST LO
28 VDC G&N LO
28 VDC G&N HI
27 VDC RLP LO
27 VDC HI OIA ON
951 1374 1375 1030 1031 1376 1377 723 (TL) 353(TL) 1 538
0.5 AMP
6.0 AMP
TCL
27 VDC RLP LO
115V 60CPS PH A PILOT POWER
115V 60CPS NEUTRAL
1 896 3
BLK I 2.0 AMP
BLK II 3.0 AMP
TMC
27 VDC RLP LO
115V 60CPS PH C OIA ON
115V 60CPS NEUTRAL
1 754 3
1.5 AMP
1.5 AMP
PRT
SGN OUTPUT LO
SGN OUTPUT HI
27 VDC HI OIA ON
27 VDC
RLP LO
+30 VDC
-30 VDC
30 VDC LO
809 808 538 1 274 274 273 273 2
3.0 AMP
RSS
28 VDC G&N LO
28 VDC G&N HI
27 VDC HI OIA ON
27 VDC RLP LO
723 353 538 1
6.0 AMP
TES
115V 60CPS NEUTRAL
115V 60CPS PH A OIA ON
27 VDC RLP LO
3 13 1
CB 10A
OCILLOGRAPH CONSOLE
OSC
115V 60 CPS NEUTRAL
115V 60CPS PH A PILOT POWER
27 VDC RLP HI
27 VDC RLP LO
3 896 1373 1
CB 5A
RELAY & LAMP
POWER SUPPLY
115V 60CPS NEUTRAL
115V 60CPS PH C OIA ON
30 VDC LO
+30 VDC
3 754 2 274
10AMP
+30 VDC
PPS
115V 60CPS NEUTRAL
115V 60CPS PH C OIA ON
30 VDC LO
-30 VDC
3 754 2 273
5AMP
-30 VDC
NPS
9 8 7 6 5 4 3 2 1
H G F E D C B A

2900210

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 23382		12 Nov 65	JJJ

REVISIONS TDRR 23719

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN 3 Aug 65 DATE
CHECKED 21 Aug 65
APPROVAL 10-6-65
APPROVAL
NASA APPROVAL A. C. Metzger
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
BLOCK II/LEM

MECHANIZATION DIAGRAM
AC POWER PROTECTION &
POWER DISTRIBUTION
(BLOCK I SERIES 100, BLOCK II-LEM)

CODE IDENT NO. 99974
SIZE J2
2900210
SCALE None
SHEET 1 OF 3

NEXT ASSY | USED ON
APPLICATION

3H

27 2900210

NOTES:

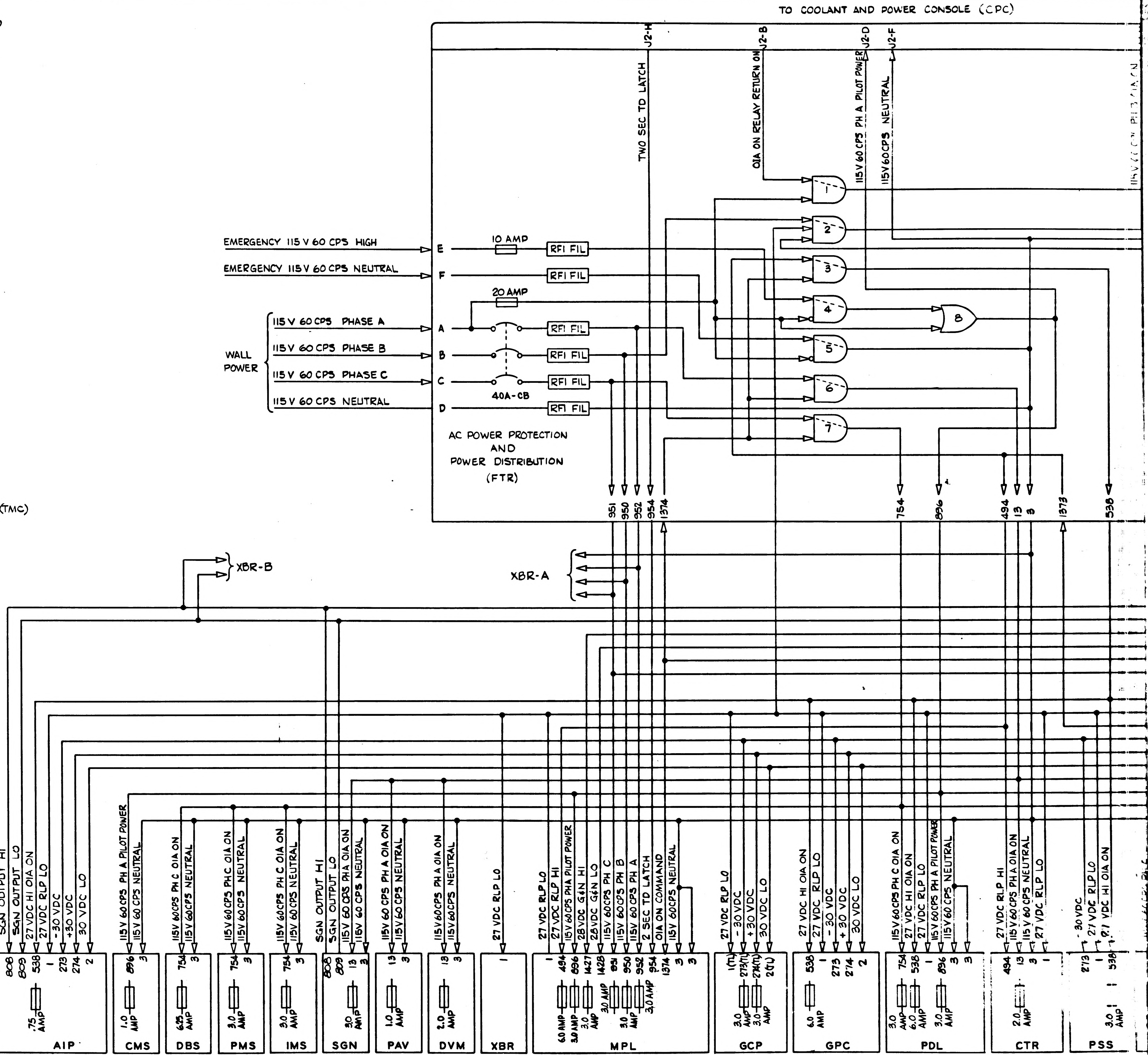
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS:

2900207	MONITOR PANEL (MPL)
2900208	POWER & DUMMY LOAD PANEL (PDL)
2900201	TEST CONTROL PANEL (BLOCK II-LEM) (TCL)
2900209	COMPUTER SIMULATOR INTERFACE (CMS)
2900223	GIMBAL POSITIONER AND CONTROL (GPC)
2900200	GYRO CAGING PANEL (GCP)
2900211	AUXILIARY INPUT PANEL (AIP)
2900203	TEMPERATURE MONITOR CONTROL (TMC)
2900206	TEST SELECTOR (TES) SIGNAL GENERATOR (SGN)
2900217	SIGNAL SELECT MEASUREMENT CROSSBAR AC SIGNALS (XBR-A) CROSSBAR DC SIGNALS (XBR-B) PHASE ANGLE VOLTMETER (PAV) DIGITAL VOLTMETER (DVM) DUAL BEAM SCOPE (A INPUT) (DBS) DIGITAL RECORDER (PRT)
2900218	OSCILLOGRAPH SIGNAL SELECT DUAL BEAM SCOPE (3 INPUT) (DBS) RSS-B TO FIXED DC CHANNEL RSS-D TO SWITCHABLE DC CHANNEL
2900219	COUNTER SIGNAL SELECT COUNTER (CTR) PRINTER (PRT)
2900215	MEASUREMENT REFERENCE POWER SUPPLIES OSCILLOGRAPH SIGNAL SELECT (RSS) PRIMARY SIGNAL SELECT (PSS)
2900212	PIPA & IRIG MONITORING IRIG MONITOR SCOPE (IMS) PIPA MONITOR SCOPE (PMS)
2900213	GROUNDING (BLOCK II - LEM)
2900202	TEST CONTROL (SERIES 100) (TCL)
2900204	TEMPERATURE MONITOR CONTROL (SERIES 100) (TMC)

4. NONSTANDARD SYMBOLS

⊐D-	INDICATES "AND" GATE WITH SWITCHED SIGNAL.
NAME A	INDICATES UNLIGHTED PUSHBUTTON - ALTERNATE ACTION
NAME	INDICATES INDICATOR LIGHT.

5. INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G&N CONFIGURATIONS
   - E. TW, TL OR WL - USED IN MORE THAN ONE G&N CONFIGURATION AS SHOWN.



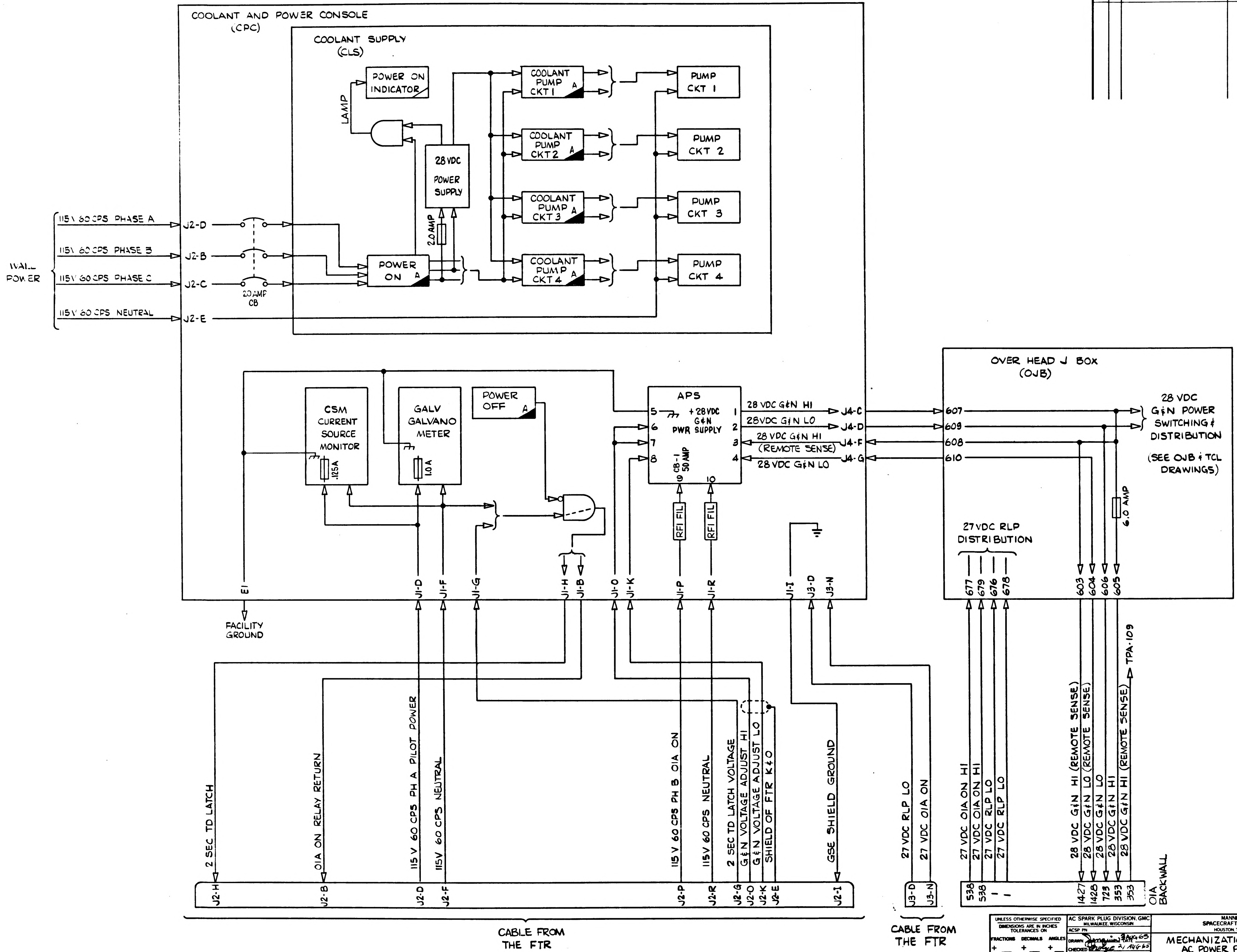
TO COOLANT AND POWER CONSOLE (CPC)
J2-H
J2-B
J2-D
J2-F
TWO SEC TO LATCH
OIA ON RELAY RETURN ON
115V 60 CPS PH A PILOT POWER
115V 60 CPS NEUTRAL
EMERGENCY 115 V 60 CPS HIGH
EMERGENCY 115 V 60 CPS NEUTRAL
E
F
10 AMP
20 AMP
RFI FIL
WALL POWER
115 V 60 CPS PHASE A
115 V 60 CPS PHASE B
115 V 60 CPS PHASE C
115 V 60 CPS NEUTRAL
A
B
C
D
40A-CB
1
2
3
4
5
6
7
8
AC POWER PROTECTION AND POWER DISTRIBUTION (FTR)
951
950
952
954
1374
754
896
494
13
3
1373
538
XBR-B
XBR-A
SGN OUTPUT HI
SGN OUTPUT LO
27 VDC HI OIA ON
27 VDC RLP LO
-30 VDC
+30 VDC
30 VDC LO
808
809
538
1
273
274
2
.75 AMP
AIP
115 V 60 CPS PH A PILOT POWER
115 V 60 CPS NEUTRAL
896
3
1.0 AMP
CMS
115V 60CPS PH C OIA ON
115V 60CPS NEUTRAL
754
3
.625 AMP
DBS
3.0 AMP
PMS
IMS
SGN
115V 60 CPS PH A OIA ON
115V 60 CPS NEUTRAL
13
1.0 AMP
PAV
2.0 AMP
DVM
27 VDC RLP LO
XBR
27 VDC RLP LO
27 VDC RLP HI
115V 60CPS PH A PILOT POWER
28 VDC G&N HI
28 VDC G&N LO
115V 60CPS PH C
115V 60CPS PH B
115V 60CPS PH A
2 SEC TO LATCH
OIA ON COMMAND
115V 60CPS NEUTRAL
1427
1428
6.0 AMP
3.0 AMP
MPL
-30 VDC
+30 VDC
30 VDC LO
1(TL)
273(TL)
274(TL)
2(TL)
GCP
27 VDC HI OIA ON
27 VDC RLP LO
6.0 AMP
GPC
115V 60CPS PH C OIA ON
27 VDC HI OIA ON
27 VDC RLP LO
115V 60CPS PH A PILOT POWER
115V 60 CPS NEUTRAL
PDL
27 VDC RLP HI
115V 60 CPS PH A OIA ON
115V 60 CPS NEUTRAL
27 VDC RLP LO
2.0 AMP
CTR
-30 VDC
27 VDC RLP LO
27 VDC HI OIA ON
PSS

2900210 REV A SH 1

1/2900210

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	REVISION STATUS CHANGED		NOV 65	

REVISIONS TCCC 337 1


COOLANT AND POWER CONSOLE (CPC)
COOLANT SUPPLY (CLS)
POWER ON INDICATOR
LAMP
28 VDC POWER SUPPLY
2.0 AMP
COOLANT PUMP CKT 1 A
COOLANT PUMP CKT 2 A
COOLANT PUMP CKT 3 A
COOLANT PUMP CKT 4 A
PUMP CKT 1
PUMP CKT 2
PUMP CKT 3
PUMP CKT 4
POWER ON A
WALL POWER
115 V 60 CPS PHASE A
115 V 60 CPS PHASE B
115 V 60 CPS PHASE C
115 V 60 CPS NEUTRAL
J2-D
J2-B
J2-C
J2-E
20 AMP CB
CSM CURRENT SOURCE MONITOR
.125A
GALV GALVANO METER
1.0A
POWER OFF A
APS
+28 VDC G&N PWR SUPPLY
CB-1 50 AMP
5 6 7 8 9 10
1 2 3 4
28 VDC G&N HI
28VDC G&N LO
28 VDC G&N HI (REMOTE SENSE)
28 VDC G&N LO
J4-C
J4-D
J4-F
J4-G
RFI FIL
RFI FIL
E1
FACILITY GROUND
J1-D J1-F J1-G J1-H J1-B J1-O J1-K J1-P J1-R J1-I J3-D J3-N
OVER HEAD J BOX (OJB)
607
609
608
610
28 VDC G&N POWER SWITCHING & DISTRIBUTION
(SEE OJB & TCL DRAWINGS)
6.0 AMP
27 VDC RLP DISTRIBUTION
677 679 676 678
603 604 606 605
TPA-109
2 SEC TD LATCH
OIA ON RELAY RETURN
115 V 60 CPS PH A PILOT POWER
115V 60 CPS NEUTRAL
115 V 60 CPS PH B OIA ON
115V 60 CPS NEUTRAL
2 SEC TD LATCH VOLTAGE
G&N VOLTAGE ADJUST HI
G&N VOLTAGE ADJUST LO
SHIELD OF FTR K40
GSE SHIELD GROUND
27 VDC RLP LO
27 VDC OIA ON
27 VDC OIA ON HI
27 VDC OIA ON HI
27 VDC RLP LO
27 VDC RLP LO
28 VDC G&N HI (REMOTE SENSE)
28 VDC G&N LO (REMOTE SENSE)
28 VDC G&N LO
28 VDC G&N HI
28 VDC G&N HI (REMOTE SENSE)
J2-H J2-B J2-D J2-F J2-P J2-R J2-G J2-O J2-K J2-E J2-I
J3-D J3-N
538 538 – –
1427 1428 723 353 353
OIA BACKWALL
CABLE FROM THE FTR
CABLE FROM THE FTR
8 7 6 5 4 3 2 1
H G F E D C B A

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Jamaquin DATE 3 AUG 65
CHECKED Molye 21 AUG 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

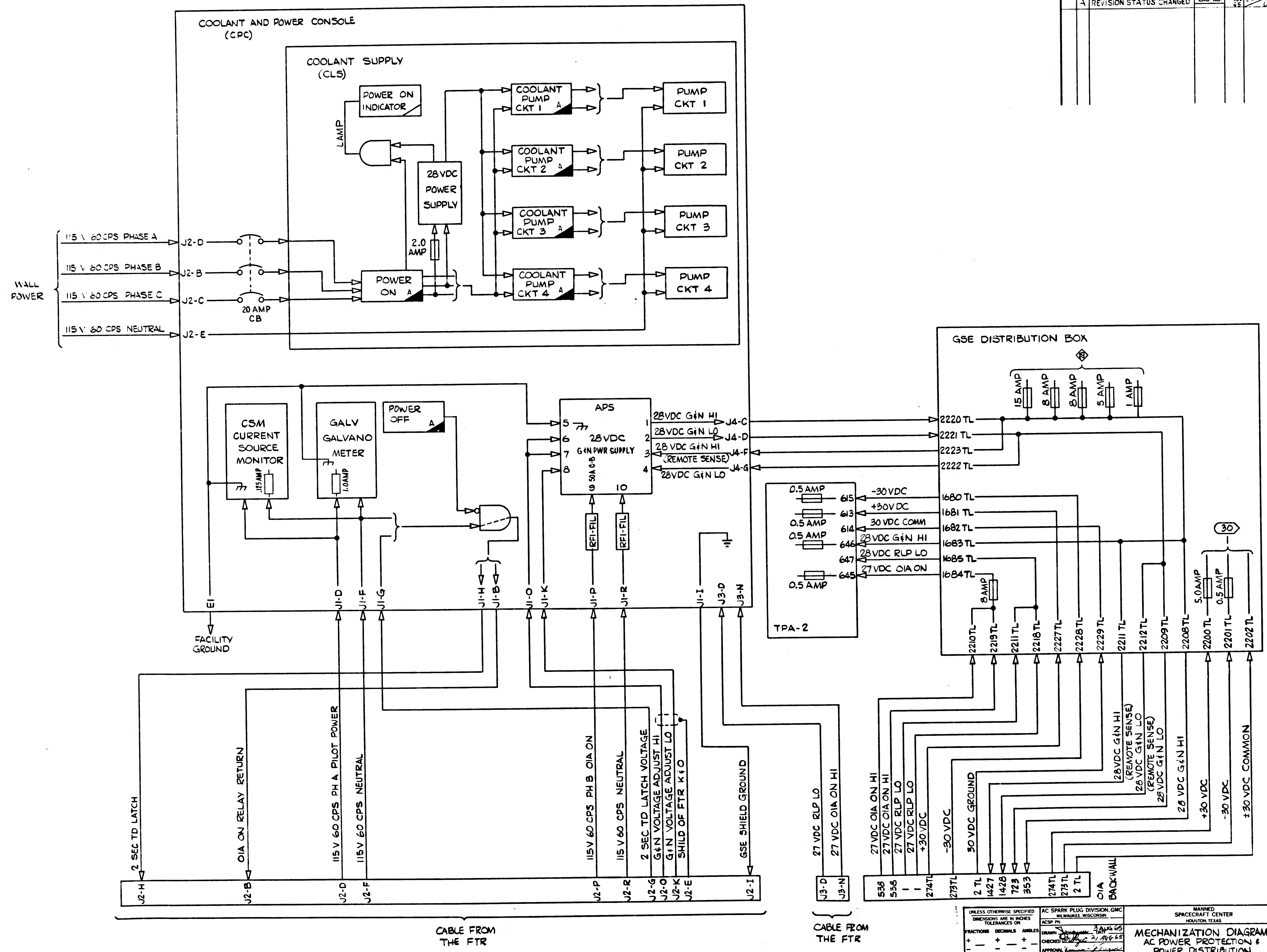
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM,
AC POWER PROTECTION &
POWER DISTIBUTION
(BLOCK I SERIES 100)

CODE IDENT NO. 99974
SIZE E
2900210
SCALE None
SHEET 2 OF 3

REVISIONS TCRR 23719

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	REVISION STATUS CHANGED		2 NOV 65	


COOLANT AND POWER CONSOLE
(CPC)
COOLANT SUPPLY
(CLS)
POWER ON INDICATOR
LAMP
28 VDC POWER SUPPLY
2.0 AMP
POWER ON A
COOLANT PUMP CKT 1 A
COOLANT PUMP CKT 2 A
COOLANT PUMP CKT 3 A
COOLANT PUMP CKT 4 A
PUMP CKT 1
PUMP CKT 2
PUMP CKT 3
PUMP CKT 4
WALL POWER
115 V 60 CPS PHASE A
115 V 60 CPS PHASE B
115 V 60 CPS PHASE C
115 V 60 CPS NEUTRAL
J2-D
J2-B
J2-C
J2-E
20 AMP CB
CSM CURRENT SOURCE MONITOR
.125 AMP
GALV GALVANO METER
1.0 AMP
POWER OFF A
APS
28 VDC
G&N PWR SUPPLY
50A 0-B
5
6
7
8
9
10
1
2
3
4
28VDC G&N HI
28VDC G&N LO
28 VDC G&N HI (REMOTE SENSE)
28VDC G&N LO
J4-C
J4-D
J4-F
J4-G
RFI-FIL
RFI-FIL
E1
FACILITY GROUND
J1-D
J1-F
J1-G
J1-H
J1-B
J1-O
J1-K
J1-P
J1-R
J1-I
J3-D
J3-N
GSE DISTRIBUTION BOX
28
15 AMP
8 AMP
8 AMP
5 AMP
1 AMP
2220 TL
2221 TL
2223 TL
2222 TL
1680 TL
1681 TL
1682 TL
1683 TL
1685 TL
1684 TL
8 AMP
30
5.0 AMP
0.5 AMP
2210 TL
2219 TL
2211 TL
2218 TL
2227 TL
2228 TL
2229 TL
2211 TL
2212 TL
2209 TL
2208 TL
2200 TL
2201 TL
2202 TL
TPA-2
0.5 AMP
0.5 AMP
0.5 AMP
0.5 AMP
615
613
614
646
647
645
-30 VDC
+30 VDC
30 VDC COMM
28 VDC G&N HI
28 VDC RLP LO
27 VDC OIA ON
2 SEC TD LATCH
OIA ON RELAY RETURN
115 V 60 CPS PH A PILOT POWER
115 V 60 CPS NEUTRAL
115 V 60 CPS PH B OIA ON
115 V 60 CPS NEUTRAL
2 SEC TD LATCH VOLTAGE
G&N VOLTAGE ADJUST HI
G&N VOLTAGE ADJUST LO
SHILD OF FTR K & O
GSE SHIELD GROUND
J2-H
J2-B
J2-D
J2-F
J2-P
J2-R
J2-G
J2-O
J2-K
J2-E
J2-I
CABLE FROM THE FTR
27 VDC RLP LO
27 VDC OIA ON HI
J3-D
J3-N
CABLE FROM THE FTR
27 VDC OIA ON HI
27 VDC OIA ON HI
27 VDC RLP LO
27 VDC RLP LO
+30 VDC
-30 VDC
30 VDC GROUND
28VDC G&N HI (REMOTE SENSE)
28 VDC G&N LO (REMOTE SENSE)
28VDC G&N LO
28 VDC G&N HI
+30 VDC
-30 VDC
±30 VDC COMMON
538
538
274TL
273TL
2 TL
1427
1428
723
353
274TL
273 TL
2 TL
OIA BACKWALL

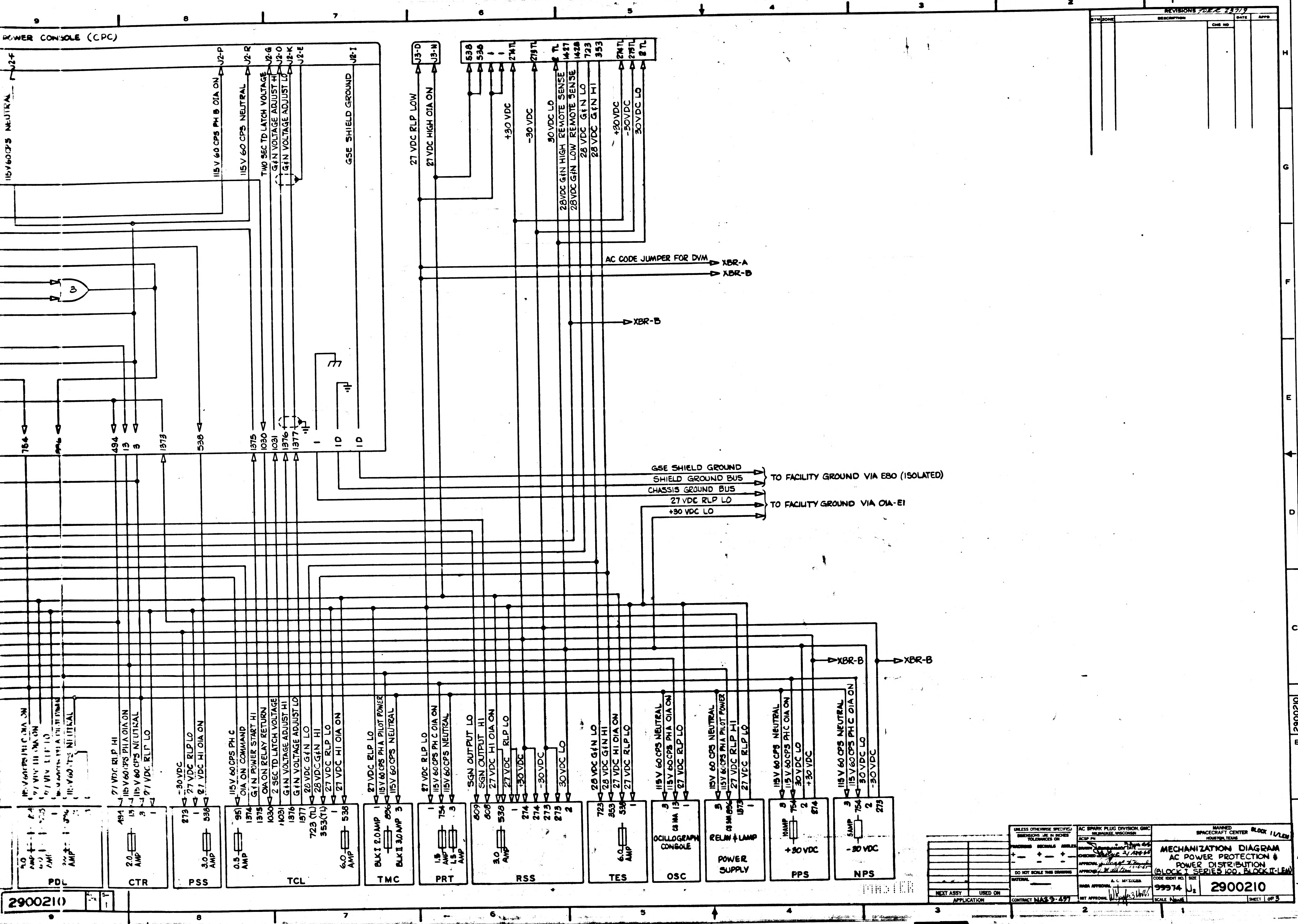
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 3 AUG 65
CHECKED 21 AUG 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
AC POWER PROTECTION &
POWER DISTRIBUTION
(BLOCK II-LEM)

CODE IDENT NO. 99974
SIZE E
2900210
SCALE None
SHEET 3 OF 3



POWER CONSOLE (CPC)
J2-F
115V 60CPS NEUTRAL
J2-P
115V 60 CPS PH B OIA ON
J2-R
115V 60 CPS NEUTRAL
J2-G
TWO SEC TD LATCH VOLTAGE
J2-O
G&N VOLTAGE ADJUST HI
J2-K
G&N VOLTAGE ADJUST LO
J2-E
J2-I
GSE SHIELD GROUND
J3-D
27 VDC RLP LOW
J3-N
27 VDC HIGH OIA ON
538
536
1
1
274TL
+30 VDC
275TL
-30 VDC
2 TL
30 VDC LO
1427
28VDC G&N HIGH REMOTE SENSE
1428
28VDC G&N LOW REMOTE SENSE
723
28 VDC G&N LO
353
28 VDC G&N HI
274TL
+30VDC
275TL
-30VDC
2TL
30VDC LO
AC CODE JUMPER FOR DVM
XBR-A
XBR-B
XBR-B
3
784
896
494
13
3
1373
538
1375
1030
1031
1376
1377
1
1D
1D
GSE SHIELD GROUND
SHIELD GROUND BUS
CHASSIS GROUND BUS
TO FACILITY GROUND VIA E80 (ISOLATED)
27 VDC RLP LO
+30 VDC LO
TO FACILITY GROUND VIA OIA-E1
XBR-B
XBR-B
115V 60CPS PH C OIA ON
27 VDC HI OIA ON
27 VDC RLP LO
115V 60CPS PH A PILOT POWER
115V 60CPS NEUTRAL
5.0 AMP
AMP
AMP
PDL
27 VDC RLP HI
115V 60CPS PH A OIA ON
115V 60 CPS NEUTRAL
27 VDC RLP LO
494
13
3
1
2.0 AMP
CTR
-30VDC
27 VDC RLP LO
27 VDC HI OIA ON
273
1
538
3.0 AMP
PSS
115V 60CPS PH C
OIA ON COMMAND
G&N POWER START HI
OIA ON RELAY RETURN
2 SEC TD LATCH VOLTAGE
G&N VOLTAGE ADJUST HI
G&N VOLTAGE ADJUST LO
28 VDC G&N LO
28 VDC G&N HI
27 VDC RLP LO
27 VDC HI OIA ON
951
1374
1375
1030
1031
1376
1377
723 (TL)
353(TL)
1
538
0.5 AMP
6.0 AMP
TCL
27 VDC RLP LO
115V 60CPS PH A PILOT POWER
115V 60CPS NEUTRAL
1
896
3
BLK I 2.0 AMP
BLK II 3.0 AMP
TMC
27 VDC RLP LO
115V 60CPS PH C OIA ON
115V 60CPS NEUTRAL
1
754
3
1.5 AMP
1.5 AMP
PRT
SGN OUTPUT LO
SGN OUTPUT HI
27 VDC HI OIA ON
27 VDC
RLP LO
+30 VDC
-30VDC
30VDC LO
809
808
538
1
274
274
273
273
2
3.0 AMP
RSS
28 VDC G&N LO
28 VDC G&N HI
27 VDC HI OIA ON
27 VDC RLP LO
723
353
538
1
6.0 AMP
TES
115V 60CPS NEUTRAL
115V 60CPS PH A OIA ON
27 VDC RLP LO
3
CB 1OA 13
1
OCILLOGRAPH CONSOLE
OSC
115V 60 CPS NEUTRAL
115V 60CPS PH A PILOT POWER
27 VDC RLP HI
27 VDC RLP LO
3
CB 5A 896
1373
1
RELAY & LAMP
POWER SUPPLY
115V 60CPS NEUTRAL
115V 60CPS PH C OIA ON
30VDC LO
+30 VDC
3
754
2
274
10AMP
+30 VDC
PPS
115V 60 CPS NEUTRAL
115V 60CPS PH C OIA ON
30VDC LO
-30VDC
3
754
2
273
5AMP
-30 VDC
NPS
MASTER

REVISIONS 7 DEC 23719

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

2900210

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

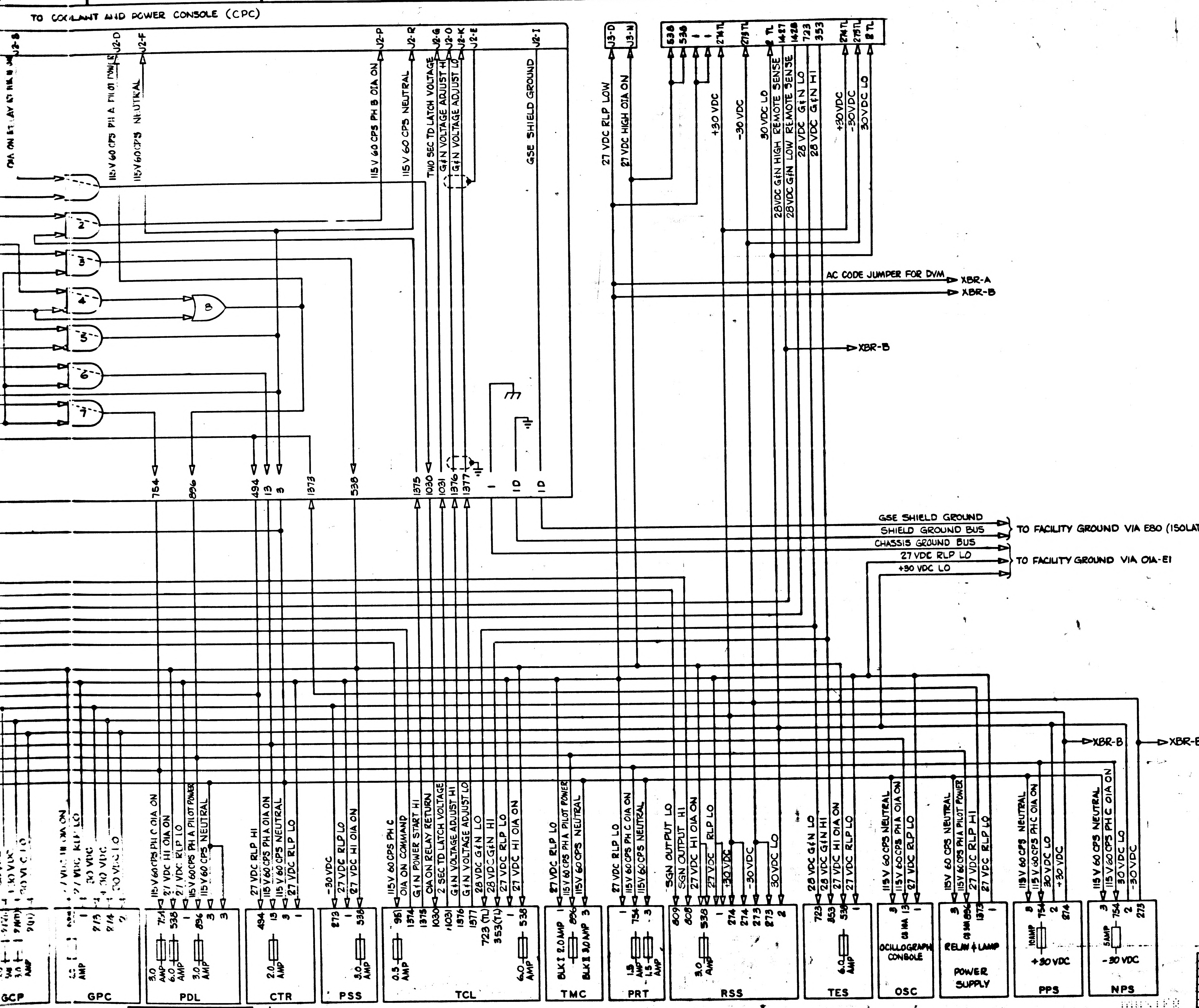
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 3 Aug 65
CHECKED 2/ Aug 65
APPROVAL 10-6-65
APPROVAL
A. C. METZGER
NASA APPROVAL
MIT APPROVAL W. Kupfer 3 Nov 65

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
BLOCK II/LEM

MECHANIZATION DIAGRAM AC POWER PROTECTION & POWER DISTRIBUTION (BLOCK I SERIES 100, BLOCK II-LEM)

CODE IDENT NO. 99974
SIZE J2
2900210
SCALE None
SHEET OF 3

3H


TO COOLANT AND POWER CONSOLE (CPC)
J2-B
OIA ON RELAY RLP ON
J2-D
115V 60 CPS PH A PILOT POWER
J2-F
115V 60 CPS NEUTRAL
J2-P
115V 60 CPS PH B OIA ON
J2-R
115V 60 CPS NEUTRAL
J2-G
TWO SEC TD LATCH VOLTAGE
J2-O
G&N VOLTAGE ADJUST HI
J2-K
G&N VOLTAGE ADJUST LO
J2-E
J2-I
GSE SHIELD GROUND
J3-D
27 VDC RLP LOW
J3-N
27 VDC HIGH OIA ON
538
538
1
1
274 TL
+30 VDC
273 TL
-30 VDC
2 TL
30 VDC LO
1427
28VDC G&N HIGH REMOTE SENSE
1428
28VDC G&N LOW REMOTE SENSE
723
28 VDC G&N LO
353
28 VDC G&N HI
274 TL
+30VDC
273 TL
-30VDC
2 TL
30VDC LO
2
3
4
5
6
7
8
AC CODE JUMPER FOR DVM
XBR-A
XBR-B
XBR-B
754
896
494
13
3
1373
538
1375
1030
1031
1376
1377
1
1D
1D
GSE SHIELD GROUND
SHIELD GROUND BUS
CHASSIS GROUND BUS
TO FACILITY GROUND VIA E80 (ISOLATED)
27 VDC RLP LO
+30 VDC LO
TO FACILITY GROUND VIA OIA-E1
XBR-B
XBR-B
30 VDC LO
GCP
27 VDC IN OIA ON
27 VDC RLP LO
30 VDC
30 VDC
30 VDC LO
AMP
GPC
115V 60 CPS PH C OIA ON
27 VDC HI OIA ON
27 VDC RLP LO
115V 60 CPS PH A PILOT POWER
115V 60 CPS NEUTRAL
754
538
1
896
3
3
3.0 AMP
6.0 AMP
3.0 AMP
PDL
27 VDC RLP HI
115V 60 CPS PH A OIA ON
115V 60 CPS NEUTRAL
27 VDC RLP LO
494
13
3
1
2.0 AMP
CTR
-30 VDC
27 VDC RLP LO
27 VDC HI OIA ON
273
1
538
3.0 AMP
PSS
115V 60 CPS PH C
OIA ON COMMAND
G&N POWER START HI
OIA ON RELAY RETURN
2 SEC TD LATCH VOLTAGE
G&N VOLTAGE ADJUST HI
G&N VOLTAGE ADJUST LO
28 VDC G&N LO
28 VDC G&N HI
27 VDC RLP LO
27 VDC HI OIA ON
951
1374
1375
1030
1031
1376
1377
723 (TL)
353 (TL)
1
538
0.5 AMP
6.0 AMP
TCL
27 VDC RLP LO
115V 60 CPS PH A PILOT POWER
115V 60 CPS NEUTRAL
1
896
3
BLK I 2.0 AMP
BLK II 3.0 AMP
TMC
27 VDC RLP LO
115V 60 CPS PH C OIA ON
115V 60 CPS NEUTRAL
1
754
3
1.5 AMP
1.5 AMP
PRT
SGN OUTPUT LO
SGN OUTPUT HI
27 VDC HI OIA ON
27 VDC
RLP LO
+30 VDC
-30 VDC
30 VDC LO
809
808
538
1
274
274
273
273
2
3.0 AMP
RSS
28 VDC G&N LO
28 VDC G&N HI
27 VDC HI OIA ON
27 VDC RLP LO
723
353
538
1
6.0 AMP
TES
115V 60 CPS NEUTRAL
115V 60 CPS PH A OIA ON
27 VDC RLP LO
3
13
1
OCILLOGRAPH CONSOLE
OSC
115V 60 CPS NEUTRAL
115V 60 CPS PH A PILOT POWER
27 VDC RLP HI
27 VDC RLP LO
3
896
1373
1
RELAY & LAMP
POWER SUPPLY
115V 60 CPS NEUTRAL
115V 60 CPS PH C OIA ON
30 VDC LO
+30 VDC
3
754
2
274
10 AMP
+30 VDC
PPS
115V 60 CPS NEUTRAL
115V 60 CPS PH C OIA ON
30 VDC LO
-30 VDC
3
754
2
273
5 AMP
-30 VDC
NPS

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

2900210 REV LTR SH 1

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

NEXT ASSY USED ON
APPLICATION

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 3 Aug 65
CHECKED 21 Aug 65
APPROVAL
APPROVAL 10-6-65
A. C. METZGER
NASA APPROVAL
KGT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
BLOCK II/LEM

MECHANIZATION DIAGRAM
AC POWER PROTECTION &
POWER DISTRIBUTION
(BLOCK I SERIES 00, BLOCK II-LEM)

CODE IDENT NO. 99974
SIZE J2
2900210
SCALE None
SHEET 23

NOTES:

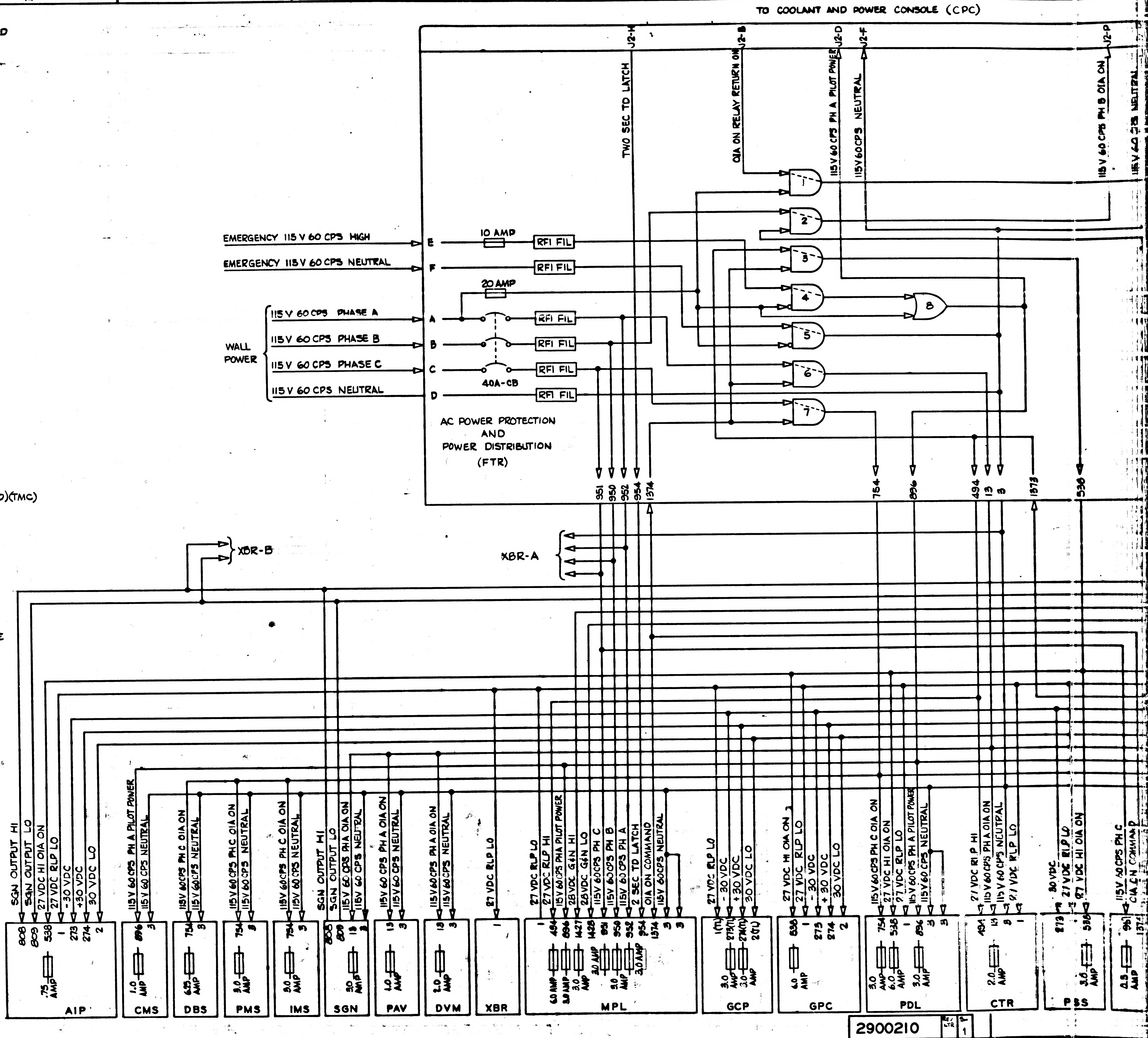
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS:

2900207	MONITOR PANEL (MPL)
2900208	POWER & DUMMY LOAD PANEL (PDL)
2900201	TEST CONTROL PANEL (BLOCK II-LEM) (TCL)
2900209	COMPUTER SIMULATOR INTERFACE (CMS)
2900223	GIMBAL POSITIONER AND CONTROL (GPC)
2900200	GYRO CAGING PANEL (GCP)
2900211	AUXILLARY INPUT PANEL (AIP)
2900203	TEMPERATURE MONITOR CONTROL (TMC)
2900206	TEST SELECTOR (TES) SIGNAL GENERATOR (SGN)
2900217	SIGNAL SELECT MEASUREMENT CROSSBAR AC SIGNALS (XBR-A) CROSSBAR DC SIGNALS (XBR-B) PHASE ANGLE VOLTMETER (PAV) DIGITAL VOLTMETER (DVM) DUAL BEAM SCOPE (A INPUT) (DBS) DIGITAL RECORDER (PRT)
2900218	OSCILLOGRAPH SIGNAL SELECT DUAL BEAM SCOPE (B INPUT) (DBS) RSS-B TO FIXED DC CHANNEL RSS-D TO SWITCHABLE DC CHANNEL
2900219	COUNTER SIGNAL SELECT COUNTER (CTR) PRINTER (PRT)
2900215	MEASUREMENT REFERENCE POWER SUPPLIES OSCILLOGRAPH SIGNAL SELECT (RSS) PRIMARY SIGNAL SELECT (PSS)
2900212	PIPA & IRIG MONITORING IRIG MONITOR SCOPE (IMS) PIPA MONITOR SCOPE (PMS)
2900213	GROUNDING (BLOCK II - LEM)
2900202	TEST CONTROL (SERIES 100) (TCL)
2900204	TEMPERATURE MONITOR CONTROL (SERIES 100) (TMC)

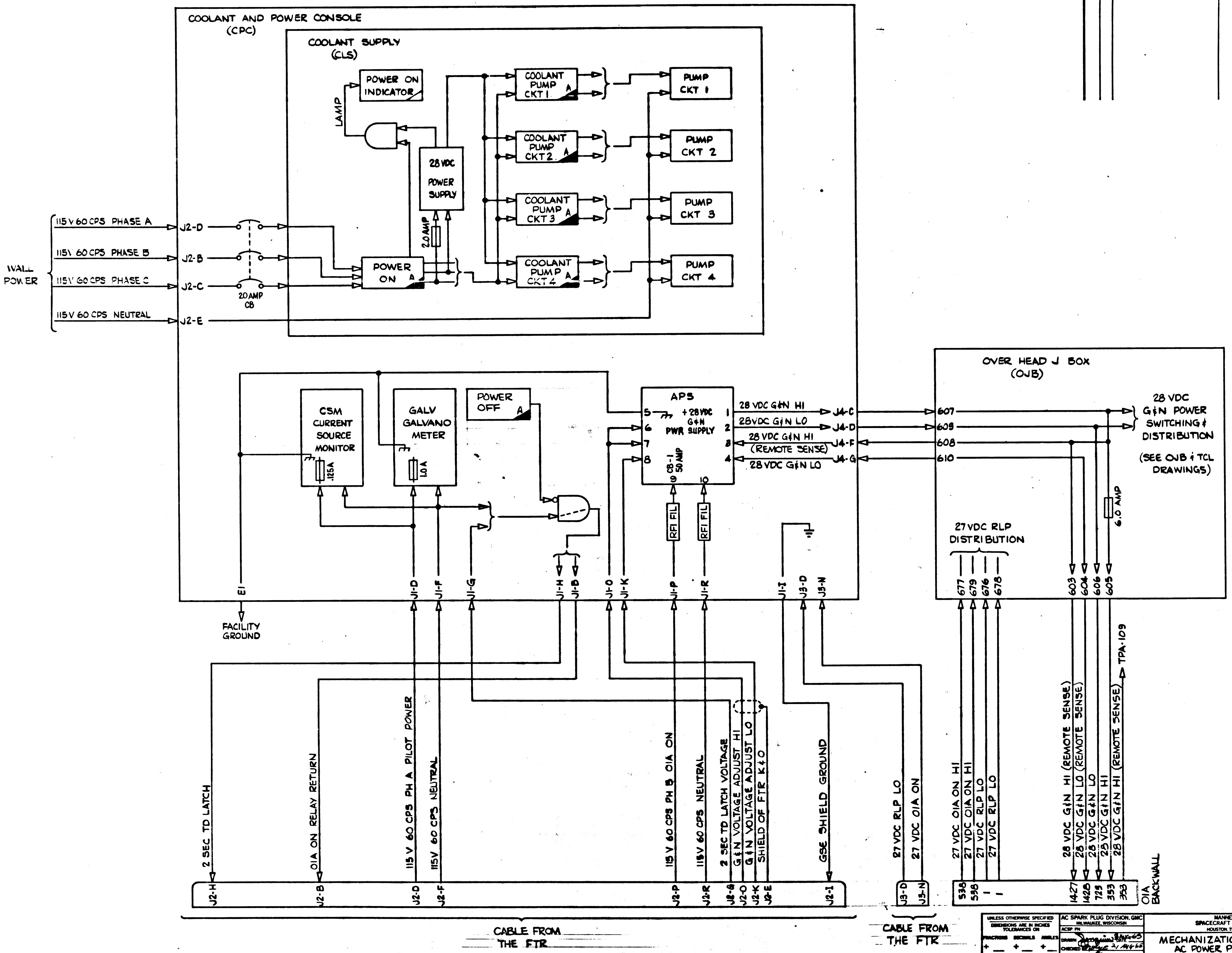
4. NONSTANDARD SYMBOLS

⊐D-	INDICATES "AND" GATE WITH SWITCHED SIGNAL.
NAME A	INDICATES UNLIGHTED PUSHBUTTON - ALTERNATE ACTION
NAME	INDICATES INDICATOR LIGHT.

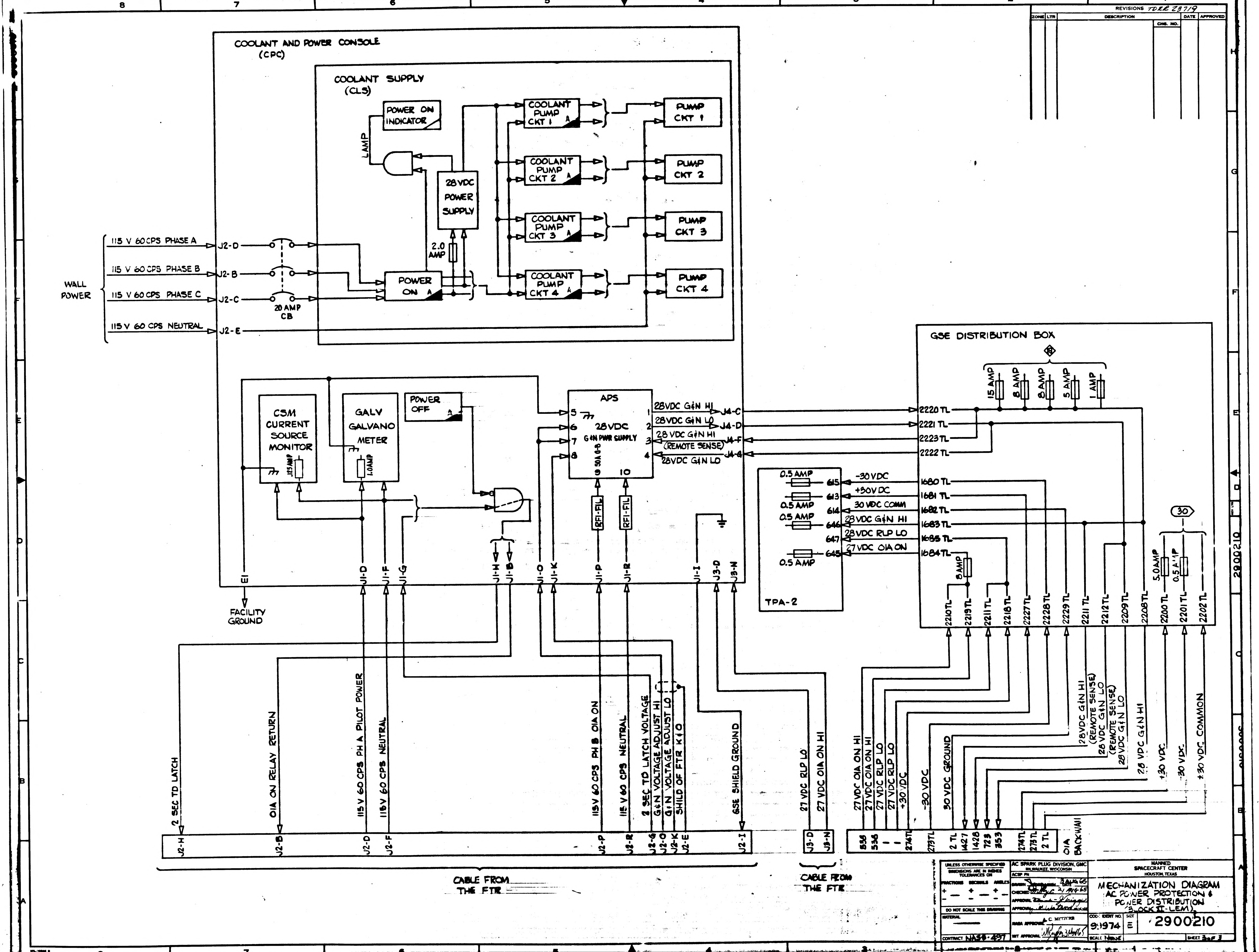
5. INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G&N CONFIGURATIONS
   - E. TW, TL OR WL - USED IN MORE THAN ONE G&N CONFIGURATION AS SHOWN.


TO COOLANT AND POWER CONSOLE (CPC)
J2-H
J2-B
J2-D
J2-F
J2-P
TWO SEC TO LATCH
OIA ON RELAY RETURN ON
115V 60 CPS PH A PILOT POWER
115V 60CPS NEUTRAL
115V 60 CPS PH B OIA ON
EMERGENCY 115 V 60 CPS HIGH
EMERGENCY 115 V 60 CPS NEUTRAL
WALL POWER
115 V 60 CPS PHASE A
115 V 60 CPS PHASE B
115 V 60 CPS PHASE C
115 V 60 CPS NEUTRAL
E
F
A
B
C
D
10 AMP
20 AMP
40A-CB
RFI FIL
1
2
3
4
5
6
7
8
AC POWER PROTECTION AND POWER DISTRIBUTION (FTR)
951
950
952
954
1374
754
896
494
13
8
1373
538
XBR-B
XBR-A
SGN OUTPUT HI
SGN OUTPUT LO
27 VDC HI OIA ON
27 VDC RLP LO
-30 VDC
+30 VDC
30 VDC LO
115V 60 CPS PH A PILOT POWER
115 V 60 CPS NEUTRAL
115V 60 CPS PH C OIA ON
AIP
CMS
DBS
PMS
IMS
SGN
PAV
DVM
XBR
MPL
GCP
GPC
PDL
CTR
PSS
.75 AMP
1.0 AMP
6.25 AMP
3.0 AMP
2.0 AMP
0.5 AMP
2900210

REVISIONS TORC 23719					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED


COOLANT AND POWER CONSOLE (CPC)
COOLANT SUPPLY (CLS)
POWER ON INDICATOR
LAMP
28 VDC POWER SUPPLY
2.0 AMP
COOLANT PUMP CKT 1 A
COOLANT PUMP CKT 2 A
COOLANT PUMP CKT 3 A
COOLANT PUMP CKT 4 A
PUMP CKT 1
PUMP CKT 2
PUMP CKT 3
PUMP CKT 4
POWER ON A
WALL POWER
115 V 60 CPS PHASE A
115 V 60 CPS PHASE B
115 V 60 CPS PHASE C
115 V 60 CPS NEUTRAL
J2-D
J2-B
J2-C
J2-E
20 AMP CB
CSM CURRENT SOURCE MONITOR
.125A
GALV GALVANO METER
1.0A
POWER OFF A
APS
+28 VDC G&N PWR SUPPLY
CB-1 50 AMP
5
6
7
8
1
2
3
4
9
10
RFI FIL
RFI FIL
28 VDC G&N HI
28 VDC G&N LO
28 VDC G&N HI (REMOTE SENSE)
28 VDC G&N LO
J4-C
J4-D
J4-F
J4-G
E1
FACILITY GROUND
J1-D
J1-F
J1-G
J1-H
J1-B
J1-O
J1-K
J1-P
J1-R
J1-I
J3-D
J3-N
OVER HEAD J BOX (OJB)
607
609
608
610
28 VDC G&N POWER SWITCHING & DISTRIBUTION
(SEE OJB & TCL DRAWINGS)
6.0 AMP
27 VDC RLP DISTRIBUTION
677
679
676
678
603
604
606
605
TPA-109
2 SEC TD LATCH
OIA ON RELAY RETURN
115 V 60 CPS PH A PILOT POWER
115V 60 CPS NEUTRAL
115 V 60 CPS PH B OIA ON
115V 60 CPS NEUTRAL
2 SEC TD LATCH VOLTAGE
G&N VOLTAGE ADJUST HI
G&N VOLTAGE ADJUST LO
SHIELD OF FTR K&O
GSE SHIELD GROUND
27 VDC RLP LO
27 VDC OIA ON
27 VDC OIA ON HI
27 VDC OIA ON HI
27 VDC RLP LO
27 VDC RLP LO
28 VDC G&N HI (REMOTE SENSE)
28 VDC G&N LO (REMOTE SENSE)
28 VDC G&N LO
28 VDC G&N HI
28 VDC G&N HI (REMOTE SENSE)
J2-H
J2-B
J2-D
J2-F
J2-P
J2-R
J2-G
J2-O
J2-K
J2-E
J2-I
J3-D
J3-N
538
538
1427
1428
729
353
353
OIA BACKWALL
CABLE FROM THE FTR
CABLE FROM THE FTR

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ___ ± ___ ± ___	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
	DRAWN Jonquin DATE 3 AUG 65 CHECKED Molye 21 AUG 65 APPROVAL [illegible] APPROVAL [illegible] 8-6-65	MECHANIZATION DIAGRAM AC POWER PROTECTION & POWER DISTIBUTION (BLOCK I SERIES 100)	
DO NOT SCALE THIS DRAWING			
MATERIAL —	NASA APPROVAL A. C. METZLER	CODE IDENT NO. 99974	SIZE E
CONTRACT NAS 9-497	MIT APPROVAL W Kupfer 3 Nov 65	SCALE None	2900210 SHEET 2 OF 3



COOLANT AND POWER CONSOLE (CPC)
COOLANT SUPPLY (CLS)
POWER ON INDICATOR
LAMP
28 VDC POWER SUPPLY
2.0 AMP
COOLANT PUMP CKT 1
COOLANT PUMP CKT 2
COOLANT PUMP CKT 3
COOLANT PUMP CKT 4
A
PUMP CKT 1
PUMP CKT 2
PUMP CKT 3
PUMP CKT 4
WALL POWER
115 V 60 CPS PHASE A
115 V 60 CPS PHASE B
115 V 60 CPS PHASE C
115 V 60 CPS NEUTRAL
J2-D
J2-B
J2-C
J2-E
20 AMP CB
POWER ON
CSM CURRENT SOURCE MONITOR
.125 AMP
GALV GALVANO METER
1.0 AMP
POWER OFF
APS
28 VDC G&N PWR SUPPLY
50A 0-8
1
2
3
4
5
6
7
8
9
10
RFI-FIL
RFI-FIL
28 VDC G&N HI
28 VDC G&N LO
28 VDC G&N HI (REMOTE SENSE)
28 VDC G&N LO
J4-C
J4-D
J4-F
J4-G
E1
FACILITY GROUND
J1-D
J1-F
J1-G
J1-H
J1-B
J1-O
J1-K
J1-P
J1-R
J1-I
J3-D
J3-N
GSE DISTRIBUTION BOX
15 AMP
8 AMP
8 AMP
5 AMP
1 AMP
2220 TL
2221 TL
2223 TL
2222 TL
TPA-2
0.5 AMP
0.5 AMP
0.5 AMP
0.5 AMP
615
613
614
646
647
645
-30 VDC
+30 VDC
30 VDC COMM
28 VDC G&N HI
28 VDC RLP LO
27 VDC OIA ON
1680 TL
1681 TL
1682 TL
1683 TL
1685 TL
1684 TL
8 AMP
30
5.0 AMP
0.5 AMP
2210 TL
2219 TL
2211 TL
2218 TL
2227 TL
2228 TL
2229 TL
2211 TL
2212 TL
2209 TL
2208 TL
2200 TL
2201 TL
2202 TL
2 SEC TD LATCH
OIA ON RELAY RETURN
115 V 60 CPS PH A PILOT POWER
115 V 60 CPS NEUTRAL
115 V 60 CPS PH B OIA ON
115 V 60 CPS NEUTRAL
2 SEC TD LATCH VOLTAGE
G&N VOLTAGE ADJUST HI
G&N VOLTAGE ADJUST LO
SHILD OF FTR K&O
GSE SHIELD GROUND
J2-H
J2-B
J2-D
J2-F
J2-P
J2-R
J2-G
J2-O
J2-K
J2-E
J2-I
CABLE FROM THE FTR
27 VDC RLP LO
27 VDC OIA ON HI
J3-D
J3-N
CABLE FROM THE FTR
27 VDC OIA ON HI
27 VDC OIA ON HI
27 VDC RLP LO
27 VDC RLP LO
+30 VDC
-30 VDC
30 VDC GROUND
28 VDC G&N HI (REMOTE SENSE)
28 VDC G&N LO (REMOTE SENSE)
28 VDC G&N LO
28 VDC G&N HI
+30 VDC
-30 VDC
+30 VDC COMMON
538
538
274 TL
273 TL
2 TL
1427
1428
723
353
274 TL
273 TL
2 TL
OIA BACKWALL

REVISIONS TDRR 23719

ZONE	LTR	DESCRIPTION	DATE	APPROVED
		CHG. NO.		

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN 3 AUG 65
CHECKED 21 AUG 65
APPROVAL J. Triggs
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL 3 Nov 65

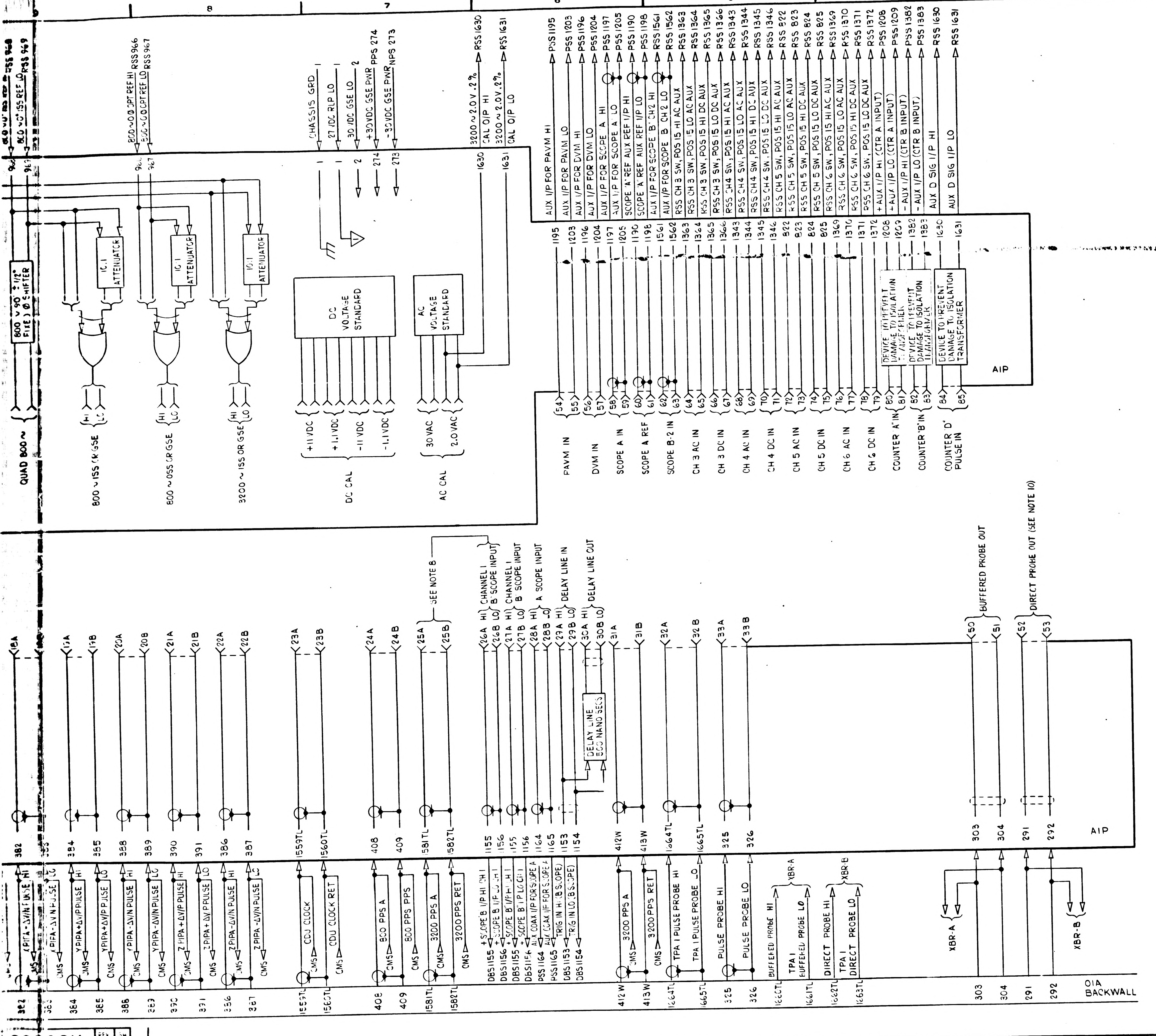
MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
AC POWER PROTECTION & POWER DISTRIBUTION (BLOCK II-LEM)

CODE IDENT NO. 91974
SIZE E
2900210
SCALE NONE
SHEET 3 OF 3

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21914		31 AUG 65	LF



800∿0° 1PT REF HI RSS 968
800∿0° ISS REF LO RSS 969
QUAD 800∿
800∿90° ± 1/2° FIXED Ø SHIFTER
800∿0° OPT REF HI RSS 966
800∿0° OPT REF LO RSS 967
IC-1 ATTENUATOR
800∿ISS OR GSE
800∿OSS OR GSE
3200∿ISS OR GSE
HI
LO
CHASSIS GRD
27.1 DC RIP LO
30.1 DC GSE LO
+30 VDC GSE PWR PPS 274
-30 VDC GSE PWR NPS 273
DC VOLTAGE STANDARD
AC VOLTAGE STANDARD
+11.1 VDC
+1.1 VDC
-11 VDC
-1.1 VDC
DC CAL
30 VAC
2.0 VAC
AC CAL
3200∿2.0 V .2% CAL O/P HI RSS 1630
3200∿2.0 V .2% CAL O/P LO RSS 1631
AUX I/P FOR PAVM HI PSS 1195
AUX I/P FOR PAVM LO PSS 1203
AUX I/P FOR DVM HI PSS 1196
AUX I/P FOR DVM LO PSS 1204
AUX I/P FOR SCOPE A HI PSS 1197
AUX I/P FOR SCOPE A LO PSS 1205
SCOPE 'A' REF AUX REF I/P HI PSS 1190
SCOPE 'A' REF AUX REF I/P LO PSS 1198
AUX I/P FOR SCOPE 'B' CH 2 HI RSS 1561
AUX I/P FOR SCOPE B CH 2 LO RSS 1562
RSS CH 3 SW, POS 15 HI AC AUX RSS 1363
RSS CH 3 SW, POS 15 LO AC AUX RSS 1364
RSS CH 3 SW, POS 15 HI DC AUX RSS 1365
RSS CH 3 SW, POS 15 LO DC AUX RSS 1366
RSS CH 4 SW, POS 15 HI AC AUX RSS 1343
RSS CH 4 SW, POS 15 LO AC AUX RSS 1344
RSS CH 4 SW, POS 15 HI DC AUX RSS 1345
RSS CH 4 SW, POS 15 LO DC AUX RSS 1346
RSS CH 5 SW, POS 15 HI AC AUX RSS 822
RSS CH 5 SW, POS 15 LO AC AUX RSS 823
RSS CH 5 SW, POS 15 HI DC AUX RSS 824
RSS CH 5 SW, POS 15 LO DC AUX RSS 825
RSS CH 6 SW, POS 15 HI AC AUX RSS 1369
RSS CH 6 SW, POS 15 LO AC AUX RSS 1370
RSS CH 6 SW, POS 15 HI DC AUX RSS 1371
RSS CH 6 SW, POS 15 LO DC AUX RSS 1372
+AUX I/P HI (CTR A INPUT) PSS 1208
+AUX I/P LO (CTR A INPUT) PSS 1209
-AUX I/P HI (CTR B INPUT) PSS 1382
-AUX I/P LO (CTR B INPUT) PSS 1383
AUX D SIG I/P HI RSS 1630
AUX D SIG I/P LO RSS 1631
DEVICE TO PREVENT DAMAGE TO ISOLATION TRANSFORMER
AIP
PAVM IN
DVM IN
SCOPE A IN
SCOPE A REF
SCOPE B-2 IN
CH 3 AC IN
CH 3 DC IN
CH 4 AC IN
CH 4 DC IN
CH 5 AC IN
CH 5 DC IN
CH 6 AC IN
CH 6 DC IN
COUNTER 'A' IN
COUNTER 'B' IN
COUNTER 'D' PULSE IN
SEE NOTE 8
CHANNEL 1 'B' SCOPE INPUT
A SCOPE INPUT
DELAY LINE IN
DELAY LINE OUT
DELAY LINE 800 NANO SECS
BUFFERED PROBE OUT
DIRECT PROBE OUT (SEE NOTE 10)
XPIPA -ΔV/N PULSE HI
XPIPA -ΔV/N PULSE LO
YPIPA +ΔV/P PULSE HI
YPIPA +ΔV/P PULSE LO
YPIPA -ΔV/N PULSE HI
YPIPA -ΔV/N PULSE LO
Z PIPA +ΔV/P PULSE HI
Z PIPA +ΔV/P PULSE LO
Z PIPA -ΔV/N PULSE HI
Z PIPA -ΔV/N PULSE LO
CDU CLOCK
CDU CLOCK RET
800 PPS A
800 PPS PPS
3200 PPS A
3200 PPS RET
+SCOPE B I/P HI CH 1
SCOPE B I/P LO CH 1
SCOPE B I/P HI CH 1
SCOPE B I/P LO CH 1
AUX COAX I/P FOR SCOPE A
TRIG IN HI (B SCOPE)
TRIG IN LO (B SCOPE)
CMS
DBS 1155
DBS 1156
PSS 1164
PSS 1165
DBS 1153
DBS 1154
TPA 1 PULSE PROBE HI
TPA 1 PULSE PROBE LO
PULSE PROBE HI
PULSE PROBE LO
BUFFERED PROBE HI
TPA 1 BUFFERED PROBE LO
XBR-A
DIRECT PROBE HI
TPA 1 DIRECT PROBE LO
XBR-B
OIA BACKWALL

2900211 REV A SH 1

2/2900211

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 17 MAY 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
AUXILIARY INPUT-OUTPUT
(BLOCK I SERIES 100, BLOCK II & LEM)

CODE IDENT NO 99974
SIZE J2
2900211
SCALE —
SHEET 1 of 4

2900211 A

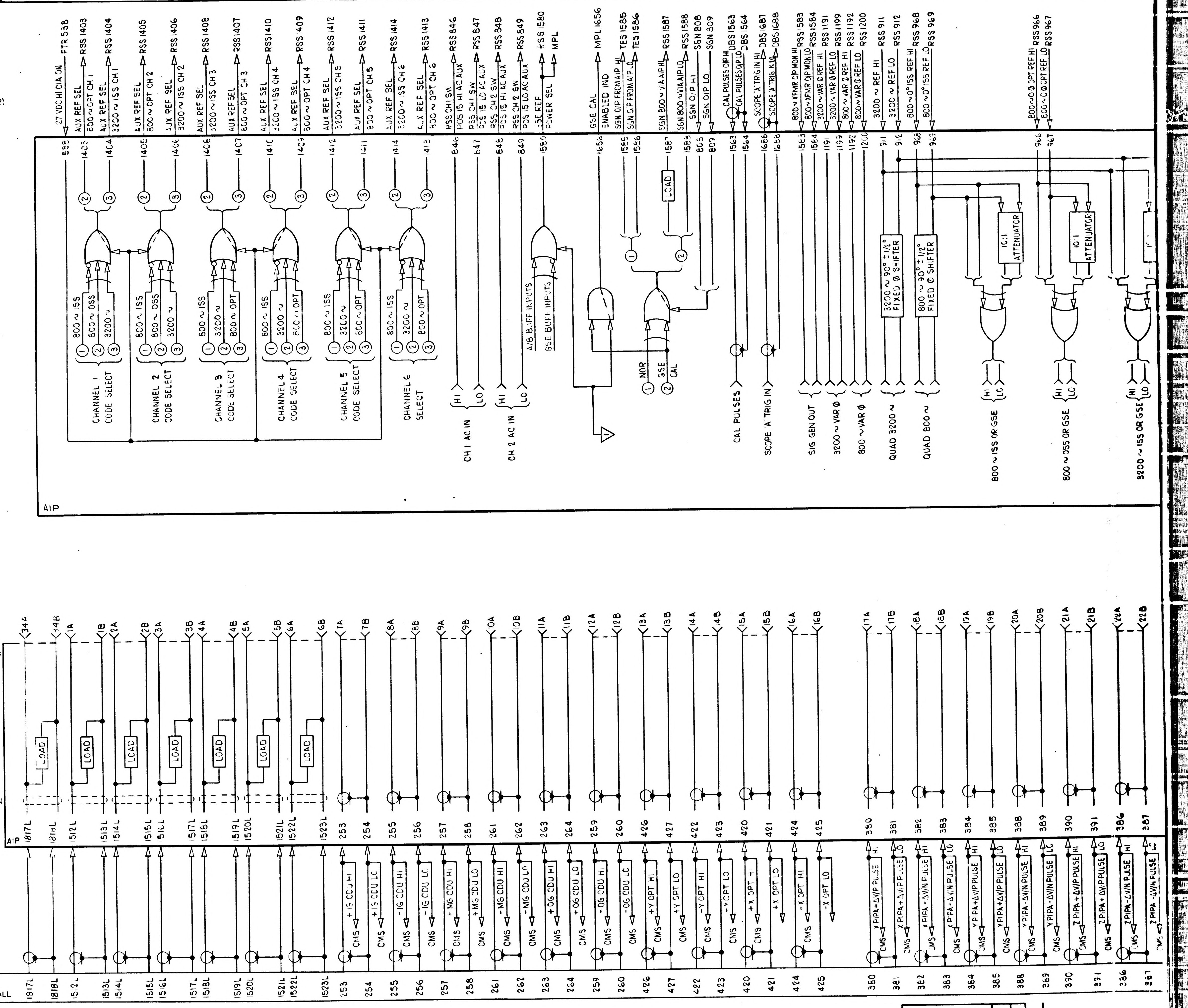
21

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806
3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM):
   - 2900210 AC POWER PROTECTION & POWER DISTRIBUTION (FTR)
     - PPS + 30 VDC POWER SUPPLY
     - NPS - 30 VDC POWER SUPPLY
     - TEST SELECTOR PANEL (TES)
     - SGN SIGNAL GENERATOR
   - 2900207 MONITOR PANEL (MPL)
   - 2900209 COMPUTER SIMULATOR INTERFACE (CMS)
   - 2900217 SIGNAL SELECTION & MEASUREMENT
     - PSS PRIMARY SIGNAL SELECTION (PARTIAL)
     - XBR-A AC SIGNALS TO CROSSBAR
     - XBR-B DC SIGNALS TO CROSSBAR
     - DBS DUAL BEAM SCOPE "A" INPUT & "B" INPUT, CHANNEL I, WITH TRIGGER LOGIC.
     - PVAM PHASE ANGLE VOLTMETER
     - DVM DIGITAL VOLTMETER
   - 2900218 OSCILLOGRAPH SIGNAL SELECTION
     - DBS DUAL BEAM SCOPE - "B" INPUT CHANNEL 2 & REF LOGIC FOR "B" INPUT
     - RSS OSCILLOGRAPH SIGNAL SELECTOR
   - 2900215 MEASUREMENT REFERENCE POWER SUPPLIES
     - RSS OSCILLOGRAPH SIGNAL SELECTOR (PARTIAL)
   - 2900219 COUNTER SIGNAL SELECTION
     - PSS PRIMARY SIGNAL SELECTOR (PARTIAL)
     - GSE GROUNDING (BLOCK I SERIES 100)
     - GSE GROUNDING (BLOCK II & LEM)
     - TPA-1 & TPA-2
4. NONSTANDARD SYMBOLS
   - INDICATES AND GATE WITH SWITCHED SIGNAL
   - INDICATES EXCLUSIVE "OR" GATE WITH ENABLE SIGNAL SWITCHED THROUGH POSITION 1, OR NOT SWITCHED THROUGH POSITION 2. ENABLE
   - INDICATES SWITCH POSITION
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEANS:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G/N CONFIGURATIONS
   - E. TW, TL OR WL - USED IN MORE THAN ONE G/N CONFIGURATIONS AS SHOWN.
6. ABBREVIATIONS
   - OIA - OPTICS-INERTIAL ANALYZER
   - ISS - INERTIAL SUB SYSTEM
   - AIP - AUXILIARY INPUT-OUTPUT & CALIBRATION PANEL
   - OPT - OPTICS
   - TPA - TEST POINT ADAPTER
   - I/P - INPUT
   - O/P - OUTPUT
7. ALL TPA'S IN THIS DRAWING SHOW ONLY THE AUXILIARY INPUTS. FOR ADDITIONAL DETAIL SEE TPA 1 & 2 MECH. & SERIES 100 TPA.
8. JUMPERS WILL BE USED TO MAKE CONNECTIONS BETWEEN TEST JACKS.
9. SHEET LAYOUT:

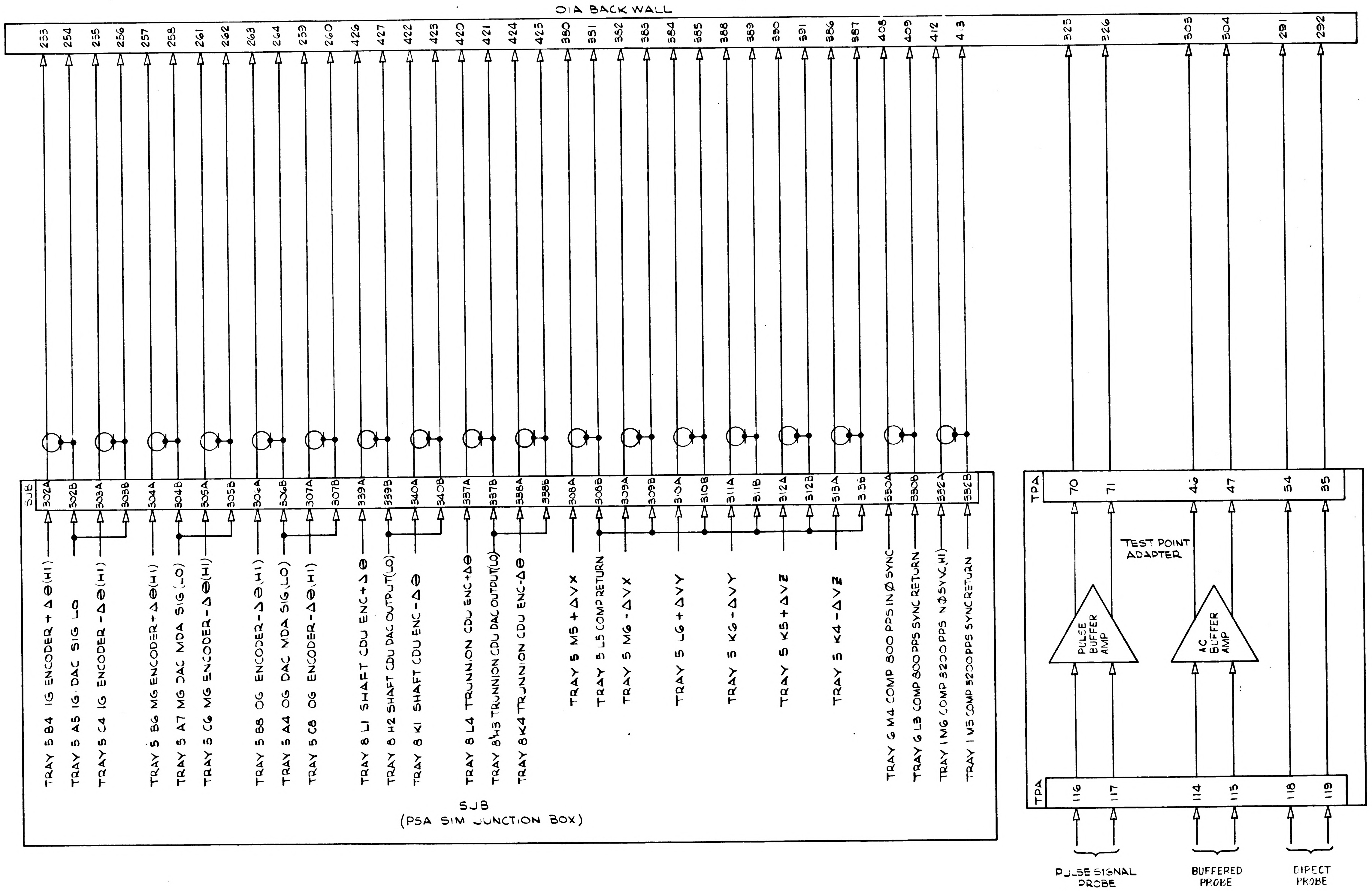
BLOCK I	SHEET 1 SHEET 2
BLOCK II	SHEET 1 SHEET 3
LEM	SHEET 1 SHEET 4

10. DVM IS AUTOMATICALLY PROGRAMED FOR DC. MUST BE MANUALLY PROGRAMED FOR AC.


AIP
27 VDC HI OIA ON FTR 538
AUX REF SEL RSS 1403
800~OPT CH 1 RSS 1404
3200~ISS CH 1
AUX REF SEL RSS 1405
800~OPT CH 2 RSS 1406
3200~ISS CH 2
AUX REF SEL RSS 1408
3200~ISS CH 3 RSS 1407
800~OPT CH 3
AUX REF SEL RSS 1410
3200~ISS CH 4 RSS 1409
800~OPT CH 4
AUX REF SEL RSS 1412
3200~ISS CH 5 RSS 1411
800~OPT CH 5
AUX REF SEL RSS 1414
3200~ISS CH 6 RSS 1413
800~OPT CH 6
PSS CH 1 SW RSS 846
POS 15 HI AC AUX RSS 847
PSS CH 1 SW
POS 15 LO AC AUX RSS 848
PSS CH 2 SW
POS 15 HI AC AUX RSS 849
PSS CH 2 SW
POS 15 LO AC AUX
GSE REF RSS 1580
POWER SEL MPL
GSE CAL MPL 1656
ENABLED IND
SGN O/P FROM AIP HI TES 1585
SGN O/P FROM AIP LO TES 1586
SGN 800~VIA AIP HI RSS 1587
SGN 800~VIA AIP LO RSS 1588
SGN O/P HI SGN 808
SGN O/P LO SGN 809
CAL PULSES O/P HI DBS 1563
CAL PULSES O/P LO DBS 1564
SCOPE A TRIG IN HI DBS 1687
SCOPE A TRIG IN LO DBS 1688
800~XFMR O/P MON HI RSS 1583
800~XFMR O/P MON LO RSS 1584
3200~VAR Ø REF HI RSS 1191
3200~VAR Ø REF LO RSS 1199
800~VAR Ø REF HI RSS 1192
800~VAR Ø REF LO RSS 1200
3200~REF HI RSS 911
3200~REF LO RSS 912
800~0° ISS REF HI RSS 968
800~0° ISS REF LO RSS 969
800~0 Ø OPT REF HI RSS 966
800~0 Ø OPT REF LO RSS 967
800~ISS
800~OSS
3200~
800~OPT
CHANNEL 1 CODE SELECT
CHANNEL 2 CODE SELECT
CHANNEL 3 CODE SELECT
CHANNEL 4 CODE SELECT
CHANNEL 5 CODE SELECT
CHANNEL 6 SELECT
A/B BUFF INPUTS
GSE BUFF INPUTS
LOAD
NOR
GSE
CAL
HI
LO
CH 1 AC IN
CH 2 AC IN
CAL PULSES
SCOPE A TRIG IN
SIG GEN OUT
3200~VAR Ø
800~VAR Ø
QUAD 3200~
QUAD 800~
3200~90° ± 1/2° FIXED Ø SHIFTER
800~90° ± 1/2° FIXED Ø SHIFTER
IC:1 ATTENUATOR
800~ISS OR GSE
800~OSS OR GSE
3200~ISS OR GSE
34A 34B 1A 1B 2A 2B 3A 3B 4A 4B 5A 5B 6A 6B 7A 7B 8A 8B 9A 9B 10A 10B 11A 11B 12A 12B 13A 13B 14A 14B 15A 15B 16A 16B 17A 17B 18A 18B 19A 19B 20A 20B 21A 21B 22A 22B
1817L 1818L 1512L 1513L 1514L 1515L 1516L 1517L 1518L 1519L 1520L 1521L 1522L 1523L 253 254 255 256 257 258 261 262 263 264 259 260 426 427 422 423 420 421 424 425 380 381 382 383 384 385 388 389 390 391 386 387
+IG CDU HI
+IG CDU LO
-IG CDU HI
-IG CDU LO
+MG CDU HI
+MG CDU LO
-MG CDU HI
-MG CDU LO
+OG CDU HI
+OG CDU LO
-OG CDU HI
-OG CDU LO
+Y OPT HI
+Y OPT LO
-Y OPT HI
-Y OPT LO
+X OPT HI
+X OPT LO
-X OPT HI
-X OPT LO
X PIPA +ΔV/P PULSE HI
X PIPA +ΔV/P PULSE LO
X PIPA -ΔV/N PULSE HI
X PIPA -ΔV/N PULSE LO
Y PIPA +ΔV/P PULSE HI
Y PIPA +ΔV/P PULSE LO
Y PIPA -ΔV/N PULSE HI
Y PIPA -ΔV/N PULSE LO
Z PIPA +ΔV/P PULSE HI
Z PIPA +ΔV/P PULSE LO
Z PIPA -ΔV/N PULSE HI
Z PIPA -ΔV/N PULSE LO
CMS
OIA BACKWALL

2900211	REV A	SH 1

REVISIONS				
LTR	DESCRIPTION	CHG NO	DATE	APPD
A	REVISED PER TDRR 21914		31 AUG 65	LK



O1A BACK WALL
253 254 255 256 257 258 261 262 263 264 259 260 426 427 422 423 420 421 424 425 380 381 382 383 384 385 388 389 390 391 386 387 408 409 412 413
325 326 303 304 291 292
SJB
302A 302B 303A 303B 304A 304B 305A 305B 306A 306B 307A 307B 339A 339B 340A 340B 337A 337B 338A 338B 308A 308B 309A 309B 310A 310B 311A 311B 312A 312B 313A 313B 330A 330B 332A 332B
TRAY 5 B4 IG ENCODER + Δθ(HI)
TRAY 5 A5 IG DAC SIG LO
TRAY 5 C4 IG ENCODER -Δθ(HI)
TRAY 5 B6 MG ENCODER+Δθ(HI)
TRAY 5 A7 MG DAC MDA SIG(LO)
TRAY 5 C6 MG ENCODER-Δθ(HI)
TRAY 5 B8 OG ENCODER-Δθ(HI)
TRAY 5 A4 OG DAC MDA SIG(LO)
TRAY 5 C8 OG ENCODER-Δθ(HI)
TRAY 8 L1 SHAFT CDU ENC+Δθ
TRAY 8 H2 SHAFT CDU DAC OUTPUT(LO)
TRAY 8 K1 SHAFT CDU ENC-Δθ
TRAY 8 L4 TRUNNION CDU ENC+Δθ
TRAY 8 H3 TRUNNION CDU DAC OUTPUT(LO)
TRAY 8 K4 TRUNNION CDU ENC-Δθ
TRAY 5 M5 +ΔVX
TRAY 5 L5 COMP RETURN
TRAY 5 M6 -ΔVX
TRAY 5 L6 +ΔVY
TRAY 5 K6 -ΔVY
TRAY 5 K5 +ΔVZ
TRAY 5 K4 -ΔVZ
TRAY 6 M4 COMP 800 PPS IN Ø SYNC
TRAY 6 L3 COMP 800 PPS SYNC RETURN
TRAY 1 M6 COMP 3200 PPS N Ø SYNC(HI)
TRAY 1 M5 COMP 3200 PPS SYNC RETURN
SJB
(PSA SIM JUNCTION BOX)
TPA
70 71 46 47 34 35
TEST POINT ADAPTER
PULSE BUFFER AMP
AC BUFFER AMP
TPA
116 117 114 115 118 119
PULSE SIGNAL PROBE
BUFFERED PROBE
DIRECT PROBE

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	+ —	+ —
- —	- —	- —

DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION GMC
MILWAUKEE WISCONSIN
DRAWN D. [illegible] DATE 10-APR-65
CHECKED Ed Foster 8 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

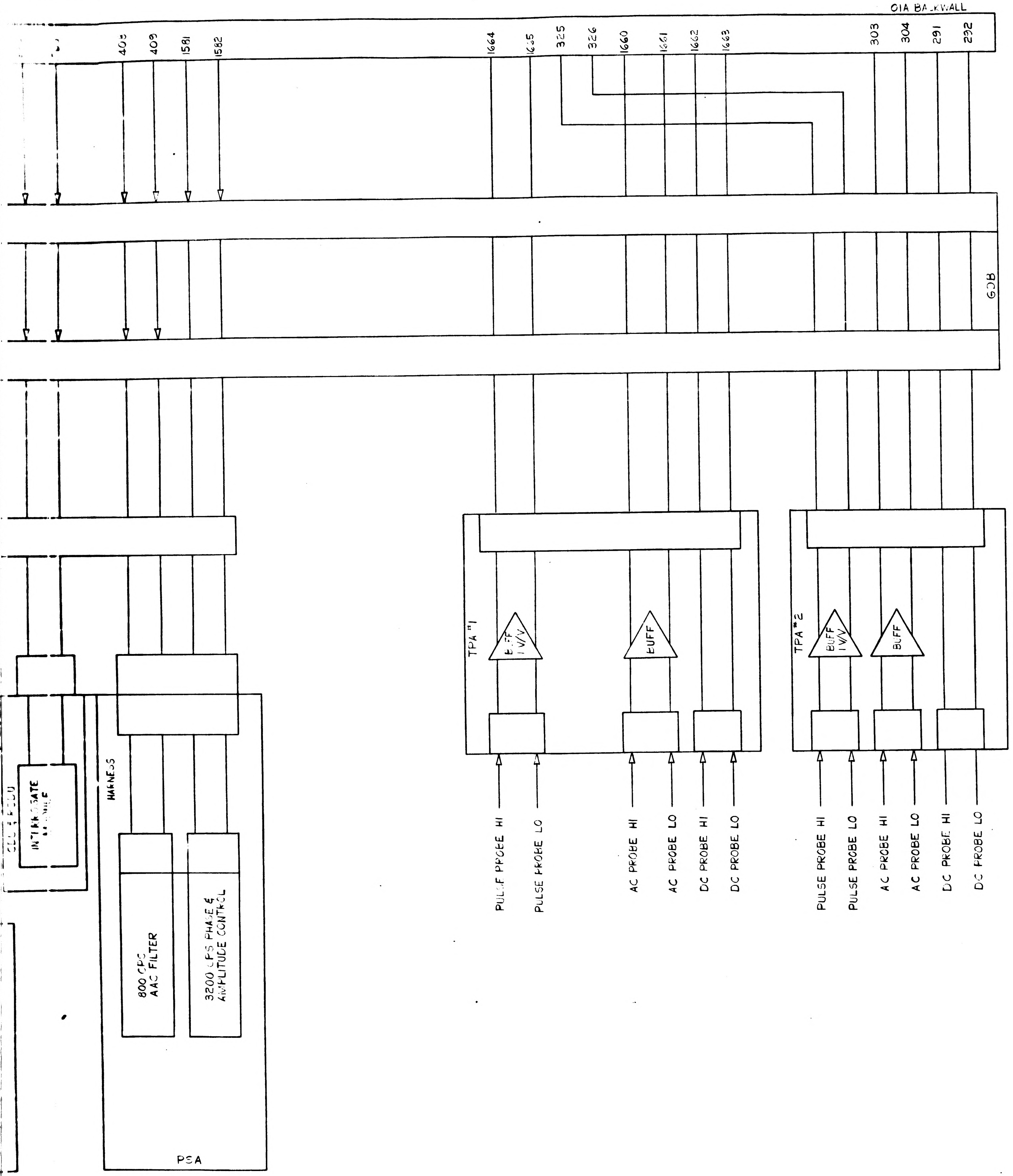
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM
AUXILIARY INPUT-OUTPUT
(BLOCK I SERIES 100)

CODE IDENT NO 99974
SIZE E
2900211
SCALE NONE
SHEET 2 OF 4

2900211

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		1A/G 65	


OIA BACKWALL
408
409
1581
1582
1664
1665
325
326
1660
1661
1662
1663
303
304
291
292
G08
TPA #1
BUFF 1 V/V
BUFF
TPA #2
BUFF 1 V/V
BUFF
PULSE PROBE HI
PULSE PROBE LO
AC PROBE HI
AC PROBE LO
DC PROBE HI
DC PROBE LO
PULSE PROBE HI
PULSE PROBE LO
AC PROBE HI
AC PROBE LO
DC PROBE HI
DC PROBE LO
INTERROGATE MODULE
HARNESS
800 CPS AAC FILTER
3200 CPS PHASE & AMPLITUDE CONTROL
PSA

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

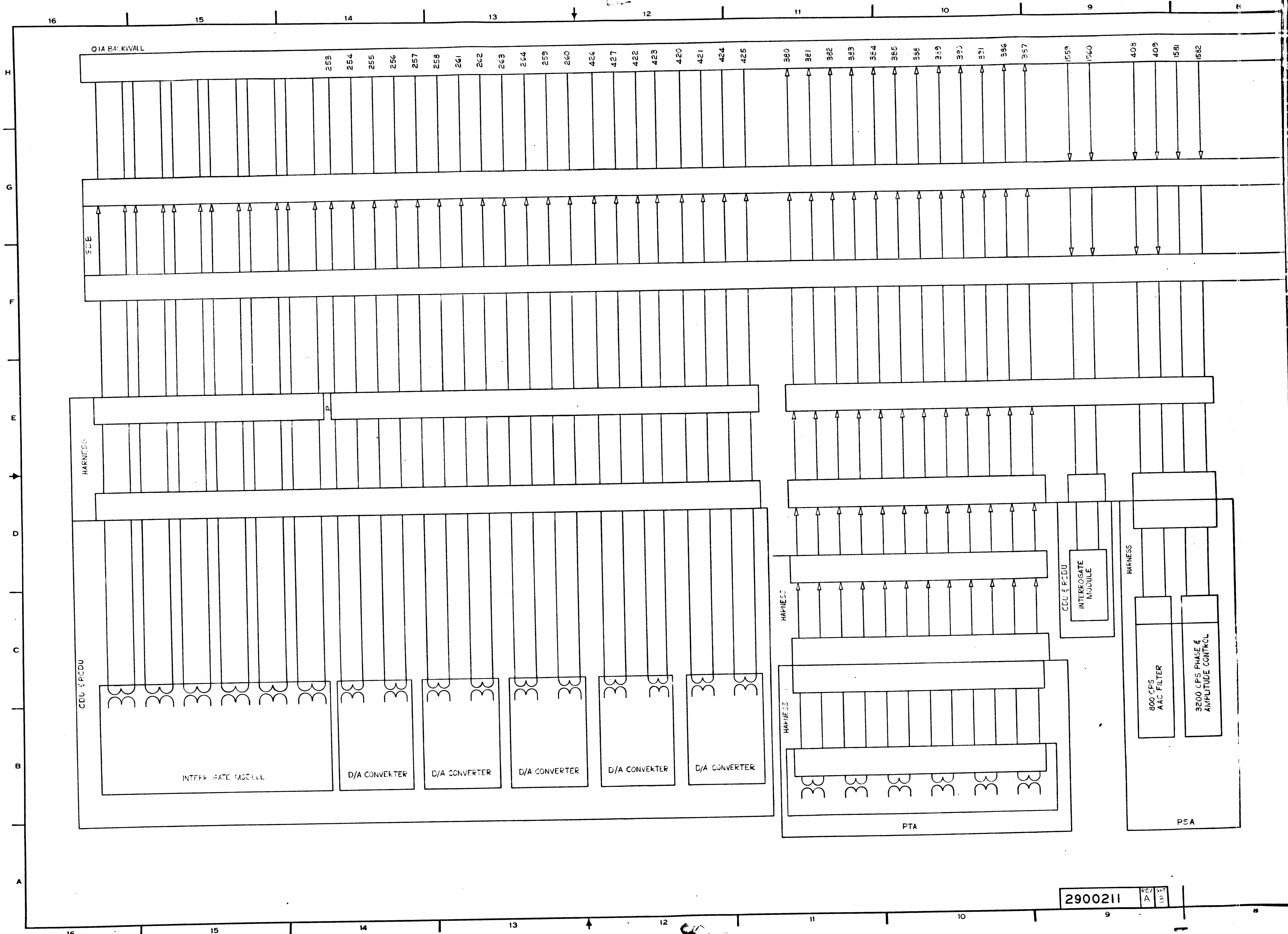
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM –
AUXILIARY INPUT-OUTPUT
(BLOCK II)

CODE IDENT NO 99974
SIZE J2
2900211
SCALE NONE
SHEET 3 OF 4

2900211 REV A SHT 3

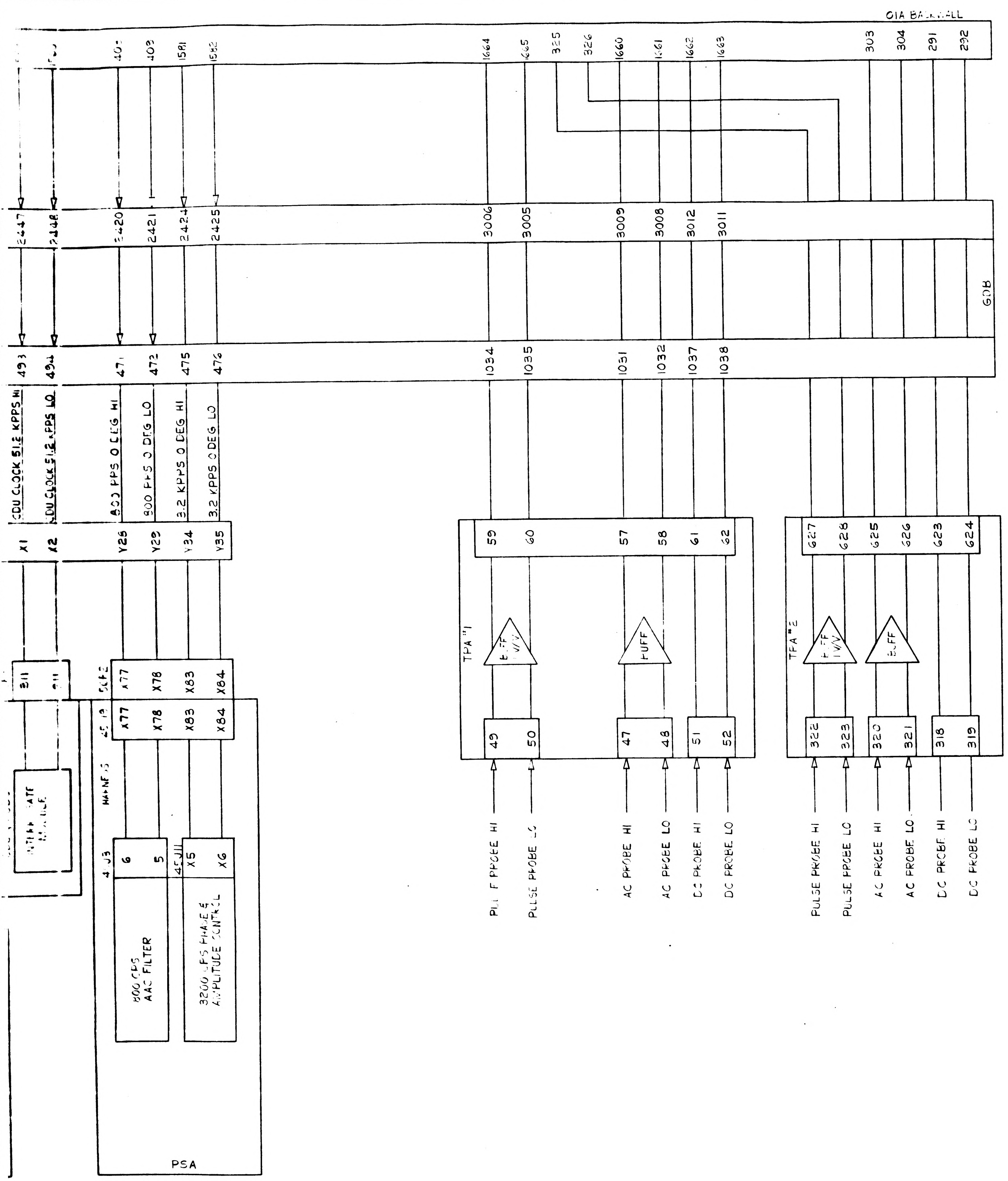
27 2900211



16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
01A BACKWALL
253
254
255
256
257
258
261
262
263
264
259
260
426
427
422
423
420
421
424
425
380
381
382
383
384
385
388
389
390
391
386
387
1559
1560
408
409
1581
1582
SDE
HARNESS
P
CDU & RCDU
INTERROGATE MODULE
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
HARNESS
HARNESS
PTA
CDU & RCDU
INTERROGATE MODULE
HARNESS
800 CPS AAC FILTER
3200 CPS PHASE & AMPLITUDE CONTROL
PSA

2900211 REV A SHT 3

1/2900211



OIA BACKWALL
40-
403
1581
1582
1664
1665
325
326
1660
1661
1662
1663
303
304
291
292
2447
2448
2420
2421
2424
2425
3006
3005
3009
3008
3012
3011
GDB
493
494
471
472
475
476
1034
1035
1031
1032
1037
1038
CDU CLOCK 51.2 KPPS HI
CDU CLOCK 51.2 KPPS LO
800 PPS 0 DEG HI
800 PPS 0 DEG LO
3.2 KPPS 0 DEG HI
3.2 KPPS 0 DEG LO
X1
X2
Y28
Y29
Y34
Y35
TPA #1
59
60
57
58
61
62
BUFF
49
50
47
48
51
52
TPA #2
627
628
625
626
623
624
BUFF
322
323
320
321
318
319
PULSE PROBE HI
PULSE PROBE LO
AC PROBE HI
AC PROBE LO
DC PROBE HI
DC PROBE LO
PULSE PROBE HI
PULSE PROBE LO
AC PROBE HI
AC PROBE LO
DC PROBE HI
DC PROBE LO
311
X77
X78
X83
X84
HARNESS
6
5
X5
X6
800 CPS AAC FILTER
3200 PPS PHASE & AMPLITUDE CONTROL
PSA

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		31 AUG 65	LK

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

AC SPARK PLUG DIVISION GMC
MILWAUKEE WISCONSIN
DRAWN DATE 4 MAY 65
CHECKED Ed Foster 18 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

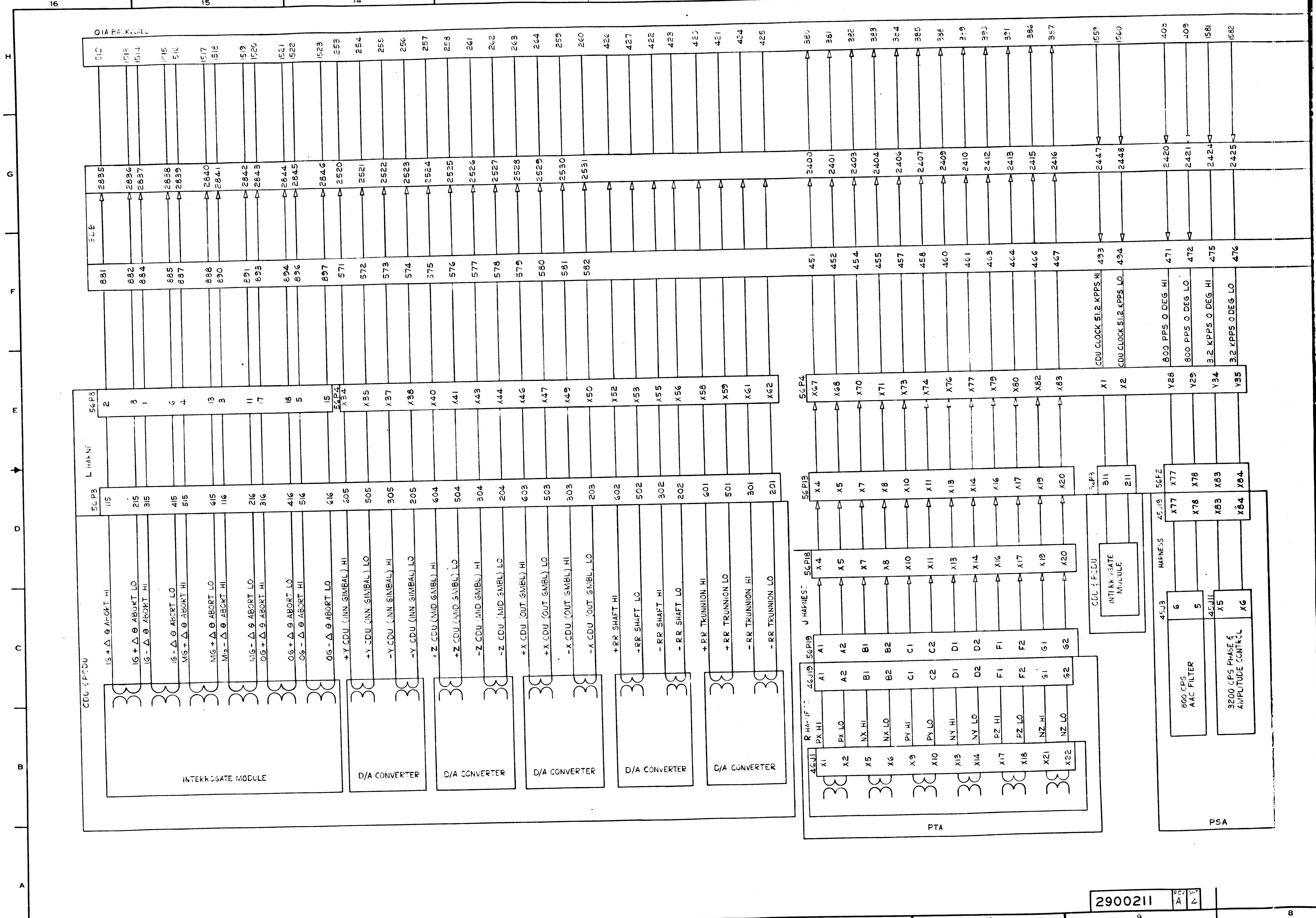
MANNED SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM - AUXILIARY INPUT-OUTPUT (LEM)

CODE IDENT NO. 99974
SIZE J
2900211
SHEET 4 OF 4

2900211 REV A SH 4

2/2900211

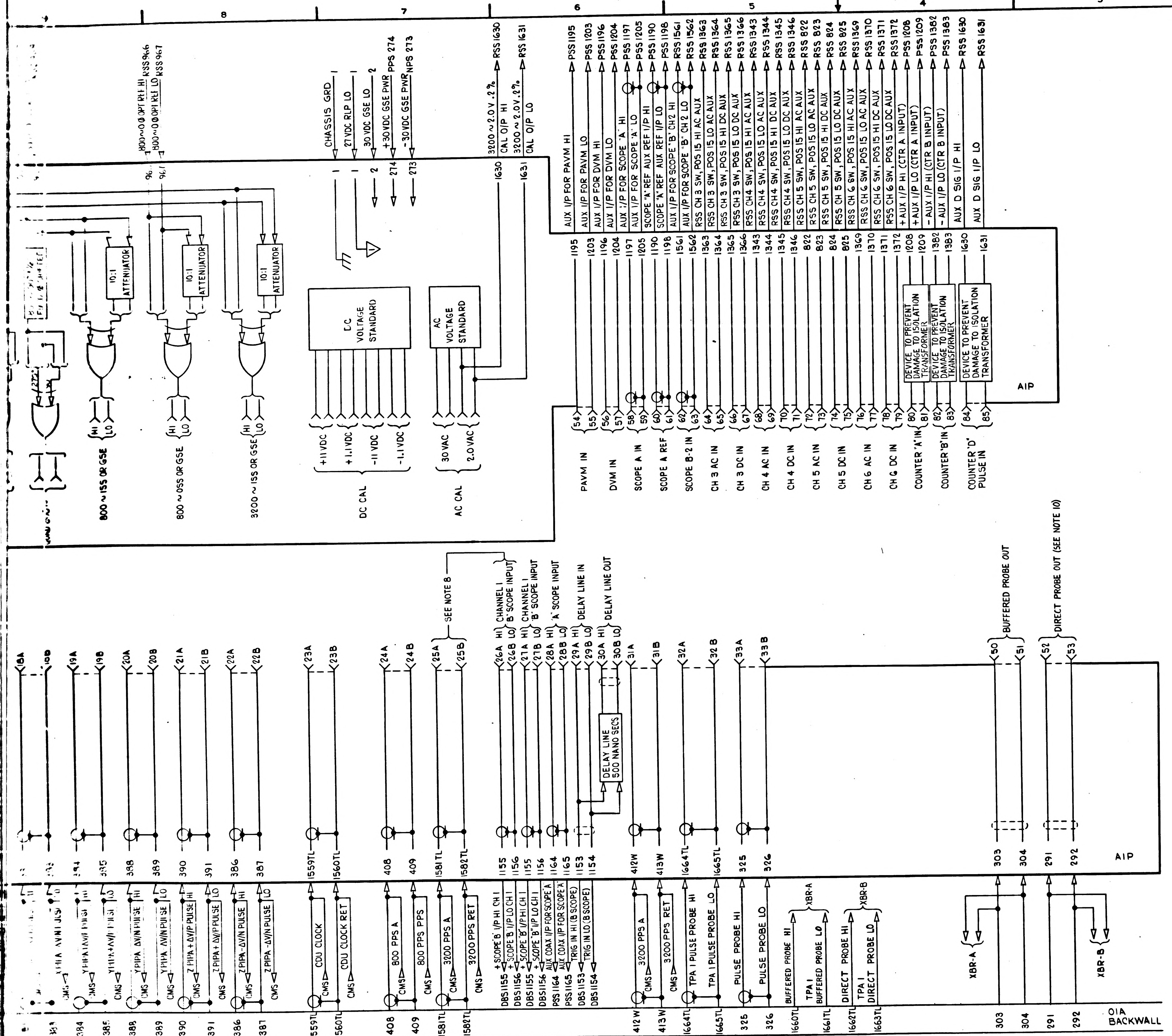


OTA BACKWALL
L HARNESS
56P3
56P4
56P13
56P18
56P19
46J19
46J1
45J3
45J11
45J19
56F2
J HARNESS
R HARNESS
HARNESS
CDU & PCDU
IG + Δ θ ABORT HI
IG + Δ θ ABORT LO
IG - Δ θ ABORT HI
IG - Δ θ ABORT LO
MG + Δ θ ABORT HI
MG + Δ θ ABORT LO
MG - Δ θ ABORT HI
MG - Δ θ ABORT LO
OG + Δ θ ABORT HI
OG + Δ θ ABORT LO
OG - Δ θ ABORT HI
OG - Δ θ ABORT LO
+Y CDU (INN GIMBAL) HI
+Y CDU (INN GIMBAL) LO
-Y CDU (INN GIMBAL) HI
-Y CDU (INN GIMBAL) LO
+Z CDU (MID GMBL) HI
+Z CDU (MID GMBL) LO
-Z CDU (MID GMBL) HI
-Z CDU (MID GMBL) LO
+X CDU (OUT GMBL) HI
+X CDU (OUT GMBL) LO
-X CDU (OUT GMBL) HI
-X CDU (OUT GMBL) LO
+RR SHAFT HI
+RR SHAFT LO
-RR SHAFT HI
-RR SHAFT LO
+RR TRUNNION HI
+RR TRUNNION LO
-RR TRUNNION HI
-RR TRUNNION LO
INTERROGATE MODULE
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
CDU CLOCK 51.2 KPPS HI
CDU CLOCK 51.2 KPPS LO
800 PPS 0 DEG HI
800 PPS 0 DEG LO
3.2 KPPS 0 DEG HI
3.2 KPPS 0 DEG LO
PX HI
PX LO
NX HI
NX LO
PY HI
PY LO
NY HI
NY LO
PZ HI
PZ LO
NZ HI
NZ LO
CDU & PCDU INTERROGATE MODULE
800 CPS AAC FILTER
3200 CPS PHASE & AMPLITUDE CONTROL
PTA
PSA
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

2900211 REV A SHT 2

1/2900211

REVISIONS 192					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21914		65	
B		REVISED PER TDRR 21915		2 SEP 65	



CHASSIS GRD
27 VDC RLP LO
30 VDC GSE LO
+30 VDC GSE PWR PPS 274
-30 VDC GSE PWR NPS 273
800~0.0 OPT REF HI RSS 966
800~0.0 OPT REF LO RSS 967
3200~2.0V .2% RSS 1630
CAL O/P HI
3200~2.0V .2% RSS 1631
CAL O/P LO
10:1 ATTENUATOR
D.C. VOLTAGE STANDARD
AC VOLTAGE STANDARD
+11 VDC
+1.1 VDC
-11 VDC
-1.1 VDC
DC CAL
30 VAC
2.0 VAC
AC CAL
800~1SS OR GSE
800~0SS OR GSE
3200~1SS OR GSE
HI
LO
AUX I/P FOR PAVM HI PSS 1195
AUX I/P FOR PAVM LO PSS 1203
AUX I/P FOR DVM HI PSS 1196
AUX I/P FOR DVM LO PSS 1204
AUX I/P FOR SCOPE 'A' HI PSS 1197
AUX I/P FOR SCOPE 'A' LO PSS 1205
SCOPE "A" REF AUX REF I/P HI PSS 1190
SCOPE "A" REF AUX REF I/P LO PSS 1198
AUX I/P FOR SCOPE "B" CH2 HI RSS 1561
AUX I/P FOR SCOPE "B" CH2 LO RSS 1562
RSS CH 3 SW, POS 15 HI AC AUX RSS 1363
RSS CH 3 SW, POS 15 LO AC AUX RSS 1364
RSS CH 3 SW, POS 15 HI DC AUX RSS 1365
RSS CH 3 SW, POS 15 LO DC AUX RSS 1366
RSS CH4 SW, POS 15 HI AC AUX RSS 1343
RSS CH4 SW, POS 15 LO AC AUX RSS 1344
RSS CH4 SW, POS 15 HI DC AUX RSS 1345
RSS CH4 SW, POS 15 LO DC AUX RSS 1346
RSS CH 5 SW, POS 15 HI AC AUX RSS 822
RSS CH 5 SW, POS 15 LO AC AUX RSS 823
RSS CH 5 SW, POS 15 HI DC AUX RSS 824
RSS CH 5 SW, POS 15 LO DC AUX RSS 825
RSS CH 6 SW, POS 15 HI AC AUX RSS 1369
RSS CH 6 SW, POS 15 LO AC AUX RSS 1370
RSS CH 6 SW, POS 15 HI DC AUX RSS 1371
RSS CH 6 SW, POS 15 LO DC AUX RSS 1372
+AUX I/P HI (CTR A INPUT) PSS 1208
+AUX I/P LO (CTR A INPUT) PSS 1209
-AUX I/P HI (CTR B INPUT) PSS 1382
-AUX I/P LO (CTR B INPUT) PSS 1383
AUX D SIG I/P HI RSS 1630
AUX D SIG I/P LO RSS 1631
DEVICE TO PREVENT DAMAGE TO ISOLATION TRANSFORMER
AIP
PAVM IN
DVM IN
SCOPE A IN
SCOPE A REF
SCOPE B-2 IN
CH 3 AC IN
CH 3 DC IN
CH 4 AC IN
CH 4 DC IN
CH 5 AC IN
CH 5 DC IN
CH 6 AC IN
CH 6 DC IN
COUNTER "A" IN
COUNTER "B" IN
COUNTER "D" PULSE IN
SEE NOTE 8
CHANNEL 1 'B' SCOPE INPUT
'A' SCOPE INPUT
DELAY LINE IN
DELAY LINE OUT
DELAY LINE 500 NANO SECS
BUFFERED PROBE OUT
DIRECT PROBE OUT (SEE NOTE 10)
Y PIPA ΔV/N PULSE
Z PIPA +ΔV/P PULSE
Z PIPA -ΔV/N PULSE
CDU CLOCK
CDU CLOCK RET
800 PPS A
800 PPS
3200 PPS A
3200 PPS RET
+SCOPE 'B' I/P HI CH 1
SCOPE 'B' I/P LO CH 1
AUX COAX I/P FOR SCOPE A
TRIG IN HI (B SCOPE)
TRIG IN LO (B SCOPE)
TPA 1 PULSE PROBE HI
TPA 1 PULSE PROBE LO
PULSE PROBE HI
PULSE PROBE LO
BUFFERED PROBE HI
TPA 1 BUFFERED PROBE LO
DIRECT PROBE HI
TPA 1 DIRECT PROBE LO
XBR-A
XBR-B
CMS
DBS 1155
DBS 1156
PSS 1164
PSS 1165
DBS 1153
DBS 1154
01A BACKWALL

2900211

27 2900211

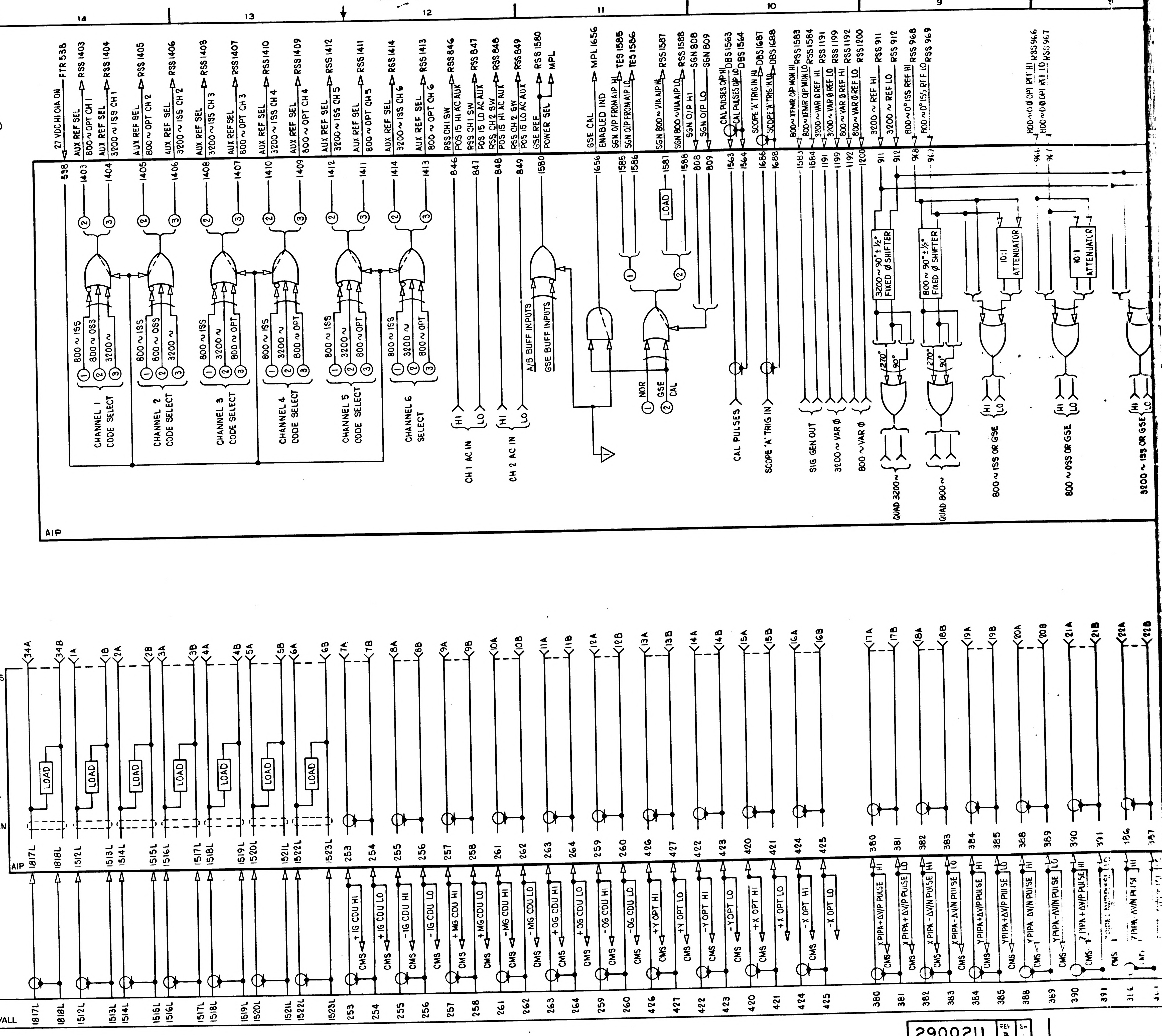
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN	MECHANIZATION DIAGRAM AUXILIARY INPUT-OUTPUT (BLOCK I SERIES 100, BLOCK II & LEM)
MATERIAL —	DRAWN J Wolski DATE 17 MAY 65 CHECKED Foster 18 MAY 65 APPROVAL APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 2900211
CONTRACT NAS 9-497	NASA APPROVAL MIT APPROVAL	SCALE — · SHEET

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806
3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM):
   - 2900210 AC POWER PROTECTION & POWER DISTRIBUTION (FTR)
     - PPS + 30 VDC POWER SUPPLY
     - NPS - 30 VDC POWER SUPPLY
     - TEST SELECTOR PANEL (TES)
     - SGN SIGNAL GENERATOR
   - 2900207 MONITOR PANEL (MPL)
   - 2900209 COMPUTER SIMULATOR INTERFACE (CMS)
   - 2900217 SIGNAL SELECTION & MEASUREMENT
     - PSS PRIMARY SIGNAL SELECTION (PARTIAL)
     - XBR-A AC SIGNALS TO CROSSBAR
     - XBR-B DC SIGNALS TO CROSSBAR
     - DBS DUAL BEAM SCOPE "A" INPUT & "B" INPUT, CHANNEL I, WITH TRIGGER LOGIC.
     - PVAM PHASE ANGLE VOLTMETER
     - DVM DIGITAL VOLTMETER
   - 2900218 OSCILLOGRAPH SIGNAL SELECTION
     - DBS DUAL BEAM SCOPE - "B" INPUT CHANNEL 2 & REF LOGIC FOR "B" INPUT.
     - RSS OSCILLOGRAPH SIGNAL SELECTOR
   - 2900215 MEASUREMENT REFERENCE POWER SUPPLIES
     - RSS OSCILLOGRAPH SIGNAL SELECTOR (PARTIAL)
   - 2900219 COUNTER SIGNAL SELECTION
     - PSS PRIMARY SIGNAL SELECTOR (PARTIAL)
     - GSE GROUNDING (BLOCK I SERIES 100)
     - GSE GROUNDING (BLOCK II & LEM)
     - TPA-1 & TPA-2
4. NONSTANDARD SYMBOLS
   - INDICATES 'AND' GATE WITH SWITCHED SIGNAL
   - INDICATES EXCLUSIVE "OR" GATE WITH ENABLE SIGNAL SWITCHED THROUGH POSITION 1, OR NOT SWITCHED THROUGH POSITION 2. ENABLE
   - (NO) INDICATES SWITCH POSITION
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   - A. W - BLOCK I, SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G/N CONFIGURATIONS
   - E. TW, TL, OR WL - USED IN MORE THAN ONE G/N CONFIGURATIONS AS SHOWN.
6. ABBREVIATIONS:
   - OIA - OPTICS - INERTIAL ANALYZER
   - ISS - INERTIAL SUB SYSTEM
   - AIP - AUXILIARY INPUT-OUTPUT & CALIBRATION PANEL
   - OPT - OPTICS
   - TPA - TEST POINT ADAPTER
   - I/P - INPUT
   - O/P - OUTPUT
7. ALL TPA'S IN THIS DRAWING SHOW ONLY THE AUXILIARY INPUTS. FOR ADDITIONAL DETAIL SEE TPA 1 & 2 MECH. & SERIES 100 TPA.
8. JUMPERS WILL BE USED TO MAKE CONNECTIONS BETWEEN TEST JACKS.
9. SHEET LAYOUT:

BLOCK I	SHEET 1 SHEET 2
BLOCK II	SHEET 1 SHEET 3
LEM	SHEET 1 SHEET 4

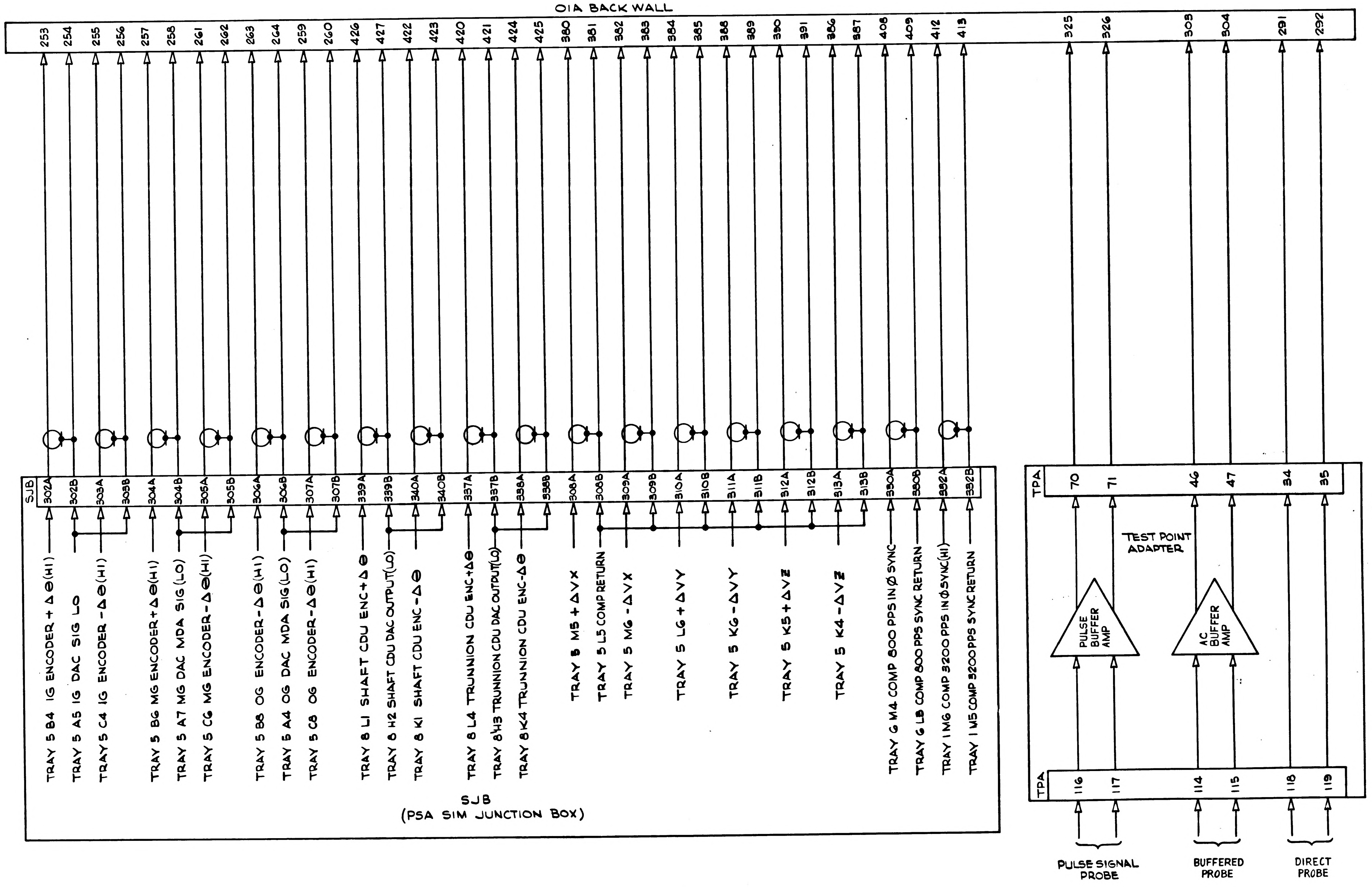
10. DVM IS AUTOMATICALLY PROGRAMED FOR DC. MUST BE MANUALLY PROGRAMED FOR AC.


AIP
CHANNEL 1 CODE SELECT
CHANNEL 2 CODE SELECT
CHANNEL 3 CODE SELECT
CHANNEL 4 CODE SELECT
CHANNEL 5 CODE SELECT
CHANNEL 6 SELECT
AUX REF SEL
800 ~ ISS
800 ~ OSS
3200 ~
800 ~ OPT
CH 1 AC IN
CH 2 AC IN
HI
LO
A/B BUFF INPUTS
GSE BUFF INPUTS
GSE CAL
MPL 1656
LOAD
NOR
GSE
CAL
CAL PULSES
SCOPE 'A' TRIG IN
SIG GEN OUT
3200 ~ VAR Ø
800 ~ VAR Ø
3200 ~ 90° ± ½° FIXED Ø SHIFTER
800 ~ 90° ± ½° FIXED Ø SHIFTER
270°
90°
10:1 ATTENUATOR
QUAD 3200 ~
QUAD 800 ~
800 ~ ISS OR GSE
800 ~ OSS OR GSE
3200 ~ ISS OR GSE
CMS
+IG CDU HI
+IG CDU LO
-IG CDU HI
-IG CDU LO
+MG CDU HI
+MG CDU LO
-MG CDU HI
-MG CDU LO
+OG CDU HI
+OG CDU LO
-OG CDU HI
-OG CDU LO
+Y OPT HI
+Y OPT LO
-Y OPT HI
-Y OPT LO
+X OPT HI
+X OPT LO
-X OPT HI
-X OPT LO
X PIPA +ΔV/P PULSE
X PIPA -ΔV/N PULSE
Y PIPA +ΔV/P PULSE
Y PIPA -ΔV/N PULSE
Z PIPA +ΔV/P PULSE
Z PIPA -ΔV/N PULSE
OIA BACKWALL

2900211

1/2900211

REVISIONS 1925-					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APP'D
A		REVISED PER TDRR 21914		31 AUG 65	LK
B		REVISION STATUS CHANGED		2 SEP 65	RwB MtM

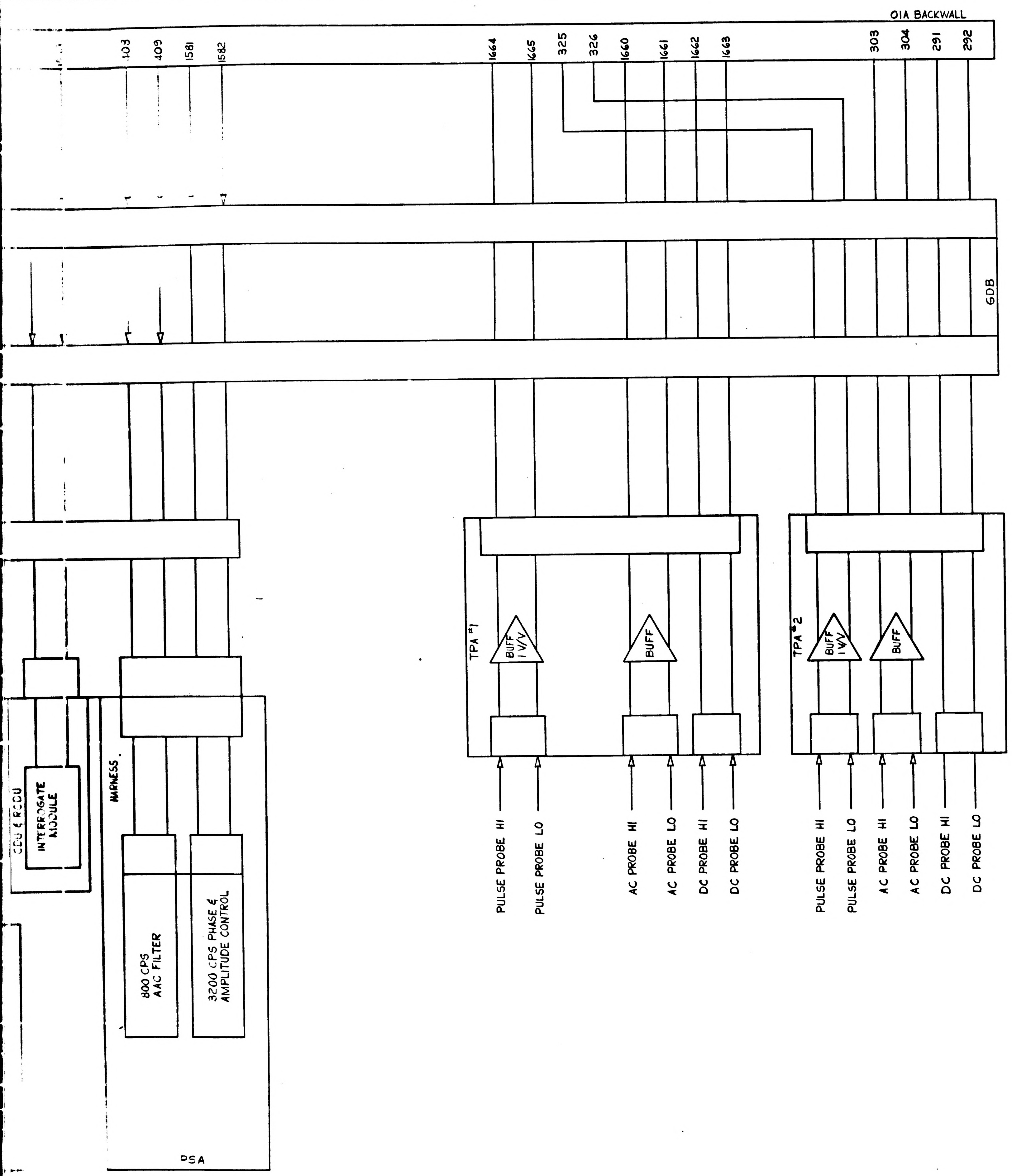


OIA BACK WALL
253
254
255
256
257
258
261
262
263
264
259
260
426
427
422
423
420
421
424
425
380
381
382
383
384
385
388
389
390
391
386
387
408
409
412
413
325
326
305
304
291
292
SJB
302A
302B
303A
303B
304A
304B
305A
305B
306A
306B
307A
307B
339A
339B
340A
340B
337A
337B
338A
338B
308A
308B
309A
309B
310A
310B
311A
311B
312A
312B
313A
313B
330A
330B
332A
332B
TRAY 5 B4 IG ENCODER + Δθ(HI)
TRAY 5 A5 IG DAC SIG LO
TRAY 5 C4 IG ENCODER - Δθ(HI)
TRAY 5 B6 MG ENCODER + Δθ(HI)
TRAY 5 A7 MG DAC MDA SIG (LO)
TRAY 5 C6 MG ENCODER - Δθ(HI)
TRAY 5 B8 OG ENCODER - Δθ(HI)
TRAY 5 A4 OG DAC MDA SIG (LO)
TRAY 5 C8 OG ENCODER - Δθ(HI)
TRAY 8 L1 SHAFT CDU ENC + Δθ
TRAY 8 H2 SHAFT CDU DAC OUTPUT(LO)
TRAY 8 K1 SHAFT CDU ENC - Δθ
TRAY 8 L4 TRUNNION CDU ENC + Δθ
TRAY 8 H3 TRUNNION CDU DAC OUTPUT(LO)
TRAY 8 K4 TRUNNION CDU ENC - Δθ
TRAY 5 M5 + ΔVX
TRAY 5 L5 COMP RETURN
TRAY 5 M6 - ΔVX
TRAY 5 L6 + ΔVY
TRAY 5 K6 - ΔVY
TRAY 5 K5 + ΔVZ
TRAY 5 K4 - ΔVZ
TRAY 6 M4 COMP 800 PPS IN Ø SYNC
TRAY 6 L8 COMP 800 PPS SYNC RETURN
TRAY 1 M6 COMP 3200 PPS IN Ø SYNC(HI)
TRAY 1 M5 COMP 3200 PPS SYNC RETURN
SJB
(PSA SIM JUNCTION BOX)
TPA
70
71
46
47
34
35
TEST POINT ADAPTER
PULSE BUFFER AMP
AC BUFFER AMP
TPA
116
117
114
115
118
119
PULSE SIGNAL PROBE
BUFFERED PROBE
DIRECT PROBE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES +— +— +— -— -— -—	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN 10-APR-65 DATE CHECKED Ed Foster 18 MAY 65 APPROVAL M. Cavalier 19 May 65 APPROVAL M. Watson	MECHANIZATION DIAGRAM AUXILIARY INPUT-OUTPUT (BLOCK I SERIES 100)
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 | SIZE E | 2900211
CONTRACT NAS9-497	MIT APPROVAL W Kupfer 20 May 65	SCALE NONE | SHEET 2 OF 2

B 2900211 B

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		AUG 65	
B		REVISION STATUS CHANGED		2 SEP 65	



OIA BACKWALL
103
409
1581
1582
1664
1665
325
326
1660
1661
1662
1663
303
304
291
292
GDB
TPA #1
BUFF 1 V/V
BUFF
TPA #2
BUFF 1 V/V
BUFF
PULSE PROBE HI
PULSE PROBE LO
AC PROBE HI
AC PROBE LO
DC PROBE HI
DC PROBE LO
PULSE PROBE HI
PULSE PROBE LO
AC PROBE HI
AC PROBE LO
DC PROBE HI
DC PROBE LO
CDU & RCDU
INTERROGATE MODULE
HARNESS
800 CPS AAC FILTER
3200 CPS PHASE & AMPLITUDE CONTROL
PSA

2H

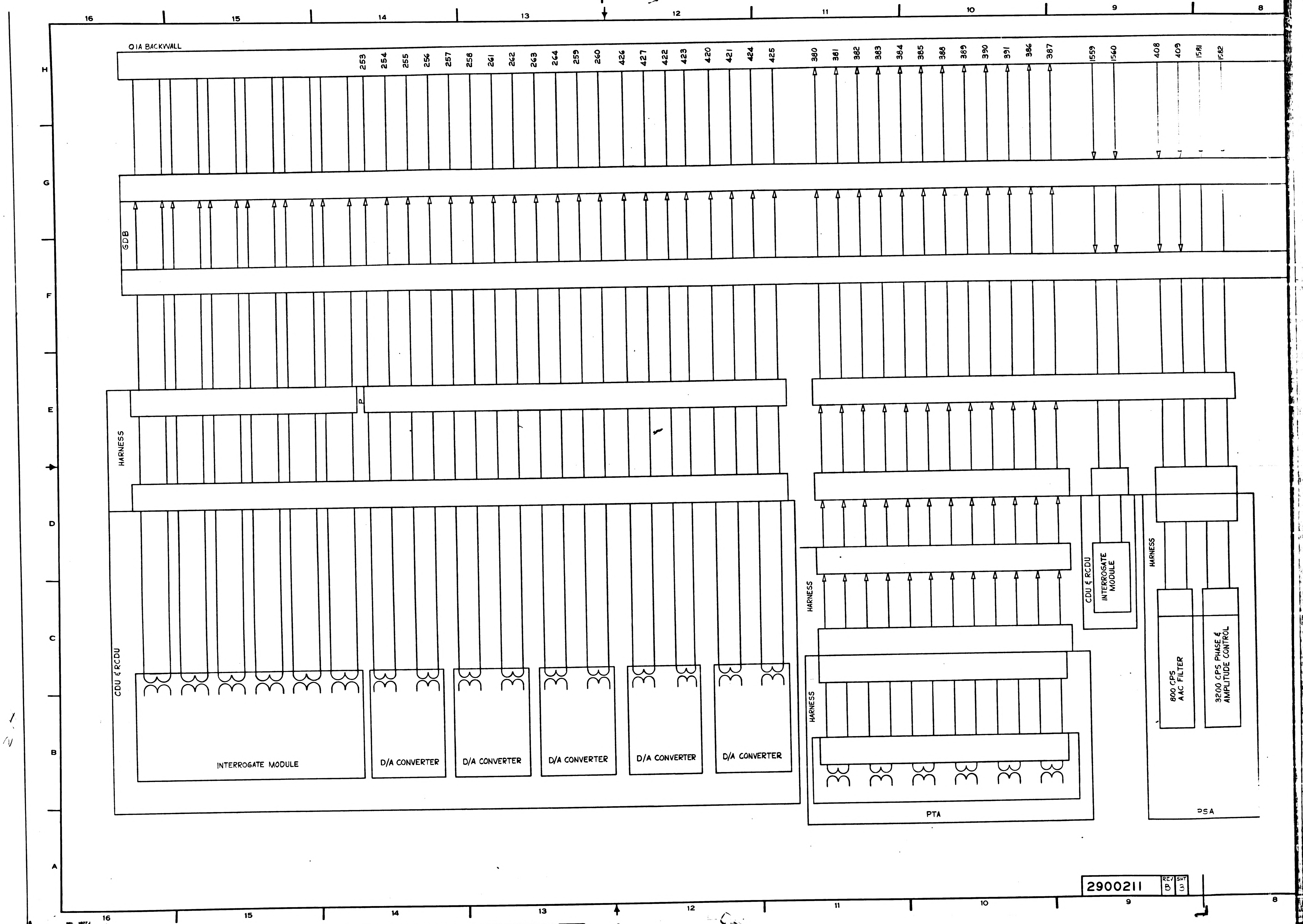
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ___
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Schwab DATE 14 MAY 65
CHECKED Ed Foster 18 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM –
AUXILIARY INPUT-OUTPUT
(BLOCK II)

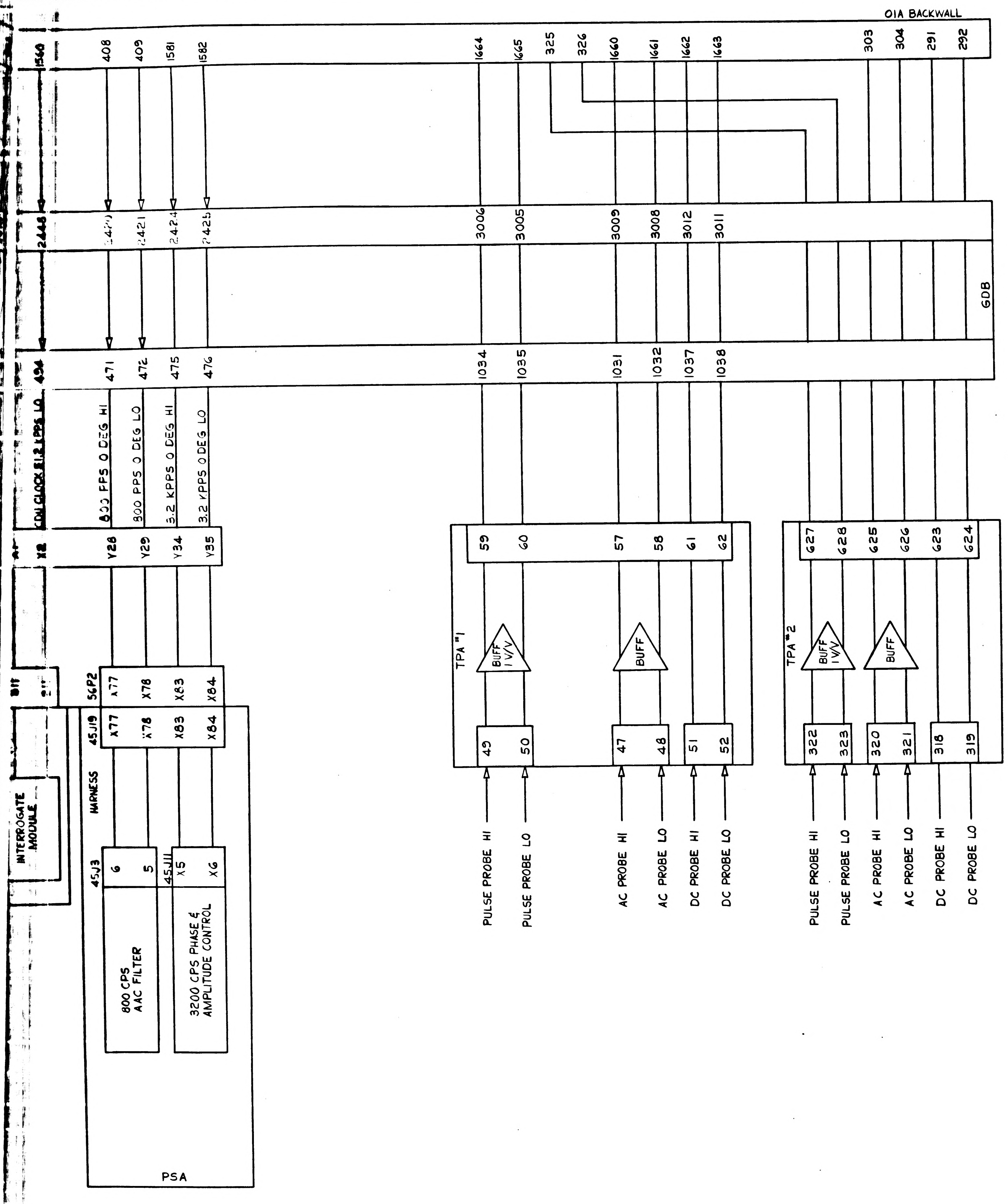
CODE IDENT NO 99974
SIZE J2
2900211
SCALE NONE
SHEET 3 OF 4



16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
253
254
255
256
257
258
261
262
263
264
259
260
426
427
422
423
420
421
424
425
380
381
382
383
384
385
388
389
390
391
386
387
1559
1560
408
409
1581
1582
GDB
P
HARNESS
CDU & RCDU
INTERROGATE MODULE
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
HARNESS
HARNESS
PTA
CDU & RCDU
INTERROGATE MODULE
HARNESS
800 CPS AAC FILTER
3200 CPS PHASE & AMPLITUDE CONTROL
PSA
2900211
REV B
SHT 3

1/2900211

REVISIONS 1925-					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED			
B		REVISION STATUS CHANGED		2 SEP 65	



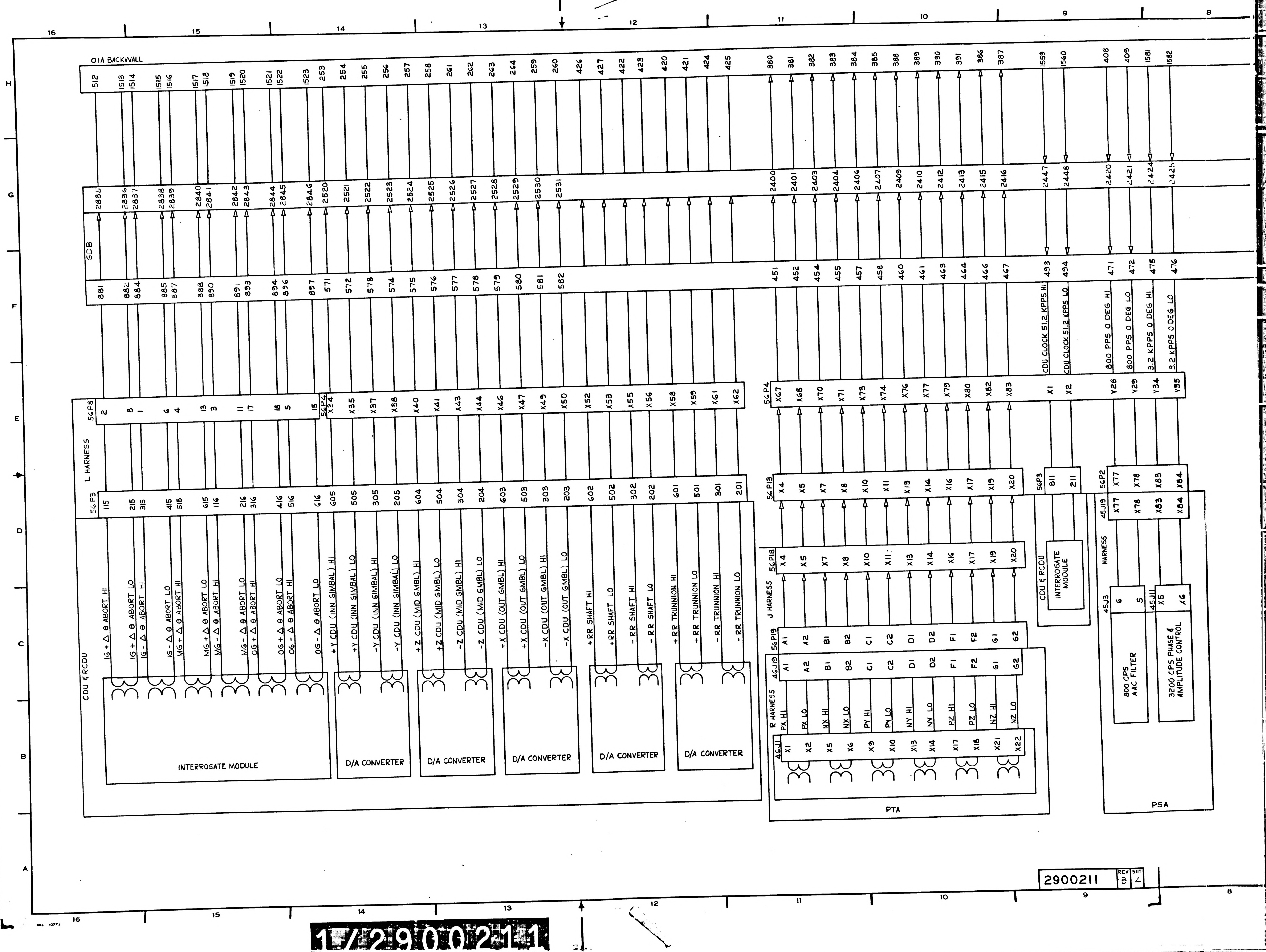
01A BACKWALL
1560
408
409
1581
1582
1664
1665
325
326
1660
1661
1662
1663
303
304
291
292
2448
2420
2421
2424
2425
3006
3005
3009
3008
3012
3011
GDB
494
471
472
475
476
1034
1035
1031
1032
1037
1038
CDU CLOCK 51.2 KPPS LO
800 PPS 0 DEG HI
800 PPS 0 DEG LO
3.2 KPPS 0 DEG HI
3.2 KPPS 0 DEG LO
X2
Y28
Y29
Y34
Y35
TPA #1
59
60
57
58
61
62
BUFF 1V/V
BUFF
49
50
47
48
51
52
TPA #2
627
628
625
626
623
624
BUFF 1V/V
BUFF
322
323
320
321
318
319
PULSE PROBE HI
PULSE PROBE LO
AC PROBE HI
AC PROBE LO
DC PROBE HI
DC PROBE LO
PULSE PROBE HI
PULSE PROBE LO
AC PROBE HI
AC PROBE LO
DC PROBE HI
DC PROBE LO
B11
56P2
X77
X78
X83
X84
45J19
X77
X78
X83
X84
HARNESS
INTERROGATE MODULE
45J3
6
5
45J11
X5
X6
800 CPS AAC FILTER
3200 CPS PHASE & AMPLITUDE CONTROL
PSA

H2

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ___ ± ___ ± ___	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
	ACSP PN DRAWN R. Schwabe DATE 14 MAY 65 CHECKED Ed Foster 18 MAY 65 APPROVAL M Carden 18 MAY 65 APPROVAL J. M. Watson	MECHANIZATION DIAGRAM — AUXILIARY INPUT-OUTPUT (LEM)
DO NOT SCALE THIS DRAWING MATERIAL ———	NASA APPROVAL	CODE IDENT NO 99974 · SIZE J2 · 2900211
CONTRACT NAS9-497	MIT APPROVAL 20 May 65	SCALE NONE · SHEET 2 OF 2

900211 REV B SHT 2

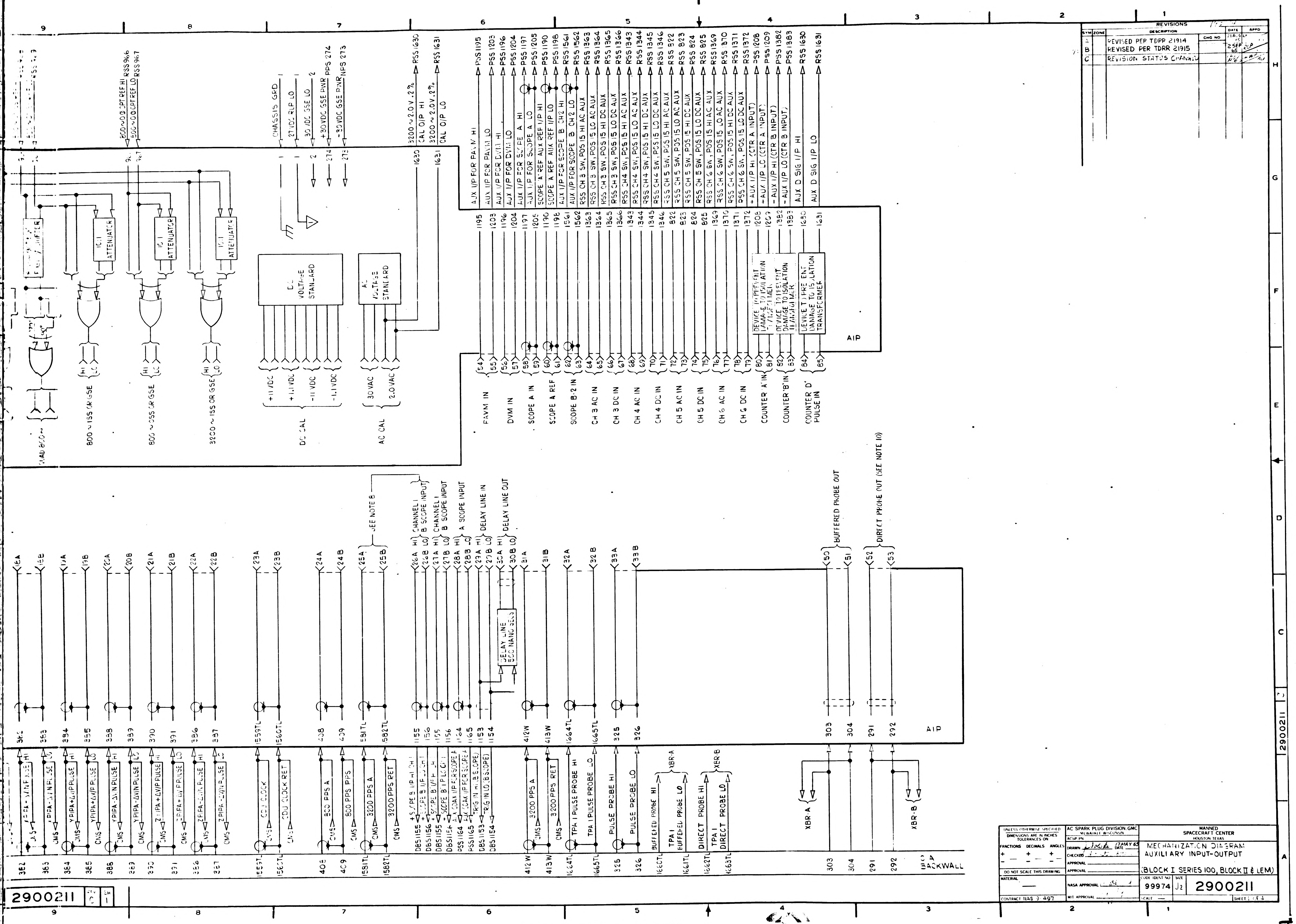
272900211


OIA BACKWALL
GDB
L HARNESS
56P3
56P4
56P13
56P2
56P18
56P19
46J19
46J1
45J19
45J3
45J11
J HARNESS
R HARNESS
HARNESS
CDU & RCDU
INTERROGATE MODULE
D/A CONVERTER
PTA
PSA
IG + Δ θ ABORT HI
IG + Δ θ ABORT LO
IG - Δ θ ABORT HI
IG - Δ θ ABORT LO
MG + Δ θ ABORT HI
MG + Δ θ ABORT LO
MG - Δ θ ABORT HI
MG - Δ θ ABORT LO
OG + Δ θ ABORT HI
OG + Δ θ ABORT LO
OG - Δ θ ABORT HI
OG - Δ θ ABORT LO
+Y CDU (INN GIMBAL) HI
+Y CDU (INN GIMBAL) LO
-Y CDU (INN GIMBAL) HI
-Y CDU (INN GIMBAL) LO
+Z CDU (MID GMBL) HI
+Z CDU (MID GMBL) LO
-Z CDU (MID GMBL) HI
-Z CDU (MID GMBL) LO
+X CDU (OUT GMBL) HI
+X CDU (OUT GMBL) LO
-X CDU (OUT GMBL) HI
-X CDU (OUT GMBL) LO
+RR SHAFT HI
+RR SHAFT LO
-RR SHAFT HI
-RR SHAFT LO
+RR TRUNNION HI
+RR TRUNNION LO
-RR TRUNNION HI
-RR TRUNNION LO
CDU CLOCK 51.2 KPPS HI
CDU CLOCK 51.2 KPPS LO
800 PPS 0 DEG HI
800 PPS 0 DEG LO
3.2 KPPS 0 DEG HI
3.2 KPPS 0 DEG LO
PX HI
PX LO
NX HI
NX LO
PY HI
PY LO
NY HI
NY LO
PZ HI
PZ LO
NZ HI
NZ LO
800 CPS AAC FILTER
3200 CPS PHASE & AMPLITUDE CONTROL
1512 1513 1514 1515 1516 1517 1518 1519 1520 1521 1522 1523 253 254 255 256 257 258 261 262 263 264 259 260 426 427 422 423 420 421 424 425
380 381 382 383 384 385 388 389 390 391 386 387 1559 1560 408 409 1581 1582
2835 2836 2837 2838 2839 2840 2841 2842 2843 2844 2845 2846 2520 2521 2522 2523 2524 2525 2526 2527 2528 2529 2530 2531
2400 2401 2403 2404 2406 2407 2409 2410 2412 2413 2415 2416 2447 2448 2420 2421 2424 2424
881 882 884 885 887 888 890 891 893 894 896 897 571 572 573 574 575 576 577 578 579 580 581 582
451 452 454 455 457 458 460 461 463 464 466 467 493 494 471 472 475 476
2 8 1 6 4 13 3 11 17 18 5 15
X34 X35 X37 X38 X40 X41 X43 X44 X46 X47 X49 X50 X52 X53 X55 X56 X58 X59 X61 X62
X67 X68 X70 X71 X73 X74 X76 X77 X79 X80 X82 X83 X1 X2 Y28 Y29 Y34 Y35
115 215 315 415 515 615 116 216 316 416 516 616 605 505 305 205 604 504 304 204 603 503 303 203 602 502 302 202 601 501 301 201
X4 X5 X7 X8 X10 X11 X13 X14 X16 X17 X19 X20
311 211
X77 X78 X83 X84
A1 A2 B1 B2 C1 C2 D1 D2 F1 F2 G1 G2
X1 X2 X5 X6 X9 X10 X13 X14 X17 X18 X21 X22
6 5 X5 X6
16 15 14 13 12 11 10 9 8
H G F E D C B A

2900211 REV B SHT 4

1/2900211

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDPR 21914		31 AUG 65	LP
B		REVISED PER TDRR 21915		2 SEP 65	RLP
C		REVISION STATUS CHANGED		12 NOV 65	



800~0 OPT REF HI RSS 966
800~0 OPT REF LO RSS 967
CHASSIS GRD
27 VDC RLP LO
30 VDC GSE LO
+30VDC GSE PWR PPS 274
-30VDC GSE PWR NPS 273
3200~2.0V .2% CAL O/P HI RSS 1630
3200~2.0V .2% CAL O/P LO RSS 1631
10:1 ATTENUATOR
DC VOLTAGE STANDARD
AC VOLTAGE STANDARD
HI
LO
LOAD 800~
800~ISS OR GSE
800~ISS OR GSE
3200~ISS OR GSE
+11 VDC
+1.1 VDC
-11 VDC
-1.1 VDC
DC CAL
30 VAC
2.0 VAC
AC CAL
AUX I/P FOR PAVM HI PSS 1195
AUX I/P FOR PAVM LO PSS 1203
AUX I/P FOR DVM HI PSS 1196
AUX I/P FOR DVM LO PSS 1204
AUX I/P FOR SCOPE A HI PSS 1197
AUX I/P FOR SCOPE A LO PSS 1205
SCOPE A REF AUX REF I/P HI PSS 1190
SCOPE A REF AUX REF I/P LO PSS 1198
AUX I/P FOR SCOPE B CH 2 HI RSS 1561
AUX I/P FOR SCOPE B CH 2 LO RSS 1562
RSS CH 3 SW, POS 15 HI AC AUX RSS 1363
RSS CH 3 SW, POS 15 LO AC AUX RSS 1364
RSS CH 3 SW, POS 15 HI DC AUX RSS 1365
RSS CH 3 SW, POS 15 LO DC AUX RSS 1366
RSS CH 4 SW, POS 15 HI AC AUX RSS 1343
RSS CH 4 SW, POS 15 LO AC AUX RSS 1344
RSS CH 4 SW, POS 15 HI DC AUX RSS 1345
RSS CH 4 SW, POS 15 LO DC AUX RSS 1346
RSS CH 5 SW, POS 15 HI AC AUX RSS 822
RSS CH 5 SW, POS 15 LO AC AUX RSS 823
RSS CH 5 SW, POS 15 HI DC AUX RSS 824
RSS CH 5 SW, POS 15 LO DC AUX RSS 825
RSS CH 6 SW, POS 15 HI AC AUX RSS 1369
RSS CH 6 SW, POS 15 LO AC AUX RSS 1370
RSS CH 6 SW, POS 15 HI DC AUX RSS 1371
RSS CH 6 SW, POS 15 LO DC AUX RSS 1372
+AUX I/P HI (CTR A INPUT) PSS 1208
-AUX I/P LO (CTR A INPUT) PSS 1209
+AUX I/P HI (CTR B INPUT) PSS 1382
-AUX I/P LO (CTR B INPUT) PSS 1383
AUX D SIG I/P HI RSS 1630
AUX D SIG I/P LO RSS 1631
DEVICE TO PREVENT DAMAGE TO ISOLATION TRANSFORMER
DEVICE TO PREVENT DAMAGE TO ISOLATION TRANSFORMER
DEVICE TO PREVENT DAMAGE TO ISOLATION TRANSFORMER
AIP
PAVM IN
DVM IN
SCOPE A IN
SCOPE A REF
SCOPE B-2 IN
CH 3 AC IN
CH 3 DC IN
CH 4 AC IN
CH 4 DC IN
CH 5 AC IN
CH 5 DC IN
CH 6 AC IN
CH 6 DC IN
COUNTER 'A' IN
COUNTER 'B' IN
COUNTER 'D' PULSE IN
SEE NOTE 8
CHANNEL I B SCOPE INPUT
CHANNEL I B SCOPE INPUT
A SCOPE INPUT
DELAY LINE IN
DELAY LINE OUT
DELAY LINE 500 NANO SECS
BUFFERED PROBE OUT
DIRECT PROBE OUT (SEE NOTE 10)
AIP
X PIPA +ΔV I/P PULSE
X PIPA -ΔV I/P PULSE
Y PIPA +ΔV I/P PULSE
Y PIPA -ΔV I/P PULSE
Z PIPA +ΔV I/P PULSE
Z PIPA -ΔV I/P PULSE
CDU CLOCK
CDU CLOCK RET
800 PPS A
800 PPS PPS
3200 PPS A
3200 PPS RET
3200 PPS A
3200 PPS RET
TPA I PULSE PROBE HI
TPA I PULSE PROBE LO
PULSE PROBE HI
PULSE PROBE LO
BUFFERED PROBE HI
TPA I BUFFERED PROBE LO
XBR-A
DIRECT PROBE HI
TPA I DIRECT PROBE LO
XBR-B
XBR-A
XBR-B
CMS
I/O A BACKWALL

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Jolske DATE 17 MAY 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
AUXILIARY INPUT-OUTPUT
(BLOCK I SERIES 100, BLOCK II & LEM)

CODE IDENT NO 99974 SIZE J2 2900211
SCALE — SHEET 1 OF 4

2900211 C 1

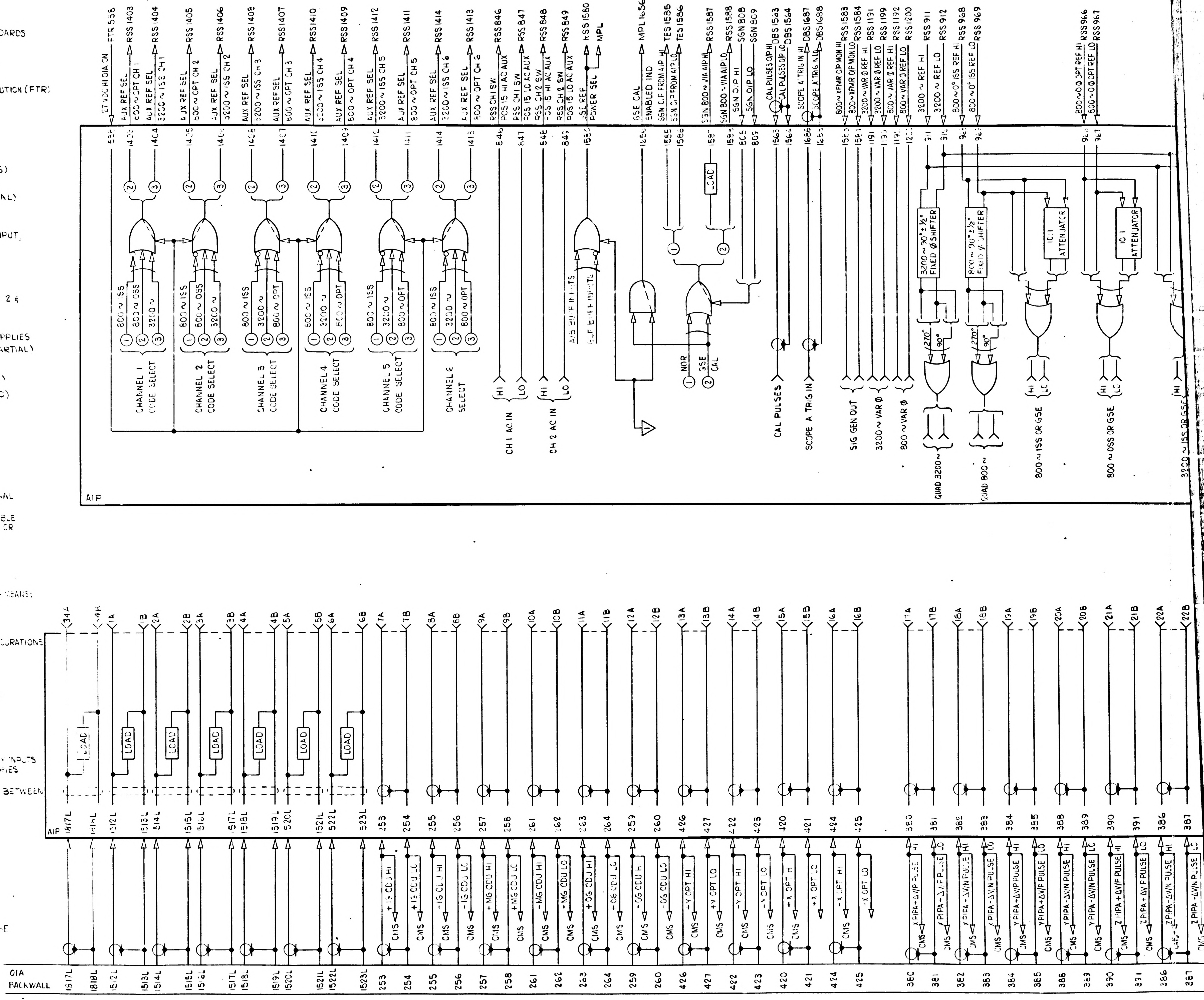
PH I
S800511

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806
3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM):
   - 2900210 AC POWER PROTECTION & POWER DISTRIBUTION (FTR)
     - PPS + 30 VDC POWER SUPPLY
     - NPS - 30 VDC POWER SUPPLY
     - TEST SELECTOR PANEL (TES)
     - SGN SIGNAL GENERATOR
   - 2900207 MONITOR PANEL (MPL)
   - 2900209 COMPUTER SIMULATOR INTERFACE (CMS)
   - 2900217 SIGNAL SELECTION & MEASUREMENT
     - PSS PRIMARY SIGNAL SELECTION (PARTIAL)
     - XBR-A AC SIGNALS TO CROSSBAR
     - XBR-B DC SIGNALS TO CROSSBAR
     - DBS DUAL BEAM SCOPE "A" INPUT & "B" INPUT, CHANNEL I, WITH TRIGGER LOGIC.
     - PVAM PHASE ANGLE VOLTMETER
     - DVM DIGITAL VOLTMETER
   - 2900218 OSCILLOGRAPH SIGNAL SELECTION
     - DBS DUAL BEAM SCOPE - "B" INPUT CHANNEL 2 & REF LOGIC FOR "B" INPUT
     - RSS OSCILLOGRAPH SIGNAL SELECTOR
   - 2900215 MEASUREMENT REFERENCE POWER SUPPLIES
     - RSS OSCILLOGRAPH SIGNAL SELECTOR (PARTIAL)
   - 2900219 COUNTER SIGNAL SELECTION
     - PSS PRIMARY SIGNAL SELECTOR (PARTIAL)
     - GSE GROUNDING (BLOCK I SERIES 100)
     - GSE GROUNDING (BLOCK II & LEM)
     - TPA-1 & TPA-2
4. NONSTANDARD SYMBOLS
   - INDICATES AND GATE WITH SWITCHED SIGNAL
   - INDICATES EXCLUSIVE OR GATE WITH ENABLE SIGNAL SWITCHED THROUGH POSITION 1 OR NOT SWITCHED THROUGH POSITION 2.
     ENABLE
   - (NO) INDICATES SWITCH POSITION
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEANS:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G/N CONFIGURATIONS
   - E. TW, TL OR WL - USED IN MORE THAN ONE G/N CONFIGURATIONS AS SHOWN
6. ABBREVIATIONS
   - OIA - OPTICS-INERTIAL ANALYZER
   - ISS - INERTIAL SUB SYSTEM
   - AIP - AUXILIARY INPUT-OUTPUT & CALIBRATION PANEL
   - OPT - OPTICS
   - TPA - TEST POINT ADAPTER
   - I/P - INPUT
   - O/P - OUTPUT
7. ALL TPA'S IN THIS DRAWING SHOW ONLY THE AUXILIARY INPUTS FOR ADDITIONAL DETAIL SEE TPA 1 & 2 MECH. & SERIES 100 TPA.
8. JUMPERS WILL BE USED TO MAKE CONNECTIONS BETWEEN TEST JACKS.
9. SHEET LAYOUT:

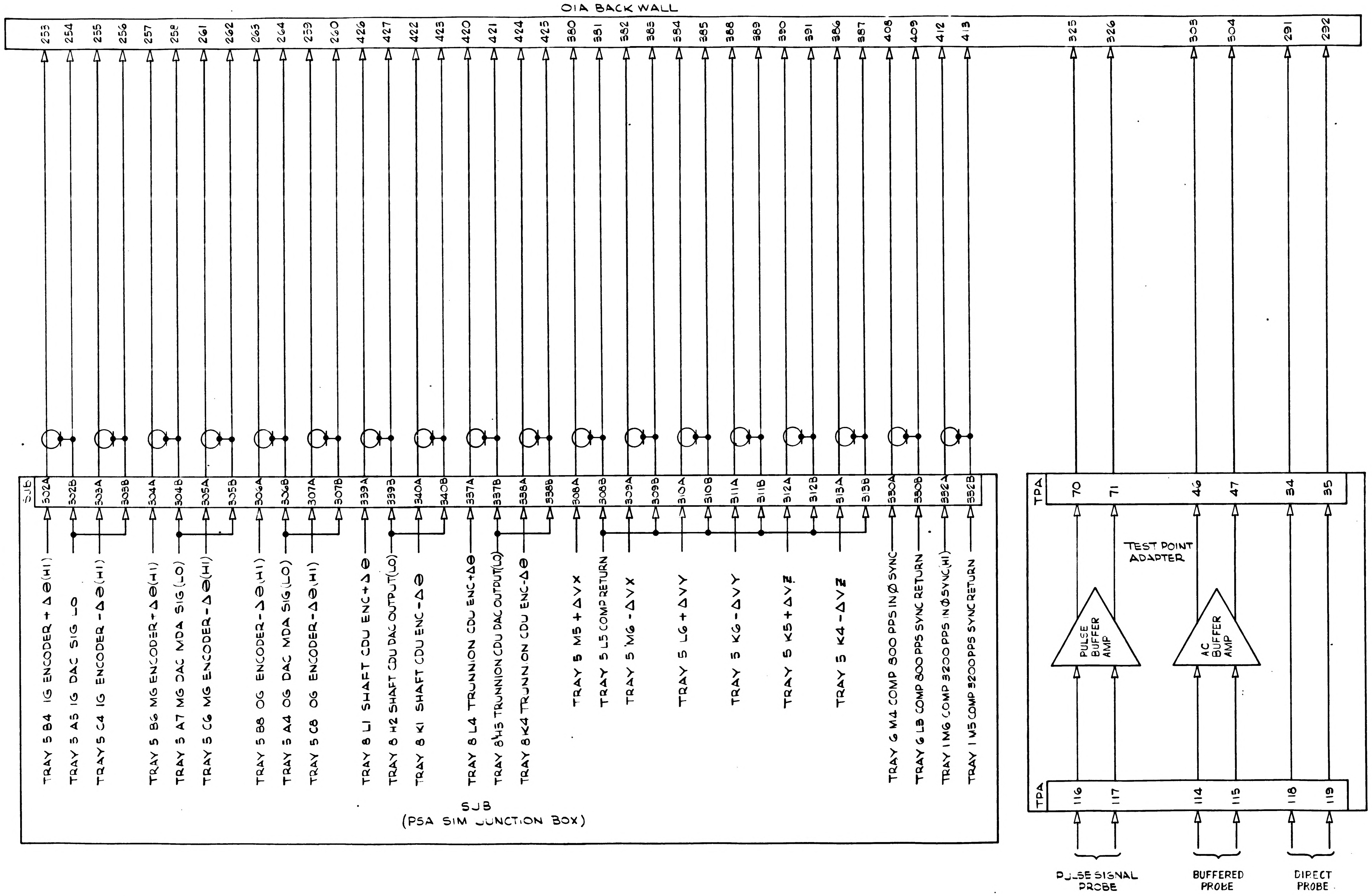
BLOCK I	SHEET 1 SHEET 2
BLOCK II	SHEET 1 SHEET 3
LEM	SHEET 1 SHEET 4

10. DVM IS AUTOMATICALLY PROGRAMED FOR DC, MUST BE MANUALLY PROGRAMED FOR AC.


27 VDC HI OIA ON FTR 558
AUX REF SEL 800~ OPT CH 1 RSS 1403
AUX REF SEL 3200~ ISS CH 1 RSS 1404
AUX REF SEL 800~ OPT CH 2 RSS 1405
AUX REF SEL 3200~ ISS CH 2 RSS 1406
AUX REF SEL 3200~ ISS CH 3 RSS 1408
AUX REF SEL 800~ OPT CH 3 RSS 1407
AUX REF SEL 3200~ ISS CH 4 RSS 1410
AUX REF SEL 800~ OPT CH 4 RSS 1409
AUX REF SEL 3200~ ISS CH 5 RSS 1412
AUX REF SEL 800~ OPT CH 5 RSS 1411
AUX REF SEL 3200~ ISS CH 6 RSS 1414
AUX REF SEL 800~ OPT CH 6 RSS 1413
RSS CH 1 SW POS 15 HI AC AUX RSS 846
RSS CH 1 SW POS 15 LO AC AUX RSS 847
RSS CH 2 SW POS 15 HI AC AUX RSS 848
RSS CH 2 SW POS 15 LO AC AUX RSS 849
GSE REF POWER SEL RSS 1580 MPL
GSE CAL ENABLED IND MPL 1656
SGN O/P FROM AIP HI TES 1585
SGN O/P FROM AIP LO TES 1586
SGN 800~ VIA AIP HI RSS 1587
SGN 800~ VIA AIP LO RSS 1588
SGN O/P HI SGN 808
SGN O/P LO SGN 809
CAL PULSES O/P HI DBS 1563
CAL PULSES O/P LO DBS 1564
SCOPE A TRIG IN HI DBS 1687
SCOPE A TRIG IN LO DBS 1688
800~ XFMR O/P MON HI RSS 1583
800~ XFMR O/P MON LO RSS 1584
3200~ VAR Ø REF HI RSS 1191
3200~ VAR Ø REF LO RSS 1199
800~ VAR Ø REF HI RSS 1192
800~ VAR Ø REF LO RSS 1200
3200~ REF HI RSS 911
3200~ REF LO RSS 912
800~0° ISS REF HI RSS 968
800~0° ISS REF LO RSS 969
800~0 Ø OPT REF HI RSS 966
800~0 Ø OPT REF LO RSS 967
800~ ISS
800~ OSS
3200~
800~ OPT
CHANNEL 1 CODE SELECT
CHANNEL 2 CODE SELECT
CHANNEL 3 CODE SELECT
CHANNEL 4 CODE SELECT
CHANNEL 5 CODE SELECT
CHANNEL 6 SELECT
A/B BUFF INPUTS
GSE BUFF INPUTS
LOAD
NOR
GSE
CAL
HI
LO
CH 1 AC IN
CH 2 AC IN
CAL PULSES
SCOPE A TRIG IN
SIG GEN OUT
3200~ VAR Ø
800~ VAR Ø
3200~90° ± 1/2° FIXED Ø SHIFTER
800~90° ± 1/2° FIXED Ø SHIFTER
270°
90°
10:1 ATTENUATOR
QUAD 3200~
QUAD 800~
800~ ISS OR GSE
800~ OSS OR GSE
3200~ ISS OR GSE
AIP
34A 34B 1A 1B 2A 2B 3A 3B 4A 4B 5A 5B 6A 6B 7A 7B 8A 8B 9A 9B 10A 10B 11A 11B 12A 12B 13A 13B 14A 14B 15A 15B 16A 16B 17A 17B 18A 18B 19A 19B 20A 20B 21A 21B 22A 22B
1817L 1818L 1512L 1513L 1514L 1515L 1516L 1517L 1518L 1519L 1520L 1521L 1522L 1523L 253 254 255 256 257 258 261 262 263 264 259 260 426 427 422 423 420 421 424 425 380 381 382 383 384 385 388 389 390 391 386 387
+IG CDU HI
+IG CDU LO
-IG CDU HI
-IG CDU LO
+MG CDU HI
+MG CDU LO
-MG CDU HI
-MG CDU LO
+OG CDU HI
+OG CDU LO
-OG CDU HI
-OG CDU LO
+Y OPT HI
+Y OPT LO
-Y OPT HI
-Y OPT LO
+X OPT HI
+X OPT LO
-X OPT HI
-X OPT LO
X PIPA +ΔV/P PULSE HI
X PIPA +ΔV/P PULSE LO
X PIPA -ΔV/N PULSE HI
X PIPA -ΔV/N PULSE LO
Y PIPA +ΔV/P PULSE HI
Y PIPA +ΔV/P PULSE LO
Y PIPA -ΔV/N PULSE HI
Y PIPA -ΔV/N PULSE LO
Z PIPA +ΔV/P PULSE HI
Z PIPA +ΔV/P PULSE LO
Z PIPA -ΔV/N PULSE HI
Z PIPA -ΔV/N PULSE LO
CMS
OIA PACKWALL
1517L 1818L 1512L 1513L 1514L 1515L 1516L 1517L 1518L 1519L 1520L 1521L 1522L 1523L 253 254 255 256 257 258 261 262 263 264 259 260 426 427 422 423 420 421 424 425 380 381 382 383 384 385 388 389 390 391 386 387

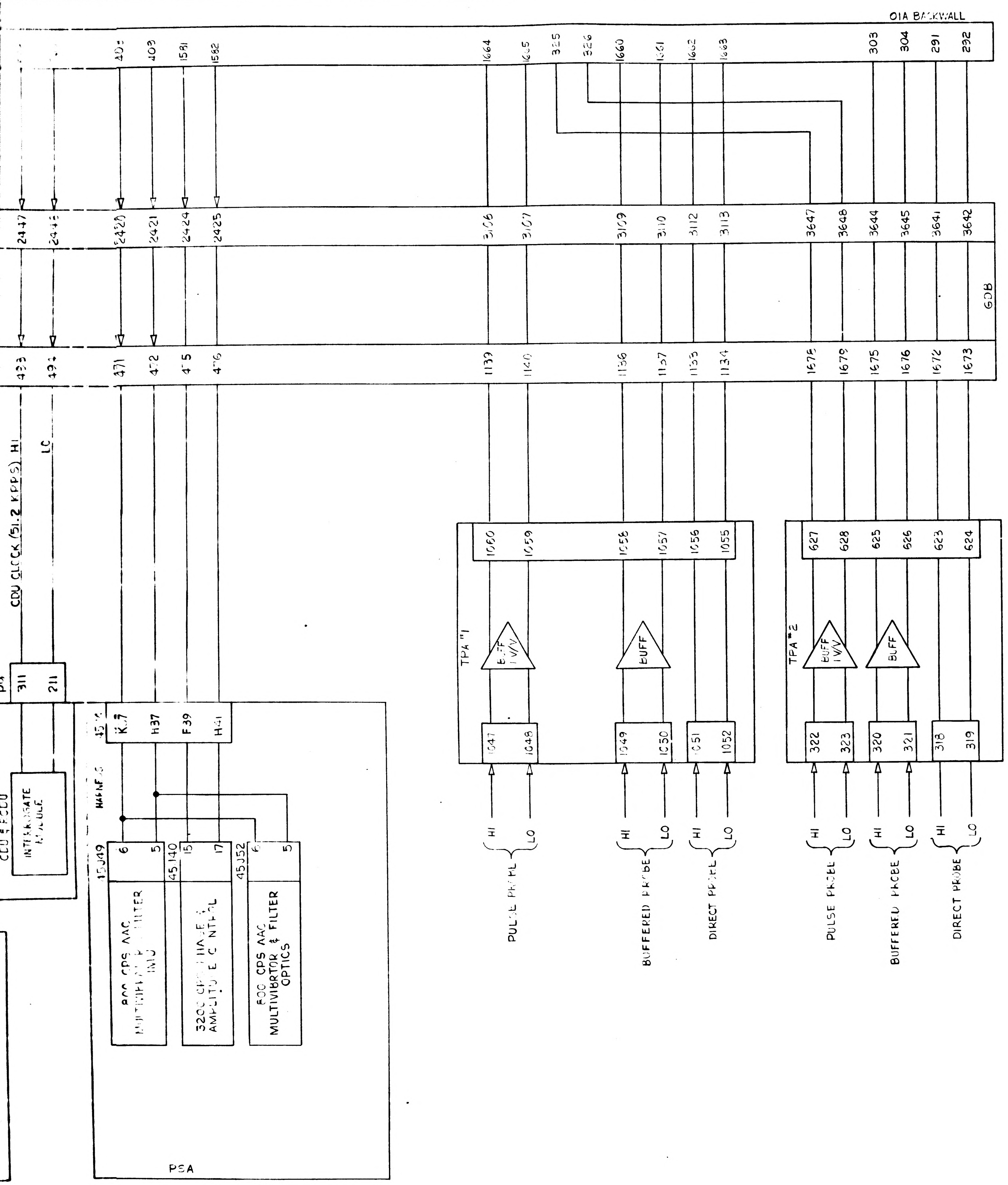
2900211 REV C SH 1

		REVISIONS			
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPR
A		REVISED PEP TDPR 21914		31 AUG 65	LK
B		REVISION STATUS CHANGED		2 SEP 65	RLP
C		REVISION STATUS CHANGED			AU


OIA BACK WALL
253
254
255
256
257
258
261
262
263
264
259
260
426
427
422
423
420
421
424
425
380
381
382
383
384
385
388
389
390
391
386
387
408
409
412
413
325
326
303
304
291
292
SJB
302A
302B
303A
303B
304A
304B
305A
305B
306A
306B
307A
307B
339A
339B
340A
340B
337A
337B
338A
338B
308A
308B
309A
309B
310A
310B
311A
311B
312A
312B
313A
313B
330A
330B
332A
332B
TRAY 5 B4 IG ENCODER + Δθ(HI)
TRAY 5 A5 IG DAC SIG LO
TRAY 5 C4 IG ENCODER - Δθ(HI)
TRAY 5 B6 MG ENCODER + Δθ(HI)
TRAY 5 A7 MG DAC MDA SIG(LO)
TRAY 5 C6 MG ENCODER - Δθ(HI)
TRAY 5 B8 OG ENCODER - Δθ(HI)
TRAY 5 A4 OG DAC MDA SIG(LO)
TRAY 5 C8 OG ENCODER - Δθ(HI)
TRAY 8 L1 SHAFT CDU ENC + Δθ
TRAY 8 H2 SHAFT CDU DAC OUTPUT(LO)
TRAY 8 K1 SHAFT CDU ENC - Δθ
TRAY 8 L4 TRUNNION CDU ENC + Δθ
TRAY 8 H5 TRUNNION CDU DAC OUTPUT(LO)
TRAY 8 K4 TRUNNION CDU ENC - Δθ
TRAY 5 M5 + ΔVX
TRAY 5 L5 COMP RETURN
TRAY 5 M6 - ΔVX
TRAY 5 L6 + ΔVY
TRAY 5 K6 - ΔVY
TRAY 5 K5 + ΔVZ
TRAY 5 K4 - ΔVZ
TRAY 6 M4 COMP 800 PPS IN Ø SYNC
TRAY 6 L8 COMP 800 PPS SYNC RETURN
TRAY 1 M6 COMP 3200 PPS IN Ø SYNC(HI)
TRAY 1 M5 COMP 3200 PPS SYNC RETURN
SJB
(PSA SIM JUNCTION BOX)
TPA
70
71
46
47
54
55
TEST POINT
ADAPTER
PULSE BUFFER AMP
AC BUFFER AMP
TPA
116
117
114
115
118
119
PULSE SIGNAL
PROBE
BUFFERED
PROBE
DIRECT
PROBE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± — ± — ± — DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN ACSP PN DRAWN 10-APR-65 DATE CHECKED Ed Foster 8 MAY 65 APPROVAL APPROVAL	MANNED SPACECRAFT CENTER HOUSTON TEXAS MECHANIZATION DIAGRAM AUXILIARY INPUT-OUTPUT (BLOCK I SERIES 100)
MATERIAL — CONTRACT NAS9-497	NASA APPROVAL MIT APPROVAL	CODE IDENT NO 99974 SIZE E 2900211 SCALE NONE SHEET 2 OF 4

2900211 C


OIA BACKWALL
402
403
1581
1582
1664
1665
325
326
1660
1661
1662
1663
303
304
291
292
2447
2448
2420
2421
2424
2425
3106
3107
3109
3110
3112
3113
3647
3648
3644
3645
3641
3642
GDB
433
434
471
472
475
476
1139
1140
1136
1137
1133
1134
1678
1679
1675
1676
1672
1673
CDU CLOCK (51.2 KPPS) HI
LO
TPA #1
1060
1059
1058
1057
1056
1055
BUFF 1V/V
BUFF
1047
1048
1049
1050
1051
1052
TPA #2
627
628
625
626
623
624
BUFF 1V/V
BUFF
322
323
320
321
318
319
HI
LO
PULSE PROBE
BUFFERED PROBE
DIRECT PROBE
PULSE PROBE
BUFFERED PROBE
DIRECT PROBE
P4
311
211
CDU #FCDU
INTERROGATE MODULE
K17
H37
F39
H41
HARNESS
15049
6
5
45140
15
17
45052
6
5
800 CPS AAC MULTIVIBRATOR & FILTER IMU
3200 CPS PHASE & AMPLITUDE CONTROL
800 CPS AAC MULTIVIBRATOR & FILTER OPTICS
PSA

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		9 AUG 65	
B		REVISION STATUS CHANGED		2 SEP 65	RLP
C		REVISED PER TDRR 23554		2 NOV 65	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN DATE 4 NOV 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

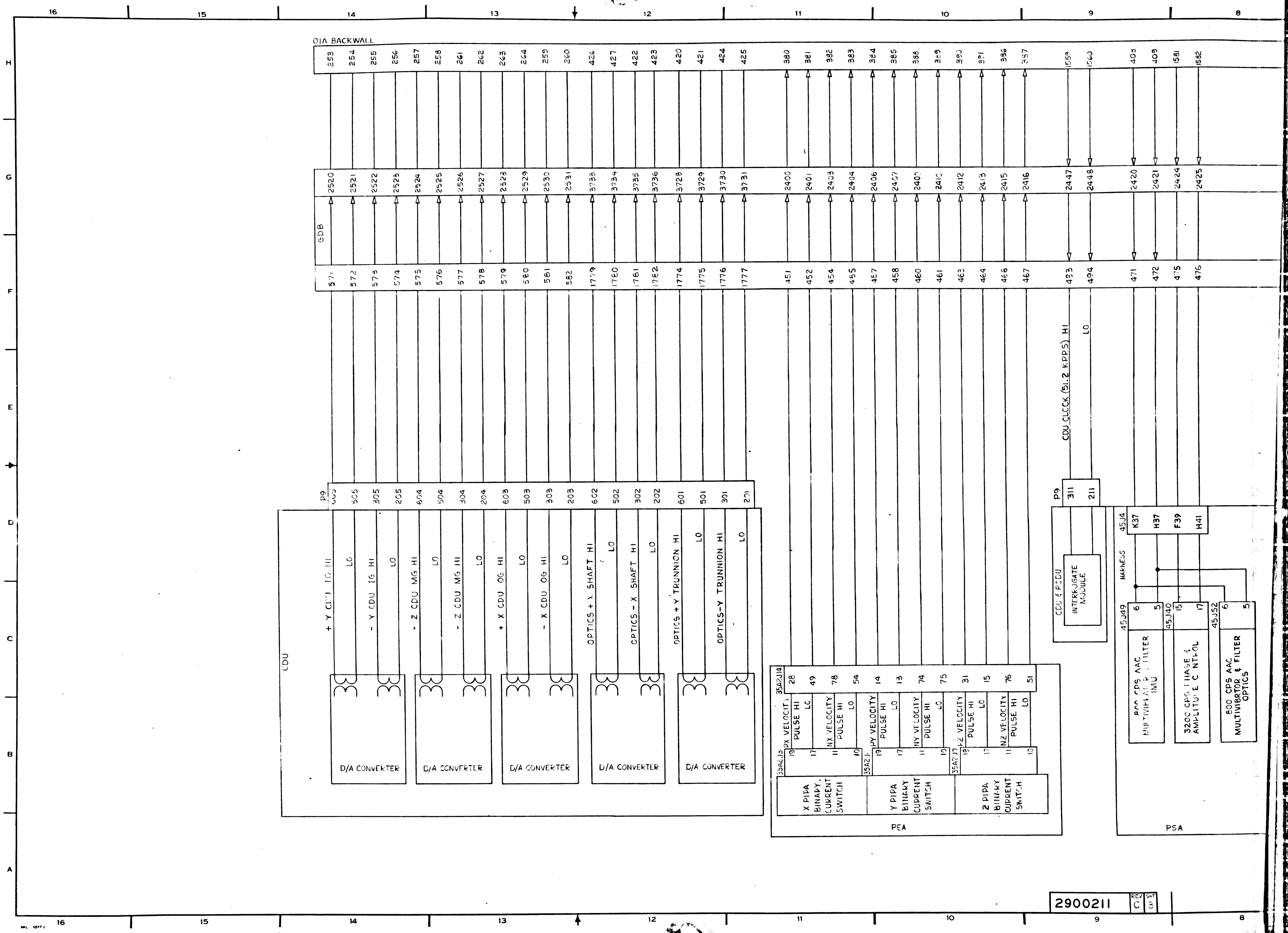
MECHANIZATION DIAGRAM –
AUXILIARY INPUT-OUTPUT
(BLOCK II)

CODE IDENT NO 99974
SIZE J2
2900211
SCALE NONE
SHEET 3 OF 4

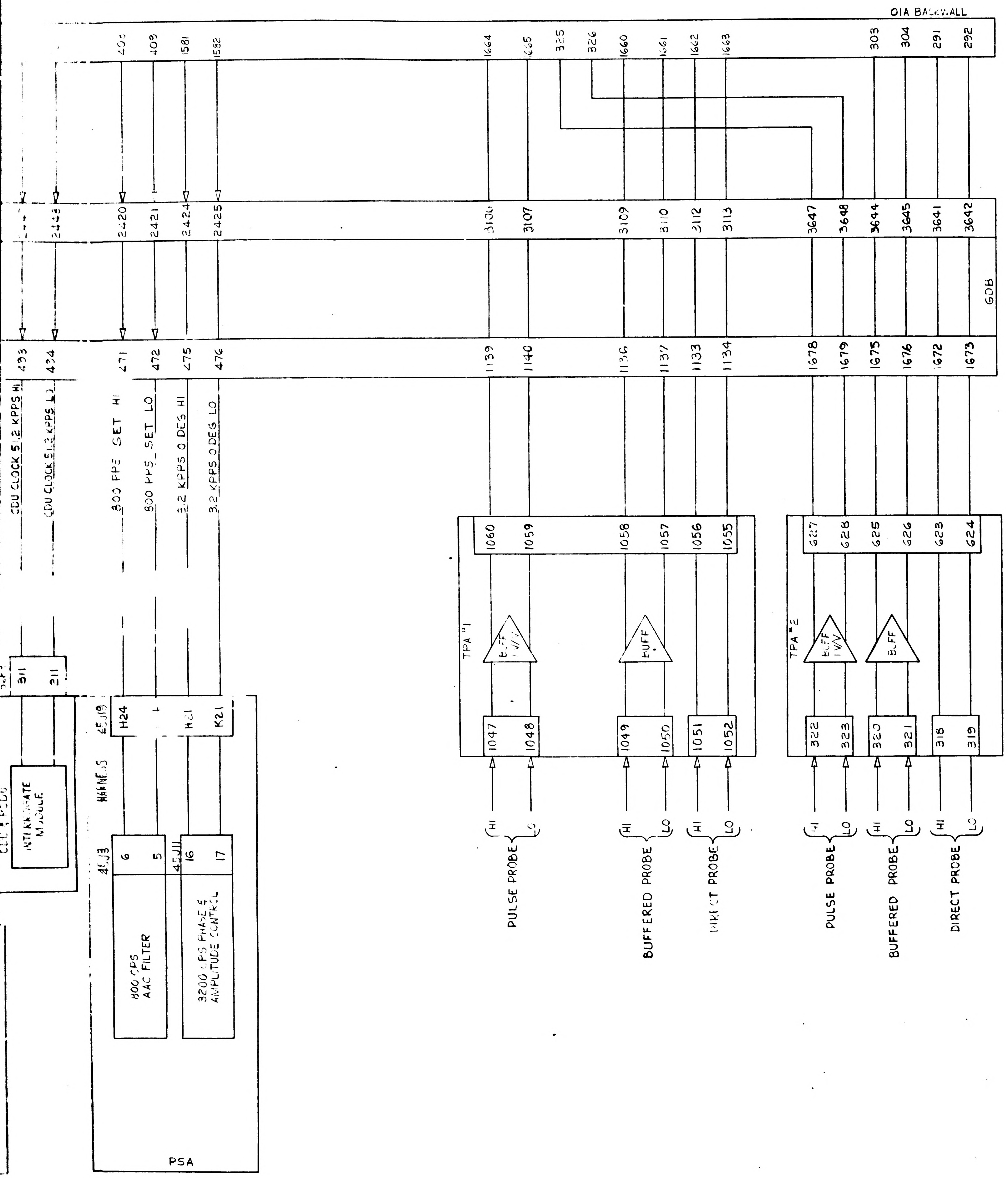
2900211

LH

27-2900211


01A BACKWALL
253 254 255 256 257 258 261 262 263 264 259 260 426 427 422 423 420 421 424 425
380 381 382 383 384 385 388 389 390 391 386 387
1559 1560 408 409 1581 1582
2520 2521 2522 2523 2524 2525 2526 2527 2528 2529 2530 2531 3733 3734 3735 3736 3728 3729 3730 3731
2400 2401 2403 2404 2406 2407 2409 2410 2412 2413 2415 2416
2447 2448 2420 2421 2424 2425
GDB
571 572 573 574 575 576 577 578 579 580 581 582 1759 1760 1761 1762 1774 1775 1776 1777
451 452 454 455 457 458 460 461 463 464 466 467
493 494 471 472 475 476
CDU CLOCK (51.2 KPPS) HI
LO
P9
505 305 205 604 504 304 204 603 503 303 203 602 502 302 202 601 501 301 201
P9 311 211
CDU
+ Y CDU IG HI
LO
- Y CDU IG HI
LO
+ Z CDU MG HI
LO
- Z CDU MG HI
LO
+ X CDU OG HI
LO
- X CDU OG HI
LO
OPTICS + X SHAFT HI
LO
OPTICS - X SHAFT HI
LO
OPTICS + Y TRUNNION HI
LO
OPTICS-Y TRUNNION HI
LO
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
35A2J14
28 49 78 54 14 13 74 75 31 15 76 51
PX VELOCITY PULSE HI LO
NX VELOCITY PULSE HI LO
PY VELOCITY PULSE HI LO
NY VELOCITY PULSE HI LO
PZ VELOCITY PULSE HI LO
NZ VELOCITY PULSE HI LO
35A2J5 19 17 11 10
35A2J 19 17 11 10
35A2J 19 17 11 10
X PIPA BINARY CURRENT SWITCH
Y PIPA BINARY CURRENT SWITCH
Z PIPA BINARY CURRENT SWITCH
PEA
CDU & PCDU
INTERROGATE MODULE
45J4
K37 H37 F39 H41
HARNESS
45J49 6 5
45J40 15 17
45J52 6 5
800 CPS AAC MULTIVIBRATOR & FILTER IMU
3200 CPS PHASE & AMPLITUDE CONTROL
800 CPS AAC MULTIVIBRATOR & FILTER OPTICS
PSA
16 15 14 13 12 11 10 9 8
H G F E D C B A
2900211 REV C SHT 3

1729002111


OIA BACKWALL
403
409
1581
1582
1664
1665
325
326
1660
1661
1662
1663
303
304
291
292
2448
2420
2421
2424
2425
3106
3107
3109
3110
3112
3113
3647
3648
3644
3645
3641
3642
GDB
433
434
471
472
475
476
1139
1140
1136
1137
1133
1134
1678
1679
1675
1676
1672
1673
CDU CLOCK 51.2 KPPS HI
CDU CLOCK 51.2 KPPS LO
800 PPS SET HI
800 PPS SET LO
3.2 KPPS 0 DEG HI
3.2 KPPS 0 DEG LO
1060
1059
1058
1057
1056
1055
627
628
625
626
623
624
TPA #1
BUFF
BUFF
TPA #2
BUFF
BUFF
311
211
45J19
H24
H21
K21
HARNESS
INTEGRATE MODULE
45J3
6
5
45J11
16
17
800 CPS AAC FILTER
3200 CPS PHASE & AMPLITUDE CONTROL
PSA
1047
1048
1049
1050
1051
1052
322
323
320
321
318
319
HI
LO
PULSE PROBE
BUFFERED PROBE
DIRECT PROBE
PULSE PROBE
BUFFERED PROBE
DIRECT PROBE

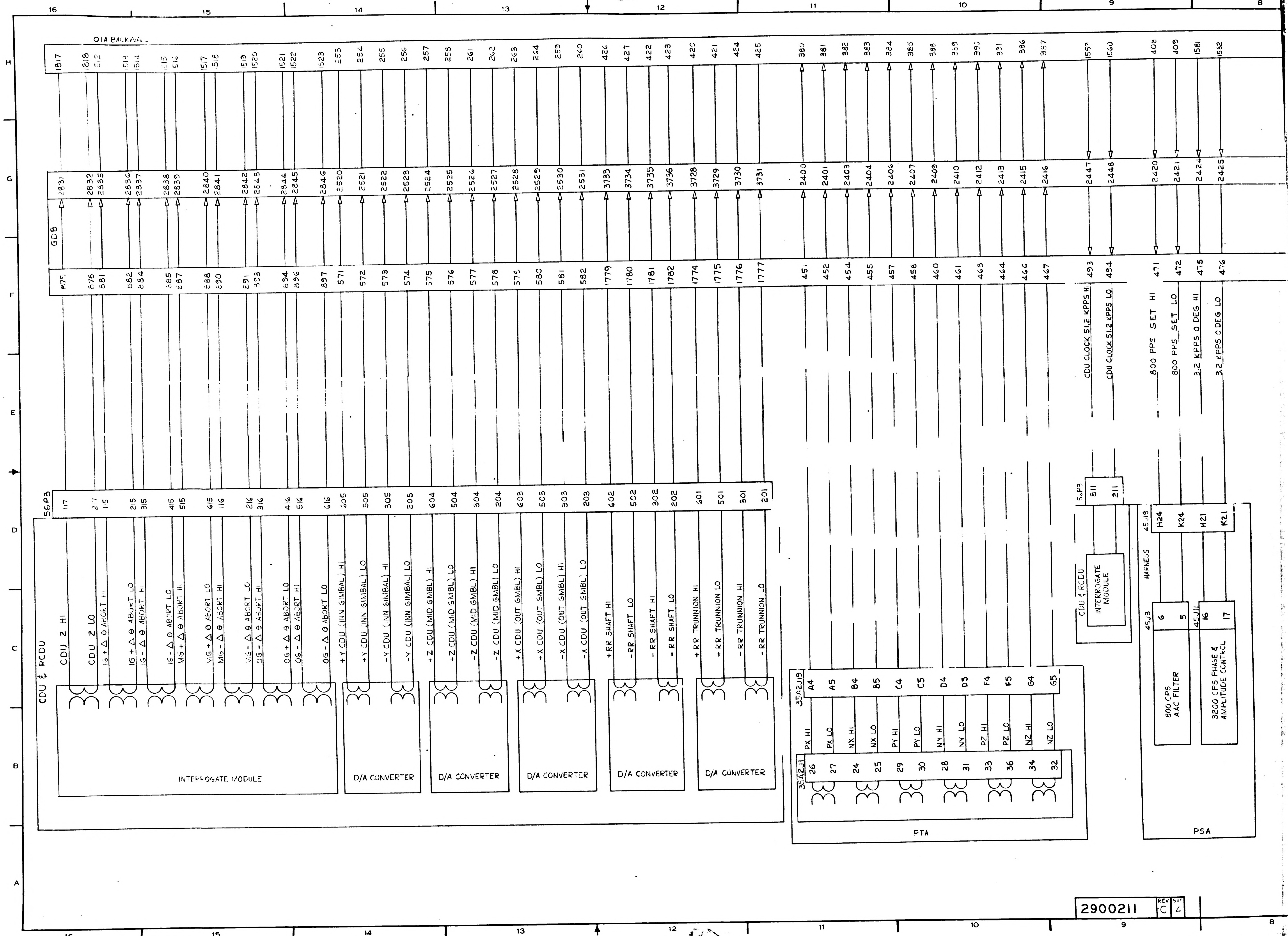
REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		11 AUG 65	LK
B		REVISION STATUS CHANGED		2 SEP 65	KLP
C		REVISED PER TDRR 23554		30 NOV 65	AU

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___ DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION GMC MILWAUKEE WISCONSIN ACSP PN DRAWN DATE 4 MAY 65 CHECKED Ed Foster 18 MAY 65 APPROVAL APPROVAL	MANNED SPACECRAFT CENTER HOUSTON TEXAS MECHANIZATION DIAGRAM — AUXILIARY INPUT-OUTPUT (LEM)
MATERIAL ___ CONTRACT NAS 9-497	NASA APPROVAL MIT APPROVAL	CODE IDENT NO 99974 | SIZE J2 | 2900211 SCALE NONE | SHEET 4 OF 4

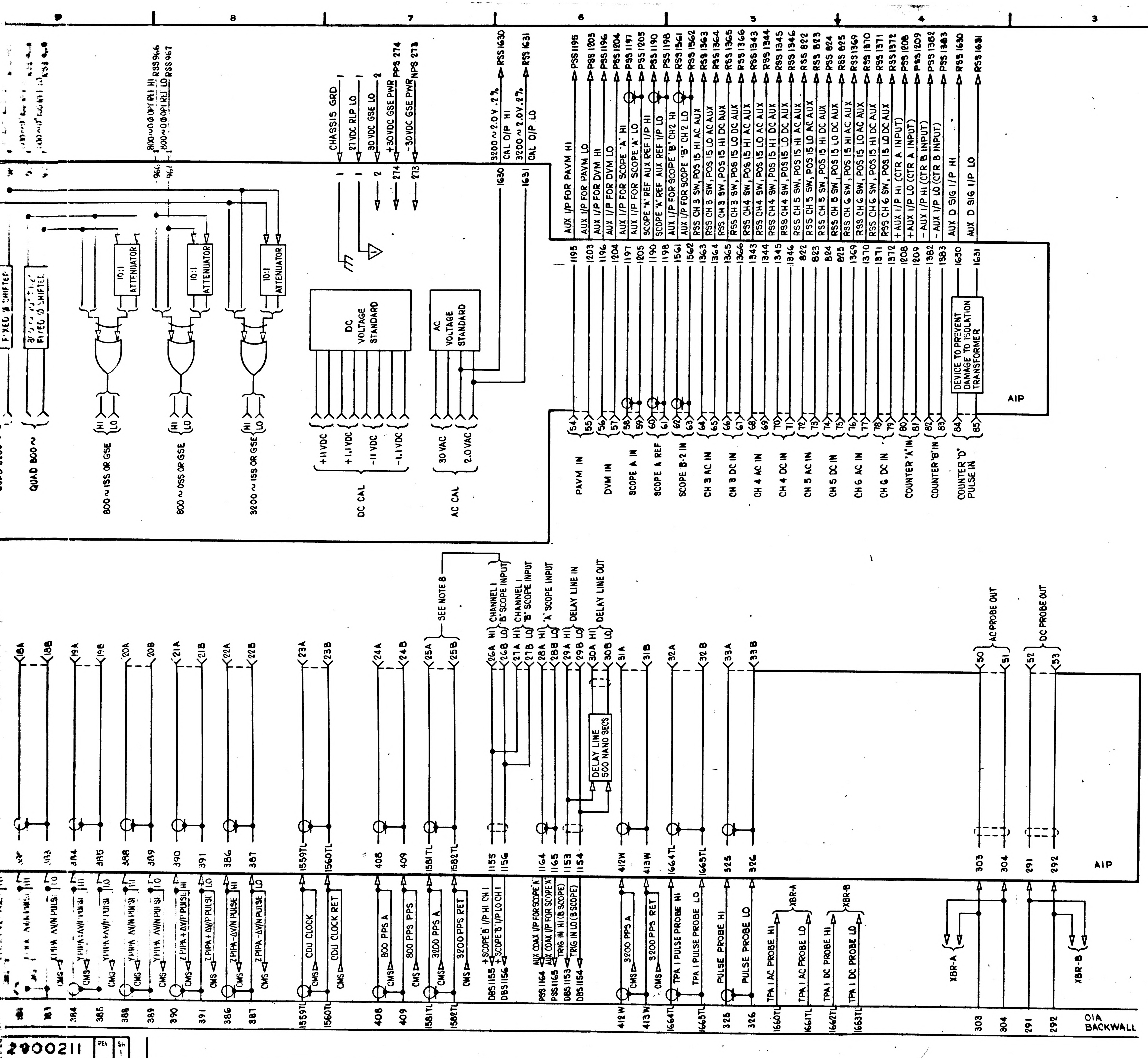
2900211 REV C SHT 4

27 2900211


OIA BACKWALL
GDB
56P3
CDU & RCDU
CDU Z HI
CDU Z LO
IG + Δ θ ABORT HI
IG + Δ θ ABORT LO
IG - Δ θ ABORT HI
IG - Δ θ ABORT LO
MG + Δ θ ABORT HI
MG + Δ θ ABORT LO
MG - Δ θ ABORT HI
MG - Δ θ ABORT LO
OG + Δ θ ABORT HI
OG + Δ θ ABORT LO
OG - Δ θ ABORT HI
OG - Δ θ ABORT LO
+Y CDU (INN GIMBAL) HI
+Y CDU (INN GIMBAL) LO
-Y CDU (INN GIMBAL) HI
-Y CDU (INN GIMBAL) LO
+Z CDU (MID GMBL) HI
+Z CDU (MID GMBL) LO
-Z CDU (MID GMBL) HI
-Z CDU (MID GMBL) LO
+X CDU (OUT GMBL) HI
+X CDU (OUT GMBL) LO
-X CDU (OUT GMBL) HI
-X CDU (OUT GMBL) LO
+RR SHAFT HI
+RR SHAFT LO
-RR SHAFT HI
-RR SHAFT LO
+RR TRUNNION HI
+RR TRUNNION LO
-RR TRUNNION HI
-RR TRUNNION LO
INTERROGATE MODULE
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
35A2J19
35A2J1
PX HI
PX LO
NX HI
NX LO
PY HI
PY LO
NY HI
NY LO
PZ HI
PZ LO
NZ HI
NZ LO
PTA
CDU CLOCK 51.2 KPPS HI
CDU CLOCK 51.2 KPPS LO
56P3
CDU & RCDU
INTERROGATE MODULE
800 PPS SET HI
800 PPS SET LO
3.2 KPPS 0 DEG HI
3.2 KPPS 0 DEG LO
45J19
HARNESS
45J3
45J11
800 CPS AAC FILTER
3200 CPS PHASE & AMPLITUDE CONTROL
PSA
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

2900211 REV C SHT 4

1/2900211


AUX I/P FOR PAVM HI
AUX I/P FOR PAVM LO
AUX I/P FOR DVM HI
AUX I/P FOR DVM LO
AUX I/P FOR SCOPE "A" HI
AUX I/P FOR SCOPE "A" LO
SCOPE "A" REF AUX REF I/P HI
SCOPE "A" REF AUX REF I/P LO
AUX I/P FOR SCOPE "B" CH 2 HI
AUX I/P FOR SCOPE "B" CH 2 LO
RSS CH 3 SW, POS 15 HI AC AUX
RSS CH 3 SW, POS 15 LO AC AUX
RSS CH 3 SW, POS 15 HI DC AUX
RSS CH 3 SW, POS 15 LO DC AUX
RSS CH 4 SW, POS 15 HI AC AUX
RSS CH 4 SW, POS 15 LO AC AUX
RSS CH 4 SW, POS 15 HI DC AUX
RSS CH 4 SW, POS 15 LO DC AUX
RSS CH 5 SW, POS 15 HI AC AUX
RSS CH 5 SW, POS 15 LO AC AUX
RSS CH 5 SW, POS 15 HI DC AUX
RSS CH 5 SW, POS 15 LO DC AUX
RSS CH 6 SW, POS 15 HI AC AUX
RSS CH 6 SW, POS 15 LO AC AUX
RSS CH 6 SW, POS 15 HI DC AUX
RSS CH 6 SW, POS 15 LO DC AUX
+AUX I/P HI (CTR A INPUT)
+AUX I/P LO (CTR A INPUT)
-AUX I/P HI (CTR B INPUT)
-AUX I/P LO (CTR B INPUT)
AUX D SIG I/P HI
AUX D SIG I/P LO
PSS 1195
PSS 1203
PSS 1196
PSS 1204
PSS 1197
PSS 1205
PSS 1190
PSS 1198
RSS 1561
RSS 1562
RSS 1363
RSS 1364
RSS 1365
RSS 1366
RSS 1343
PSS 1344
RSS 1345
RSS 1346
RSS 822
RSS 823
PSS 824
RSS 825
RSS 1369
RSS 1370
RSS 1371
RSS 1372
PSS 1208
PSS 1209
PSS 1382
PSS 1383
RSS 1630
RSS 1631
CHASSIS GRD
27 VDC RLP LO
30 VDC GSE LO
+30VDC GSE PWR
-30VDC GSE PWR
PPS 274
NPS 273
3200 ~ 2.0V .2% CAL O/P HI
3200 ~ 2.0V .2% CAL O/P LO
RSS 1630
RSS 1631
800 ~ 0 OPT RI HI RSS 966
800 ~ 0 OPT RI LO RSS 967
10:1 ATTENUATOR
DC VOLTAGE STANDARD
AC VOLTAGE STANDARD
DEVICE TO PREVENT DAMAGE TO ISOLATION TRANSFORMER
AIP
FIXED Ø SHIFTER
QUAD 800 ~
800 ~ ISS OR GSE
800 ~ OSS OR GSE
3200 ~ ISS OR GSE
HI
LO
+11 VDC
+1.1 VDC
-11 VDC
-1.1 VDC
DC CAL
30 VAC
2.0 VAC
AC CAL
PAVM IN
DVM IN
SCOPE A IN
SCOPE A REF
SCOPE B-2 IN
CH 3 AC IN
CH 3 DC IN
CH 4 AC IN
CH 4 DC IN
CH 5 AC IN
CH 5 DC IN
CH 6 AC IN
CH 6 DC IN
COUNTER "A" IN
COUNTER "B" IN
COUNTER "D" PULSE IN
SEE NOTE 8
CHANNEL 1 'B' SCOPE INPUT HI
CHANNEL 1 'B' SCOPE INPUT LO
'A' SCOPE INPUT
DELAY LINE IN
DELAY LINE OUT
DELAY LINE 500 NANO SEC'S
AC PROBE OUT
DC PROBE OUT
AIP
CMS
CDU CLOCK
CDU CLOCK RET
800 PPS A
800 PPS
3200 PPS A
3200 PPS RET
+SCOPE 'B' I/P HI CH 1
+SCOPE 'B' I/P LO CH 1
DBS 1155
DBS 1156
AUX COAX I/P FOR SCOPE 'A'
AUX COAX I/P FOR SCOPE 'A'
TRIG IN HI (B SCOPE)
TRIG IN LO (B SCOPE)
PSS 1164
PSS 1165
DBS 1153
DBS 1154
3200 PPS A
3200 PPS RET
TPA 1 PULSE PROBE HI
TPA 1 PULSE PROBE LO
PULSE PROBE HI
PULSE PROBE LO
TPA 1 AC PROBE HI
TPA 1 AC PROBE LO
TPA 1 DC PROBE HI
TPA 1 DC PROBE LO
XBR-A
XBR-B
Y PIPA ΔV/N PULSE
Z PIPA +ΔV/N PULSE HI
Z PIPA +ΔV/N PULSE LO
Z PIPA -ΔV/N PULSE HI
Z PIPA -ΔV/N PULSE
01A BACKWALL
412W
413W
1664TL
1665TL
1660TL
1661TL
1662TL
1663TL
1559TL
1560TL
1581TL
1582TL
408
409
303
304
291
292
2900211

SYM	ZONE	REVISIONS DESCRIPTION	CHG NO	DATE	APPD

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Woloski DATE 17 MAY 65
CHECKED Ed Foster 18 MAY 65
APPROVAL M. Cavallo 18 MAY 65
APPROVAL James Mikitson
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
AUXILIARY INPUT-OUTPUT
(BLOCK I SERIES 100, BLOCK II & LEM)

CODE IDENT NO.	SIZE	
99974	J2	2900211

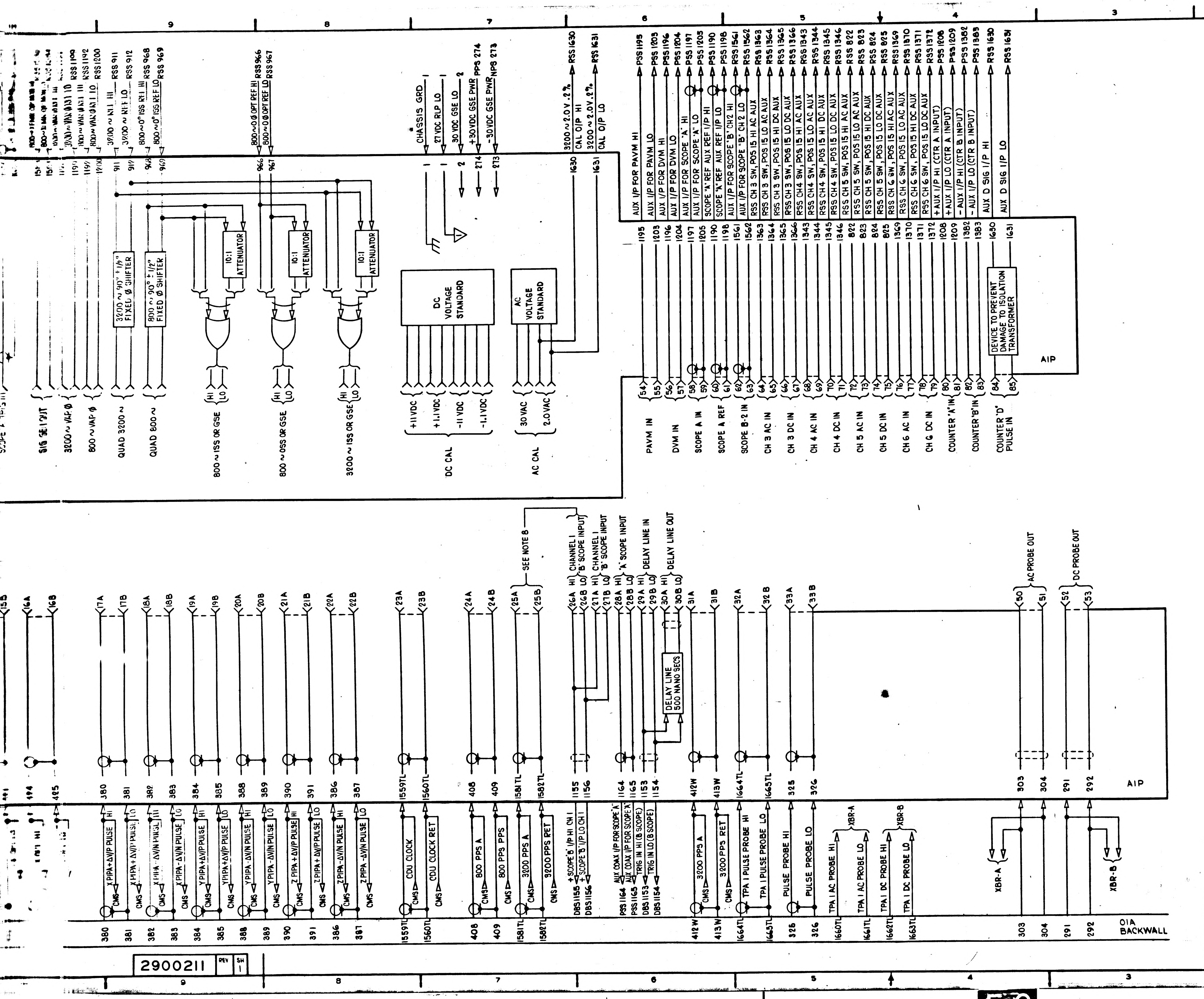
SCALE — SHEET 1 of 4

2900211

2/4

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD



AIP
ACP IN
PAVM IN
DVM IN
SCOPE A IN
SCOPE A REF
SCOPE B-2 IN
CH 3 AC IN
CH 3 DC IN
CH 4 AC IN
CH 4 DC IN
CH 5 AC IN
CH 5 DC IN
CH 6 AC IN
CH 6 DC IN
COUNTER "A" IN
COUNTER "B" IN
COUNTER "D" PULSE IN
AUX I/P FOR PAVM HI
AUX I/P FOR PAVM LO
AUX I/P FOR DVM HI
AUX I/P FOR DVM LO
AUX I/P FOR SCOPE "A" HI
AUX I/P FOR SCOPE "A" LO
SCOPE "A" REF AUX REF I/P HI
SCOPE "A" REF AUX REF I/P LO
AUX I/P FOR SCOPE "B" CH 2 HI
AUX I/P FOR SCOPE "B" CH 2 LO
RSS CH 3 SW, POS 15 HI AC AUX
RSS CH 3 SW, POS 15 LO AC AUX
RSS CH 3 SW, POS 15 HI DC AUX
RSS CH 3 SW, POS 15 LO DC AUX
RSS CH 4 SW, POS 15 HI AC AUX
RSS CH 4 SW, POS 15 LO AC AUX
RSS CH 4 SW, POS 15 HI DC AUX
RSS CH 4 SW, POS 15 LO DC AUX
RSS CH 5 SW, POS 15 HI AC AUX
RSS CH 5 SW, POS 15 LO AC AUX
RSS CH 5 SW, POS 15 HI DC AUX
RSS CH 5 SW, POS 15 LO DC AUX
RSS CH 6 SW, POS 15 HI AC AUX
RSS CH 6 SW, POS 15 LO AC AUX
RSS CH 6 SW, POS 15 HI DC AUX
RSS CH 6 SW, POS 15 LO DC AUX
+AUX I/P HI (CTR A INPUT)
+AUX I/P LO (CTR A INPUT)
-AUX I/P HI (CTR B INPUT)
-AUX I/P LO (CTR B INPUT)
AUX D SIG I/P HI
AUX D SIG I/P LO
DEVICE TO PREVENT DAMAGE TO ISOLATION TRANSFORMER
PSS 1195
PSS 1203
PSS 1196
PSS 1204
PSS 1197
PSS 1205
PSS 1190
PSS 1198
RSS 1561
RSS 1562
RSS 1363
RSS 1364
RSS 1365
RSS 1366
RSS 1343
RSS 1344
RSS 1345
RSS 1346
RSS 822
RSS 823
RSS 824
RSS 825
RSS 1369
RSS 1370
RSS 1371
RSS 1372
PSS 1208
PSS 1209
PSS 1382
PSS 1383
RSS 1630
RSS 1631
CHASSIS GRD
27 VDC RLP LO
30 VDC GSE LO
+30VDC GSE PWR
-30VDC GSE PWR
PPS 274
NPS 273
3200 ~ 2.0V .2% CAL O/P HI
3200 ~ 2.0V .2% CAL O/P LO
DC VOLTAGE STANDARD
AC VOLTAGE STANDARD
+11 VDC
+1.1 VDC
-11 VDC
-1.1 VDC
DC CAL
30 VAC
2.0 VAC
AC CAL
10:1 ATTENUATOR
3200 ~ 90° ± 1/2° FIXED Ø SHIFTER
800 ~ 90° ± 1/2° FIXED Ø SHIFTER
800 ~ 0° OPT REF HI
800 ~ 0° OPT REF LO
RSS 966
RSS 967
3200 ~ REF HI
3200 ~ REF LO
800 ~ 0° IGS REF HI
800 ~ 0° IGS REF LO
RSS 911
RSS 912
RSS 968
RSS 969
RSS 1190
RSS 1192
RSS 1200
SIG SELECT
3200 ~ VAP Ø
800 ~ VAP Ø
QUAD 3200 ~
QUAD 800 ~
800 ~ 1SS OR GSE
800 ~ 0SS OR GSE
3200 ~ 1SS OR GSE
HI
LO
SEE NOTE 8
CHANNEL 1 "B" SCOPE INPUT
"A" SCOPE INPUT
DELAY LINE IN
DELAY LINE OUT
DELAY LINE 500 NANO SECS
AC PROBE OUT
DC PROBE OUT
X PIPA +ΔV/P PULSE
X PIPA +ΔV/P PULSE LO
X PIPA -ΔV/N PULSE HI
X PIPA -ΔV/N PULSE LO
Y PIPA +ΔV/P PULSE HI
Y PIPA +ΔV/P PULSE LO
Y PIPA -ΔV/N PULSE HI
Y PIPA -ΔV/N PULSE LO
Z PIPA +ΔV/P PULSE HI
Z PIPA +ΔV/P PULSE LO
Z PIPA -ΔV/N PULSE HI
Z PIPA -ΔV/N PULSE LO
CDU CLOCK
CDU CLOCK RET
800 PPS A
800 PPS
3200 PPS A
3200 PPS RET
+SCOPE "B" I/P HI CH 1
SCOPE "B" I/P LO CH 1
AUX COAX I/P FOR SCOPE "A"
AUX COAX I/P FOR SCOPE "A"
TRIG IN HI (B SCOPE)
TRIG IN LO (B SCOPE)
3200 PPS A
3200 PPS RET
TPA 1 PULSE PROBE HI
TPA 1 PULSE PROBE LO
PULSE PROBE HI
PULSE PROBE LO
TPA 1 AC PROBE HI
TPA 1 AC PROBE LO
TPA 1 DC PROBE HI
TPA 1 DC PROBE LO
XBR-A
XBR-B
CMS
DBS 1155
DBS 1156
PSS 1164
PSS 1165
DBS 1153
DBS 1154
OIA BACKWALL
380
381
382
383
384
385
388
389
390
391
386
387
1559TL
1560TL
408
409
1581TL
1582TL
1155
1156
1164
1165
1153
1154
412W
413W
1664TL
1665TL
325
326
1660TL
1661TL
1662TL
1663TL
303
304
291
292
17A
17B
18A
18B
19A
19B
20A
20B
21A
21B
22A
22B
23A
23B
24A
24B
25A
25B
26A
26B
27A
27B
28A
28B
29A
29B
30A
30B
31A
31B
32A
32B
33A
33B
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2900211
REV
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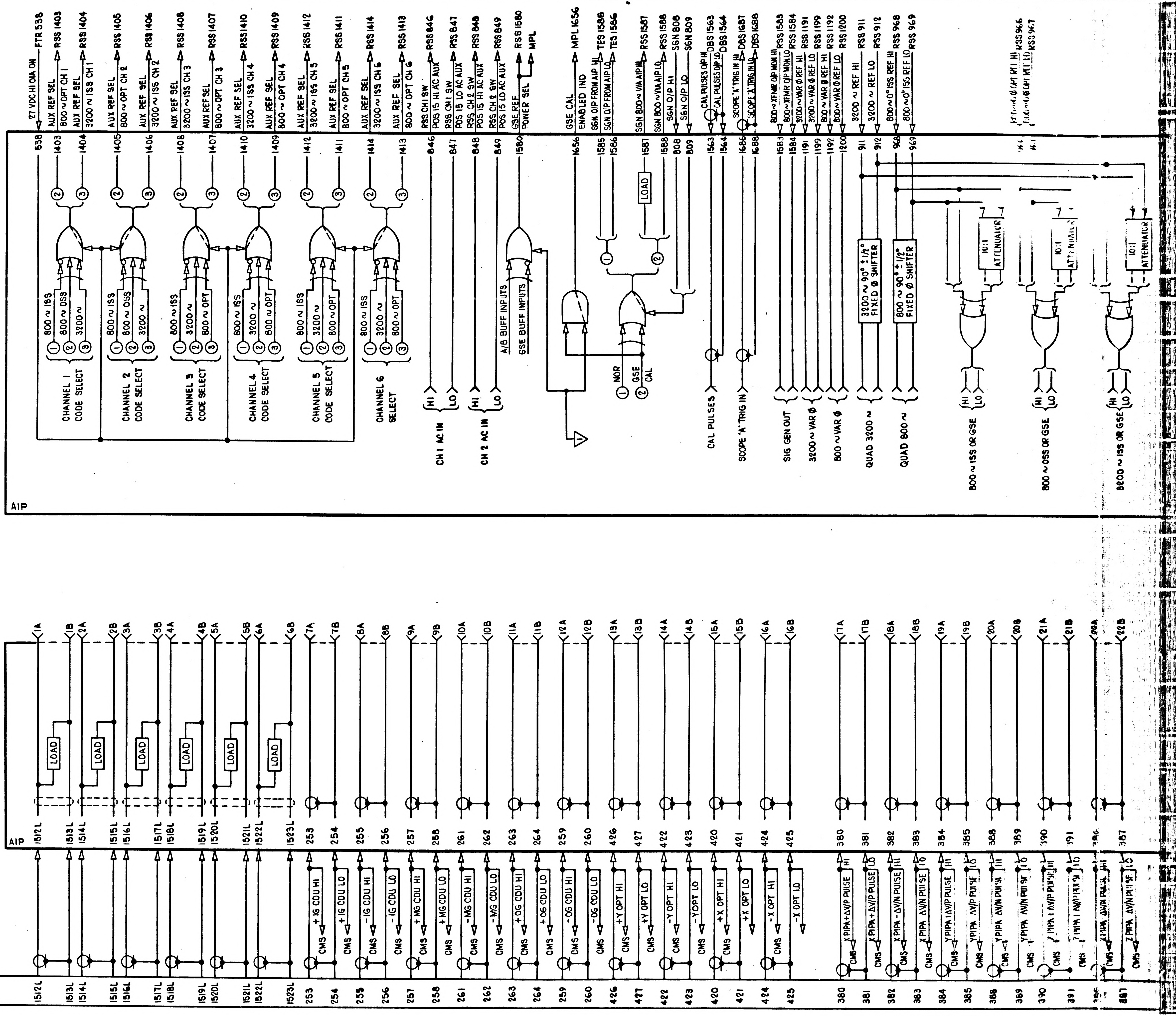
1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
FRACTIONS ± DECIMALS ± ANGLES ±	ACSP PN	
	DRAWN J. Kolski DATE 17 MAY 65 CHECKED J. Foster 18 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM AUXILIARY INPUT-OUTPUT (BLOCK I SERIES 100, BLOCK II & LEM)
DO NOT SCALE THIS DRAWING		
MATERIAL —	NASA APPROVAL MIT APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 2900211
CONTRACT NAS 9-497		SCALE — · SHEET OF

NOTES:

1. INTEPPRET DRAWING IN ACCORDANCE WITH STANDARDS PPESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806
3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM):
   - 2900210 AC POWER PROTECTION & POWER DISTRIBUTION (FTR)
     - PPS + 30 VDC POWER SUPPLY
     - NPS - 30 VDC POWER SUPPLY
       - TEST SELECTOR PANEL (TES)
     - SGN SIGNAL GENERATOR
   - 2900207 MONITOR PANEL (MPL)
   - 2900209 COMPUTER SIMULATOR INTERFACE (CMS)
   - 2900217 SIGNAL SELECTION & MEASUREMENT
     - PSS PRIMARY SIGNAL SELECTION (PARTIAL)
     - XBR-A AC SIGNALS TO CROSSBAR
     - XBR-B DC SIGNALS TO CROSSBAR
     - DBS DUAL BEAM SCOPE "A" INPUT & "B" INPUT, CHANNEL I, WITH TRIGGER LOGIC.
     - PVAM PHASE ANGLE VOLTMETER
     - DVM DIGITAL VOLTMETER
   - 2900218 OSCILLOGRAPH SIGNAL SELECTION
     - DBS DUAL BEAM SCOPE - "B" INPUT CHANNEL 2 & REF LOGIC FOR "B" INPUT.
     - RSS OSCILLOGRAPH SIGNAL SELECTOR
   - 2900215 MEASUREMENT REFERENCE POWER SUPPLIES
     - RSS OSCILLOGRAPH SIGNAL SELECTOR (PARTIAL)
   - 2900219 COUNTER SIGNAL SELECTION
     - PSS PRIMARY SIGNAL SELECTOR (PARTIAL)
       - GSE GROUNDING (BLOCK I SERIES 100)
       - GSE GROUNDING (BLOCK II & LEM)
       - TPA-1 & TPA-2
4. NONSTANDARD SYMBOLS
   - INDICATES 'AND' GATE WITH SWITCHED SIGNAL
   - ①② ENABLE — INDICATES EXCLUSIVE 'OR' GATE WITH ENABLE SIGNAL SWITCHED THROUGH POSITION 1, OR NOT SWITCHED THROUGH POSITION 2.
   - (NO.) INDICATES SWITCH POSITION
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, MEANS:
   - A. W - BLOCK I, SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G/N CONFIGURATIONS
   - E. TW, TL, OR WL - USED IN MORE THAN ONE G/N CONFIGURATIONS AS SHOWN.
6. ABBREVIATIONS:
   - OIA - OPTICS- INERTIAL ANALYZER
   - ISS - INERTIAL SUB SYSTEM
   - AIP - AUXILIARY INPUT-OUTPUT & CALIBRATION PANEL
   - OPT - OPTICS
   - TPA - TEST POINT ADAPTER
   - I/P - INPUT
   - O/P - OUTPUT
7. ALL TPA'S IN THIS DRAWING SHOW ONLY THE AUXILIARY INPUTS. FOR ADDITIONAL DETAIL SEE TPA 1 & 2 MECH. & SERIES 100 TPA.
8. JUMPERS WILL BE USED TO MAKE CONNECTIONS BETWEEN TEST JACKS.
9. SHEET LAYOUT:

BLOCK I	SHEET 1 SHEET 2
BLOCK II	SHEET 1 SHEET 3
LEM	SHEET 1 SHEET 4


27 VDC HI OIA ON FTR 538
AUX REF SEL 800 ~ OPT CH 1 RSS 1403
AUX REF SEL 3200 ~ ISS CH 1 RSS 1404
AUX REF SEL 800 ~ OPT CH 2 RSS 1405
AUX REF SEL 3200 ~ ISS CH 2 RSS 1406
AUX REF SEL 3200 ~ ISS CH 3 RSS 1408
AUX REF SEL 800 ~ OPT CH 3 RSS 1407
AUX REF SEL 3200 ~ ISS CH 4 RSS 1410
AUX REF SEL 800 ~ OPT CH 4 RSS 1409
AUX REF SEL 3200 ~ ISS CH 5 RSS 1412
AUX REF SEL 800 ~ OPT CH 5 RSS 1411
AUX REF SEL 3200 ~ ISS CH 6 RSS 1414
AUX REF SEL 800 ~ OPT CH 6 RSS 1413
RSS CH 1 SW POS 15 HI AC AUX RSS 846
RSS CH 1 SW POS 15 LO AC AUX RSS 847
RSS CH 2 SW POS 15 HI AC AUX RSS 848
RSS CH 2 SW POS 15 LO AC AUX RSS 849
GSE REF POWER SEL RSS 1580 MPL
GSE CAL ENABLED IND MPL 1656
SGN O/P FROM AIP HI TES 1585
SGN O/P FROM AIP LO TES 1586
SGN 800 ~ VIA AIP HI RSS 1587
SGN 800 ~ VIA AIP LO RSS 1588
SGN O/P HI SGN 808
SGN O/P LO SGN 809
CAL PULSES O/P HI DBS 1563
CAL PULSES O/P LO DBS 1564
SCOPE 'A' TRIG IN HI DBS 1687
SCOPE 'A' TRIG IN LO DBS 1688
800 ~ XFMR O/P MON HI RSS 1583
800 ~ XFMR O/P MON LO RSS 1584
3200 ~ VAR Ø REF HI RSS 1191
3200 ~ VAR Ø REF LO RSS 1199
800 ~ VAR Ø REF HI RSS 1192
800 ~ VAR Ø REF LO RSS 1200
3200 ~ REF HI RSS 911
3200 ~ REF LO RSS 912
800 ~ 0° ISS REF HI RSS 968
800 ~ 0° ISS REF LO RSS 969
RSS 966
RSS 967
538
1403
1404
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1564
1686
1688
1583
1584
1191
1199
1192
1200
911
912
968
969
② ③
800 ~ ISS
800 ~ OSS
3200 ~
800 ~ OPT
① ② ③
CHANNEL 1 CODE SELECT
CHANNEL 2 CODE SELECT
CHANNEL 3 CODE SELECT
CHANNEL 4 CODE SELECT
CHANNEL 5 CODE SELECT
CHANNEL 6 SELECT
A/B BUFF INPUTS
GSE BUFF INPUTS
LOAD
NOR
GSE CAL
3200 ~ 90° ± 1/2° FIXED Ø SHIFTER
800 ~ 90° ± 1/2° FIXED Ø SHIFTER
10:1 ATTENUATOR
HI
LO
CH 1 AC IN
CH 2 AC IN
CAL PULSES
SCOPE 'A' TRIG IN
SIG GEN OUT
3200 ~ VAR Ø
800 ~ VAR Ø
QUAD 3200 ~
QUAD 800 ~
800 ~ ISS OR GSE
800 ~ OSS OR GSE
3200 ~ ISS OR GSE
AIP
1A 1B 2A 2B 3A 3B 4A 4B 5A 5B 6A 6B 7A 7B 8A 8B 9A 9B 10A 10B 11A 11B 12A 12B 13A 13B 14A 14B 15A 15B 16A 16B 17A 17B 18A 18B 19A 19B 20A 20B 21A 21B 22A 22B
1512L
1513L
1514L
1515L
1516L
1517L
1518L
1519L
1520L
1521L
1522L
1523L
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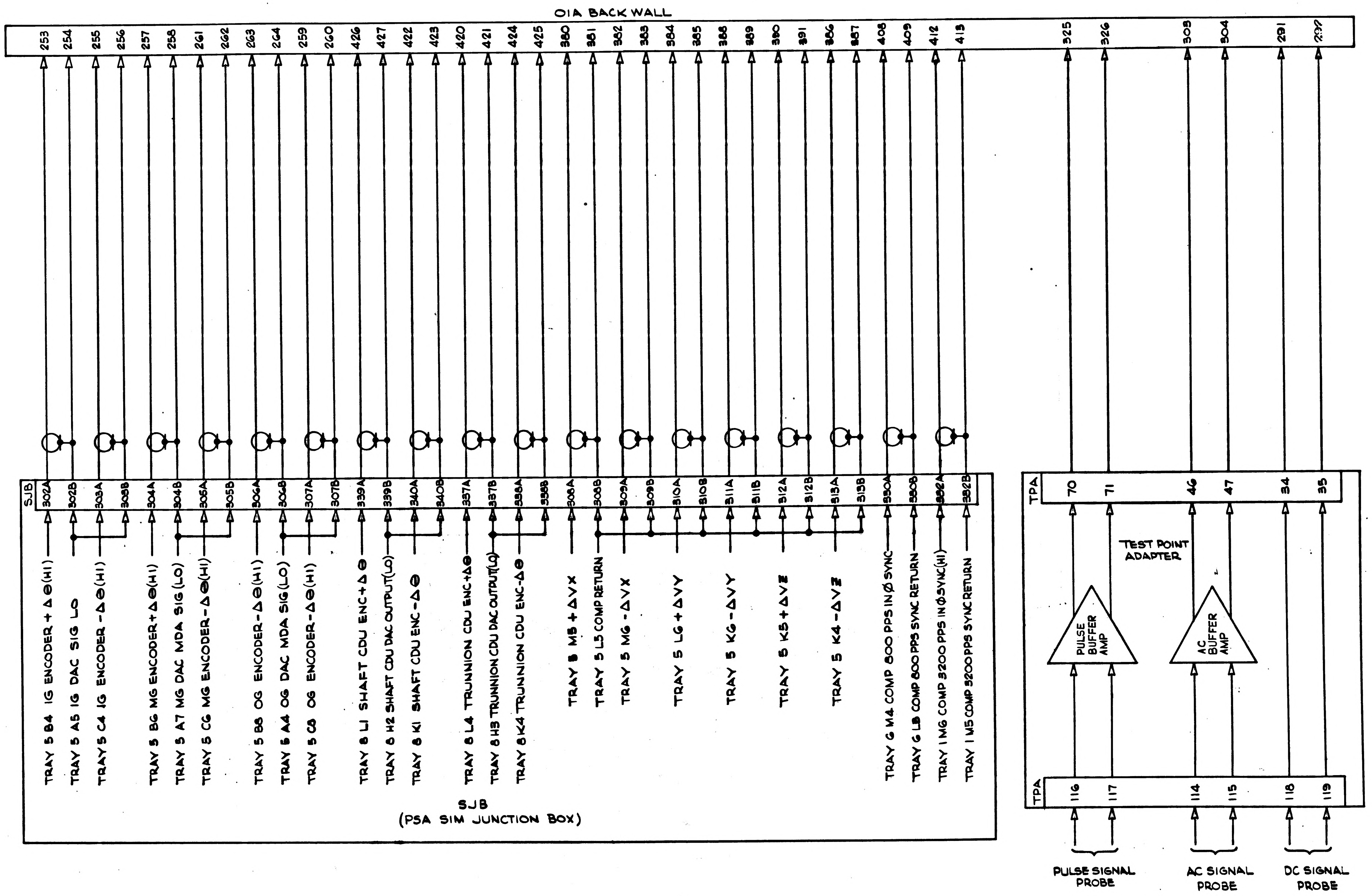
+ IG CDU HI CMS
+ IG CDU LO CMS
- IG CDU HI CMS
- IG CDU LO CMS
+ MG CDU HI CMS
+ MG CDU LO CMS
- MG CDU HI CMS
- MG CDU LO CMS
+ OG CDU HI CMS
+ OG CDU LO CMS
- OG CDU HI CMS
- OG CDU LO CMS
+ Y OPT HI CMS
+ Y OPT LO CMS
- Y OPT HI CMS
- Y OPT LO CMS
+ X OPT HI CMS
+ X OPT LO
- X OPT HI CMS
- X OPT LO
X PIPA + ΔV/P PULSE HI CMS
X PIPA + ΔV/P PULSE LO CMS
X PIPA - ΔV/N PULSE HI CMS
X PIPA ΔV/N PULSE LO CMS
Y PIPA + ΔV/P PULSE HI CMS
Y PIPA ΔV/P PULSE LO CMS
Y PIPA ΔV/N PULSE HI CMS
Y PIPA ΔV/N PULSE LO CMS
Z PIPA + ΔV/P PULSE HI CMS
Z PIPA + ΔV/P PULSE LO CMS
Z PIPA - ΔV/N PULSE HI CMS
Z PIPA ΔV/N PULSE LO CMS
OIA BACKWALL

2900211 REV SH 1

REVISIONS 19254				
SYM	ZONE	DESCRIPTION	DATE	APPD.
		CHG NO.		



OIA BACK WALL
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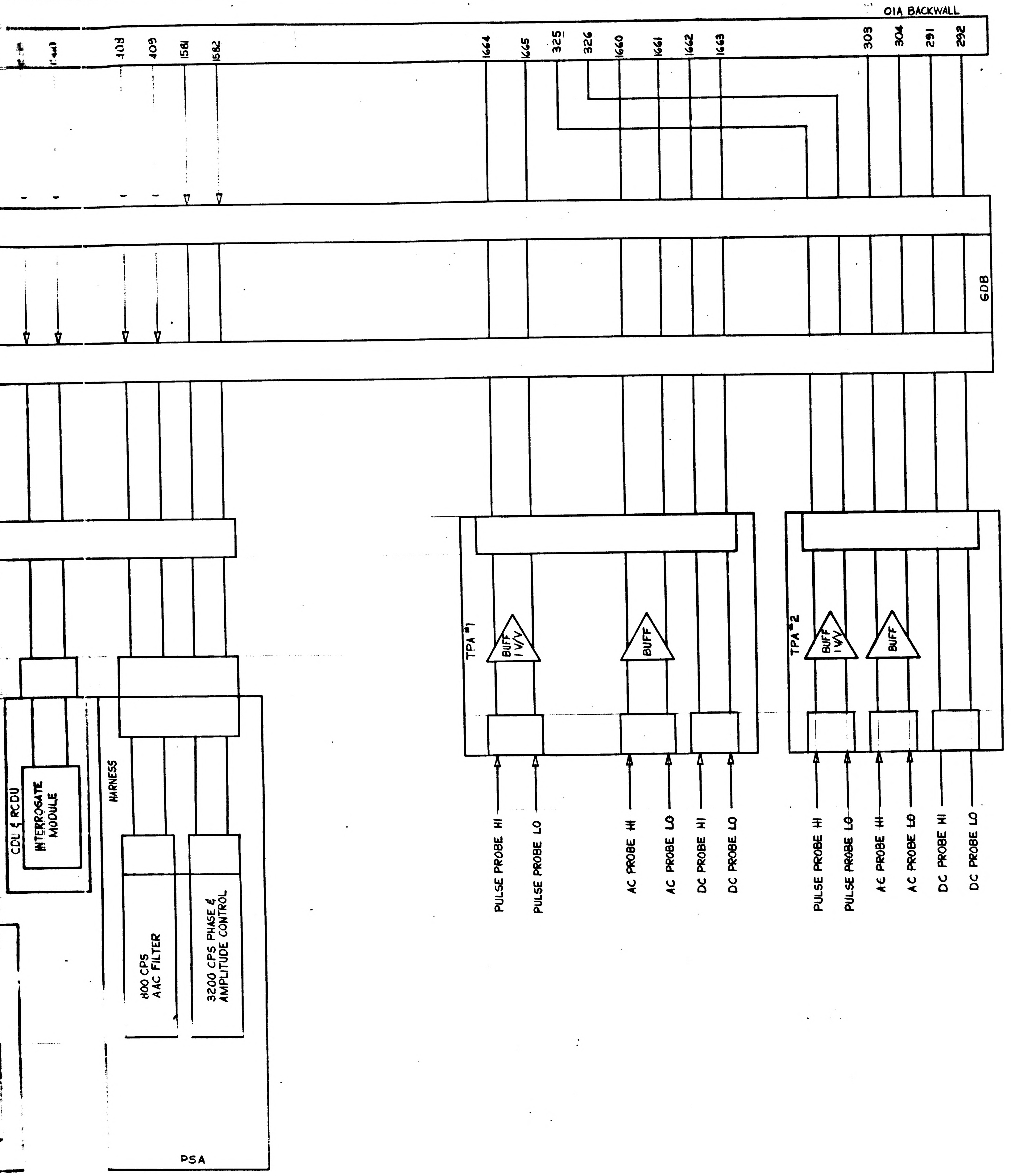
SJB
302A
302B
303A
303B
304A
304B
305A
305B
306A
306B
307A
307B
339A
339B
340A
340B
337A
337B
338A
338B
308A
308B
309A
309B
310A
310B
311A
311B
312A
312B
313A
313B
330A
330B
332A
332B
TRAY 5 B4 IG ENCODER + Δ θ (HI)
TRAY 5 A5 IG DAC SIG LO
TRAY 5 C4 IG ENCODER - Δ θ (HI)
TRAY 5 B6 MG ENCODER + Δ θ (HI)
TRAY 5 A7 MG DAC MDA SIG (LO)
TRAY 5 C6 MG ENCODER - Δ θ (HI)
TRAY 5 B8 OG ENCODER - Δ θ (HI)
TRAY 5 A4 OG DAC MDA SIG (LO)
TRAY 5 C8 OG ENCODER - Δ θ (HI)
TRAY 8 L1 SHAFT CDU ENC + Δ θ
TRAY 8 H2 SHAFT CDU DAC OUTPUT (LO)
TRAY 8 K1 SHAFT CDU ENC - Δ θ
TRAY 8 L4 TRUNNION CDU ENC + Δ θ
TRAY 8 H3 TRUNNION CDU DAC OUTPUT (LO)
TRAY 8 K4 TRUNNION CDU ENC - Δ θ
TRAY 5 M5 + Δ V X
TRAY 5 L5 COMP RETURN
TRAY 5 M6 - Δ V X
TRAY 5 L6 + Δ V Y
TRAY 5 K6 - Δ V Y
TRAY 5 K5 + Δ V Z
TRAY 5 K4 - Δ V Z
TRAY 6 M4 COMP 800 PPS IN Ø SYNC
TRAY 6 L8 COMP 800 PPS SYNC RETURN
TRAY 1 M6 COMP 3200 PPS IN Ø SYNC (HI)
TRAY 1 M5 COMP 3200 PPS SYNC RETURN
SJB
(PSA SIM JUNCTION BOX)
TPA
70
71
46
47
34
35
TEST POINT ADAPTER
PULSE BUFFER AMP
AC BUFFER AMP
TPA
116
117
114
115
118
119
PULSE SIGNAL PROBE
AC SIGNAL PROBE
DC SIGNAL PROBE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN G. D. 10-MAY-65 DATE CHECKED G. Foster 18 MAY 65 APPROVAL M. Cavalier 18 May 65 APPROVAL M. Watson	MECHANIZATION DIAGRAM AUXILIARY INPUT-OUTPUT (BLOCK I SERIES 100)
DO NOT SCALE THIS DRAWING		
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 | SIZE E | 2900211
CONTRACT NAS9-497	MIT APPROVAL 20 May 65	SCALE NONE | SHEET 2 OF 4

2900211



OIA BACKWALL
408
409
1581
1582
1664
1665
325
326
1660
1661
1662
1663
303
304
291
292
GDB
TPA #1
BUFF 1 V/V
BUFF
TPA #2
BUFF 1 V/V
BUFF
PULSE PROBE HI
PULSE PROBE LO
AC PROBE HI
AC PROBE LO
DC PROBE HI
DC PROBE LO
PULSE PROBE HI
PULSE PROBE LO
AC PROBE HI
AC PROBE LO
DC PROBE HI
DC PROBE LO
CDU & RCDU
INTERROGATE MODULE
HARNESS
800 CPS AAC FILTER
3200 CPS PHASE & AMPLITUDE CONTROL
PSA

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

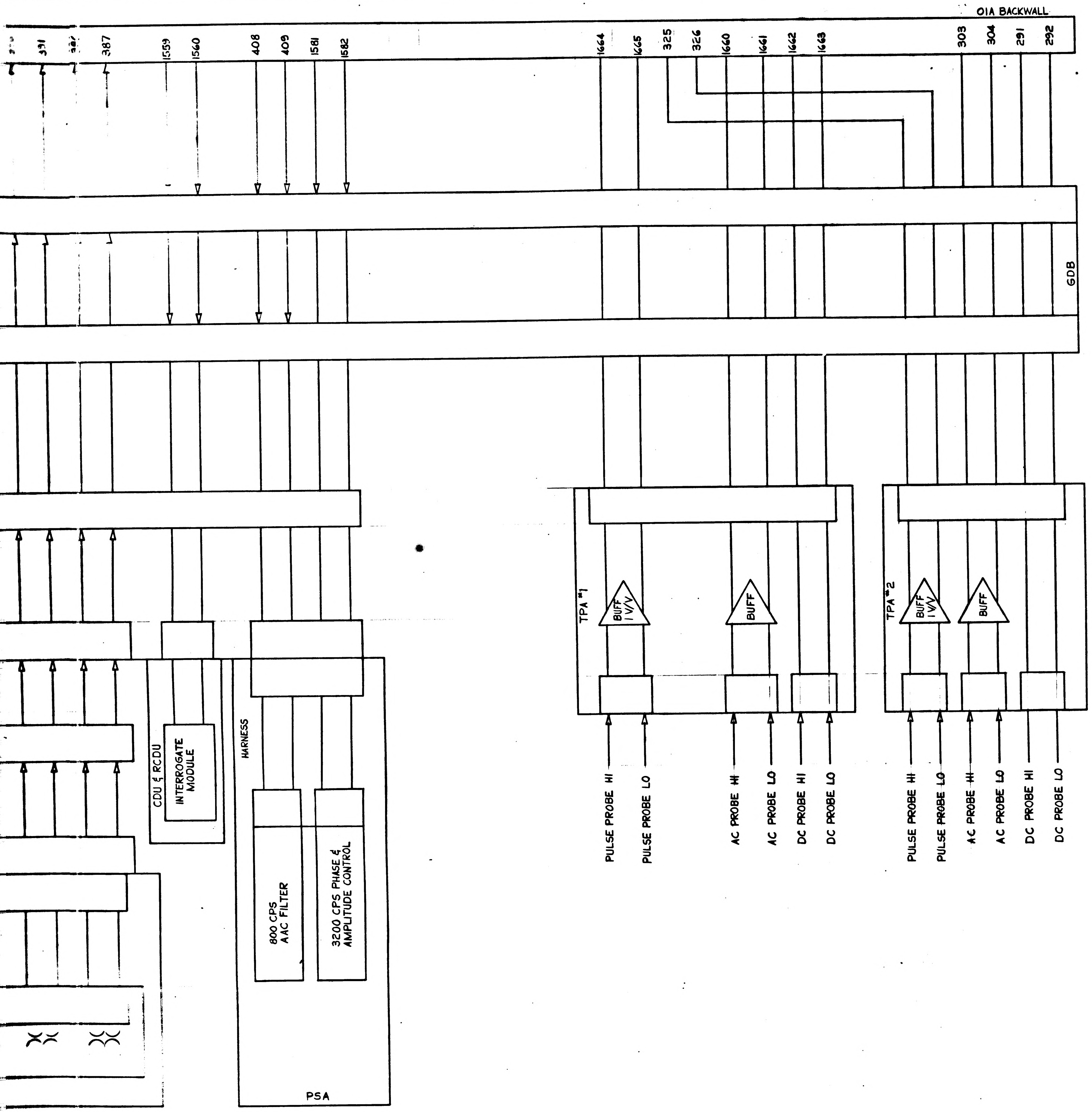
2 H

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + — DECIMALS + — ANGLES + —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN	
MATERIAL ———	DRAWN R. Schumb DATE 14 MAY 65 CHECKED Ed Foster 18 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM — AUXILIARY INPUT-OUTPUT (BLOCK II)
	NASA APPROVAL MIT APPROVAL	CODE IDENT NO. 99974 SIZE J2 2900211
CONTRACT NAS 9-497		SCALE NONE SHEET 3 OF 4

2900211	REV	SHT 3

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APP



OIA BACKWALL
391
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1662
1663
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291
292
GDB
TPA #1
BUFF 1 V/V
BUFF
TPA #2
BUFF 1 V/V
BUFF
CDU & RCDU
INTERROGATE MODULE
HARNESS
800 CPS AAC FILTER
3200 CPS PHASE & AMPLITUDE CONTROL
PSA
PULSE PROBE HI
PULSE PROBE LO
AC PROBE HI
AC PROBE LO
DC PROBE HI
DC PROBE LO
PULSE PROBE HI
PULSE PROBE LO
AC PROBE HI
AC PROBE LO
DC PROBE HI
DC PROBE LO

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL ——
CONTRACT NAS 9-497

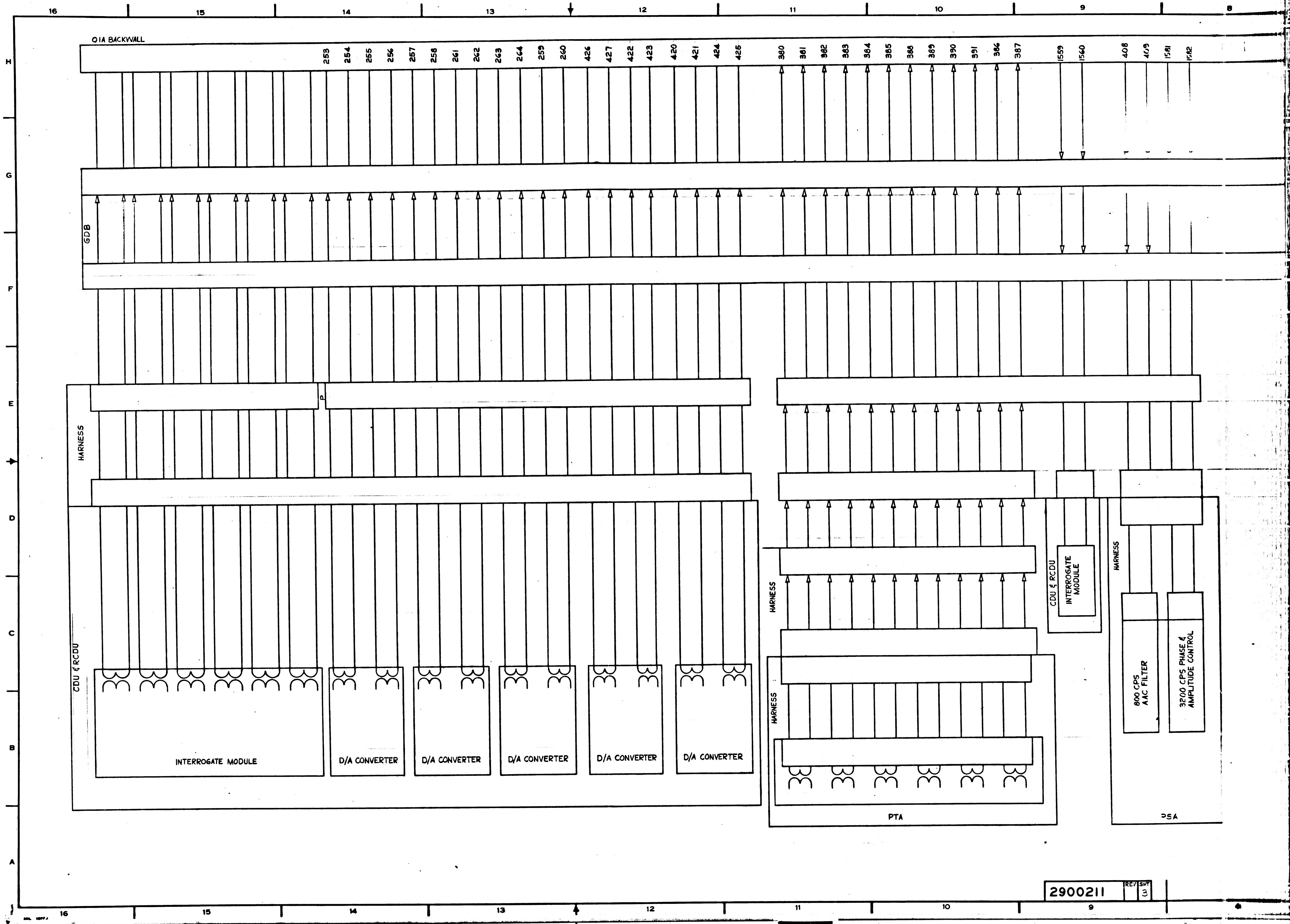
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Schwab DATE 4 MAY 65
CHECKED Ed Foster 12 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM —
AUXILIARY INPUT-OUTPUT
(BLOCK II)

CODE IDENT NO. 99974 SIZE J2 2900211
SCALE NONE SHEET 3 E 4

2900211 REV SHT 3


16
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01A BACKWALL
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387
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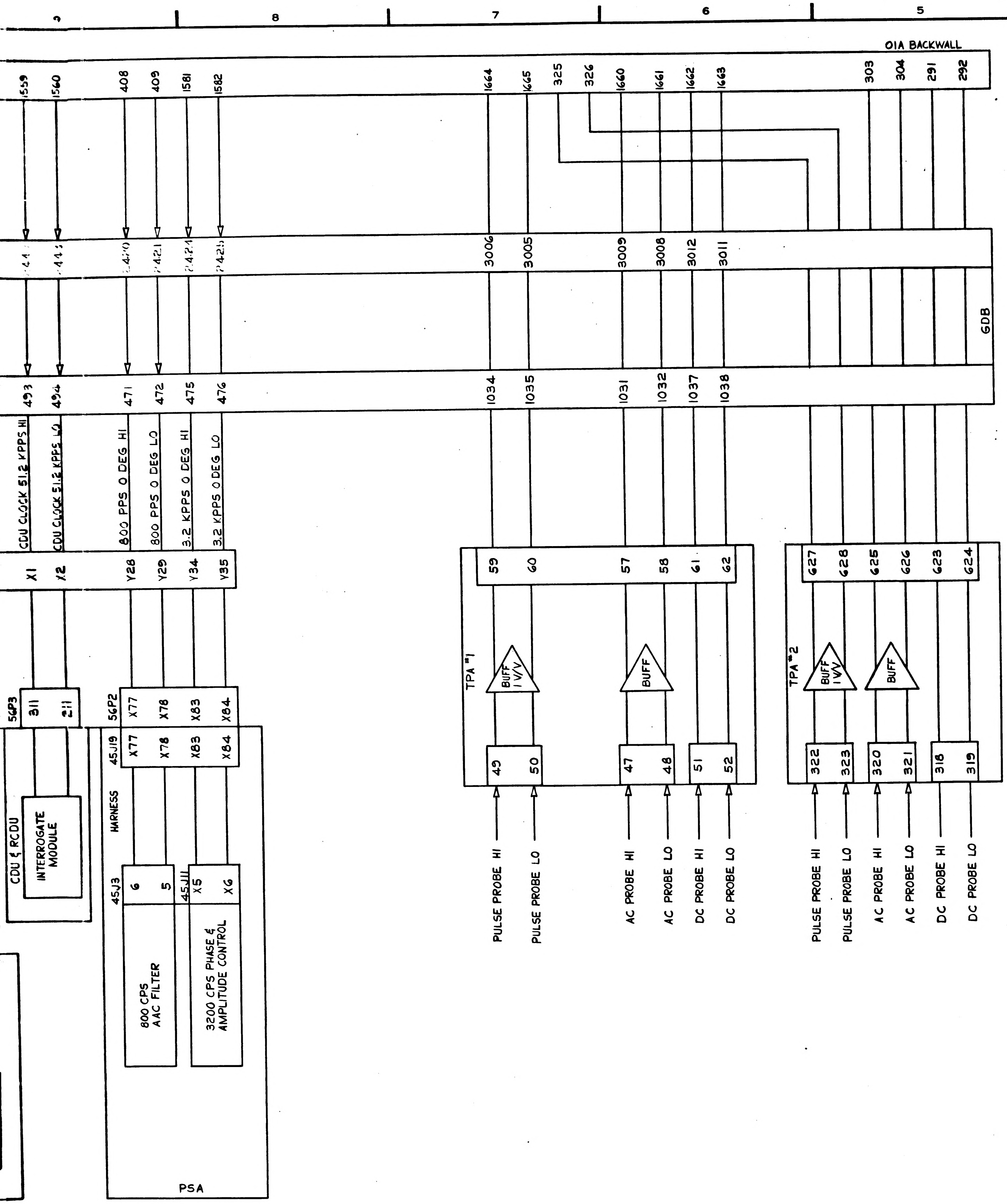
408
409
1581
1582
GDB
P
HARNESS
CDU & RCDU
INTERROGATE MODULE
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
HARNESS
HARNESS
PTA
CDU & RCDU
INTERROGATE MODULE
HARNESS
800 CPS AAC FILTER
3200 CPS PHASE & AMPLITUDE CONTROL
PSA
REV
SHT
3

2900211


OIA BACKWALL
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GDB
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1038
CDU CLOCK 51.2 KPPS HI
CDU CLOCK 51.2 KPPS LO
800 PPS 0 DEG HI
800 PPS 0 DEG LO
3.2 KPPS 0 DEG HI
3.2 KPPS 0 DEG LO
X1
X2
Y28
Y29
Y34
Y35
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57
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627
628
625
626
623
624
TPA #1
TPA #2
BUFF 1V/V
BUFF
49
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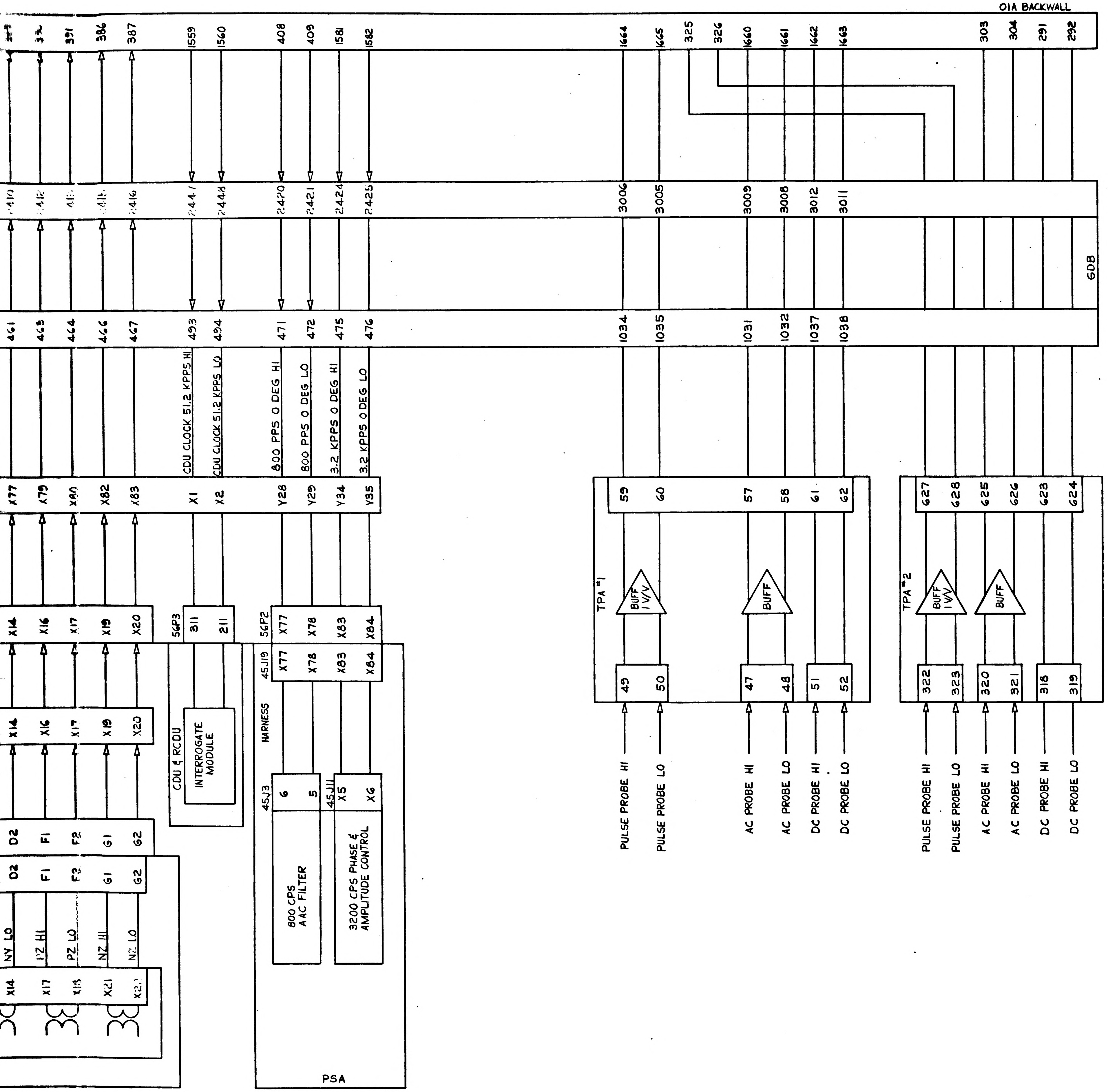
322
323
320
321
318
319
56P3
311
211
56P2
X77
X78
X83
X84
45J19
HARNESS
CDU & RCDU
INTERROGATE MODULE
45J3
6
5
45J11
X5
X6
800 CPS AAC FILTER
3200 CPS PHASE & AMPLITUDE CONTROL
PSA
PULSE PROBE HI
PULSE PROBE LO
AC PROBE HI
AC PROBE LO
DC PROBE HI
DC PROBE LO

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
	ACSP PN	
	DRAWN R. Schwabe DATE 14 MAY 65 CHECKED Ed Foster 18 MAY 65 APPROVAL M Carolan 18 May 65 APPROVAL J. M. Watson	MECHANIZATION DIAGRAM – AUXILIARY INPUT-OUTPUT (LEM)
DO NOT SCALE THIS DRAWING		
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974 SIZE J2 2900211
CONTRACT NAS 9-497	MIT APPROVAL 20 May 65	SCALE NONE SHEET 4 OF 4

2900211 REV SHT 4

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPD
		CHG NO		



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CDU CLOCK 51.2 KPPS HI
CDU CLOCK 51.2 KPPS LO
800 PPS 0 DEG HI
800 PPS 0 DEG LO
3.2 KPPS 0 DEG HI
3.2 KPPS 0 DEG LO
X77
X79
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TPA #1
BUFF 1V/V
BUFF
TPA #2
BUFF 1V/V
BUFF
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X16
X17
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56P3
311
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56P2
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X78
X83
X84
45J19
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CDU & RCDU
INTERROGATE MODULE
HARNESS
45J3
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45J11
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PULSE PROBE LO
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AC PROBE LO
DC PROBE HI
DC PROBE LO
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DC PROBE LO
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G1
G2
NY LO
PZ HI
PZ LO
NZ HI
NZ LO
X14
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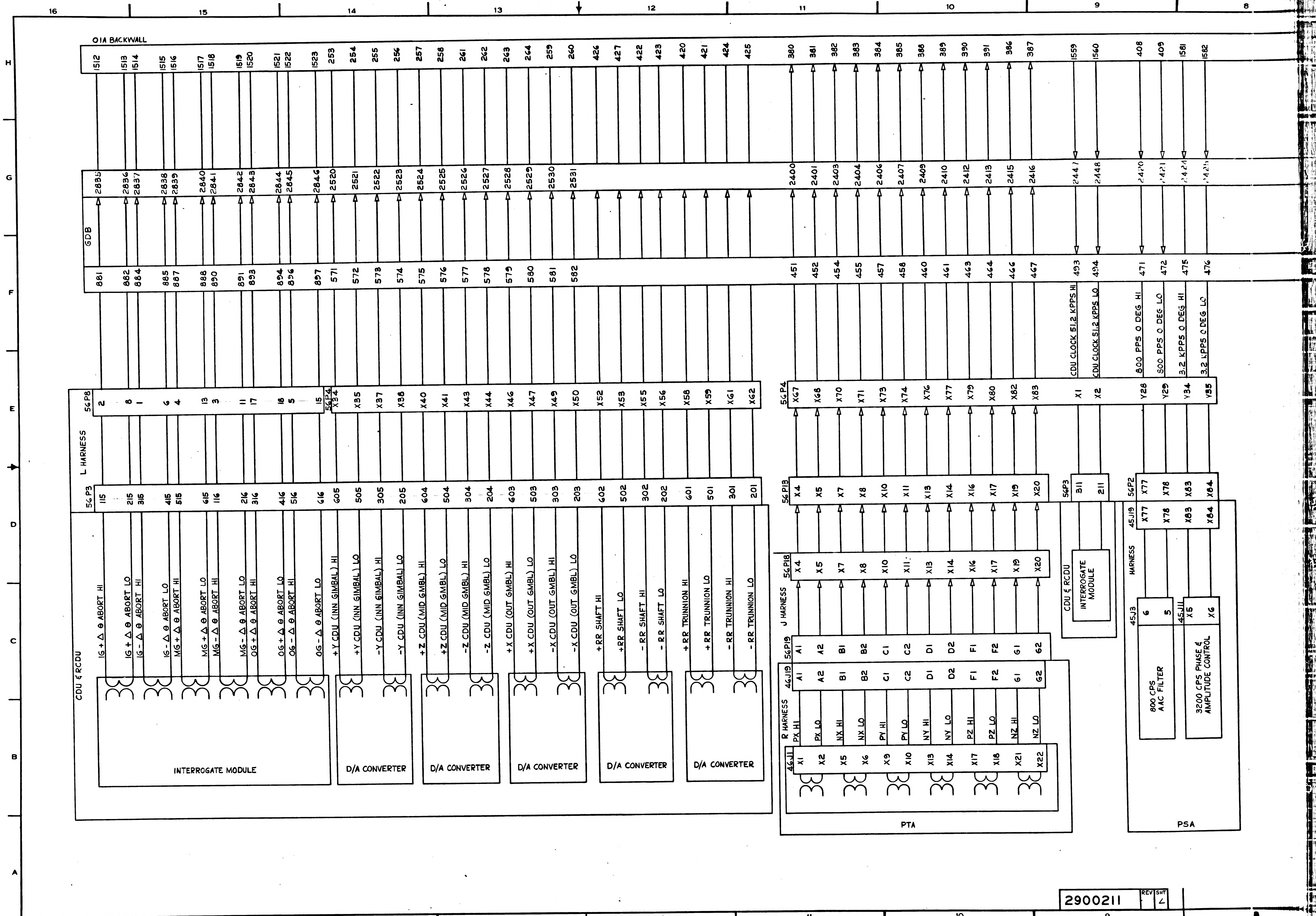
X18
X21
X22
800 CPS AAC FILTER
3200 CPS PHASE & AMPLITUDE CONTROL
PSA

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
	ACSP PN	
	DRAWN R. Schwabe DATE 14 MAY 65 CHECKED Ed Foster 18 MAY 65 APPROVAL M Carolan 18 MAY 65 APPROVAL	MECHANIZATION DIAGRAM - AUXILIARY INPUT-OUTPUT (-EV)
DO NOT SCALE THIS DRAWING		
MATERIAL ___	NASA APPROVAL	CODE IDENT NO 99974 / SIZE J2 / 2900211
CONTRACT NAS 9-497	MIT APPROVAL	SCALE NONE / SHEET 4 OF 4



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CDU CLOCK 51.2 KPPS HI
CDU CLOCK 51.2 KPPS LO
800 PPS 0 DEG HI
800 PPS 0 DEG LO
3.2 KPPS 0 DEG HI
3.2 KPPS 0 DEG LO
56P8
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18
5
15
56P4
X34
X35
X37
X38
X40
X41
X43
X44
X46
X47
X49
X50
X52
X53
X55
X56
X58
X59
X61
X62
56P4
X67
X68
X70
X71
X73
X74
X76
X77
X79
X80
X82
X83
X1
X2
Y28
Y29
Y34
Y35
L HARNESS
56P3
115
215
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201
56P13
X4
X5
X7
X8
X10
X11
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X14
X16
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X19
X20
56P3
311
211
56P2
X77
X78
X83
X84
45J19
X77
X78
X83
X84
CDU & RCDU
IG + Δ θ ABORT HI
IG + Δ θ ABORT LO
IG - Δ θ ABORT HI
IG - Δ θ ABORT LO
MG + Δ θ ABORT HI
MG + Δ θ ABORT LO
MG - Δ θ ABORT HI
MG - Δ θ ABORT LO
OG + Δ θ ABORT HI
OG + Δ θ ABORT LO
OG - Δ θ ABORT HI
OG - Δ θ ABORT LO
+Y CDU (INN GIMBAL) HI
+Y CDU (INN GIMBAL) LO
-Y CDU (INN GIMBAL) HI
-Y CDU (INN GIMBAL) LO
+Z CDU (MID GMBL) HI
+Z CDU (MID GMBL) LO
-Z CDU (MID GMBL) HI
-Z CDU (MID GMBL) LO
+X CDU (OUT GMBL) HI
+X CDU (OUT GMBL) LO
-X CDU (OUT GMBL) HI
-X CDU (OUT GMBL) LO
+RR SHAFT HI
+RR SHAFT LO
-RR SHAFT HI
-RR SHAFT LO
+RR TRUNNION HI
+RR TRUNNION LO
-RR TRUNNION HI
-RR TRUNNION LO
INTERROGATE MODULE
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
D/A CONVERTER
J HARNESS
56P18
X4
X5
X7
X8
X10
X11
X13
X14
X16
X17
X19
X20
56P19
A1
A2
B1
B2
C1
C2
D1
D2
F1
F2
G1
G2
46J19
A1
A2
B1
B2
C1
C2
D1
D2
F1
F2
G1
G2
R HARNESS
PX HI
PX LO
NX HI
NX LO
PY HI
PY LO
NY HI
NY LO
PZ HI
PZ LO
NZ HI
NZ LO
46J11
X1
X2
X5
X6
X9
X10
X13
X14
X17
X18
X21
X22
PTA
CDU & RCDU
INTERROGATE MODULE
HARNESS
45J3
6
5
45J11
X5
X6
800 CPS AAC FILTER
3200 CPS PHASE & AMPLITUDE CONTROL
PSA
16
15
14
13
12
11
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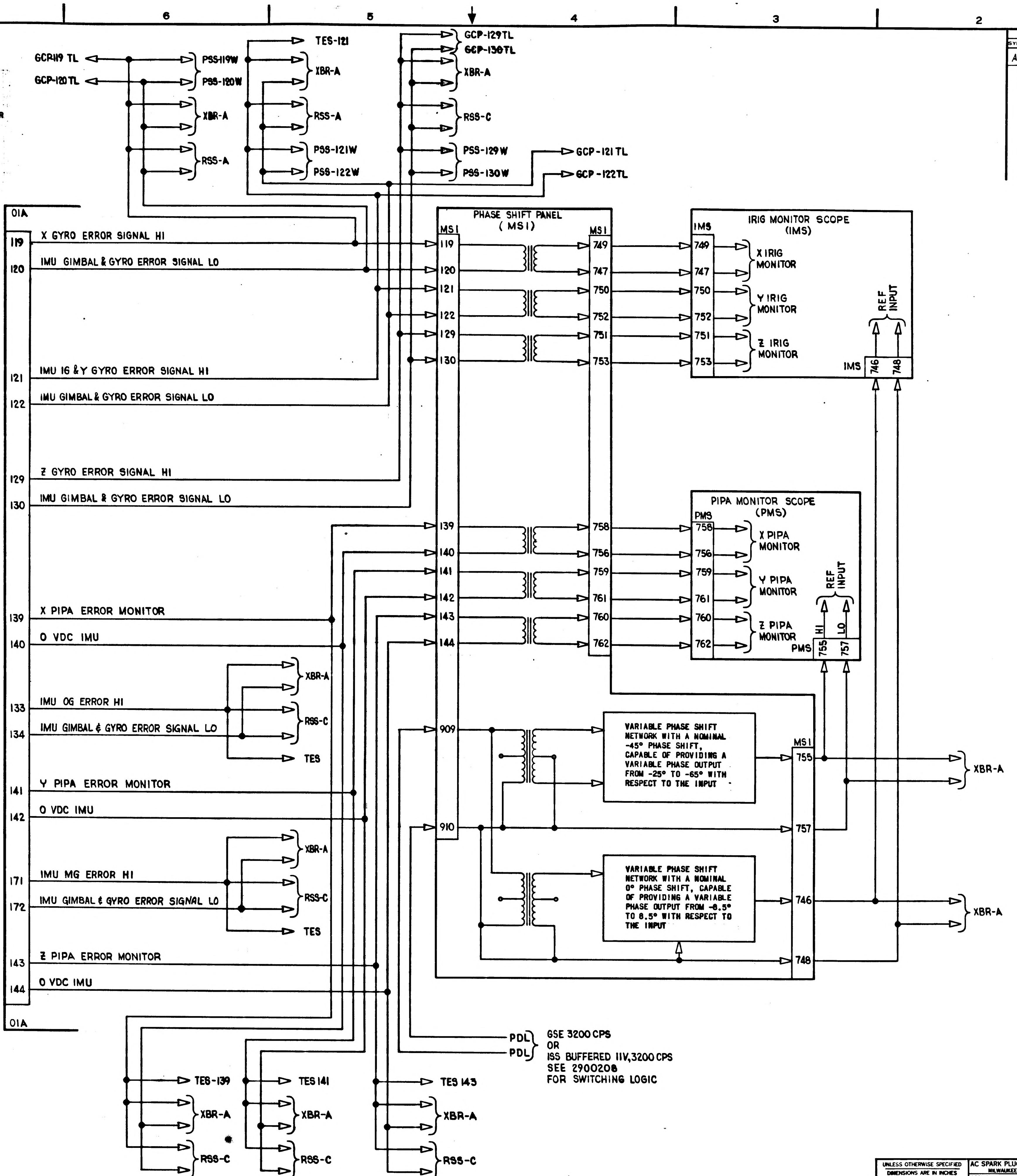
9
8

2900211 REV SHT 4

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. REFERENCE MECHANIZATION DIAGRAMS,
   - 29002C POWER AND DUMMY LOAD PANEL/PRIMARY SIGNAL SELECT GYRO CAGING FUNCTIONS (PDL) PRIMARY SIGNAL SELECTOR (PARTIAL) (PSS)
   - 2900206 TEST SELECT PANEL (TES)
   - 2900217 SIGNAL SELECTION AND MEASUREMENT CROSSBAR - AC SIGNALS (XBR-A)
   - 2900218 OSCILLOGRAPH SIGNAL SELECTION TO FIXED AC CHANNEL (RSS-A) TO SWITCHABLE AC CHANNEL (RSS-C)
     GSE GROUNDING (BLOCK I, SERIES 100)
     GSE GROUNDING (BLOCK II & LEM)
   - 290020 GYRO CAGING
3. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING, INDICATE USAGE DURING:
   - a. W - BLOCK I, SERIES 100 ONLY
   - b. T - BLOCK II, ONLY
   - c. L - LEM ONLY
   - d. BLANK - ALL G/N CONFIGURATIONS
   - e. TW, TL, OR WL - USED IN MORE THAN ONE G/N CONFIGURATIONS AS SHOWN.

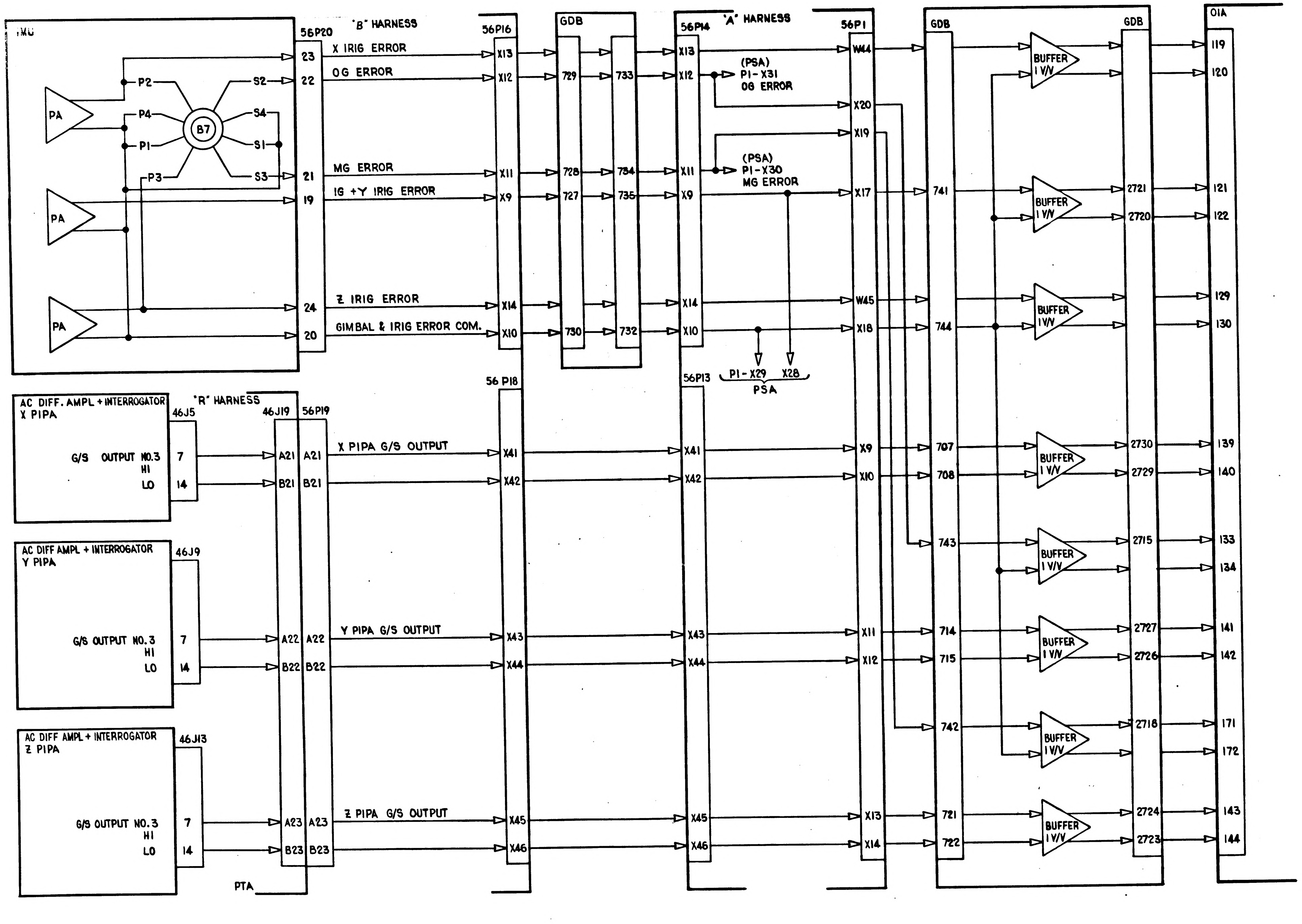

GCP-119 TL
GCP-120 TL
PSS-119W
PSS-120W
XBR-A
RSS-A
TES-121
XBR-A
RSS-A
PSS-121W
PSS-122W
GCP-129TL
GCP-130TL
XBR-A
RSS-C
PSS-129W
PSS-130W
GCP-121TL
GCP-122TL
01A
119 X GYRO ERROR SIGNAL HI
120 IMU GIMBAL & GYRO ERROR SIGNAL LO
121 IMU IG & Y GYRO ERROR SIGNAL HI
122 IMU GIMBAL & GYRO ERROR SIGNAL LO
129 Z GYRO ERROR SIGNAL HI
130 IMU GIMBAL & GYRO ERROR SIGNAL LO
139 X PIPA ERROR MONITOR
140 0 VDC IMU
133 IMU OG ERROR HI
134 IMU GIMBAL & GYRO ERROR SIGNAL LO
XBR-A
RSS-C
TES
141 Y PIPA ERROR MONITOR
142 0 VDC IMU
171 IMU MG ERROR HI
172 IMU GIMBAL & GYRO ERROR SIGNAL LO
XBR-A
RSS-C
TES
143 Z PIPA ERROR MONITOR
144 0 VDC IMU
01A
PHASE SHIFT PANEL
(MS1)
MS1
119
120
121
122
129
130
139
140
141
142
143
144
909
910
MS1
749
747
750
752
751
753
758
756
759
761
760
762
IRIG MONITOR SCOPE
(IMS)
IMS
749
747
750
752
751
753
X IRIG MONITOR
Y IRIG MONITOR
Z IRIG MONITOR
REF. INPUT
IMS
746
748
PIPA MONITOR SCOPE
(PMS)
PMS
758
756
759
761
760
762
X PIPA MONITOR
Y PIPA MONITOR
Z PIPA MONITOR
REF. INPUT
HI
LO
PMS
755
757
VARIABLE PHASE SHIFT NETWORK WITH A NOMINAL -45° PHASE SHIFT, CAPABLE OF PROVIDING A VARIABLE PHASE OUTPUT FROM -25° TO -65° WITH RESPECT TO THE INPUT
VARIABLE PHASE SHIFT NETWORK WITH A NOMINAL 0° PHASE SHIFT, CAPABLE OF PROVIDING A VARIABLE PHASE OUTPUT FROM -8.5° TO 8.5° WITH RESPECT TO THE INPUT
MS1
755
757
746
748
XBR-A
XBR-A
PDL
PDL
GSE 3200 CPS
OR
ISS BUFFERED 11V, 3200 CPS
SEE 2900208
FOR SWITCHING LOGIC
TES-139
XBR-A
RSS-C
TES 141
XBR-A
RSS-C
TES 143
XBR-A
RSS-C

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.
A		Revised Per DO 60459		15 MAY 65	TK T.M.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN R.H. Bebl DATE 3 MAY 65 CHECKED Ed Foster 11 MAY 65 APPROVAL R. Caughin 11 May 65 APPROVAL J. M. Watson	MECHANIZATION DIAGRAM PIPA AND IRIG MONITORING (BLOCK I SERIES 100, BLOCK II, & LEM)
MATERIAL —	NASA APPROVAL A. C. Metzger MIT APPROVAL	CODE IDENT NO. 99974 SIZE E 2900212
CONTRACT NAS 9-497		SCALE NONE SHEET 1 OF 4

2900212

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD


IMU
PA
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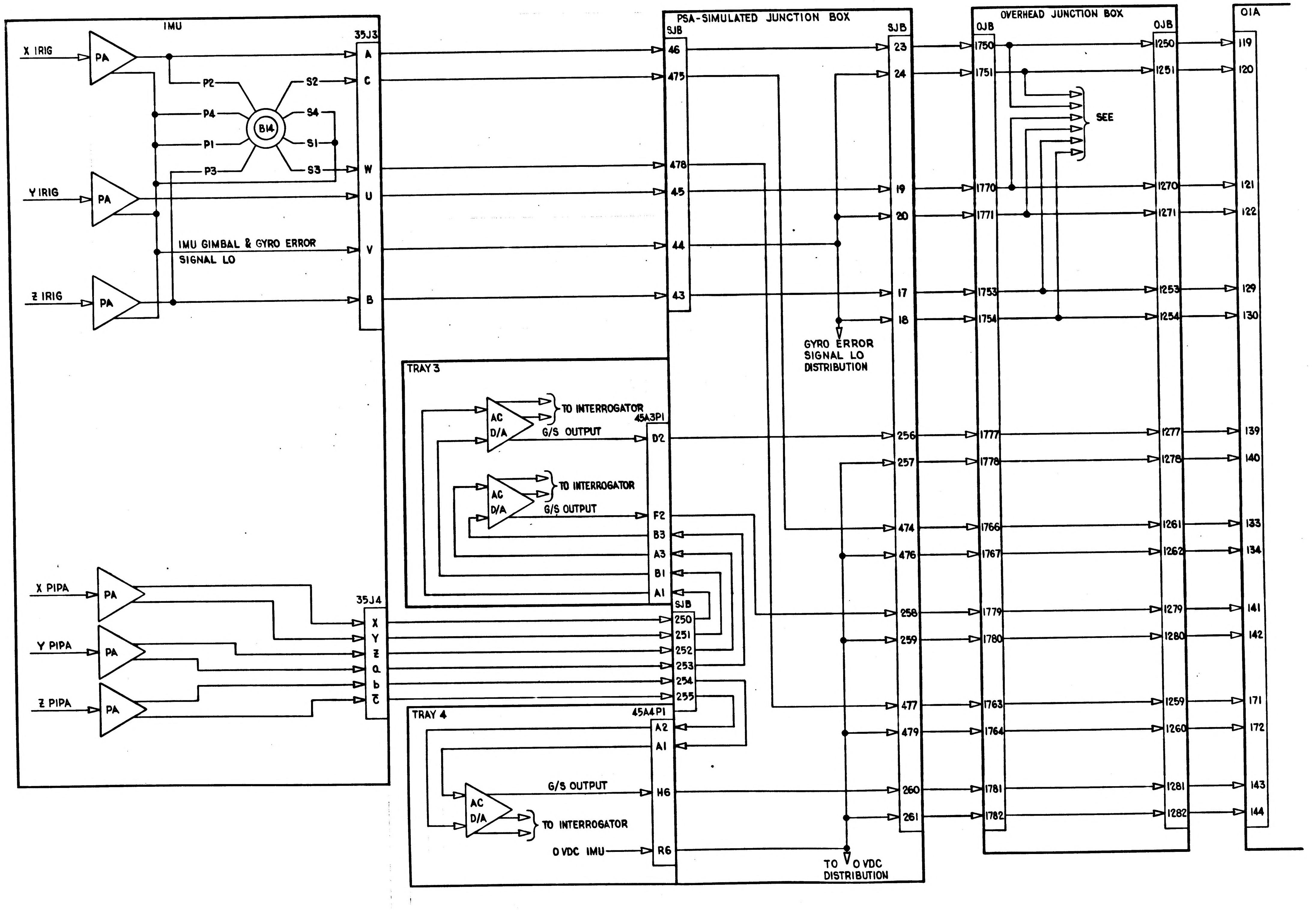
PA
B7
P1
P2
P3
P4
S1
S2
S3
S4
56P20
"B" HARNESS
X IRIG ERROR
OG ERROR
MG ERROR
IG +Y IRIG ERROR
Z IRIG ERROR
GIMBAL & IRIG ERROR COM.
23
22
21
19
24
20
56P16
X13
X12
X11
X9
X14
X10
GDB
729
733
728
734
727
735
730
732
56P14
"A" HARNESS
(PSA)
P1-X31
OG ERROR
(PSA)
P1-X30
MG ERROR
P1-X29
X28
PSA
56P1
W44
X20
X19
X17
W45
X18
GDB
741
744
707
708
743
714
715
742
721
722
BUFFER
1 V/V
GDB
2721
2720
2730
2729
2715
2727
2726
2718
2724
2723
01A
119
120
121
122
129
130
139
140
133
134
141
142
171
172
143
144
AC DIFF. AMPL + INTERROGATOR
X PIPA
46J5
G/S OUTPUT NO.3
HI
LO
7
14
"R" HARNESS
46J19
56P19
A21
B21
X PIPA G/S OUTPUT
56 P18
X41
X42
56P13
X9
X10
AC DIFF AMPL + INTERROGATOR
Y PIPA
46J9
A22
B22
Y PIPA G/S OUTPUT
X43
X44
X11
X12
AC DIFF AMPL + INTERROGATOR
Z PIPA
46J13
A23
B23
Z PIPA G/S OUTPUT
X45
X46
X13
X14
PTA

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS + — − — DECIMALS + — − — ANGLES + — − —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN	MECHANIZATION DIAGRAM - PIPA & IRIG MONITORING (LEM ONLY)
MATERIAL —	DRAWN DATE 3MAY65 CHECKED Ed Foster 11MAY65 APPROVAL 11 May 65 APPROVAL NASA APPROVAL MIT APPROVAL	CODE IDENT NO. 99974 · SIZE E · 2900212
CONTRACT NAS9-497		SCALE NONE · SHEET 2 OF 4

2900212

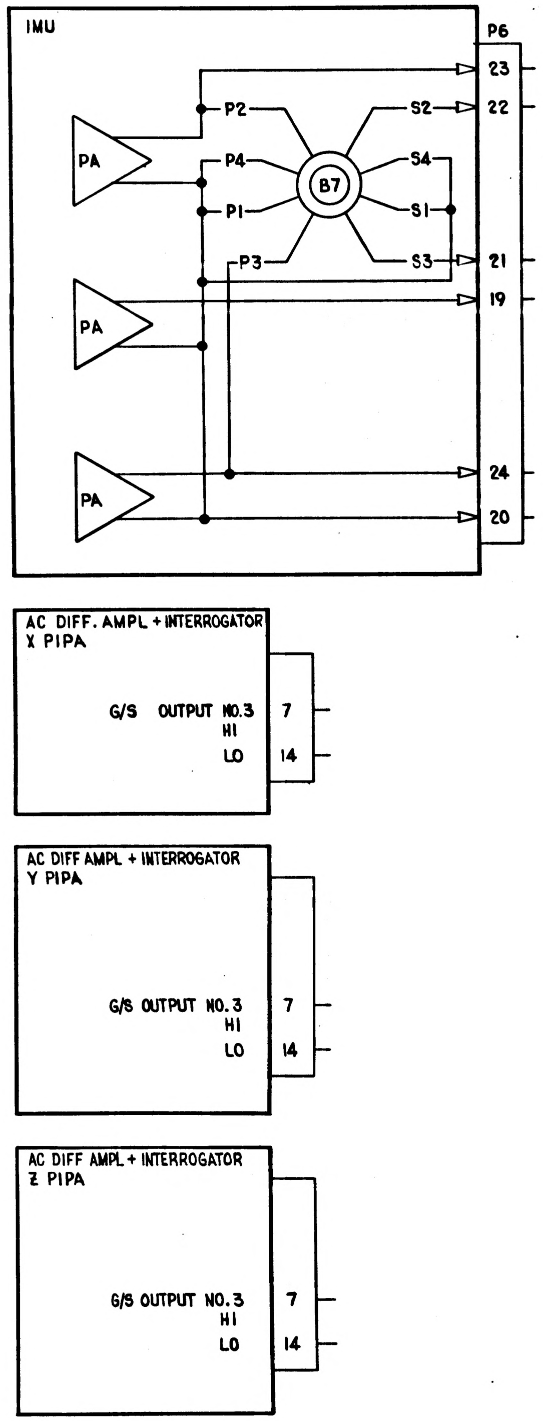
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD.


IMU
X IRIG
Y IRIG
Z IRIG
PA
B14
P1
P2
P3
P4
S1
S2
S3
S4
35J3
IMU GIMBAL & GYRO ERROR SIGNAL LO
X PIPA
Y PIPA
Z PIPA
35J4
TRAY 3
TRAY 4
AC D/A
TO INTERROGATOR
G/S OUTPUT
45A3P1
45A4P1
0 VDC IMU
PSA-SIMULATED JUNCTION BOX
SJB
GYRO ERROR SIGNAL LO DISTRIBUTION
TO 0 VDC DISTRIBUTION
OVERHEAD JUNCTION BOX
OJB
SEE
OIA

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN G.H. Bleh DATE 6 MAY 65 CHECKED Ed Foster 11 MAY 65 APPROVAL M.P. Cuschin 11 MAY 65 APPROVAL J. M. Watson	MECHANIZATION DIAGRAM- PIPA & IRIG MONITORING (BLOCK I SERIES 100 ONLY)
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE E · 2900212
CONTRACT NAS9-497	MIT APPROVAL 20 May 65	SCALE NONE · SHEET 3 OF 4

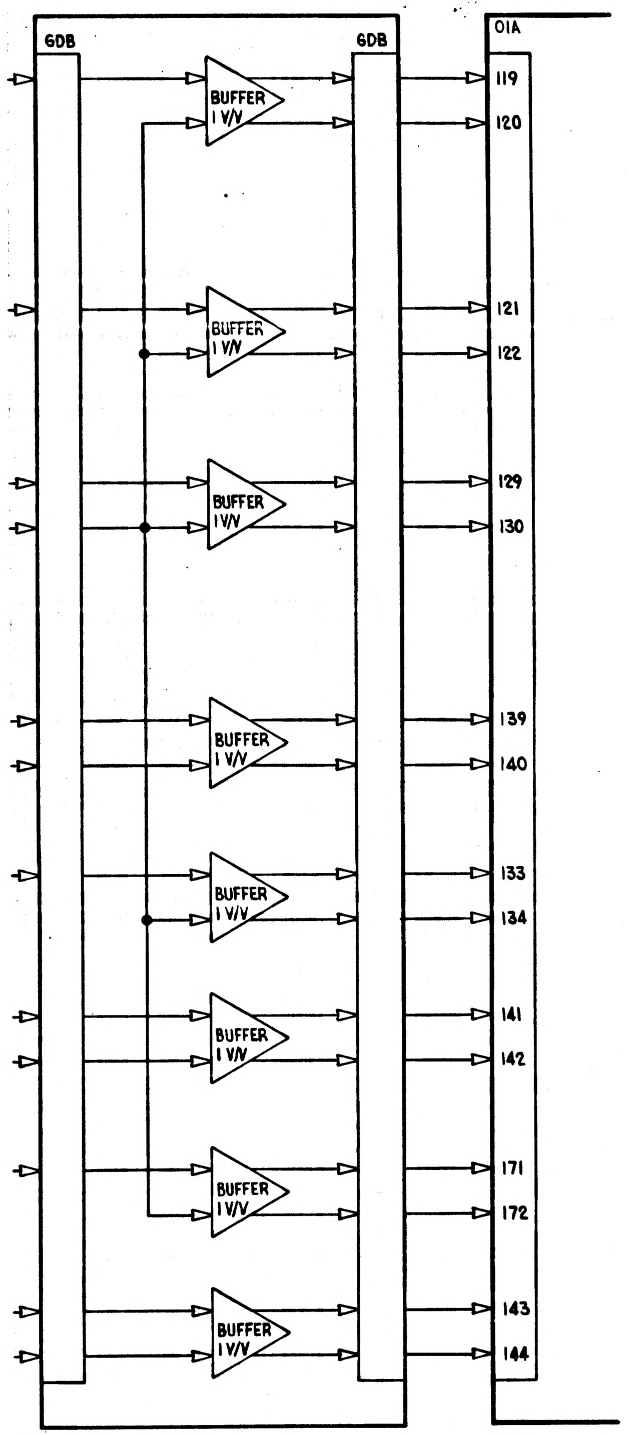
2900212

REVISIONS 9-65					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.



IMU
P6
PA
PA
PA
P1
P2
P3
P4
S1
S2
S3
S4
B7
23
22
21
19
24
20
AC DIFF. AMPL + INTERROGATOR
X PIPA
G/S OUTPUT NO.3
HI
LO
7
14
AC DIFF AMPL + INTERROGATOR
Y PIPA
G/S OUTPUT NO. 3
HI
LO
7
14
AC DIFF AMPL + INTERROGATOR
Z PIPA
G/S OUTPUT NO. 3
HI
LO
7
14

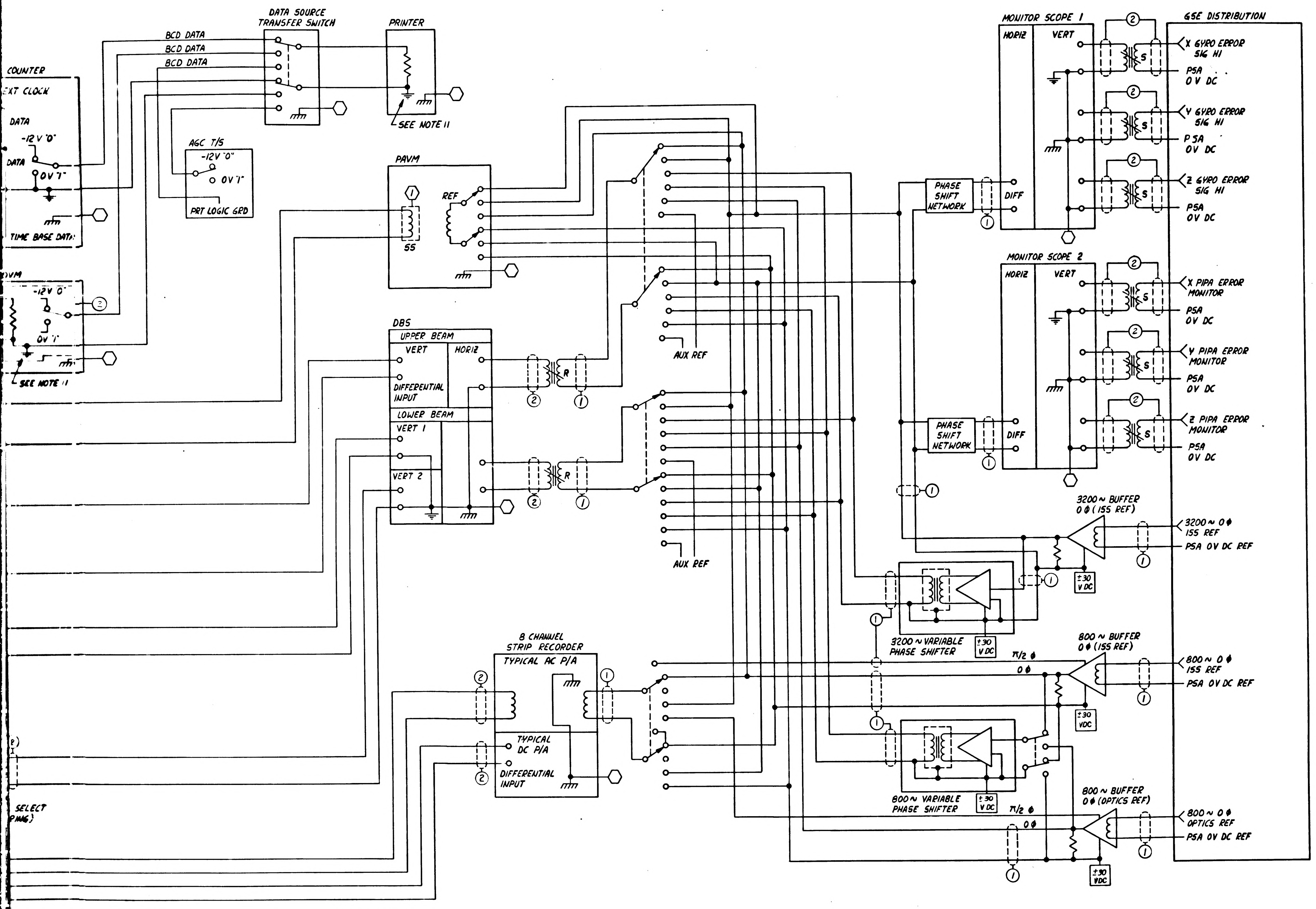
THIS SHEET IS INCOMPLETE



6DB
6DB
OIA
BUFFER
I V/V
119
120
121
122
129
130
139
140
133
134
141
142
171
172
143
144

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± — ± — ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN 3MAY65 DATE CHECKED Ed Foster 11MAY65 APPROVAL 11 MAY 65 APPROVAL J.	MECHANIZATION DIAGRAM - PIPA & IRIG MONITORING (BLOCK II)
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974 · SIZE E · 2900212
CONTRACT NAS 9-497	MIT APPROVAL 20 May 65	SCALE NONE · SHEET 4 OF 4

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.O. 61106			
B		INITIAL RELEASE TDRR 23553			



COUNTER
EXT CLOCK
DATA
-12V "0"
DATA
0V "1"
TIME BASE DATA
DVM
-12V "0"
0V "1"
SEE NOTE 11
SELECT
DATA SOURCE TRANSFER SWITCH
BCD DATA
BCD DATA
BCD DATA
AGC T/S
-12V "0"
0V "1"
PRT LOGIC GRD
PRINTER
SEE NOTE 11
PAVM
REF
SS
DBS
UPPER BEAM
VERT
HORIZ
DIFFERENTIAL INPUT
LOWER BEAM
VERT 1
VERT 2
R
R
AUX REF
AUX REF
8 CHANNEL STRIP RECORDER
TYPICAL AC P/A
TYPICAL DC P/A
DIFFERENTIAL INPUT
MONITOR SCOPE 1
HORIZ
VERT
DIFF
PHASE SHIFT NETWORK
MONITOR SCOPE 2
HORIZ
VERT
DIFF
PHASE SHIFT NETWORK
S
GSE DISTRIBUTION
X GYRO ERROR SIG HI
PSA 0V DC
Y GYRO ERROR SIG HI
PSA 0V DC
Z GYRO ERROR SIG HI
PSA 0V DC
X PIPA ERROR MONITOR
PSA 0V DC
Y PIPA ERROR MONITOR
PSA 0V DC
Z PIPA ERROR MONITOR
PSA 0V DC
3200~ BUFFER 0φ (15S REF)
±30 VDC
3200~ 0φ 15S REF
PSA 0V DC REF
3200~ VARIABLE PHASE SHIFTER
±30 VDC
π/2 φ
0φ
800~ BUFFER 0φ (15S REF)
±30 VDC
800~ 0φ 15S REF
PSA 0V DC REF
800~ VARIABLE PHASE SHIFTER
±30 VDC
π/2 φ
0φ
800~ BUFFER 0φ (OPTICS REF)
±30 VDC
800~ 0φ OPTICS REF
PSA 0V DC REF
①
②

01A

SIGNAL ISOLATION
SHIELDING & GROUNDING

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL

NEXT ASSY | USED ON
APPLICATION

CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN C. Krotak DATE 4 AUG 65
CHECKED 4 AUG 65
APPROVAL
APPROVAL M. Watson 10-15-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
GSE & TEST CONFIGURATION GROUNDING
BLOCK I - SERIES 100
BLOCK II & LEM

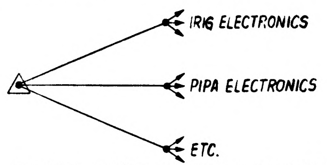
CODE IDENT NO. 99974
SIZE J
2900213
SCALE —
SHEET OF 9

2900213 A

2Y 2900213

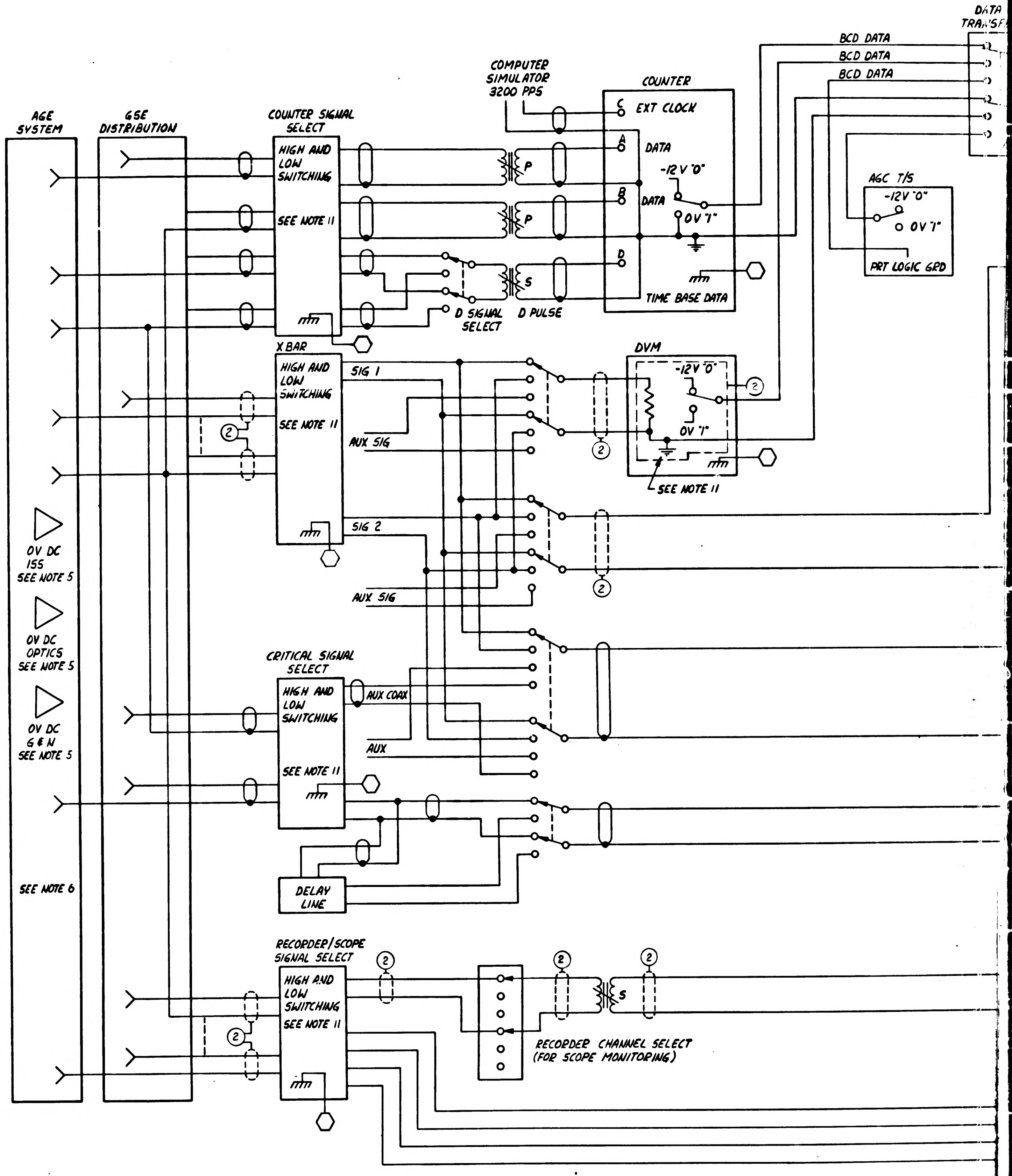
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. ISOLATE ALL CONSOLES FROM ANY OTHER CONSOLE OR GROUNDS EXCEPT AS SHOWN BY INTERCONNECT CABLES.
3. MUST BE ELECTRICALLY ISOLATED FROM STRUCTURES AND GROUND EXCEPT AS SHOWN BY CABLES.
4. CONSOLE CHASSIS CABLES HAVE A PRIME SAFETY FUNCTION. THE EQUIPMENT MUST NEVER HAVE POWER APPLIED WITH THESE CABLES REMOVED.
5. THE 0 VDC BUSES ARE GROUND COLLECTING POINTS:
   EXAMPLE : (SUBSYSTEM DISTRIBUTION)



IRIG ELECTRONICS
PIPA ELECTRONICS
ETC.

   IF A SIGNAL LOW (FOR MONITORING) IS PROVIDED AT THE SIGNAL POINT OF ORIGIN, THE MONITORING LEAD SHALL BE REFERENCED TO IT. IF A SIGNAL LOW IS NOT PROVIDED, THEN THE MONITORING LEAD SHALL BE REFERENCED TO THE 0 VDC POINT FOR THE SUBSYSTEM SIGNAL TO BE MONITORED.
6. ALL AGE SIGNALS WILL BE MONITORED VIA TWO WIRES. EACH SIGNAL HI WILL HAVE ITS LO REFERENCED TO ONE OF THE 0 VDC POINTS SHOWN ABOVE. THE 0 VDC POINT USED WILL DEPEND ON THE SUBSYSTEM ORIGIN OF THE SIGNAL TO BE MONITORED.
7. REFERENCES:
   A. ALL SUBSYSTEM LOWS SHOULD BE REFERENCED TO THEIR RESPECTIVE 0 VDC COLLECTING BUS.
   B. THERE MUST BE ONLY ONE EARTH REFERENCE FOR G&N TESTING. IT SHALL BE VIA G&N ONE POINT GROUND.
   C. LOWS FOR MONITORING SHALL BE REFERENCED AS CLOSE TO THE SIGNAL SOURCE AS POSSIBLE.
   D. WHEN NO SIGNAL LO IS PROVIDED, THE RESPECTIVE SUBSYSTEM LO BUS SHOULD BE USED. HOWEVER WITH MOST DC SIGNALS AND SOME NON-CRITICAL AC SIGNALS THE REFERENCED LO MAY BE PICKED UP AT THE OIA DISTRIBUTION IF IT COMES FROM THE CORRECT SUBSYSTEM GROUND BUS.
8. SYMBOL DESCRIPTION:
   A. ⚠ 0 VDC BUS (SEE NOTE 3)
   B. ○ SHIELD BUS { ① HI ② LO
   C. ⬡ STRUCTURE GROUND BUS (PANEL)
   D. ⊡ ISOLATED BUS
   E. ⊡ CHASSIS CONNECTION (MAIN STRUCTURE)
   F. ☐ PANELS, POWER SUPPLIES
   G. ⊡ FACILITY GROUND REMOTE
   H. ⊡ FACILITY GROUND-EARTH GROUND (SEE NOTE 9)
   J. ⏚ CHASSIS GROUND
   K. ⏚ SIGNAL LOW
   L. S SIGNAL
   M. R REF.
   N. P PULSE
   O. (R) RAYTHEON SUPPLIED CABLE
   P. 1▷ GROUNDING & SHIELDING PER GSED 17A.
   R. 2▷ GROUNDING & SHIELDING PER GSED 18.
   S. 3▷ GROUNDING STRAPS TO BE IN ACCORDANCE WITH THE FOLLOWING, 5:1 LENGTH TO WIDTH RATIO, 1½" FLAT MESH OR EQUIVALENT, BONDING BY OTHER MEANS THAN STRAPS TO BE ELECTRICALLY EQUIVALENT IN CONFORMANCE TO STANDARD MIL SPEC BONDING PROCEDURES
9. AT SOME INSTALLATION SITES THE POWER TO THE ROTARY TABLE WILL BE SUPPLIED VIA WIRES IN CONDUIT. HOWEVER, THE FACILITY GROUND CABLE SHOULD BE CONNECTED TO EARTH GROUND. THIS SHOULD PROVIDE THE BEST SYSTEM OPERATION AND PERSONEL SAFETY.
10. W CABLE NUMBERS ARE FOR REFERENCE ONLY.
11. SIGNALS ISOLATED FROM EACH OTHER AND CHASSIS GROUND.
12. GROUND CABLE AWGS ARE FOR CROSS SECTIONAL AREA REFERENCE ONLY EXCEPT AS NOTED.



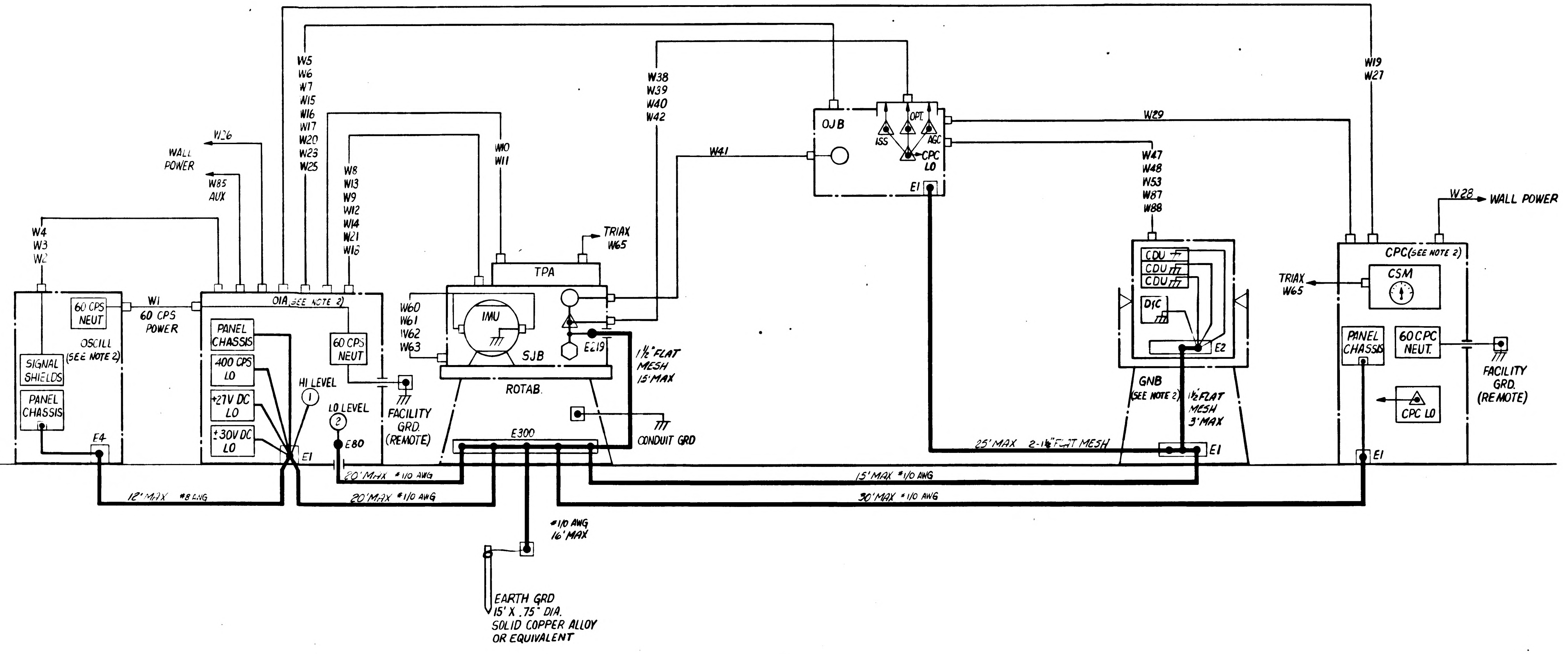
AGE SYSTEM
GSE DISTRIBUTION
COUNTER SIGNAL SELECT
HIGH AND LOW SWITCHING
SEE NOTE 11
COMPUTER SIMULATOR 3200 PPS
COUNTER
C EXT CLOCK
A DATA
B DATA
-12V "0"
0V "1"
D
TIME BASE DATA
P
P
S
D SIGNAL SELECT
D PULSE
BCD DATA
BCD DATA
BCD DATA
DATA TRANSF
AGC T/S
-12V "0"
0V "1"
PRT LOGIC GRD
X BAR
HIGH AND LOW SWITCHING
SEE NOTE 11
SIG 1
AUX SIG
SIG 2
AUX SIG
DVM
-12V "0"
0V "1"
SEE NOTE 11
2
0V DC ISS SEE NOTE 5
0V DC OPTICS SEE NOTE 5
0V DC G&N SEE NOTE 5
SEE NOTE 6
CRITICAL SIGNAL SELECT
HIGH AND LOW SWITCHING
AUX COAX
AUX
SEE NOTE 11
DELAY LINE
RECORDER/SCOPE SIGNAL SELECT
HIGH AND LOW SWITCHING
SEE NOTE 11
S
RECORDER CHANNEL SELECT (FOR SCOPE MONITORING)

2900213 A

1/2900213

REVISIONS

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	REVISED PER D.O. 1106		OCT 65	
	B	INITIAL RELEASE TDRR 23553		OCT 65	

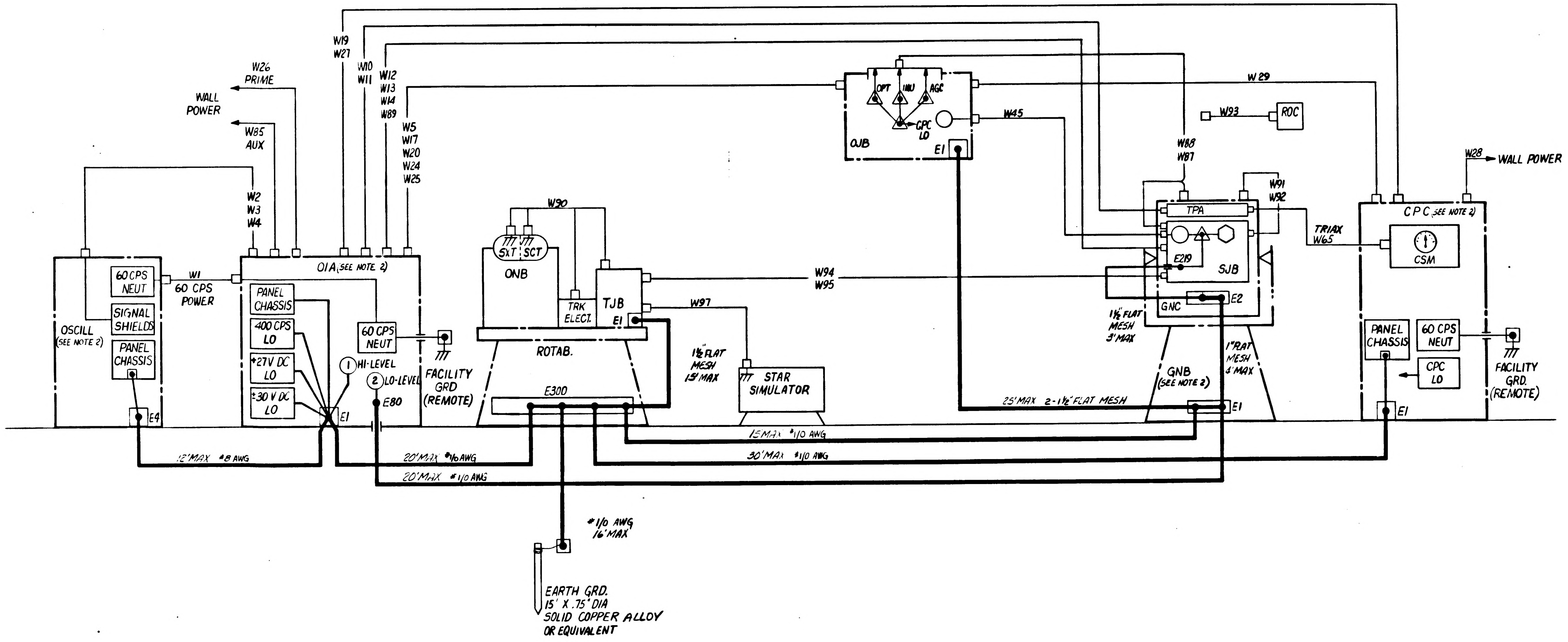


W5
W6
W7
W15
W16
W17
W20
W23
W25
W38
W39
W40
W42
W19
W27
W126
WALL POWER
W85 AUX
W8
W13
W9
W12
W14
W21
W16
W10
W11
W41
OJB
OPT.
ISS
AGC
CPC LO
E1
W29
W47
W48
W53
W87
W88
W28
WALL POWER
W4
W3
W2
TRIAX W65
TPA
60 CPS NEUT
W1
60 CPS POWER
OIA (SEE NOTE 2)
OSCILL (SEE NOTE 2)
PANEL CHASSIS
400 CPS LO
+27V DC LO
±30V DC LO
60 CPS NEUT
SIGNAL SHIELDS
PANEL CHASSIS
HI LEVEL
1
LO LEVEL
2
E80
E1
E4
FACILITY GRD. (REMOTE)
W60
W61
W62
W63
IMU
SJB
E219
ROTAB.
1½" FLAT MESH 15' MAX
E300
CONDUIT GRD
CDU
CDU
CDU
D/C
E2
GNB (SEE NOTE 2)
1½" FLAT MESH 3' MAX
E1
25' MAX 2-1½" FLAT MESH
CPC (SEE NOTE 2)
CSM
TRIAX W65
PANEL CHASSIS
60 CPC NEUT.
FACILITY GRD. (REMOTE)
CPC LO
E1
12' MAX #8 AWG
20' MAX #1/0 AWG
20' MAX #1/0 AWG
15' MAX #1/0 AWG
30' MAX #1/0 AWG
#1/0 AWG 16' MAX
EARTH GRD 15' X .75" DIA. SOLID COPPER ALLOY OR EQUIVALENT

SERIES 100 ISS
UNIVERSAL TEST STATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN DATE 27 JULY 65 CHECKED APPROVAL 4 AUG 65 APPROVAL J M Walsh 10-13-65	MECHANIZATION DIAGRAM GSE & TEST CONFIGURATION GROUNDING BLOCK I - SERIES 100 BLOCK II & LEM
DO NOT SCALE THIS DRAWING		
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE E · 2900213
CONTRACT NAS9-497	MIT APPROVAL	SCALE — · SHEET 2 OF 9

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.O. 61106		12 OCT 65	A.J.F.
B		INITIAL RELEASE TDRR 23553		18 Oct 65	



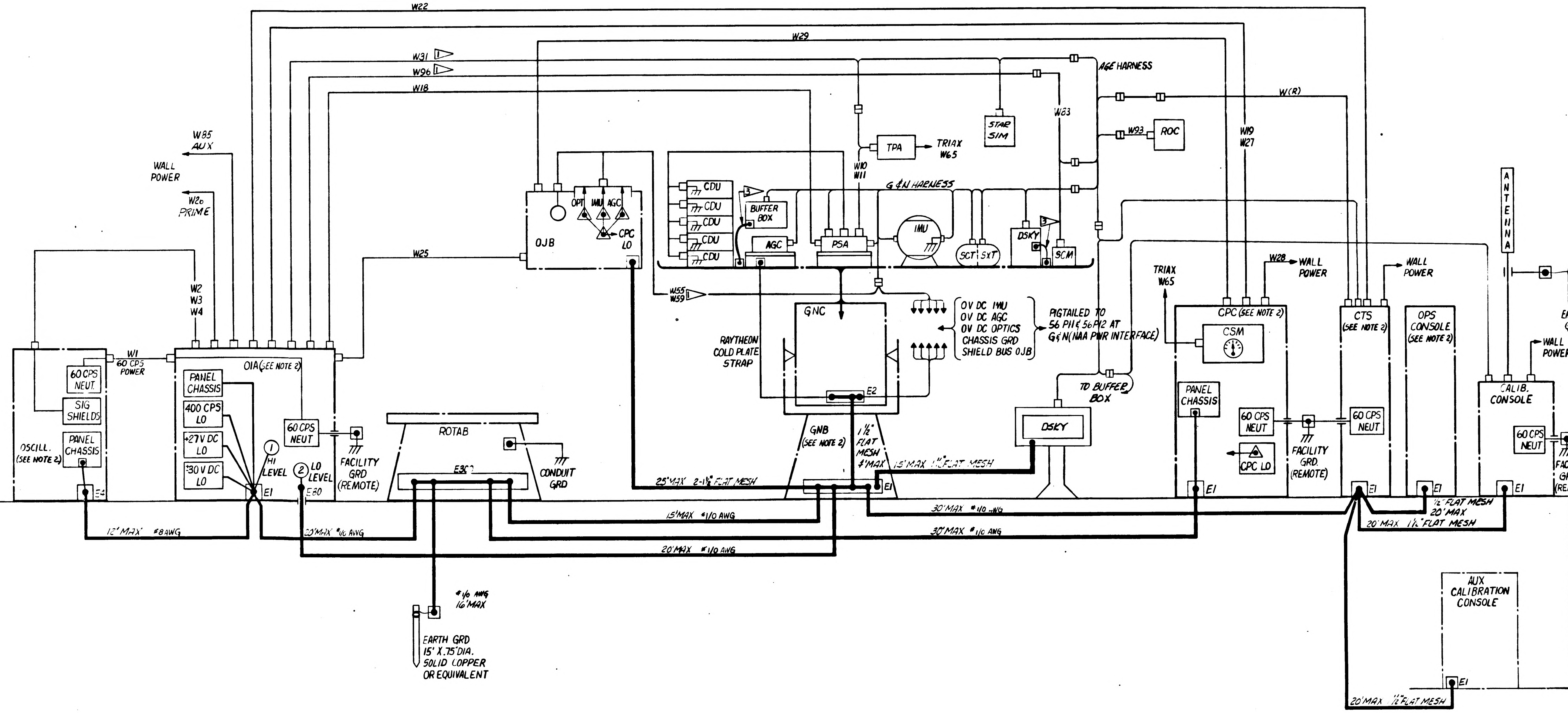
W26
PRIME
WALL
POWER
W85
AUX
W19
W27
W10
W11
W12
W13
W14
W89
W5
W17
W20
W24
W25
W2
W3
W4
OSCILL
(SEE NOTE 2)
60 CPS
NEUT
SIGNAL
SHIELDS
PANEL
CHASSIS
E4
W1
60 CPS
POWER
OIA (SEE NOTE 2)
PANEL
CHASSIS
400 CPS
LO
+27V DC
LO
±30 V DC
LO
60 CPS
NEUT
1 HI-LEVEL
2 LO-LEVEL
E80
E1
FACILITY
GRD
(REMOTE)
12'MAX #8 AWG
20'MAX #1/0 AWG
20'MAX #1/0 AWG
W90
SXT
SCT
ONB
TRK
ELECT.
TJB
E1
ROTAB.
E300
#1/0 AWG
16'MAX
EARTH GRD.
15' X .75" DIA
SOLID COPPER ALLOY
OR EQUIVALENT
W97
1½" FLAT
MESH
15' MAX
STAR
SIMULATOR
15'MAX #1/0 AWG
30'MAX #1/0 AWG
W94
W95
OPT
IMU
AGC
CPC
LO
OJB
E1
W45
W29
W93
ROC
W88
W87
25'MAX 2-1½" FLAT MESH
W91
W92
TPA
E219
SJB
GNC
E2
1½" FLAT
MESH
3' MAX
1" FLAT
MESH
4' MAX
GNB
(SEE NOTE 2)
E1
TRIAX
W65
W28
WALL POWER
CPC (SEE NOTE 2)
CSM
PANEL
CHASSIS
60 CPS
NEUT
CPC
LO
FACILITY
GRD.
(REMOTE)
E1

SERIES 100 OPTICS
UNIVERSAL TEST STATION

2900213 B

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN A.C. Kotik DATE 27 JULY 65 CHECKED M. Manning 4 AUG 65 APPROVAL T.A. McLeod 4 AUG 65 APPROVAL J. M. Walton 10-15-65	MECHANIZATION DIAGRAM GSE & TEST CONFIGURATION GROUNDING BLOCK I - SERIES 100 BLOCK II & LEM
DO NOT SCALE THIS DRAWING		
MATERIAL	NASA APPROVAL	CODE IDENT NO. SIZE E 2900213
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — SHEET 3 OF 9

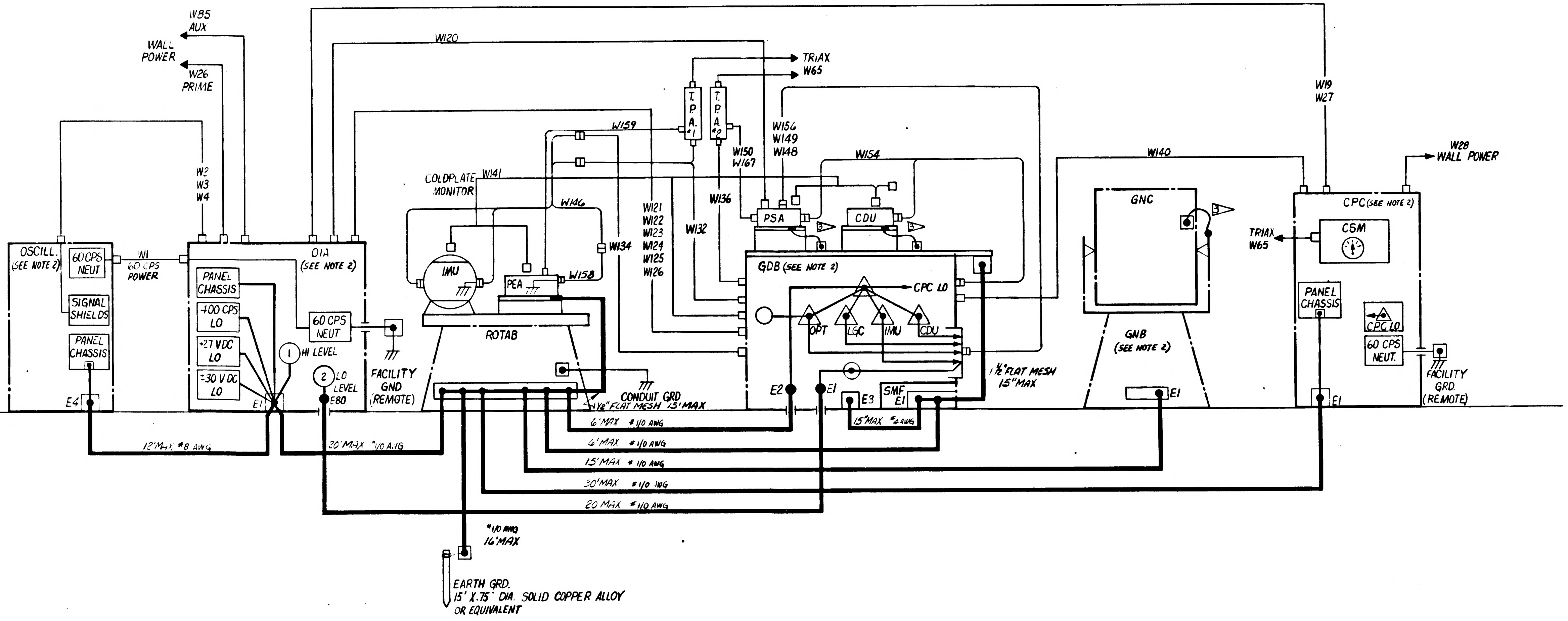
REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	A	REVISED PER O.O. 1106		OCT. 65	[illegible]
	B	INITIAL RBABASE - DRR 23553		[illegible] 65	[illegible]


W22
W29
W31
W96
W18
AGE HARNESS
W(R)
W83
STAR SIM
W93
ROC
TPA
TRIAX W65
W10 W11
W19 W27
W85 AUX
WALL POWER
W20 PRIME
G & N HARNESS
CDU
CDU
CDU
CDU
CDU
BUFFER BOX
AGC
PSA
IMU
SCT
SXT
DSKY
SCM
OJB
OPT
IMU
AGC
CPC LO
W25
W2 W3 W4
W1 60 CPS POWER
W55 W59
GNC
RAYTHEON COLD PLATE STRAP
OV DC IMU
OV DC AGC
OV DC OPTICS
CHASSIS GRD
SHIELD BUS OJB
PIGTAILED TO 56 P11 & 56 P12 AT G & N (NAA PWR INTERFACE)
TRIAX W65
W28
WALL POWER
WALL POWER
ANTENNA
EARTH GRD
WALL POWER
E2
TO BUFFER BOX
60 CPS NEUT
SIG SHIELDS
PANEL CHASSIS
OSCILL. (SEE NOTE 2)
E4
OIA (SEE NOTE 2)
PANEL CHASSIS
400 CPS LO
+27 V DC LO
±30 V DC LO
60 CPS NEUT
① HI LEVEL
② LO LEVEL
E1
E80
FACILITY GRD (REMOTE)
ROTAB
E300
CONDUIT GRD
GNB (SEE NOTE 2)
1½" FLAT MESH 4' MAX
15' MAX 1½" FLAT MESH
25' MAX 2-1½" FLAT MESH
E1
DSKY
CPC (SEE NOTE 2)
CSM
PANEL CHASSIS
60 CPS NEUT
CPC LO
FACILITY GRD. (REMOTE)
E1
CTS (SEE NOTE 2)
60 CPS NEUT
E1
OPS CONSOLE (SEE NOTE 2)
E1
CALIB. CONSOLE
60 CPS NEUT
FACILITY GRD (REMOTE)
E1
12' MAX #8 AWG
20' MAX #1/0 AWG
15' MAX #1/0 AWG
30' MAX #1/0 AWG
30' MAX #1/0 AWG
20' MAX #1/0 AWG
½" FLAT MESH 20' MAX
20' MAX 1½" FLAT MESH
#1/0 AWG 16' MAX
EARTH GRD 15' X .75" DIA. SOLID COPPER OR EQUIVALENT
AUX CALIBRATION CONSOLE
E1
20' MAX 1½" FLAT MESH

SERIES 00 G & N
UNIVERSAL TEST STATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + - + - + - - - - - - -	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN C. Anotch DATE 27 July 65 CHECKED [illegible] 4 Aug 65 APPROVAL T. W. McLeod 4 AUG 65 APPROVAL J. M. Watson 10-15-65	MANNED SPACECRAFT CENTER HOUSTON, TEXAS MECHANIZATION DIAGRAM GSE & TEST CONFIGURATION GROUNDING BLOCK I - SERIES 00
DO NOT SCALE THIS DRAWING MATERIAL	NASA APPROVAL [illegible]	CODE IDENT NO 99974 SIZE E 29C0213
CONTRACT NAS 9-497	MIT APPROVAL [illegible]	SCALE — SHEET 6 OF 7

ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
1	A	REVISED PER D.C. 61106		[illegible] 65	[illegible]
	B	INITIAL RELEASE TDRR 23553		[illegible] 65	[illegible]


W85
AUX
WALL
POWER
W26
PRIME
W120
W2
W3
W4
OSCILL.
(SEE NOTE 2)
60 CPS
NEUT
SIGNAL
SHIELDS
PANEL
CHASSIS
E4
W1
60 CPS
POWER
OIA
(SEE NOTE 2)
PANEL
CHASSIS
400 CPS
LO
+27 VDC
LO
±30 VDC
LO
E1
60 CPS
NEUT
1
HI LEVEL
2
LO
LEVEL
E80
FACILITY
GND
(REMOTE)
COLDPLATE
MONITOR
W141
W146
W159
IMU
PEA
W158
W134
ROTAB
CONDUIT GRD
1/2" FLAT MESH 15' MAX
W121
W122
W123
W124
W125
W126
W132
W136
T.
P.
A.
#1
T.
P.
A.
#2
TRIAX
W65
W150
W167
W156
W149
W148
W154
PSA
CDU
3
GDB (SEE NOTE 2)
CPC LO
OPT
LGC
IMU
CDU
E2
E1
E3
SMF
E1
15" MAX #4 AWG
1 1/2" FLAT MESH
15" MAX
W140
GNC
3
GNB
(SEE NOTE 2)
E1
W19
W27
W28
WALL POWER
TRIAX
W65
CPC (SEE NOTE 2)
CSM
PANEL
CHASSIS
CPC LO
60 CPS
NEUT.
FACILITY
GRD.
(REMOTE)
E1
12' MAX #8 AWG
20' MAX #1/0 AWG
6' MAX #1/0 AWG
6' MAX #1/0 AWG
15' MAX #1/0 AWG
30' MAX #1/0 AWG
20 MAX #1/0 AWG
#1/0 AWG
16' MAX
EARTH GRD.
15' X .75" DIA. SOLID COPPER ALLOY
OR EQUIVALENT

BLOCK II ISS
UNIVERSAL TEST STATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

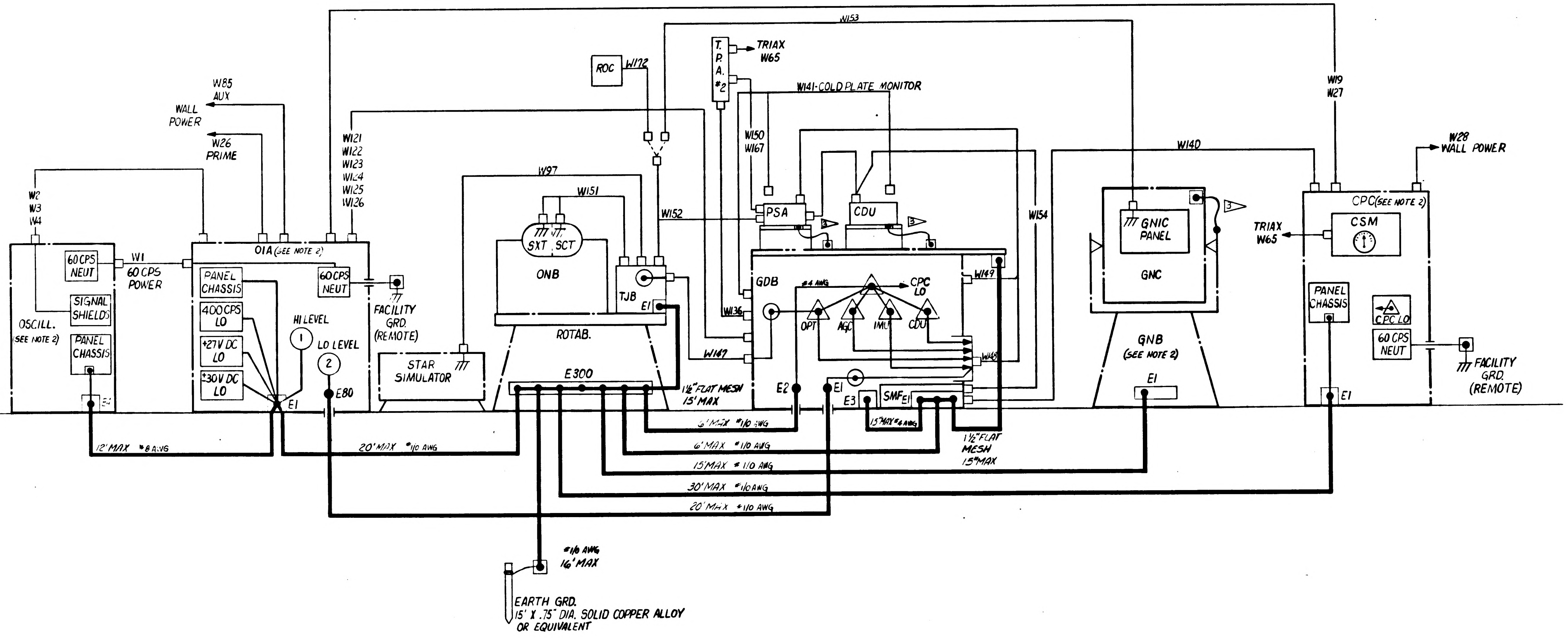
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN 27 JUL 65 DATE
CHECKED 4 AUG 65
APPROVAL 2 AUG 65
APPROVAL -15-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
GSE & TEST CONFIGURATION GROUNDING
BLOCK I-SERIES 100

CODE IDENT NO. 99974
SIZE E
2900213
SCALE —
SHEET 5 OF 7

REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
	F	REVISED PER D.O. 01106		OCT 65	TMD
	3	INITIAL RELEASE TDRR 23553		OCT 65	


W85
AUX
WALL
POWER
W26
PRIME
W2
W3
W4
60 CPS
NEUT
SIGNAL
SHIELDS
OSCILL.
(SEE NOTE 2)
PANEL
CHASSIS
E4
W1
60 CPS
POWER
OIA (SEE NOTE 2)
PANEL
CHASSIS
400 CPS
LO
+27V DC
LO
±30V DC
LO
60 CPS
NEUT
HI LEVEL
1
LO LEVEL
2
E1
E80
FACILITY
GRD.
(REMOTE)
W121
W122
W123
W124
W125
W126
STAR
SIMULATOR
W97
W151
SXT
SCT
ONB
TJB
E1
ROTAB.
E300
ROC
W172
W153
T.
P.
A.
#2
TRIAX
W65
W141-COLD PLATE MONITOR
W150
W167
W152
PSA
CDU
3
3
W154
GDB
#4 AWG
CPC
LO
OPT
AGC
IMU
CDU
W149
W148
W136
W147
E2
E1
E3
SMF E1
1½" FLAT MESH
15' MAX
15" MAX #4 AWG
1½" FLAT
MESH
15" MAX
12' MAX #8 AWG
20' MAX #1/0 AWG
6' MAX #1/0 AWG
6' MAX #1/0 AWG
15' MAX #1/0 AWG
30' MAX #1/0 AWG
20' MAX #1/0 AWG
#1/0 AWG
16' MAX
EARTH GRD.
15' X .75" DIA. SOLID COPPER ALLOY
OR EQUIVALENT
W140
GNIC
PANEL
GNC
3
GNB
(SEE NOTE 2)
E1
W19
W27
W28
WALL POWER
TRIAX
W65
CPC (SEE NOTE 2)
CSM
PANEL
CHASSIS
CPC LO
60 CPS
NEUT
E1
FACILITY
GRD.
(REMOTE)

BLOCK II OPTICS
UNIVERSAL TEST STATION

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

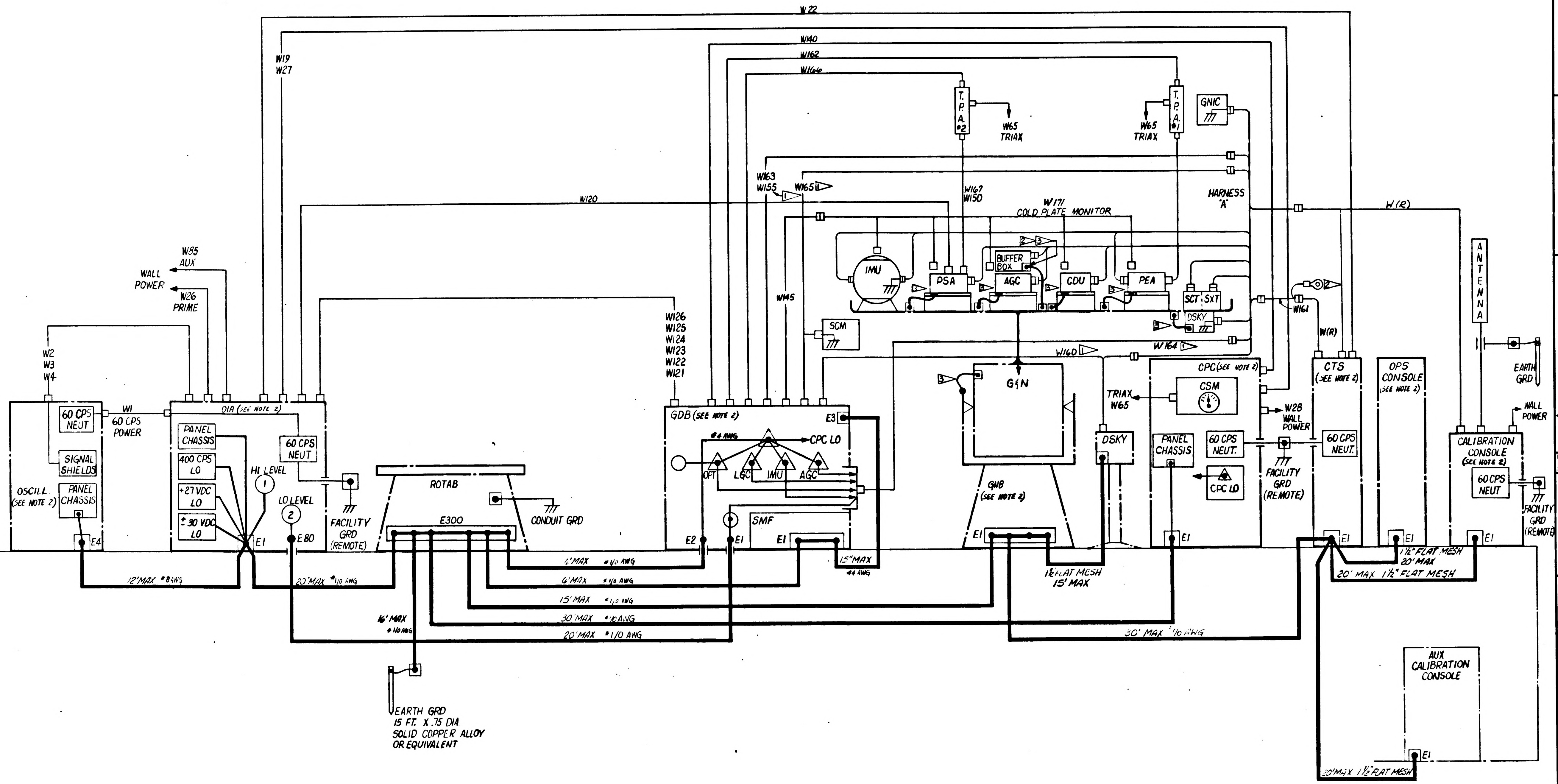
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN C. J. Knott DATE 29 JUL 65
CHECKED 4 AUG 65
APPROVAL 4 AUG 65
APPROVAL 13-8-65
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
GSE & TEST CONFIGURATION GROUNDING
BLOCK I - SERIES 100

CODE IDENT NO. 99974
SIZE E
2900213
SCALE —
SHEET 6 OF 9

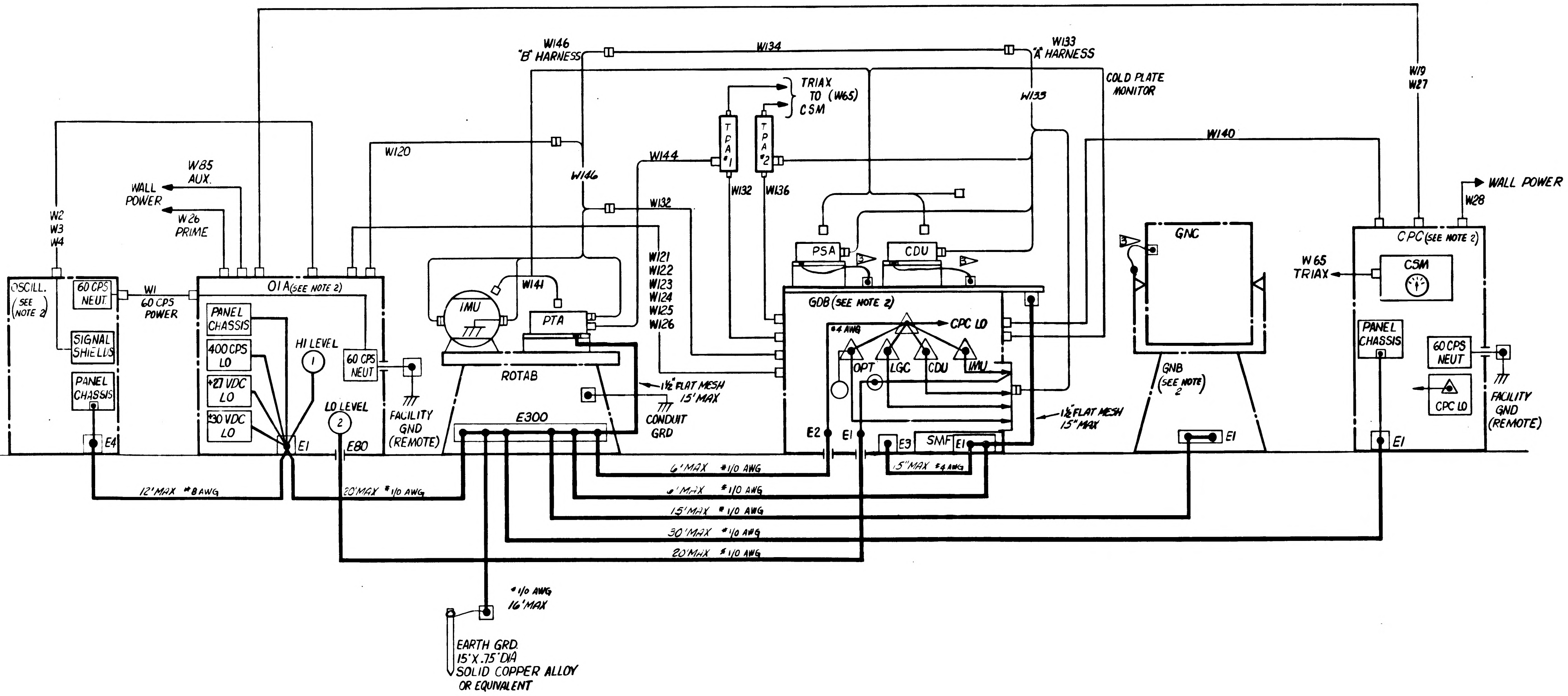
REVISIONS					
ZONE	LTR	DESCRIPTION	CHG. NO.	DATE	APPROVED
..	A	REVISED PER D.O. 61106		12-OCT-65	
	B	INITIAL RELEASE TDRR 23553			


W22
W140
W162
W166
W19
W27
T.P.A. #2
T.P.A. #1
W65 TRIAX
W65 TRIAX
GNIC
W163
W155
W165 1
1
W167
W150
W171
COLD PLATE MONITOR
HARNESS "A"
W(R)
W120
W85 AUX
WALL POWER
W26 PRIME
IMU
BUFFER BOX
PSA
AGC
CDU
PEA
SCT
SXT
DSKY
W145
W161
2
3
SCM
W160 1
W164 1
W126
W125
W124
W123
W122
W121
W2
W3
W4
W1
60 CPS POWER
60 CPS NEUT
SIGNAL SHIELDS
PANEL CHASSIS
OSCILL. (SEE NOTE 2)
E4
OIA (SEE NOTE 2)
PANEL CHASSIS
400 CPS LO
+27 VDC LO
± 30 VDC LO
60 CPS NEUT
HI LEVEL
1
LO LEVEL
2
E1
E80
FACILITY GRD (REMOTE)
ROTAB
E300
CONDUIT GRD
GDB (SEE NOTE 2)
E3
#4 AWG
CPC LO
OPT
LGC
IMU
AGC
SMF
E2
E1
E1
15" MAX
#4 AWG
G&N
GNB (SEE NOTE 2)
E1
TRIAX W65
DSKY
1½" FLAT MESH 15' MAX
CPC (SEE NOTE 2)
CSM
W28 WALL POWER
PANEL CHASSIS
60 CPS NEUT.
CPC LO
FACILITY GRD (REMOTE)
E1
CTS (SEE NOTE 2)
60 CPS NEUT.
E1
OPS CONSOLE (SEE NOTE 2)
E1
ANTENNA
EARTH GRD
WALL POWER
CALIBRATION CONSOLE (SEE NOTE 2)
60 CPS NEUT
FACILITY GRD (REMOTE)
E1
1½" FLAT MESH 20' MAX
20' MAX 1½" FLAT MESH
AUX CALIBRATION CONSOLE
E1
20' MAX 1½" FLAT MESH
12' MAX #8 AWG
20' MAX #1/0 AWG
4' MAX #1/0 AWG
6' MAX #1/0 AWG
15' MAX #1/0 AWG
30' MAX #1/0 AWG
20' MAX #1/0 AWG
16' MAX #1/0 AWG
30' MAX #1/0 AWG
EARTH GRD
15 FT. X .75 DIA
SOLID COPPER ALLOY
OR EQUIVALENT

BLOCK II G&N
UNIVERSAL TEST STATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± — ± — ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	MECHANIZATION DIAGRAM GSE & TEST CONFIGURATION GROUNDING BLOCK I - SERIES 100
DO NOT SCALE THIS DRAWING	DRAWN DATE 28 JULY 65 CHECKED 4 AUG 65 APPROVAL T.A. McLeod 4 AUG 65 APPROVAL J. M. Watson 10-13-65	
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 / SIZE E / 2900213
CONTRACT	MIT APPROVAL	SCALE — / SHEET 7 OF 9

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.O. 61106		OCT 65	AJ
3		INITIAL RELEASE TDRR 23553		18 OCT 65	



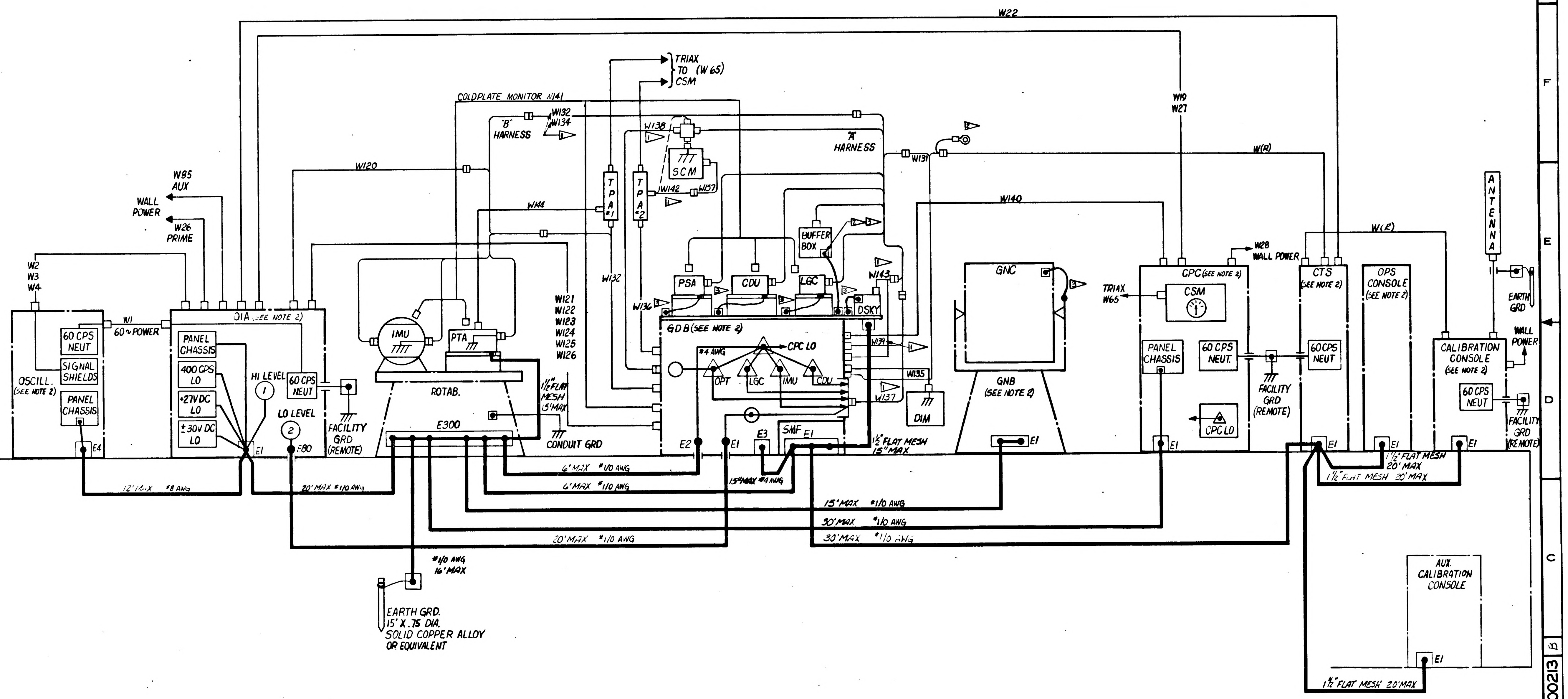
W146
"B" HARNESS
W134
W133
"A" HARNESS
COLD PLATE MONITOR
W133
W19
W27
TRIAX TO (W65) CSM
T P A #1
T P A #2
W120
W144
W146
W132
W136
W132
W140
W85 AUX.
WALL POWER
W26 PRIME
W2
W3
W4
WALL POWER
W28
OSCILL. (SEE NOTE 2)
60 CPS NEUT.
SIGNAL SHIELDS
PANEL CHASSIS
E4
W1 60 CPS POWER
OIA (SEE NOTE 2)
PANEL CHASSIS
400 CPS LO
+27 VDC LO
+30 VDC LO
HI LEVEL
1
LO LEVEL
2
E1
E80
60 CPS NEUT
FACILITY GND (REMOTE)
IMU
W141
PTA
ROTAB
E300
1½" FLAT MESH 15' MAX
CONDUIT GRD
W121
W122
W123
W124
W125
W126
PSA
CDU
GDB (SEE NOTE 2)
#4 AWG
CPC LO
OPT
LGC
CDU
IMU
1½" FLAT MESH 15" MAX
E2
E1
E3
SMF
E1
GNC
GNB (SEE NOTE 2)
E1
W 65 TRIAX
CPC (SEE NOTE 2)
CSM
PANEL CHASSIS
60 CPS NEUT
CPC LO
FACILITY GND (REMOTE)
E1
12' MAX #8 AWG
20' MAX #1/0 AWG
6' MAX #1/0 AWG
6' MAX #1/0 AWG
15' MAX #1/0 AWG
30' MAX #1/0 AWG
20' MAX #1/0 AWG
5" MAX #4 AWG
#1/0 AWG
16' MAX
EARTH GRD.
15' X .75" DIA
SOLID COPPER ALLOY
OR EQUIVALENT

LEM ISS
UNIVERSAL TEST STATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN	
	DRAWN 27 JULY 65 CHECKED DATE 8 AUG 65 APPROVAL 4 AUG 65 APPROVAL 10-15-65	MECHANIZATION DIAGRAM GSE & TEST CONFIGURATION GROUNDING BLOCK I - SERIES 100
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE E · 2900213
CONTRACT NAS 9-497	MIT APPROVAL 29 Oct 65	SCALE — · SHEET 8 OF 9

2900213 A

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	
A	-	REVISED PER D.O. 61106		65	
Ⓜ B		INITIAL RELEASE TDRR 23553			

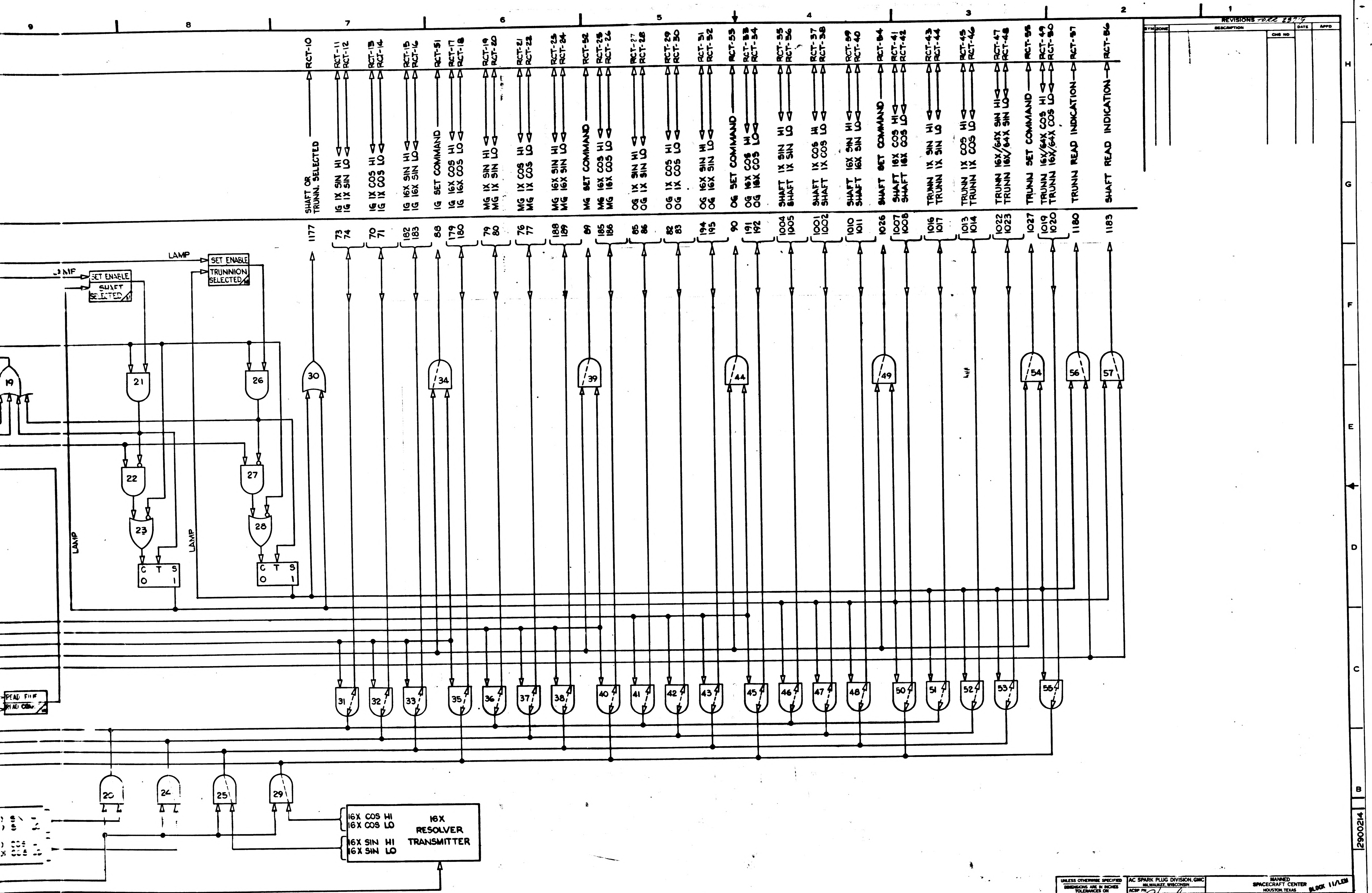


W22
W19
W27
W(P)
W(P)
TRIAX
TO (W 65)
CSM
COLDPLATE MONITOR W141
"B"
HARNESS
W132
W134
W138
SCM
"A"
HARNESS
W131
W140
W120
W85
AUX
WALL
POWER
W26
PRIME
W144
W142
W157
T P A #1
T P A #2
W132
W136
W121
W122
W123
W124
W125
W126
BUFFER BOX
PSA
CDU
LGC
DSKY
W143
W139
W135
W137
DIM
GDB (SEE NOTE 2)
#4 AWG
CPC LO
OPT
LGC
IMU
CDU
SMF
E1
E2
E3
GNC
TRIAX
W65
GNB
(SEE NOTE 2)
GPC (SEE NOTE 2)
W28
WALL POWER
CSM
PANEL
CHASSIS
60 CPS
NEUT.
CPC LO
FACILITY
GRD
(REMOTE)
CTS
(SEE NOTE 2)
60 CPS
NEUT
OPS
CONSOLE
(SEE NOTE 2)
A N T E N N A
EARTH
GRD
WALL
POWER
CALIBRATION
CONSOLE
(SEE NOTE 2)
60 CPS
NEUT
FACILITY
GRD
(REMOTE)
W2
W3
W4
OSCILL.
(SEE NOTE 2)
60 CPS
NEUT
SIGNAL
SHIELDS
PANEL
CHASSIS
E4
W1
60~ POWER
OIA (SEE NOTE 2)
PANEL
CHASSIS
400 CPS
LO
+27V DC
LO
±30V DC
LO
E1
HI LEVEL
1
LO LEVEL
2
E80
60 CPS
NEUT
FACILITY
GRD
(REMOTE)
IMU
PTA
ROTAB.
E300
1½" FLAT
MESH
15' MAX
CONDUIT GRD
12' MAX #8 AWG
20' MAX #1/0 AWG
6' MAX #1/0 AWG
6' MAX #1/0 AWG
15" MAX #4 AWG
1½" FLAT MESH
15" MAX
15' MAX #1/0 AWG
30' MAX #1/0 AWG
20' MAX #1/0 AWG
30' MAX #1/0 AWG
#1/0 AWG
16' MAX
EARTH GRD.
15' X .75 DIA.
SOLID COPPER ALLOY
OR EQUIVALENT
E1
E1
E1
E1
1½" FLAT MESH
20' MAX
1½" FLAT MESH 20' MAX
AUX.
CALIBRATION
CONSOLE
E1
1½" FLAT MESH 20' MAX

2900213 B

LEM G&N
UNIVERSAL TEST STATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES +- +- +- -- -- --	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN C. J. Kutch DATE 27 JULY 65 CHECKED 4 AUG 65 APPROVAL MSC 4 AUG 65 APPROVAL 10-15-65	MECHANIZATION DIAGRAM GSE & TEST CONFIGURATION GROUNDING BLOCK I - SERIES 100
DO NOT SCALE THIS DRAWING		
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 | SIZE E | 2900213
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — | SHEET 9 OF 9



REVISIONS
SYM
ZONE
DESCRIPTION
CHG NO
DATE
APPD
RCT-10
SHAFT OR TRUNN. SELECTED
1177
RCT-11
RCT-12
IG 1X SIN HI
IG 1X SIN LO
73
74
RCT-13
RCT-14
IG 1X COS HI
IG 1X COS LO
70
71
RCT-15
RCT-16
IG 16X SIN HI
IG 16X SIN LO
182
183
RCT-51
IG SET COMMAND
88
RCT-17
RCT-18
IG 16X COS HI
IG 16X COS LO
179
180
RCT-19
RCT-20
MG 1X SIN HI
MG 1X SIN LO
79
80
RCT-21
RCT-22
MG 1X COS HI
MG 1X COS LO
76
77
RCT-23
RCT-24
MG 16X SIN HI
MG 16X SIN LO
188
189
RCT-52
MG SET COMMAND
89
RCT-25
RCT-26
MG 16X COS HI
MG 16X COS LO
185
186
RCT-27
RCT-28
OG 1X SIN HI
OG 1X SIN LO
85
86
RCT-29
RCT-30
OG 1X COS HI
OG 1X COS LO
82
83
RCT-31
RCT-32
OG 16X SIN HI
OG 16X SIN LO
194
195
RCT-53
OG SET COMMAND
90
RCT-33
RCT-34
OG 16X COS HI
OG 16X COS LO
191
192
RCT-35
RCT-36
SHAFT 1X SIN HI
SHAFT 1X SIN LO
1004
1005
RCT-37
RCT-38
SHAFT 1X COS HI
SHAFT 1X COS LO
1001
1002
RCT-39
RCT-40
SHAFT 16X SIN HI
SHAFT 16X SIN LO
1010
1011
RCT-54
SHAFT SET COMMAND
1026
RCT-41
RCT-42
SHAFT 16X COS HI
SHAFT 16X COS LO
1007
1008
RCT-43
RCT-44
TRUNN 1X SIN HI
TRUNN 1X SIN LO
1016
1017
RCT-45
RCT-46
TRUNN 1X COS HI
TRUNN 1X COS LO
1013
1014
RCT-47
RCT-48
TRUNN 16X/64X SIN HI
TRUNN 16X/64X SIN LO
1022
1023
RCT-55
TRUNN SET COMMAND
1027
RCT-49
RCT-50
TRUNN 16X/64X COS HI
TRUNN 16X/64X COS LO
1019
1020
RCT-57
TRUNN READ INDICATION
1180
RCT-56
SHAFT READ INDICATION
1183
LAMP
SET ENABLE
SHAFT SELECTED
SET ENABLE
TRUNNION SELECTED
LAMP
LAMP
19
21
22
23
26
27
28
C T S
O 1
C T S
O 1
30
34
39
44
49
54
56
57
31
32
33
35
36
37
38
40
41
42
43
45
46
47
48
50
51
52
53
55
READ FINE
READ CRS
20
24
25
29
16X COS HI
16X COS LO
16X SIN HI
16X SIN LO
16X RESOLVER TRANSMITTER
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

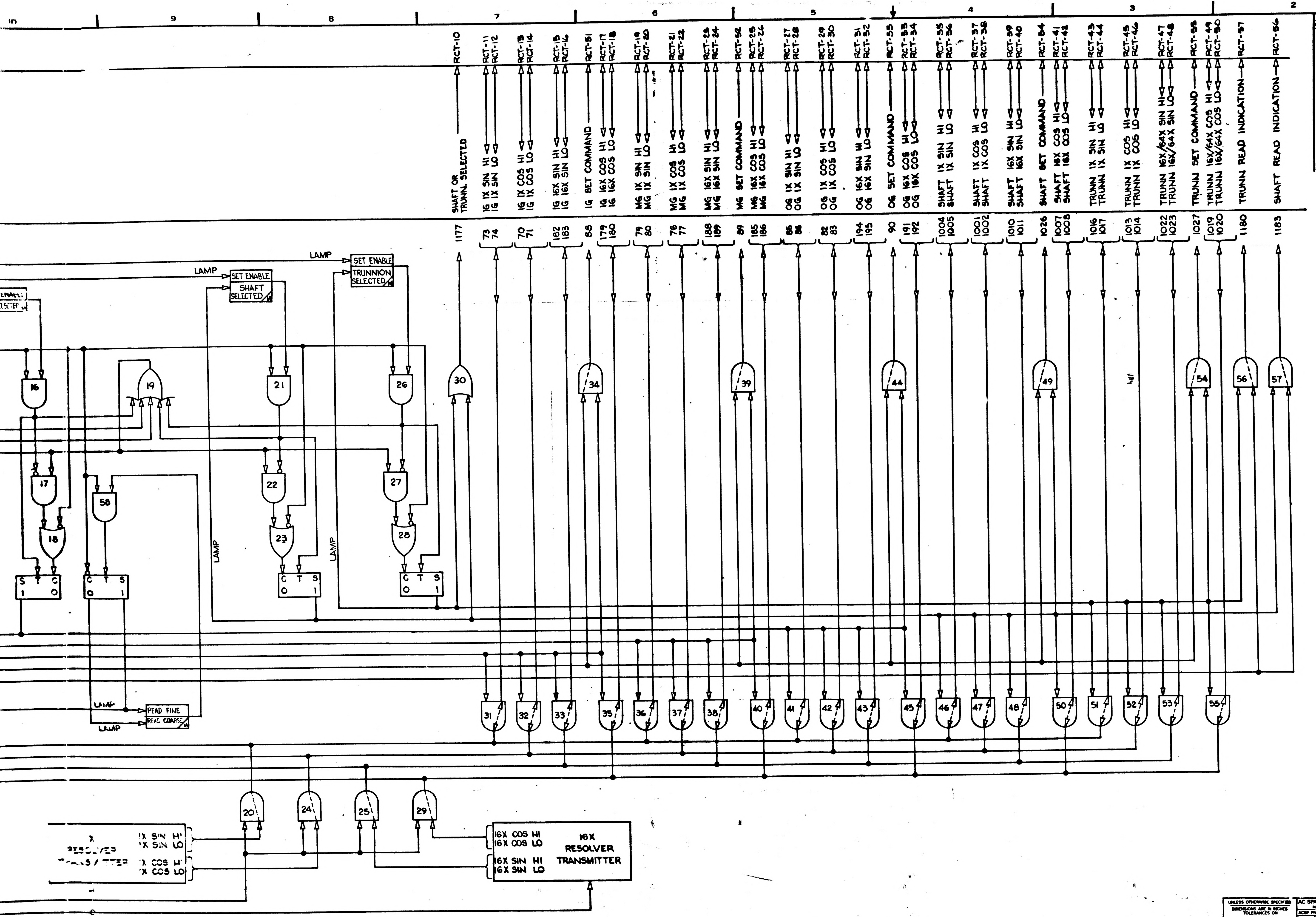
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± — ± — ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN R. Pautsch DATE 23 JUL 65 CHECKED 11 AUG 65 APPROVAL APPROVAL	MANNED SPACECRAFT CENTER HOUSTON, TEXAS BLOCK II/LEM MECHANIZATION DIAGRAM- RESOLVER CIRCUIT TESTER CONTROL PANEL (BLOCK II & LEM)
DO NOT SCALE THIS DRAWING MATERIAL —	A. C. MEYER NASA APPROVAL	CODE IDENT NO. 99974 SIZE J2 2900214
CONTRACT NAS 9-497	MIT APPROVAL	SCALE NONE SHEET 1 OF 3

2900214

2900214

3H

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD



10
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
RCT-10
RCT-11
RCT-12
RCT-13
RCT-14
RCT-15
RCT-16
RCT-51
RCT-17
RCT-18
RCT-19
RCT-20
RCT-21
RCT-22
RCT-23
RCT-24
RCT-52
RCT-25
RCT-26
RCT-27
RCT-28
RCT-29
RCT-30
RCT-31
RCT-32
RCT-53
RCT-33
RCT-34
RCT-35
RCT-36
RCT-37
RCT-38
RCT-39
RCT-40
RCT-54
RCT-41
RCT-42
RCT-43
RCT-44
RCT-45
RCT-46
RCT-47
RCT-48
RCT-56
RCT-49
RCT-50
RCT-57
RCT-56
SHAFT OR TRUNN. SELECTED
IG 1X SIN HI
IG 1X SIN LO
IG 1X COS HI
IG 1X COS LO
IG 16X SIN HI
IG 16X SIN LO
IG SET COMMAND
IG 16X COS HI
IG 16X COS LO
MG 1X SIN HI
MG 1X SIN LO
MG 1X COS HI
MG 1X COS LO
MG 16X SIN HI
MG 16X SIN LO
MG SET COMMAND
MG 16X COS HI
MG 16X COS LO
OG 1X SIN HI
OG 1X SIN LO
OG 1X COS HI
OG 1X COS LO
OG 16X SIN HI
OG 16X SIN LO
OG SET COMMAND
OG 16X COS HI
OG 16X COS LO
SHAFT 1X SIN HI
SHAFT 1X SIN LO
SHAFT 1X COS HI
SHAFT 1X COS LO
SHAFT 16X SIN HI
SHAFT 16X SIN LO
SHAFT SET COMMAND
SHAFT 16X COS HI
SHAFT 16X COS LO
TRUNN 1X SIN HI
TRUNN 1X SIN LO
TRUNN 1X COS HI
TRUNN 1X COS LO
TRUNN 16X/64X SIN HI
TRUNN 16X/64X SIN LO
TRUNN SET COMMAND
TRUNN 16X/64X COS HI
TRUNN 16X/64X COS LO
TRUNN READ INDICATION
SHAFT READ INDICATION
1177
73
74
70
71
182
183
88
179
180
79
80
76
77
188
189
89
185
186
85
86
82
83
194
195
90
191
192
1004
1005
1001
1002
1010
1011
1026
1007
1008
1016
1017
1013
1014
1022
1023
1027
1019
1020
1180
1183
LAMP
SET ENABLE
SHAFT SELECTED
LAMP
SET ENABLE
TRUNNION SELECTED
ENABLE
SELECTED
16
17
18
19
21
22
23
26
27
28
30
34
39
44
49
54
56
57
58
S T C
1 0
C T S
0 1
C T S
0 1
C T S
0 1
LAMP
LAMP
LAMP
READ FINE
READ COARSE
LAMP
31
32
33
35
36
37
38
40
41
42
43
45
46
47
48
50
51
52
53
55
20
24
25
29
1X RESOLVER TRANSMITTER
1X SIN HI
1X SIN LO
1X COS HI
1X COS LO
16X COS HI
16X COS LO
16X SIN HI
16X SIN LO
16X RESOLVER TRANSMITTER

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± — ± — ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS BLOCK II/LEM
	ACSP PN	MECHANIZATION DIAGRAM- RESOLVER CIRCUIT TESTER CONTROL PANEL (BLOCK I & LEM)
	DRAWN DATE 28 JUL 65	
	CHECKED AUG 65	
	APPROVAL	
DO NOT SCALE THIS DRAWING	APPROVAL	
MATERIAL —	A. C. METZGER NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 2900214
CONTRACT NAS 9-497	MIT APPROVAL	SCALE NONE · SHEET OF

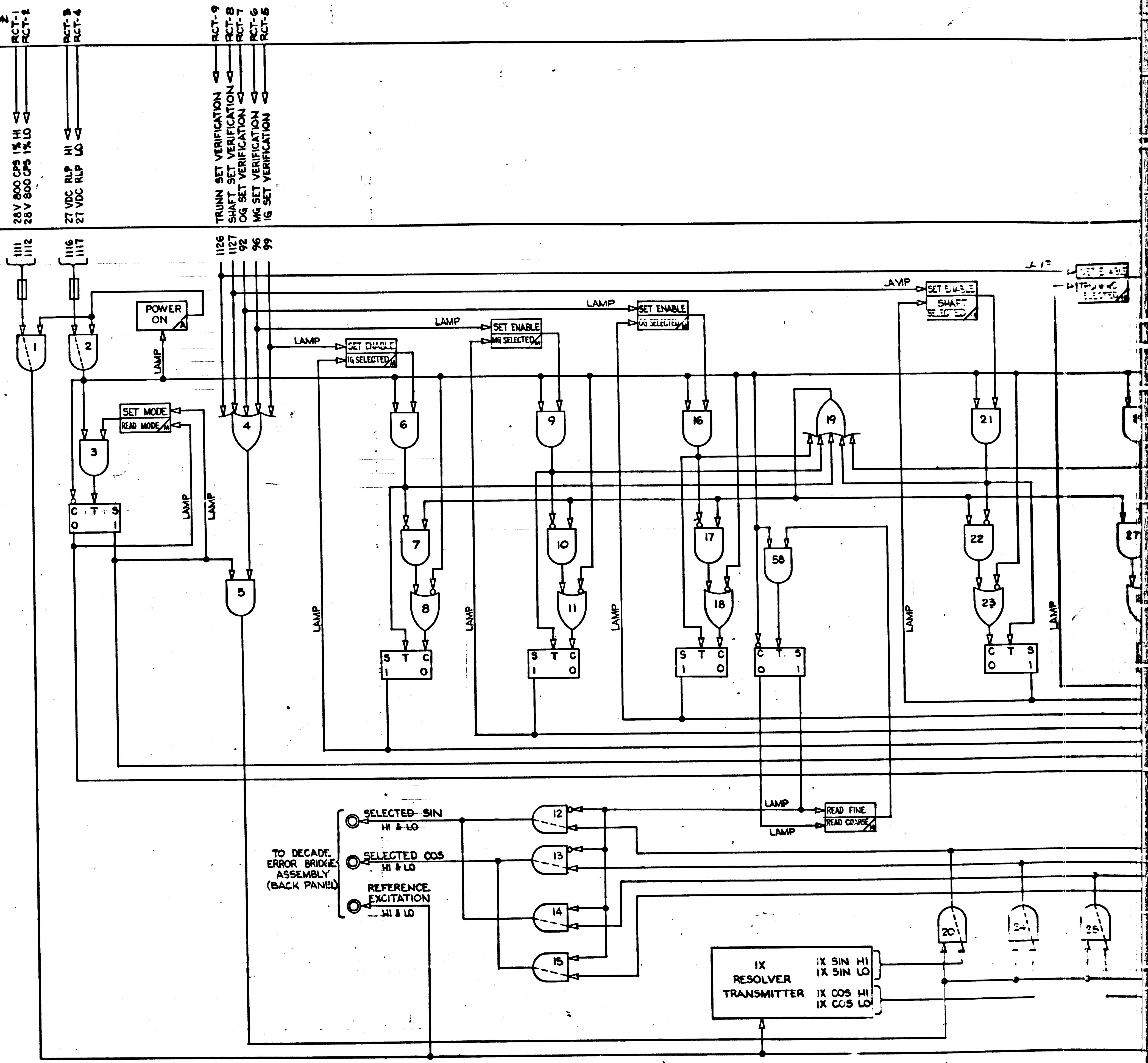
2900214

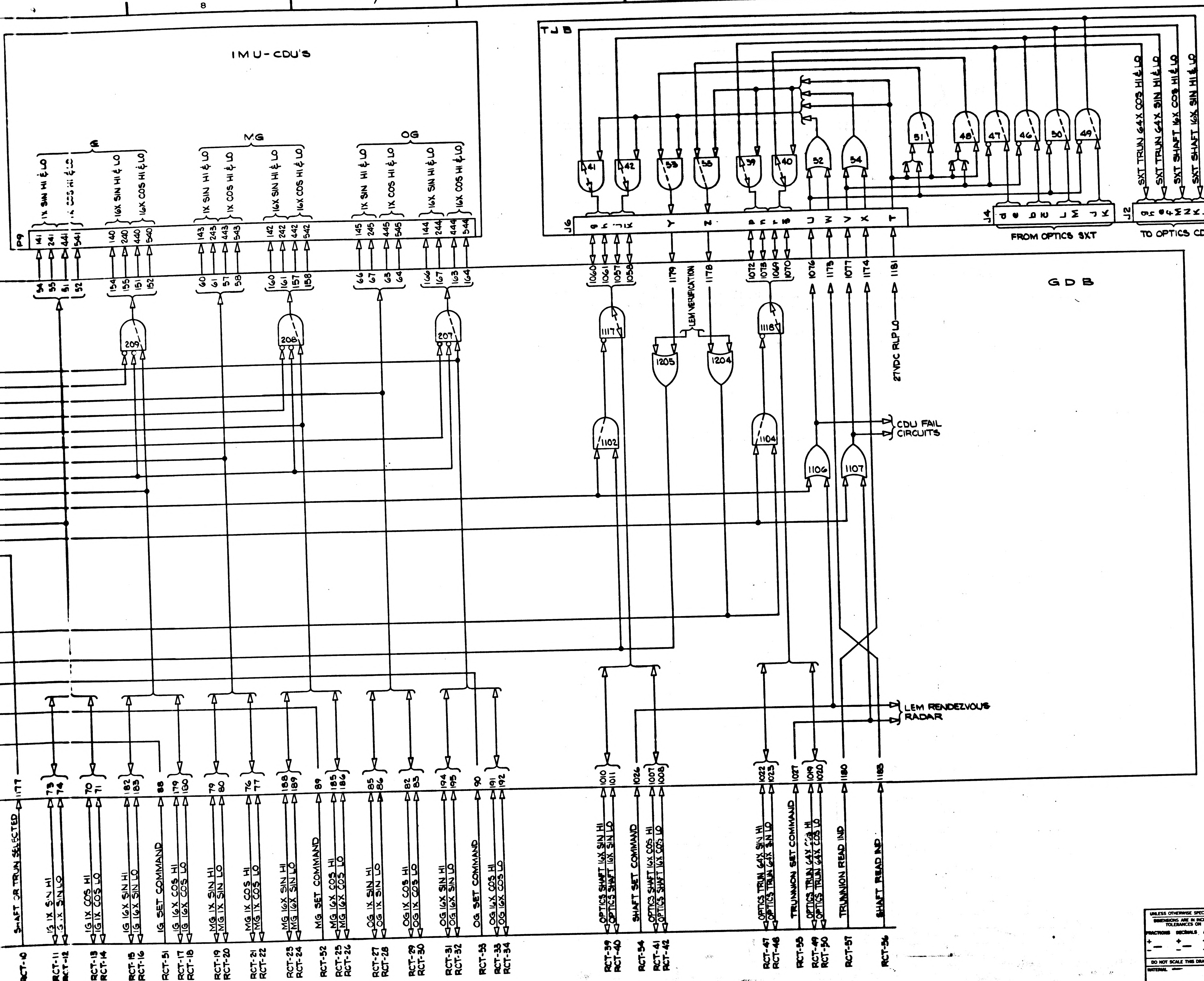
2900214	REV LTR	SH 1

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. STANDARD LOGIC SYMBOLOGY PER MIL-STD-806.
3. ADDITIONAL NON-STANDARD SYMBOLOGY.
   - INDICATES AN "AND" GATE WITH A UNILATERAL SWITCHED SIGNAL.
   - INDICATES AN "AND" GATE WITH A BILATERAL SWITCHED SIGNAL.
   - NAME M — INDICATES LIGHTED PUSHBUTTON (M-MOMENTARY ACTION, A-ALTERNATE ACTION)
   - NAME / NAME M — INDICATES LIGHTED PUSHBUTTON SPLIT SCREEN (M-MOMENTARY ACTION, A-ALTERNATE ACTION)
4. ALL INTERFACE NUMBERS REFLECT GSE DISTRIBUTION BOX REFERENCE NUMBERS.
5. REFERENCE DRAWINGS:

2900127	SPECIFICATION CONTROL DRAWING DECADE ERROR BRIDGE ASSEMBLY
2900206	TEST SELECTOR (SERIES 100, BLOCK II & LEM) TES


MECHANIZATION DIAGRAM INTERFACE
RCT-1
RCT-2
RCT-3
RCT-4
RCT-9
RCT-8
RCT-7
RCT-6
RCT-5
28 V 800 CPS 1% HI
28 V 800 CPS 1% LO
27 VDC RLP HI
27 VDC RLP LO
TRUNN SET VERIFICATION
SHAFT SET VERIFICATION
OG SET VERIFICATION
MG SET VERIFICATION
IG SET VERIFICATION
1111
1112
1116
1117
1126
1127
92
96
99
POWER ON A
LAMP
SET MODE
READ MODE M
SET ENABLE
IG SELECTED M
SET ENABLE
MG SELECTED M
SET ENABLE
OG SELECTED M
SET ENABLE
SHAFT SELECTED M
1
2
3
4
5
6
7
8
9
10
11
16
17
18
19
21
22
23
27
58
C T S
O I
S T C
I O
READ FINE
READ COARSE M
SELECTED SIN
HI & LO
SELECTED COS
HI & LO
REFERENCE EXCITATION
HI & LO
TO DECADE ERROR BRIDGE ASSEMBLY (BACK PANEL)
12
13
14
15
20
24
25
IX RESOLVER TRANSMITTER
IX SIN HI
IX SIN LO
IX COS HI
IX COS LO


IMU-CDU'S
IG
MG
OG
IX SIN HI & LO
IX COS HI & LO
16X SIN HI & LO
16X COS HI & LO
P9
141 241 441 541 140 240 440 540 143 243 443 543 142 242 442 542 145 245 445 545 144 244 444 544
54 55 51 52 154 155 151 152 60 61 57 58 160 161 157 158 66 67 63 64 166 167 163 164
209
208
207
TJB
41
42
53
55
39
40
52
54
51
48
47
46
50
49
J6
Y
Z
U W V X T
J4
FROM OPTICS SXT
J2
TO OPTICS CDU'S
SXT TRUN 64X COS HI & LO
SXT TRUN 64X SIN HI & LO
SXT SHAFT 16X COS HI & LO
SXT SHAFT 16X SIN HI & LO
1060 1061 1057 1058 1179 1178 1072 1073 1069 1070 1076 1175 1077 1174 1181
GDB
1117
LEM VERIFICATION
1205
1204
1118
27VDC RLP LO
1102
1104
1106
1107
CDU FAIL CIRCUITS
LEM RENDEZVOUS RADAR
1177
73 74
70 71
182 183
88
179 180
79 80
76 77
188 189
89
185 186
85 86
82 83
194 195
90
191 192
1010 1011
1026
1007 1008
1022 1023
1027
1019 1020
1180
1185
SHAFT OR TRUN SELECTED
IG IX SIN HI
IG IX SIN LO
IG IX COS HI
IG IX COS LO
IG 16X SIN HI
IG 16X SIN LO
IG SET COMMAND
IG 16X COS HI
IG 16X COS LO
MG IX SIN HI
MG IX SIN LO
MG IX COS HI
MG IX COS LO
MG 16X SIN HI
MG 16X SIN LO
MG SET COMMAND
MG 16X COS HI
MG 16X COS LO
OG IX SIN HI
OG IX SIN LO
OG IX COS HI
OG IX COS LO
OG 16X SIN HI
OG 16X SIN LO
OG SET COMMAND
OG 16X COS HI
OG 16X COS LO
OPTICS SHAFT 16X SIN HI
OPTICS SHAFT 16X SIN LO
SHAFT SET COMMAND
OPTICS SHAFT 16X COS HI
OPTICS SHAFT 16X COS LO
OPTICS TRUN 64X SIN HI
OPTICS TRUN 64X SIN LO
TRUNNION SET COMMAND
OPTICS TRUN 64X COS HI
OPTICS TRUN 64X COS LO
TRUNNION READ IND
SHAFT READ IND
RCT-10
RCT-11 RCT-12
RCT-13 RCT-14
RCT-15 RCT-16
RCT-51
RCT-17 RCT-18
RCT-19 RCT-20
RCT-21 RCT-22
RCT-23 RCT-24
RCT-52
RCT-25 RCT-26
RCT-27 RCT-28
RCT-29 RCT-30
RCT-31 RCT-32
RCT-53
RCT-33 RCT-34
RCT-39 RCT-40
RCT-54
RCT-41 RCT-42
RCT-47 RCT-48
RCT-55
RCT-49 RCT-50
RCT-57
RCT-56

REVISIONS 23719

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

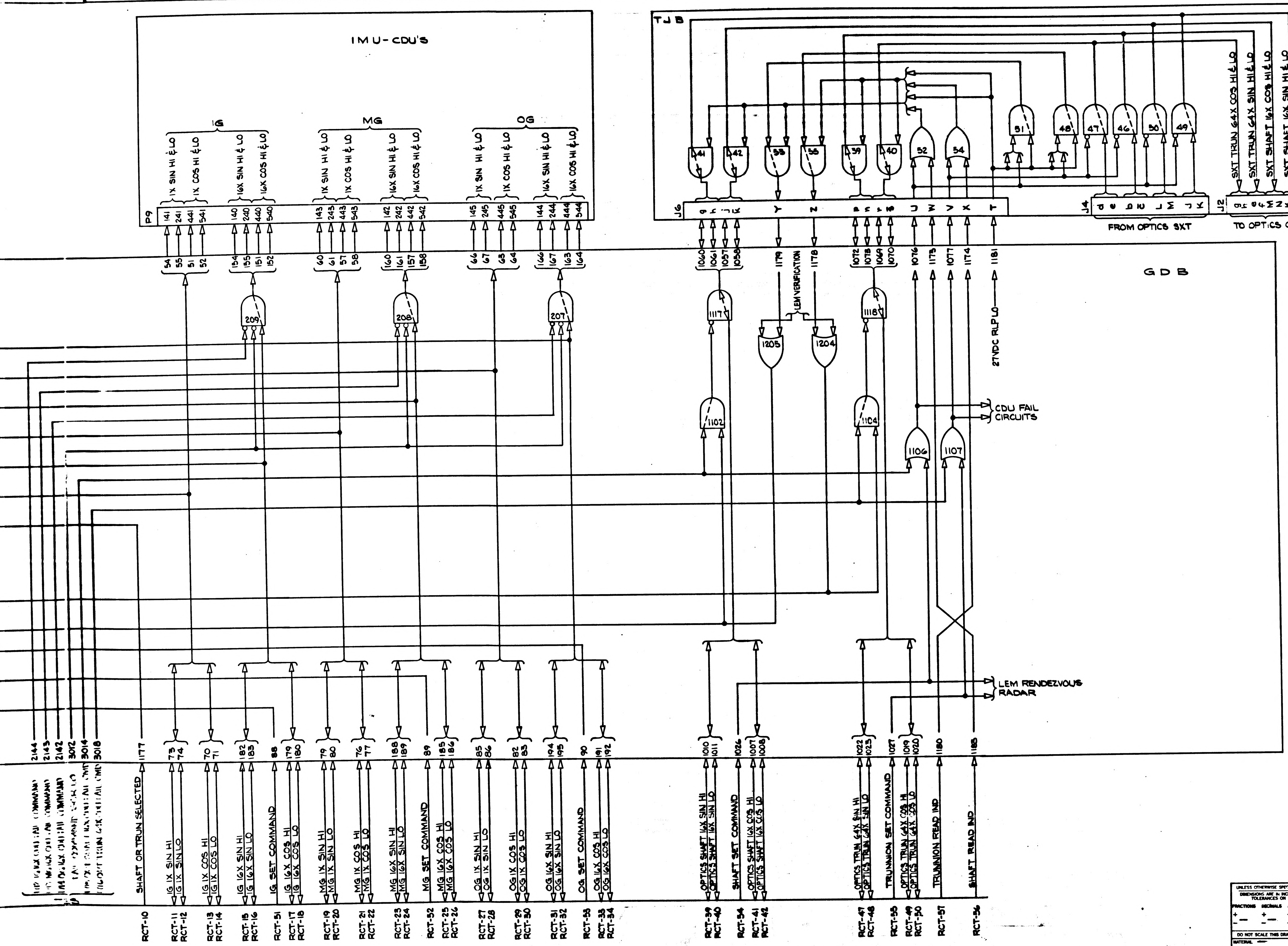
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE
CHECKED Ed Foster 7 SEP 65
APPROVAL
APPROVAL J. M. Watkins 10-8-65
A. C. METZGER
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM - RESOLVER CIRCUIT TESTER CONTROL PANEL (BLOCK II)

CODE IDENT NO. 99974
SIZE J2
2900214
SCALE —
SHEET 2 OF 3

2900214 J 2


IMU-CDU'S
IG
MG
OG
P9
1X SIN HI & LO
1X COS HI & LO
16X SIN HI & LO
16X COS HI & LO
141 241 441 541
140 240 440 540
143 243 443 543
142 242 442 542
145 245 445 545
144 244 444 544
54 55 51 52
154 155 151 152
60 61 57 58
160 161 157 158
66 67 63 64
166 167 163 164
209
208
207
TJB
J6
41 42 53 55 39 40 52 54
51 48 47 46 50 49
J4
J2
FROM OPTICS SXT
TO OPTICS CDU'S
SXT TRUN 64X COS HI & LO
SXT TRUN 64X SIN HI & LO
SXT SHAFT 16X COS HI & LO
SXT SHAFT 16X SIN HI & LO
1060 1061 1057 1056
1179 1178
1072 1073 1069 1070
1076 1175 1077 1174 1181
GDB
LEM VERIFICATION
1117 1205 1204 1116
27VDC RLP LO
1102 1104 1106 1107
CDU FAIL CIRCUITS
LEM RENDEZVOUS RADAR
2144 2143 2142 3012 3014 3018
1177
73 74 70 71 182 183 88 179 180
79 80 76 77 188 189 89 185 186
85 86 82 83 194 195 90 191 192
1010 1011 1026 1007 1008
1022 1023 1027 1019 1020 1180 1185
SHAFT OR TRUN SELECTED
IG 1X SIN HI
IG 1X SIN LO
IG 1X COS HI
IG 1X COS LO
IG 16X SIN HI
IG 16X SIN LO
IG SET COMMAND
IG 16X COS HI
IG 16X COS LO
MG 1X SIN HI
MG 1X SIN LO
MG 1X COS HI
MG 1X COS LO
MG 16X SIN HI
MG 16X SIN LO
MG SET COMMAND
MG 16X COS HI
MG 16X COS LO
OG 1X SIN HI
OG 1X SIN LO
OG 1X COS HI
OG 1X COS LO
OG 16X SIN HI
OG 16X SIN LO
OG SET COMMAND
OG 16X COS HI
OG 16X COS LO
OPTICS SHAFT 16X SIN HI
OPTICS SHAFT 16X SIN LO
SHAFT SET COMMAND
OPTICS SHAFT 16X COS HI
OPTICS SHAFT 16X COS LO
OPTICS TRUN 64X SIN HI
OPTICS TRUN 64X SIN LO
TRUNNION SET COMMAND
OPTICS TRUN 64X COS HI
OPTICS TRUN 64X COS LO
TRUNNION READ IND
SHAFT READ IND
RCT-10
RCT-11 RCT-12
RCT-13 RCT-14
RCT-15 RCT-16
RCT-51
RCT-17 RCT-18
RCT-19 RCT-20
RCT-21 RCT-22
RCT-23 RCT-24
RCT-52
RCT-25 RCT-26
RCT-27 RCT-28
RCT-29 RCT-30
RCT-31 RCT-32
RCT-53
RCT-33 RCT-34
RCT-39 RCT-40
RCT-54
RCT-41 RCT-42
RCT-47 RCT-48
RCT-55
RCT-49 RCT-50
RCT-57
RCT-56

REVISIONS 23					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Lochman DATE 30 AUG
CHECKED Ed Foster 7 SEP 65
APPROVAL
APPROVAL 10-8-65
NASA APPROVAL A. L. METZGER
MIT APPROVAL

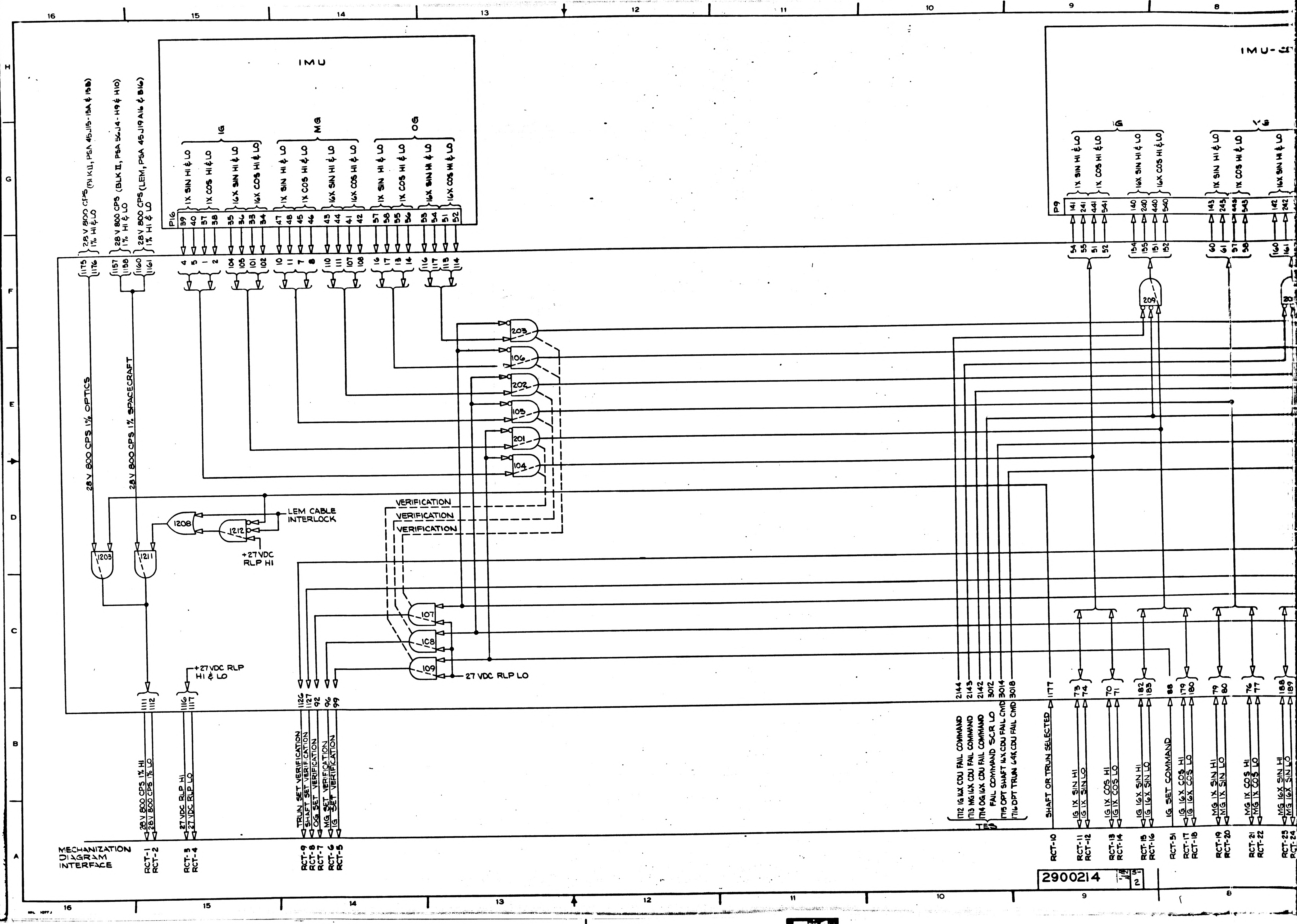
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

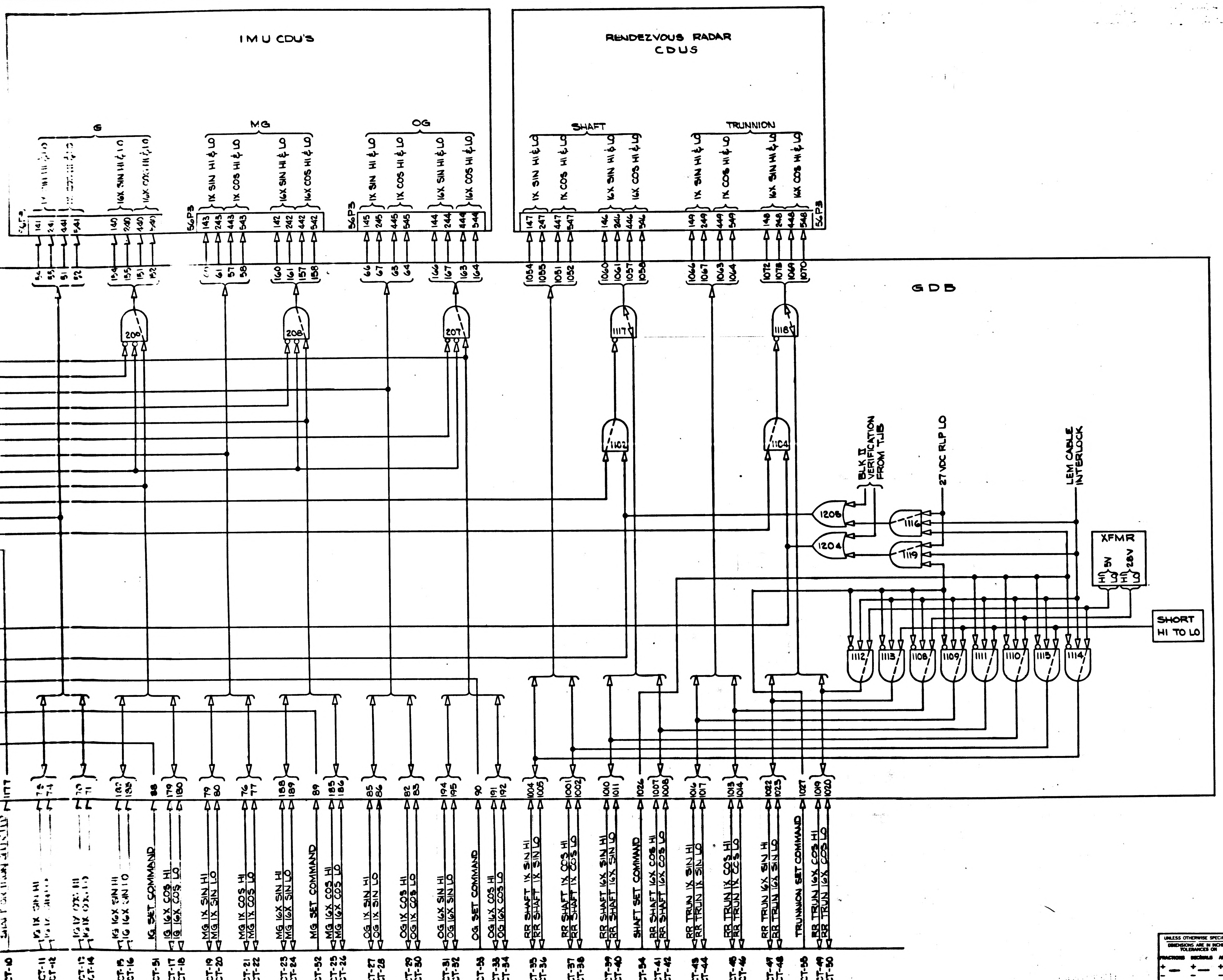
MECHANIZATION DIAGRAM - RESOLVER CIRCUIT TESTER CONTROL PANEL (BLOCK II)

CODE IDENT NO. 99974
SIZE -2
2900214
SCALE —
SHEET 2 OF 3

2900214 REV LTR SH 2

F-2


IMU
IG
MG
OG
P16
1X SIN HI & LO
1X COS HI & LO
16X SIN HI & LO
16X COS HI & LO
39 40 37 38 35 36 33 34 47 48 45 46 43 44 41 42 57 58 55 56 53 54 51 52
4 5 1 2 104 105 101 102 10 11 7 8 110 111 107 108 16 17 13 14 116 117 113 114
28 V 800 CPS 1% HI & LO (51 K11, PSA 45J15-15A & 15B)
28 V 800 CPS 1% HI & LO (BLK II, PSA 56J4-H9 & H10)
28 V 800 CPS 1% HI & LO (LEM, PSA 45J19 A16 & B16)
1175 1176 1157 1158 1160 1161
28 V 800 CPS 1% OPTICS
28 V 800 CPS 1% SPACECRAFT
203
106
202
105
201
104
209
1208
1212
1203
1211
LEM CABLE INTERLOCK
+27 VDC RLP HI
VERIFICATION
VERIFICATION
VERIFICATION
107
108
109
27 VDC RLP LO
+27 VDC RLP HI & LO
1111 1112
1116 1117
1126 1127 92 96 99
28 V 800 CPS 1% HI
28 V 800 CPS 1% LO
27 VDC RLP HI
27 VDC RLP LO
TRUN SET VERIFICATION
SHAFT SET VERIFICATION
OG SET VERIFICATION
MG SET VERIFICATION
IG SET VERIFICATION
MECHANIZATION DIAGRAM INTERFACE
RCT-1 RCT-2
RCT-3 RCT-4
RCT-9 RCT-8 RCT-7 RCT-6 RCT-5
IMU-
P9
141 241 441 541 140 240 440 540 143 243 443 543 142 242
54 55 51 52 154 155 151 152 60 61 57 58 160 161
2144 2143 2142 3012 3014 3018
1712 IG 16X CDU FAIL COMMAND
1713 MG 16X CDU FAIL COMMAND
1714 OG 16X CDU FAIL COMMAND
FAIL COMMAND SCR LO
1715 OPT SHAFT 16X CDU FAIL CMD
1716 OPT TRUN 64X CDU FAIL CMD
TES
1177
SHAFT OR TRUN SELECTED
RCT-10
73 74
IG 1X SIN HI
IG 1X SIN LO
RCT-11 RCT-12
70 71
IG 1X COS HI
IG 1X COS LO
RCT-13 RCT-14
182 183
IG 16X SIN HI
IG 16X SIN LO
RCT-15 RCT-16
88
IG SET COMMAND
RCT-51
179 180
IG 16X COS HI
IG 16X COS LO
RCT-17 RCT-18
79 80
MG 1X SIN HI
MG 1X SIN LO
RCT-19 RCT-20
76 77
MG 1X COS HI
MG 1X COS LO
RCT-21 RCT-22
188 189
MG 16X SIN HI
MG 16X SIN LO
RCT-23 RCT-24
2900214
2
16 15 14 13 12 11 10 9 8
H G F E D C B A


IMU CDU'S
RENDEZVOUS RADAR CDUS
G
MG
OG
SHAFT
TRUNNION
1X SIN HI & LO
1X COS HI & LO
16X SIN HI & LO
16X COS HI & LO
56P3
GDB
200
208
207
1117
1118
1102
1104
1206
1204
1116
1119
BLK II VERIFICATION FROM T-15
27 VDC RLP LO
LEM CABLE INTERLOCK
XFMR
5V
28V
SHORT HI TO LO
1112
1113
1108
1109
1111
1110
1115
1114
IG SET COMMAND
IG 16X COS HI
IG 16X COS LO
MG 1X SIN HI
MG 1X SIN LO
MG 1X COS HI
MG 1X COS LO
MG 16X SIN HI
MG 16X SIN LO
MG SET COMMAND
MG 16X COS HI
MG 16X COS LO
OG 1X SIN HI
OG 1X SIN LO
OG 1X COS HI
OG 1X COS LO
OG 16X SIN HI
OG 16X SIN LO
OG SET COMMAND
OG 16X COS HI
OG 16X COS LO
RR SHAFT 1X SIN HI
RR SHAFT 1X SIN LO
RR SHAFT 1X COS HI
RR SHAFT 1X COS LO
RR SHAFT 16X SIN HI
RR SHAFT 16X SIN LO
SHAFT SET COMMAND
RR SHAFT 16X COS HI
RR SHAFT 16X COS LO
RR TRUN 1X SIN HI
RR TRUN 1X SIN LO
RR TRUN 1X COS HI
RR TRUN 1X COS LO
RR TRUN 16X SIN HI
RR TRUN 16X SIN LO
TRUNNION SET COMMAND
RR TRUN 16X COS HI
RR TRUN 16X COS LO
RCT-10
RCT-11
RCT-12
RCT-13
RCT-14
RCT-15
RCT-16
RCT-51
RCT-17
RCT-18
RCT-19
RCT-20
RCT-21
RCT-22
RCT-23
RCT-24
RCT-52
RCT-25
RCT-26
RCT-27
RCT-28
RCT-29
RCT-30
RCT-31
RCT-32
RCT-53
RCT-33
RCT-34
RCT-35
RCT-36
RCT-37
RCT-38
RCT-39
RCT-40
RCT-54
RCT-41
RCT-42
RCT-43
RCT-44
RCT-45
RCT-46
RCT-47
RCT-48
RCT-55
RCT-49
RCT-50

REVISIONS

2900214

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

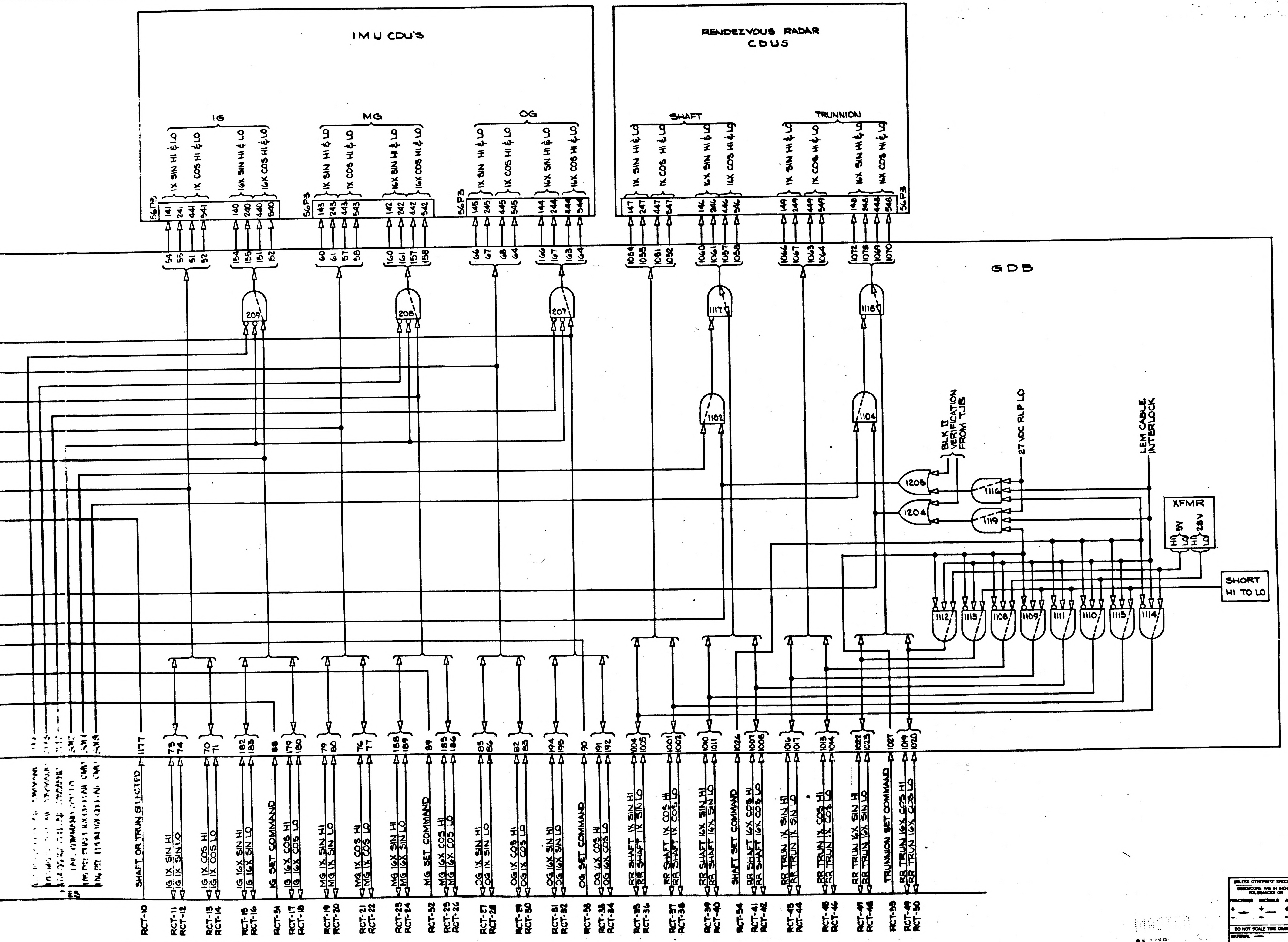
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE
CHECKED 7 SEP 65
APPROVAL
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
RESOLVER CIRCUIT TESTER
CONTROL PANEL
(LEM)

CODE IDENT NO. 99974
SIZE J2
2900214
SCALE —
SHEET 3 OF 3

F3


IMU CDU'S
IG
MG
OG
1X SIN HI & LO
1X COS HI & LO
16X SIN HI & LO
16X COS HI & LO
56P3
141 241 441 541
140 240 440 540
143 243 443 543
142 242 442 542
145 245 445 545
144 244 444 544
54 55 51 52
154 155 151 152
60 61 57 58
160 161 157 158
66 67 63 64
166 167 163 164
209
208
207
RENDEZVOUS RADAR CDUS
SHAFT
TRUNNION
147 247 447 547
146 246 446 546
149 249 449 549
148 248 448 548
1054 1055 1051 1052
1060 1061 1057 1058
1066 1067 1063 1064
1072 1073 1069 1070
1117
1118
1102
1104
GDB
BLK II VERIFICATION FROM TJB
27 VDC RLP LO
LEM CABLE INTERLOCK
1205
1204
1116
1119
XFMR
5V
28V
HI
LO
SHORT HI TO LO
1112
1113
1108
1109
1111
1110
1115
1114
1177
73 74
70 71
182 183
88
179 180
79 80
76 77
188 189
89
185 186
85 86
82 83
194 195
90
191 192
1004 1005
1001 1002
1010 1011
1026
1007 1008
1016 1017
1013 1014
1022 1023
1027
1019 1020
SHAFT OR TRUN SELECTED
IG 1X SIN HI
IG 1X SIN LO
IG 1X COS HI
IG 1X COS LO
IG 16X SIN HI
IG 16X SIN LO
IG SET COMMAND
IG 16X COS HI
IG 16X COS LO
MG 1X SIN HI
MG 1X SIN LO
MG 1X COS HI
MG 1X COS LO
MG 16X SIN HI
MG 16X SIN LO
MG SET COMMAND
MG 16X COS HI
MG 16X COS LO
OG 1X SIN HI
OG 1X SIN LO
OG 1X COS HI
OG 1X COS LO
OG 16X SIN HI
OG 16X SIN LO
OG SET COMMAND
OG 16X COS HI
OG 16X COS LO
RR SHAFT 1X SIN HI
RR SHAFT 1X SIN LO
RR SHAFT 1X COS HI
RR SHAFT 1X COS LO
RR SHAFT 16X SIN HI
RR SHAFT 16X SIN LO
SHAFT SET COMMAND
RR SHAFT 16X COS HI
RR SHAFT 16X COS LO
RR TRUN 1X SIN HI
RR TRUN 1X SIN LO
RR TRUN 1X COS HI
RR TRUN 1X COS LO
RR TRUN 16X SIN HI
RR TRUN 16X SIN LO
TRUNNION SET COMMAND
RR TRUN 16X COS HI
RR TRUN 16X COS LO
RCT-10
RCT-11 RCT-12
RCT-13 RCT-14
RCT-15 RCT-16
RCT-51
RCT-17 RCT-18
RCT-19 RCT-20
RCT-21 RCT-22
RCT-23 RCT-24
RCT-52
RCT-25 RCT-26
RCT-27 RCT-28
RCT-29 RCT-30
RCT-31 RCT-32
RCT-53
RCT-33 RCT-34
RCT-35 RCT-36
RCT-37 RCT-38
RCT-39 RCT-40
RCT-54
RCT-41 RCT-42
RCT-43 RCT-44
RCT-45 RCT-46
RCT-47 RCT-48
RCT-55
RCT-49 RCT-50

2900214 REV LTR SH 3

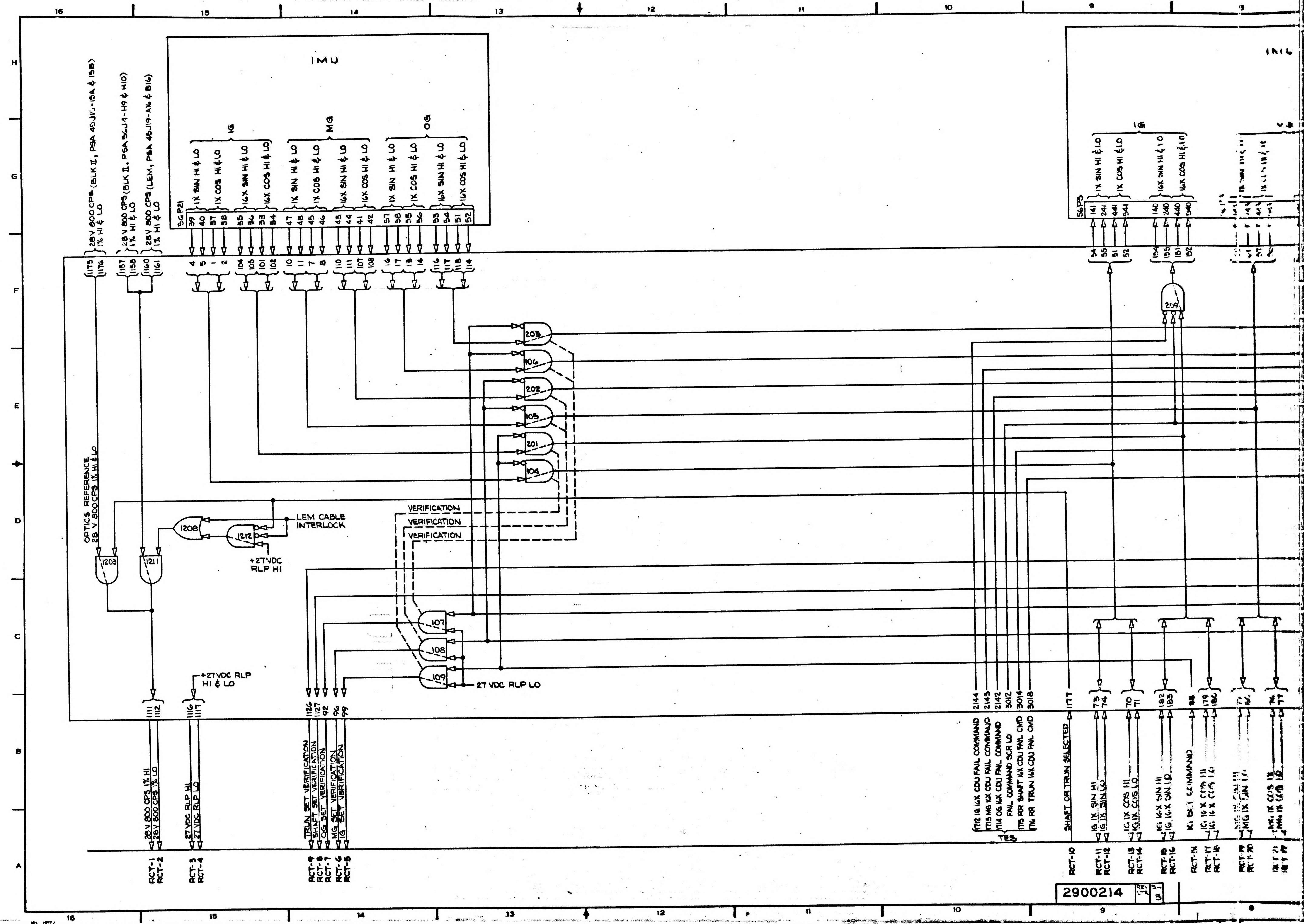
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 31 AUG 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL A. C. METZGER
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-RESOLVER CIRCUIT TESTER CONTROL PANEL (LEM)

CODE IDENT NO. 99974
SIZE J2
2900214
SCALE —
SHEET 3 OF 5


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
IMU
IG
MG
OG
5GP21
1X SIN HI & LO
1X COS HI & LO
16X SIN HI & LO
16X COS HI & LO
39 40 37 38 35 36 33 34
47 48 45 46 43 44 41 42
57 58 55 56 53 54 51 52
4 5 1 2 104 105 101 102
10 11 7 8 110 111 107 108
16 17 13 14 116 117 113 114
28V 800CPS (BLK II, PSA 45J15-15A & 15B) 1% HI & LO
28V 800 CPS (BLK II, PSA 56J4-H9 & H10) 1% HI & LO
28V 800 CPS (LEM, PSA 45J19-A16 & B16) 1% HI & LO
1175 1176
1157 1158
1160 1161
203
106
202
105
201
104
OPTICS REFERENCE 28 V 800CPS 1% HI & LO
1208
1212
LEM CABLE INTERLOCK
+27VDC RLP HI
1203
1211
VERIFICATION
VERIFICATION
VERIFICATION
107
108
109
27 VDC RLP LO
+27VDC RLP HI & LO
1111 1112
1116 1117
1126 1127 92 96 99
28V 800 CPS 1% HI
28V 800 CPS 1% LO
27VDC RLP HI
27VDC RLP LO
TRUN SET VERIFICATION
SHAFT SET VERIFICATION
OG SET VERIFICATION
MG SET VERIFICATION
IG SET VERIFICATION
RCT-1
RCT-2
RCT-3
RCT-4
RCT-9
RCT-8
RCT-7
RCT-6
RCT-5
56P5
IG
1X SIN HI & LO
1X COS HI & LO
16X SIN HI & LO
16X COS HI & LO
141 241 441 541
140 240 440 540
54 55 51 52
154 155 151 152
209
2144 2143 2142 3012 3014 3018
1712 IG 16X CDU FAIL COMMAND
1713 MG 16X CDU FAIL COMMAND
1714 OG 16X CDU FAIL COMMAND
FAIL COMMAND SCR LO
1715 RR SHAFT 16X CDU FAIL CMD
1716 RR TRUN 16X CDU FAIL CMD
TES
1177
SHAFT OR TRUN SELECTED
73 74
70 71
182 183
179 180
IG 1X SIN HI
IG 1X SIN LO
IG 1X COS HI
IG 1X COS LO
IG 16X SIN HI
IG 16X SIN LO
IG 16 X COS HI
IG 16 X COS LO
MG 1X SIN LO
MG 1X COS HI
MG 1X COS LO
RCT-10
RCT-11
RCT-12
RCT-13
RCT-14
RCT-15
RCT-16
RCT-17
RCT-18
2900214
REV
3

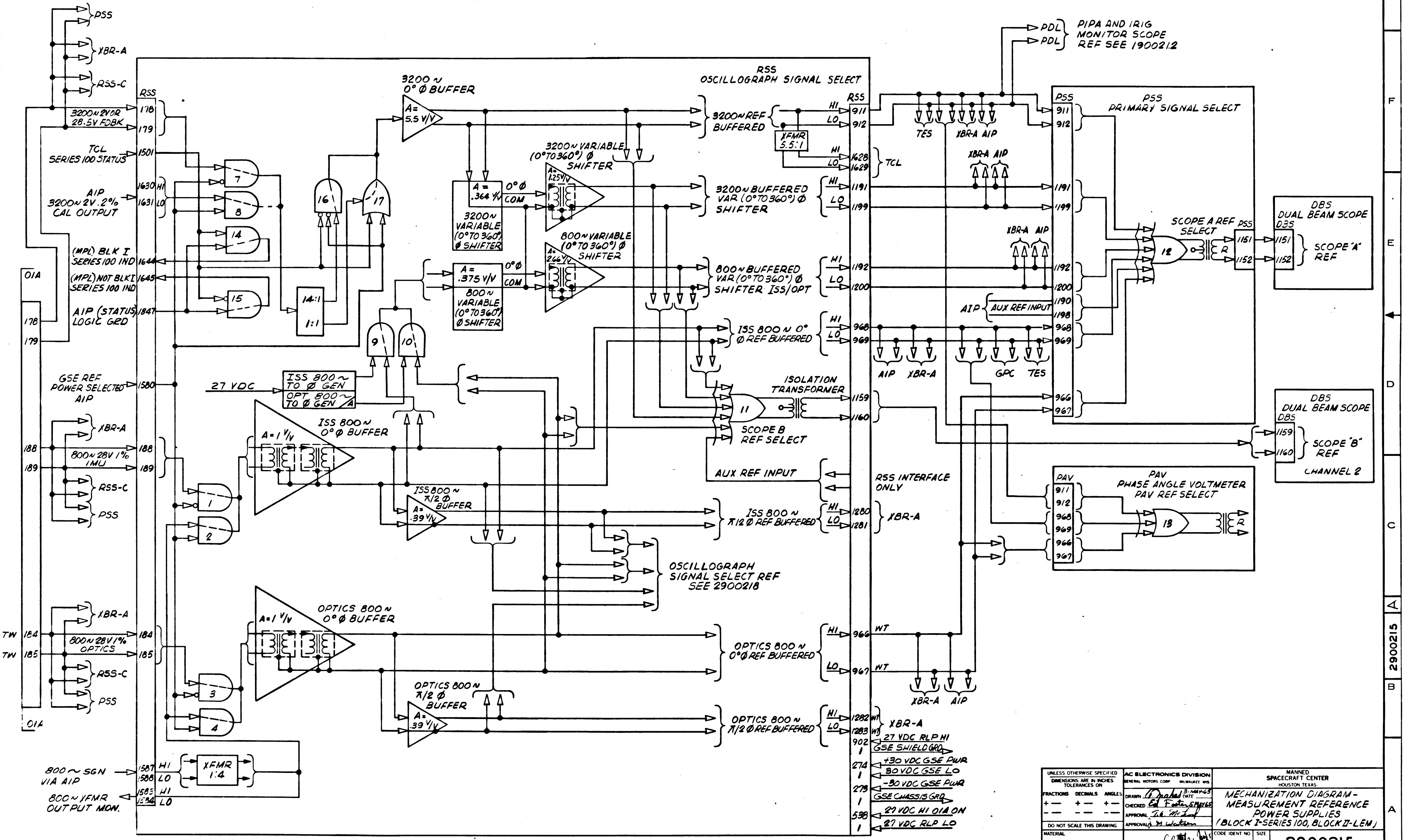
REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR24953	—	4-JAN 66	

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS PER MIL-STD-806
3. REFERENCE MECHANIZATION DIAGRAMS
   2900219-COUNTER SIGNAL SELECTION

   2900208-POWER AND DUMMY LOAD PANEL/PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTION
   2900223-GIMBAL POSITION CONTROL PANEL (GPC)
   2900202-TEST CONTROL PANEL (BLOCK I, SERIES 100) (TCL)
   2900201-TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
   2900206-TEST SELECT PANEL. (TES)
   2900217-SIGNAL SELECTION AND MEASUREMENT

   2900218-OSCILLOGRAPH SIGNAL SELECTION
   (RSS-C) TO SWITCHABLE AC CHANNEL
   GSE GROUNDING (BLOCK I SERIES 100)
   GSE GROUNDING (BLOCK II & LEM)
   2900212-PIPA AND IRIG MONITORING
4. INDICATES "AND" GATE WITH SWITCHED SIGNAL.
5. NAME NAME A INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION).
6. A INDICATES "OK" GATE WITH "A" SIGNAL SWITCHED.


PSS
XBR-A
RSS-C
RSS
3200~ 2V OR 28.5V FDBK
TCL SERIES 100 STATUS
AIP 3200~ 2V .2% CAL OUTPUT
(MPL) BLK I SERIES 100 IND
(MPL) NOT BLK I SERIES 100 IND
AIP (STATUS) LOGIC GRD
GSE REF POWER SELECTED AIP
800~ 28V 1% IMU
800~ 28V 1% OPTICS
800~ SGN VIA AIP
800~ XFMR OUTPUT MON.
01A
178
179
188
189
184
185
TW
1501
1630 HI
1631 LO
1644
1645
1847
1580
1587 HI
1588 LO
1583 HI
1584 LO
XFMR 1:4
27 VDC
ISS 800~ TO Ø GEN
OPT 800~ TO Ø GEN A
14:1
1:1
3200~ 0° Ø BUFFER
A= 5.5 V/V
A= .364 V/V
0° Ø
COM
3200~ VARIABLE (0° TO 360°) Ø SHIFTER
A= 1.25 V/V
A= .375 V/V
800~ VARIABLE (0° TO 360°) Ø SHIFTER
A= 2.66 V/V
ISS 800~ 0° Ø BUFFER
A= 1 V/V
ISS 800~ π/2 Ø BUFFER
A= .39 V/V
OPTICS 800~ 0° Ø BUFFER
OPTICS 800~ π/2 Ø BUFFER
RSS OSCILLOGRAPH SIGNAL SELECT
3200~ REF BUFFERED
XFMR 5.5:1
3200~ BUFFERED VAR (0° TO 360°) Ø SHIFTER
800~ BUFFERED VAR (0° TO 360°) Ø SHIFTER ISS/OPT
ISS 800~ 0° Ø REF BUFFERED
ISOLATION TRANSFORMER
SCOPE B REF SELECT
AUX REF INPUT
ISS 800~ π/2 Ø REF BUFFERED
OSCILLOGRAPH SIGNAL SELECT REF SEE 2900218
OPTICS 800~ 0° Ø REF BUFFERED
OPTICS 800~ π/2 Ø REF BUFFERED
HI
LO
911
912
1628
1629
1191
1199
1192
1200
968
969
1159
1160
1280
1281
966
967
1282
1283
WT
902
274
273
538
27 VDC RLP HI
GSE SHIELD GRD
+30 VDC GSE PWR
30 VDC GSE LO
-30 VDC GSE PWR
GSE CHASSIS GRD
27 VDC HI 01A ON
27 VDC RLP LO
TCL
TES
XBR-A AIP
AIP
GPC
RSS INTERFACE ONLY
PDL
PDL
PIPA AND IRIG MONITOR SCOPE REF SEE 1900212
PSS PRIMARY SIGNAL SELECT
1190
1198
AUX REF INPUT
SCOPE A REF SELECT
R
1151
1152
DBS DUAL BEAM SCOPE
DBS
SCOPE "A" REF
SCOPE "B" REF
CHANNEL 2
PAV PHASE ANGLE VOLTMETER PAV REF SELECT
PAV
1
2
3
4
7
8
9
10
11
12
13
14
15
16
17

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN DATE 3-MAY-65
CHECKED Ed Foster 5 MAY 65
APPROVAL T.G. McLeod
APPROVAL J. M. Watson
NASA APPROVAL
MIT APPROVAL

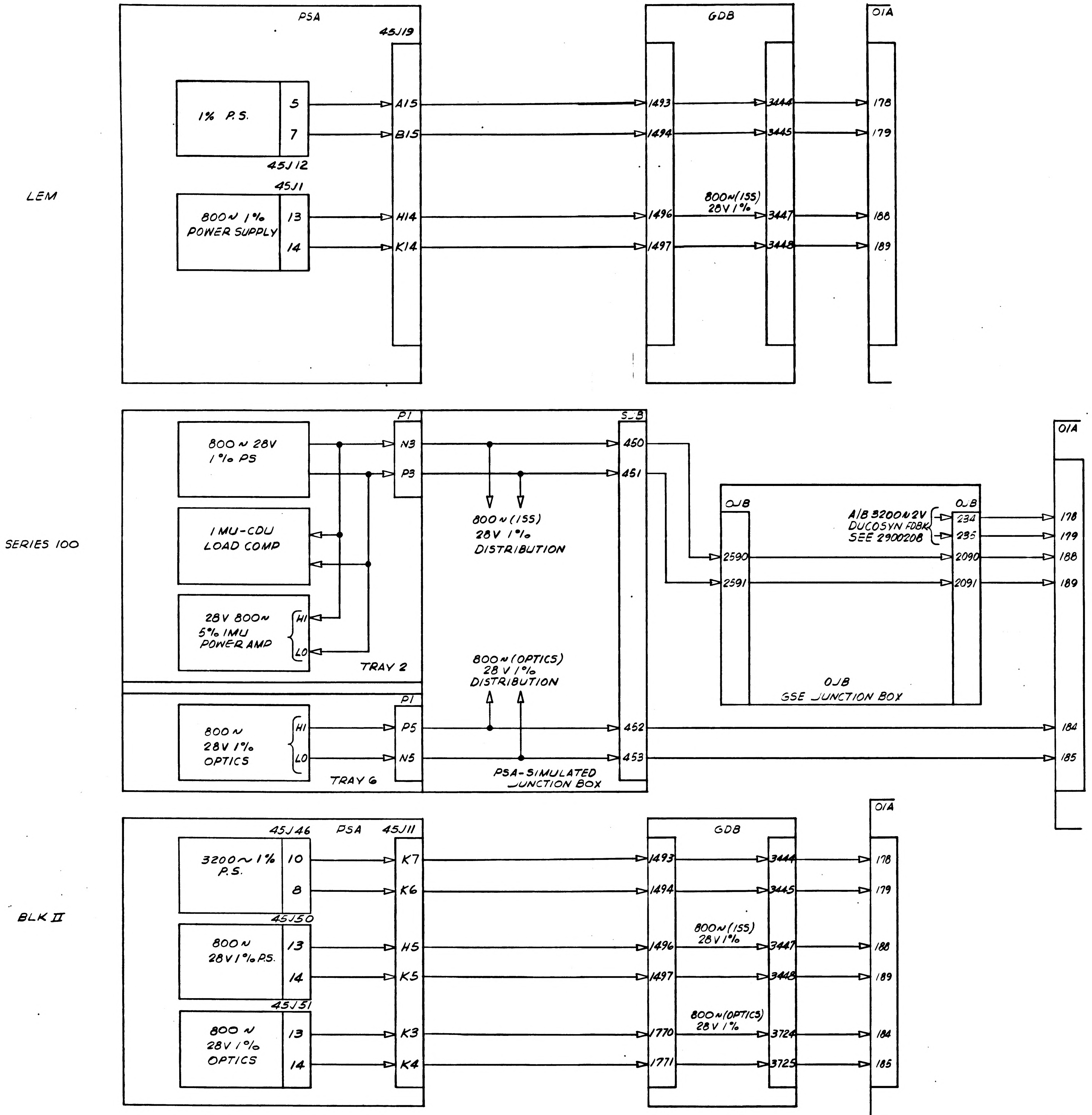
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
MEASUREMENT REFERENCE
POWER SUPPLIES
(BLOCK I-SERIES 100, BLOCK II-LEM)

CODE IDENT NO 99974
SIZE E
2900215
SCALE NONE
SHEET 1 OF 2

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 24953			



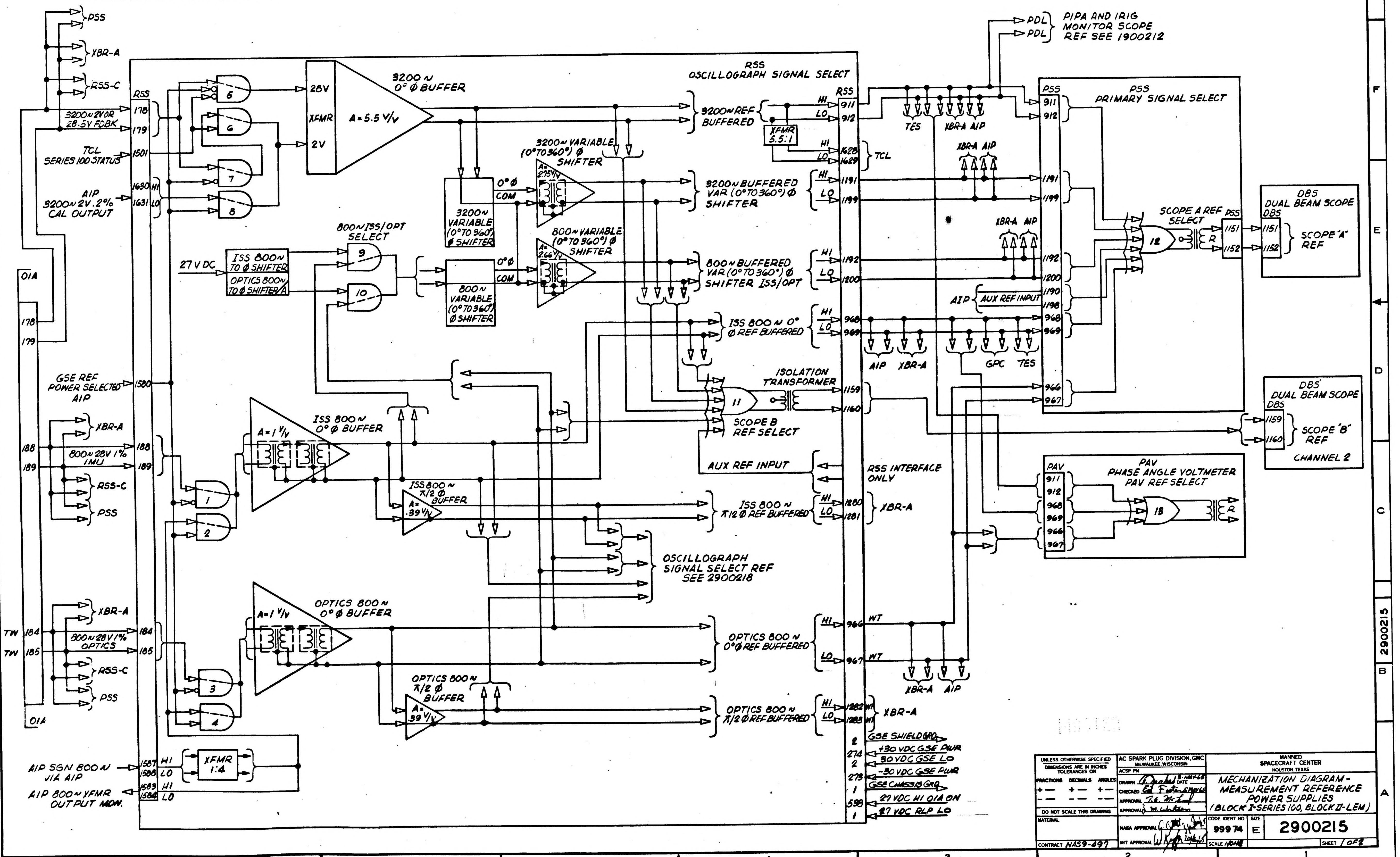
LEM
PSA
45J19
1% P.S.
5
7
45J12
A15
B15
45J1
800~ 1%
POWER SUPPLY
13
14
H14
K14
GDB
1493
1494
1496
1497
3444
3445
3447
3448
800~(ISS)
28V 1%
OIA
178
179
188
189
SERIES 100
800 ~ 28V
1% PS
P1
N3
P3
IMU-CDU
LOAD COMP
28V 800~
5% IMU
POWER AMP
HI
LO
TRAY 2
800~(ISS)
28V 1%
DISTRIBUTION
SJB
450
451
OJB
2590
2591
A/B 3200~2V
DUCOSYN FDBK
SEE 2900208
234
235
2090
2091
OJB
GSE JUNCTION BOX
OIA
178
179
188
189
184
185
800~(OPTICS)
28V 1%
DISTRIBUTION
800~
28V 1%
OPTICS
HI
LO
P1
P5
N5
TRAY 6
PSA-SIMULATED
JUNCTION BOX
452
453
BLK II
45J46
PSA
45J11
3200~ 1%
P.S.
10
8
K7
K6
45J50
800~
28V 1% P.S.
13
14
H5
K5
45J51
800 ~
28V 1%
OPTICS
13
14
K3
K4
GDB
1493
1494
1496
1497
1770
1771
800~(ISS)
28V 1%
800~(OPTICS)
28V 1%
3444
3445
3447
3448
3724
3725
OIA
178
179
188
189
184
185

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
FRACTIONS + − − DECIMALS + − − ANGLES + − −	DRAWN Doshal DATE 3-MAY-65 CHECKED Ed Foster 5 MAY 65 APPROVAL T.A. McLeod APPROVAL J. M. Watson	MECHANIZATION DIAGRAM- MEASUREMENT REFERENCE POWER SUPPLIES (BLOCK I-SERIES 100, BLOCK II-LEM)
DO NOT SCALE THIS DRAWING		
MATERIAL	NASA APPROVAL	CODE IDENT NO 99974 · SIZE E · 2900215
CONTRACT NAS9-497	MIT APPROVAL	SCALE NONE · SHEET 2 OF 2

2900215 A

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPD.
		CHG NO.		

NOTES:
1. INTERPRET DRAWING INACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS PER MIL-STD-806
3. REFERENCE MECHANIZATION DIAGRAMS
   - 2900219-COUNTER SIGNAL SELECTION
   - 2900208-POWER AND DUMMY LOAD PANEL/PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTION
   - 2900223-GIMBAL POSITION CONTROL PANEL (GPC)
   - 2900202-TEST CONTROL PANEL (BLOCK I, SERIES 100) (TCL)
   - 2900201-TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
   - 2900206-TEST SELECT PANEL. (TES)
   - 2900217-SIGNAL SELECTION AND MEASUREMENT
   - 2900218-OSCILLOGRAPH SIGNAL SELECTION (RSS-C) TO SWITCHABLE AC CHANNEL GSE GROUNDING (BLOCK I SERIES 100) GSE GROUNDING (BLOCK II & LEM)
   - 2900212-PIPA AND IRIG MONITORING
4. INDICATES "AND" GATE WITH SWITCHED SIGNAL.
5. NAME / NAME INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION).



PSS
XBR-A
RSS-C
RSS
178
179
3200~2V OR 28.5V FDBK
TCL SERIES 100 STATUS
1501
AIP 3200~2V .2% CAL OUTPUT
1630 HI
1631 LO
5
6
7
8
28V
XFMR
2V
A=5.5 V/V
3200~ 0° Φ BUFFER
01A
178
179
27 V DC
ISS 800~ TO Φ SHIFTER
OPTICS 800~ TO Φ SHIFTER A
800~ ISS/OPT SELECT
9
10
3200~ VARIABLE (0° TO 360°) Φ SHIFTER
800~ VARIABLE (0° TO 360°) Φ SHIFTER
0° Φ
COM
A= 2.75 V/V
A= 2.66 V/V
3200~ VARIABLE (0° TO 360°) Φ SHIFTER
800~ VARIABLE (0° TO 360°) Φ SHIFTER
RSS OSCILLOGRAPH SIGNAL SELECT
3200~ REF BUFFERED
HI
LO
911
912
XFMR 5.5:1
1628
1629
TCL
3200~ BUFFERED VAR (0° TO 360°) Φ SHIFTER
1191
1199
800~ BUFFERED VAR (0° TO 360°) Φ SHIFTER ISS/OPT
1192
1200
ISS 800~ 0° Φ REF BUFFERED
968
969
ISOLATION TRANSFORMER
11
1159
1160
SCOPE B REF SELECT
AUX REF INPUT
RSS INTERFACE ONLY
GSE REF POWER SELECTED AIP
1580
XBR-A
188
189
800~ 28V 1% IMU
RSS-C
PSS
1
2
A=1 V/V
ISS 800~ 0° Φ BUFFER
ISS 800~ π/2 Φ BUFFER
A= .39 V/V
ISS 800~ π/2 Φ REF BUFFERED
1280
1281
XBR-A
OSCILLOGRAPH SIGNAL SELECT REF SEE 2900218
XBR-A
TW 184
TW 185
800~ 28V 1% OPTICS
RSS-C
PSS
01A
3
4
A=1 V/V
OPTICS 800~ 0° Φ BUFFER
OPTICS 800~ π/2 Φ BUFFER
A= .39 V/V
OPTICS 800~ 0° Φ REF BUFFERED
966 WT
967 WT
XBR-A
AIP
OPTICS 800~ π/2 Φ REF BUFFERED
1282 WT
1283 WT
XBR-A
AIP SGN 800~ VIA AIP
AIP 800~ XFMR OUTPUT MON.
1587 HI
1588 LO
1583 HI
1584 LO
XFMR 1:4
2 GSE SHIELD GRD
274 +30 VDC GSE PWR
2 30 VDC GSE LO
273 -30 VDC GSE PWR
1 GSE CHASSIS GRD
538 27 VDC HI 01A ON
1 27 VDC RLP LO
PDL
PDL
PIPA AND IRIG MONITOR SCOPE REF SEE 1900212
TES
XBR-A AIP
XBR-A AIP
XBR-A AIP
AIP
XBR-A
GPC
TES
PSS PRIMARY SIGNAL SELECT
911
912
1191
1199
1192
1200
AIP AUX REF INPUT
1190
1198
968
969
966
967
SCOPE A REF SELECT
12
R
PSS
1151
1152
DBS DUAL BEAM SCOPE
DBS
1151
1152
SCOPE "A" REF
DBS DUAL BEAM SCOPE
DBS
1159
1160
SCOPE "B" REF
CHANNEL 2
PAV PHASE ANGLE VOLTMETER PAV REF SELECT
PAV
911
912
968
969
966
967
13
R

1H

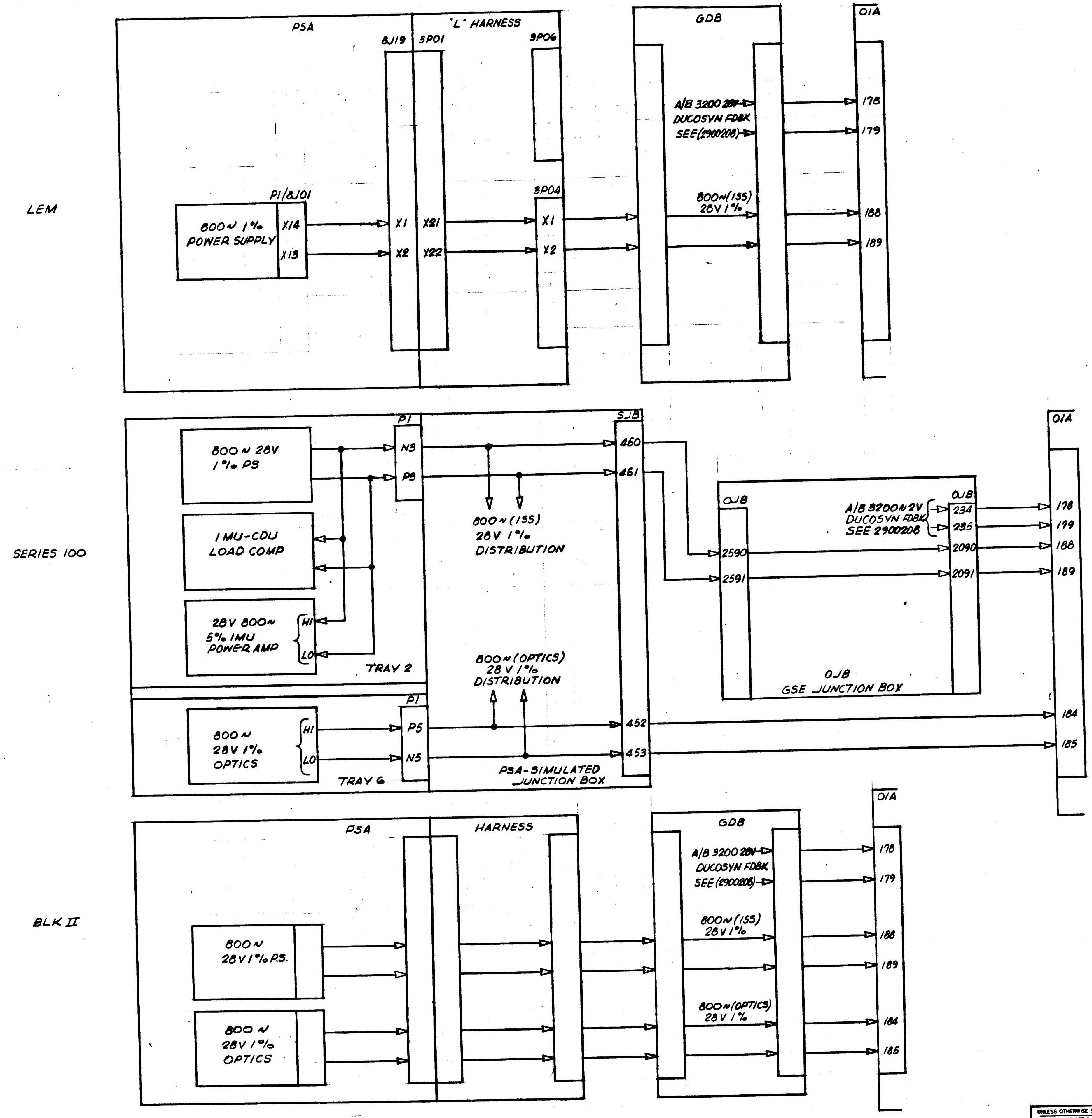
1H

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES +— +— +— -— -— -— DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN R. Drake DATE 3-MAY-65 CHECKED Ed Foster 5 MAY 65 APPROVAL T. A. McL APPROVAL J. M. Watson	MECHANIZATION DIAGRAM- MEASUREMENT REFERENCE POWER SUPPLIES (BLOCK I-SERIES 100, BLOCK II-LEM)
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 SIZE E 2900215
CONTRACT NAS9-497	MIT APPROVAL W Kupfer	SCALE NONE SHEET 1 OF 2

2900215

REVISIONS 9-54

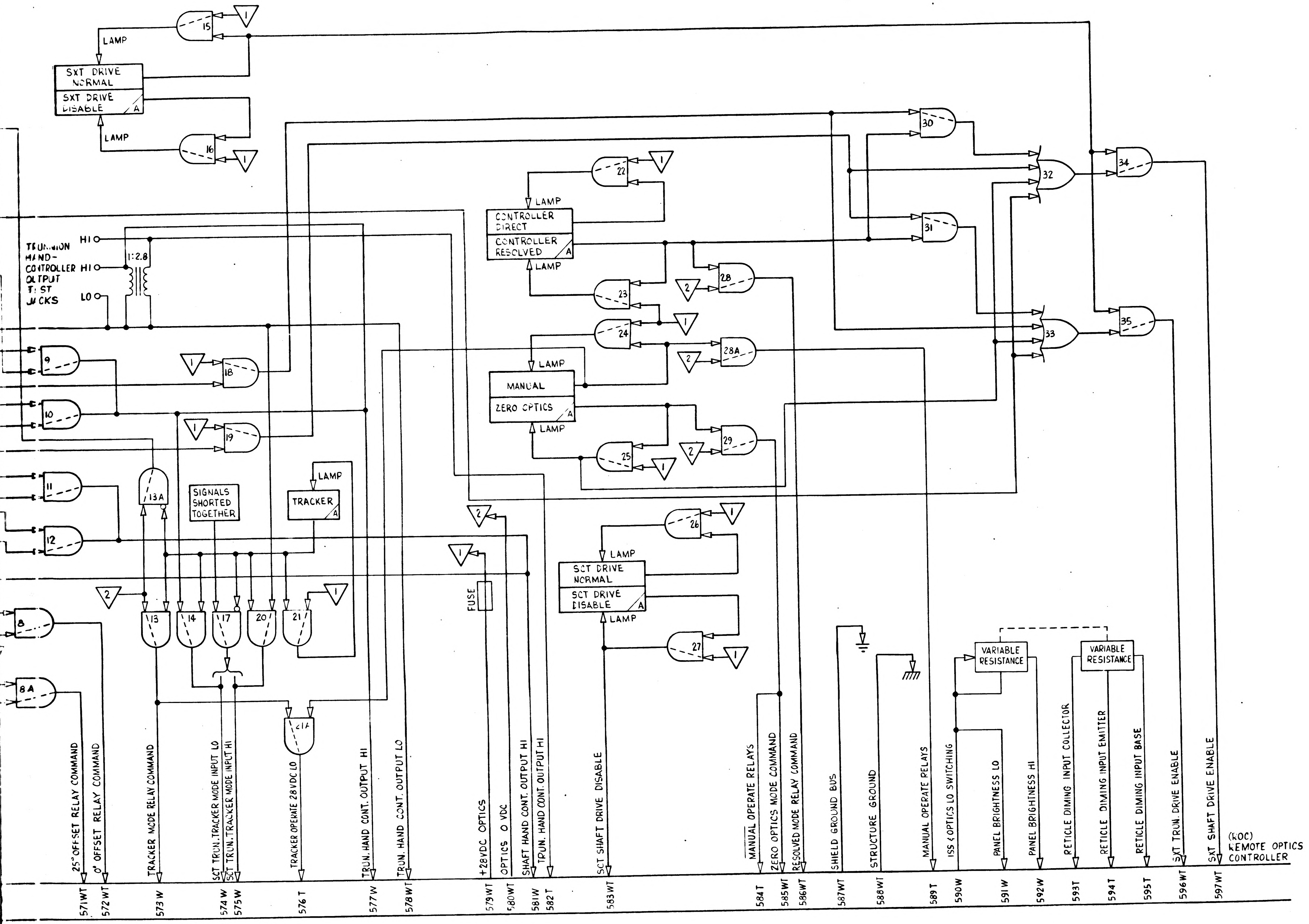
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.


LEM
PSA
"L" HARNESS
8J19
3P01
3P06
P1/8J01
800~ 1% POWER SUPPLY
X14
X13
X1
X2
X21
X22
3P04
X1
X2
GDB
A/B 3200 28V
DUCOSYN FDBK
SEE (2900208)
800~ (ISS)
28V 1%
OIA
178
179
188
189
SERIES 100
P1
800~ 28V 1% PS
N3
P3
IMU-CDU LOAD COMP
28V 800~ 5% IMU POWER AMP
HI
LO
TRAY 2
SJB
450
451
800~ (ISS) 28V 1% DISTRIBUTION
800~ (OPTICS) 28V 1% DISTRIBUTION
800~ 28V 1% OPTICS
P5
N5
TRAY 6
452
453
PSA-SIMULATED JUNCTION BOX
OJB
A/B 3200~ 28V
DUCOSYN FDBK
SEE 2900208
234
235
2090
2091
2590
2591
OJB GSE JUNCTION BOX
OIA
178
179
188
189
184
185
BLK II
PSA
HARNESS
GDB
800~ 28V 1% P.S.
800~ 28V 1% OPTICS
A/B 3200 28V
DUCOSYN FDBK
SEE (2900208)
800~ (ISS) 28V 1%
800~ (OPTICS) 28V 1%
OIA
178
179
188
189
184
185

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + − + − + − − − − − − −	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN C. Deaka 13 MAY 65 DATE	MECHANIZATION DIAGRAM- MEASUREMENT REFERENCE POWER SUPPLIES (BLOCK I-SERIES 100, BLOCK II-LEM)
	CHECKED Ed Foster 5 MAY 65	
	APPROVAL T. A. McLeod	
DO NOT SCALE THIS DRAWING	APPROVAL J. M. Watson	
MATERIAL	NASA APPROVAL	CODE IDENT NO. 99974 | SIZE E | 2900215
CONTRACT NAS9-497	MIT APPROVAL 20 May 65	SCALE NONE | SHEET 2 OF 2

2900215

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		7 SEP 65	



LAMP
15
SXT DRIVE NORMAL
SXT DRIVE DISABLE
A
LAMP
16
30
31
32
33
34
35
22
23
24
25
26
27
28
28A
29
LAMP
CONTROLLER DIRECT
CONTROLLER RESOLVED
LAMP
MANUAL
ZERO OPTICS
TRUNNION HAND-CONTROLLER OUTPUT TEST JACKS
HI
HI
HI
LO
1:2.8
9
10
11
12
18
19
13A
13
14
17
20
21
21A
8
8A
SIGNALS SHORTED TOGETHER
TRACKER
FUSE
SCT DRIVE NORMAL
SCT DRIVE DISABLE
VARIABLE RESISTANCE
VARIABLE RESISTANCE
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN. TRACKER MODE INPUT LO
SCT TRUN. TRACKER MODE INPUT HI
TRACKER OPERATE 28VDC LO
TRUN. HAND CONT. OUTPUT HI
TRUN. HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS 0 VDC
SHAFT HAND CONT. OUTPUT HI
TRUN. HAND CONT. OUTPUT HI
SCT SHAFT DRIVE DISABLE
MANUAL OPERATE RELAYS
ZERO OPTICS MODE COMMAND
RESOLVED MODE RELAY COMMAND
SHIELD GROUND BUS
STRUCTURE GROUND
MANUAL OPERATE RELAYS
ISS & OPTICS LO SWITCHING
PANEL BRIGHTNESS LO
PANEL BRIGHTNESS HI
RETICLE DIMING INPUT COLLECTOR
RETICLE DIMING INPUT EMITTER
RETICLE DIMING INPUT BASE
SXT TRUN. DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
(ROC) REMOTE OPTICS CONTROLLER
571WT
572WT
573W
574W
575W
576T
577W
578WT
579WT
580WT
581W
582T
583WT
584T
585WT
586WT
587WT
588WT
589T
590W
591W
592W
593T
594T
595T
596WT
597WT

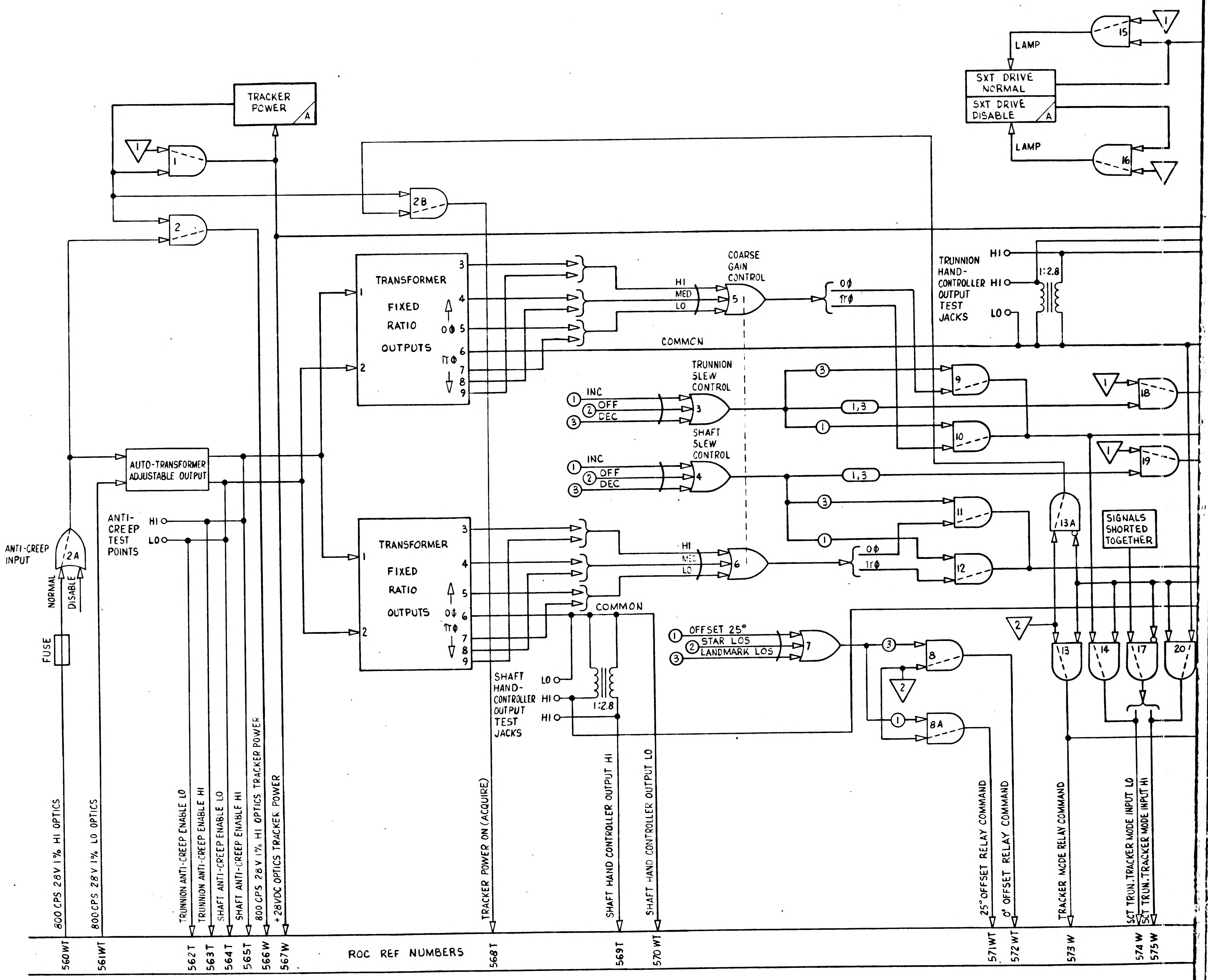
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
	ACSP PN	
	DRAWN Spriane DATE CHECKED APPROVAL APPROVAL	MECHANIZATION DIAGRAM OPTICS CONTROL (GSE MODE) (BLOCK I SERIES 100 & BLOCK II)
DO NOT SCALE THIS DRAWING		
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974 · SIZE J2 · 2900216
CONTRACT	MIT APPROVAL	SCALE — · SHEET 1 OF 3

2900216 REV LTR A SH 1

2/2900216

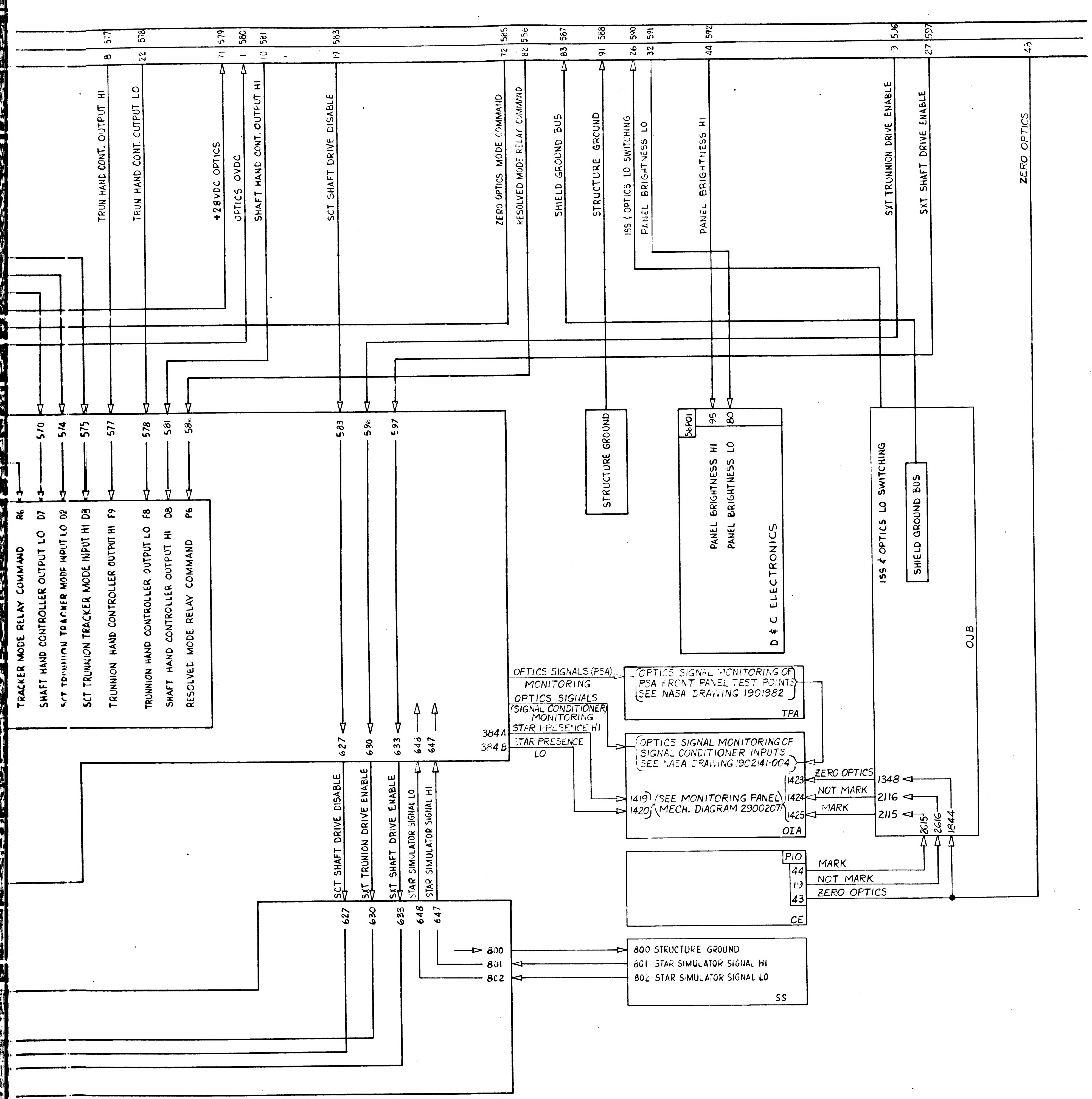
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. NONSTANDARD SYMBOLOGY:
   - INDICATES "AND" GATE WITH SWITCHED SIGNAL
   - NAME A — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
   - NAME / NAME A — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION)
4. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:
   - SHEET 1 / SHEET 2 — BLOCK I SERIES 100
   - SHEET 1 / SHEET 3 — BLOCK II
   - INDICATES "BILATERAL AND" GATE WITH SWITCHED SIGNAL.


TRACKER POWER A
1
2B
2
TRANSFORMER FIXED RATIO OUTPUTS
0φ
πφ
COARSE GAIN CONTROL
HI
MED
LO
5
COMMON
TRUNNION SLEW CONTROL
INC
OFF
DEC
3
SHAFT SLEW CONTROL
4
1,3
9
10
11
12
13
13A
14
15
16
17
18
19
20
TRUNNION HAND-CONTROLLER OUTPUT TEST JACKS
1:2.8
SXT DRIVE NORMAL
SXT DRIVE DISABLE A
LAMP
SIGNALS SHORTED TOGETHER
AUTO-TRANSFORMER ADJUSTABLE OUTPUT
ANTI-CREEP TEST POINTS
ANTI-CREEP INPUT
2A
NORMAL
DISABLE
FUSE
6
OFFSET 25°
STAR LOS
LANDMARK LOS
7
8
8A
SHAFT HAND-CONTROLLER OUTPUT TEST JACKS
800 CPS 28 V 1% HI OPTICS
800 CPS 28 V 1% LO OPTICS
TRUNNION ANTI-CREEP ENABLE LO
TRUNNION ANTI-CREEP ENABLE HI
SHAFT ANTI-CREEP ENABLE LO
SHAFT ANTI-CREEP ENABLE HI
800 CPS 28 V 1% HI OPTICS TRACKER POWER
+28VDC OPTICS TRACKER POWER
TRACKER POWER ON (ACQUIRE)
SHAFT HAND CONTROLLER OUTPUT HI
SHAFT HAND CONTROLLER OUTPUT LO
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN. TRACKER MODE INPUT LO
SCT TRUN. TRACKER MODE INPUT HI
ROC REF NUMBERS
560 WT
561 WT
562 T
563 T
564 T
565 T
566 W
567 W
568 T
569 T
570 WT
571 WT
572 WT
573 W
574 W
575 W

2900216 REV LTR A SH 1

1/2900216


577
578
579
580
581
583
585
586
587
588
590
591
592
596
597
8
22
71
1
10
17
72
82
83
91
26
32
44
9
27
45
TRUN HAND CONT. OUTPUT HI
TRUN HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS OVDC
SHAFT HAND CONT. OUTPUT HI
SCT SHAFT DRIVE DISABLE
ZERO OPTICS MODE COMMAND
RESOLVED MODE RELAY COMMAND
SHIELD GROUND BUS
STRUCTURE GROUND
ISS & OPTICS LO SWITCHING
PANEL BRIGHTNESS LO
PANEL BRIGHTNESS HI
SXT TRUNNION DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
ZERO OPTICS
570
574
575
577
578
581
586
583
596
597
TRACKER MODE RELAY COMMAND R6
SHAFT HAND CONTROLLER OUTPUT LO D7
SCT TRUNNION TRACKER MODE INPUT LO D2
SCT TRUNNION TRACKER MODE INPUT HI D3
TRUNNION HAND CONTROLLER OUTPUT HI F9
TRUNNION HAND CONTROLLER OUTPUT LO F8
SHAFT HAND CONTROLLER OUTPUT HI D8
RESOLVED MODE RELAY COMMAND P6
STRUCTURE GROUND
56P01
95
80
PANEL BRIGHTNESS HI
PANEL BRIGHTNESS LO
D & C ELECTRONICS
ISS & OPTICS LO SWITCHING
SHIELD GROUND BUS
OJB
OPTICS SIGNALS (PSA)
MONITORING
OPTICS SIGNALS
(SIGNAL CONDITIONER)
MONITORING
STAR PRESENCE HI
STAR PRESENCE
LO
384A
384B
627
630
633
646
647
OPTICS SIGNAL MONITORING OF PSA FRONT PANEL TEST POINTS SEE NASA DRAWING 1901982
TPA
OPTICS SIGNAL MONITORING OF SIGNAL CONDITIONER INPUTS SEE NASA DRAWING 1902141-004
1419
1420
(SEE MONITORING PANEL MECH. DIAGRAM 2900207)
1423
1424
1425
ZERO OPTICS
NOT MARK
MARK
OIA
1348
2116
2115
2615
2616
1844
P10
44
19
43
MARK
NOT MARK
ZERO OPTICS
CE
SCT SHAFT DRIVE DISABLE
SXT TRUNION DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
STAR SIMULATOR SIGNAL LO
STAR SIMULATOR SIGNAL HI
627
630
633
648
647
800
801
802
800 STRUCTURE GROUND
801 STAR SIMULATOR SIGNAL HI
802 STAR SIMULATOR SIGNAL LO
SS

REVISIONS 27111-TCRR

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		7 SEP 65	J J J

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT [illegible]

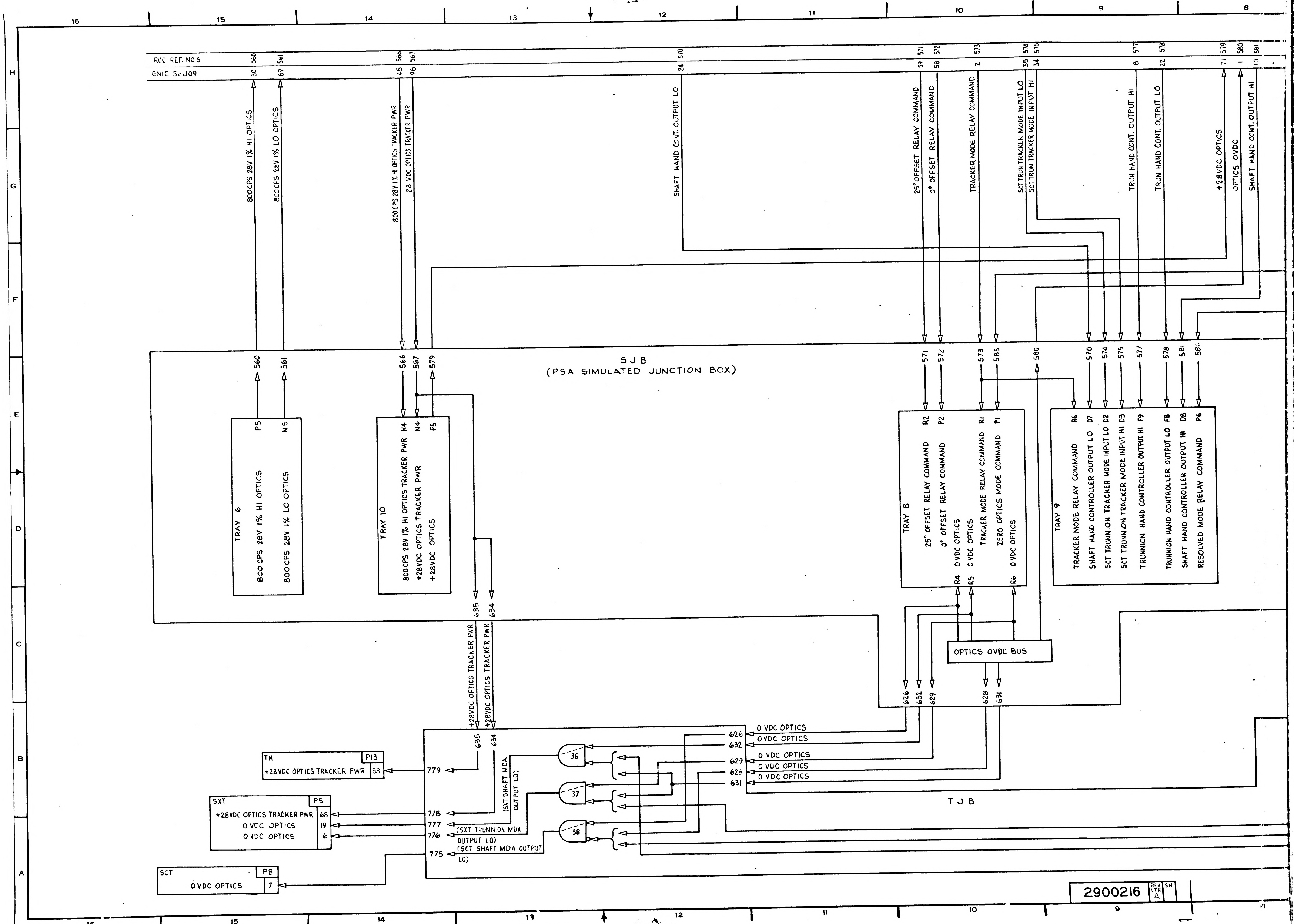
AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN Splane DATE 17 JUN 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM
OPTICS CONTROL (GSE MODE)
(BLOCK I SERIES 100, BLOCK II)

CODE IDENT NO 99974
SIZE J2
2900216
SCALE —
SHEET 2 OF 3

2900216 REV LTR A SH

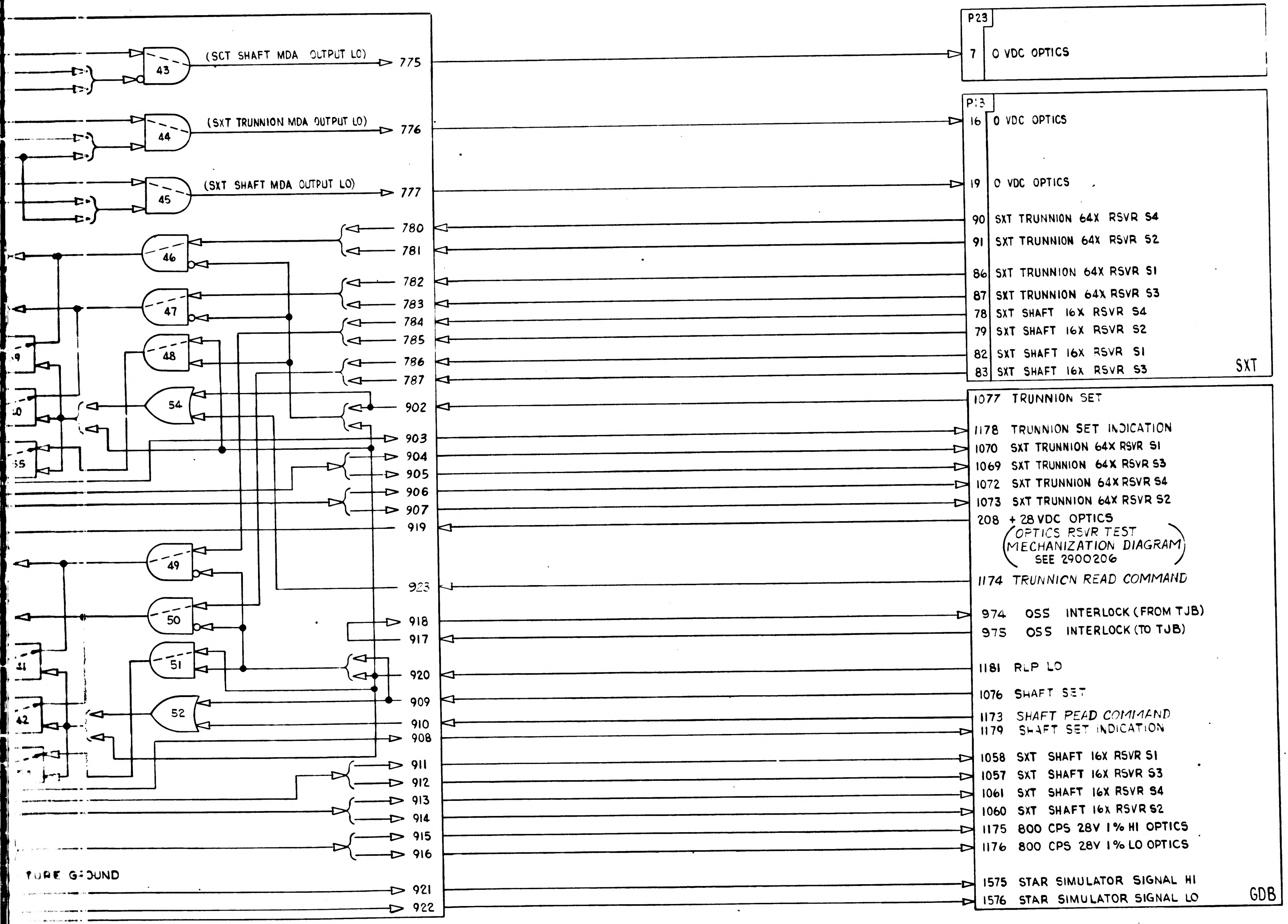

16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
ROC REF. NO'S
GNIC 50J09
560
561
566
567
570
571
572
573
574
575
577
578
579
580
581
80
69
45
96
24
59
58
2
35
34
8
22
71
1
10
800CPS 28V 1% HI OPTICS
800CPS 28V 1% LO OPTICS
800 CPS 28V 1% HI OPTICS TRACKER PWR
28 VDC OPTICS TRACKER PWR
SHAFT HAND CONT. OUTPUT LO
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN TRACKER MODE INPUT LO
SCT TRUN TRACKER MODE INPUT HI
TRUN HAND CONT. OUTPUT HI
TRUN HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS OVDC
SHAFT HAND CONT. OUTPUT HI
S J B
(PSA SIMULATED JUNCTION BOX)
579
585
570
574
575
577
578
581
584
TRAY 6
P5
N5
800 CPS 28V 1% HI OPTICS
800 CPS 28V 1% LO OPTICS
TRAY 10
H4
N4
P5
800CPS 28V 1% HI OPTICS TRACKER PWR
+28VDC OPTICS TRACKER PWR
+28VDC OPTICS
TRAY 8
R2
P2
R1
P1
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
0 VDC OPTICS
0 VDC OPTICS
TRACKER MODE RELAY COMMAND
ZERO OPTICS MODE COMMAND
0 VDC OPTICS
R4
R5
R6
TRAY 9
R6
D7
D2
D3
F9
F8
D8
P6
TRACKER MODE RELAY COMMAND
SHAFT HAND CONTROLLER OUTPUT LO
SCT TRUNNION TRACKER MODE INPUT LO
SCT TRUNNION TRACKER MODE INPUT HI
TRUNNION HAND CONTROLLER OUTPUT HI
TRUNNION HAND CONTROLLER OUTPUT LO
SHAFT HAND CONTROLLER OUTPUT HI
RESOLVED MODE RELAY COMMAND
635
634
OPTICS OVDC BUS
626
632
629
628
631
+28VDC OPTICS TRACKER PWR
+28VDC OPTICS TRACKER PWR
635
634
626
632
629
628
631
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
36
37
38
(SXT SHAFT MDA OUTPUT LO)
(SXT TRUNNION MDA OUTPUT LO)
(SCT SHAFT MDA OUTPUT LO)
T J B
779
778
777
776
775
TH
P13
+28VDC OPTICS TRACKER PWR
33
SXT
P5
+28VDC OPTICS TRACKER PWR
0 VDC OPTICS
0 VDC OPTICS
68
19
16
SCT
P8
0 VDC OPTICS
7

2900216 REV LTR A SH

1-4 2900216

REVISIONS TDRR 21F11

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21919	—	7 SEP 65	J J J



P23
7 0 VDC OPTICS
P13
16 0 VDC OPTICS
19 0 VDC OPTICS
90 SXT TRUNNION 64X RSVR S4
91 SXT TRUNNION 64X RSVR S2
86 SXT TRUNNION 64X RSVR S1
87 SXT TRUNNION 64X RSVR S3
78 SXT SHAFT 16X RSVR S4
79 SXT SHAFT 16X RSVR S2
82 SXT SHAFT 16X RSVR S1
83 SXT SHAFT 16X RSVR S3
SXT
1077 TRUNNION SET
1178 TRUNNION SET INDICATION
1070 SXT TRUNNION 64X RSVR S1
1069 SXT TRUNNION 64X RSVR S3
1072 SXT TRUNNION 64X RSVR S4
1073 SXT TRUNNION 64X RSVR S2
208 +28 VDC OPTICS
(OPTICS RSVR TEST MECHANIZATION DIAGRAM SEE 2900206)
1174 TRUNNION READ COMMAND
974 OSS INTERLOCK (FROM TJB)
975 OSS INTERLOCK (TO TJB)
1181 RLP LO
1076 SHAFT SET
1173 SHAFT READ COMMAND
1179 SHAFT SET INDICATION
1058 SXT SHAFT 16X RSVR S1
1057 SXT SHAFT 16X RSVR S3
1061 SXT SHAFT 16X RSVR S4
1060 SXT SHAFT 16X RSVR S2
1175 800 CPS 28V 1% HI OPTICS
1176 800 CPS 28V 1% LO OPTICS
1575 STAR SIMULATOR SIGNAL HI
1576 STAR SIMULATOR SIGNAL LO
GDB
(SCT SHAFT MDA OUTPUT LO)
(SXT TRUNNION MDA OUTPUT LO)
(SXT SHAFT MDA OUTPUT LO)
43
44
45
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48
54
49
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51
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775
776
777
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781
782
783
784
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914
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916
921
922
TURE GROUND

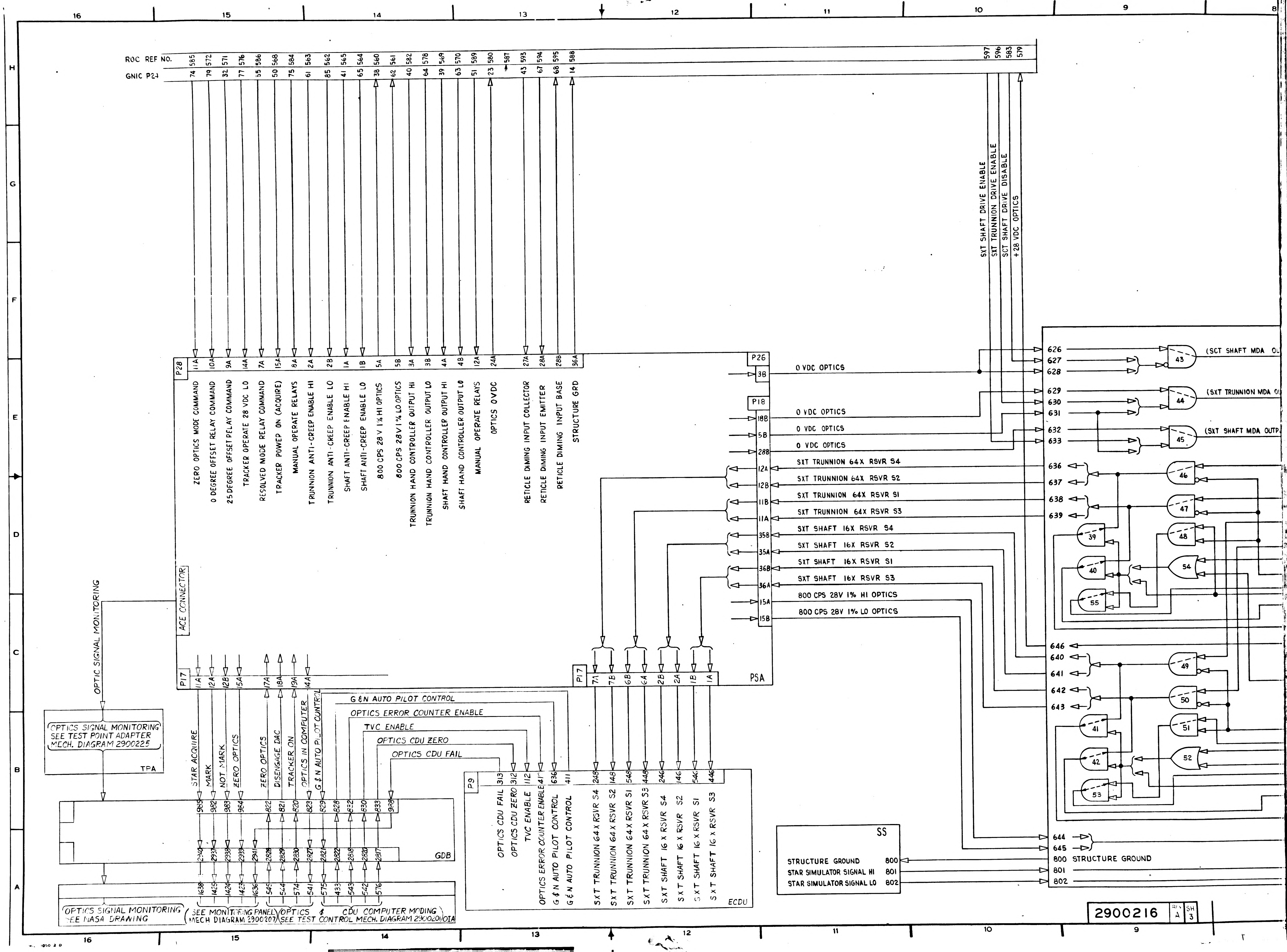
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE WISCONSIN
ACSP PN
DRAWN DATE 17 JUN 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
OPTICS CONTROL (GSE MODE)
(BLOCK I SERIES 100, BLOCK II)

CODE IDENT NO 99974
SIZE J2
2900216
SCALE —
SHEET 3 OF 3


16
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D
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A
ROC REF NO.
GNIC P24
585 572 571 576 586 568 584 563 562 565 564 560 561 582 578 569 570 589 580 587 593 594 595 588
74 79 32 77 55 50 75 61 85 41 65 38 62 40 64 39 63 51 23 43 67 68 14
597 596 583 579
SXT SHAFT DRIVE ENABLE
SXT TRUNNION DRIVE ENABLE
SCT SHAFT DRIVE DISABLE
+28 VDC OPTICS
P28
11A 10A 9A 14A 7A 15A 6A 2A 2B 1A 1B 5A 5B 3A 3B 4A 4B 12A 24A 27A 28A 28B 36A
ZERO OPTICS MODE COMMAND
0 DEGREE OFFSET RELAY COMMAND
25 DEGREE OFFSET RELAY COMMAND
TRACKER OPERATE 28 VDC LO
RESOLVED MODE RELAY COMMAND
TRACKER POWER ON (ACQUIRE)
MANUAL OPERATE RELAYS
TRUNNION ANTI-CREEP ENABLE HI
TRUNNION ANTI-CREEP ENABLE LO
SHAFT ANTI-CREEP ENABLE HI
SHAFT ANTI-CREEP ENABLE LO
800 CPS 28 V 1% HI OPTICS
800 CPS 28 V 1% LO OPTICS
TRUNNION HAND CONTROLLER OUTPUT HI
TRUNNION HAND CONTROLLER OUTPUT LO
SHAFT HAND CONTROLLER OUTPUT HI
SHAFT HAND CONTROLLER OUTPUT LO
MANUAL OPERATE RELAYS
OPTICS 0 VDC
RETICLE DIMING INPUT COLLECTOR
RETICLE DIMING INPUT EMITTER
RETICLE DIMING INPUT BASE
STRUCTURE GRD
P26
3B
0 VDC OPTICS
P18
18B
0 VDC OPTICS
5B
0 VDC OPTICS
28B
0 VDC OPTICS
12A
SXT TRUNNION 64X RSVR S4
12B
SXT TRUNNION 64X RSVR S2
11B
SXT TRUNNION 64X RSVR S1
11A
SXT TRUNNION 64X RSVR S3
35B
SXT SHAFT 16X RSVR S4
35A
SXT SHAFT 16X RSVR S2
36B
SXT SHAFT 16X RSVR S1
36A
SXT SHAFT 16X RSVR S3
15A
800 CPS 28V 1% HI OPTICS
15B
800 CPS 28V 1% LO OPTICS
626
627
628
629
630
631
632
633
636
637
638
639
646
640
641
642
643
644
645
800 STRUCTURE GROUND
801
802
43 44 45 46 47 39 48 40 54 55 49 50 41 51 42 52 53
(SCT SHAFT MDA OU
(SXT TRUNNION MDA OU
(SXT SHAFT MDA OUTP
ACE CONNECTOR
OPTIC SIGNAL MONITORING
P17
11A 12A 12B 15A 17A 18A 19A 14A
P17
7A 7B 6B 6A 2B 2A 1B 1A
PSA
G & N AUTO PILOT CONTROL
OPTICS ERROR COUNTER ENABLE
TVC ENABLE
OPTICS CDU ZERO
OPTICS CDU FAIL
OPTICS SIGNAL MONITORING
SEE TEST POINT ADAPTER
MECH. DIAGRAM 2900225
TPA
STAR ACQUIRE
MARK
NOT MARK
ZERO OPTICS
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
OPTICS IN COMPUTER
G & N AUTO PILOT CONTROL
985 982 983 984 822 821 820 823 829 828 832 830 833 928
2940 2937 2938 2939 2941 2828 2829 2830 2827 2821 2822 2818 2820 2817
GDB
1638 1425 1424 1423 1636 545 544 574 541 575 433 543 542 576
OPTICS SIGNAL MONITORING
SEE NASA DRAWING
SEE MONITORING PANEL
MECH DIAGRAM 2900207
OPTICS &
SEE TEST CONTROL
CDU COMPUTER MODING
MECH. DIAGRAM 2900201/01A
P9
313 312 112 41 636 411 248 148 548 448 246 146 546 446
OPTICS CDU FAIL
OPTICS CDU ZERO
TVC ENABLE
OPTICS ERROR COUNTER ENABLE
G & N AUTO PILOT CONTROL
G & N AUTO PILOT CONTROL
SXT TRUNNION 64 X RSVR S4
SXT TRUNNION 64 X RSVR S2
SXT TRUNNION 64 X RSVR S1
SXT TRUNNION 64 X RSVR S3
SXT SHAFT 16 X RSVR S4
SXT SHAFT 16 X RSVR S2
SXT SHAFT 16 X RSVR S1
SXT SHAFT 16 X RSVR S3
ECDU
SS
STRUCTURE GROUND 800
STAR SIMULATOR SIGNAL HI 801
STAR SIMULATOR SIGNAL LO 802
2900216
REV A
SH 3

1/2900216

REVISIONS TDRR 21191

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
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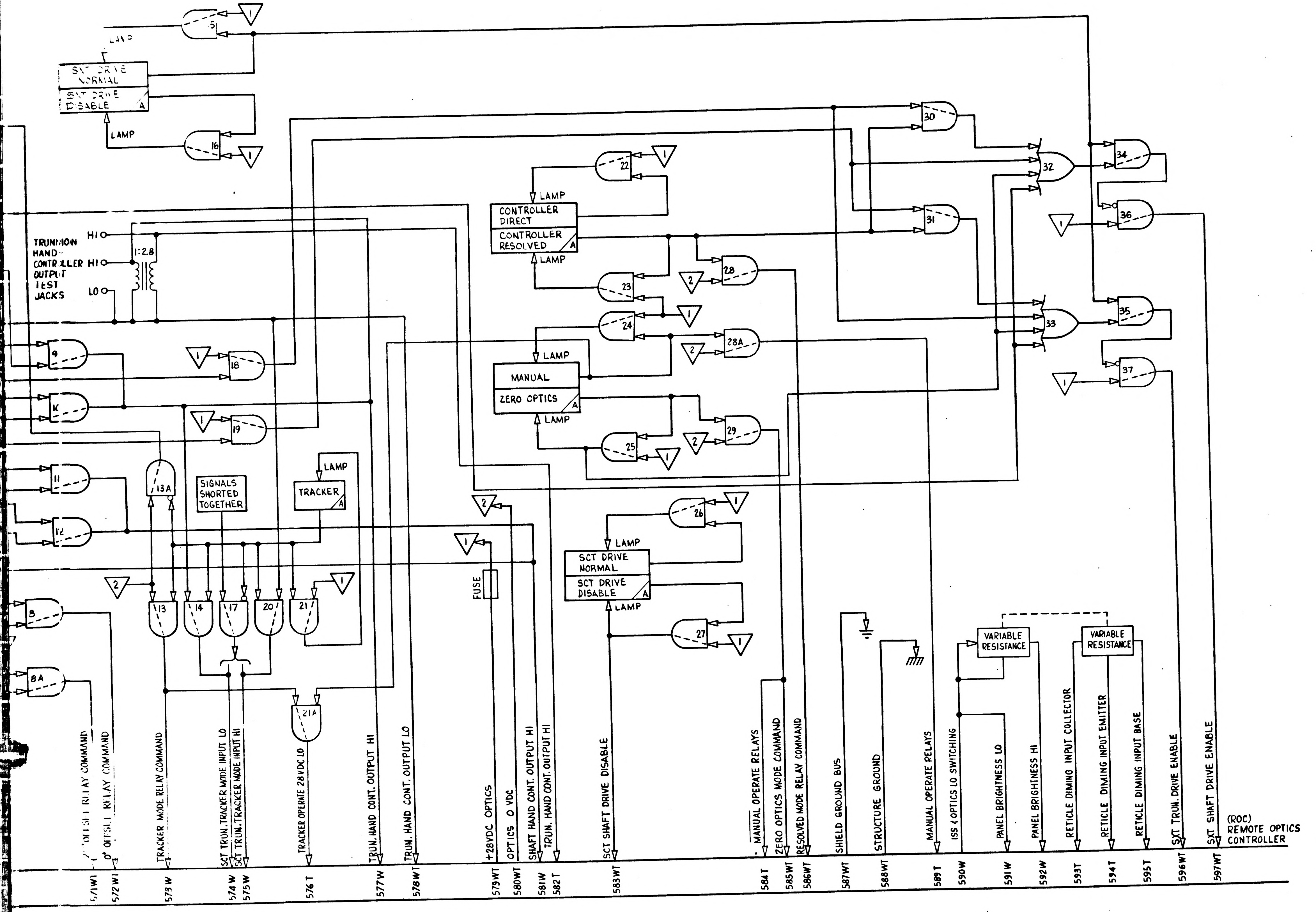
B		REVISED PER TDRR 21912		8 SEP 65	



LAMP
SXT DRIVE NORMAL
SXT DRIVE DISABLE
A
LAMP
5
16
1
1
TRUNNION HAND CONTROLLER OUTPUT TEST JACKS
HI
HI
LO
1:2.8
9
K
11
12
8
8A
13A
13
14
17
20
21
21A
18
19
1
1
2
1
SIGNALS SHORTED TOGETHER
TRACKER
LAMP
FUSE
2
1
CONTROLLER DIRECT
CONTROLLER RESOLVED
LAMP
LAMP
22
23
24
28
28A
2
2
1
MANUAL
ZERO OPTICS
LAMP
LAMP
25
29
2
1
SCT DRIVE NORMAL
SCT DRIVE DISABLE
LAMP
LAMP
26
27
1
1
30
31
32
33
34
35
36
37
1
1
VARIABLE RESISTANCE
VARIABLE RESISTANCE
0° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN. TRACKER MODE INPUT LO
SCT TRUN. TRACKER MODE INPUT HI
TRACKER OPERATE 28 VDC LO
TRUN. HAND CONT. OUTPUT HI
TRUN. HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS 0 VDC
SHAFT HAND CONT. OUTPUT HI
TRUN. HAND CONT. OUTPUT HI
SCT SHAFT DRIVE DISABLE
MANUAL OPERATE RELAYS
ZERO OPTICS MODE COMMAND
RESOLVED MODE RELAY COMMAND
SHIELD GROUND BUS
STRUCTURE GROUND
MANUAL OPERATE RELAYS
ISS & OPTICS LO SWITCHING
PANEL BRIGHTNESS LO
PANEL BRIGHTNESS HI
RETICLE DIMING INPUT COLLECTOR
RETICLE DIMING INPUT EMITTER
RETICLE DIMING INPUT BASE
SXT TRUN. DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
(ROC) REMOTE OPTICS CONTROLLER
571W1
572W1
573W
574W
575W
576T
577W
578WT
579WT
580WT
581W
582T
583WT
584T
585WT
586WT
587WT
588WT
589T
590W
591W
592W
593T
594T
595T
596WT
597WT

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Solane DATE
CHECKED Carter 20 Jun 65
APPROVAL 30 Jun 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
OPTICS CONTROL (GSE MODE)
(BLOCK I SERIES 100, BLOCK II)

CODE IDENT NO. 99974
SIZE J2
2900216
SCALE —
SHEET 1 OF 3

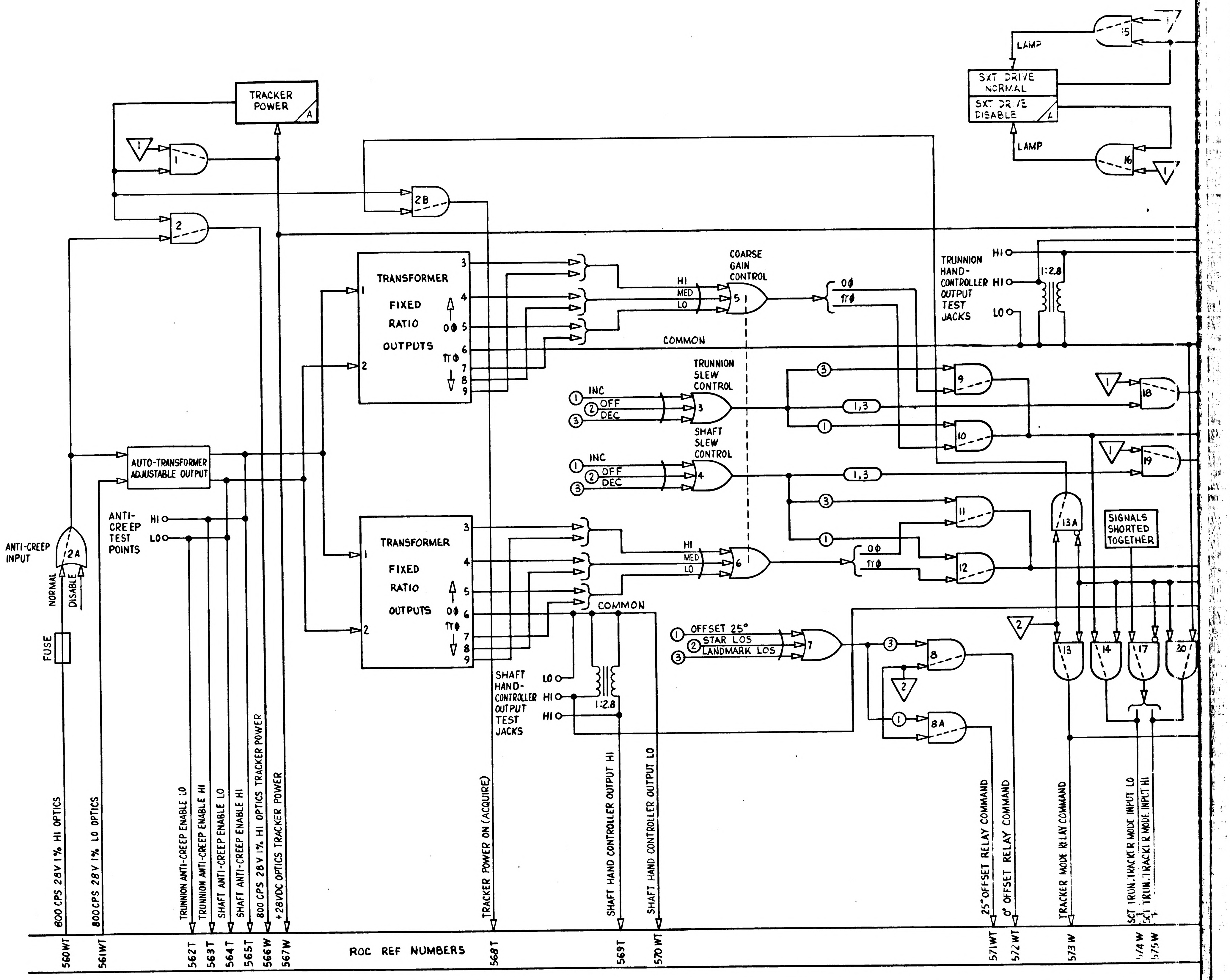
2900216 B

2900216

2/2900216

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. NONSTANDARD SYMBOLOGY:
    - INDICATES "AND" GATE WITH SWITCHED SIGNAL
    - NAME — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
    - NAME / NAME — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION)
4. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:
    - SHEET 1 / SHEET 2 — BLOCK I SERIES 100
    - SHEET 1 / SHEET 3 — BLOCK II
    - INDICATES "BILATERAL AND" GATE WITH SWITCHED SIGNAL.

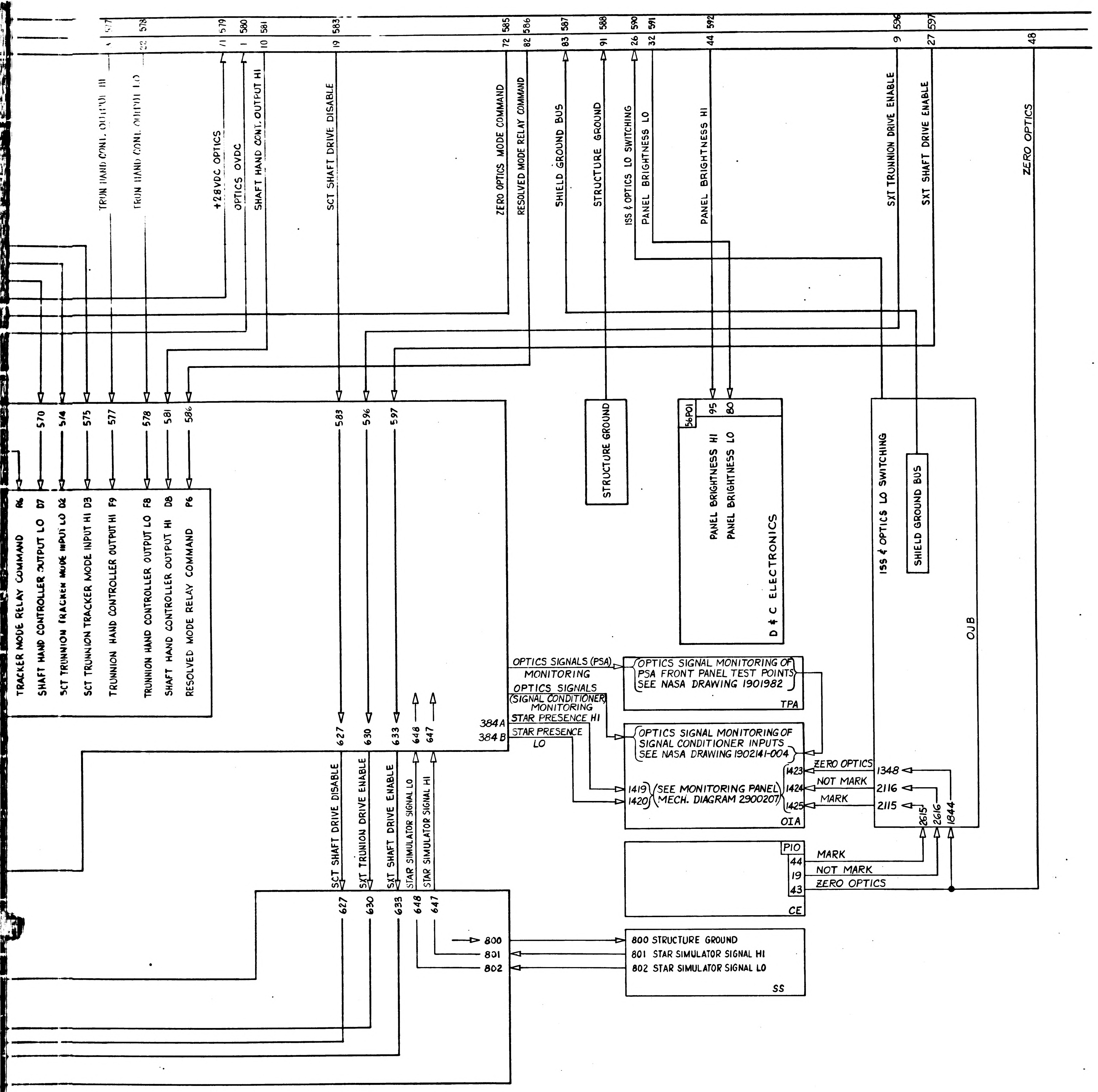


TRACKER POWER
A
SXT DRIVE NORMAL
SXT DRIVE DISABLE
LAMP
LAMP
1
2
2B
15
16
TRANSFORMER FIXED RATIO OUTPUTS
0ϕ
πϕ
COMMON
COARSE GAIN CONTROL
HI
MED
LO
5
6
TRUNNION HAND-CONTROLLER OUTPUT TEST JACKS
HI
LO
1:2.8
TRUNNION SLEW CONTROL
SHAFT SLEW CONTROL
INC
OFF
DEC
3
4
1,3
9
10
11
12
18
19
13A
SIGNALS SHORTED TOGETHER
AUTO-TRANSFORMER ADJUSTABLE OUTPUT
ANTI-CREEP TEST POINTS
ANTI-CREEP INPUT
2A
NORMAL
DISABLE
FUSE
SHAFT HAND-CONTROLLER OUTPUT TEST JACKS
OFFSET 25°
STAR LOS
LANDMARK LOS
7
8
8A
13
14
17
20
800 CPS 28V 1% HI OPTICS
800 CPS 28V 1% LO OPTICS
TRUNNION ANTI-CREEP ENABLE LO
TRUNNION ANTI-CREEP ENABLE HI
SHAFT ANTI-CREEP ENABLE LO
SHAFT ANTI-CREEP ENABLE HI
800 CPS 28V 1% HI OPTICS TRACKER POWER
+28VDC OPTICS TRACKER POWER
TRACKER POWER ON (ACQUIRE)
SHAFT HAND CONTROLLER OUTPUT HI
SHAFT HAND CONTROLLER OUTPUT LO
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN. TRACKER MODE INPUT LO
SCT TRUN. TRACKER MODE INPUT HI
560WT
561WT
562T
563T
564T
565T
566W
567W
ROC REF NUMBERS
568T
569T
570WT
571WT
572WT
573W
574W
575W

2900216 | REV | SH 1

1/2900216

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
REVISIONS					
A		REVISION STATUS CHANGED		SEP 65	
B		REVISED PER TDRR 21912		8 SEP 65	



577
578
579
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581
583
585
586
587
588
590
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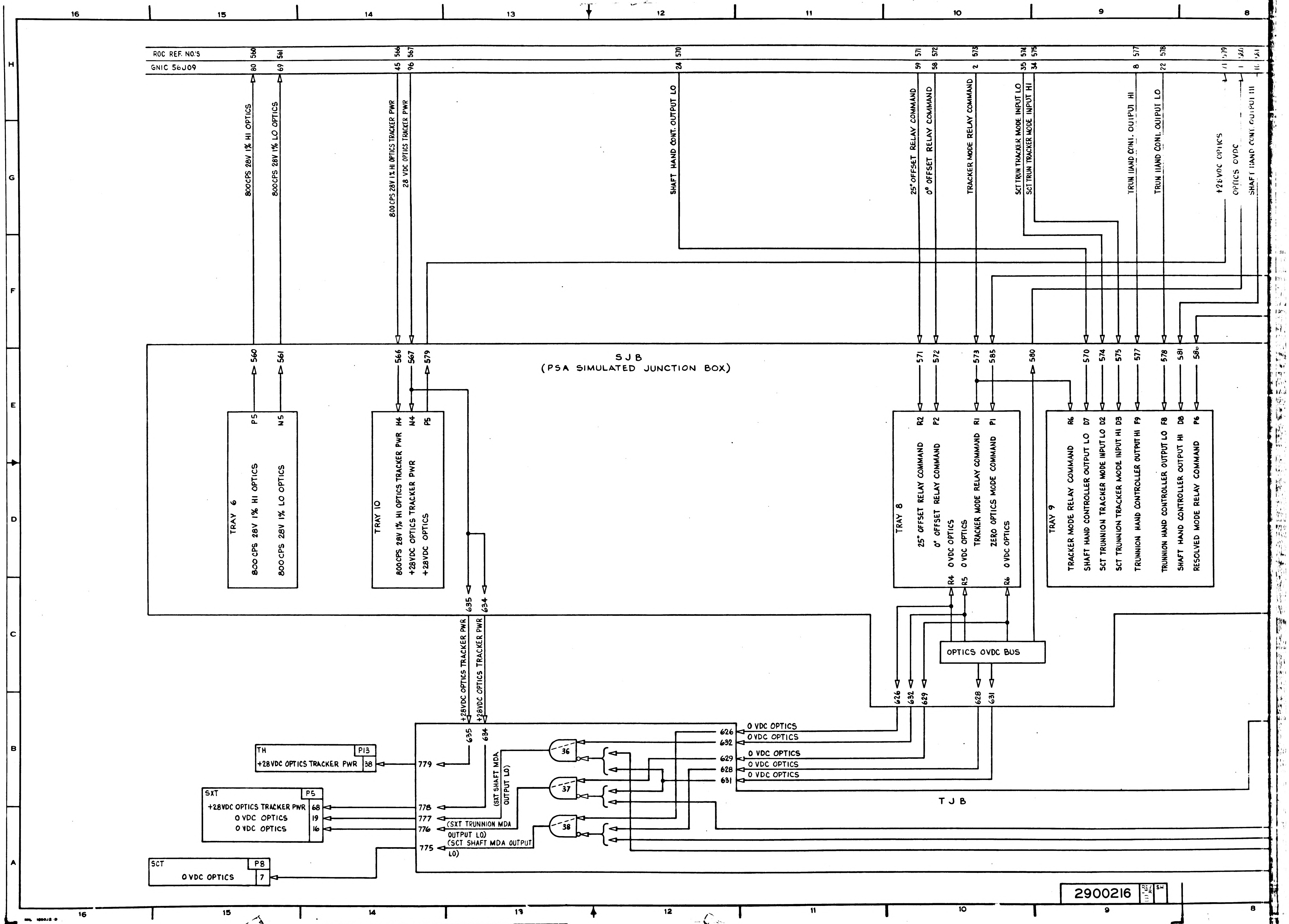
592
596
597
4
22
71
1
10
19
72
82
83
91
26
32
44
9
27
48
TRUN HAND CONT. OUTPUT HI
TRUN HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS OVDC
SHAFT HAND CONT. OUTPUT HI
SCT SHAFT DRIVE DISABLE
ZERO OPTICS MODE COMMAND
RESOLVED MODE RELAY COMMAND
SHIELD GROUND BUS
STRUCTURE GROUND
ISS & OPTICS LO SWITCHING
PANEL BRIGHTNESS LO
PANEL BRIGHTNESS HI
SXT TRUNNION DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
ZERO OPTICS
570
574
575
577
578
581
586
583
596
597
TRACKER MODE RELAY COMMAND R6
SHAFT HAND CONTROLLER OUTPUT LO D7
SCT TRUNNION TRACKER MODE INPUT LO D2
SCT TRUNNION TRACKER MODE INPUT HI D3
TRUNNION HAND CONTROLLER OUTPUT HI F9
TRUNNION HAND CONTROLLER OUTPUT LO F8
SHAFT HAND CONTROLLER OUTPUT HI D8
RESOLVED MODE RELAY COMMAND P6
STRUCTURE GROUND
56P01
95
80
PANEL BRIGHTNESS HI
PANEL BRIGHTNESS LO
D & C ELECTRONICS
ISS & OPTICS LO SWITCHING
SHIELD GROUND BUS
OJB
627
630
633
648
647
384A
384B
OPTICS SIGNALS (PSA)
MONITORING
OPTICS SIGNALS
(SIGNAL CONDITIONER)
MONITORING
STAR PRESENCE HI
STAR PRESENCE
LO
OPTICS SIGNAL MONITORING OF PSA FRONT PANEL TEST POINTS SEE NASA DRAWING 1901982
TPA
OPTICS SIGNAL MONITORING OF SIGNAL CONDITIONER INPUTS SEE NASA DRAWING 1902141-004
1423
1424
1425
1419
1420
SEE MONITORING PANEL MECH. DIAGRAM 2900207
OIA
ZERO OPTICS
NOT MARK
MARK
1348
2116
2115
2615
2616
1844
P10
44
19
43
MARK
NOT MARK
ZERO OPTICS
CE
SCT SHAFT DRIVE DISABLE
SXT TRUNION DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
STAR SIMULATOR SIGNAL LO
STAR SIMULATOR SIGNAL HI
800
801
802
800 STRUCTURE GROUND
801 STAR SIMULATOR SIGNAL HI
802 STAR SIMULATOR SIGNAL LO
SS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± — ± — ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN Solane DATE 17 JUN 65 CHECKED 29 JUN 65 APPROVAL 30 JUN 65 APPROVAL	MANNED SPACECRAFT CENTER HOUSTON, TEXAS MECHANIZATION DIAGRAM OPTICS CONTROL (GSE MODE) (BLOCK I SERIES 100, BLOCK II)
DO NOT SCALE THIS DRAWING MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 SIZE J_2 2900216
CONTRACT NAS9-497	MIT APPROVAL	SCALE — SHEET 2 OF 3

27 2900216


16
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A
ROC REF. NO.'S
GNIC 56J09
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45
96
24
59
58
2
35
34
8
22
800CPS 28V 1% HI OPTICS
800CPS 28V 1% LO OPTICS
800 CPS 28V 1% HI OPTICS TRACKER PWR
28 VDC OPTICS TRACKER PWR
SHAFT HAND CONT. OUTPUT LO
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN TRACKER MODE INPUT LO
SCT TRUN TRACKER MODE INPUT HI
TRUN HAND CONT. OUTPUT HI
TRUN HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS OVDC
SHAFT HAND CONT. OUTPUT HI
SJB
(PSA SIMULATED JUNCTION BOX)
560
561
566
567
579
571
572
573
585
580
570
574
575
577
578
581
586
TRAY 6
P5
N5
800 CPS 28V 1% HI OPTICS
800 CPS 28V 1% LO OPTICS
TRAY 10
H4
N4
P5
800CPS 28V 1% HI OPTICS TRACKER PWR
+28VDC OPTICS TRACKER PWR
+28VDC OPTICS
TRAY 8
R2
P2
R1
P1
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
0 VDC OPTICS
0 VDC OPTICS
TRACKER MODE RELAY COMMAND
ZERO OPTICS MODE COMMAND
0 VDC OPTICS
R4
R5
R6
TRAY 9
R6
D7
D2
D3
F9
F8
D8
P6
TRACKER MODE RELAY COMMAND
SHAFT HAND CONTROLLER OUTPUT LO
SCT TRUNNION TRACKER MODE INPUT LO
SCT TRUNNION TRACKER MODE INPUT HI
TRUNNION HAND CONTROLLER OUTPUT HI
TRUNNION HAND CONTROLLER OUTPUT LO
SHAFT HAND CONTROLLER OUTPUT HI
RESOLVED MODE RELAY COMMAND
635
634
+28VDC OPTICS TRACKER PWR
+28VDC OPTICS TRACKER PWR
OPTICS OVDC BUS
626
632
629
628
631
TH
P13
+28VDC OPTICS TRACKER PWR
38
SXT
P5
+28VDC OPTICS TRACKER PWR
68
0 VDC OPTICS
19
0 VDC OPTICS
16
SCT
P8
0 VDC OPTICS
7
779
778
777
776
775
(SXT SHAFT MDA OUTPUT LO)
(SXT TRUNNION MDA OUTPUT LO)
(SCT SHAFT MDA OUTPUT LO)
36
37
38
626
632
629
628
631
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
TJB
2900216
SH

1/2900216

REVISIONS TDRR 21891

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
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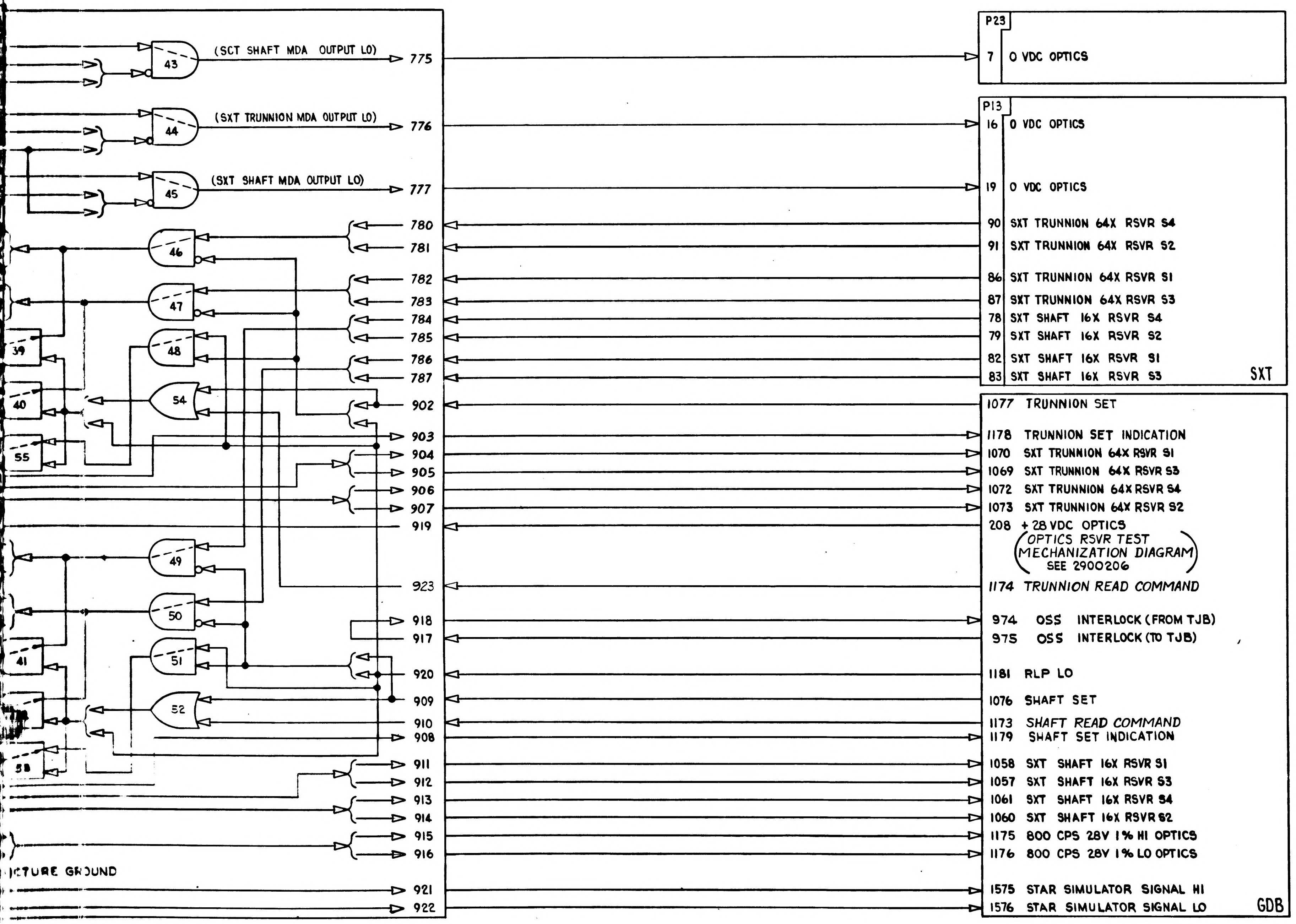
B		REVISED PER TDRR 21912	—	8 SEP 65	J J



(SCT SHAFT MDA OUTPUT LO)
(SXT TRUNNION MDA OUTPUT LO)
(SXT SHAFT MDA OUTPUT LO)
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780
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920
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910
908
911
912
913
914
915
916
ICTURE GROUND
921
922
P23
7 0 VDC OPTICS
P13
16 0 VDC OPTICS
19 0 VDC OPTICS
90 SXT TRUNNION 64X RSVR S4
91 SXT TRUNNION 64X RSVR S2
86 SXT TRUNNION 64X RSVR S1
87 SXT TRUNNION 64X RSVR S3
78 SXT SHAFT 16X RSVR S4
79 SXT SHAFT 16X RSVR S2
82 SXT SHAFT 16X RSVR S1
83 SXT SHAFT 16X RSVR S3
SXT
1077 TRUNNION SET
1178 TRUNNION SET INDICATION
1070 SXT TRUNNION 64X RSVR S1
1069 SXT TRUNNION 64X RSVR S3
1072 SXT TRUNNION 64X RSVR S4
1073 SXT TRUNNION 64X RSVR S2
208 +28 VDC OPTICS
(OPTICS RSVR TEST MECHANIZATION DIAGRAM SEE 2900206)
1174 TRUNNION READ COMMAND
974 OSS INTERLOCK (FROM TJB)
975 OSS INTERLOCK (TO TJB)
1181 RLP LO
1076 SHAFT SET
1173 SHAFT READ COMMAND
1179 SHAFT SET INDICATION
1058 SXT SHAFT 16X RSVR S1
1057 SXT SHAFT 16X RSVR S3
1061 SXT SHAFT 16X RSVR S4
1060 SXT SHAFT 16X RSVR S2
1175 800 CPS 28V 1% HI OPTICS
1176 800 CPS 28V 1% LO OPTICS
1575 STAR SIMULATOR SIGNAL HI
1576 STAR SIMULATOR SIGNAL LO
GDB

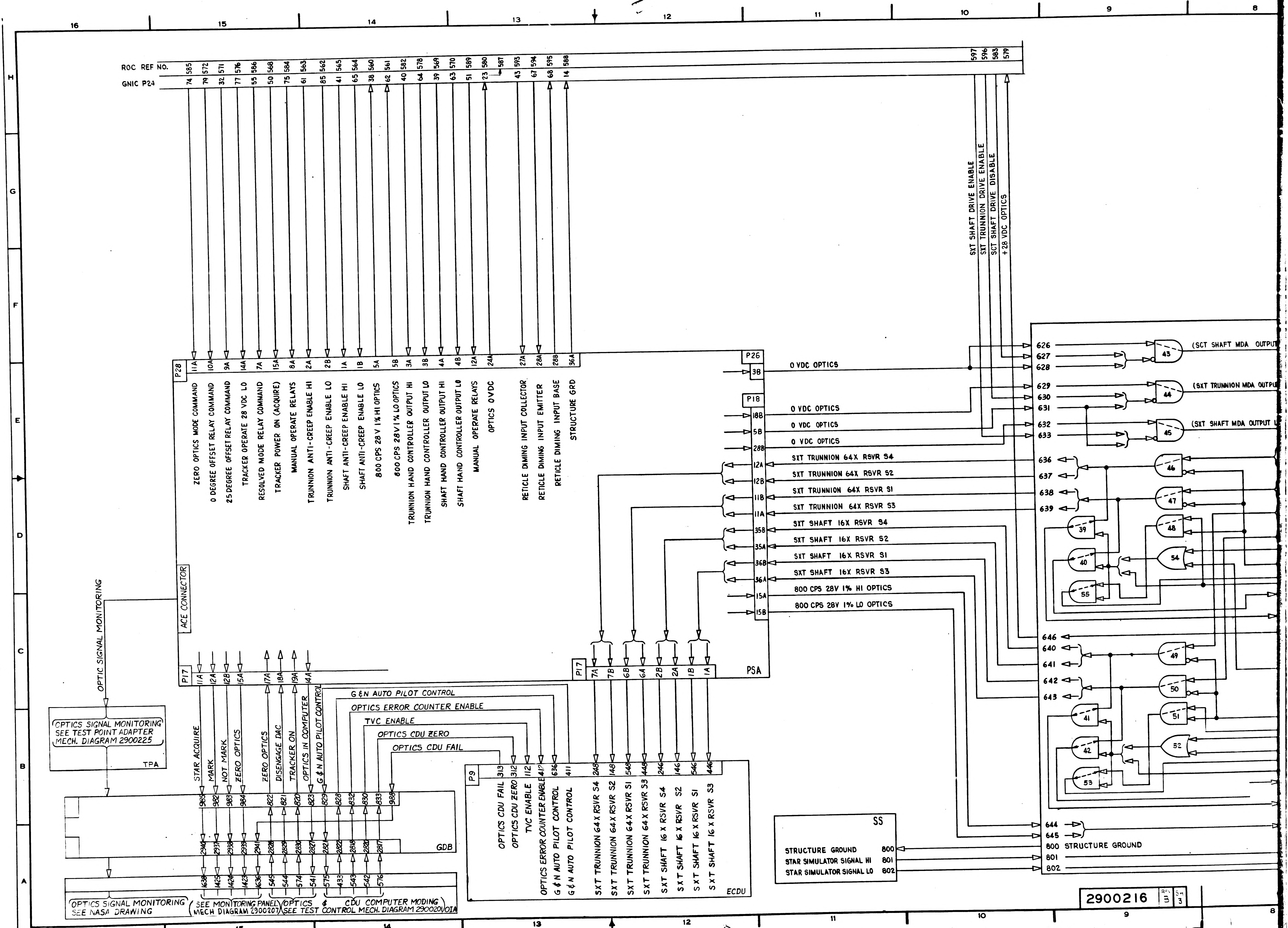
3H

2900216 B

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± — ± — ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN DATE 17 JUN 65 CHECKED 29 JUN 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM OPTICS CONTROL (GSE MODE) (BLOCK I SERIES 100, BLOCK II)
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 2900216
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — · SHEET 3 OF 3

2900216 B Sh 3

2/ 2900216



ROC REF NO.
GNIC P24
74 585
79 572
32 571
77 576
55 586
50 568
75 584
61 563
85 562
41 565
65 564
38 560
62 561
40 582
64 578
39 569
63 570
51 589
23 580
587
43 593
67 594
68 595
14 588
597
596
583
579
SXT SHAFT DRIVE ENABLE
SXT TRUNNION DRIVE ENABLE
SCT SHAFT DRIVE DISABLE
+28 VDC OPTICS
P28
ZERO OPTICS MODE COMMAND
0 DEGREE OFFSET RELAY COMMAND
25 DEGREE OFFSET RELAY COMMAND
TRACKER OPERATE 28 VDC LO
RESOLVED MODE RELAY COMMAND
TRACKER POWER ON (ACQUIRE)
MANUAL OPERATE RELAYS
TRUNNION ANTI-CREEP ENABLE HI
TRUNNION ANTI-CREEP ENABLE LO
SHAFT ANTI-CREEP ENABLE HI
SHAFT ANTI-CREEP ENABLE LO
800 CPS 28 V 1% HI OPTICS
800 CPS 28V 1% LO OPTICS
TRUNNION HAND CONTROLLER OUTPUT HI
TRUNNION HAND CONTROLLER OUTPUT LO
SHAFT HAND CONTROLLER OUTPUT HI
SHAFT HAND CONTROLLER OUTPUT LO
MANUAL OPERATE RELAYS
OPTICS OVDC
RETICLE DIMING INPUT COLLECTOR
RETICLE DIMING INPUT EMITTER
RETICLE DIMING INPUT BASE
STRUCTURE GRD
ACE CONNECTOR
P26
0 VDC OPTICS
P18
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
SXT TRUNNION 64X RSVR S4
SXT TRUNNION 64X RSVR S2
SXT TRUNNION 64X RSVR S1
SXT TRUNNION 64X RSVR S3
SXT SHAFT 16X RSVR S4
SXT SHAFT 16X RSVR S2
SXT SHAFT 16X RSVR S1
SXT SHAFT 16X RSVR S3
800 CPS 28V 1% HI OPTICS
800 CPS 28V 1% LO OPTICS
PSA
P17
(SCT SHAFT MDA OUTPUT
(SXT TRUNNION MDA OUTPUT
(SXT SHAFT MDA OUTPUT
626 627 628 629 630 631 632 633 636 637 638 639 640 641 642 643 644 645 646
43 44 45 46 47 48 39 40 54 55 49 50 41 51 42 52 53
OPTIC SIGNAL MONITORING
OPTICS SIGNAL MONITORING
SEE TEST POINT ADAPTER
MECH. DIAGRAM 2900225
TPA
STAR ACQUIRE
MARK
NOT MARK
ZERO OPTICS
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
OPTICS IN COMPUTER
G & N AUTO PILOT CONTROL
G & N AUTO PILOT CONTROL
OPTICS ERROR COUNTER ENABLE
TVC ENABLE
OPTICS CDU ZERO
OPTICS CDU FAIL
GDB
P9
OPTICS CDU FAIL
OPTICS CDU ZERO
TVC ENABLE
OPTICS ERROR COUNTER ENABLE
G & N AUTO PILOT CONTROL
G & N AUTO PILOT CONTROL
SXT TRUNNION 64 X RSVR S4
SXT TRUNNION 64 X RSVR S2
SXT TRUNNION 64 X RSVR S1
SXT TRUNNION 64 X RSVR S3
SXT SHAFT 16 X RSVR S4
SXT SHAFT 16 X RSVR S2
SXT SHAFT 16 X RSVR S1
SXT SHAFT 16 X RSVR S3
ECDU
SS
STRUCTURE GROUND 800
STAR SIMULATOR SIGNAL HI 801
STAR SIMULATOR SIGNAL LO 802
800 STRUCTURE GROUND
801
802
OPTICS SIGNAL MONITORING
SEE NASA DRAWING
SEE MONITORING PANEL
MECH. DIAGRAM 2900207
OPTICS & CDU COMPUTER MODING
SEE TEST CONTROL MECH. DIAGRAM 2900201/01A
16 15 14 13 12 11 10 9 8
H G F E D C B A

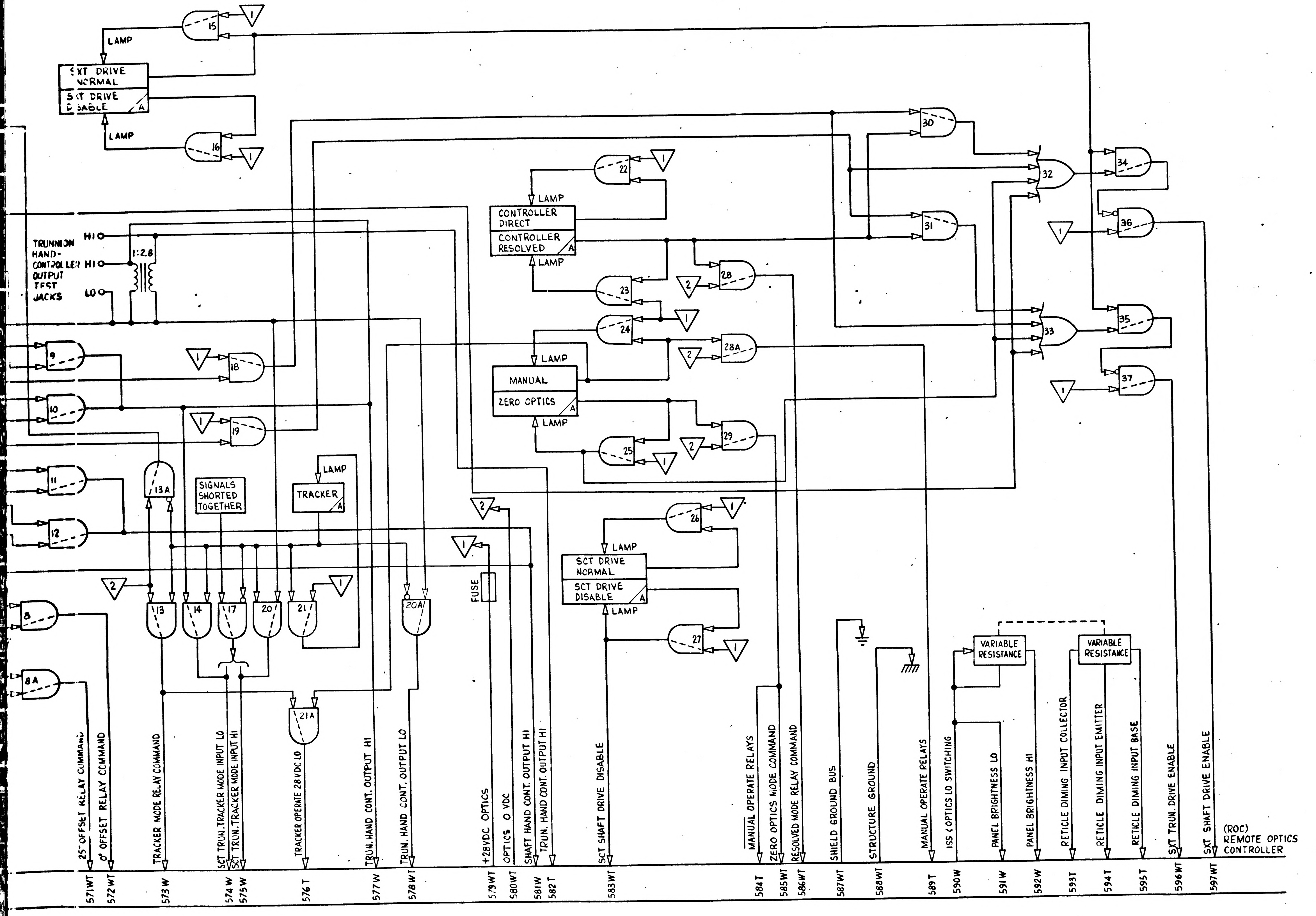
2900216 REV B SH 3

1/2900216

S800518

REVISIONS TDRR 21891

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		7 SEP 65	J J J mcm
B		REVISED PER TDRR 21912		8 SEP 65	J J J mcm
C		REVISED PER TDRR 22290		21-SEP-65	K.F.N.



LAMP
SXT DRIVE NORMAL
SXT DRIVE DISABLE
A
15
16
1
TRUNNION HAND-CONTROLLER OUTPUT TEST JACKS
HI
HI
LO
1:2.8
9
10
11
12
13A
8
8A
13
14
17
20
21
21A
20A
18
19
2
SIGNALS SHORTED TOGETHER
TRACKER
FUSE
CONTROLLER DIRECT
CONTROLLER RESOLVED
MANUAL
ZERO OPTICS
22
23
24
25
26
27
28
28A
29
30
31
32
33
34
35
36
37
SCT DRIVE NORMAL
SCT DRIVE DISABLE
VARIABLE RESISTANCE
VARIABLE RESISTANCE
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN. TRACKER MODE INPUT LO
SCT TRUN. TRACKER MODE INPUT HI
TRACKER OPERATE 28VDC LO
TRUN. HAND CONT. OUTPUT HI
TRUN. HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS 0 VDC
SHAFT HAND CONT. OUTPUT HI
TRUN. HAND CONT. OUTPUT HI
SCT SHAFT DRIVE DISABLE
MANUAL OPERATE RELAYS
ZERO OPTICS MODE COMMAND
RESOLVED MODE RELAY COMMAND
SHIELD GROUND BUS
STRUCTURE GROUND
MANUAL OPERATE RELAYS
ISS & OPTICS LO SWITCHING
PANEL BRIGHTNESS LO
PANEL BRIGHTNESS HI
RETICLE DIMING INPUT COLLECTOR
RETICLE DIMING INPUT EMITTER
RETICLE DIMING INPUT BASE
SXT TRUN. DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
(ROC) REMOTE OPTICS CONTROLLER
571WT
572WT
573W
574W
575W
576T
577W
578WT
579WT
580WT
581W
582T
583WT
584T
585WT
586WT
587WT
588WT
589T
590W
591W
592W
593T
594T
595T
596WT
597WT

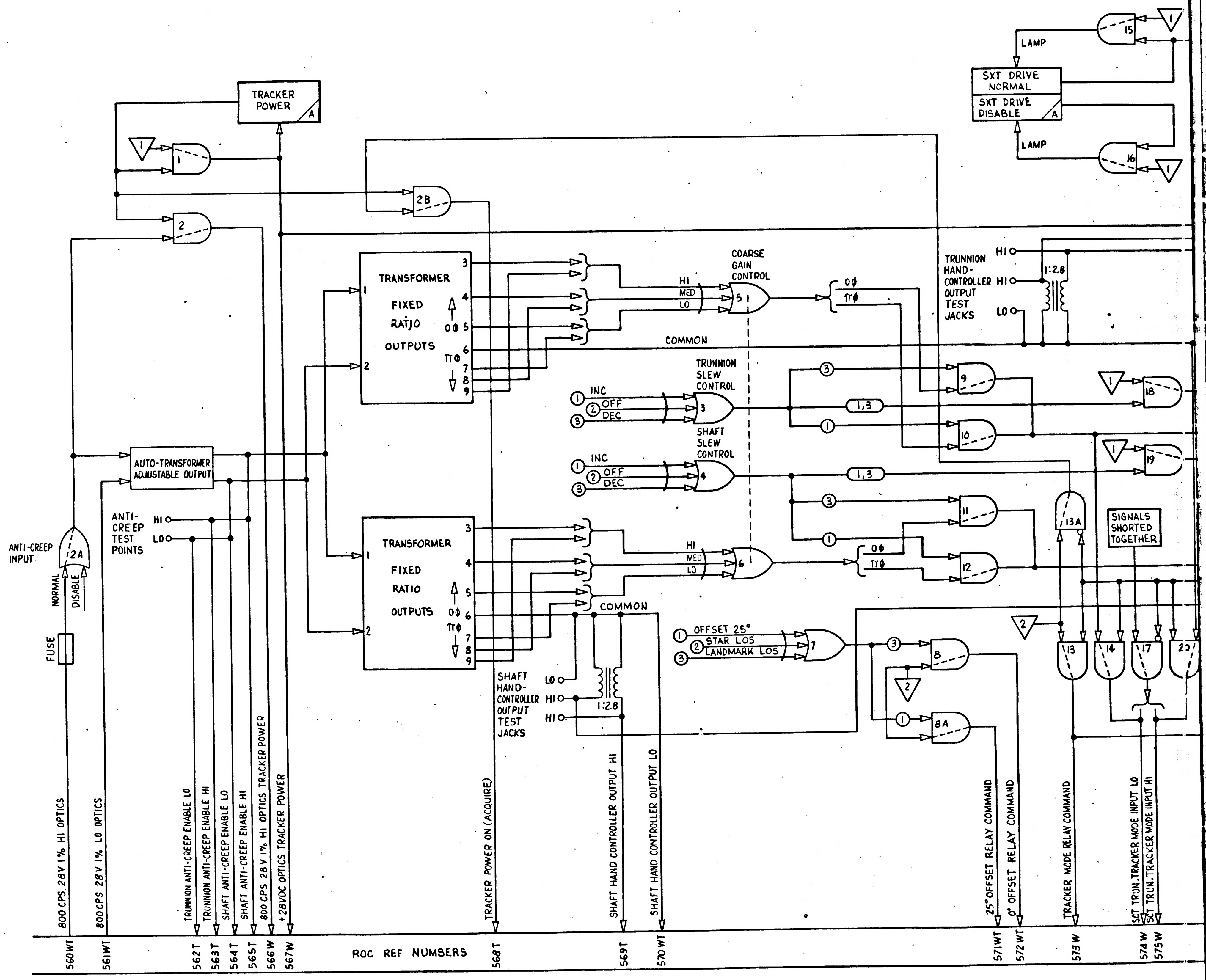
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN Solane DATE CHECKED APPROVAL APPROVAL	MECHANIZATION DIAGRAM OPTICS CONTROL (GSE MODE) (BLOCK I SERIES 100, BLOCK II)
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 2900216
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — · SHEET 1 OF 3

2900216 C

SH 1 of 3
2900216

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. NONSTANDARD SYMBOLOGY:
   - INDICATES "AND" GATE WITH SWITCHED SIGNAL
   - NAME — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
   - NAME / NAME — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION)
4. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:
   - SHEET 1 / SHEET 2 — BLOCK I SERIES 100
   - SHEET 1 / SHEET 3 — BLOCK II
   - INDICATES "BILATERAL AND" GATE WITH SWITCHED SIGNAL.


TRACKER POWER
A
1
2
2B
SXT DRIVE NORMAL
SXT DRIVE DISABLE
A
LAMP
LAMP
15
16
TRANSFORMER FIXED RATIO OUTPUTS
1
2
3
4
5
6
7
8
9
0ϕ
πϕ
COARSE GAIN CONTROL
HI
MED
LO
5
6
COMMON
TRUNNION HAND-CONTROLLER OUTPUT TEST JACKS
HI
HI
LO
1:2.8
TRUNNION SLEW CONTROL
SHAFT SLEW CONTROL
INC
OFF
DEC
3
4
1,3
9
10
11
12
18
19
13A
SIGNALS SHORTED TOGETHER
AUTO-TRANSFORMER ADJUSTABLE OUTPUT
ANTI-CREEP TEST POINTS
ANTI-CREEP INPUT
2A
NORMAL
DISABLE
FUSE
SHAFT HAND-CONTROLLER OUTPUT TEST JACKS
OFFSET 25°
STAR LOS
LANDMARK LOS
7
8
8A
13
14
17
20
800 CPS 28V 1% HI OPTICS
800 CPS 28V 1% LO OPTICS
TRUNNION ANTI-CREEP ENABLE LO
TRUNNION ANTI-CREEP ENABLE HI
SHAFT ANTI-CREEP ENABLE LO
SHAFT ANTI-CREEP ENABLE HI
800 CPS 28V 1% HI OPTICS TRACKER POWER
+28VDC OPTICS TRACKER POWER
TRACKER POWER ON (ACQUIRE)
SHAFT HAND CONTROLLER OUTPUT HI
SHAFT HAND CONTROLLER OUTPUT LO
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN. TRACKER MODE INPUT LO
SCT TRUN. TRACKER MODE INPUT HI
ROC REF NUMBERS
560WT
561WT
562T
563T
564T
565T
566W
567W
568T
569T
570WT
571WT
572WT
573W
574W
575W

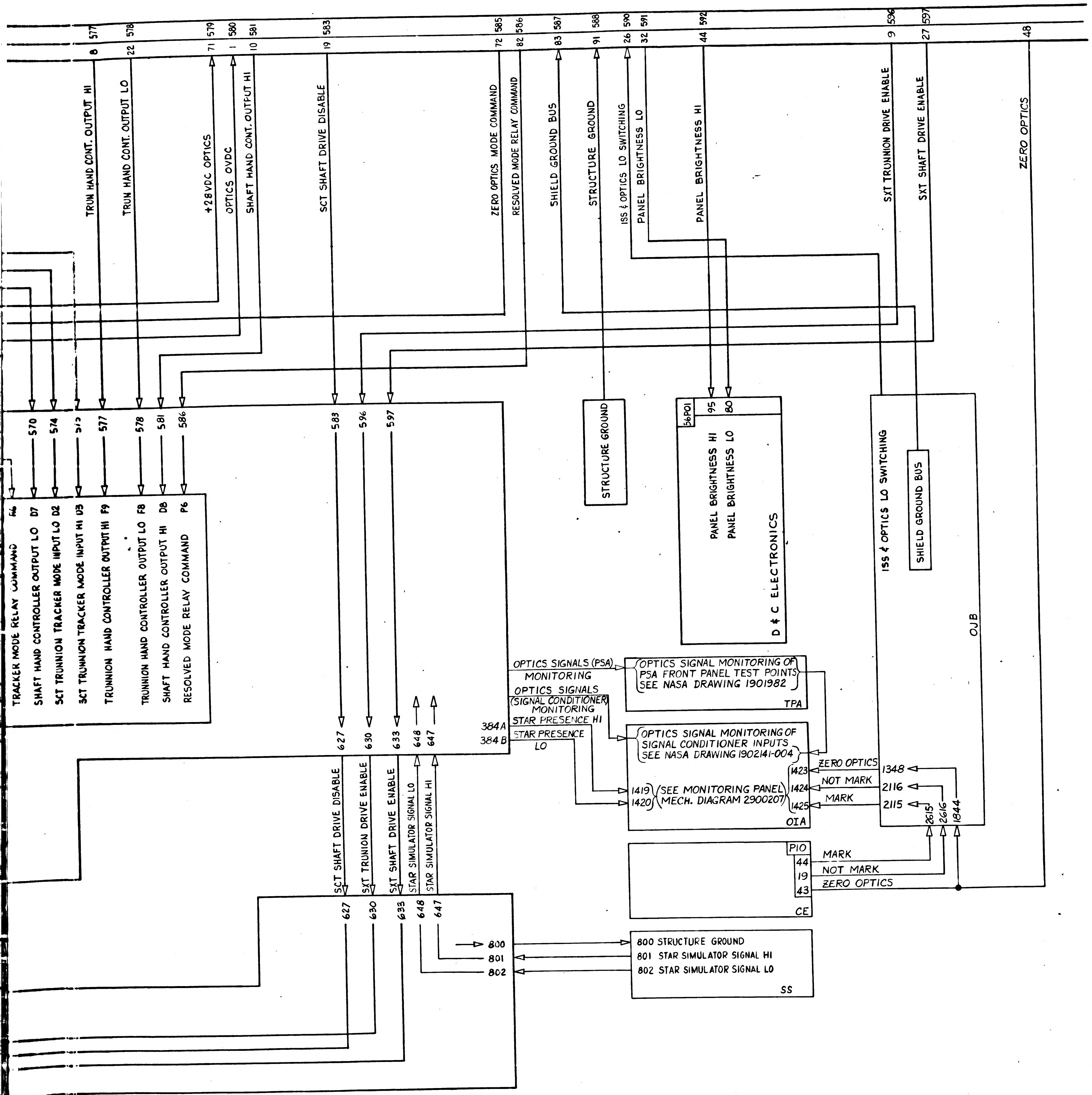
2900216 REV LTR C SH 1

1/2900216

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		7 SEP 65	J J J / MGM
B		REVISED PER TDRR 21912		8 SEP 65	J J J / MEM
C		REVISION STATUS CHANGED		21-SEP-65	X.F.N. / E.K.

REVISIONS 21891-TDRR

(M)

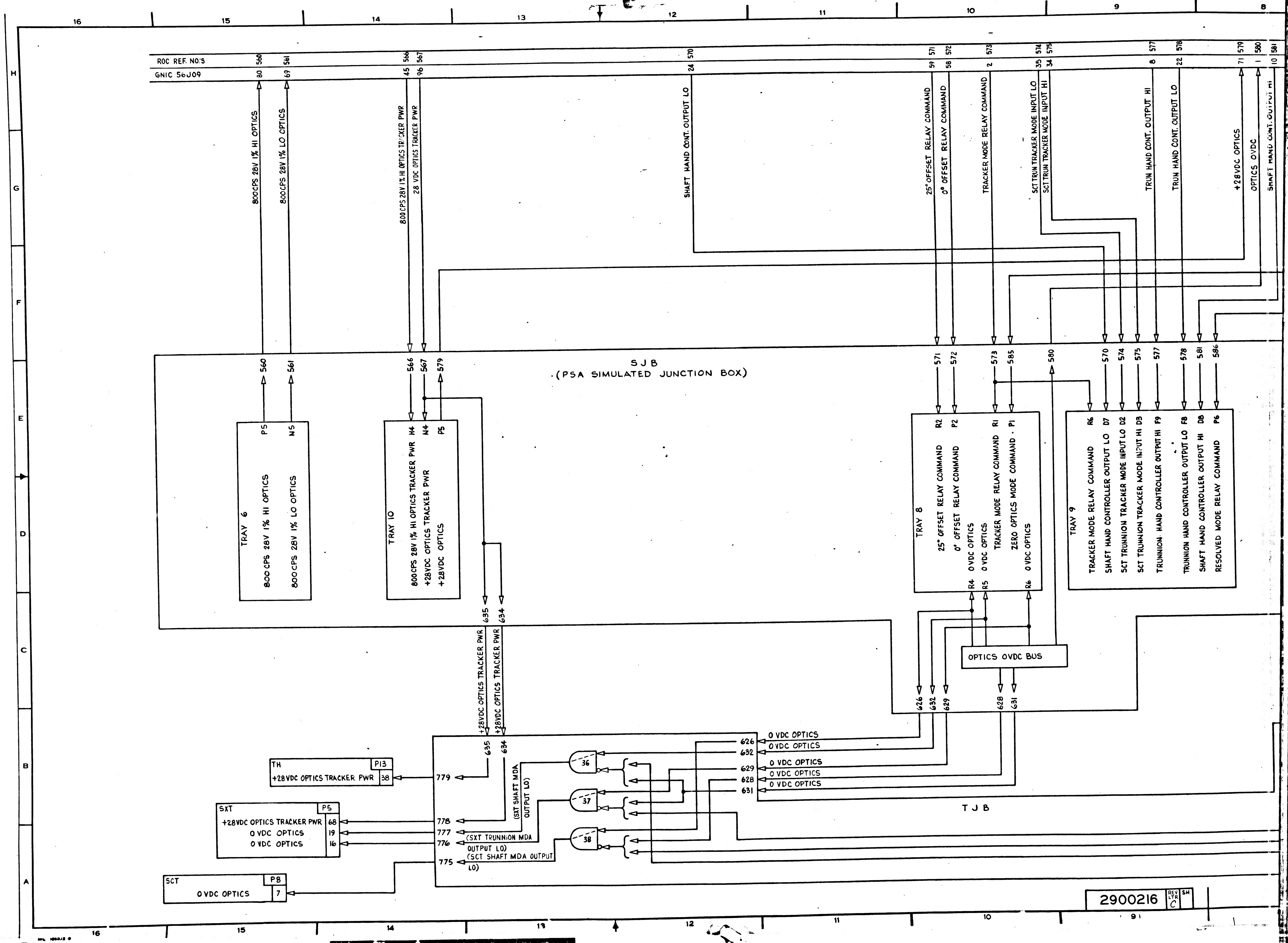


8 577
22 578
71 579
1 580
10 581
19 583
72 585
82 586
83 587
91 588
26 590
32 591
44 592
9 596
27 597
48
TRUN HAND CONT. OUTPUT HI
TRUN HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS OVDC
SHAFT HAND CONT. OUTPUT HI
SCT SHAFT DRIVE DISABLE
ZERO OPTICS MODE COMMAND
RESOLVED MODE RELAY COMMAND
SHIELD GROUND BUS
STRUCTURE GROUND
ISS & OPTICS LO SWITCHING
PANEL BRIGHTNESS LO
PANEL BRIGHTNESS HI
SXT TRUNNION DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
ZERO OPTICS
570
574
577
578
581
586
583
596
597
TRACKER MODE RELAY COMMAND
SHAFT HAND CONTROLLER OUTPUT LO D7
SCT TRUNNION TRACKER MODE INPUT LO D2
SCT TRUNNION TRACKER MODE INPUT HI D3
TRUNNION HAND CONTROLLER OUTPUT HI F9
TRUNNION HAND CONTROLLER OUTPUT LO F8
SHAFT HAND CONTROLLER OUTPUT HI D8
RESOLVED MODE RELAY COMMAND P6
STRUCTURE GROUND
56P01
95
80
PANEL BRIGHTNESS HI
PANEL BRIGHTNESS LO
D & C ELECTRONICS
ISS & OPTICS LO SWITCHING
SHIELD GROUND BUS
OJB
627
630
633
648
647
384A
384B
OPTICS SIGNALS (PSA) MONITORING
OPTICS SIGNALS (SIGNAL CONDITIONER) MONITORING
STAR PRESENCE HI
STAR PRESENCE LO
OPTICS SIGNAL MONITORING OF PSA FRONT PANEL TEST POINTS SEE NASA DRAWING 1901982
TPA
OPTICS SIGNAL MONITORING OF SIGNAL CONDITIONER INPUTS SEE NASA DRAWING 1902141-004
1419
1420
(SEE MONITORING PANEL MECH. DIAGRAM 2900207)
1423
1424
1425
OIA
ZERO OPTICS
NOT MARK
MARK
1348
2116
2115
2615
2616
1844
P10
44
19
43
MARK
NOT MARK
ZERO OPTICS
CE
SCT SHAFT DRIVE DISABLE
SXT TRUNION DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
STAR SIMULATOR SIGNAL LO
STAR SIMULATOR SIGNAL HI
627
630
633
648
647
800
801
802
800 STRUCTURE GROUND
801 STAR SIMULATOR SIGNAL HI
802 STAR SIMULATOR SIGNAL LO
SS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN	
MATERIAL —	DRAWN Solane DATE 17 JUN 65 CHECKED APPROVAL APPROVAL	MECHANIZATION DIAGRAM OPTICS CONTROL (GSE MODE) (BLOCK I SERIES 100, BLOCK II)
CONTRACT NAS9-497	NASA APPROVAL MIT APPROVAL	CODE IDENT NO. 99974 SIZE J2 2900216 SCALE — SHEET 2 OF 3

2900216 C

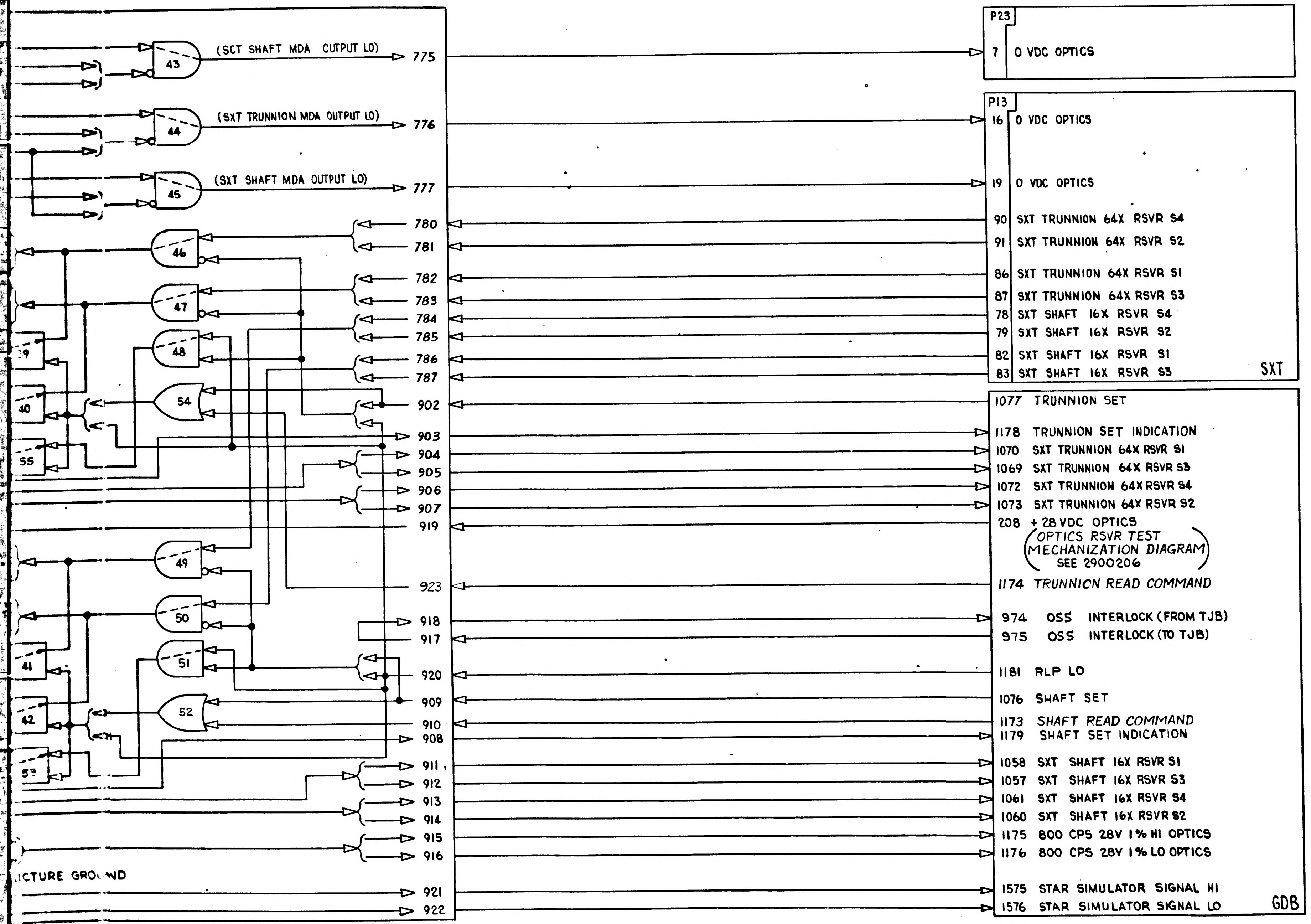
2900216 REV LTR C SH


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
ROC REF. NO'S
GNIC 56J09
560
561
566
567
570
571
572
573
574
575
577
578
579
580
581
80
69
45
96
24
59
58
2
35
34
8
22
71
1
10
800CPS 28V 1% HI OPTICS
800CPS 28V 1% LO OPTICS
800CPS 28V 1% HI OPTICS TRACKER PWR
28 VDC OPTICS TRACKER PWR
SHAFT HAND CONT. OUTPUT LO
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN TRACKER MODE INPUT LO
SCT TRUN TRACKER MODE INPUT HI
TRUN HAND CONT. OUTPUT HI
TRUN HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS OVDC
SHAFT HAND CONT. OUTPUT HI
S J B
(PSA SIMULATED JUNCTION BOX)
560
561
566
567
579
571
572
573
585
580
570
574
575
577
578
581
586
TRAY 6
800CPS 28V 1% HI OPTICS
800CPS 28V 1% LO OPTICS
P5
N5
TRAY 10
800CPS 28V 1% HI OPTICS TRACKER PWR
+28VDC OPTICS TRACKER PWR
+28VDC OPTICS
H4
N4
P5
TRAY 8
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
0 VDC OPTICS
0 VDC OPTICS
TRACKER MODE RELAY COMMAND
ZERO OPTICS MODE COMMAND
0 VDC OPTICS
R2
P2
R4
R5
R1
P1
R6
TRAY 9
TRACKER MODE RELAY COMMAND
SHAFT HAND CONTROLLER OUTPUT LO
SCT TRUNNION TRACKER MODE INPUT LO
SCT TRUNNION TRACKER MODE INPUT HI
TRUNNION HAND CONTROLLER OUTPUT HI
TRUNNION HAND CONTROLLER OUTPUT LO
SHAFT HAND CONTROLLER OUTPUT HI
RESOLVED MODE RELAY COMMAND
R6
D7
D2
D3
F9
F8
D8
P6
635
634
OPTICS OVDC BUS
626
632
629
628
631
+28VDC OPTICS TRACKER PWR
+28VDC OPTICS TRACKER PWR
635
634
T J B
626
632
629
628
631
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
36
37
38
(SXT SHAFT MDA OUTPUT LO)
(SXT TRUNNION MDA OUTPUT LO)
(SCT SHAFT MDA OUTPUT LO)
779
778
777
776
775
TH
P13
+28VDC OPTICS TRACKER PWR
38
SXT
P5
+28VDC OPTICS TRACKER PWR
0 VDC OPTICS
0 VDC OPTICS
68
19
16
SCT
P8
0 VDC OPTICS
7
2900216
REV LTR
C
SH

1-7 2900216

REVISIONS TDRR 21891

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21919	—	7 SEP 65	J J J mcm
B		REVISED PER TDRR 21912	—	8 SEP 65	J J J mcm
C		REVISION STATUS CHANGED		21-SEP-65	K.Z.W.



P23
7 0 VDC OPTICS
P13
16 0 VDC OPTICS
19 0 VDC OPTICS
90 SXT TRUNNION 64X RSVR S4
91 SXT TRUNNION 64X RSVR S2
86 SXT TRUNNION 64X RSVR S1
87 SXT TRUNNION 64X RSVR S3
78 SXT SHAFT 16X RSVR S4
79 SXT SHAFT 16X RSVR S2
82 SXT SHAFT 16X RSVR S1
83 SXT SHAFT 16X RSVR S3
SXT
1077 TRUNNION SET
1178 TRUNNION SET INDICATION
1070 SXT TRUNNION 64X RSVR S1
1069 SXT TRUNNION 64X RSVR S3
1072 SXT TRUNNION 64X RSVR S4
1073 SXT TRUNNION 64X RSVR S2
208 + 28 VDC OPTICS
(OPTICS RSVR TEST MECHANIZATION DIAGRAM SEE 2900206)
1174 TRUNNION READ COMMAND
974 OSS INTERLOCK (FROM TJB)
975 OSS INTERLOCK (TO TJB)
1181 RLP LO
1076 SHAFT SET
1173 SHAFT READ COMMAND
1179 SHAFT SET INDICATION
1058 SXT SHAFT 16X RSVR S1
1057 SXT SHAFT 16X RSVR S3
1061 SXT SHAFT 16X RSVR S4
1060 SXT SHAFT 16X RSVR S2
1175 800 CPS 28V 1% HI OPTICS
1176 800 CPS 28V 1% LO OPTICS
1575 STAR SIMULATOR SIGNAL HI
1576 STAR SIMULATOR SIGNAL LO
GDB
(SCT SHAFT MDA OUTPUT LO)
(SXT TRUNNION MDA OUTPUT LO)
(SXT SHAFT MDA OUTPUT LO)
43
44
45
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47
48
54
49
50
51
52
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42
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775
776
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908
911
912
913
914
915
916
921
922
UCTURE GROUND

2900216	RE. C	SH 3

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

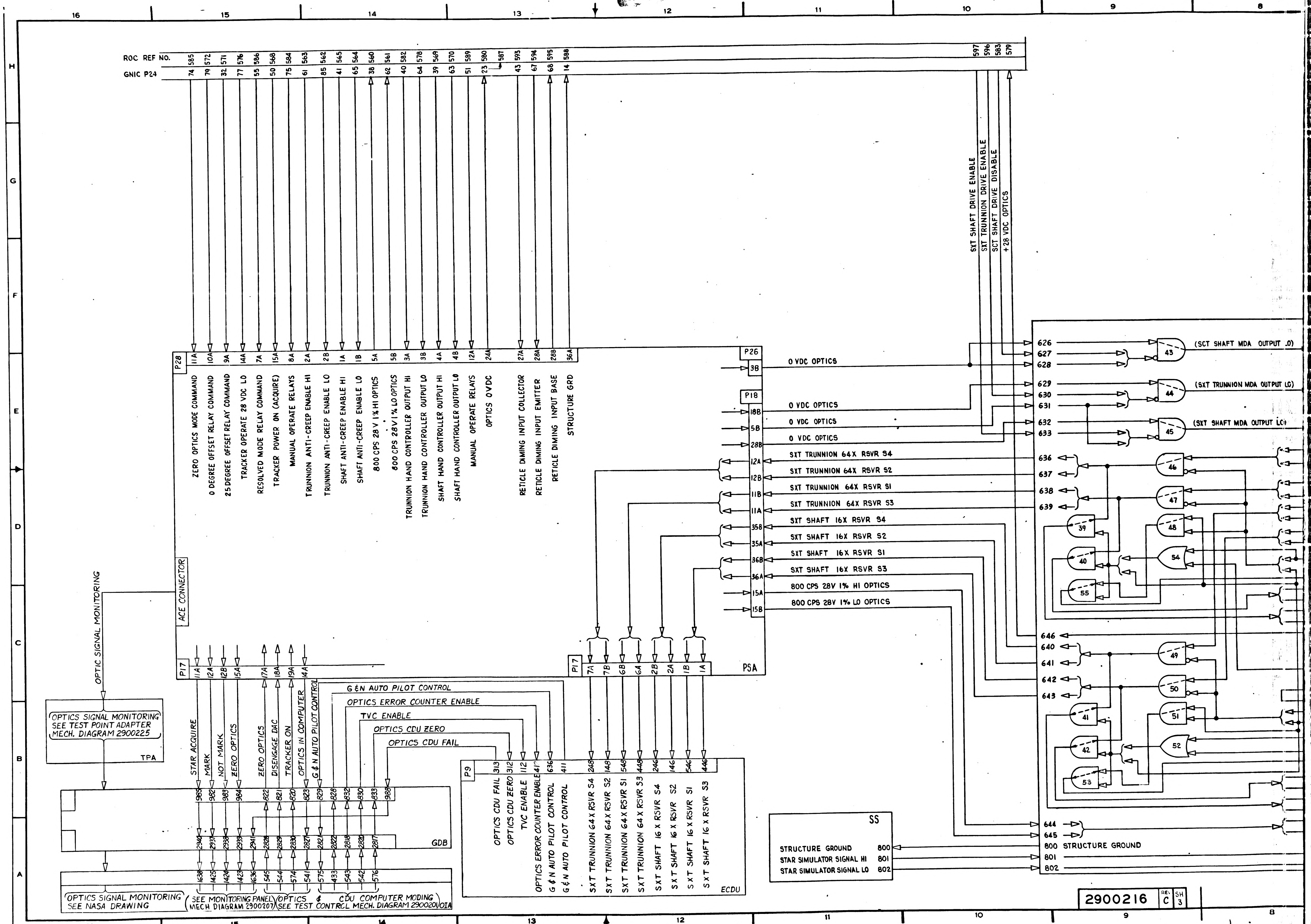
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J Killinger DATE 17 JUN 68
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
OPTICS CONTROL (GSE MODE)
(BLOCK I SERIES 100, BLOCK II)

CODE IDENT NO. 99974 SIZE J2 2900216
SCALE — SHEET 3 OF 3

2/2900216


ROC REF NO.
GNIC P24
74 585
79 572
32 571
77 576
55 586
50 568
75 584
61 563
85 562
41 565
65 564
38 560
62 561
40 582
64 578
39 569
63 570
51 589
23 580
587
43 593
67 594
68 595
14 588
597
596
583
579
SXT SHAFT DRIVE ENABLE
SXT TRUNNION DRIVE ENABLE
SCT SHAFT DRIVE DISABLE
+28 VDC OPTICS
P28
11A ZERO OPTICS MODE COMMAND
10A 0 DEGREE OFFSET RELAY COMMAND
9A 25 DEGREE OFFSET RELAY COMMAND
14A TRACKER OPERATE 28 VDC LO
7A RESOLVED MODE RELAY COMMAND
15A TRACKER POWER ON (ACQUIRE)
8A MANUAL OPERATE RELAYS
2A TRUNNION ANTI-CREEP ENABLE HI
2B TRUNNION ANTI-CREEP ENABLE LO
1A SHAFT ANTI-CREEP ENABLE HI
1B SHAFT ANTI-CREEP ENABLE LO
5A 800 CPS 28 V 1% HI OPTICS
5B 800 CPS 28V 1% LO OPTICS
3A TRUNNION HAND CONTROLLER OUTPUT HI
3B TRUNNION HAND CONTROLLER OUTPUT LO
4A SHAFT HAND CONTROLLER OUTPUT HI
4B SHAFT HAND CONTROLLER OUTPUT LO
12A MANUAL OPERATE RELAYS
24A OPTICS 0 VDC
27A RETICLE DIMING INPUT COLLECTOR
28A RETICLE DIMING INPUT EMITTER
28B RETICLE DIMING INPUT BASE
36A STRUCTURE GRD
P26
3B 0 VDC OPTICS
P18
18B 0 VDC OPTICS
5B 0 VDC OPTICS
28B 0 VDC OPTICS
12A SXT TRUNNION 64X RSVR S4
12B SXT TRUNNION 64X RSVR S2
11B SXT TRUNNION 64X RSVR S1
11A SXT TRUNNION 64X RSVR S3
35B SXT SHAFT 16X RSVR S4
35A SXT SHAFT 16X RSVR S2
36B SXT SHAFT 16X RSVR S1
36A SXT SHAFT 16X RSVR S3
15A 800 CPS 28V 1% HI OPTICS
15B 800 CPS 28V 1% LO OPTICS
ACE CONNECTOR
PSA
P17
7A
7B
6B
6A
2B
2A
1B
1A
P17
11A
12A
12B
15A
17A
18A
19A
14A
OPTIC SIGNAL MONITORING
OPTICS SIGNAL MONITORING
SEE TEST POINT ADAPTER
MECH. DIAGRAM 2900225
TPA
STAR ACQUIRE
MARK
NOT MARK
ZERO OPTICS
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
OPTICS IN COMPUTER
G & N AUTO PILOT CONTROL
G & N AUTO PILOT CONTROL
OPTICS ERROR COUNTER ENABLE
TVC ENABLE
OPTICS CDU ZERO
OPTICS CDU FAIL
985
982
983
984
822
821
820
823
829
828
832
830
833
988
2940
2937
2938
2939
2941
2828
2829
2830
2827
2821
2822
2818
2820
2817
GDB
1638
1425
1424
1423
1636
545
544
574
541
575
433
543
542
576
OPTICS SIGNAL MONITORING
SEE NASA DRAWING
SEE MONITORING PANEL
MECH DIAGRAM 2900207
OPTICS & CDU COMPUTER MODING
SEE TEST CONTROL MECH. DIAGRAM 2900201/01A
P9
313 OPTICS CDU FAIL
312 OPTICS CDU ZERO
112 TVC ENABLE
41? OPTICS ERROR COUNTER ENABLE
636 G & N AUTO PILOT CONTROL
411 G & N AUTO PILOT CONTROL
248 SXT TRUNNION 64 X RSVR S4
148 SXT TRUNNION 64 X RSVR S2
548 SXT TRUNNION 64 X RSVR S1
448 SXT TRUNNION 64 X RSVR S3
246 SXT SHAFT 16 X RSVR S4
146 SXT SHAFT 16 X RSVR S2
546 SXT SHAFT 16 X RSVR S1
446 SXT SHAFT 16 X RSVR S3
ECDU
626
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42
52
53
(SCT SHAFT MDA OUTPUT .0)
(SXT TRUNNION MDA OUTPUT LO)
(SXT SHAFT MDA OUTPUT LO)
SS
STRUCTURE GROUND 800
STAR SIMULATOR SIGNAL HI 801
STAR SIMULATOR SIGNAL LO 802
800 STRUCTURE GROUND
801
802
2900216
REV C
SH 3
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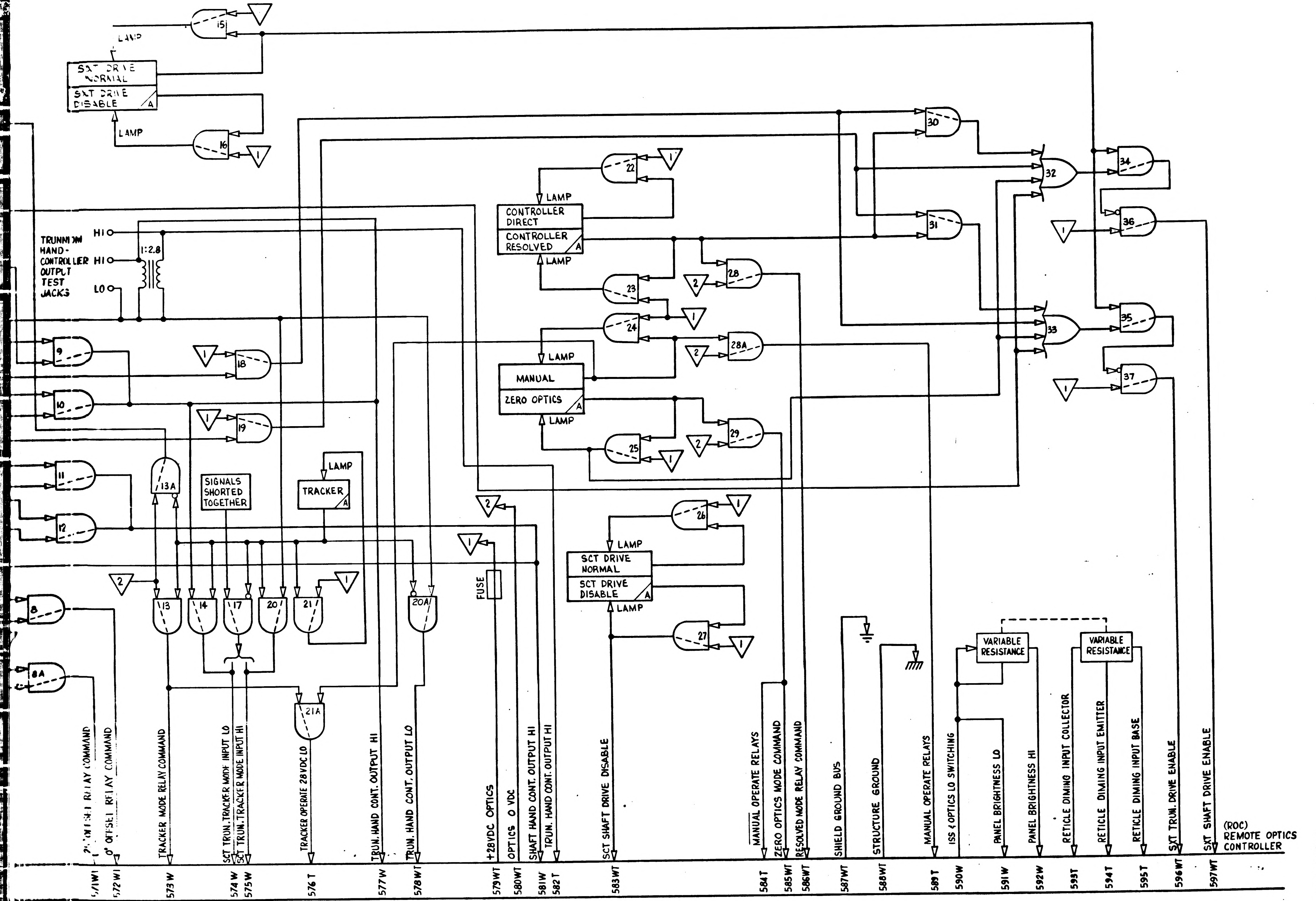
1/2900216

REVISIONS TDRR 2191

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		SEP 65	
B		REVISED PER TDRR 21912		8 SEP 65	
C		REVISED PER TDRR 22290		21-SEP-65	
D		REVISION STATUS CHANGED		22 SEP 65	



LAMP
15
SXT DRIVE NORMAL
SXT DRIVE DISABLE
A
LAMP
16
1
TRUNNION HAND-CONTROLLER OUTPUT TEST JACKS
HI
HI
LO
1:2.8
9
10
11
12
8
8A
13A
13
14
17
20
21
20A
21A
18
19
2
1
SIGNALS SHORTED TOGETHER
TRACKER
LAMP
22
CONTROLLER DIRECT
CONTROLLER RESOLVED
LAMP
23
24
28
28A
MANUAL
ZERO OPTICS
LAMP
25
29
26
SCT DRIVE NORMAL
SCT DRIVE DISABLE
LAMP
27
FUSE
30
31
32
33
34
35
36
37
VARIABLE RESISTANCE
VARIABLE RESISTANCE
2° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN. TRACKER MODE INPUT LO
SCT TRUN. TRACKER MODE INPUT HI
TRACKER OPERATE 28VDC LO
TRUN. HAND CONT. OUTPUT HI
TRUN. HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS 0 VDC
SHAFT HAND CONT. OUTPUT HI
TRUN. HAND CONT. OUTPUT HI
SCT SHAFT DRIVE DISABLE
MANUAL OPERATE RELAYS
ZERO OPTICS MODE COMMAND
RESOLVED MODE RELAY COMMAND
SHIELD GROUND BUS
STRUCTURE GROUND
MANUAL OPERATE RELAYS
ISS & OPTICS LO SWITCHING
PANEL BRIGHTNESS LO
PANEL BRIGHTNESS HI
RETICLE DIMING INPUT COLLECTOR
RETICLE DIMING INPUT EMITTER
RETICLE DIMING INPUT BASE
SXT TRUN. DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
(ROC) REMOTE OPTICS CONTROLLER
571W1
572W1
573W
574W
575W
576T
577W
578WT
579WT
580WT
581W
582T
583WT
584T
585WT
586WT
587WT
588WT
589T
590W
591W
592W
593T
594T
595T
596WT
597WT

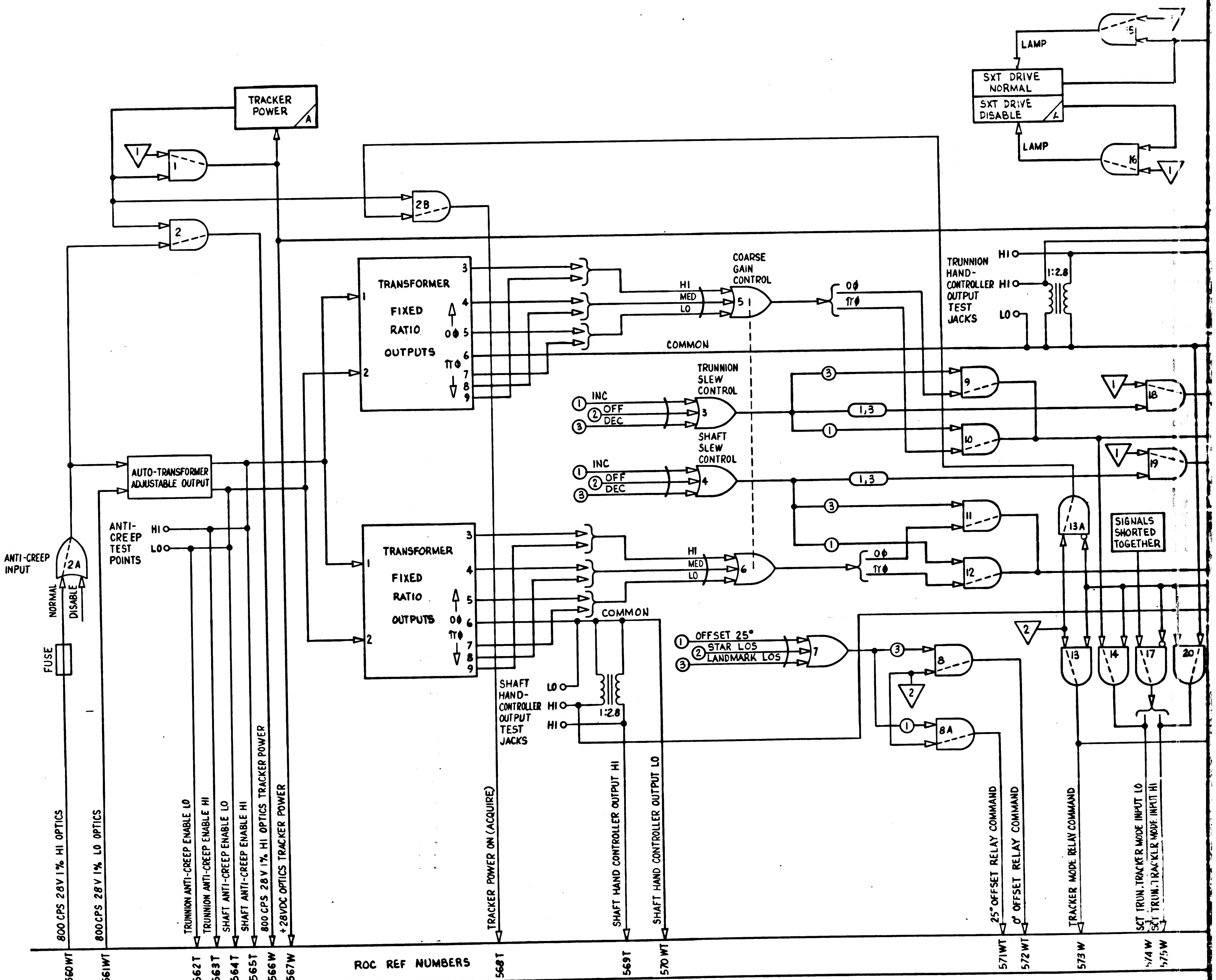
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN Solano DATE CHECKED Cantu 29 Jun 65 APPROVAL 30 Jun 65 APPROVAL	MECHANIZATION DIAGRAM OPTICS CONTROL (GSE MODE) (BLOCK I SERIES 100, BLOCK II)
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 2900216
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — · SHEET 1 OF 3

2900216 D SH 1

2/2900216

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. NONSTANDARD SYMBOLOGY:
   - INDICATES "AND" GATE WITH SWITCHED SIGNAL
   - NAME — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
   - NAME / NAME — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION)
4. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:
   - SHEET 1 / SHEET 2 — BLOCK I SERIES 100
   - SHEET 1 / SHEET 3 — BLOCK II
   - INDICATES "BILATERAL AND" GATE WITH SWITCHED SIGNAL.

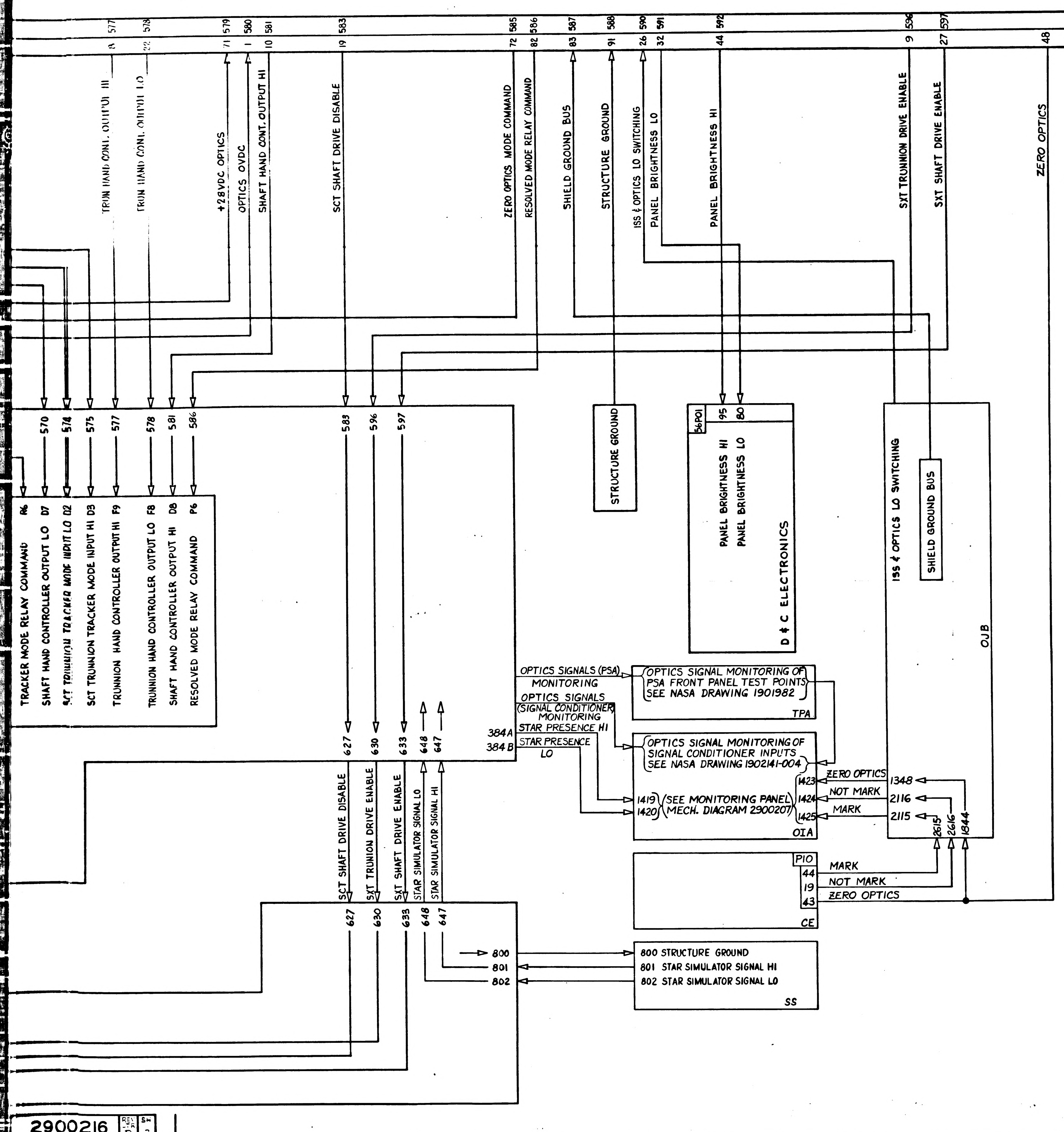

TRACKER POWER
SXT DRIVE NORMAL
SXT DRIVE DISABLE
LAMP
LAMP
TRANSFORMER FIXED RATIO OUTPUTS
0ϕ
πϕ
COARSE GAIN CONTROL
HI
MED
LO
COMMON
TRUNNION HAND-CONTROLLER OUTPUT TEST JACKS
1:2.8
TRUNNION SLEW CONTROL
INC
OFF
DEC
SHAFT SLEW CONTROL
1,3
AUTO-TRANSFORMER ADJUSTABLE OUTPUT
ANTI-CREEP TEST POINTS
ANTI-CREEP INPUT
NORMAL
DISABLE
FUSE
SIGNALS SHORTED TOGETHER
OFFSET 25°
STAR LOS
LANDMARK LOS
SHAFT HAND-CONTROLLER OUTPUT TEST JACKS
800 CPS 28V 1% HI OPTICS
800 CPS 28V 1% LO OPTICS
TRUNNION ANTI-CREEP ENABLE LO
TRUNNION ANTI-CREEP ENABLE HI
SHAFT ANTI-CREEP ENABLE LO
SHAFT ANTI-CREEP ENABLE HI
800 CPS 28V 1% HI OPTICS TRACKER POWER
+28VDC OPTICS TRACKER POWER
TRACKER POWER ON (ACQUIRE)
SHAFT HAND CONTROLLER OUTPUT HI
SHAFT HAND CONTROLLER OUTPUT LO
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN. TRACKER MODE INPUT LO
SCT TRUN. TRACKER MODE INPUT HI
560WT
561WT
562T
563T
564T
565T
566W
567W
ROC REF NUMBERS
568T
569T
570WT
571WT
572WT
573W
574W
575W

2900216 REV U SH 1

1/2900216

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		SEP 65	
B		REVISED PER TDRR 21912		8 SEP 65	
C		REVISION STATUS CHANGED		2 SEP 65	
D		REVISED PER TDRR 22487		22 SEP 65	

REVISIONS 21891



TRUN HAND CONT. OUTPUT HI
TRUN HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS OVDC
SHAFT HAND CONT. OUTPUT HI
SCT SHAFT DRIVE DISABLE
ZERO OPTICS MODE COMMAND
RESOLVED MODE RELAY COMMAND
SHIELD GROUND BUS
STRUCTURE GROUND
ISS & OPTICS LO SWITCHING
PANEL BRIGHTNESS LO
PANEL BRIGHTNESS HI
SXT TRUNNION DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
ZERO OPTICS
577 578 579 580 581 583 585 586 587 588 590 591 592 596 597
8 22 71 1 10 19 72 82 83 91 26 32 44 9 27 48
570 574 575 577 578 581 586 583 596 597
TRACKER MODE RELAY COMMAND R6
SHAFT HAND CONTROLLER OUTPUT LO D7
SCT TRUNNION TRACKER MODE INPUT LO D2
SCT TRUNNION TRACKER MODE INPUT HI D3
TRUNNION HAND CONTROLLER OUTPUT HI F9
TRUNNION HAND CONTROLLER OUTPUT LO F8
SHAFT HAND CONTROLLER OUTPUT HI D8
RESOLVED MODE RELAY COMMAND P6
STRUCTURE GROUND
56P01 95 80
PANEL BRIGHTNESS HI
PANEL BRIGHTNESS LO
D & C ELECTRONICS
ISS & OPTICS LO SWITCHING
SHIELD GROUND BUS
OJB
627 630 633 648 647
384A
384B
OPTICS SIGNALS (PSA) MONITORING
OPTICS SIGNALS (SIGNAL CONDITIONER) MONITORING
STAR PRESENCE HI
STAR PRESENCE LO
OPTICS SIGNAL MONITORING OF PSA FRONT PANEL TEST POINTS SEE NASA DRAWING 1901982
TPA
OPTICS SIGNAL MONITORING OF SIGNAL CONDITIONER INPUTS SEE NASA DRAWING 1902141-004
1419
1420
SEE MONITORING PANEL MECH. DIAGRAM 2900207
1423
1424
1425
OIA
ZERO OPTICS
NOT MARK
MARK
1348
2116
2115
2615 2616 1844
P10
44
19
43
MARK
NOT MARK
ZERO OPTICS
CE
SCT SHAFT DRIVE DISABLE
SXT TRUNION DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
STAR SIMULATOR SIGNAL LO
STAR SIMULATOR SIGNAL HI
627 630 633 648 647
800
801
802
800 STRUCTURE GROUND
801 STAR SIMULATOR SIGNAL HI
802 STAR SIMULATOR SIGNAL LO
SS
9 8 7 6 5 4 3 2 1
H G F E D C B A

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Solane DATE 17 JUN 65
CHECKED 29 JUN 65
APPROVAL 30 JUN 65
APPROVAL
NASA APPROVAL A.C. McKay
MIT APPROVAL

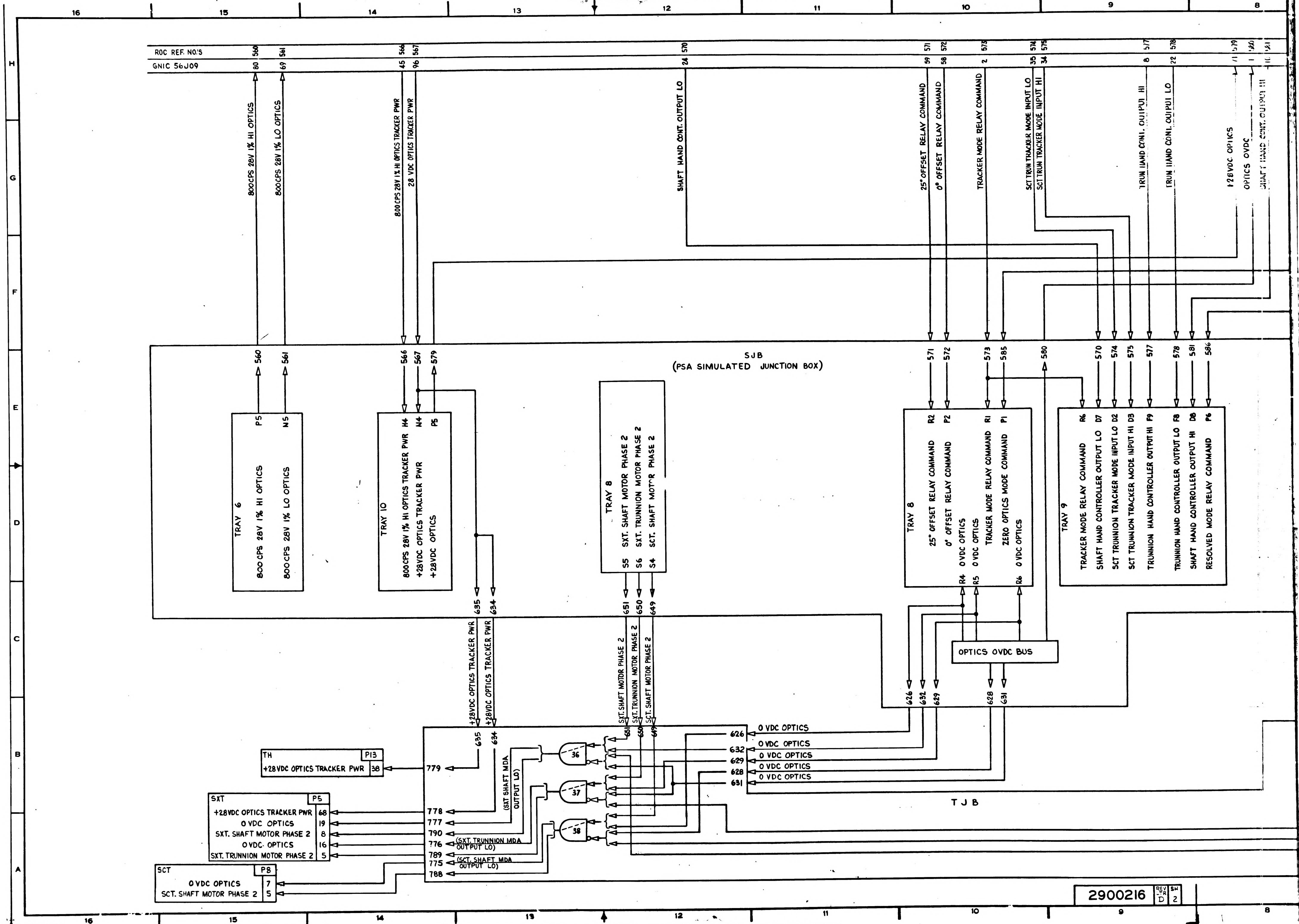
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
OPTICS CONTROL (GSE MODE)
(BLOCK I SERIES 100, BLOCK II)

CODE IDENT NO.	SIZE	
99974	J2	2900216
SCALE —		SHEET 2 OF 3

2900216 REV D SH 2

2/2900216



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ROC REF. NO.'S
GNIC 56J09
800CPS 28V 1% HI OPTICS
800CPS 28V 1% LO OPTICS
800CPS 28V 1% HI OPTICS TRACKER PWR
28 VDC OPTICS TRACKER PWR
SHAFT HAND CONT. OUTPUT LO
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN TRACKER MODE INPUT LO
SCT TRUN TRACKER MODE INPUT HI
TRUN HAND CONT. OUTPUT HI
TRUN HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS OVDC
SHAFT HAND CONT. OUTPUT HI
SJB
(PSA SIMULATED JUNCTION BOX)
TRAY 6
800CPS 28V 1% HI OPTICS
800CPS 28V 1% LO OPTICS
TRAY 10
800CPS 28V 1% HI OPTICS TRACKER PWR
+28VDC OPTICS TRACKER PWR
+28VDC OPTICS
TRAY 8
SXT. SHAFT MOTOR PHASE 2
SXT. TRUNNION MOTOR PHASE 2
SCT. SHAFT MOTOR PHASE 2
TRAY 8
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
0 VDC OPTICS
0 VDC OPTICS
TRACKER MODE RELAY COMMAND
ZERO OPTICS MODE COMMAND
0 VDC OPTICS
TRAY 9
TRACKER MODE RELAY COMMAND
SHAFT HAND CONTROLLER OUTPUT LO
SCT TRUNNION TRACKER MODE INPUT LO
SCT TRUNNION TRACKER MODE INPUT HI
TRUNNION HAND CONTROLLER OUTPUT HI
TRUNNION HAND CONTROLLER OUTPUT LO
SHAFT HAND CONTROLLER OUTPUT HI
RESOLVED MODE RELAY COMMAND
OPTICS OVDC BUS
+28VDC OPTICS TRACKER PWR
+28VDC OPTICS TRACKER PWR
SXT. SHAFT MOTOR PHASE 2
SXT. TRUNNION MOTOR PHASE 2
SCT. SHAFT MOTOR PHASE 2
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
TJB
36
37
38
TH P13
+28VDC OPTICS TRACKER PWR 38
SXT P5
+28VDC OPTICS TRACKER PWR 68
0 VDC OPTICS 19
SXT. SHAFT MOTOR PHASE 2 8
0 VDC OPTICS 16
SXT. TRUNNION MOTOR PHASE 2 5
SCT P8
0 VDC OPTICS 7
SCT. SHAFT MOTOR PHASE 2 5
(SXT SHAFT MDA OUTPUT LO)
(SXT. TRUNNION MDA OUTPUT LO)
(SCT. SHAFT MDA OUTPUT LO)
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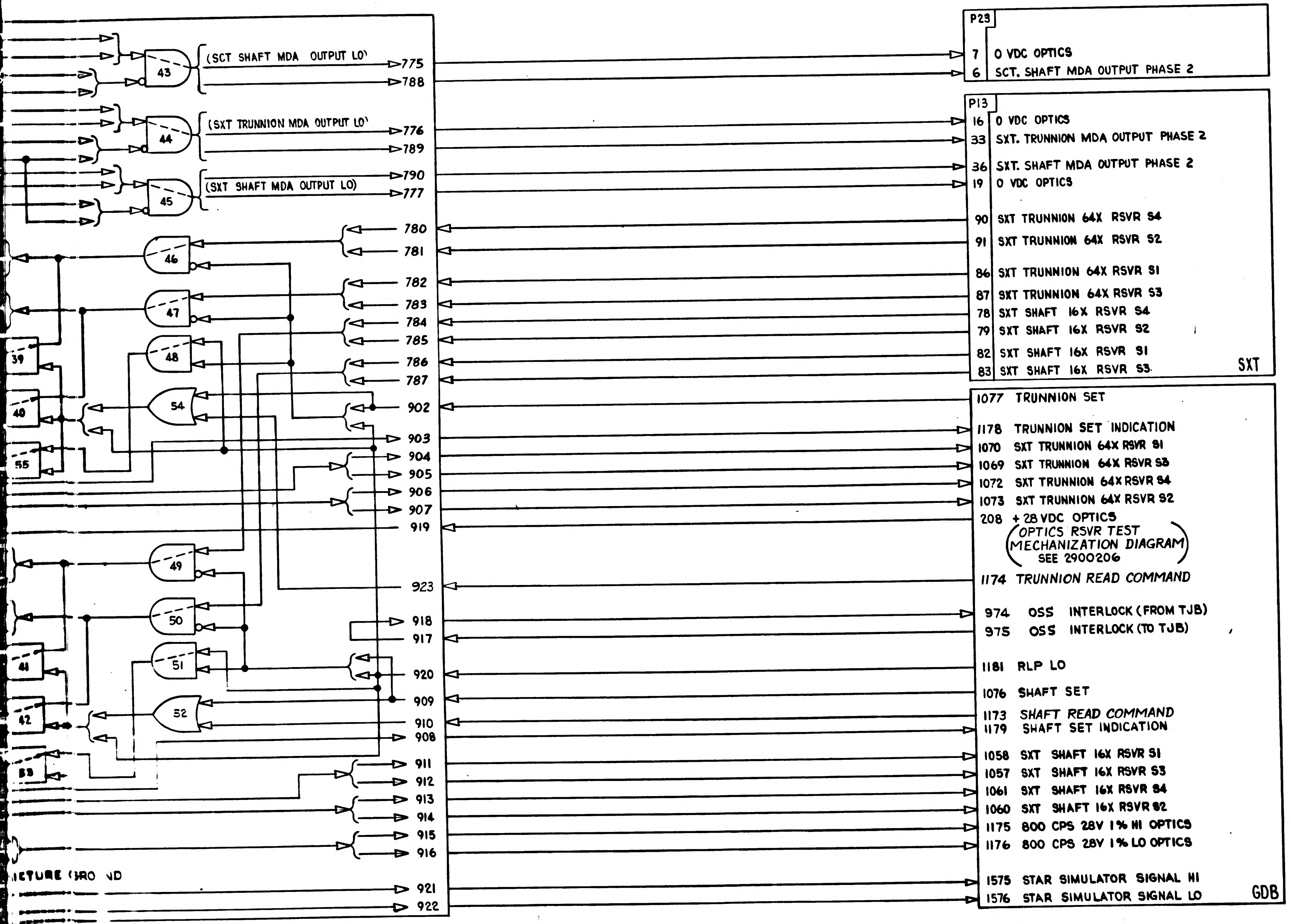
2900216 REV D SH 2

1/2900216

REVISIONS TDRR 21891

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21919	—	SEP 65	J J J
B		REVISED PER TDRR 21912	—	8 SEP 65	J J J
C		REVISION STATUS CHANGED		2 SEP 65	
D		REVISED PER TDRR 2248		22 SEP 65	


(SCT SHAFT MDA OUTPUT LO)
775
788
43
(SXT TRUNNION MDA OUTPUT LO)
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(SXT SHAFT MDA OUTPUT LO)
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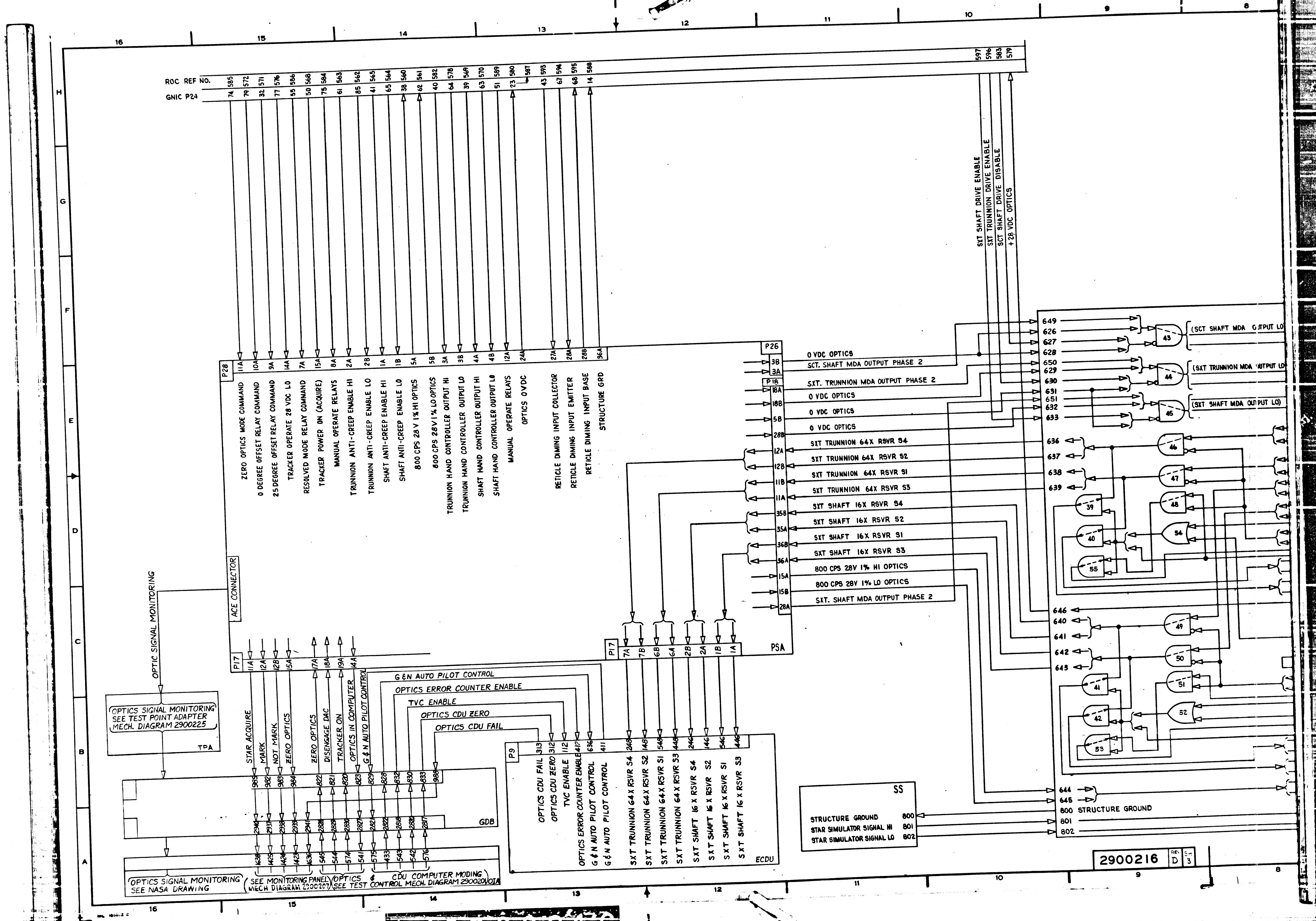
ICTURE GRO ND
921
922
P23
7 0 VDC OPTICS
6 SCT. SHAFT MDA OUTPUT PHASE 2
P13
16 0 VDC OPTICS
33 SXT. TRUNNION MDA OUTPUT PHASE 2
36 SXT. SHAFT MDA OUTPUT PHASE 2
19 0 VDC OPTICS
90 SXT TRUNNION 64X RSVR S4
91 SXT TRUNNION 64X RSVR S2
86 SXT TRUNNION 64X RSVR S1
87 SXT TRUNNION 64X RSVR S3
78 SXT SHAFT 16X RSVR S4
79 SXT SHAFT 16X RSVR S2
82 SXT SHAFT 16X RSVR S1
83 SXT SHAFT 16X RSVR S3
SXT
1077 TRUNNION SET
1178 TRUNNION SET INDICATION
1070 SXT TRUNNION 64X RSVR S1
1069 SXT TRUNNION 64X RSVR S3
1072 SXT TRUNNION 64X RSVR S4
1073 SXT TRUNNION 64X RSVR S2
208 +28 VDC OPTICS
(OPTICS RSVR TEST MECHANIZATION DIAGRAM SEE 2900206)
1174 TRUNNION READ COMMAND
974 OSS INTERLOCK (FROM TJB)
975 OSS INTERLOCK (TO TJB)
1181 RLP LO
1076 SHAFT SET
1173 SHAFT READ COMMAND
1179 SHAFT SET INDICATION
1058 SXT SHAFT 16X RSVR S1
1057 SXT SHAFT 16X RSVR S3
1061 SXT SHAFT 16X RSVR S4
1060 SXT SHAFT 16X RSVR S2
1175 800 CPS 28V 1% HI OPTICS
1176 800 CPS 28V 1% LO OPTICS
1575 STAR SIMULATOR SIGNAL HI
1576 STAR SIMULATOR SIGNAL LO
GDB

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + — + — + — - - -	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN J Kilvenner 17 JUN 65 DATE CHECKED 29 JUN 65 APPROVAL 30 JUN 65 APPROVAL	MECHANIZATION DIAGRAM OPTICS CONTROL (GSE MODE) (BLOCK I SERIES 100, BLOCK II)
DO NOT SCALE THIS DRAWING		
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 2900216
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — · SHEET 3 OF 3

2900216 RE D SH 3

2/2900216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ROC REF NO.
GNIC P24
74 585
79 572
32 571
77 576
55 586
50 568
75 584
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85 562
41 565
65 564
38 560
62 561
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64 578
39 569
63 570
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23 580
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43 593
67 594
68 595
14 588
597
596
583
579
SXT SHAFT DRIVE ENABLE
SXT TRUNNION DRIVE ENABLE
SCT SHAFT DRIVE DISABLE
+28 VDC OPTICS
P28
11A ZERO OPTICS MODE COMMAND
10A 0 DEGREE OFFSET RELAY COMMAND
9A 25 DEGREE OFFSET RELAY COMMAND
14A TRACKER OPERATE 28 VDC LO
7A RESOLVED MODE RELAY COMMAND
15A TRACKER POWER ON (ACQUIRE)
8A MANUAL OPERATE RELAYS
2A TRUNNION ANTI-CREEP ENABLE HI
2B TRUNNION ANTI-CREEP ENABLE LO
1A SHAFT ANTI-CREEP ENABLE HI
1B SHAFT ANTI-CREEP ENABLE LO
5A 800 CPS 28 V 1% HI OPTICS
5B 800 CPS 28V 1% LO OPTICS
3A TRUNNION HAND CONTROLLER OUTPUT HI
3B TRUNNION HAND CONTROLLER OUTPUT LO
4A SHAFT HAND CONTROLLER OUTPUT HI
4B SHAFT HAND CONTROLLER OUTPUT LO
12A MANUAL OPERATE RELAYS
24A OPTICS OVDC
27A RETICLE DIMING INPUT COLLECTOR
28A RETICLE DIMING INPUT EMITTER
28B RETICLE DIMING INPUT BASE
36A STRUCTURE GRD
ACE CONNECTOR
P26
3B 0 VDC OPTICS
3A SCT. SHAFT MDA OUTPUT PHASE 2
P18
18A SXT. TRUNNION MDA OUTPUT PHASE 2
18B 0 VDC OPTICS
5B 0 VDC OPTICS
28B 0 VDC OPTICS
12A SXT TRUNNION 64X RSVR S4
12B SXT TRUNNION 64X RSVR S2
11B SXT TRUNNION 64X RSVR S1
11A SXT TRUNNION 64X RSVR S3
35B SXT SHAFT 16X RSVR S4
35A SXT SHAFT 16X RSVR S2
36B SXT SHAFT 16X RSVR S1
36A SXT SHAFT 16X RSVR S3
15A 800 CPS 28V 1% HI OPTICS
15B 800 CPS 28V 1% LO OPTICS
28A SXT. SHAFT MDA OUTPUT PHASE 2
P17
7A
7B
6B
6A
2B
2A
1B
1A
PSA
649
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651
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(SCT SHAFT MDA OUTPUT LO
(SXT TRUNNION MDA OUTPUT LO
(SXT SHAFT MDA OUTPUT LO)
636
637
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41
42
52
53
644
645
800 STRUCTURE GROUND
801
802
SS
STRUCTURE GROUND 800
STAR SIMULATOR SIGNAL HI 801
STAR SIMULATOR SIGNAL LO 802
OPTIC SIGNAL MONITORING
OPTICS SIGNAL MONITORING SEE TEST POINT ADAPTER MECH. DIAGRAM 2900225
TPA
P17
11A STAR ACQUIRE
12A MARK
12B NOT MARK
15A ZERO OPTICS
17A ZERO OPTICS
18A DISENGAGE DAC
19A TRACKER ON
14A OPTICS IN COMPUTER
G & N AUTO PILOT CONTROL
G & N AUTO PILOT CONTROL
OPTICS ERROR COUNTER ENABLE
TVC ENABLE
OPTICS CDU ZERO
OPTICS CDU FAIL
985
982
983
984
822
821
820
823
829
828
832
830
833
988
GDB
2940
2937
2938
2939
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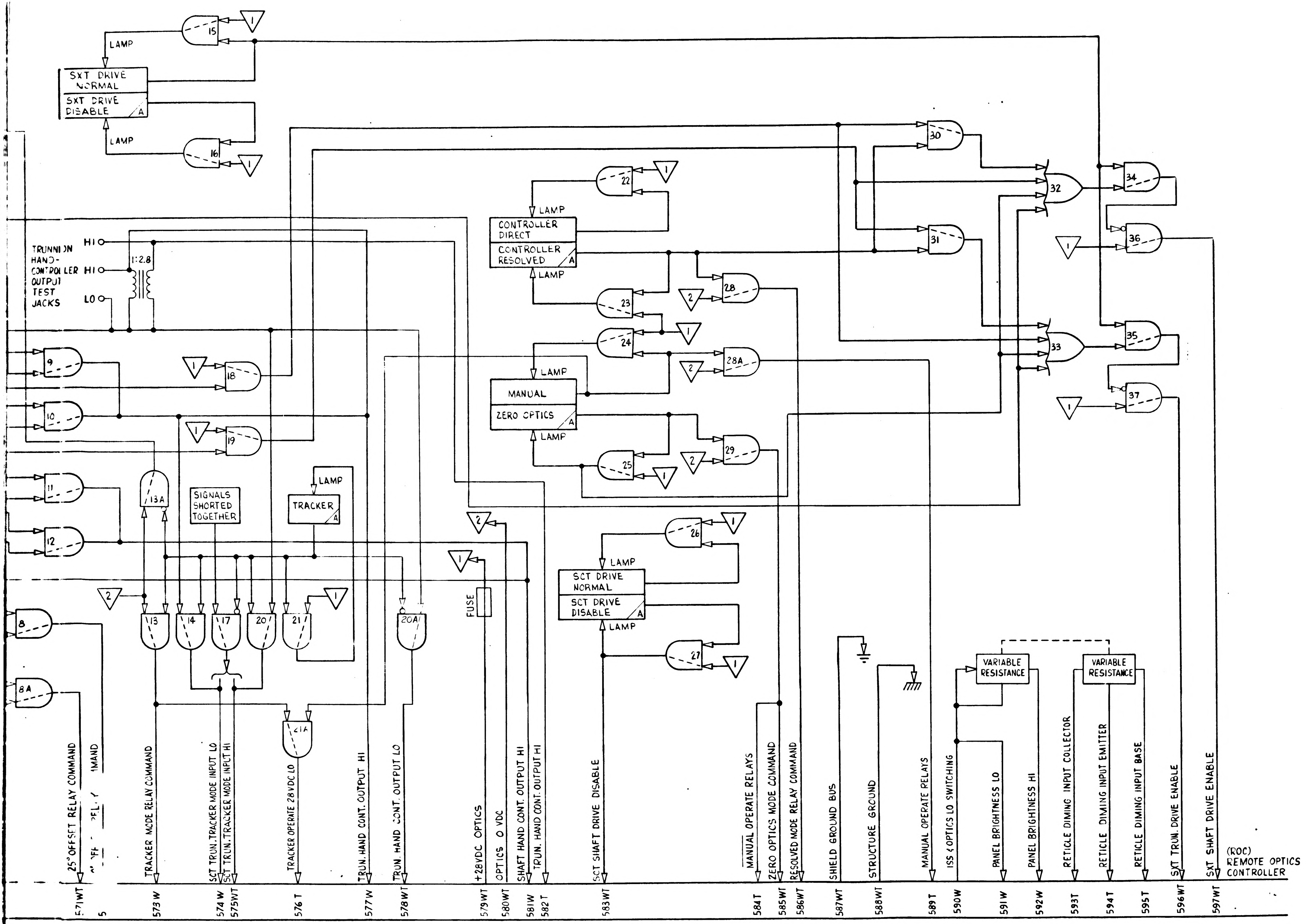
OPTICS SIGNAL MONITORING SEE NASA DRAWING
(SEE MONITORING PANEL MECH DIAGRAM 2900207)
(OPTICS & CDU COMPUTER MODING SEE TEST CONTROL MECH. DIAGRAM 2900201 OIA)
P9
313 OPTICS CDU FAIL
312 OPTICS CDU ZERO
112 TVC ENABLE
412 OPTICS ERROR COUNTER ENABLE
636 G & N AUTO PILOT CONTROL
411 G & N AUTO PILOT CONTROL
248 SXT TRUNNION 64 X RSVR S4
148 SXT TRUNNION 64 X RSVR S2
548 SXT TRUNNION 64 X RSVR S1
448 SXT TRUNNION 64 X RSVR S3
246 SXT SHAFT 16 X RSVR S4
146 SXT SHAFT 16 X RSVR S2
546 SXT SHAFT 16 X RSVR S1
446 SXT SHAFT 16 X RSVR S3
ECDU
2900216
REV D
SH 3

REVISIONS TDRR 21911

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		7 SEP 65	
B		REVISED PER TDRR 21912		8 SEP 65	
C		REVISED PER TDRR 22290		21-SEP-65	
D		REVISION STATUS CHANGED		22 SEP 65	RCP
E		REVISED PER TDRR 23760		10 NOV 65	UNP


LAMP
SXT DRIVE NORMAL
SXT DRIVE DISABLE
A
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16
1
TRUNNION HAND-CONTROLLER OUTPUT TEST JACKS
HI
HI
LO
1:2.8
CONTROLLER DIRECT
CONTROLLER RESOLVED
MANUAL
ZERO OPTICS
22
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28A
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13A
18
19
SIGNALS SHORTED TOGETHER
TRACKER
8
8A
13
14
17
20
21
20A
21A
FUSE
SCT DRIVE NORMAL
SCT DRIVE DISABLE
26
27
VARIABLE RESISTANCE
VARIABLE RESISTANCE
25° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN. TRACKER MODE INPUT LO
SCT TRUN. TRACKER MODE INPUT HI
TRACKER OPERATE 28VDC LO
TRUN. HAND CONT. OUTPUT HI
TRUN. HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS 0 VDC
SHAFT HAND CONT. OUTPUT HI
TRUN. HAND CONT. OUTPUT HI
SCT SHAFT DRIVE DISABLE
MANUAL OPERATE RELAYS
ZERO OPTICS MODE COMMAND
RESOLVED MODE RELAY COMMAND
SHIELD GROUND BUS
STRUCTURE GROUND
MANUAL OPERATE RELAYS
ISS & OPTICS LO SWITCHING
PANEL BRIGHTNESS LO
PANEL BRIGHTNESS HI
RETICLE DIMING INPUT COLLECTOR
RETICLE DIMING INPUT EMITTER
RETICLE DIMING INPUT BASE
SXT TRUN. DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
(ROC) REMOTE OPTICS CONTROLLER
571WT
573W
574W
575WT
576T
577W
578WT
579WT
580WT
581W
582T
583WT
584T
585WT
586WT
587WT
588WT
589T
590W
591W
592W
593T
594T
595T
596WT
597WT

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Splane DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM
OPTICS CONTROL (GSE MODE)
(BLOCK I SERIES 100, BLOCK II)

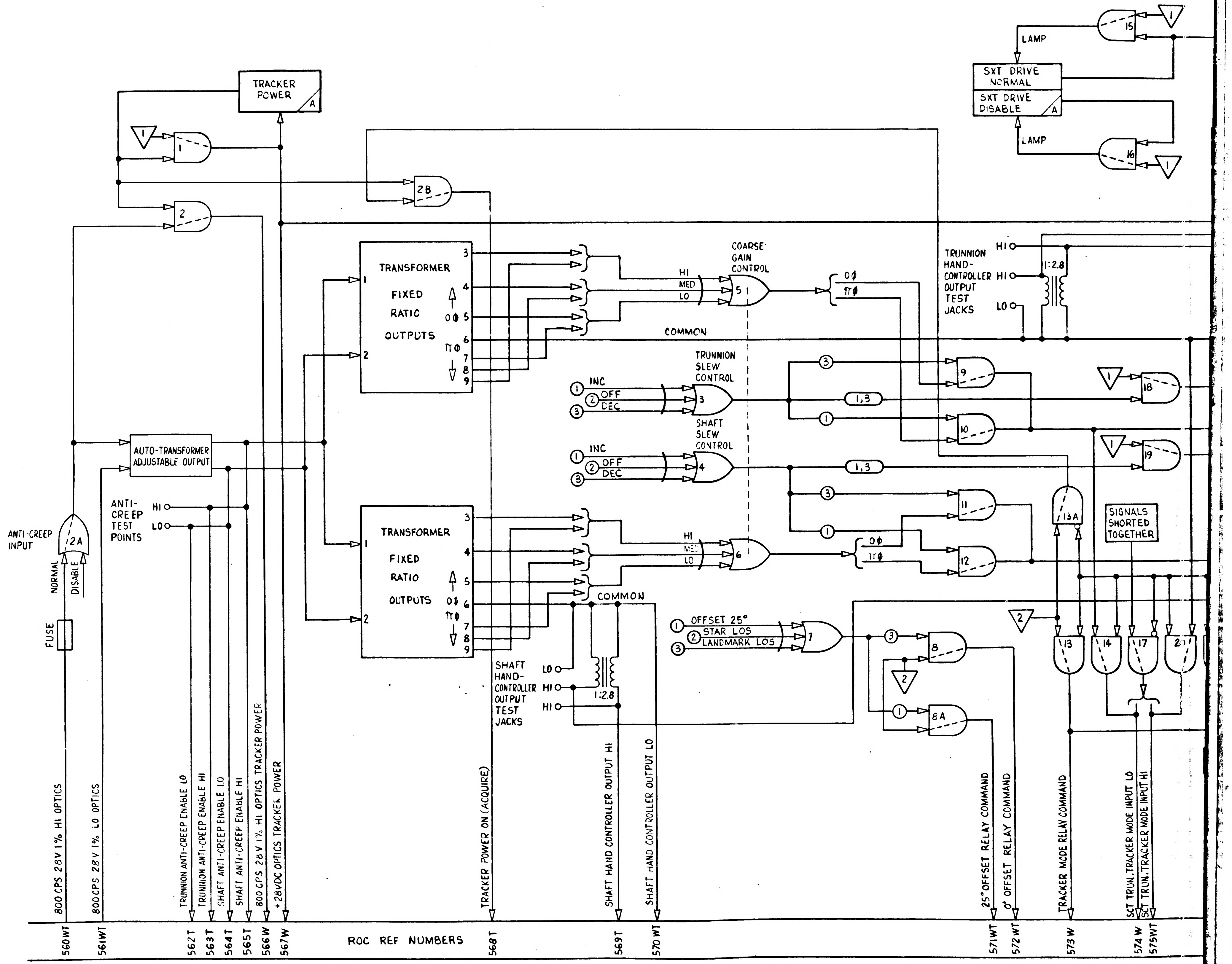
CODE IDENT NO 99974
SIZE J2
2900216
SCALE —
SHEET 1 OF 3

2900216 REV E

27 2900216

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. NONSTANDARD SYMBOLOGY:
   - INDICATES "AND" GATE WITH SWITCHED SIGNAL
   - NAME — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
   - NAME / NAME — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION)
4. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:
   - SHEET 1 / SHEET 2 — BLOCK I SERIES 100
   - SHEET 1 / SHEET 3 — BLOCK II
   - INDICATES "BILATERAL AND" GATE WITH SWITCHED SIGNAL.

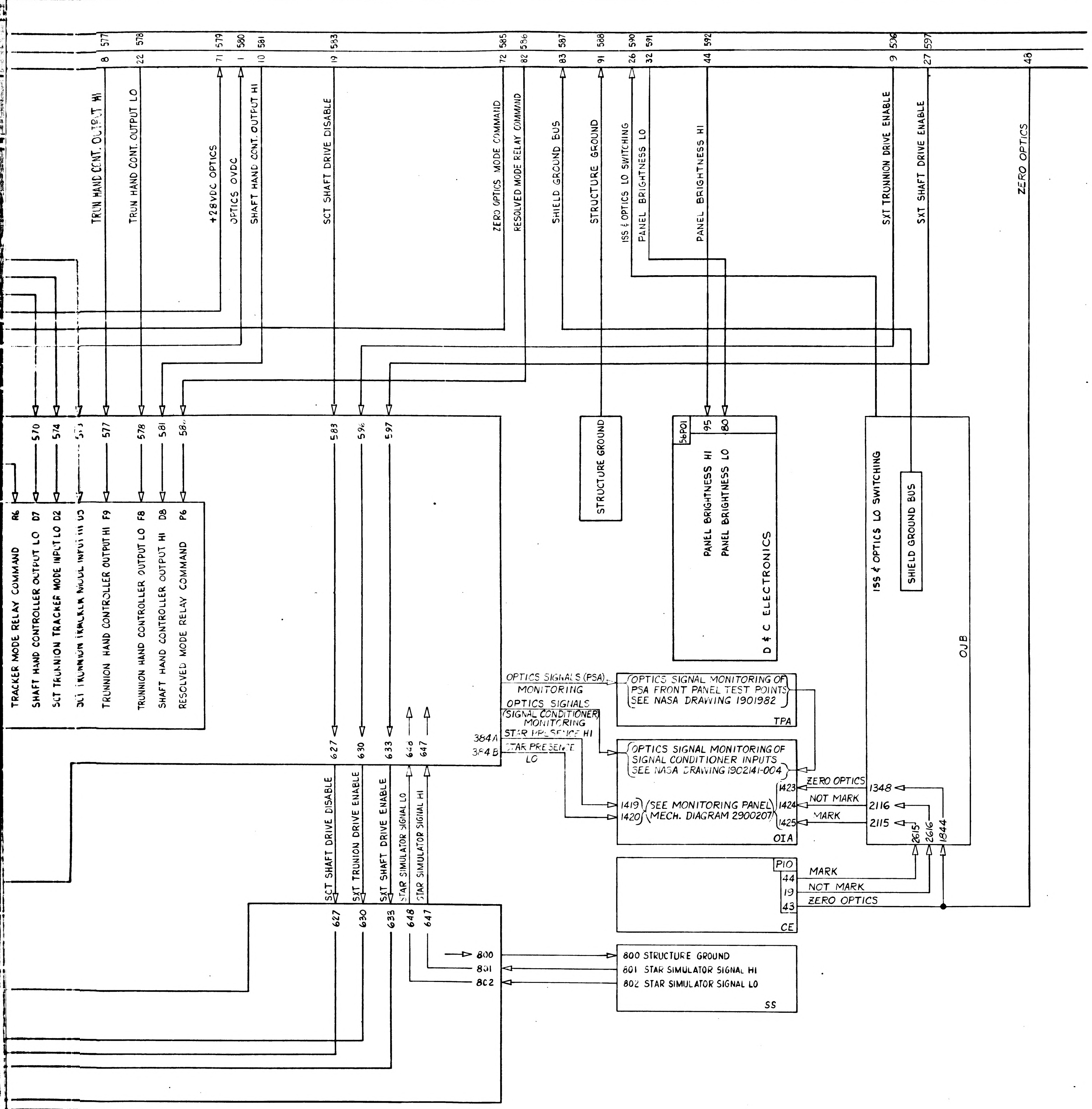

TRACKER POWER
A
1
2B
2
SXT DRIVE NORMAL
SXT DRIVE DISABLE
LAMP
LAMP
15
16
TRANSFORMER
FIXED
RATIO
OUTPUTS
0Φ
πΦ
1
2
3
4
5
6
7
8
9
COARSE GAIN CONTROL
HI
MED
LO
5
0Φ
πΦ
COMMON
TRUNNION HAND-CONTROLLER OUTPUT TEST JACKS
HI
HI
LO
1:2.8
TRUNNION SLEW CONTROL
INC
OFF
DEC
3
SHAFT SLEW CONTROL
INC
OFF
DEC
4
1,3
1,3
9
10
11
12
13A
18
19
SIGNALS SHORTED TOGETHER
6
COMMON
SHAFT HAND-CONTROLLER OUTPUT TEST JACKS
LO
HI
HI
1:2.8
OFFSET 25°
STAR LOS
LANDMARK LOS
7
8
8A
13
14
17
20
AUTO-TRANSFORMER ADJUSTABLE OUTPUT
ANTI-CREEP TEST POINTS
HI
LO
ANTI-CREEP INPUT
2A
NORMAL
DISABLE
FUSE
800 CPS 28V 1% HI OPTICS
800 CPS 28V 1% LO OPTICS
TRUNNION ANTI-CREEP ENABLE LO
TRUNNION ANTI-CREEP ENABLE HI
SHAFT ANTI-CREEP ENABLE LO
SHAFT ANTI-CREEP ENABLE HI
800 CPS 28V 1% HI OPTICS TRACKER POWER
+28VDC OPTICS TRACKER POWER
TRACKER POWER ON (ACQUIRE)
SHAFT HAND CONTROLLER OUTPUT HI
SHAFT HAND CONTROLLER OUTPUT LO
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN. TRACKER MODE INPUT LO
SCT TRUN. TRACKER MODE INPUT HI
ROC REF NUMBERS
560WT
561WT
562T
563T
564T
565T
566W
567W
568T
569T
570WT
571WT
572WT
573W
574W
575WT

2900216 REV E SH 1

1/2900216

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		7 SEP 65	
B		REVISED PER TDRR 21312		8 SEP 65	
C		REVISION STATUS CHANGED		21 SEP 65	
D		REVISED PER TDRR 22487		22 SEP 65	RLP
E		REVISION STATUS CHANGED		10 NOV 65	JWP

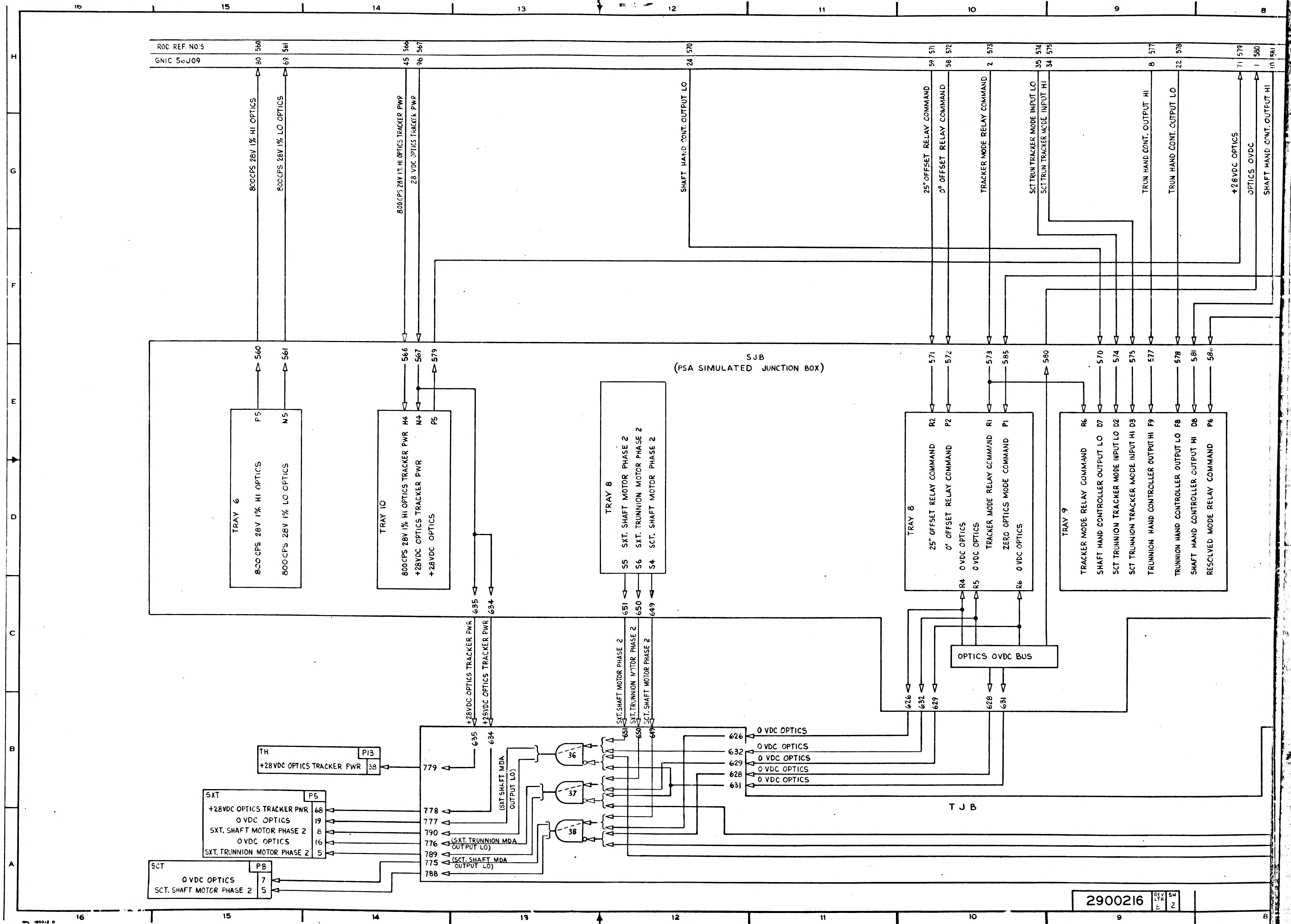

9
8
7
6
5
4
3
577
578
579
580
581
583
585
586
587
588
590
591
592
596
597
8
22
71
1
10
19
72
82
83
91
26
32
44
9
27
48
TRUN HAND CONT. OUTPUT HI
TRUN HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS OVDC
SHAFT HAND CONT. OUTPUT HI
SCT SHAFT DRIVE DISABLE
ZERO OPTICS MODE COMMAND
RESOLVED MODE RELAY COMMAND
SHIELD GROUND BUS
STRUCTURE GROUND
ISS & OPTICS LO SWITCHING
PANEL BRIGHTNESS LO
PANEL BRIGHTNESS HI
SXT TRUNNION DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
ZERO OPTICS
570
574
577
578
581
583
596
597
TRACKER MODE RELAY COMMAND R6
SHAFT HAND CONTROLLER OUTPUT LO D7
SCT TRUNNION TRACKER MODE INPUT LO D2
SCT TRUNNION TRACKER MODE INPUT HI
TRUNNION HAND CONTROLLER OUTPUT HI F9
TRUNNION HAND CONTROLLER OUTPUT LO F8
SHAFT HAND CONTROLLER OUTPUT HI D8
RESOLVED MODE RELAY COMMAND P6
STRUCTURE GROUND
56P01
95
80
PANEL BRIGHTNESS HI
PANEL BRIGHTNESS LO
D & C ELECTRONICS
ISS & OPTICS LO SWITCHING
SHIELD GROUND BUS
OJB
OPTICS SIGNALS (PSA)
MONITORING
OPTICS SIGNALS
(SIGNAL CONDITIONER)
MONITORING
STAR PRESENCE HI
STAR PRESENCE
LO
384A
384B
OPTICS SIGNAL MONITORING OF
PSA FRONT PANEL TEST POINTS
SEE NASA DRAWING 1901982
TPA
OPTICS SIGNAL MONITORING OF
SIGNAL CONDITIONER INPUTS
SEE NASA DRAWING 1902141-004
1419
1420
(SEE MONITORING PANEL
MECH. DIAGRAM 2900207)
1423
1424
1425
ZERO OPTICS
NOT MARK
MARK
OIA
1348
2116
2115
2615
2616
1844
P10
44
19
43
MARK
NOT MARK
ZERO OPTICS
CE
627
630
633
648
647
SCT SHAFT DRIVE DISABLE
SXT TRUNION DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
STAR SIMULATOR SIGNAL LO
STAR SIMULATOR SIGNAL HI
800
801
802
800 STRUCTURE GROUND
801 STAR SIMULATOR SIGNAL HI
802 STAR SIMULATOR SIGNAL LO
SS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± — DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
MATERIAL —	DRAWN Solane DATE 17 JUN 65 CHECKED APPROVAL APPROVAL NASA APPROVAL MIT APPROVAL	MECHANIZATION DIAGRAM OPTICS CONTROL (GSE MODE) (BLOCK I SERIES 100, BLOCK II)
CONTRACT NAS 9 497		CODE IDENT NO 99974 SIZE J2 2900216 SCALE — SHEET 2 OF 3

2900216 REV LTR E SH 2

2/2900216

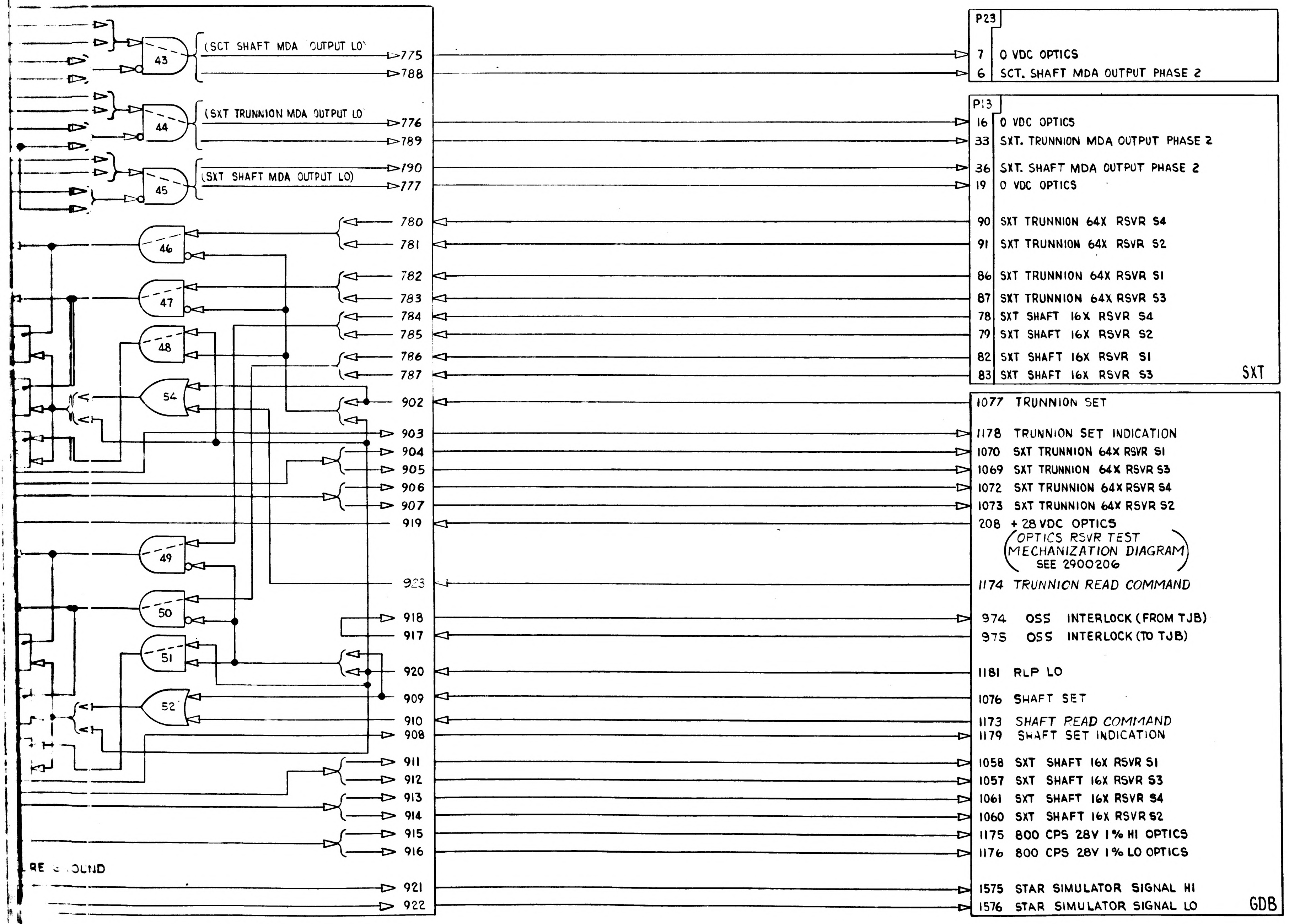
2900216
SH 2 of 3



ROC REF. NO'S
GNIC 50J09
560 561 566 567 570 571 572 573 574 575 577 578 579 580 581
80 69 45 96 24 59 58 2 35 34 8 22 71 1 10
800CPS 28V 1% HI OPTICS
800CPS 28V 1% LO OPTICS
800CPS 28V 1% HI OPTICS TRACKER PWR
28 VDC OPTICS TRACKER PWR
SHAFT HAND CONT. OUTPUT LO
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN TRACKER MODE INPUT LO
SCT TRUN TRACKER MODE INPUT HI
TRUN HAND CONT. OUTPUT HI
TRUN HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS OVDC
SHAFT HAND CONT. OUTPUT HI
SJB
(PSA SIMULATED JUNCTION BOX)
TRAY 6
800CPS 28V 1% HI OPTICS P5
800CPS 28V 1% LO OPTICS N5
TRAY 10
800CPS 28V 1% HI OPTICS TRACKER PWR H4
+28VDC OPTICS TRACKER PWR N4
+28VDC OPTICS P5
TRAY 8
SXT. SHAFT MOTOR PHASE 2 S5
SXT. TRUNNION MOTOR PHASE 2 S6
SCT. SHAFT MOTOR PHASE 2 S4
TRAY 8
25° OFFSET RELAY COMMAND R2
0° OFFSET RELAY COMMAND P2
0 VDC OPTICS R4
0 VDC OPTICS R5
TRACKER MODE RELAY COMMAND R1
ZERO OPTICS MODE COMMAND P1
0 VDC OPTICS R6
585 580
TRAY 9
TRACKER MODE RELAY COMMAND R6
SHAFT HAND CONTROLLER OUTPUT LO D7
SCT TRUNNION TRACKER MODE INPUT LO D2
SCT TRUNNION TRACKER MODE INPUT HI D3
TRUNNION HAND CONTROLLER OUTPUT HI F9
TRUNNION HAND CONTROLLER OUTPUT LO F8
SHAFT HAND CONTROLLER OUTPUT HI D8
RESOLVED MODE RELAY COMMAND P6
635 634 651 650 649
+28VDC OPTICS TRACKER PWR
SXT. SHAFT MOTOR PHASE 2
SXT. TRUNNION MOTOR PHASE 2
SCT. SHAFT MOTOR PHASE 2
OPTICS OVDC BUS
626 632 629 628 631
0 VDC OPTICS
TJB
36 37 38
SXT SHAFT MDA OUTPUT LO
(SXT. TRUNNION MDA OUTPUT LO)
(SCT. SHAFT MDA OUTPUT LO)
779 778 777 790 776 789 775 788
TH P13
+28VDC OPTICS TRACKER PWR 38
SXT P5
+28VDC OPTICS TRACKER PWR 68
0 VDC OPTICS 19
SXT. SHAFT MOTOR PHASE 2 8
0 VDC OPTICS 16
SXT. TRUNNION MOTOR PHASE 2 5
SCT P8
0 VDC OPTICS 7
SCT. SHAFT MOTOR PHASE 2 5
16 15 14 13 12 11 10 9 8
H G F E D C B A
2900216 REV LTR E SH 2

1/2900216

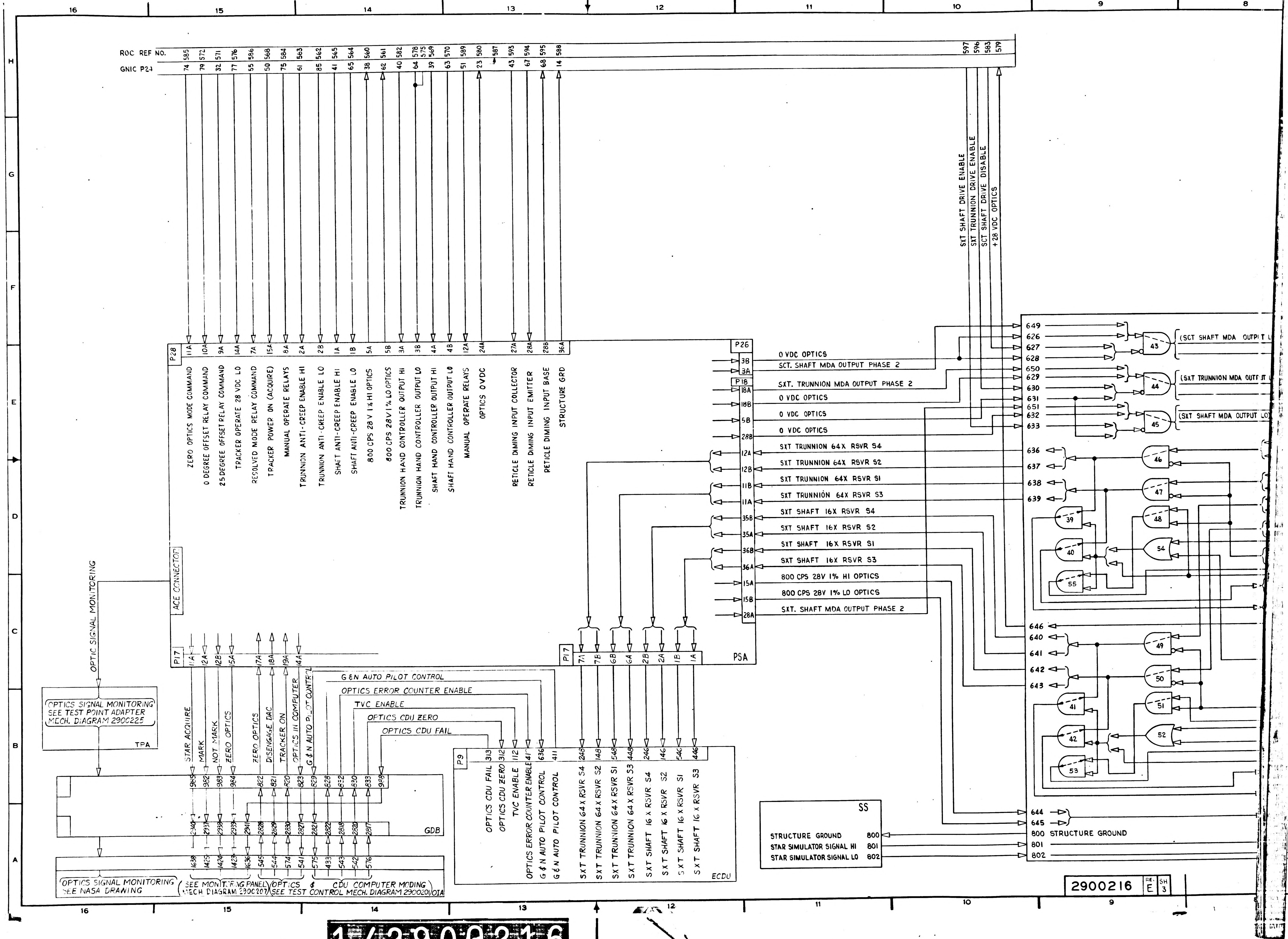
REVISIONS TDRR 21841					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21919	—	7 SEP 65	J J J
B		REVISED PER TDRR 21912	—	8 SEP 65	
C		REVISION STATUS CHANGED		21 SEP 65	
D		REVISED PER TDRR 22487		22 SEP 65	KCP
E		REVISED PER TDRR 23760		10 NOV 65	JWD


43
(SCT SHAFT MDA OUTPUT LO)
775
788
44
(SXT TRUNNION MDA OUTPUT LO)
776
789
45
(SXT SHAFT MDA OUTPUT LO)
790
777
46
47
48
54
49
50
51
52
780
781
782
783
784
785
786
787
902
903
904
905
906
907
919
923
918
917
920
909
910
908
911
912
913
914
915
916
RE GROUND
921
922
P23
7 0 VDC OPTICS
6 SCT. SHAFT MDA OUTPUT PHASE 2
P13
16 0 VDC OPTICS
33 SXT. TRUNNION MDA OUTPUT PHASE 2
36 SXT. SHAFT MDA OUTPUT PHASE 2
19 0 VDC OPTICS
90 SXT TRUNNION 64X RSVR S4
91 SXT TRUNNION 64X RSVR S2
86 SXT TRUNNION 64X RSVR S1
87 SXT TRUNNION 64X RSVR S3
78 SXT SHAFT 16X RSVR S4
79 SXT SHAFT 16X RSVR S2
82 SXT SHAFT 16X RSVR S1
83 SXT SHAFT 16X RSVR S3
SXT
1077 TRUNNION SET
1178 TRUNNION SET INDICATION
1070 SXT TRUNNION 64X RSVR S1
1069 SXT TRUNNION 64X RSVR S3
1072 SXT TRUNNION 64X RSVR S4
1073 SXT TRUNNION 64X RSVR S2
208 +28 VDC OPTICS
(OPTICS RSVR TEST MECHANIZATION DIAGRAM SEE 2900206)
1174 TRUNNION READ COMMAND
974 OSS INTERLOCK (FROM TJB)
975 OSS INTERLOCK (TO TJB)
1181 RLP LO
1076 SHAFT SET
1173 SHAFT READ COMMAND
1179 SHAFT SET INDICATION
1058 SXT SHAFT 16X RSVR S1
1057 SXT SHAFT 16X RSVR S3
1061 SXT SHAFT 16X RSVR S4
1060 SXT SHAFT 16X RSVR S2
1175 800 CPS 28V 1% HI OPTICS
1176 800 CPS 28V 1% LO OPTICS
1575 STAR SIMULATOR SIGNAL HI
1576 STAR SIMULATOR SIGNAL LO
GDB

900216 RE E SH 3

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± DECIMALS ± ANGLES ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN J. Kilmer DATE 17 JUN 65 CHECKED APPROVAL APPROVAL	MECHANIZATION DIAGRAM OPTICS CONTROL (GSE MODE) (BLOCK I SERIES 100, BLOCK II)
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974 SIZE J_2 2900216
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — SHEET 3 OF 3

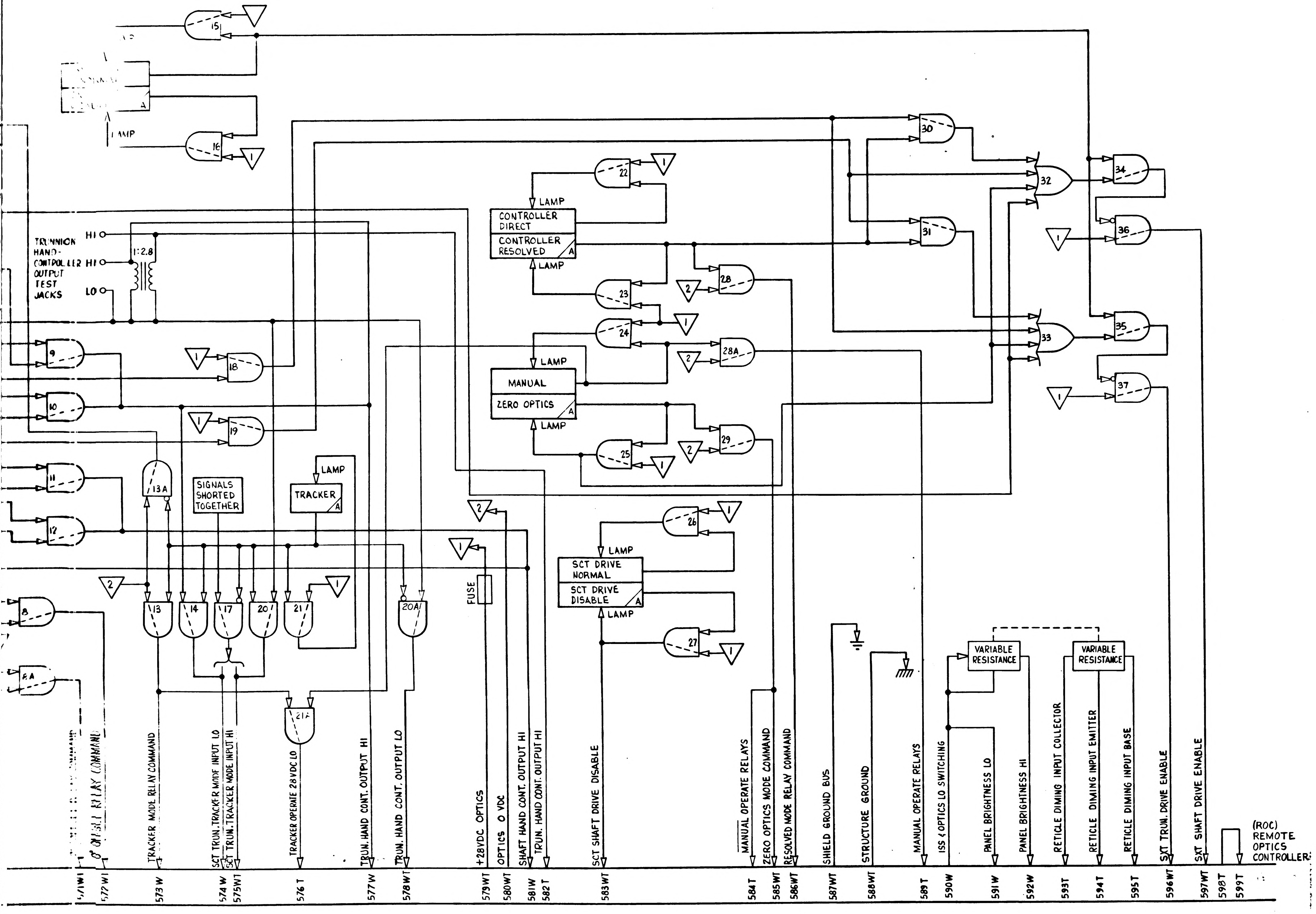
2 / 2900216


ROC REF NO.
GNIC P24
585 572 571 576 586 568 584 563 562 565 564 560 561 582 578 575 569 570 589 580 587 593 594 595 588
74 79 32 77 55 50 75 61 85 41 65 38 62 40 64 39 63 51 23 43 67 68 14
597 596 583 579
SXT SHAFT DRIVE ENABLE
SXT TRUNNION DRIVE ENABLE
SCT SHAFT DRIVE DISABLE
+28 VDC OPTICS
P28
11A 10A 9A 14A 7A 15A 8A 2A 2B 1A 1B 5A 5B 3A 3B 4A 4B 12A 24A 27A 28A 28B 36A
ZERO OPTICS MODE COMMAND
0 DEGREE OFFSET RELAY COMMAND
25 DEGREE OFFSET RELAY COMMAND
TRACKER OPERATE 28 VDC LO
RESOLVED MODE RELAY COMMAND
TRACKER POWER ON (ACQUIRE)
MANUAL OPERATE RELAYS
TRUNNION ANTI-CREEP ENABLE HI
TRUNNION ANTI-CREEP ENABLE LO
SHAFT ANTI-CREEP ENABLE HI
SHAFT ANTI-CREEP ENABLE LO
800 CPS 28V 1% HI OPTICS
800 CPS 28V 1% LO OPTICS
TRUNNION HAND CONTROLLER OUTPUT HI
TRUNNION HAND CONTROLLER OUTPUT LO
SHAFT HAND CONTROLLER OUTPUT HI
SHAFT HAND CONTROLLER OUTPUT LO
MANUAL OPERATE RELAYS
OPTICS OVDC
RETICLE DIMING INPUT COLLECTOR
RETICLE DIMING INPUT EMITTER
RETICLE DIMING INPUT BASE
STRUCTURE GRD
P26
3B 3A
0 VDC OPTICS
SCT. SHAFT MDA OUTPUT PHASE 2
P18
18A 18B 5B 28B 12A 12B 11B 11A 35B 35A 36B 36A 15A 15B 28A
SXT. TRUNNION MDA OUTPUT PHASE 2
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
SXT TRUNNION 64X RSVR S4
SXT TRUNNION 64X RSVR S2
SXT TRUNNION 64X RSVR S1
SXT TRUNNION 64X RSVR S3
SXT SHAFT 16X RSVR S4
SXT SHAFT 16X RSVR S2
SXT SHAFT 16X RSVR S1
SXT SHAFT 16X RSVR S3
800 CPS 28V 1% HI OPTICS
800 CPS 28V 1% LO OPTICS
SXT. SHAFT MDA OUTPUT PHASE 2
PSA
ACE CONNECTOR
P17
11A 12A 12B 15A 17A 18A 19A 14A
7A 7B 6B 6A 2B 2A 1B 1A
649 626 627 628 650 629 630 631 651 632 633
636 637 638 639
646 640 641 642 643
644 645
43 44 45 46 47 39 48 40 54 55 49 50 41 51 42 52 53
(SCT SHAFT MDA OUTPUT
(SXT TRUNNION MDA OUTPUT
(SXT SHAFT MDA OUTPUT
800 STRUCTURE GROUND
801
802
SS
STRUCTURE GROUND 800
STAR SIMULATOR SIGNAL HI 801
STAR SIMULATOR SIGNAL LO 802
OPTIC SIGNAL MONITORING
OPTICS SIGNAL MONITORING
SEE TEST POINT ADAPTER
MECH. DIAGRAM 2900225
TPA
STAR ACQUIRE
MARK
NOT MARK
ZERO OPTICS
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
OPTICS IN COMPUTER
G & N AUTO PILOT CONTROL
G & N AUTO PILOT CONTROL
OPTICS ERROR COUNTER ENABLE
TVC ENABLE
OPTICS CDU ZERO
OPTICS CDU FAIL
985 982 983 984 822 821 820 823 829 828 832 830 833 988
2940 2937 2938 2939 2941 2828 2829 2830 2827 2821 2822 2818 2816 2817
GDB
1638 1429 1424 1423 1636 545 544 574 541 575 433 543 542 576
OPTICS SIGNAL MONITORING
SEE NASA DRAWING
SEE MONITORING PANEL
MECH DIAGRAM 2900207
OPTICS & CDU COMPUTER MODING
SEE TEST CONTROL MECH. DIAGRAM 2900201/01A
P9
313 312 112 411 636 411 248 148 548 448 246 146 546 446
OPTICS CDU FAIL
OPTICS CDU ZERO
TVC ENABLE
OPTICS ERROR COUNTER ENABLE
G & N AUTO PILOT CONTROL
G & N AUTO PILOT CONTROL
SXT TRUNNION 64X RSVR S4
SXT TRUNNION 64X RSVR S2
SXT TRUNNION 64X RSVR S1
SXT TRUNNION 64X RSVR S3
SXT SHAFT 16X RSVR S4
SXT SHAFT 16X RSVR S2
SXT SHAFT 16X RSVR S1
SXT SHAFT 16X RSVR S3
ECDU
16 15 14 13 12 11 10 9 8
H G F E D C B A
2900216
REV E
SH 3

1/2900216

5800518

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		7 SEP 65	
B		REVISED PER TDRR 21912		8 SEP 65	
C		REVISED PER TDRR 22290		21-SEP-65	
D		REVISION STATUS CHANGED		22 SEP 65	
E		REVISED PER TDRR 23760		10 NOV 65	
F		REVISED PER TDRR 23759		12 NOV 65	


15
16
LAMP
TRUNNION HAND-CONTROLLER OUTPUT TEST JACKS
HI
HI
LO
1:2.8
9
10
11
12
13A
13
14
17
20
21
20A
21A
18
19
SIGNALS SHORTED TOGETHER
TRACKER
LAMP
FUSE
22
23
24
25
26
27
28
28A
29
30
31
32
33
34
35
36
37
CONTROLLER DIRECT
CONTROLLER RESOLVED
MANUAL
ZERO OPTICS
SCT DRIVE NORMAL
SCT DRIVE DISABLE
LAMP
VARIABLE RESISTANCE
VARIABLE RESISTANCE
8
8A
OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN. TRACKER MODE INPUT LO
SCT TRUN. TRACKER MODE INPUT HI
TRACKER OPERATE 28VDC LO
TRUN. HAND CONT. OUTPUT HI
TRUN. HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS 0 VDC
SHAFT HAND CONT. OUTPUT HI
TRUN. HAND CONT. OUTPUT HI
SCT SHAFT DRIVE DISABLE
MANUAL OPERATE RELAYS
ZERO OPTICS MODE COMMAND
RESOLVED MODE RELAY COMMAND
SHIELD GROUND BUS
STRUCTURE GROUND
MANUAL OPERATE RELAYS
ISS & OPTICS LO SWITCHING
PANEL BRIGHTNESS LO
PANEL BRIGHTNESS HI
RETICLE DIMING INPUT COLLECTOR
RETICLE DIMING INPUT EMITTER
RETICLE DIMING INPUT BASE
SXT TRUN. DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
(ROC) REMOTE OPTICS CONTROLLER
571W1
572W1
573W
574W
575WT
576T
577W
578WT
579WT
580WT
581W
582T
583WT
584T
585WT
586WT
587WT
588WT
589T
590W
591W
592W
593T
594T
595T
596WT
597WT
598T
599T

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Solano DATE 29 JUN 65
CHECKED
APPROVAL 30 JUN 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
OPTICS CONTROL (GSE MODE)
(BLOCK I SERIES 100, BLOCK II)

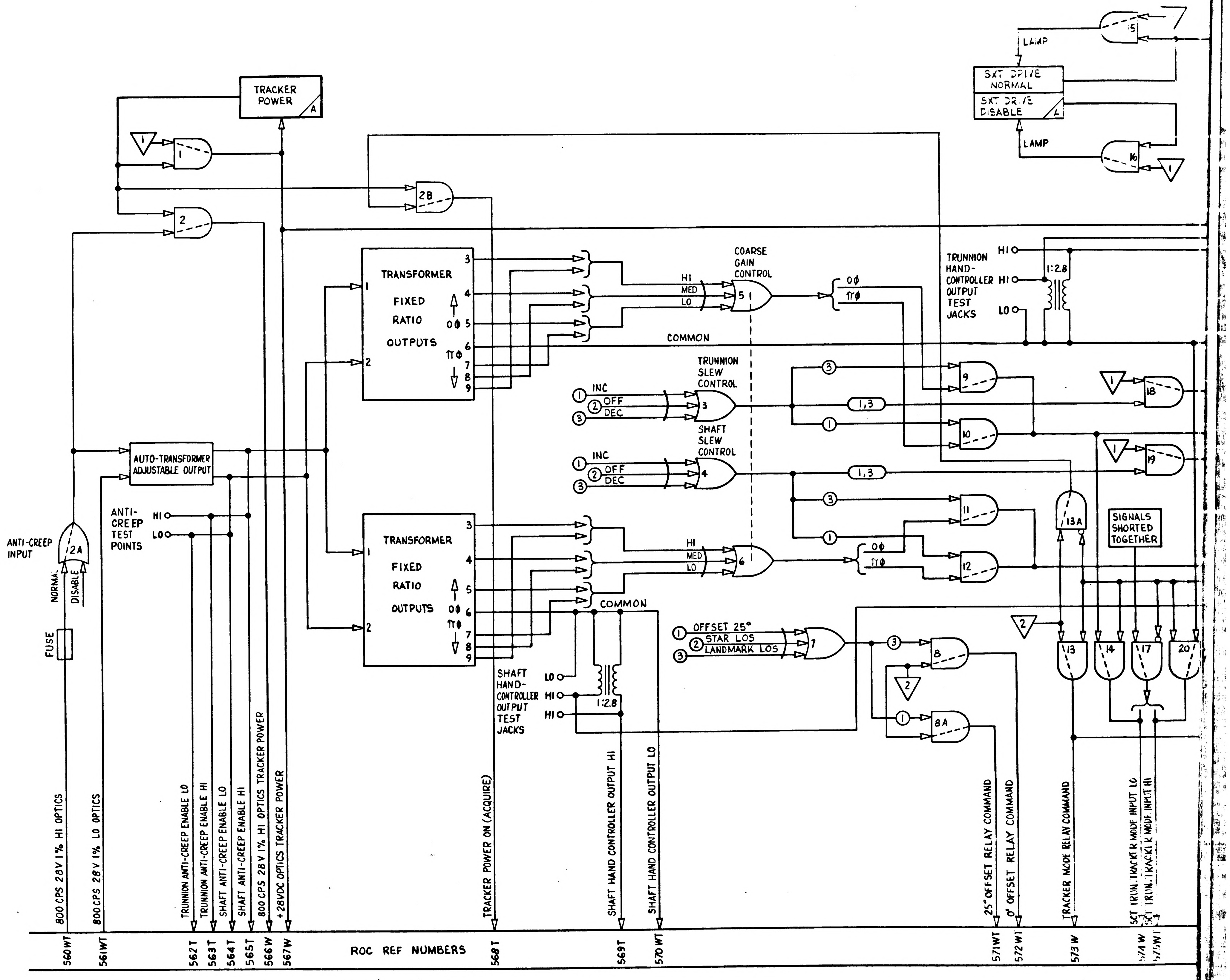
CODE IDENT NO. 99974
SIZE J_2
2900216
SCALE —
SHEET 1 OF 2

2900216

27 2900216

NOTES:

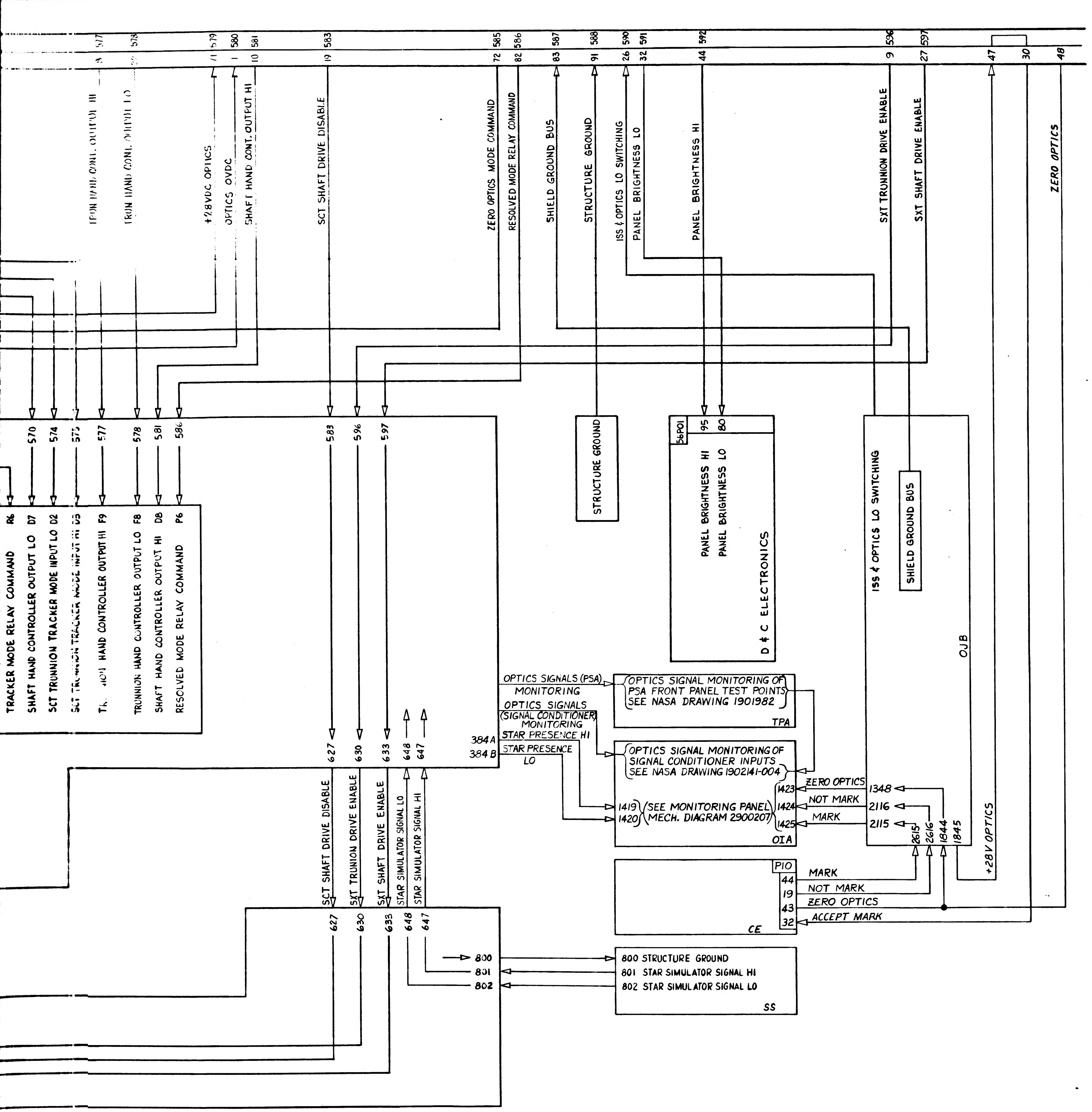
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. NONSTANDARD SYMBOLOGY:
   - INDICATES "AND" GATE WITH SWITCHED SIGNAL
   - NAME — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
   - NAME / NAME — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION)
4. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:
   - SHEET 1 / SHEET 2 — BLOCK I SERIES 100
   - SHEET 1 / SHEET 3 — BLOCK II
   - INDICATES "BILATERAL AND" GATE WITH SWITCHED SIGNAL.


TRACKER POWER
A
1
2
2B
2A
ANTI-CREEP INPUT
NORMAL
DISABLE
FUSE
AUTO-TRANSFORMER ADJUSTABLE OUTPUT
ANTI-CREEP TEST POINTS
HI
LO
TRANSFORMER FIXED RATIO OUTPUTS
0ϕ
πϕ
COMMON
COARSE GAIN CONTROL
HI
MED
LO
5
0ϕ
πϕ
TRUNNION SLEW CONTROL
INC
OFF
DEC
3
SHAFT SLEW CONTROL
4
1,3
6
9
10
11
12
13A
18
19
TRUNNION HAND-CONTROLLER OUTPUT TEST JACKS
1:2.8
SHAFT HAND-CONTROLLER OUTPUT TEST JACKS
LAMP
SXT DRIVE NORMAL
SXT DRIVE DISABLE
15
16
OFFSET 25°
STAR LOS
LANDMARK LOS
7
8
8A
13
14
17
20
SIGNALS SHORTED TOGETHER
800 CPS 28V 1% HI OPTICS
800 CPS 28V 1% LO OPTICS
TRUNNION ANTI-CREEP ENABLE LO
TRUNNION ANTI-CREEP ENABLE HI
SHAFT ANTI-CREEP ENABLE LO
SHAFT ANTI-CREEP ENABLE HI
800 CPS 28V 1% HI OPTICS TRACKER POWER
+28VDC OPTICS TRACKER POWER
TRACKER POWER ON (ACQUIRE)
SHAFT HAND CONTROLLER OUTPUT HI
SHAFT HAND CONTROLLER OUTPUT LO
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN. TRACKER MODE INPUT LO
SCT TRUN. TRACKER MODE INPUT HI
ROC REF NUMBERS
560WT
561WT
562T
563T
564T
565T
566W
567W
568T
569T
570WT
571WT
572WT
573W
574W
575W

2900216 REV SH 1

1/2900216

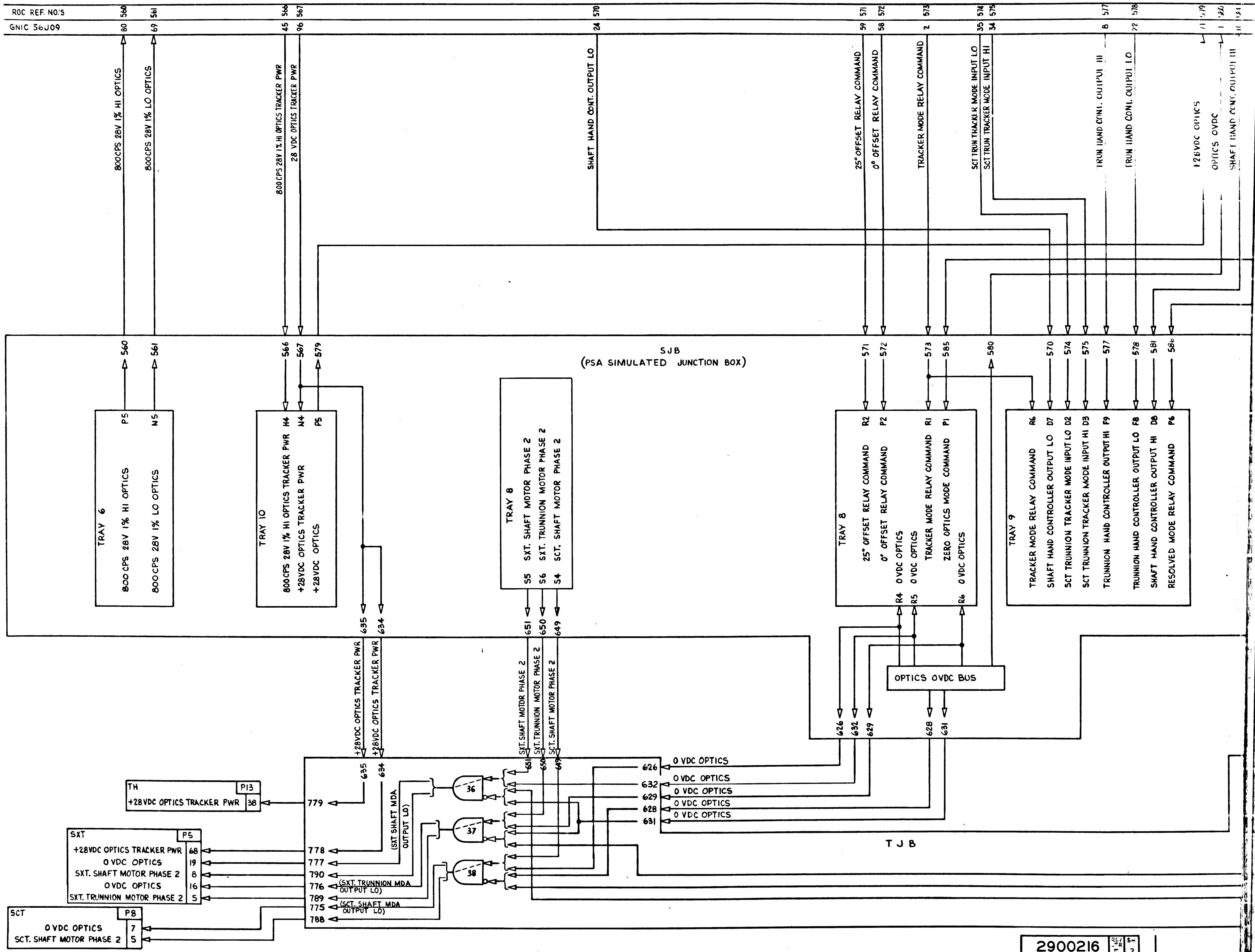
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		SEP 65	
B		REVISED PER TDRR 21912		8 SEP 65	
C		REVISION STATUS CHANGED		2 SEP 65	
D		REVISED PER TDRR 22487		22 SEP 65	
E		REVISION STATUS CHANGED		[illegible] 65	
F		REVISED PER TDRR 23759		2 NOV 65	



577
578
71 579
1 580
10 581
19 583
72 585
82 586
83 587
91 588
26 590
32 591
44 592
9 596
27 597
47
30
48
TRUN HAND CONT. OUTPUT HI
TRUN HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS OVDC
SHAFT HAND CONT. OUTPUT HI
SCT SHAFT DRIVE DISABLE
ZERO OPTICS MODE COMMAND
RESOLVED MODE RELAY COMMAND
SHIELD GROUND BUS
STRUCTURE GROUND
ISS & OPTICS LO SWITCHING
PANEL BRIGHTNESS LO
PANEL BRIGHTNESS HI
SXT TRUNNION DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
ZERO OPTICS
570
574
575
577
578
581
586
R6
D7
D2
D3
F9
F8
D8
P6
TRACKER MODE RELAY COMMAND
SHAFT HAND CONTROLLER OUTPUT LO
SCT TRUNNION TRACKER MODE INPUT LO
SCT TRUNNION TRACKER MODE INPUT HI
TRUNNION HAND CONTROLLER OUTPUT HI
TRUNNION HAND CONTROLLER OUTPUT LO
SHAFT HAND CONTROLLER OUTPUT HI
RESOLVED MODE RELAY COMMAND
583
596
597
627
630
633
648
647
384A
384B
STRUCTURE GROUND
56P01
95
80
PANEL BRIGHTNESS HI
PANEL BRIGHTNESS LO
D & C ELECTRONICS
ISS & OPTICS LO SWITCHING
SHIELD GROUND BUS
OJB
OPTICS SIGNALS (PSA) MONITORING
OPTICS SIGNALS (SIGNAL CONDITIONER) MONITORING
STAR PRESENCE HI
STAR PRESENCE LO
OPTICS SIGNAL MONITORING OF PSA FRONT PANEL TEST POINTS SEE NASA DRAWING 1901982
TPA
OPTICS SIGNAL MONITORING OF SIGNAL CONDITIONER INPUTS SEE NASA DRAWING 1902141-004
1419
1420
SEE MONITORING PANEL MECH. DIAGRAM 2900207
1423
1424
1425
ZERO OPTICS
NOT MARK
MARK
OIA
1348
2116
2115
2615
2616
1844
1845
+28V OPTICS
PIO
44
19
43
32
MARK
NOT MARK
ZERO OPTICS
ACCEPT MARK
CE
SCT SHAFT DRIVE DISABLE
SXT TRUNNION DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
STAR SIMULATOR SIGNAL LO
STAR SIMULATOR SIGNAL HI
627
630
633
648
647
800
801
802
800 STRUCTURE GROUND
801 STAR SIMULATOR SIGNAL HI
802 STAR SIMULATOR SIGNAL LO
SS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± — DO NOT SCALE THIS DRAWING	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN Solane DATE 17 JUN65 CHECKED 29 JUN 65 APPROVAL 30 JUN 65 APPROVAL	MANNED SPACECRAFT CENTER HOUSTON, TEXAS MECHANIZATION DIAGRAM OPTICS CONTROL (GSE MODE) (BLOCK I SERIES 100, BLOCK II)
MATERIAL — CONTRACT NAS9-497	NASA APPROVAL MIT APPROVAL	CODE IDENT NO. 99974 SIZE J2 2900216 SCALE — SHEET 2 OF 2

2900216

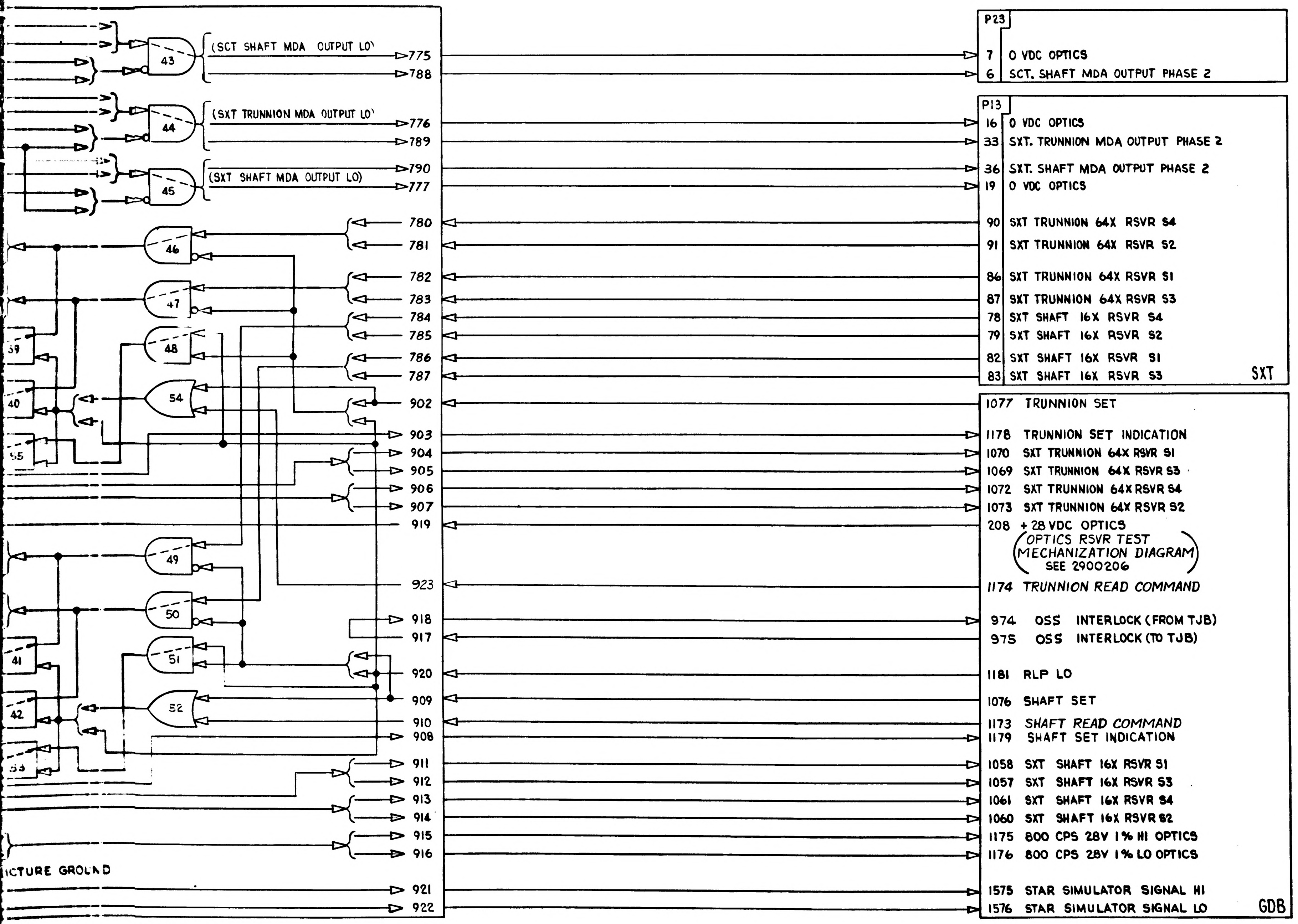

ROC REF. NO.'S
GNIC 56J09
560
561
566
567
570
571
572
573
574
575
577
578
80
69
45
96
24
59
58
2
35
34
8
22
800CPS 28V 1% HI OPTICS
800CPS 28V 1% LO OPTICS
800CPS 28V 1% HI OPTICS TRACKER PWR
28 VDC OPTICS TRACKER PWR
SHAFT HAND CONT. OUTPUT LO
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN TRACKER MODE INPUT LO
SCT TRUN TRACKER MODE INPUT HI
TRUN HAND CONT. OUTPUT HI
TRUN HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS OVDC
SHAFT HAND CONT. OUTPUT HI
SJB
(PSA SIMULATED JUNCTION BOX)
579
585
580
581
586
TRAY 6
800CPS 28V 1% HI OPTICS
800CPS 28V 1% LO OPTICS
P5
N5
TRAY 10
800CPS 28V 1% HI OPTICS TRACKER PWR
+28VDC OPTICS TRACKER PWR
+28VDC OPTICS
H4
N4
P5
TRAY 8
SXT. SHAFT MOTOR PHASE 2
SXT. TRUNNION MOTOR PHASE 2
SCT. SHAFT MOTOR PHASE 2
S5
S6
S4
TRAY 8
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
0 VDC OPTICS
0 VDC OPTICS
TRACKER MODE RELAY COMMAND
ZERO OPTICS MODE COMMAND
0 VDC OPTICS
R2
P2
R4
R5
R1
P1
R6
TRAY 9
TRACKER MODE RELAY COMMAND
SHAFT HAND CONTROLLER OUTPUT LO
SCT TRUNNION TRACKER MODE INPUT LO
SCT TRUNNION TRACKER MODE INPUT HI
TRUNNION HAND CONTROLLER OUTPUT HI
TRUNNION HAND CONTROLLER OUTPUT LO
SHAFT HAND CONTROLLER OUTPUT HI
RESOLVED MODE RELAY COMMAND
R6
D7
D2
D3
F9
F8
D8
P6
635
634
651
650
649
+28VDC OPTICS TRACKER PWR
+28VDC OPTICS TRACKER PWR
SXT. SHAFT MOTOR PHASE 2
SXT. TRUNNION MOTOR PHASE 2
SCT. SHAFT MOTOR PHASE 2
OPTICS OVDC BUS
626
632
629
628
631
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
TJB
36
37
38
(SXT SHAFT MDA OUTPUT LO)
(SXT. TRUNNION MDA OUTPUT LO)
(SCT. SHAFT MDA OUTPUT LO)
779
778
777
790
776
789
775
788
TH
P13
+28VDC OPTICS TRACKER PWR
38
SXT
P5
+28VDC OPTICS TRACKER PWR
68
0 VDC OPTICS
19
SXT. SHAFT MOTOR PHASE 2
8
0 VDC OPTICS
16
SXT. TRUNNION MOTOR PHASE 2
5
SCT
P8
0 VDC OPTICS
7
SCT. SHAFT MOTOR PHASE 2
5

2900216 REV LTR F SH 2

1/2900216

REVISIONS TDRR 2 8

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21919	—	SEP 65	J J J
B		REVISED PER TDRR 21912	—	8 SEP 65	J J
C		REVISION STATUS CHANGED		2 SEP 65	
D		REVISED PER TDRR 22487		22 SEP 65	
E		REVISED PER TDRR 23760		10 NOV 65	
F		REVISED PER TDRR 23759		2 NOV 65	


43
(SCT SHAFT MDA OUTPUT LO)
775
788
44
(SXT TRUNNION MDA OUTPUT LO)
776
789
45
(SXT SHAFT MDA OUTPUT LO)
790
777
46
780
781
47
782
783
784
785
39
48
786
787
40
54
902
55
903
904
905
906
907
919
49
923
50
918
917
41
51
920
42
52
909
910
908
53
911
912
913
914
915
916
ICTURE GROUND
921
922
P23
7 0 VDC OPTICS
6 SCT. SHAFT MDA OUTPUT PHASE 2
P13
16 0 VDC OPTICS
33 SXT. TRUNNION MDA OUTPUT PHASE 2
36 SXT. SHAFT MDA OUTPUT PHASE 2
19 0 VDC OPTICS
90 SXT TRUNNION 64X RSVR S4
91 SXT TRUNNION 64X RSVR S2
86 SXT TRUNNION 64X RSVR S1
87 SXT TRUNNION 64X RSVR S3
78 SXT SHAFT 16X RSVR S4
79 SXT SHAFT 16X RSVR S2
82 SXT SHAFT 16X RSVR S1
83 SXT SHAFT 16X RSVR S3
SXT
1077 TRUNNION SET
1178 TRUNNION SET INDICATION
1070 SXT TRUNNION 64X RSVR S1
1069 SXT TRUNNION 64X RSVR S3
1072 SXT TRUNNION 64X RSVR S4
1073 SXT TRUNNION 64X RSVR S2
208 +28 VDC OPTICS
(OPTICS RSVR TEST MECHANIZATION DIAGRAM SEE 2900206)
1174 TRUNNION READ COMMAND
974 OSS INTERLOCK (FROM TJB)
975 OSS INTERLOCK (TO TJB)
1181 RLP LO
1076 SHAFT SET
1173 SHAFT READ COMMAND
1179 SHAFT SET INDICATION
1058 SXT SHAFT 16X RSVR S1
1057 SXT SHAFT 16X RSVR S3
1061 SXT SHAFT 16X RSVR S4
1060 SXT SHAFT 16X RSVR S2
1175 800 CPS 28V 1% HI OPTICS
1176 800 CPS 28V 1% LO OPTICS
1575 STAR SIMULATOR SIGNAL HI
1576 STAR SIMULATOR SIGNAL LO
GDB

2900216 F SH 3

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

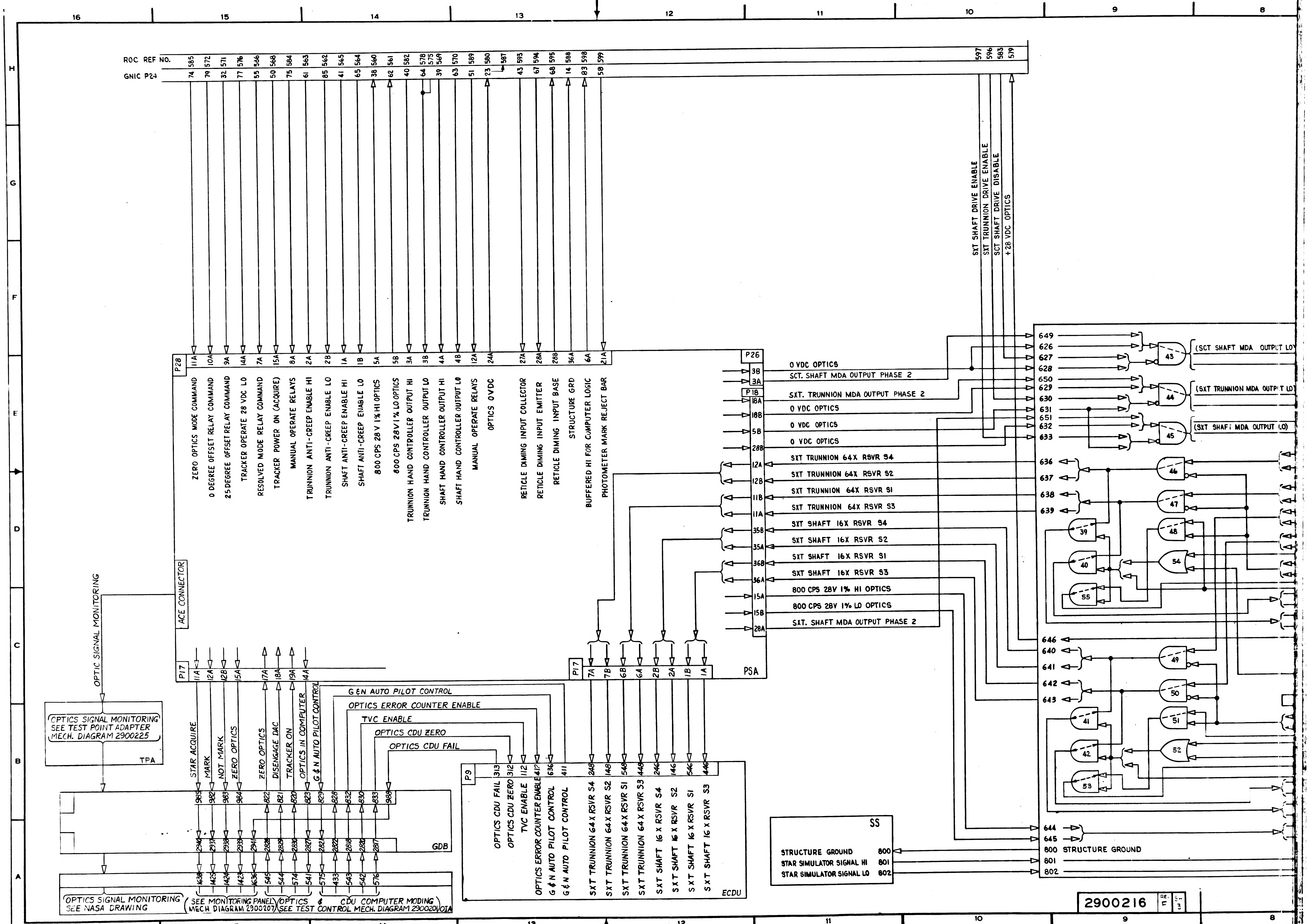
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J Kilmer DATE 17 JUN 68
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
OPTICS CONTROL (GSE MODE)
(BLOCK I SERIES 100, BLOCK II)

CODE IDENT NO. 99974
SIZE J2
2900216
SCALE —
SHEET 3 OF 3

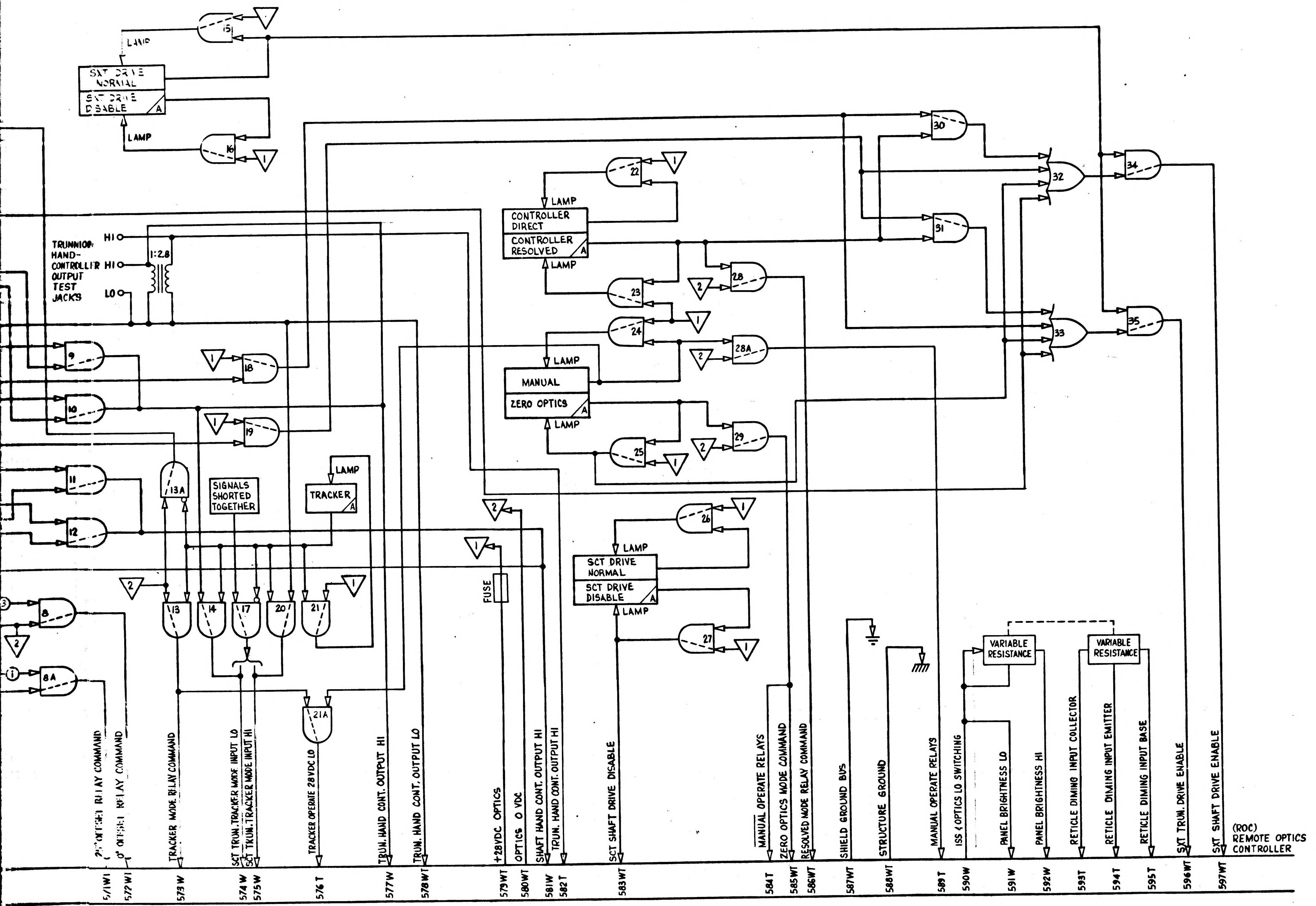
27 2900216


ROC REF NO.
GNIC P24
585 572 571 576 586 568 584 563 562 565 564 560 561 582 578 575 569 570 589 580 587 593 594 595 588 598 599
74 79 32 77 55 50 75 61 85 41 65 38 62 40 64 39 63 51 23 43 67 68 14 83 58
597 596 583 579
SXT SHAFT DRIVE ENABLE
SXT TRUNNION DRIVE ENABLE
SCT SHAFT DRIVE DISABLE
+28 VDC OPTICS
P28
11A 10A 9A 14A 7A 15A 8A 2A 2B 1A 1B 5A 5B 3A 3B 4A 4B 12A 24A 27A 28A 28B 36A 6A 21A
ZERO OPTICS MODE COMMAND
0 DEGREE OFFSET RELAY COMMAND
25 DEGREE OFFSET RELAY COMMAND
TRACKER OPERATE 28 VDC LO
RESOLVED MODE RELAY COMMAND
TRACKER POWER ON (ACQUIRE)
MANUAL OPERATE RELAYS
TRUNNION ANTI-CREEP ENABLE HI
TRUNNION ANTI-CREEP ENABLE LO
SHAFT ANTI-CREEP ENABLE HI
SHAFT ANTI-CREEP ENABLE LO
800 CPS 28 V 1% HI OPTICS
800 CPS 28V 1% LO OPTICS
TRUNNION HAND CONTROLLER OUTPUT HI
TRUNNION HAND CONTROLLER OUTPUT LO
SHAFT HAND CONTROLLER OUTPUT HI
SHAFT HAND CONTROLLER OUTPUT LO
MANUAL OPERATE RELAYS
OPTICS O VDC
RETICLE DIMING INPUT COLLECTOR
RETICLE DIMING INPUT EMITTER
RETICLE DIMING INPUT BASE
STRUCTURE GRD
BUFFERED HI FOR COMPUTER LOGIC
PHOTOMETER MARK REJECT BAR
ACE CONNECTOR
P26
3B 3A
P18
18A 18B 5B 28B 12A 12B 11B 11A 35B 35A 36B 36A 15A 15B 28A
0 VDC OPTICS
SCT. SHAFT MDA OUTPUT PHASE 2
SXT. TRUNNION MDA OUTPUT PHASE 2
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
SXT TRUNNION 64X RSVR S4
SXT TRUNNION 64X RSVR S2
SXT TRUNNION 64X RSVR S1
SXT TRUNNION 64X RSVR S3
SXT SHAFT 16X RSVR S4
SXT SHAFT 16X RSVR S2
SXT SHAFT 16X RSVR S1
SXT SHAFT 16X RSVR S3
800 CPS 28V 1% HI OPTICS
800 CPS 28V 1% LO OPTICS
SXT. SHAFT MDA OUTPUT PHASE 2
PSA
P17
7A 7B 6B 6A 2B 2A 1B 1A
11A 12A 12B 15A 17A 18A 19A 14A
OPTIC SIGNAL MONITORING
OPTICS SIGNAL MONITORING SEE TEST POINT ADAPTER MECH. DIAGRAM 2900225
TPA
STAR ACQUIRE
MARK
NOT MARK
ZERO OPTICS
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
OPTICS IN COMPUTER
G & N AUTO PILOT CONTROL
G & N AUTO PILOT CONTROL
OPTICS ERROR COUNTER ENABLE
TVC ENABLE
OPTICS CDU ZERO
OPTICS CDU FAIL
985 982 983 984 822 821 820 823 829 828 832 830 833 988
2940 2937 2938 2939 2941 2828 2829 2830 2827 2821 2822 2818 2820 2817
GDB
1638 1425 1424 1423 1636 545 544 574 541 575 433 543 542 576
OPTICS SIGNAL MONITORING SEE NASA DRAWING
SEE MONITORING PANEL MECH DIAGRAM 2900207
OPTICS & CDU COMPUTER MODING SEE TEST CONTROL MECH. DIAGRAM 2900201
OIA
P9
313 312 112 636 417 411 248 148 548 448 246 146 546 446
OPTICS CDU FAIL
OPTICS CDU ZERO
TVC ENABLE
OPTICS ERROR COUNTER ENABLE
G & N AUTO PILOT CONTROL
G & N AUTO PILOT CONTROL
SXT TRUNNION 64X RSVR S4
SXT TRUNNION 64X RSVR S2
SXT TRUNNION 64X RSVR S1
SXT TRUNNION 64X RSVR S3
SXT SHAFT 16X RSVR S4
SXT SHAFT 16X RSVR S2
SXT SHAFT 16X RSVR S1
SXT SHAFT 16X RSVR S3
ECDU
SS
STRUCTURE GROUND 800
STAR SIMULATOR SIGNAL HI 801
STAR SIMULATOR SIGNAL LO 802
649 626 627 628 650 629 630 631 651 632 633
636 637 638 639
646 640 641 642 643
644 645
800 STRUCTURE GROUND
801
802
43 44 45 46 47 48 39 40 54 55 49 50 41 51 42 52 53
(SCT SHAFT MDA OUTPUT LO)
(SXT TRUNNION MDA OUTPUT LO)
(SXT SHAFT MDA OUTPUT LO)
16 15 14 13 12 11 10 9 8
H G F E D C B A

2900216 REV F SH 3

13/2900216

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPD
		CHG NO		



LAMP
SXT DRIVE NORMAL
SXT DRIVE DISABLE
A
15
16
LAMP
1
TRUNNION HAND-CONTROLLER OUTPUT TEST JACKS
HI
HI
LO
1:2.8
9
10
11
12
8
8A
2
13A
13
14
17
20
21
21A
18
19
1
2
SIGNALS SHORTED TOGETHER
TRACKER
LAMP
CONTROLLER DIRECT
CONTROLLER RESOLVED
MANUAL
ZERO OPTICS
22
23
24
25
28
28A
29
26
27
30
31
32
33
34
35
FUSE
SCT DRIVE NORMAL
SCT DRIVE DISABLE
VARIABLE RESISTANCE
VARIABLE RESISTANCE
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN. TRACKER MODE INPUT LO
SCT TRUN. TRACKER MODE INPUT HI
TRACKER OPERATE 28VDC LO
TRUN. HAND CONT. OUTPUT HI
TRUN. HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS 0 VDC
SHAFT HAND CONT. OUTPUT HI
TRUN. HAND CONT. OUTPUT HI
SCT SHAFT DRIVE DISABLE
MANUAL OPERATE RELAYS
ZERO OPTICS MODE COMMAND
RESOLVED MODE RELAY COMMAND
SHIELD GROUND BUS
STRUCTURE GROUND
MANUAL OPERATE RELAYS
ISS & OPTICS LO SWITCHING
PANEL BRIGHTNESS LO
PANEL BRIGHTNESS HI
RETICLE DIMING INPUT COLLECTOR
RETICLE DIMING INPUT EMITTER
RETICLE DIMING INPUT BASE
SXT TRUN. DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
(ROC) REMOTE OPTICS CONTROLLER
571W1
572W1
573W
574W
575W
576T
577W
578WT
579WT
580WT
581W
582T
583WT
584T
585WT
586WT
587WT
588WT
589T
590W
591W
592W
593T
594T
595T
596WT
597WT

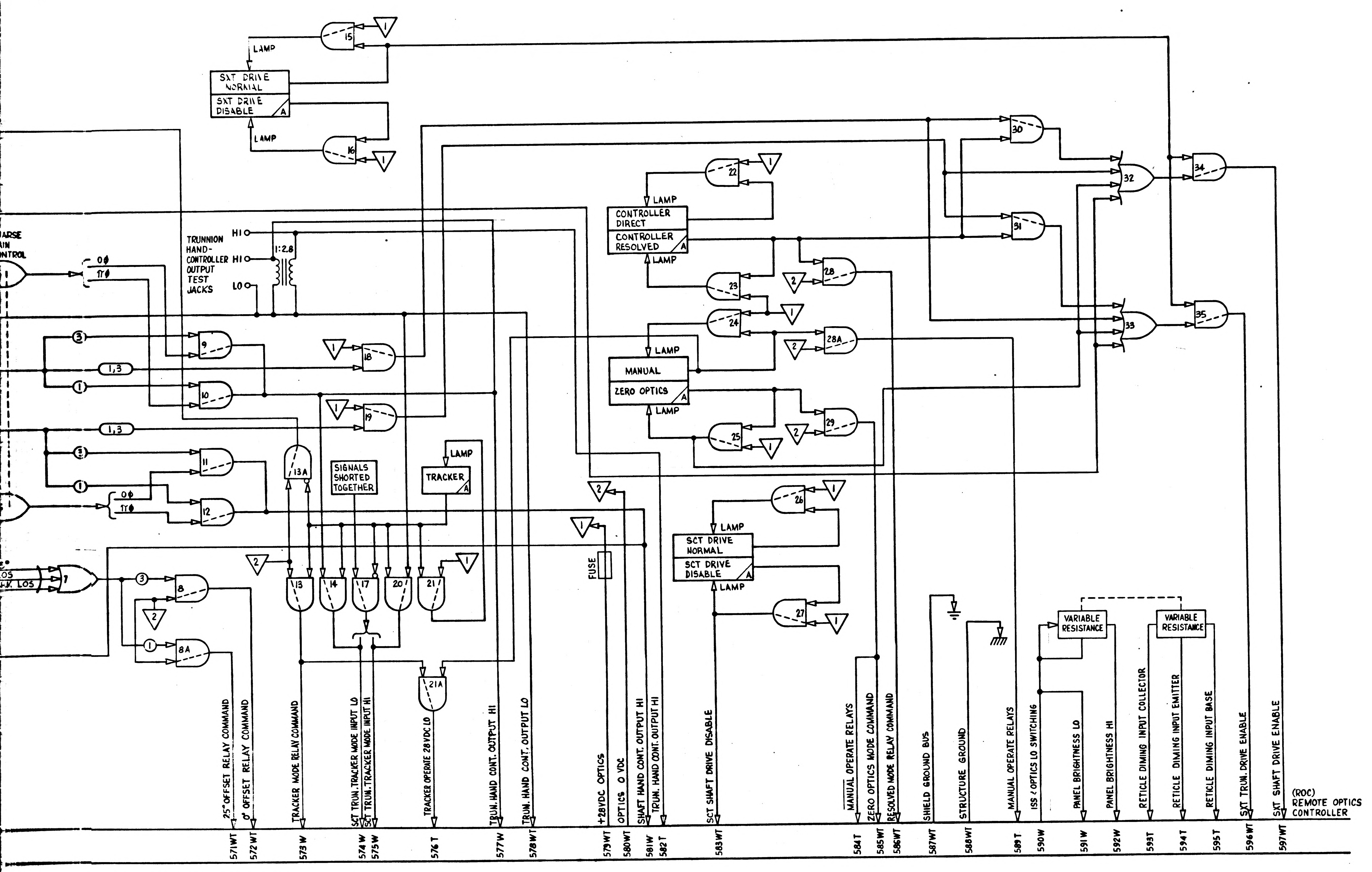
3H

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Solane DATE CHECKED Cantu 29 Jun 65 APPROVAL Lenke 30 Jun 65 APPROVAL M Watson 8-18-65	MECHANIZATION DIAGRAM OPTICS CONTROL (GSE MODE) (BLOCK I SERIES 100, BLOCK II)
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 SIZE J₂ 2900216
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — SHEET 1 OF 3

2900216 REV SH 1

F13

SYM	ZONE	REVISIONS DESCRIPTION	CHG NO	DATE	APPD


SXT DRIVE NORMAL
SXT DRIVE DISABLE
LAMP
CONTROLLER DIRECT
CONTROLLER RESOLVED
MANUAL
ZERO OPTICS
SCT DRIVE NORMAL
SCT DRIVE DISABLE
TRACKER
SIGNALS SHORTED TOGETHER
TRUNNION HAND-CONTROLLER OUTPUT TEST JACKS
HI
HI
LO
1:2.8
ARSE
AIN
ONTROL
0ϕ
πϕ
1,3
OS
H.K. LOS
FUSE
VARIABLE RESISTANCE
VARIABLE RESISTANCE
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN. TRACKER MODE INPUT LO
SCT TRUN. TRACKER MODE INPUT HI
TRACKER OPERATE 28 VDC LO
TRUN. HAND CONT. OUTPUT HI
TRUN. HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS 0 VDC
SHAFT HAND CONT. OUTPUT HI
TRUN. HAND CONT. OUTPUT HI
SCT SHAFT DRIVE DISABLE
MANUAL OPERATE RELAYS
ZERO OPTICS MODE COMMAND
RESOLVED MODE RELAY COMMAND
SHIELD GROUND BUS
STRUCTURE GROUND
MANUAL OPERATE RELAYS
ISS & OPTICS LO SWITCHING
PANEL BRIGHTNESS LO
PANEL BRIGHTNESS HI
RETICLE DIMING INPUT COLLECTOR
RETICLE DIMING INPUT EMITTER
RETICLE DIMING INPUT BASE
SXT TRUN. DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
(ROC) REMOTE OPTICS CONTROLLER
571WT
572WT
573W
574W
575W
576T
577W
578WT
579WT
580WT
581W
582T
583WT
584T
585WT
586WT
587WT
588WT
589T
590W
591W
592W
593T
594T
595T
596WT
597WT
7
8
8A
9
10
11
12
13
13A
14
15
16
17
18
19
20
21
21A
22
23
24
25
26
27
28
28A
29
30
31
32
33
34
35
1
2
3

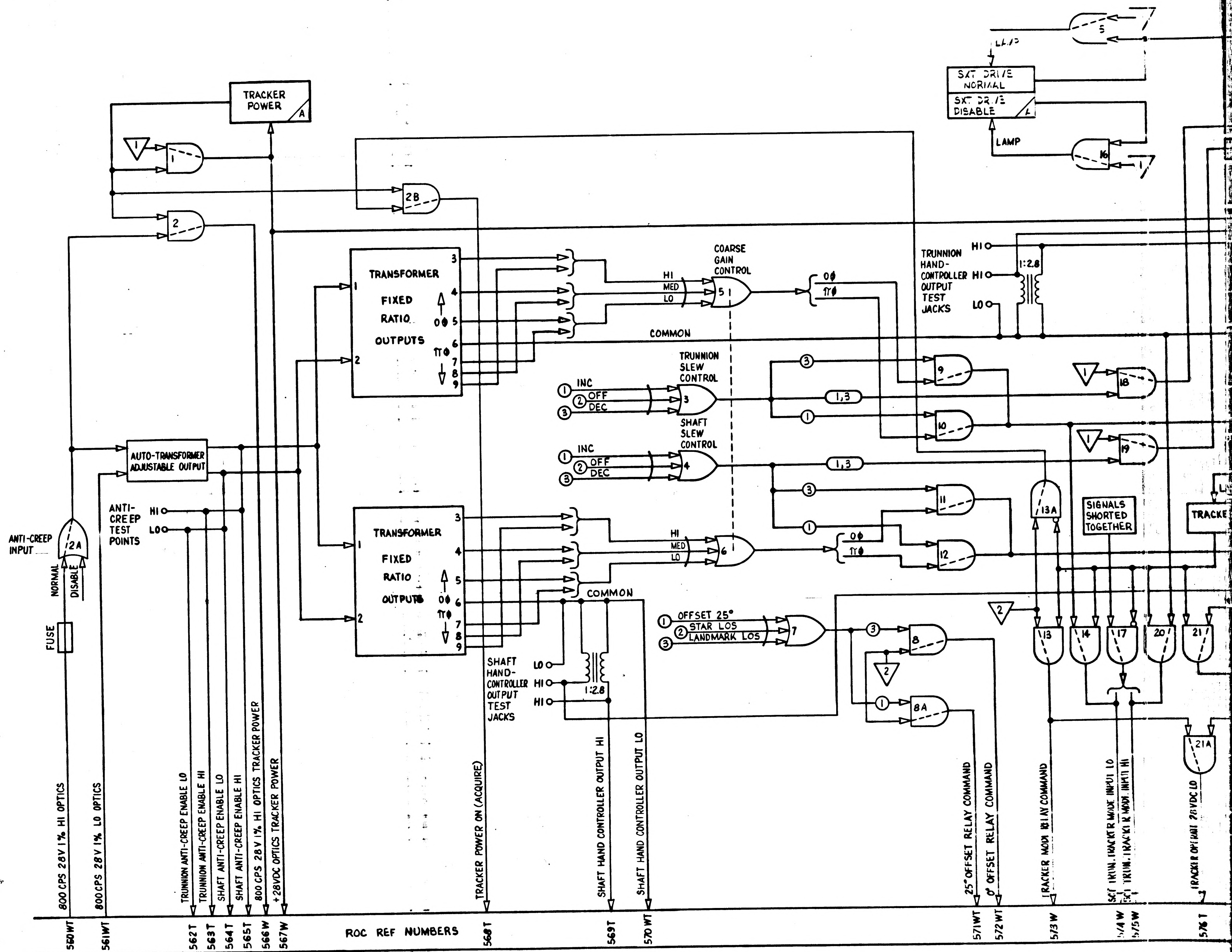
2900216	REV LTR	SH 1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN Solans DATE	MECHANIZATION DIAGRAM OPTICS CONTROL (ESE MODE) (BLOCK I SERIES 100, BLOCK II)
	CHECKED Santee 29 Jan 65	
DO NOT SCALE THIS DRAWING	APPROVAL Funke 3 Feb 65	
	APPROVAL M. Watson	
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J₂ · 2900216
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — · SHEET 1 OF 3

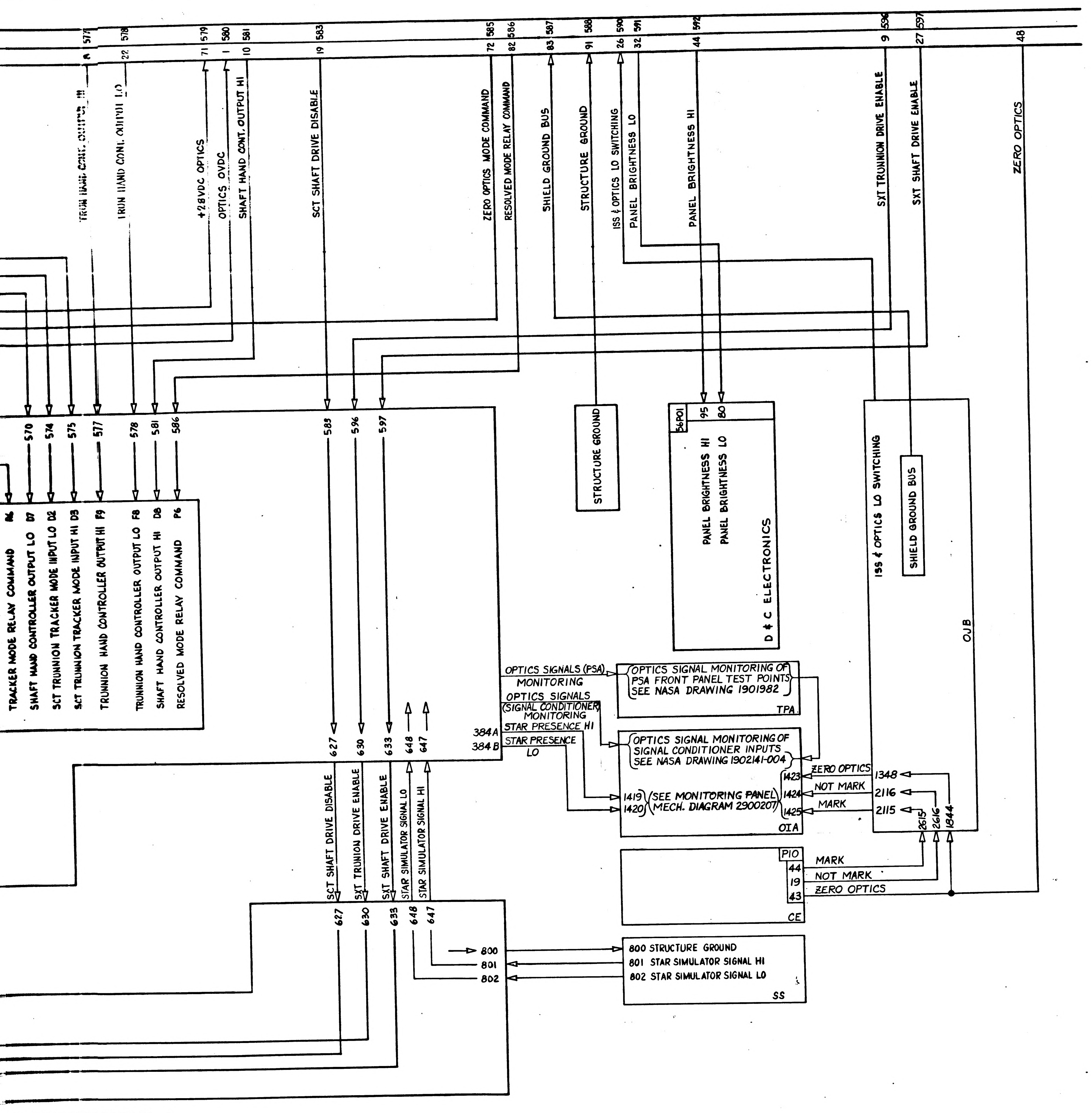
F-2

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. NONSTANDARD SYMBOLOGY:
   - INDICATES "AND" GATE WITH SWITCHED SIGNAL
   - NAME A — INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)
   - NAME / NAME A — INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON (ALTERNATE ACTION)
4. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:
   - SHEET 1 / SHEET 2 — BLOCK I SERIES 100
   - SHEET 1 / SHEET 3 — BLOCK II
   - INDICATES "BILATERAL AND" GATE WITH SWITCHED SIGNAL.


TRACKER POWER A
SXT DRIVE NORMAL
SXT DRIVE DISABLE
LAMP
TRANSFORMER FIXED RATIO OUTPUTS
0ϕ
πϕ
COARSE GAIN CONTROL
HI
MED
LO
COMMON
TRUNNION HAND-CONTROLLER OUTPUT TEST JACKS
1:2.8
TRUNNION SLEW CONTROL
SHAFT SLEW CONTROL
INC
OFF
DEC
1,3
SIGNALS SHORTED TOGETHER
TRACKE
AUTO-TRANSFORMER ADJUSTABLE OUTPUT
ANTI-CREEP TEST POINTS
ANTI-CREEP INPUT
NORMAL
DISABLE
FUSE
OFFSET 25°
STAR LOS
LANDMARK LOS
SHAFT HAND-CONTROLLER OUTPUT TEST JACKS
800 CPS 28V 1% HI OPTICS
800 CPS 28V 1% LO OPTICS
TRUNNION ANTI-CREEP ENABLE LO
TRUNNION ANTI-CREEP ENABLE HI
SHAFT ANTI-CREEP ENABLE LO
SHAFT ANTI-CREEP ENABLE HI
800 CPS 28V 1% HI OPTICS TRACKER POWER
+28VDC OPTICS TRACKER POWER
TRACKER POWER ON (ACQUIRE)
SHAFT HAND CONTROLLER OUTPUT HI
SHAFT HAND CONTROLLER OUTPUT LO
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN. TRACKER MODE INPUT LO
SCT TRUN. TRACKER MODE INPUT HI
TRACKER OPERATE 28VDC LO
ROC REF NUMBERS
560WT
561WT
562T
563T
564T
565T
566W
567W
568T
569T
570WT
571WT
572WT
573W
574W
575W
576T

2900216 REV TR SH 1


577
578
579
580
581
583
585
586
587
588
590
591
592
596
597
22
71
1
10
19
72
82
83
91
26
32
44
9
27
48
TRUN HAND CONT. OUTPUT HI
TRUN HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS OVDC
SHAFT HAND CONT. OUTPUT HI
SCT SHAFT DRIVE DISABLE
ZERO OPTICS MODE COMMAND
RESOLVED MODE RELAY COMMAND
SHIELD GROUND BUS
STRUCTURE GROUND
ISS & OPTICS LO SWITCHING
PANEL BRIGHTNESS LO
PANEL BRIGHTNESS HI
SXT TRUNNION DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
ZERO OPTICS
570
574
575
577
578
581
586
TRACKER MODE RELAY COMMAND
SHAFT HAND CONTROLLER OUTPUT LO D7
SCT TRUNNION TRACKER MODE INPUT LO D2
SCT TRUNNION TRACKER MODE INPUT HI D3
TRUNNION HAND CONTROLLER OUTPUT HI F9
TRUNNION HAND CONTROLLER OUTPUT LO F8
SHAFT HAND CONTROLLER OUTPUT HI D8
RESOLVED MODE RELAY COMMAND P6
583
596
597
627
630
633
648
647
384A
384B
OPTICS SIGNALS (PSA) MONITORING
OPTICS SIGNALS (SIGNAL CONDITIONER) MONITORING
STAR PRESENCE HI
STAR PRESENCE LO
STRUCTURE GROUND
56P01
95
80
PANEL BRIGHTNESS HI
PANEL BRIGHTNESS LO
D & C ELECTRONICS
ISS & OPTICS LO SWITCHING
SHIELD GROUND BUS
OJB
OPTICS SIGNAL MONITORING OF PSA FRONT PANEL TEST POINTS SEE NASA DRAWING 1901982
TPA
OPTICS SIGNAL MONITORING OF SIGNAL CONDITIONER INPUTS SEE NASA DRAWING 1902141-004
1419
1420
(SEE MONITORING PANEL MECH. DIAGRAM 2900207)
1423
1424
1425
OIA
ZERO OPTICS
NOT MARK
MARK
1348
2116
2115
2615
2616
1844
P10
44
19
43
MARK
NOT MARK
ZERO OPTICS
CE
SCT SHAFT DRIVE DISABLE
SXT TRUNION DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
STAR SIMULATOR SIGNAL LO
STAR SIMULATOR SIGNAL HI
627
630
633
648
647
800
801
802
800 STRUCTURE GROUND
801 STAR SIMULATOR SIGNAL HI
802 STAR SIMULATOR SIGNAL LO
SS

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

3H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Solane DATE 17 JUN 65
CHECKED 29 JUN 65
APPROVAL 30 JUN 65
APPROVAL 8-9-65
NASA APPROVAL
MIT APPROVAL 8-4-65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
OPTICS CONTROL (GSE MODE)
(BLOCK I SERIES 100, BLOCK II)

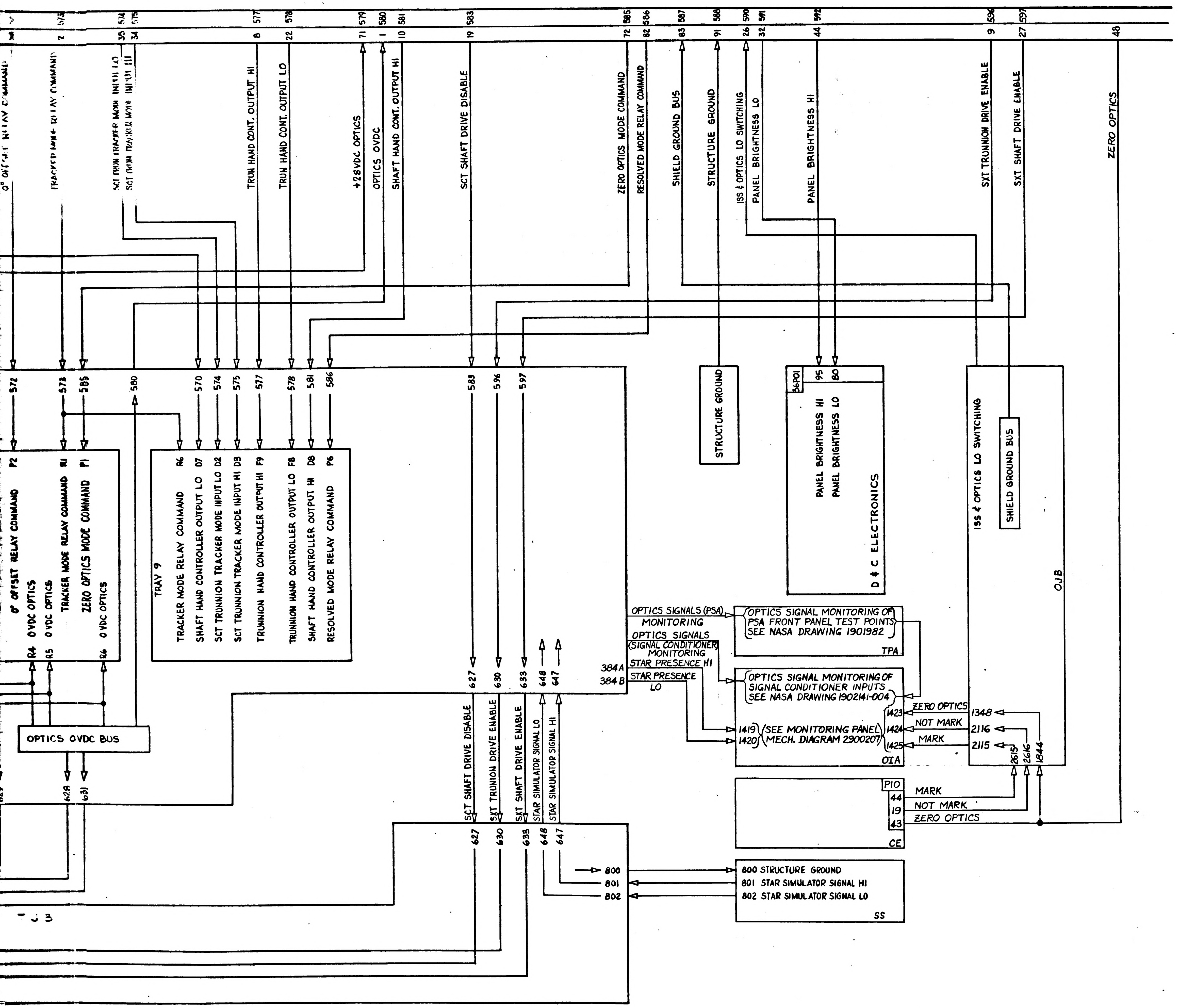
CODE IDENT NO. 99974
SIZE J2
2900216
SCALE —
SHEET 2 OF 3

2900216 REV B

2900216

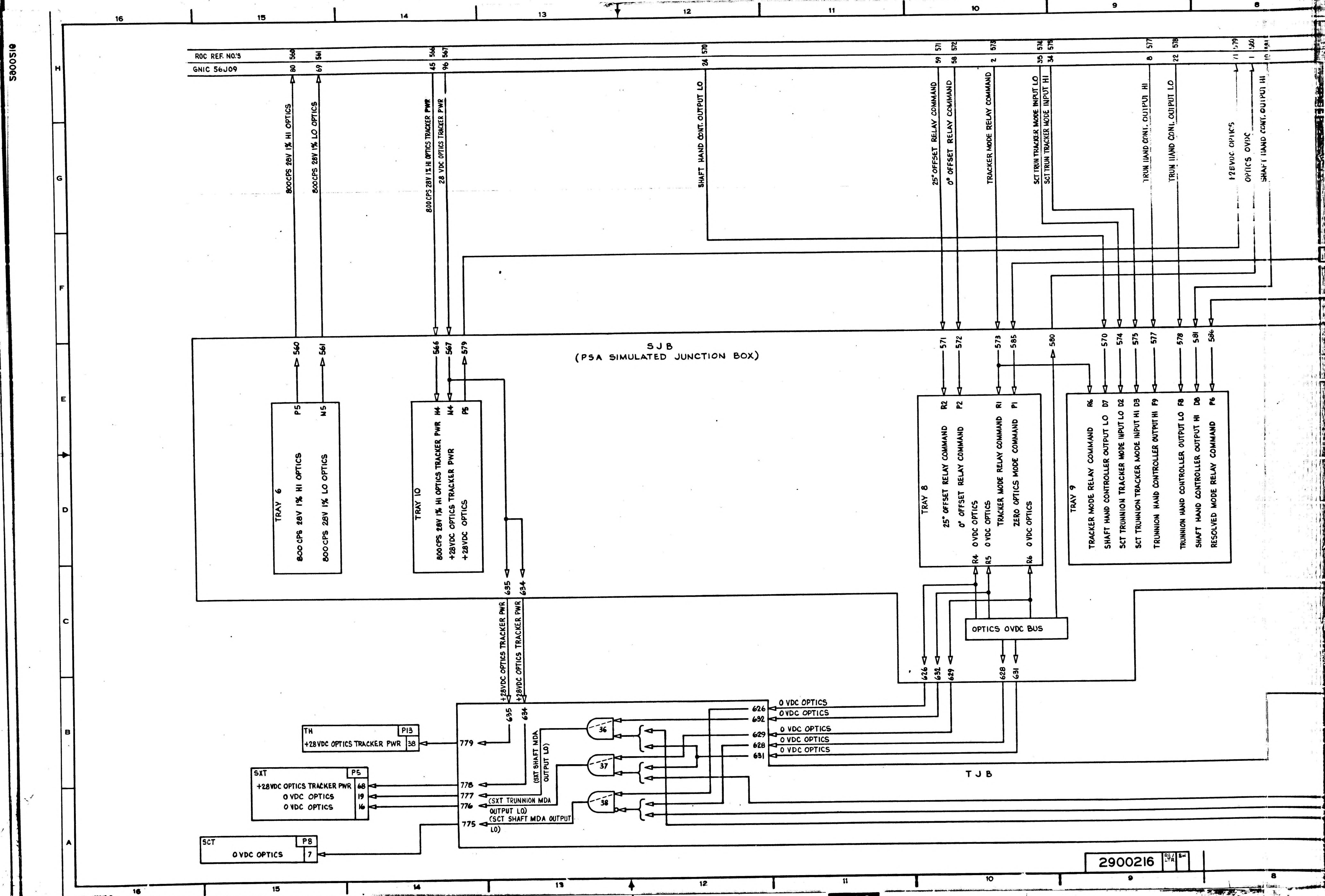
REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

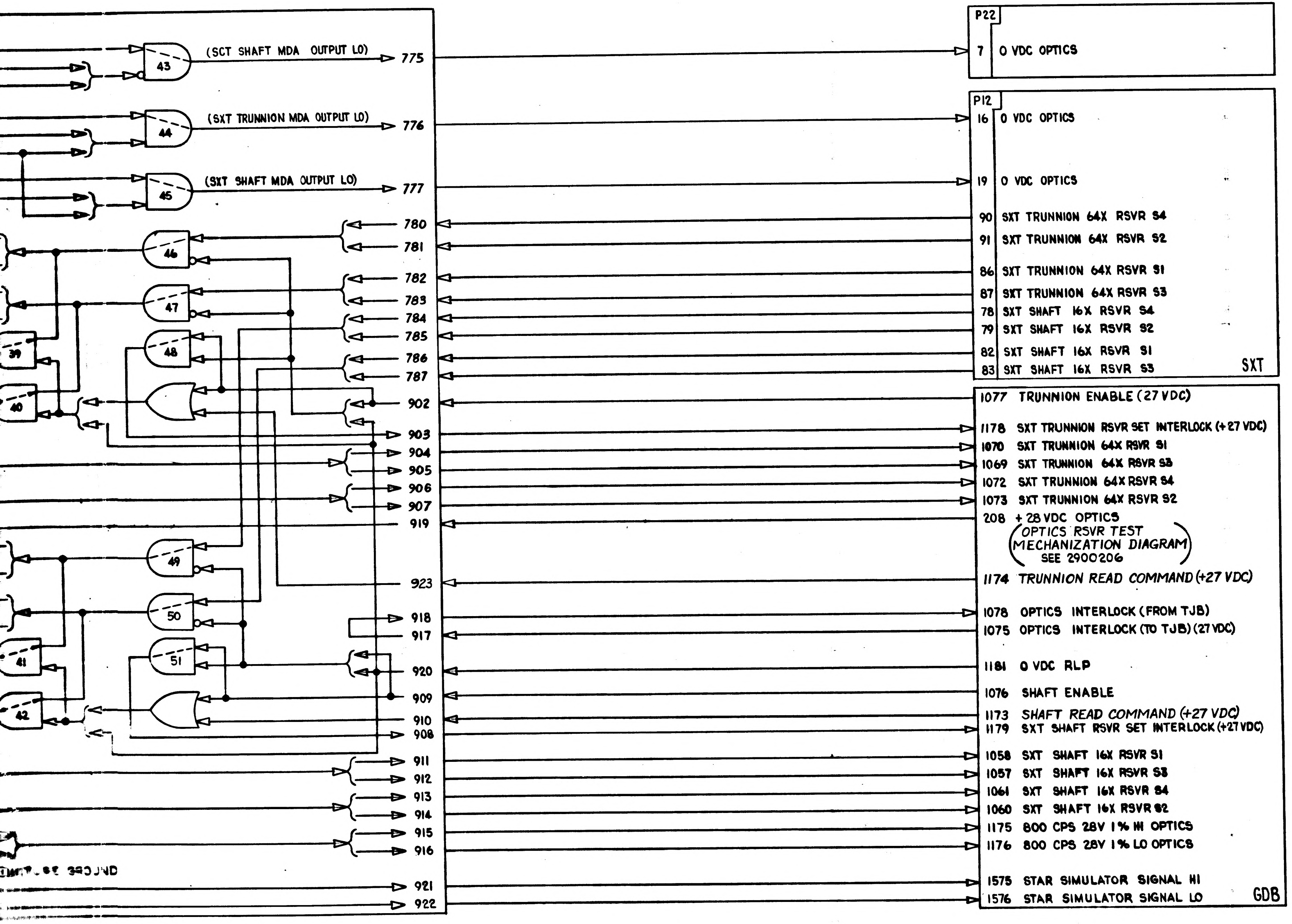

0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN TRACKER MODE INPUT LO
SCT TRUN TRACKER MODE INPUT HI
TRUN HAND CONT. OUTPUT HI
TRUN HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS OVDC
SHAFT HAND CONT. OUTPUT HI
SCT SHAFT DRIVE DISABLE
ZERO OPTICS MODE COMMAND
RESOLVED MODE RELAY COMMAND
SHIELD GROUND BUS
STRUCTURE GROUND
ISS & OPTICS LO SWITCHING
PANEL BRIGHTNESS LO
PANEL BRIGHTNESS HI
SXT TRUNNION DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
ZERO OPTICS
573
574
575
577
578
579
580
581
583
585
586
587
588
590
591
592
596
597
2
35
34
8
22
71
1
10
19
72
82
83
91
26
32
44
9
27
48
572
573
585
580
570
574
575
577
578
581
586
583
596
597
P2
R1
P1
0° OFFSET RELAY COMMAND
0 VDC OPTICS
0 VDC OPTICS
TRACKER MODE RELAY COMMAND
ZERO OPTICS MODE COMMAND
0 VDC OPTICS
R4
R5
R6
TRAY 9
R6
D7
D2
D3
F9
F8
D8
P6
TRACKER MODE RELAY COMMAND
SHAFT HAND CONTROLLER OUTPUT LO
SCT TRUNNION TRACKER MODE INPUT LO
SCT TRUNNION TRACKER MODE INPUT HI
TRUNNION HAND CONTROLLER OUTPUT HI
TRUNNION HAND CONTROLLER OUTPUT LO
SHAFT HAND CONTROLLER OUTPUT HI
RESOLVED MODE RELAY COMMAND
OPTICS OVDC BUS
628
631
STRUCTURE GROUND
56P01
95
80
PANEL BRIGHTNESS HI
PANEL BRIGHTNESS LO
D & C ELECTRONICS
ISS & OPTICS LO SWITCHING
SHIELD GROUND BUS
OJB
OPTICS SIGNALS (PSA)
MONITORING
OPTICS SIGNALS
(SIGNAL CONDITIONER)
MONITORING
STAR PRESENCE HI
STAR PRESENCE LO
384A
384B
627
630
633
648
647
OPTICS SIGNAL MONITORING OF PSA FRONT PANEL TEST POINTS SEE NASA DRAWING 1901982
TPA
OPTICS SIGNAL MONITORING OF SIGNAL CONDITIONER INPUTS SEE NASA DRAWING 1902141-004
1419
1420
(SEE MONITORING PANEL MECH. DIAGRAM 2900207)
1423
1424
1425
OIA
ZERO OPTICS
NOT MARK
MARK
1348
2116
2115
2615
2616
1844
P10
44
19
43
CE
MARK
NOT MARK
ZERO OPTICS
SCT SHAFT DRIVE DISABLE
SXT TRUNNION DRIVE ENABLE
SXT SHAFT DRIVE ENABLE
STAR SIMULATOR SIGNAL LO
STAR SIMULATOR SIGNAL HI
627
630
633
648
647
800
801
802
800 STRUCTURE GROUND
801 STAR SIMULATOR SIGNAL HI
802 STAR SIMULATOR SIGNAL LO
SS

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± — ± — ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN DRAWN Solano DATE 17 JUN 65 CHECKED APPROVAL APPROVAL	MECHANIZATION DIAGRAM OPTICS CONTROL (GSE ...) (BLOCK I SERIES 100, ...)
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 SIZE J2 2900216
CONTRACT NAS9-497	MIT APPROVAL	SCALE — SHEET

2900216 REV LTR SH

5800516
ROC REF. NO.'S
GNIC 56J09
800CPS 28V 1% HI OPTICS
800CPS 28V 1% LO OPTICS
800CPS 28V 1% HI OPTICS TRACKER PWR
28 VDC OPTICS TRACKER PWR
SHAFT HAND CONT. OUTPUT LO
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
TRACKER MODE RELAY COMMAND
SCT TRUN TRACKER MODE INPUT LO
SCT TRUN TRACKER MODE INPUT HI
TRUN HAND CONT. OUTPUT HI
TRUN HAND CONT. OUTPUT LO
+28VDC OPTICS
OPTICS OVDC
SHAFT HAND CONT. OUTPUT HI
S J B
(PSA SIMULATED JUNCTION BOX)
TRAY 6
800CPS 28V 1% HI OPTICS
800CPS 28V 1% LO OPTICS
P5
N5
TRAY 10
800CPS 28V 1% HI OPTICS TRACKER PWR
+28VDC OPTICS TRACKER PWR
+28VDC OPTICS
M4
N4
P5
TRAY 8
25° OFFSET RELAY COMMAND
0° OFFSET RELAY COMMAND
0 VDC OPTICS
0 VDC OPTICS
TRACKER MODE RELAY COMMAND
ZERO OPTICS MODE COMMAND
0 VDC OPTICS
R2
P2
R1
P1
R4
R5
R6
TRAY 9
TRACKER MODE RELAY COMMAND
SHAFT HAND CONTROLLER OUTPUT LO
SCT TRUNNION TRACKER MODE INPUT LO
SCT TRUNNION TRACKER MODE INPUT HI
TRUNNION HAND CONTROLLER OUTPUT HI
TRUNNION HAND CONTROLLER OUTPUT LO
SHAFT HAND CONTROLLER OUTPUT HI
RESOLVED MODE RELAY COMMAND
R6
D7
D2
D3
F9
F8
D8
P6
OPTICS OVDC BUS
+28VDC OPTICS TRACKER PWR
+28VDC OPTICS TRACKER PWR
T J B
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
0 VDC OPTICS
36
37
38
(SXT SHAFT MDA OUTPUT LO)
(SXT TRUNNION MDA OUTPUT LO)
(SCT SHAFT MDA OUTPUT LO)
TH
P13
+28VDC OPTICS TRACKER PWR
38
SXT
P5
+28VDC OPTICS TRACKER PWR
0 VDC OPTICS
0 VDC OPTICS
68
19
16
SCT
P8
0 VDC OPTICS
7
779
778
777
776
775
635
634
626
632
629
628
631
560
561
566
567
579
571
572
573
585
580
570
574
575
577
578
581
586
80
69
45
96
24
59
58
2
35
34
8
22
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
2900216

REVISIONS TDRR 2189					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD



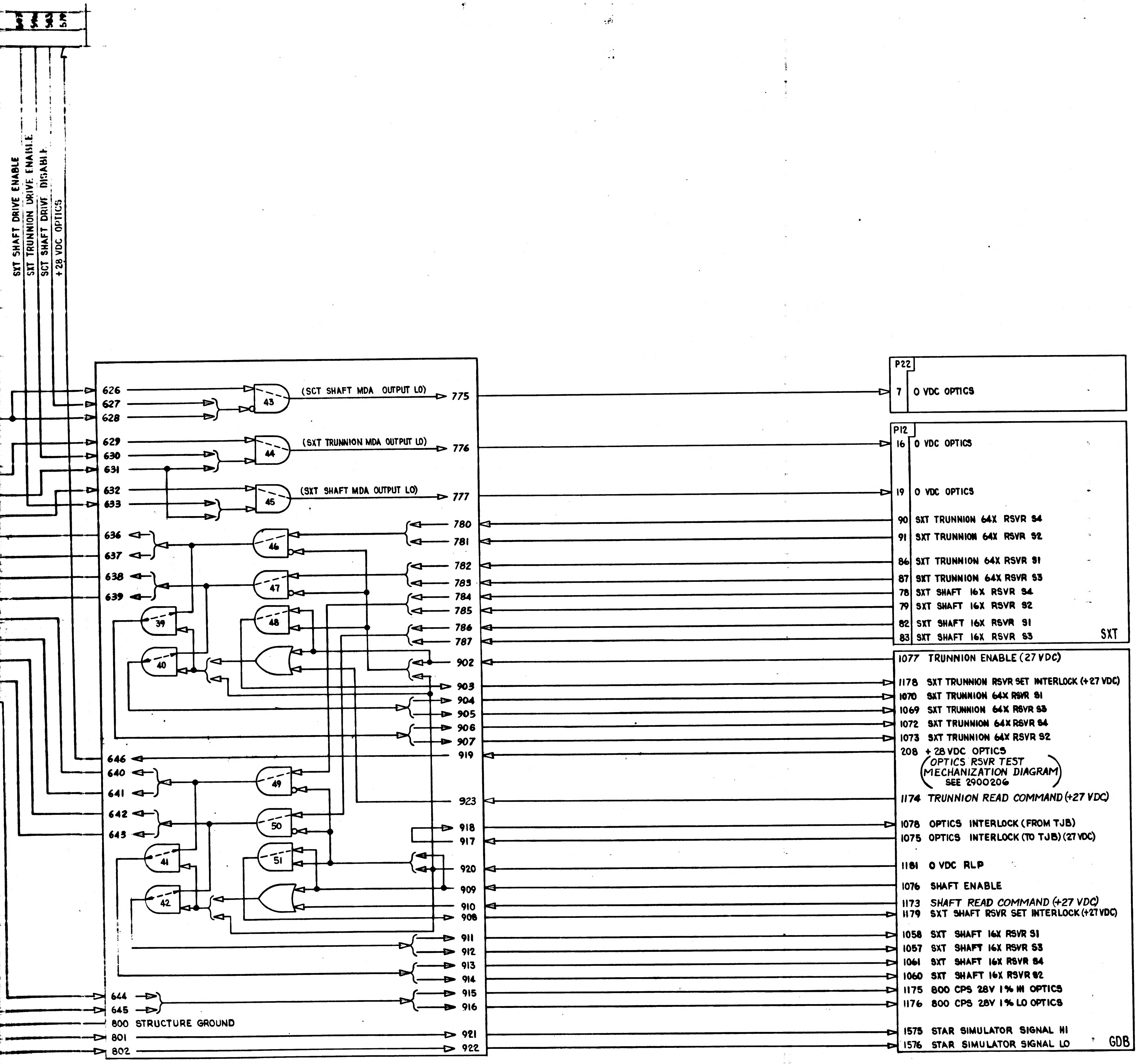
43
(SCT SHAFT MDA OUTPUT LO)
775
44
(SXT TRUNNION MDA OUTPUT LO)
776
45
(SXT SHAFT MDA OUTPUT LO)
777
46
47
48
39
40
49
50
51
41
42
780
781
782
783
784
785
786
787
902
903
904
905
906
907
919
923
918
917
920
909
910
908
911
912
913
914
915
916
921
922
[illegible] GROUND
P22
7 0 VDC OPTICS
P12
16 0 VDC OPTICS
19 0 VDC OPTICS
90 SXT TRUNNION 64X RSVR S4
91 SXT TRUNNION 64X RSVR S2
86 SXT TRUNNION 64X RSVR S1
87 SXT TRUNNION 64X RSVR S3
78 SXT SHAFT 16X RSVR S4
79 SXT SHAFT 16X RSVR S2
82 SXT SHAFT 16X RSVR S1
83 SXT SHAFT 16X RSVR S3
SXT
1077 TRUNNION ENABLE (27 VDC)
1178 SXT TRUNNION RSVR SET INTERLOCK (+27 VDC)
1070 SXT TRUNNION 64X RSVR S1
1069 SXT TRUNNION 64X RSVR S3
1072 SXT TRUNNION 64X RSVR S4
1073 SXT TRUNNION 64X RSVR S2
208 + 28 VDC OPTICS
(OPTICS RSVR TEST MECHANIZATION DIAGRAM SEE 2900206)
1174 TRUNNION READ COMMAND (+27 VDC)
1078 OPTICS INTERLOCK (FROM TJB)
1075 OPTICS INTERLOCK (TO TJB) (27 VDC)
1181 0 VDC RLP
1076 SHAFT ENABLE
1173 SHAFT READ COMMAND (+27 VDC)
1179 SXT SHAFT RSVR SET INTERLOCK (+27 VDC)
1058 SXT SHAFT 16X RSVR S1
1057 SXT SHAFT 16X RSVR S3
1061 SXT SHAFT 16X RSVR S4
1060 SXT SHAFT 16X RSVR S2
1175 800 CPS 28V 1% HI OPTICS
1176 800 CPS 28V 1% LO OPTICS
1575 STAR SIMULATOR SIGNAL HI
1576 STAR SIMULATOR SIGNAL LO
GDB

3H

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN J Kilmer DATE 17 JUN 65 CHECKED 29 JUN 65 APPROVAL 30 JUN 65 APPROVAL 2-19-65	MECHANIZATION DIAGRAM OPTICS CONTROL (GSE MODE) (BLOCK I SERIES 100, BLOCK II)
DO NOT SCALE THIS DRAWING		
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 2900216
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — · SHEET 3 OF 3

2900216 REV SH 3

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPD
		CHG NO		

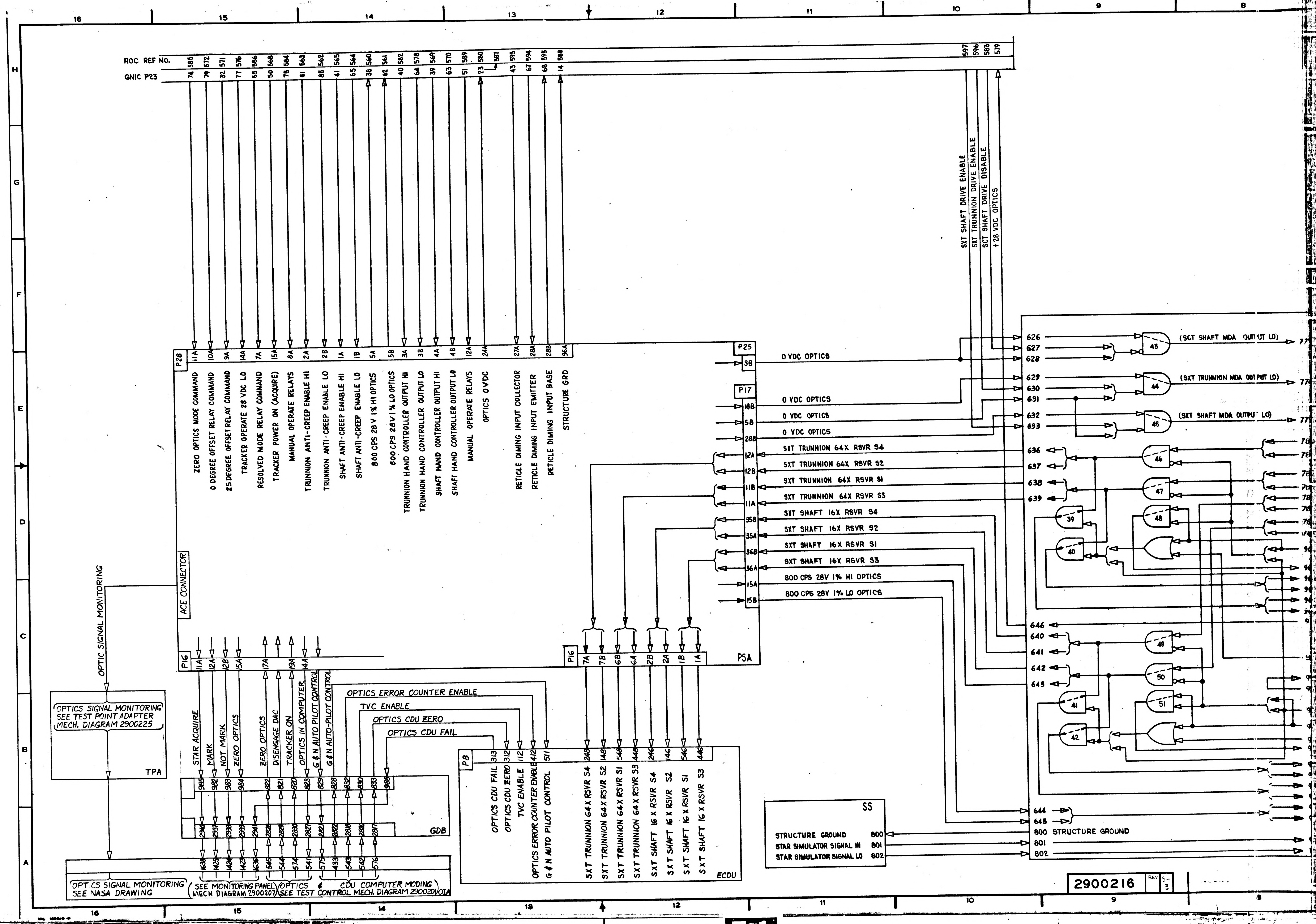


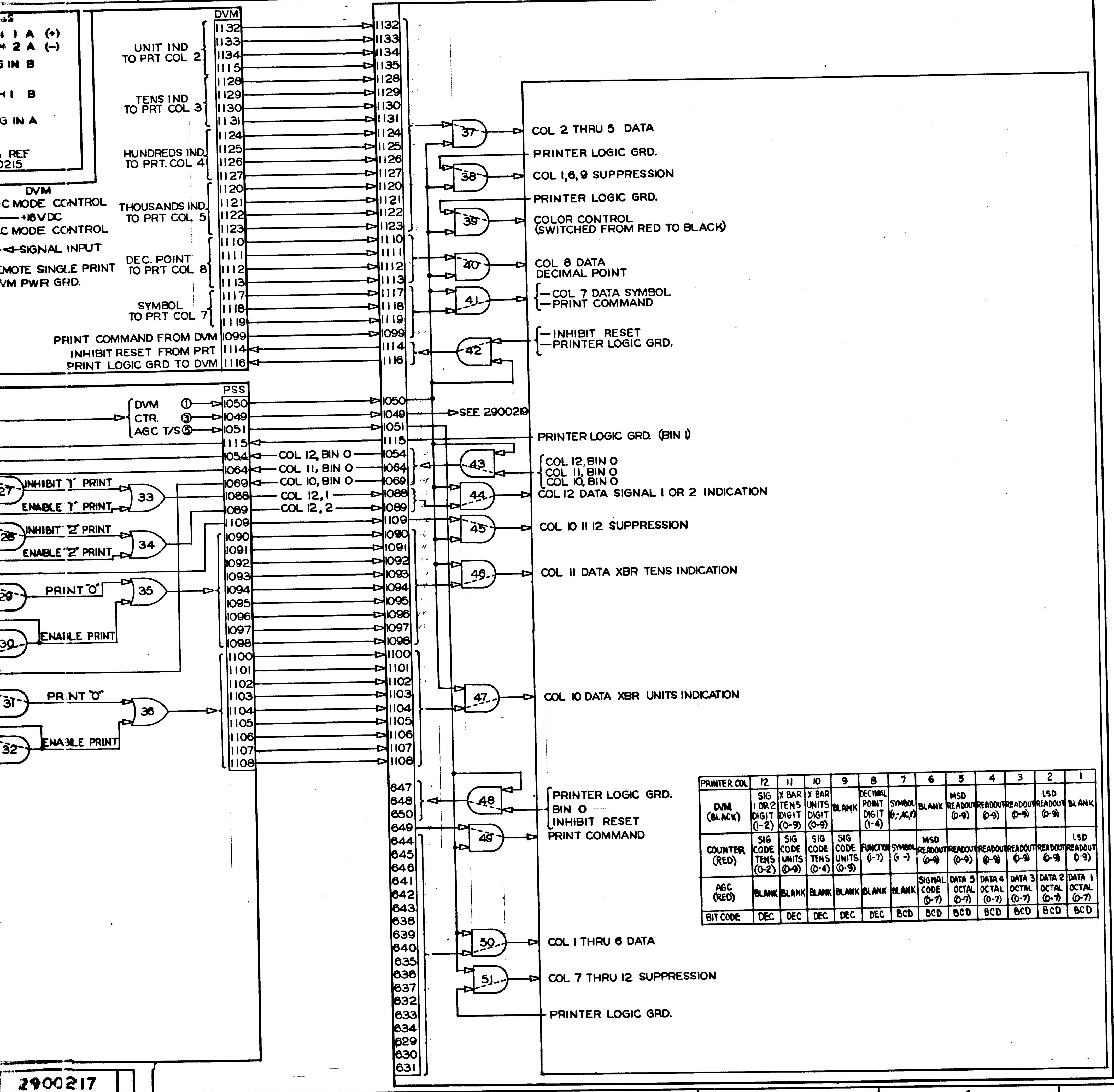
SXT SHAFT DRIVE ENABLE
SXT TRUNNION DRIVE ENABLE
SCT SHAFT DRIVE DISABLE
+28 VDC OPTICS
626
627
628
629
630
631
632
633
636
637
638
639
646
640
641
642
643
644
645
800 STRUCTURE GROUND
801
802
43
44
45
46
47
48
39
40
49
50
51
41
42
(SCT SHAFT MDA OUTPUT LO)
(SXT TRUNNION MDA OUTPUT LO)
(SXT SHAFT MDA OUTPUT LO)
775
776
777
780
781
782
783
784
785
786
787
902
903
904
905
906
907
919
923
918
917
920
909
910
908
911
912
913
914
915
916
921
922
P22
7 0 VDC OPTICS
P12
16 0 VDC OPTICS
19 0 VDC OPTICS
90 SXT TRUNNION 64X RSVR S4
91 SXT TRUNNION 64X RSVR S2
86 SXT TRUNNION 64X RSVR S1
87 SXT TRUNNION 64X RSVR S3
78 SXT SHAFT 16X RSVR S4
79 SXT SHAFT 16X RSVR S2
82 SXT SHAFT 16X RSVR S1
83 SXT SHAFT 16X RSVR S3
SXT
1077 TRUNNION ENABLE (27 VDC)
1178 SXT TRUNNION RSVR SET INTERLOCK (+27 VDC)
1070 SXT TRUNNION 64X RSVR S1
1069 SXT TRUNNION 64X RSVR S3
1072 SXT TRUNNION 64X RSVR S4
1073 SXT TRUNNION 64X RSVR S2
208 +28 VDC OPTICS
(OPTICS RSVR TEST MECHANIZATION DIAGRAM SEE 2900206)
1174 TRUNNION READ COMMAND (+27 VDC)
1078 OPTICS INTERLOCK (FROM TJB)
1075 OPTICS INTERLOCK (TO TJB) (27 VDC)
1181 0 VDC RLP
1076 SHAFT ENABLE
1173 SHAFT READ COMMAND (+27 VDC)
1179 SXT SHAFT RSVR SET INTERLOCK (+27 VDC)
1058 SXT SHAFT 16X RSVR S1
1057 SXT SHAFT 16X RSVR S3
1061 SXT SHAFT 16X RSVR S4
1060 SXT SHAFT 16X RSVR S2
1175 800 CPS 28V 1% HI OPTICS
1176 800 CPS 28V 1% LO OPTICS
1575 STAR SIMULATOR SIGNAL HI
1576 STAR SIMULATOR SIGNAL LO
GDB

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
DO NOT SCALE THIS DRAWING	DRAWN J Kilvmer DATE 17 JUN 68 CHECKED APPROVAL APPROVAL	MECHANIZATION DIAGRAM OPTICS CONTROL (GSE MOD II) (BLOCK I SERIES 100, BLOCK II)
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 2900216
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — · SHEET 3 OF 3

2900216 REV SH 3

F2


ROC REF NO.
GNIC P23
P28
ZERO OPTICS MODE COMMAND
0 DEGREE OFFSET RELAY COMMAND
25 DEGREE OFFSET RELAY COMMAND
TRACKER OPERATE 28 VDC LO
RESOLVED MODE RELAY COMMAND
TRACKER POWER ON (ACQUIRE)
MANUAL OPERATE RELAYS
TRUNNION ANTI-CREEP ENABLE HI
TRUNNION ANTI-CREEP ENABLE LO
SHAFT ANTI-CREEP ENABLE HI
SHAFT ANTI-CREEP ENABLE LO
800 CPS 28 V 1% HI OPTICS
800 CPS 28 V 1% LO OPTICS
TRUNNION HAND CONTROLLER OUTPUT HI
TRUNNION HAND CONTROLLER OUTPUT LO
SHAFT HAND CONTROLLER OUTPUT HI
SHAFT HAND CONTROLLER OUTPUT LO
MANUAL OPERATE RELAYS
OPTICS 0 VDC
RETICLE DIMING INPUT COLLECTOR
RETICLE DIMING INPUT EMITTER
RETICLE DIMING INPUT BASE
STRUCTURE GRD
ACE CONNECTOR
SXT SHAFT DRIVE ENABLE
SXT TRUNNION DRIVE ENABLE
SCT SHAFT DRIVE DISABLE
+28 VDC OPTICS
P25
P17
0 VDC OPTICS
SXT TRUNNION 64X RSVR S4
SXT TRUNNION 64X RSVR S2
SXT TRUNNION 64X RSVR S1
SXT TRUNNION 64X RSVR S3
SXT SHAFT 16X RSVR S4
SXT SHAFT 16X RSVR S2
SXT SHAFT 16X RSVR S1
SXT SHAFT 16X RSVR S3
800 CPS 28V 1% HI OPTICS
800 CPS 28V 1% LO OPTICS
PSA
P16
(SCT SHAFT MDA OUTPUT LO)
(SXT TRUNNION MDA OUTPUT LO)
(SXT SHAFT MDA OUTPUT LO)
OPTIC SIGNAL MONITORING
OPTICS SIGNAL MONITORING SEE TEST POINT ADAPTER MECH. DIAGRAM 2900225
TPA
STAR ACQUIRE
MARK
NOT MARK
ZERO OPTICS
ZERO OPTICS
DISENGAGE DAC
TRACKER ON
OPTICS IN COMPUTER
G & N AUTO PILOT CONTROL
G & N AUTO-PILOT CONTROL
OPTICS ERROR COUNTER ENABLE
TVC ENABLE
OPTICS CDU ZERO
OPTICS CDU FAIL
GDB
P8
OPTICS CDU FAIL
OPTICS CDU ZERO
TVC ENABLE
OPTICS ERROR COUNTER ENABLE
G & N AUTO PILOT CONTROL
SXT TRUNNION 64 X RSVR S4
SXT TRUNNION 64 X RSVR S2
SXT TRUNNION 64 X RSVR S1
SXT TRUNNION 64 X RSVR S3
SXT SHAFT 16 X RSVR S4
SXT SHAFT 16 X RSVR S2
SXT SHAFT 16 X RSVR S1
SXT SHAFT 16 X RSVR S3
ECDU
SS
STRUCTURE GROUND 800
STAR SIMULATOR SIGNAL HI 801
STAR SIMULATOR SIGNAL LO 802
800 STRUCTURE GROUND
OPTICS SIGNAL MONITORING SEE NASA DRAWING
SEE MONITORING PANEL MECH DIAGRAM 2900207
OPTICS & CDU COMPUTER MODING SEE TEST CONTROL MECH. DIAGRAM 2900201/OIA
2900216
REV


1 A (+)
2 A (−)
G IN B
I B
G IN A
REF
0215
DVM
C MODE CONTROL
+16VDC
C MODE CONTROL
SIGNAL INPUT
EMOTE SINGLE PRINT
VM PWR GRD.
UNIT IND TO PRT COL 2
TENS IND TO PRT COL 3
HUNDREDS IND TO PRT. COL 4
THOUSANDS IND TO PRT COL 5
DEC. POINT TO PRT COL 8
SYMBOL TO PRT COL 7
PRINT COMMAND FROM DVM
INHIBIT RESET FROM PRT
PRINT LOGIC GRD TO DVM
DVM
1132
1133
1134
1115
1128
1129
1130
1131
1124
1125
1126
1127
1120
1121
1122
1123
1110
1111
1112
1113
1117
1118
1119
1099
1114
1116
PSS
DVM ①
CTR. ③
AGC T/S ⑤
1050
1049
1051
1115
1054
1064
1069
1088
1089
1109
1090
1091
1092
1093
1094
1095
1096
1097
1098
1100
1101
1102
1103
1104
1105
1106
1107
1108
COL 12, BIN O
COL 11, BIN O
COL 10, BIN O
COL 12, 1
COL 12, 2
27
INHIBIT "1" PRINT
ENABLE "1" PRINT
33
28
INHIBIT "2" PRINT
ENABLE "2" PRINT
34
29
PRINT "0"
35
30
ENABLE PRINT
31
PRINT "0"
36
32
ENABLE PRINT
647
648
650
649
644
645
646
641
642
643
638
639
640
635
636
637
632
633
634
629
630
631
37
COL 2 THRU 5 DATA
PRINTER LOGIC GRD.
38
COL 1,6,9 SUPPRESSION
PRINTER LOGIC GRD.
39
COLOR CONTROL (SWITCHED FROM RED TO BLACK)
40
COL 8 DATA DECIMAL POINT
41
COL 7 DATA SYMBOL
PRINT COMMAND
42
INHIBIT RESET
PRINTER LOGIC GRD.
SEE 2900219
PRINTER LOGIC GRD. (BIN 1)
43
COL. 12, BIN O
COL. 11, BIN O
COL. 10, BIN O
44
COL 12 DATA SIGNAL 1 OR 2 INDICATION
45
COL 10 11 12 SUPPRESSION
46
COL 11 DATA XBR TENS INDICATION
47
COL 10 DATA XBR UNITS INDICATION
48
PRINTER LOGIC GRD.
BIN O
INHIBIT RESET
49
PRINT COMMAND
50
COL 1 THRU 6 DATA
51
COL 7 THRU 12 SUPPRESSION
PRINTER LOGIC GRD.

PRINTER COL	12	11	10	9	8	7	6	5	4	3	2	1
DVM (BLACK)	SIG 1 OR 2 DIGIT (1-2)	X BAR TENS DIGIT (0-9)	X BAR UNITS DIGIT (0-9)	BLANK	DECIMAL POINT DIGIT (1-4)	SYMBOL (+,-,AC,F)	BLANK	MSD READOUT (0-9)	READOUT (0-9)	READOUT (0-9)	LSD READOUT (0-9)	BLANK
COUNTER (RED)	SIG CODE TENS (0-2)	SIG CODE UNITS (0-9)	SIG CODE TENS (0-4)	SIG CODE UNITS (0-9)	FUNCTION (1-7)	SYMBOL (+ -)	MSD READOUT (0-9)	READOUT (0-9)	READOUT (0-9)	READOUT (0-9)	READOUT (0-9)	LSD READOUT (0-9)
AGC (RED)	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	SIGNAL CODE (0-7)	DATA 5 OCTAL (0-7)	DATA 4 OCTAL (0-7)	DATA 3 OCTAL (0-7)	DATA 2 OCTAL (0-7)	DATA 1 OCTAL (0-7)
BIT CODE	DEC	DEC	DEC	DEC	DEC	BCD	BCD	BCD	BCD	BCD	BCD	BCD

REVISIONS 19234

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

BLOCK 11/LEM

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Parks DATE 10MAY65
CHECKED Ed Foster 12 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL G.C. Metzger
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

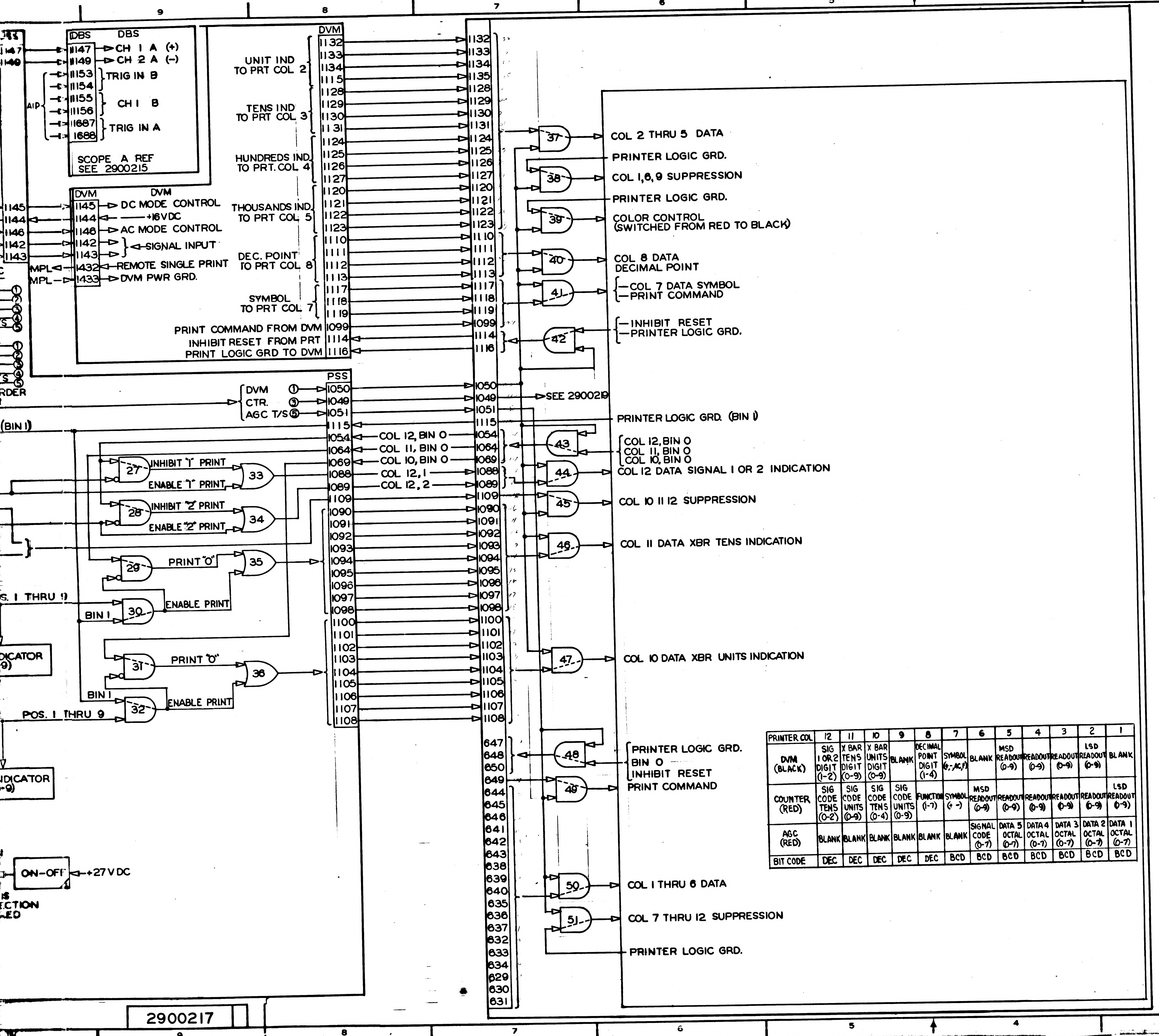
MECHANIZATION DIAGRAM
SIGNAL SELECTION
AND MEASUREMENT

CODE IDENT NO. 99974 SIZE J 2900217
SCALE — SHEET 1 OF 1

2900217

2H

F-3


DBS
1147 CH 1 A (+)
1149 CH 2 A (-)
1153 1154 TRIG IN B
1155 1156 CH 1 B
1687 1688 TRIG IN A
AIP
SCOPE A REF SEE 2900215
DVM
1145 DC MODE CONTROL
1144 +16VDC
1146 AC MODE CONTROL
1142 1143 SIGNAL INPUT
MPL 1432 REMOTE SINGLE PRINT
MPL 1433 DVM PWR GRD.
UNIT IND TO PRT COL 2
TENS IND TO PRT COL 3
HUNDREDS IND TO PRT. COL 4
THOUSANDS IND TO PRT COL 5
DEC. POINT TO PRT COL 8
SYMBOL TO PRT COL 7
PRINT COMMAND FROM DVM 1099
INHIBIT RESET FROM PRT 1114
PRINT LOGIC GRD TO DVM 1116
PSS
DVM ① 1050
CTR. ③ 1049
AGC T/S ⑤ 1051
(BIN 1) 1115
COL 12, BIN 0 1054
COL 11, BIN 0 1064
COL 10, BIN 0 1069
COL 12, 1 1088
COL 12, 2 1089
27 INHIBIT "1" PRINT
ENABLE "1" PRINT 33
28 INHIBIT "2" PRINT
ENABLE "2" PRINT 34
29 PRINT "0" 35
30 ENABLE PRINT
BIN 1
POS. 1 THRU 9
31 PRINT "0" 36
32 ENABLE PRINT
BIN 1
POS. 1 THRU 9
INDICATOR
ON-OFF +27 VDC
SELECTION
37 COL 2 THRU 5 DATA
PRINTER LOGIC GRD.
38 COL 1,6,9 SUPPRESSION
PRINTER LOGIC GRD.
39 COLOR CONTROL (SWITCHED FROM RED TO BLACK)
40 COL 8 DATA DECIMAL POINT
41 COL 7 DATA SYMBOL
PRINT COMMAND
42 INHIBIT RESET
PRINTER LOGIC GRD.
SEE 2900219
PRINTER LOGIC GRD. (BIN 1)
43 COL 12, BIN 0
COL 11, BIN 0
COL 10, BIN 0
44 COL 12 DATA SIGNAL 1 OR 2 INDICATION
45 COL 10 11 12 SUPPRESSION
46 COL 11 DATA XBR TENS INDICATION
47 COL 10 DATA XBR UNITS INDICATION
48 PRINTER LOGIC GRD.
BIN 0
INHIBIT RESET
49 PRINT COMMAND
50 COL 1 THRU 6 DATA
51 COL 7 THRU 12 SUPPRESSION
PRINTER LOGIC GRD.

PRINTER COL	12	11	10	9	8	7	6	5	4	3	2	1
DVM (BLACK)	SIG 1 OR 2 DIGIT (1-2)	X BAR TENS DIGIT (0-9)	X BAR UNITS DIGIT (0-9)	BLANK	DECIMAL POINT DIGIT (1-4)	SYMBOL (+,-,AC,F)	BLANK	MSD READOUT (0-9)	READOUT (0-9)	READOUT (0-9)	LSD READOUT (0-9)	BLANK
COUNTER (RED)	SIG CODE TENS (0-2)	SIG CODE UNITS (0-9)	SIG CODE TENS (0-4)	SIG CODE UNITS (0-9)	FUNCTION (1-7)	SYMBOL (+ -)	MSD READOUT (0-9)	READOUT (0-9)	READOUT (0-9)	READOUT (0-9)	READOUT (0-9)	LSD READOUT (0-9)
AGC (RED)	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	SIGNAL CODE (0-7)	DATA 5 OCTAL (0-7)	DATA 4 OCTAL (0-7)	DATA 3 OCTAL (0-7)	DATA 2 OCTAL (0-7)	DATA 1 OCTAL (0-7)
BIT CODE	DEC	DEC	DEC	DEC	DEC	BCD	BCD	BCD	BCD	BCD	BCD	BCD

BLOCK I /LEM

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Parker DATE 10 MAY 65
CHECKED Ed Foster 12 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
SIGNAL SELECTION
AND MEASUREMENT

CODE IDENT NO. 99974
SIZE J
2900217
SCALE —
SHEET OF

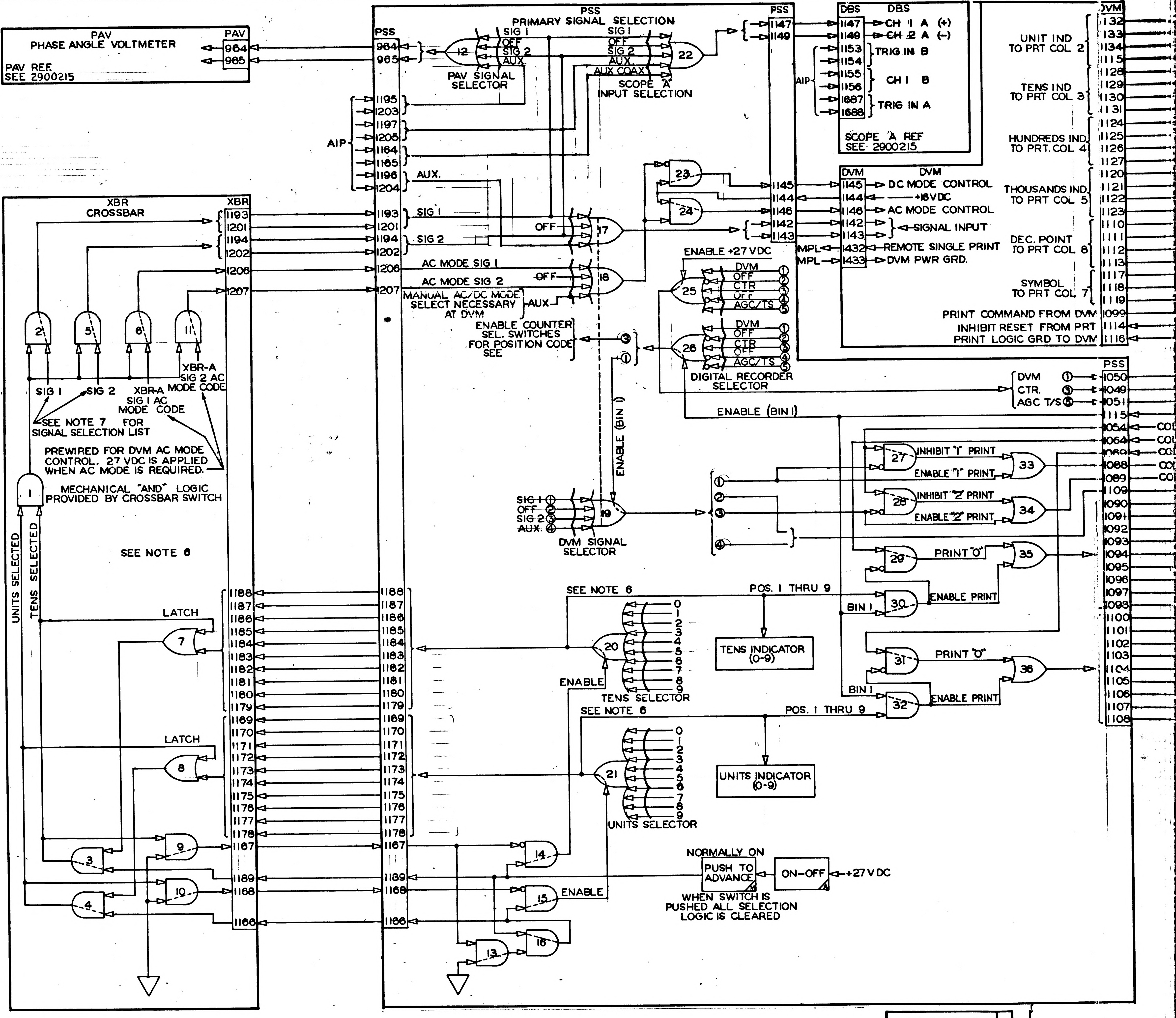
2900217

NOTES:-

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS:

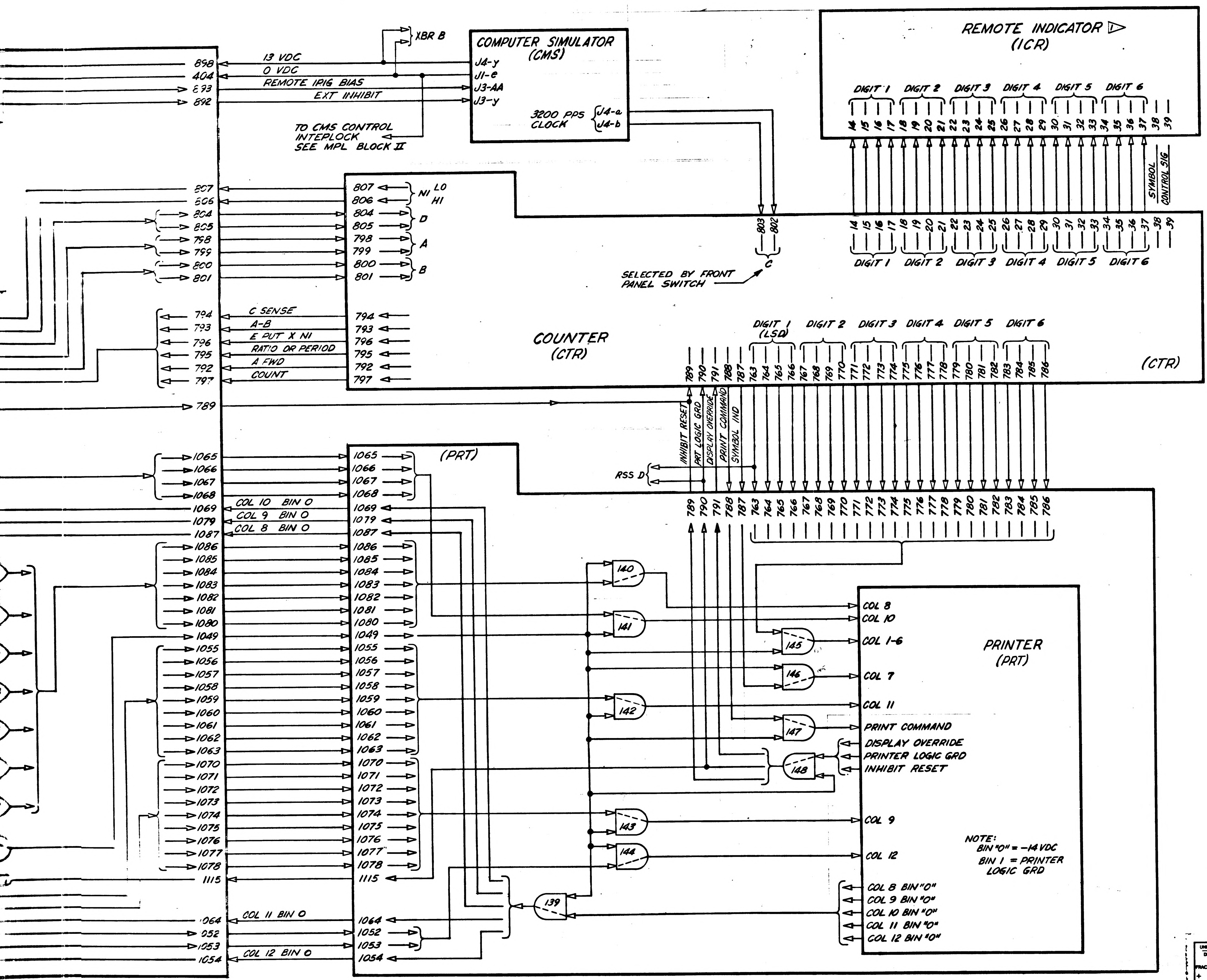
2900211	AUXILIARY INPUT-OUTPUT AND CALIBRATION.
2900215	MEASUREMENT REFERENCE POWER SUPPLIES.
2900207	MONITOR PANEL.
2900219	COUNTER SIGNAL SELECTION.
2900214	GSE GROUNDING (BLOCK I SERIES 100).
2900213	GSE GROUNDING (LEM, BLOCK II).

4. ABBREVIATIONS:
   - DVM - DIGITAL VOLTMETER
   - DBS - DUAL BEAM SCOPE
   - MPL - MONITOR PANEL
   - AIP - AUXILIARY INPUT PANEL
   - OIA - OPTICS INERTIAL ANALYZER
   - RLP - RELAY AND LAMP POWER SUPPLY
   - XBR-A - AC SIGNALS TO CROSSBAR
   - XBR-B - DC SIGNALS TO CROSSBAR
5. NON-STANDARD SYMBOLOGY
   - INDICATES "AND" GATE WITH SWITCHED SIGNAL
   - NAME — INDICATES LIGHTED PUSH BUTTON (MOMENTARY ACTION)
   - NAME — INDICATES LIGHTED PUSH BUTTON (ALTERNATE ACTION)
   - ① ② ENABLE — INDICATES EXCLUSIVE "OR" GATE WITH ENABLE SWITCHED THROUGH (①) OR NOT SWITCHED THROUGH (②).
   - INDICATES 27 V DC RLP LO.
   - (NO) INDICATES SWITCH POSITION.
6. LOGIC SHOWN IS FOR A TYPICAL SWITCH POSITION BUT INTERFACE IS SHOWN FOR ALL. THERE ARE 10 INDEPENDENT LOGIC CIRCUITS.
7. SIGNAL SELECTION LISTS:
   - BLOCK I SERIES 100.
   - LEM
   - BLOCK II



PAV
PHASE ANGLE VOLTMETER
PAV REF. SEE 2900215
964
965
PSS
PRIMARY SIGNAL SELECTION
SIG 1
OFF
SIG 2
AUX.
AUX COAX
PAV SIGNAL SELECTOR
SCOPE "A" INPUT SELECTION
DBS
CH 1 A (+)
CH 2 A (-)
TRIG IN B
CH 1 B
TRIG IN A
SCOPE "A" REF SEE 2900215
AIP
1147
1149
1153
1154
1155
1156
1687
1688
1195
1203
1197
1205
1164
1165
1196
1204
AUX.
XBR
CROSSBAR
1193
1201
1194
1202
1206
1207
SIG 1
SIG 2
AC MODE SIG 1
AC MODE SIG 2
MANUAL AC/DC MODE SELECT NECESSARY AT DVM
ENABLE COUNTER SEL. SWITCHES FOR POSITION CODE SEE
DVM
DC MODE CONTROL
+18 VDC
AC MODE CONTROL
SIGNAL INPUT
REMOTE SINGLE PRINT
DVM PWR GRD.
MPL
1145
1144
1146
1142
1143
1432
1433
ENABLE +27 VDC
DVM
OFF
CTR
AGC/TS
DIGITAL RECORDER SELECTOR
UNIT IND TO PRT COL 2
TENS IND TO PRT COL 3
HUNDREDS IND TO PRT. COL 4
THOUSANDS IND TO PRT COL 5
DEC. POINT TO PRT COL 8
SYMBOL TO PRT COL 7
PRINT COMMAND FROM DVM
INHIBIT RESET FROM PRT
PRINT LOGIC GRD TO DVM
1132
1133
1134
1115
1128
1129
1130
1131
1124
1125
1126
1127
1120
1121
1122
1123
1110
1111
1112
1113
1117
1118
1119
1099
1114
1116
1050
1049
1051
1054
1064
1088
1089
1109
1090
1091
1092
1093
1094
1095
1096
1097
1098
1100
1101
1102
1103
1104
1105
1106
1107
1108
DVM ① CTR. ③ AGC T/S ⑤
ENABLE (BIN 1)
INHIBIT "1" PRINT
ENABLE "1" PRINT
INHIBIT "2" PRINT
ENABLE "2" PRINT
PRINT "0"
ENABLE PRINT
BIN 1
DVM SIGNAL SELECTOR
SIG 1 ①
OFF ②
SIG 2 ③
AUX. ④
XBR-A SIG 1 AC MODE CODE
XBR-A SIG 2 AC MODE CODE
SEE NOTE 7 FOR SIGNAL SELECTION LIST
PREWIRED FOR DVM AC MODE CONTROL. 27 VDC IS APPLIED WHEN AC MODE IS REQUIRED.
MECHANICAL "AND" LOGIC PROVIDED BY CROSSBAR SWITCH
SEE NOTE 6
UNITS SELECTED
TENS SELECTED
LATCH
1188
1187
1186
1185
1184
1183
1182
1181
1180
1179
1169
1170
1171
1172
1173
1174
1175
1176
1177
1178
1167
1189
1168
1166
SEE NOTE 6
POS. 1 THRU 9
TENS INDICATOR (0-9)
TENS SELECTOR
UNITS INDICATOR (0-9)
UNITS SELECTOR
ENABLE
0
1
2
3
4
5
6
7
8
9
NORMALLY ON
PUSH TO ADVANCE
ON-OFF
+27 V DC
WHEN SWITCH IS PUSHED ALL SELECTION LOGIC IS CLEARED
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36

2900217


COMPUTER SIMULATOR (CMS)
XBR B
J4-y
J1-e
J3-AA
J3-y
3200 PPS CLOCK
J4-a
J4-b
13 VDC
0 VDC
REMOTE IRIG BIAS
EXT INHIBIT
TO CMS CONTROL INTERLOCK SEE MPL BLOCK II
REMOTE INDICATOR
(ICR)
DIGIT 1
DIGIT 2
DIGIT 3
DIGIT 4
DIGIT 5
DIGIT 6
SYMBOL CONTROL SIG
COUNTER (CTR)
(CTR)
807
806
804
805
798
799
800
801
N1 LO
HI
D
A
B
803
802
C
SELECTED BY FRONT PANEL SWITCH
C SENSE
A-B
E PUT X N1
RATIO OR PERIOD
A FWD
COUNT
794
793
796
795
792
797
DIGIT 1 (LSD)
789
INHIBIT RESET
PRT LOGIC GRD
DISPLAY OVERRIDE
PRINT COMMAND
SYMBOL IND
RSS D
(PRT)
COL 10 BIN 0
COL 9 BIN 0
COL 8 BIN 0
COL 11 BIN 0
COL 12 BIN 0
140
141
142
143
144
145
146
147
148
139
PRINTER (PRT)
COL 8
COL 10
COL 1-6
COL 7
COL 11
PRINT COMMAND
DISPLAY OVERRIDE
PRINTER LOGIC GRD
INHIBIT RESET
COL 9
COL 12
COL 8 BIN "0"
COL 9 BIN "0"
COL 10 BIN "0"
COL 11 BIN "0"
COL 12 BIN "0"
NOTE: BIN "0" = -14 VDC BIN 1 = PRINTER LOGIC GRD

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

4H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

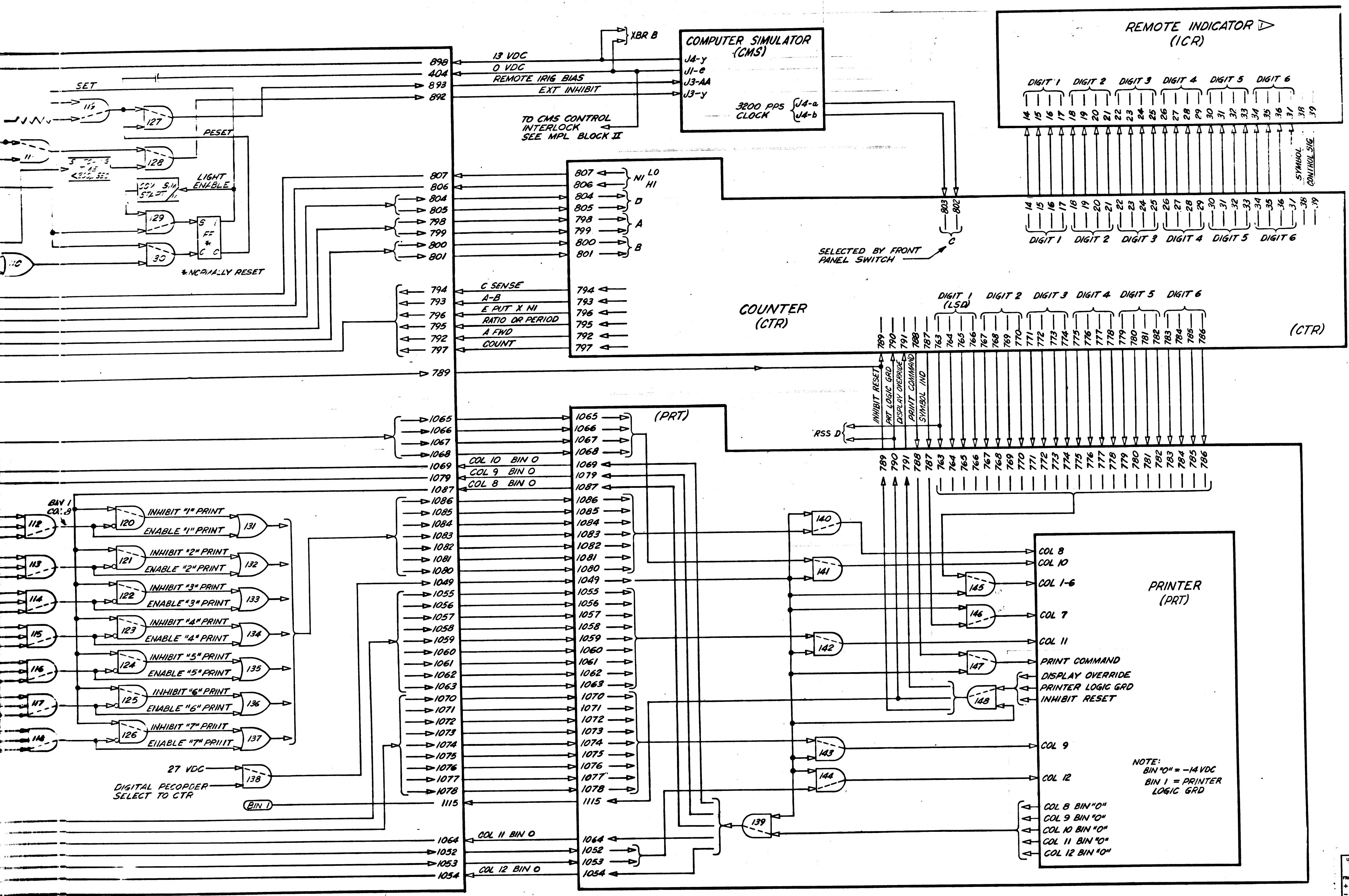
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN R. Peterbek DATE 17 MAY 65
CHECKED 18 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM - COUNTER SIGNAL SELECTION (BLOCK I SERIES 100, BLOCK II AND LEM)

CODE IDENT NO. 99974
SIZE J
2900219
SCALE NONE
SHEET 1 OF 1

F-4



COMPUTER SIMULATOR (CMS)
J4-y
J1-e
J3-AA
J3-y
3200 PPS CLOCK
J4-a
J4-b
XBR B
13 VDC
0 VDC
REMOTE IRIG BIAS
EXT INHIBIT
TO CMS CONTROL INTERLOCK SEE MPL BLOCK II
898
404
893
892
SET
RESET
LIGHT ENABLE
127
128
129
130
FF
*NORMALLY RESET
REMOTE INDICATOR (ICR)
DIGIT 1
DIGIT 2
DIGIT 3
DIGIT 4
DIGIT 5
DIGIT 6
14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
SYMBOL CONTROL SIG
COUNTER (CTR)
(CTR)
807 806 804 805 798 799 800 801
NI LO
HI
D
A
B
803
802
C
SELECTED BY FRONT PANEL SWITCH
C SENSE
A-B
E PUT X NI
RATIO OR PERIOD
A FWD
COUNT
794 793 796 795 792 797
789
DIGIT 1 (LSD)
789 790 791 788 787 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786
INHIBIT RESET
PRT LOGIC GRD
DISPLAY OVERRIDE
PRINT COMMAND
SYMBOL IND
RSS D
(PRT)
1065 1066 1067 1068 1069 1079 1087
COL 10 BIN 0
COL 9 BIN 0
COL 8 BIN 0
1086 1085 1084 1083 1082 1081 1080 1049
1055 1056 1057 1058 1059 1060 1061 1062 1063
1070 1071 1072 1073 1074 1075 1076 1077 1078
1115
1064 1052 1053 1054
COL 11 BIN 0
COL 12 BIN 0
BIN 1 COL 8
112 113 114 115 116 117 118
120 121 122 123 124 125 126
INHIBIT "1" PRINT
ENABLE "1" PRINT
INHIBIT "2" PRINT
ENABLE "2" PRINT
INHIBIT "3" PRINT
ENABLE "3" PRINT
INHIBIT "4" PRINT
ENABLE "4" PRINT
INHIBIT "5" PRINT
ENABLE "5" PRINT
INHIBIT "6" PRINT
ENABLE "6" PRINT
INHIBIT "7" PRINT
ENABLE "7" PRINT
131 132 133 134 135 136 137
27 VDC
DIGITAL RECORDER SELECT TO CTR
138
BIN 1
139 140 141 142 143 144 145 146 147 148
PRINTER (PRT)
COL 8
COL 10
COL 1-6
COL 7
COL 11
PRINT COMMAND
DISPLAY OVERRIDE
PRINTER LOGIC GRD
INHIBIT RESET
COL 9
COL 12
COL 8 BIN "0"
COL 9 BIN "0"
COL 10 BIN "0"
COL 11 BIN "0"
COL 12 BIN "0"
NOTE: BIN "0" = -14 VDC
BIN 1 = PRINTER LOGIC GRD

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+	+	+
−	−	−

DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT

AC SPARK PLUG DIVISION. GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN P. Tatick DATE 17 MAY 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

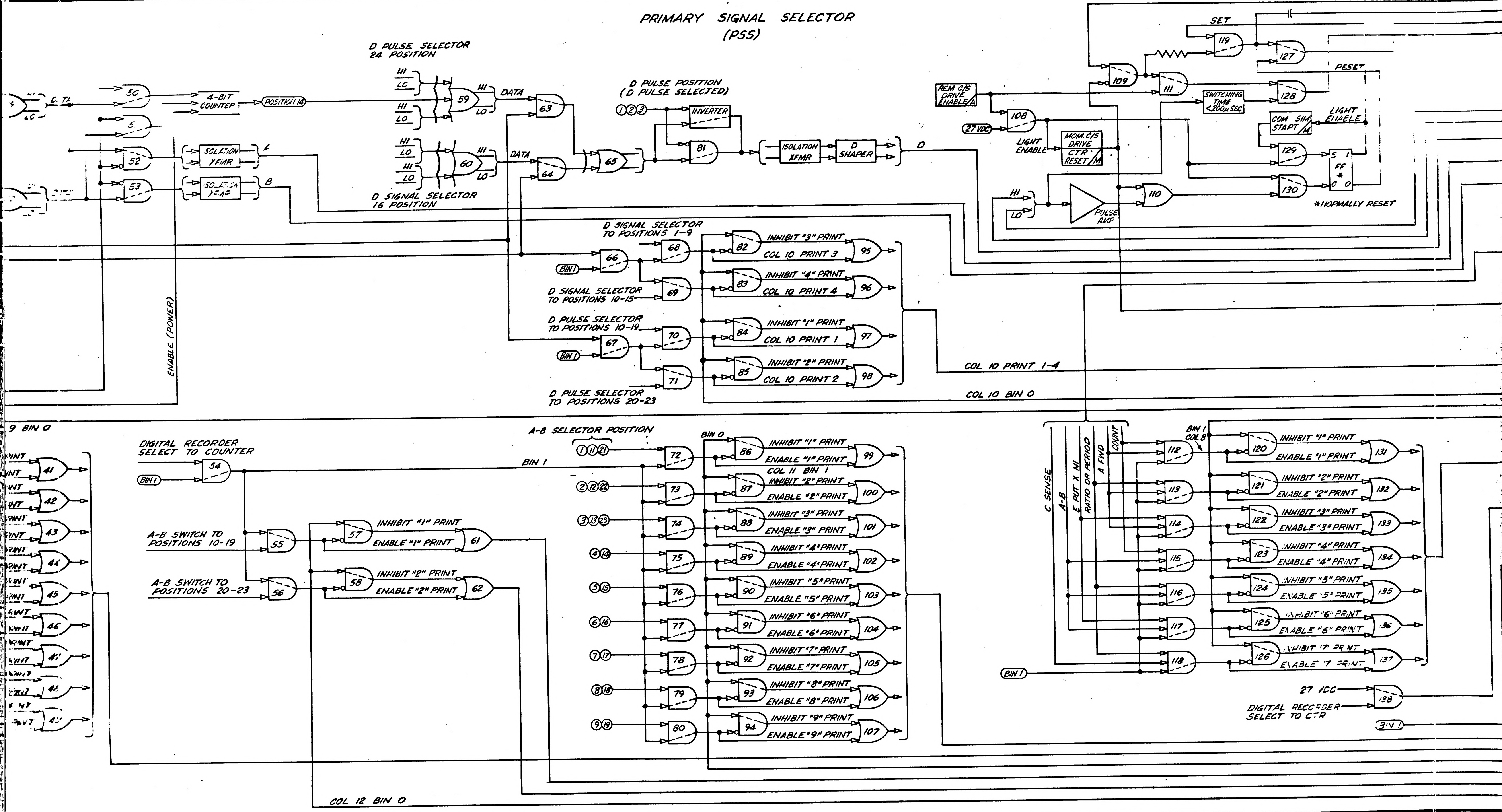
MECHAN
COUNTE
BLOCK I

CODE IDENT NO.
99974
SCALE NONE

2900219

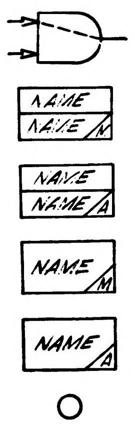
F-3

PRIMARY SIGNAL SELECTOR
(PSS)


D PULSE SELECTOR
24 POSITION
D SIGNAL SELECTOR
16 POSITION
4-BIT COUNTER
POSITION 14
ISOLATION XFMR
ENABLE (POWER)
HI
LO
DATA
A
B
D PULSE POSITION
(D PULSE SELECTED)
①②③
INVERTER
ISOLATION XFMR
D SHAPER
D
REM C/S DRIVE ENABLE/A
27 VDC
LIGHT ENABLE
MOM. C/S DRIVE CTR RESET/M
PULSE AMP
SET
RESET
SWITCHING TIME <200μ SEC
COM SIIA START/M
LIGHT ENABLE
FF
S
C
*NORMALLY RESET
D SIGNAL SELECTOR
TO POSITIONS 1-9
D SIGNAL SELECTOR
TO POSITIONS 10-15
D PULSE SELECTOR
TO POSITIONS 10-19
D PULSE SELECTOR
TO POSITIONS 20-23
BIN I
INHIBIT "3" PRINT
COL 10 PRINT 3
INHIBIT "4" PRINT
COL 10 PRINT 4
INHIBIT "1" PRINT
COL 10 PRINT 1
INHIBIT "2" PRINT
COL 10 PRINT 2
COL 10 PRINT 1-4
COL 10 BIN 0
9 BIN 0
DIGITAL RECORDER
SELECT TO COUNTER
A-B SWITCH TO
POSITIONS 10-19
A-B SWITCH TO
POSITIONS 20-23
INHIBIT "1" PRINT
ENABLE "1" PRINT
INHIBIT "2" PRINT
ENABLE "2" PRINT
COL 12 BIN 0
A-B SELECTOR POSITION
①⑪㉑
②⑫㉒
③⑬㉓
④⑭
⑤⑮
⑥⑯
⑦⑰
⑧⑱
⑨⑲
BIN 0
BIN 1
COL 11 BIN 1
INHIBIT "1" PRINT
ENABLE "1" PRINT
INHIBIT "2" PRINT
ENABLE "2" PRINT
INHIBIT "3" PRINT
ENABLE "3" PRINT
INHIBIT "4" PRINT
ENABLE "4" PRINT
INHIBIT "5" PRINT
ENABLE "5" PRINT
INHIBIT "6" PRINT
ENABLE "6" PRINT
INHIBIT "7" PRINT
ENABLE "7" PRINT
INHIBIT "8" PRINT
ENABLE "8" PRINT
INHIBIT "9" PRINT
ENABLE "9" PRINT
C SENSE
A-B
E PUT X NI
RATIO OR PERIOD
A FWD
COUNT
BIN I
COL 8
27 VDC
DIGITAL RECORDER
SELECT TO CTR
41 42 43 44 45 46 47 48 49
50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138
17 16 15 14 13 12 11 10 9
F-2

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS PER MIL-STD-806
3. REFERENCE MECHANIZATION DIAGRAMS:
   - GSE GROUNDING (BLOCK I SERIES 100)
   - GSE GROUNDING (BLOCK II & LEM)
   - AC POWER PROTECTION & POWER DISTR. (FTR)
   - 2900207 MONITOR PANEL (MPL)
   - 2900209 COMPUTER SIMULATOR INTERFACE (CMS)
4. NONSTANDARD SYMBOLS


NAME
NAME
M
NAME
NAME
A
NAME
M
NAME
A

INDICATES SWITCHED INPUT "AND" GATE

INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON SWITCH (MOMENTARY ACTION)

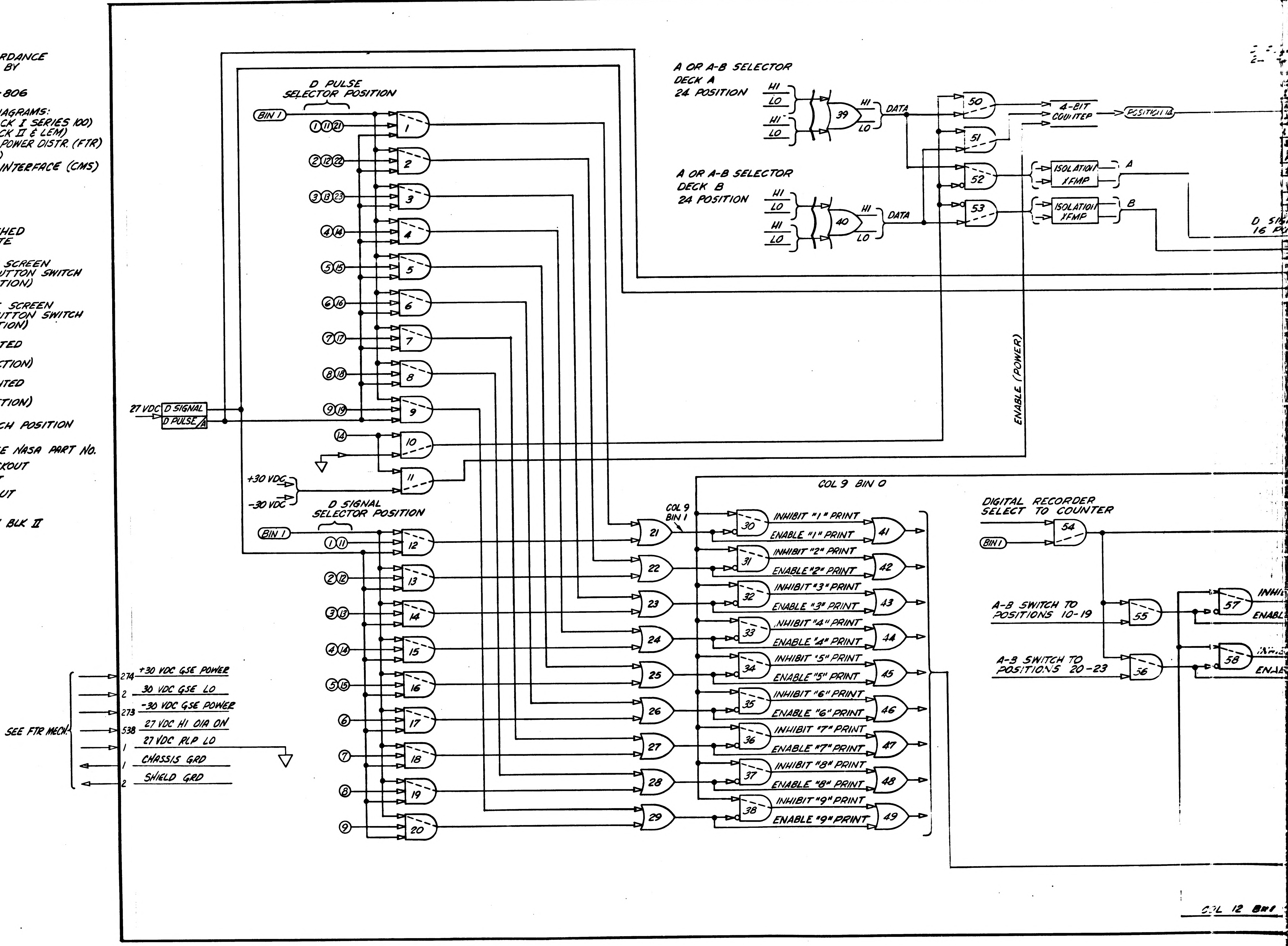
INDICATES SPLIT SCREEN LIGHTED PUSHBUTTON SWITCH (ALTERNATE ACTION)

INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

INDICATES LIGHTED PUSHBUTTON (ALTERNATE ACTION)

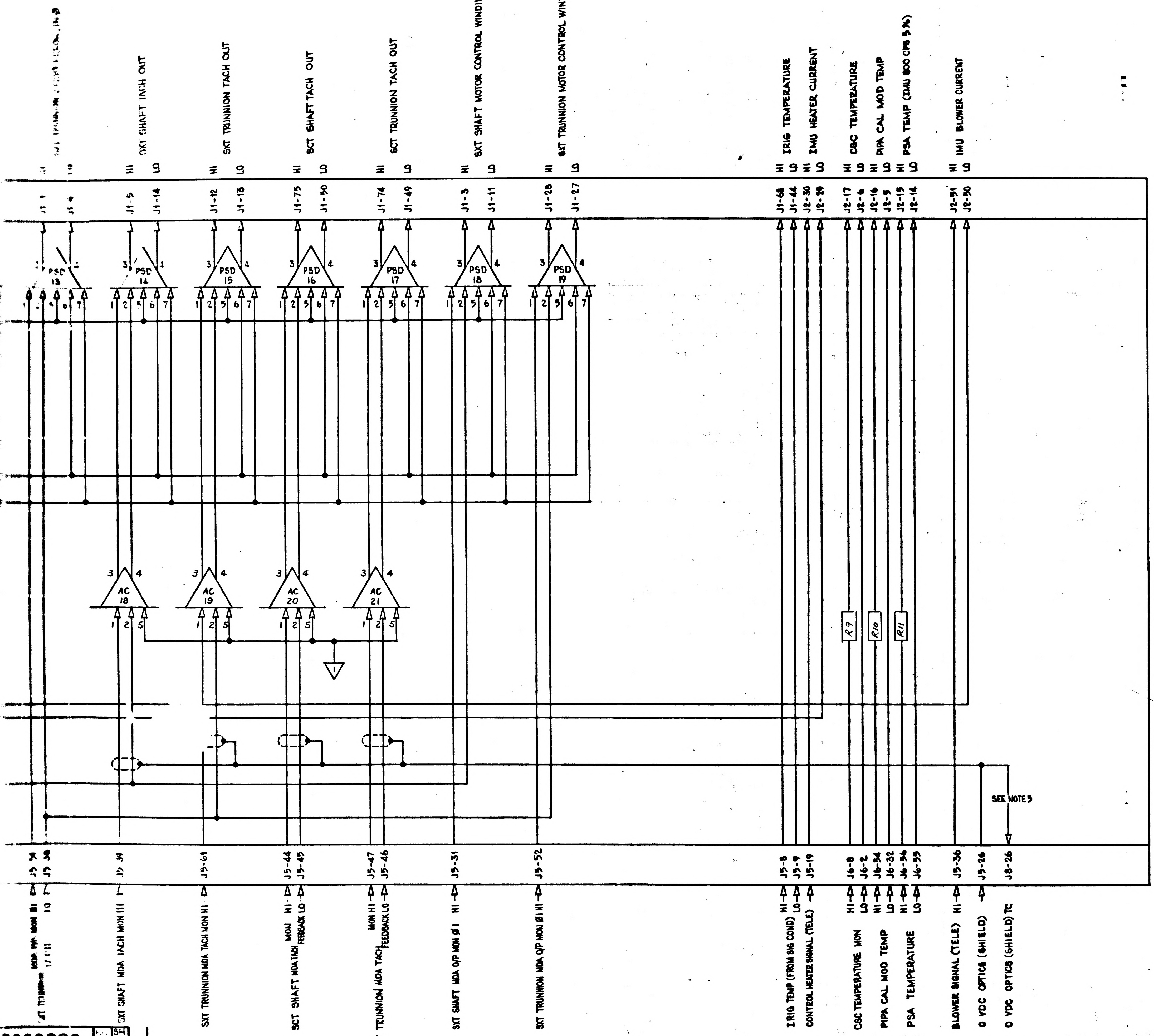
INDICATES SWITCH POSITION

5. FOR SIGNAL SELECTION LIST SEE NASA PART NO.
   - FOR SERIES 100 CHECKOUT
   - FOR LEM CHECKOUT
   - FOR BLK II CHECKOUT
6. ICR NOT INCLUDED IN NEW BLK II PRODUCTION UNITS.


D PULSE
SELECTOR POSITION
BIN 1
①⑪㉑
②⑫㉒
③⑬㉓
④⑭
⑤⑮
⑥⑯
⑦⑰
⑧⑱
⑨⑲
⑭
1
2
3
4
5
6
7
8
9
10
11
27 VDC
D SIGNAL
D PULSE
+30 VDC
-30 VDC
D SIGNAL
SELECTOR POSITION
BIN 1
①⑪
②⑫
③⑬
④⑭
⑤⑮
⑥
⑦
⑧
⑨
12
13
14
15
16
17
18
19
20
COL 9
BIN 1
21
22
23
24
25
26
27
28
29
COL 9 BIN 0
30
31
32
33
34
35
36
37
38
INHIBIT "1" PRINT
ENABLE "1" PRINT
INHIBIT "2" PRINT
ENABLE "2" PRINT
INHIBIT "3" PRINT
ENABLE "3" PRINT
INHIBIT "4" PRINT
ENABLE "4" PRINT
INHIBIT "5" PRINT
ENABLE "5" PRINT
INHIBIT "6" PRINT
ENABLE "6" PRINT
INHIBIT "7" PRINT
ENABLE "7" PRINT
INHIBIT "8" PRINT
ENABLE "8" PRINT
INHIBIT "9" PRINT
ENABLE "9" PRINT
41
42
43
44
45
46
47
48
49
A OR A-B SELECTOR
DECK A
24 POSITION
HI
LO
HI
LO
39
HI
LO
DATA
A OR A-B SELECTOR
DECK B
24 POSITION
HI
LO
HI
LO
40
HI
LO
DATA
50
51
52
53
4-BIT
COUNTER
POSITION 1A
ISOLATION
XFMR
A
ISOLATION
XFMR
B
D SI
16 P
ENABLE (POWER)
DIGITAL RECORDER
SELECT TO COUNTER
54
BIN 1
A-B SWITCH TO
POSITIONS 10-19
55
A-B SWITCH TO
POSITIONS 20-23
56
57
58
INHI
ENABL
INHI
ENA
COL 12 BIN 1
SEE FTR MECH
274
+30 VDC GSE POWER
2
30 VDC GSE LO
273
-30 VDC GSE POWER
538
27 VDC HI OIA ON
1
27 VDC RLP LO
1
CHASSIS GRD
2
SHIELD GRD

2900219

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.O. 61599		1 FEB 66	RRW
B		REVISED PER DO 61621			P7
C		INITIAL RELEASE CLASS A PER TDRR 27202		15 FEB 66	


SXT TRUNNION ... HI LO J1-7 J1-6
SXT SHAFT TACH OUT HI LO J1-5 J1-14
SXT TRUNNION TACH OUT HI LO J1-12 J1-13
SCT SHAFT TACH OUT HI LO J1-75 J1-50
SCT TRUNNION TACH OUT HI LO J1-74 J1-49
SXT SHAFT MOTOR CONTROL WINDING HI LO J1-3 J1-11
SXT TRUNNION MOTOR CONTROL WINDING HI LO J1-28 J1-27
IRIG TEMPERATURE HI LO J1-68 J1-44
IMU HEATER CURRENT HI LO J2-30 J2-29
CSC TEMPERATURE HI LO J2-17 J2-6
PIPA CAL MOD TEMP HI LO J2-16 J2-5
PSA TEMP (IMU 800 CPS 5%) HI LO J2-15 J2-14
IMU BLOWER CURRENT HI LO J2-51 J2-50
PSD 13
PSD 14
PSD 15
PSD 16
PSD 17
PSD 18
PSD 19
AC 18
AC 19
AC 20
AC 21
1 2 3 4 5 6 7
R9
R10
R11
SEE NOTE 5
J5-54 J5-38
J5-39
J5-61
J5-44 J5-45
J5-47 J5-46
J5-31
J5-52
J5-8 J5-9 J5-19
J6-8 J6-2 J6-54 J6-32 J6-56 J6-55
J5-36 J5-26 J8-26
SXT TRUNNION MDA O/P MON Ø1 HI LO
SXT SHAFT MDA TACH MON HI
SXT TRUNNION MDA TACH MON HI
SCT SHAFT MDA TACH MON HI FEEDBACK LO
SCT TRUNNION MDA TACH MON HI FEEDBACK LO
SXT SHAFT MDA O/P MON Ø1 HI
SXT TRUNNION MDA O/P MON Ø1 HI
IRIG TEMP (FROM SIG COND) HI LO
CONTROL HEATER SIGNAL (TELE)
CSC TEMPERATURE MON HI LO
PIPA CAL MOD TEMP HI LO
PSA TEMPERATURE HI LO
BLOWER SIGNAL (TELE) HI
0 VDC OPTICS (SHIELD)
0 VDC OPTICS (SHIELD) TC

2900220 C SH 1

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ___ ± ___ ± ___
DO NOT SCALE THIS DRAWING
MATERIAL ———
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DR E.H. Bickel 24 JAN 65 DATE
CHECKED 24 JAN 65
APPROVAL 2/25/65
APPROVAL
A. C. METZGER
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM –
PSA ADAPTER MODULE
(BLOCK II)

CODE IDENT NO. 99974
SIZE J_2
2900220
SCALE ——
SHEET OF 2

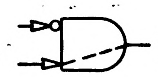
2900220 C
2900220
0S5008

2H

E-2

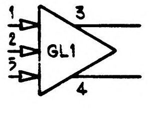
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS PER MIL-STD-806.
3. NON-STANDARD SYMBOLS:

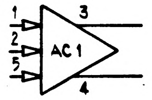


INDICATES "AND" GATE WITH SWITCHED SIGNAL

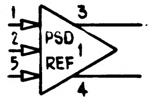
INDICATES UNLIGHTED PUSHBUTTON (MOMENTARY ACTION)



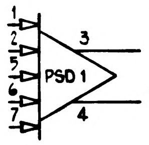
INDICATES GLITCH DETECTOR
PIN 1 INPUT HI
PIN 2 INPUT LO
PIN 3 OUTPUT HI
PIN 4 OUTPUT LO
PIN 5 B+



INDICATES AC AMPLIFIER (SAME PIN ASSIGNMENT AS ABOVE)


PSD REF
1
2
5
3
4

INDICATES PHASE SENSITIVE DEMOD REFERENCE SUPPLY (SAME PIN ASSIGNMENT AS ABOVE)


PSD 1
1
2
5
6
7
3
4

INDICATES PHASE SENSITIVE DEMOD
PIN 1 INPUT HI
PIN 2 INPUT LO
PIN 3 OUTPUT HI
PIN 4 OUTPUT LO
PIN 5 B+
PIN 6 REF HI
PIN 7 REF LO

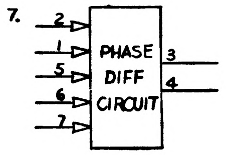
4. J1 MATES WITH ACE SIGNAL CABLE
J2 MATES WITH ACE SIGNAL CABLE
J3 MATES WITH ACE COMMAND CABLE
J4 MATES WITH ACE PIPA HARDLINE CABLE
J5 MATES WITH CABLE CONNECTING PSAAM TO PSA (45J3)
J6 MATES WITH CABLE CONNECTING PSAAM TO PSA (45J1)
J7 IS A TEST CONNECTOR JUMPERED INTERNALLY TO J6 (PIN FOR PIN)
J8 IS A TEST CONNECTOR JUMPERED INTERNALLY TO J5 (PIN FOR PIN)

SEE SHEET 2

5. ALL WIRES TO J5 MUST BE JUMPERED TO TEST CONNECTOR J8, AND WIRES TO J6 MUST BE JUMPERED TO TEST CONNECTOR J7 AS SHOWN IN THIS EXAMPLE. ALL PIN NO.S MUST CORRESPOND ON ASSOCIATED CONNECTORS. (SEE AREA C4, SH 1)

6. UNIT SHALL BE DESIGNED TO CONFORM TO PERFORMANCE REQUIREMENTS DEFINED IN PS 2901143

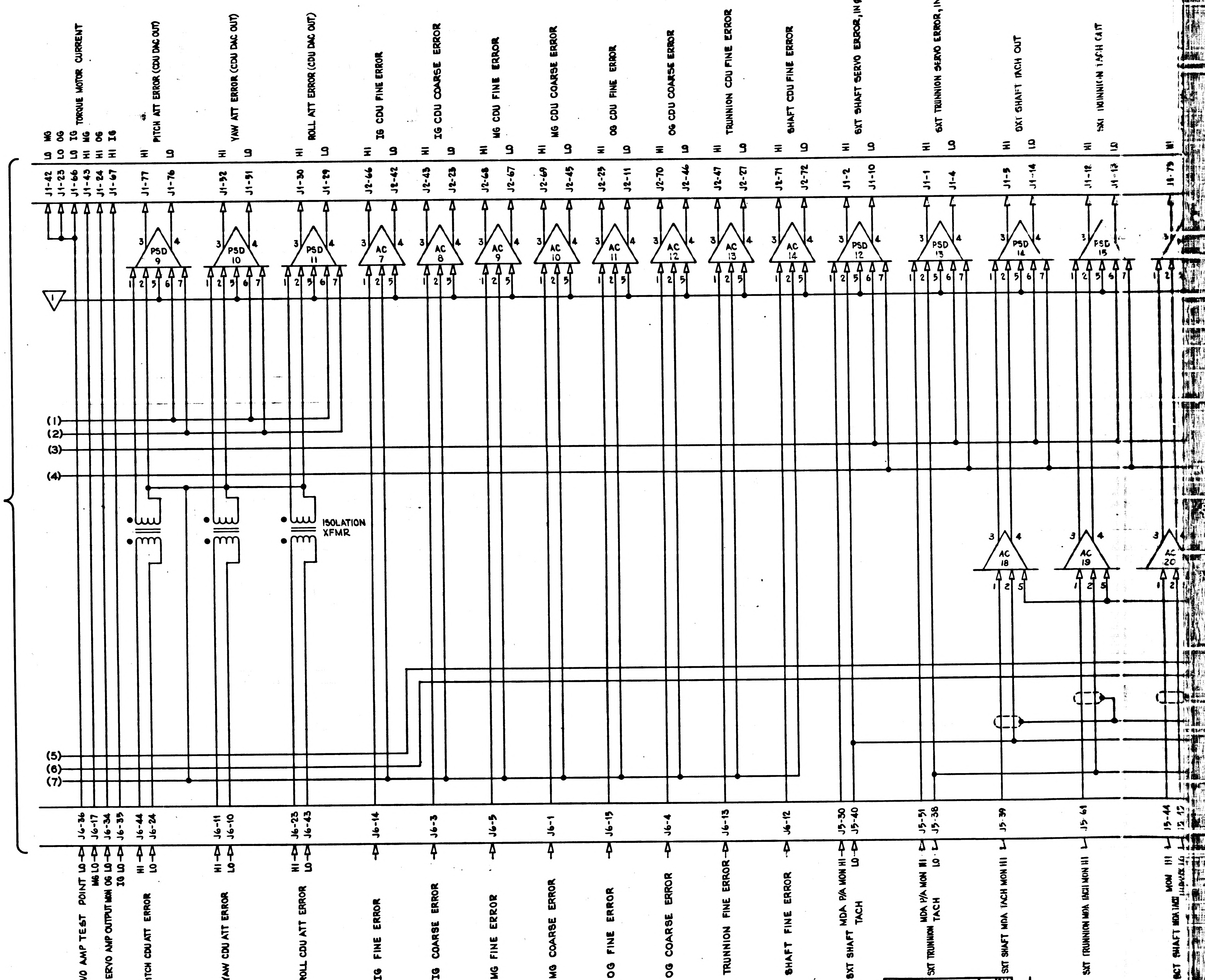
7.


PHASE DIFF CIRCUIT
2
1
5
6
7
3
4

(SAME PIN ASSIGNMENT AS PHASE SENSITIVE DEMOD).

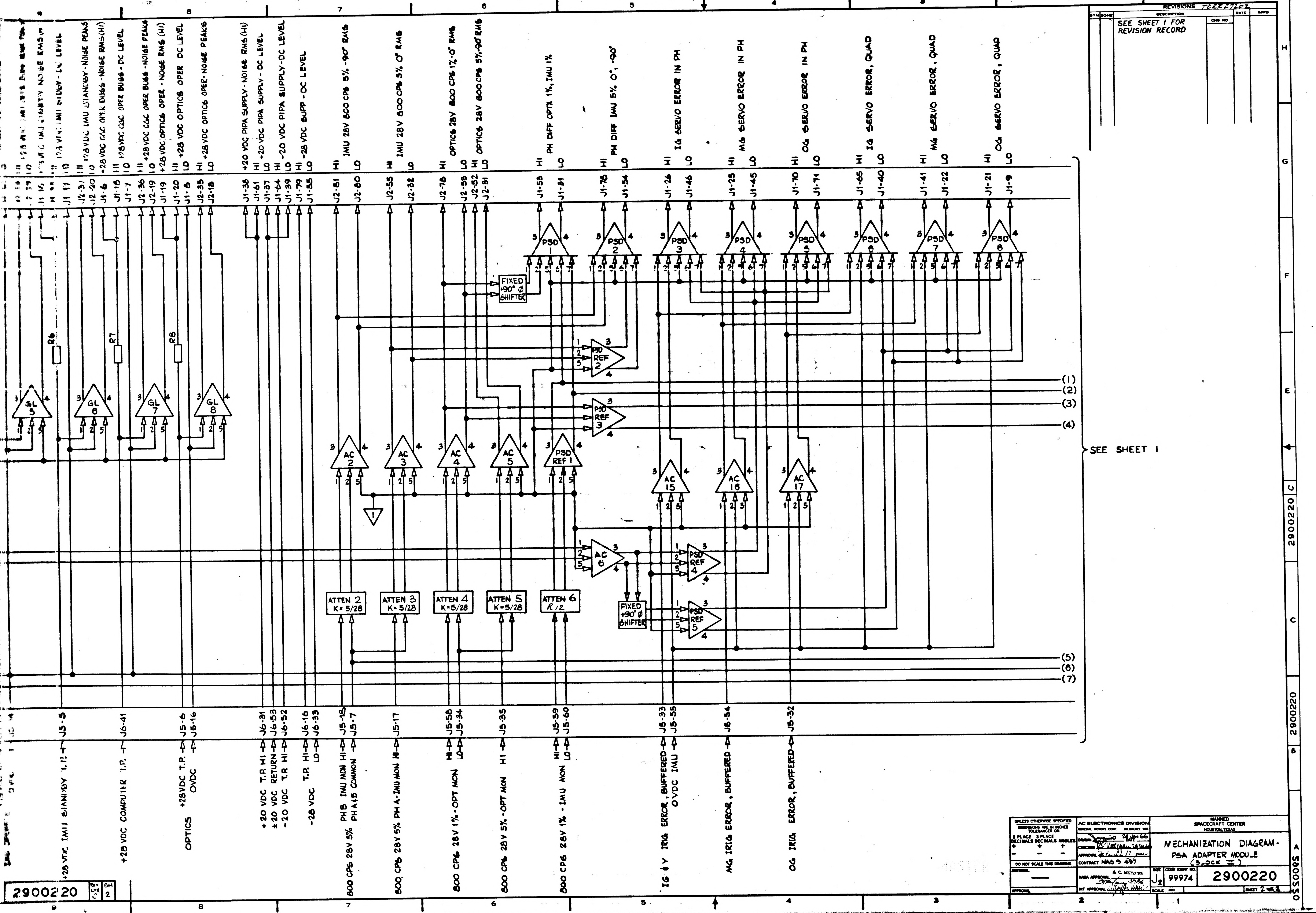
8. *FAN OUT WIRING TECHNIQUES WILL BE UTILIZED WHERE FEASIBLE.*

9. *COMPONENT (MODULE) LOCATION WILL BE DESIGNED TO MINIMIZE CROSS-TALK.*


TORQUE MOTOR CURRENT
LO MG J1-42
LO OG J1-23
LO IG J1-66
HI MG J1-43
HI OG J1-24
HI IG J1-67
PITCH ATT ERROR (CDU DAC OUT) HI J1-77 LO J1-76
YAW ATT ERROR (CDU DAC OUT) HI J1-52 LO J1-51
ROLL ATT ERROR (CDU DAC OUT) HI J1-30 LO J1-29
IG CDU FINE ERROR HI J2-66 LO J2-42
IG CDU COARSE ERROR HI J2-43 LO J2-23
MG CDU FINE ERROR HI J2-68 LO J2-67
MG CDU COARSE ERROR HI J2-69 LO J2-45
OG CDU FINE ERROR HI J2-25 LO J2-11
OG CDU COARSE ERROR HI J2-70 LO J2-46
TRUNNION CDU FINE ERROR HI J2-47 LO J2-27
SHAFT CDU FINE ERROR HI J2-71 LO J2-72
SXT SHAFT SERVO ERROR, IN Ø HI J1-2 LO J1-10
SXT TRUNNION SERVO ERROR, IN Ø HI J1-1 LO J1-4
SXT SHAFT TACH OUT HI J1-5 LO J1-14
SXT TRUNNION TACH OUT HI J1-12 LO J1-13
HI J1-79
PSD 9
PSD 10
PSD 11
AC 7
AC 8
AC 9
AC 10
AC 11
AC 12
AC 13
AC 14
PSD 12
PSD 13
PSD 14
PSD 15
ISOLATION XFMR
AC 18
AC 19
AC 20
(1)
(2)
(3)
(4)
(5)
(6)
(7)
J6-36 SERVO AMP TEST POINT LO
J6-17 MG LO
J6-34 SERVO AMP OUTPUT MON OG LO
J6-35 IG LO
J6-44 HI J6-24 LO PITCH CDU ATT ERROR
J6-11 HI J6-10 LO YAW CDU ATT ERROR
J6-23 HI J6-43 LO ROLL CDU ATT ERROR
J6-14 IG FINE ERROR
J6-3 IG COARSE ERROR
J6-5 MG FINE ERROR
J6-1 MG COARSE ERROR
J6-15 OG FINE ERROR
J6-4 OG COARSE ERROR
J6-13 TRUNNION FINE ERROR
J6-12 SHAFT FINE ERROR
J5-30 HI J5-40 LO SXT SHAFT MDA P/A MON TACH
J5-51 HI J5-38 LO SXT TRUNNION MDA P/A MON TACH
J5-39 SXT SHAFT MDA TACH MON HI
J5-61 SXT TRUNNION MDA TACH MON HI
J5-44 SXT SHAFT MDA TACH MON HI

2900220 REV. LTR. C SH 1

REVISIONS				
SYM	ZONE	DESCRIPTION	DATE	APPD
		SEE SHEET 1 FOR REVISION RECORD		

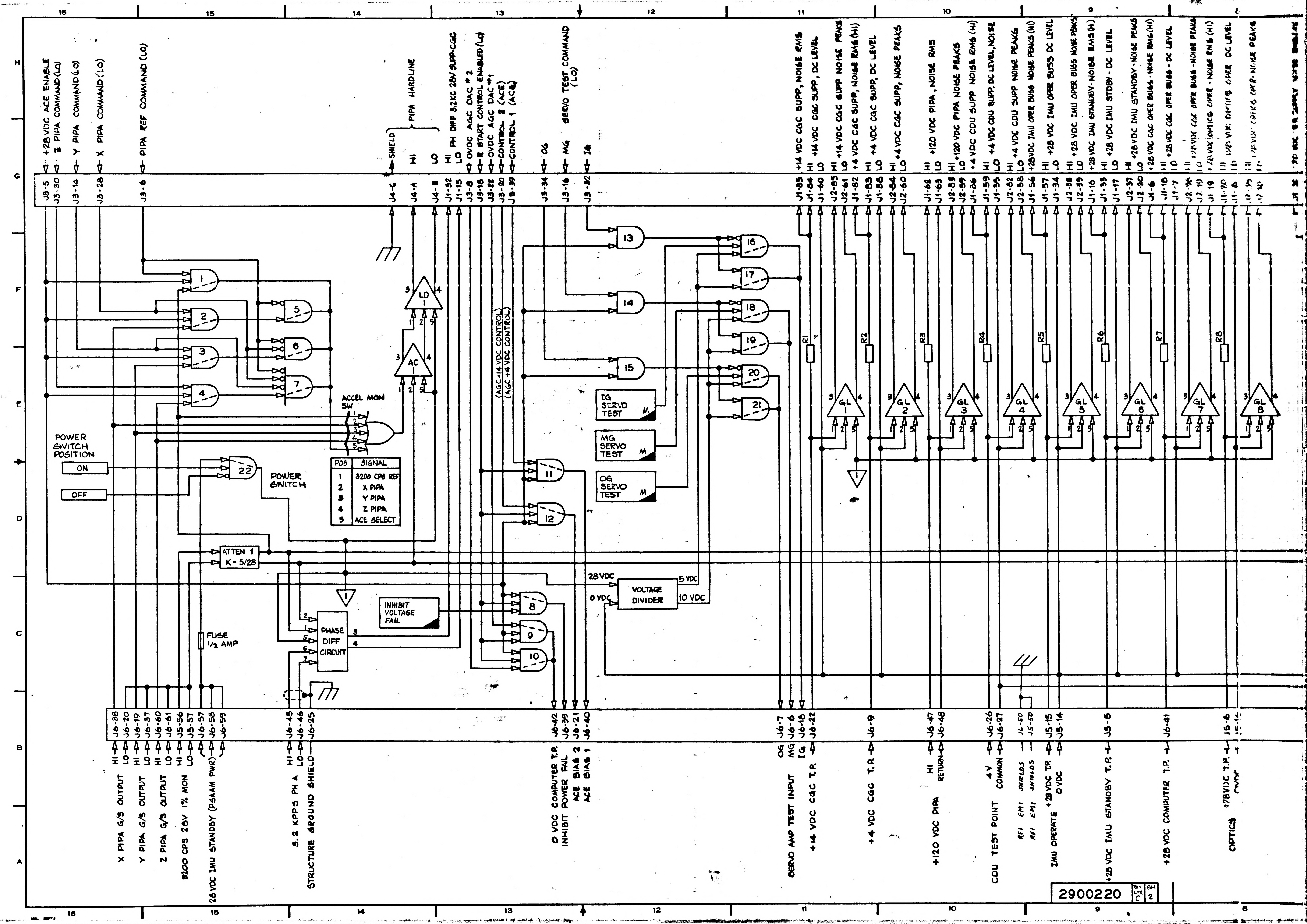

+28 VDC IMU STANDBY NOISE RMS (HI)
+28 VDC IMU STDBY - DC LEVEL
+28 VDC IMU STANDBY - NOISE PEAKS
+28 VDC C&C OPER BUSS - NOISE RMS (HI)
+28 VDC C&C OPER BUSS - DC LEVEL
+28 VDC C&C OPER BUSS - NOISE PEAKS
+28 VDC OPTICS OPER - NOISE RMS (HI)
+28 VDC OPTICS OPER DC LEVEL
+28 VDC OPTICS OPER - NOISE PEAKS
+20 VDC PIPA SUPPLY - NOISE RMS (HI)
+20 VDC PIPA SUPPLY - DC LEVEL
-20 VDC PIPA SUPPLY - DC LEVEL
-28 VDC SUPP - DC LEVEL
IMU 28V 800 CPS 5% -90° RMS
IMU 28V 800 CPS 5% 0° RMS
OPTICS 28V 800 CPS 1% -0° RMS
OPTICS 28V 800 CPS 5% -90° RMS
PH DIFF OPTX 1%, IMU 1%
PH DIFF IMU 5% 0°, -90°
IG SERVO ERROR IN PH
MG SERVO ERROR IN PH
OG SERVO ERROR IN PH
IG SERVO ERROR, QUAD
MG SERVO ERROR, QUAD
OG SERVO ERROR, QUAD
HI
LO
J2-37
J2-20
J1-6
J1-16
J1-7
J2-36
J2-19
J1-19
J1-20
J1-8
J2-35
J2-18
J1-38
J1-61
J1-37
J1-64
J1-39
J1-79
J1-55
J2-81
J2-80
J2-55
J2-32
J2-78
J2-53
J2-52
J2-31
J1-53
J1-31
J1-78
J1-54
J1-26
J1-46
J1-25
J1-45
J1-70
J1-71
J1-65
J1-40
J1-41
J1-22
J1-21
J1-9
PSD 1
PSD 2
PSD 3
PSD 4
PSD 5
PSD 6
PSD 7
PSD 8
FIXED +90° Ø SHIFTER
PSD REF 1
PSD REF 2
PSD REF 3
PSD REF 4
PSD REF 5
GL 5
GL 6
GL 7
GL 8
R6
R7
R8
AC 2
AC 3
AC 4
AC 5
AC 6
AC 15
AC 16
AC 17
ATTEN 2 K=5/28
ATTEN 3 K=5/28
ATTEN 4 K=5/28
ATTEN 5 K=5/28
ATTEN 6 K/12
(1)
(2)
(3)
(4)
(5)
(6)
(7)
SEE SHEET 1
J5-5
J6-41
J5-6
J5-16
J6-31
J6-53
J6-52
J6-16
J6-33
J5-18
J5-7
J5-17
J5-58
J5-34
J5-35
J5-59
J5-60
J5-33
J5-55
J5-54
J5-32
+28 VDC IMU STANDBY T.P.
+28 VDC COMPUTER T.P.
OPTICS +28VDC T.P.
OVDC
+20 VDC T.R HI
±20 VDC RETURN
-20 VDC T.R HI
-28 VDC T.R HI
LO
800 CPS 28V 5% PH B IMU MON HI
PH A+B COMMON
800 CPS 28V 5% PH A-IMU MON HI
800 CPS 28V 1% -OPT MON
800 CPS 28V 5% -OPT MON HI
800 CPS 28V 1% - IMU MON
IG & Y IRIG ERROR, BUFFERED
OVDC IMU
MG IRIG ERROR, BUFFERED
OG IRIG ERROR, BUFFERED
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE DECIMALS + − 3 PLACE DECIMALS + − ANGLES + −	AC ELECTRONICS DIVISION GENERAL MOTORS CORP. MILWAUKEE WIS.	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Jongquist DATE 24 JAN 66 CHECKED 24 Jan 66 APPROVAL CONTRACT NAS 9 497	MECHANIZATION DIAGRAM- PSA ADAPTER MODULE (BLOCK II)
MATERIAL —	NASA APPROVAL A. C. METZGER 3/7/66	SIZE J2 · CODE IDENT NO. 99974 · 2900220
APPROVAL	MIT APPROVAL	SCALE — · SHEET 2 OF 2

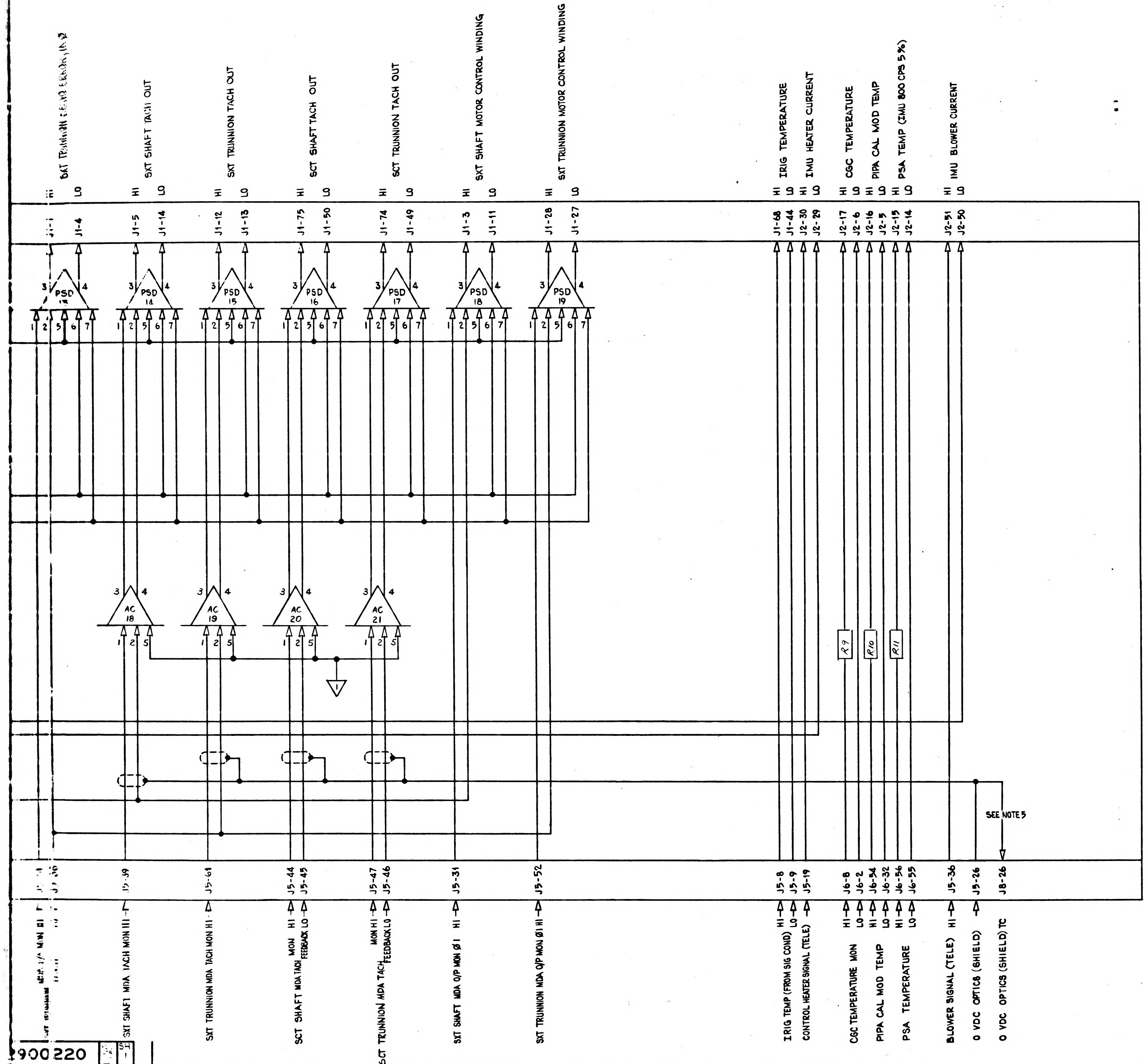
2900220 REV C SH 2

2900220

2900220


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
+28 VDC ACE ENABLE
Z PIPA COMMAND (LO)
Y PIPA COMMAND (LO)
X PIPA COMMAND (LO)
PIPA REF COMMAND (LO)
SHIELD
PIPA HARDLINE
HI
LO
HI
LO
PH DIFF 3.2KC 28V SUPP-CGC
OVDC AGC DAC #2
R START CONTROL ENABLED (LO)
OVDC AGC DAC #1
CONTROL 2 (ACE)
CONTROL 1 (ACE)
OG
MG
IG
SERVO TEST COMMAND (LO)
+14 VDC CGC SUPP, NOISE RMS
HI
+14 VDC CGC SUPP, DC LEVEL
LO
HI
+14 VDC CGC SUPP NOISE PEAKS
LO
+4 VDC CGC SUPP, NOISE RMS (HI)
HI
+4 VDC CGC SUPP, DC LEVEL
LO
HI
+4 VDC CGC SUPP, NOISE PEAKS
LO
HI
+120 VDC PIPA, NOISE RMS
LO
HI
+120 VDC PIPA NOISE PEAKS
LO
+4 VDC CDU SUPP NOISE RMS (HI)
HI
+4 VDC CDU SUPP, DC LEVEL, NOISE
LO
HI
+4 VDC CDU SUPP NOISE PEAKS
LO
+28 VDC IMU OPER BUSS NOISE PEAKS (HI)
HI
+28 VDC IMU OPER BUSS DC LEVEL
LO
HI
+28 VDC IMU OPER BUSS NOISE PEAKS
LO
+28 VDC IMU STANDBY-NOISE RMS (HI)
HI
+28 VDC IMU STDBY - DC LEVEL
LO
HI
+28 VDC IMU STANDBY - NOISE PEAKS
LO
+28 VDC CGC OPER BUSS - NOISE RMS (HI)
HI
+28 VDC CGC OPER BUSS - DC LEVEL
LO
HI
+28 VDC CGC OPER BUSS - NOISE PEAKS
LO
+28 VDC OPTICS OPER - NOISE RMS (HI)
HI
+28 VDC OPTICS OPER DC LEVEL
LO
HI
+28 VDC OPTICS OPER - NOISE PEAKS
LO
J3-5
J3-30
J3-14
J3-28
J3-6
J4-C
J4-A
J4-B
J1-32
J1-15
J3-8
J3-18
J3-22
J3-20
J3-39
J3-34
J3-16
J3-32
J1-85
J1-84
J1-60
J2-85
J2-61
J1-82
J1-83
J1-88
J2-84
J2-60
J1-62
J1-63
J2-83
J2-59
J1-36
J1-59
J1-35
J2-82
J2-58
J1-56
J1-57
J1-34
J2-38
J2-39
J1-16
J1-33
J1-17
J2-37
J2-20
J4-6
J1-18
J1-7
J2-36
J2-19
J1-19
J1-20
J1-8
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
LD 1
AC 1
3
4
1
2
5
ACCEL MON SW
POWER SWITCH POSITION
ON
OFF
POWER SWITCH
P03 SIGNAL
1 3200 CPS REF
2 X PIPA
3 Y PIPA
4 Z PIPA
5 ACE SELECT
(AGC +14 VDC CONTROL)
(AGC +4 VDC CONTROL)
IG SERVO TEST
M
MG SERVO TEST
M
OG SERVO TEST
M
R1
R2
R3
R4
R5
R6
R7
R8
GL 1
GL 2
GL 3
GL 4
GL 5
GL 6
GL 7
GL 8
ATTEN 1
K = 5/28
28 VDC
0 VDC
VOLTAGE DIVIDER
5 VDC
10 VDC
INHIBIT VOLTAGE FAIL
PHASE DIFF CIRCUIT
FUSE 1/2 AMP
J6-38
J6-20
J6-19
J6-37
J6-60
J6-61
J5-56
J5-57
J6-57
J6-58
J6-59
J6-45
J6-46
J6-25
J6-42
J6-39
J6-21
J6-40
J6-7
J6-6
J6-18
J6-22
J6-9
J6-47
J6-48
J6-26
J6-27
J6-50
J5-50
J5-15
J5-14
J5-5
J6-41
J5-6
HI
LO
HI
LO
HI
LO
HI
LO
X PIPA G/S OUTPUT
Y PIPA G/S OUTPUT
Z PIPA G/S OUTPUT
3200 CPS 28V 1% MON
28 VDC IMU STANDBY (PSAAM PWR)
HI
LO
3.2 KPPS PH A
STRUCTURE GROUND SHIELD
0 VDC COMPUTER T.P.
INHIBIT POWER FAIL
ACE BIAS 2
ACE BIAS 1
OG
MG
IG
SERVO AMP TEST INPUT
+14 VDC CGC T.P.
+4 VDC CGC T.P.
HI
RETURN
+120 VDC PIPA
4 V
COMMON
CDU TEST POINT
RFI EMI SHIELDS
RFI EMI SHIELDS
+28 VDC T.P.
0 VDC
IMU OPERATE
+28 VDC IMU STANDBY T.P.
+28 VDC COMPUTER T.P.
+28 VDC T.P.
OPTICS

2900220 REV LTR C SH 2


SXT TRUNNION SERVO ERROR, IN 2
SXT SHAFT TACH OUT
SXT TRUNNION TACH OUT
SCT SHAFT TACH OUT
SCT TRUNNION TACH OUT
SXT SHAFT MOTOR CONTROL WINDING
SXT TRUNNION MOTOR CONTROL WINDING
IRIG TEMPERATURE
IMU HEATER CURRENT
CGC TEMPERATURE
PIPA CAL MOD TEMP
PSA TEMP (IMU 800 CPS 5%)
IMU BLOWER CURRENT
HI
LO
J1-4
J1-5
J1-14
J1-12
J1-13
J1-75
J1-50
J1-74
J1-49
J1-3
J1-11
J1-28
J1-27
J1-68
J1-44
J2-30
J2-29
J2-17
J2-6
J2-16
J2-5
J2-15
J2-14
J2-51
J2-50
PSD 13
PSD 14
PSD 15
PSD 16
PSD 17
PSD 18
PSD 19
AC 18
AC 19
AC 20
AC 21
1
2
3
4
5
6
7
R9
R10
R11
SEE NOTE 5
J5-39
J5-61
J5-44
J5-45
J5-47
J5-46
J5-31
J5-52
J5-8
J5-9
J5-19
J6-8
J6-2
J6-54
J6-32
J6-56
J6-55
J5-36
J5-26
J8-26
SXT SHAFT MDA TACH MON HI
SXT TRUNNION MDA TACH MON HI
SCT SHAFT MDA TACH MON HI
SCT SHAFT MDA TACH FEEDBACK LO
SCT TRUNNION MDA TACH MON HI
SCT TRUNNION MDA TACH FEEDBACK LO
SXT SHAFT MDA O/P MON Ø1 HI
SXT TRUNNION MDA O/P MON Ø1 HI
IRIG TEMP (FROM SIG COND) HI
IRIG TEMP (FROM SIG COND) LO
CONTROL HEATER SIGNAL (TELE)
CGC TEMPERATURE MON HI
CGC TEMPERATURE MON LO
PIPA CAL MOD TEMP HI
PIPA CAL MOD TEMP LO
PSA TEMPERATURE HI
PSA TEMPERATURE LO
BLOWER SIGNAL (TELE) HI
0 VDC OPTICS (SHIELD)
0 VDC OPTICS (SHIELD) TC
9
8
7
6
5
4
3

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.O. 61599		1 FEB 66	FRW
B		REVISED PER DO 61621			P7
C		INITIAL RELEASE CLASS A PER TDRR 27202		15 FEB 66	
D		REVISION STATUS CHANGED			

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC ELECTRONICS DIVISION
GENERAL MOTORS CORP MILWAUKEE WIS
DRAWN 24 JAN 66
CHECKED 24 JAN 66
APPROVAL 1/25/66
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
PSA ADAPTER MODULE
(BLOCK II)

CODE IDENT NO. 99974
SIZE J2
2900220
SCALE —
SHEET OF 2

2900220

2900220

2H

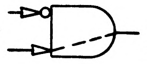
SH 1 OF 5
S800550

2-4-2900220

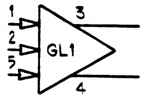
2900220
SH 1 OF 2

NOTES:

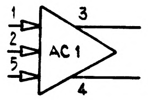
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS PER MIL-STD-806.
3. NON-STANDARD SYMBOLS:


INDICATES "AND" GATE WITH SWITCHED SIGNAL

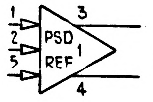
INDICATES UNLIGHTED PUSHBUTTON (MOMENTARY ACTION)



INDICATES GLITCH DETECTOR
PIN 1 INPUT HI
PIN 2 INPUT LO
PIN 3 OUTPUT HI
PIN 4 OUTPUT LO
PIN 5 B+

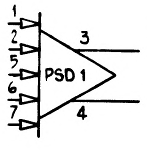


INDICATES AC AMPLIFIER (SAME PIN ASSIGNMENT AS ABOVE)



1
2
5
3
4
PSD REF
1

INDICATES PHASE SENSITIVE DEMOD REFERENCE SUPPLY (SAME PIN ASSIGNMENT AS ABOVE)



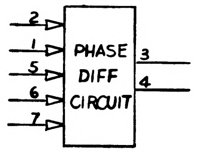
1
2
5
6
7
3
4
PSD 1

INDICATES PHASE SENSITIVE DEMOD
PIN 1 INPUT HI
PIN 2 INPUT LO
PIN 3 OUTPUT HI
PIN 4 OUTPUT LO
PIN 5 B+
PIN 6 REF HI
PIN 7 REF LO

4. J1 MATES WITH ACE SIGNAL CABLE
J2 MATES WITH ACE SIGNAL CABLE
J3 MATES WITH ACE COMMAND CABLE
J4 MATES WITH ACE PIPA HARDLINE CABLE
J5 MATES WITH CABLE CONNECTING PSAAM TO PSA (45J3)
J6 MATES WITH CABLE CONNECTING PSAAM TO PSA (45J1)
J7 IS A TEST CONNECTOR JUMPERED INTERNALLY TO J6 (PIN FOR PIN)
J8 IS A TEST CONNECTOR JUMPERED INTERNALLY TO J5 (PIN FOR PIN)

5. ALL WIRES TO J5 MUST BE JUMPERED TO TEST CONNECTOR J8, AND WIRES TO J6 MUST BE JUMPERED TO TEST CONNECTOR J7 AS SHOWN IN THIS EXAMPLE. ALL PIN NO.S MUST CORRESPOND ON ASSOCIATED CONNECTORS. (SEE AREA C4, SH 1)

6. UNIT SHALL BE DESIGNED TO CONFORM TO PERFORMANCE REQUIREMENTS DEFINED IN PS 290143

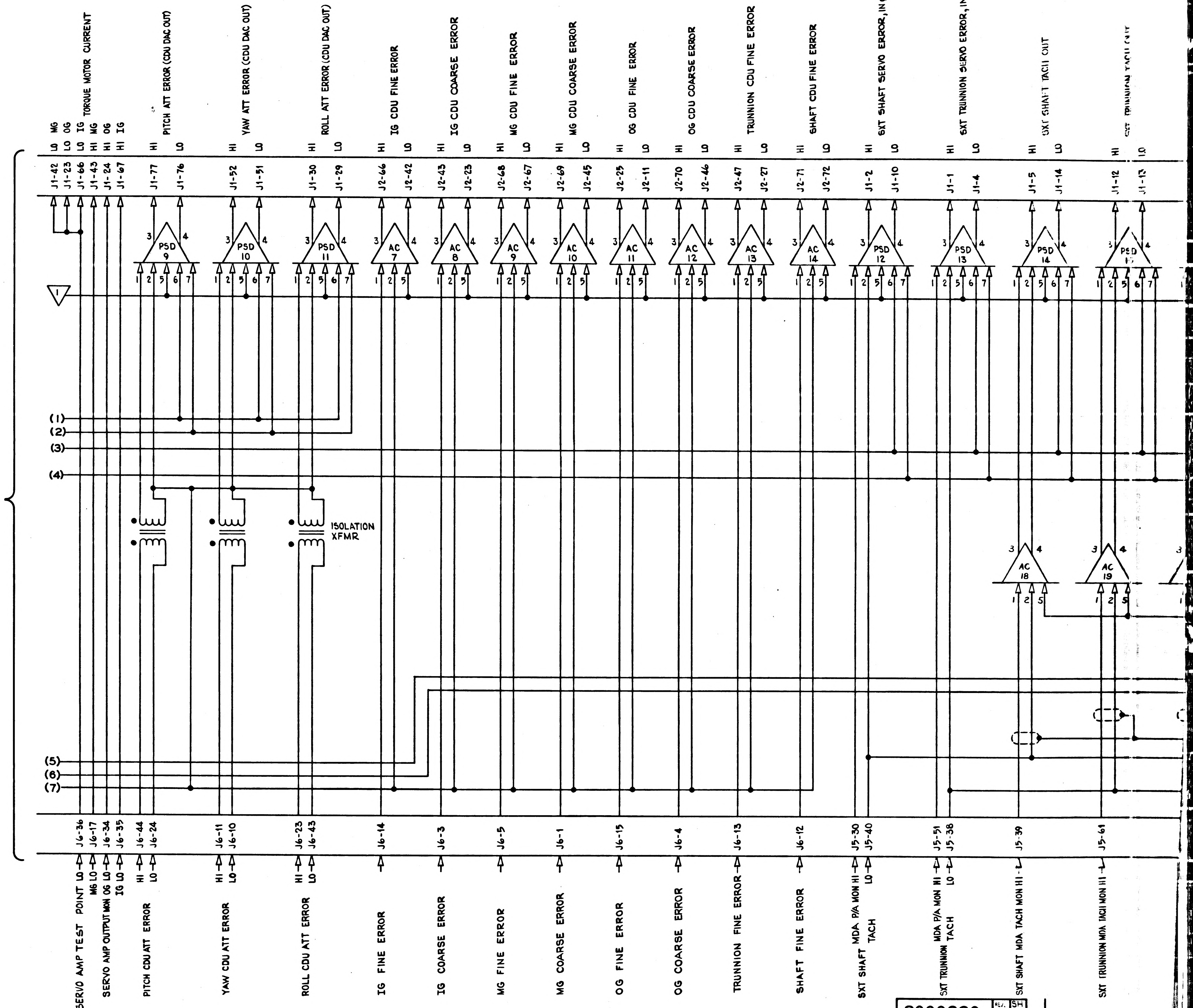
7. 

2
1
5
6
7
3
4
PHASE DIFF CIRCUIT

(SAME PIN ASSIGNMENT AS PHASE SENSITIVE DEMOD).

8. *FAN OUT WIRING TECHNIQUES WILL BE UTILIZED WHERE FEASIBLE.*

9. *COMPONENT (MODULE) LOCATION WILL BE DESIGNED TO MINIMIZE CROSS-TALK.*

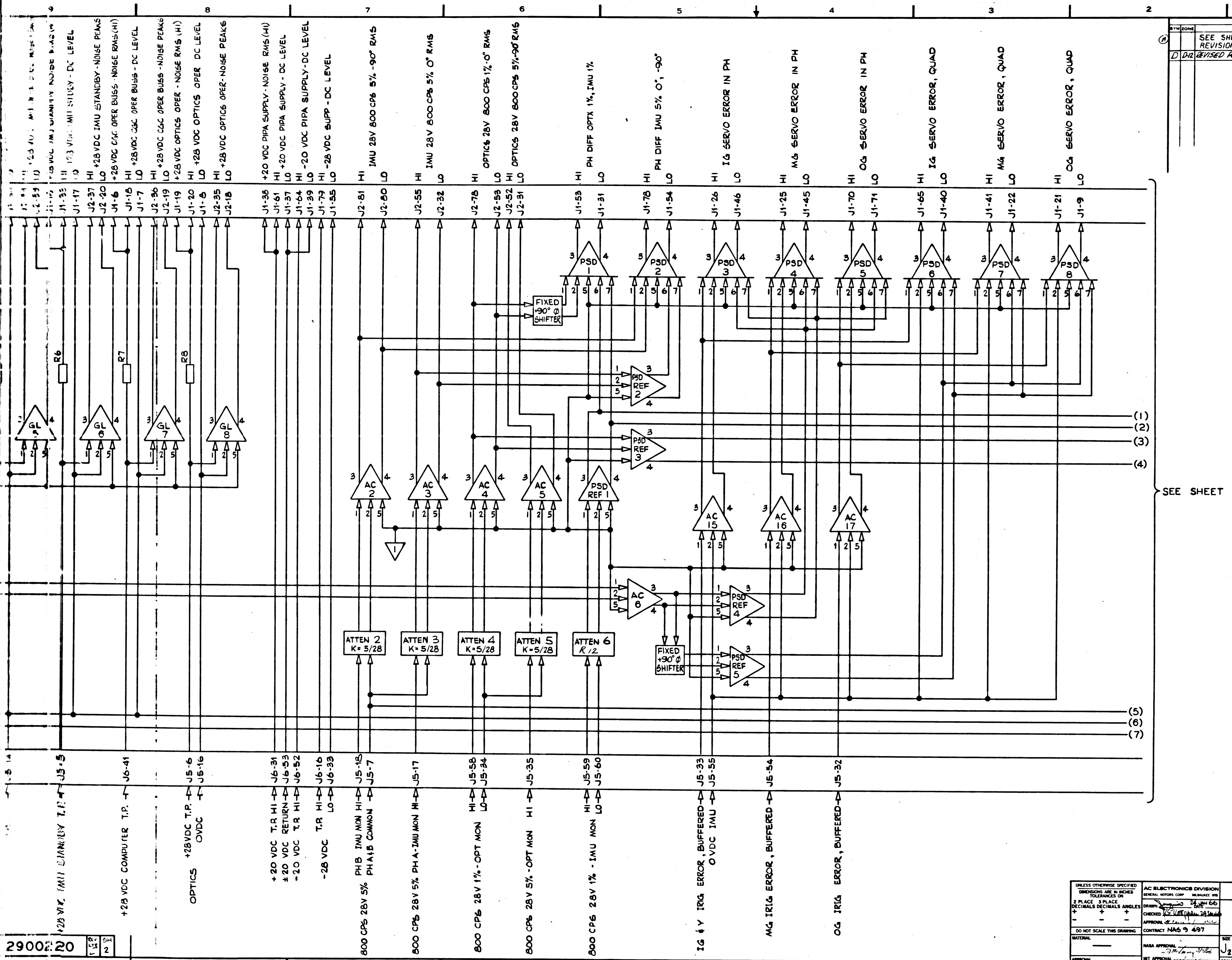


SEE SHEET 2
MG
OG
IG
MG
OG
IG
TORQUE MOTOR CURRENT
PITCH ATT ERROR (CDU DAC OUT)
YAW ATT ERROR (CDU DAC OUT)
ROLL ATT ERROR (CDU DAC OUT)
IG CDU FINE ERROR
IG CDU COARSE ERROR
MG CDU FINE ERROR
MG CDU COARSE ERROR
OG CDU FINE ERROR
OG CDU COARSE ERROR
TRUNNION CDU FINE ERROR
SHAFT CDU FINE ERROR
SXT SHAFT SERVO ERROR, IN Ø
SXT TRUNNION SERVO ERROR, IN Ø
SXT SHAFT TACH OUT
SXT TRUNNION TACH OUT
HI
LO
J1-42
J1-23
J1-66
J1-43
J1-24
J1-67
J1-77
J1-76
J1-52
J1-51
J1-30
J1-29
J2-66
J2-42
J2-43
J2-23
J2-68
J2-67
J2-69
J2-45
J2-25
J2-11
J2-70
J2-46
J2-47
J2-27
J2-71
J2-72
J1-2
J1-10
J1-1
J1-4
J1-5
J1-14
J1-12
J1-13
PSD 9
PSD 10
PSD 11
AC 7
AC 8
AC 9
AC 10
AC 11
AC 12
AC 13
AC 14
PSD 12
PSD 13
PSD 14
PSD 15
AC 18
AC 19
ISOLATION XFMR
(1)
(2)
(3)
(4)
(5)
(6)
(7)
J6-36
J6-17
J6-34
J6-35
J6-44
J6-24
J6-11
J6-10
J6-23
J6-43
J6-14
J6-3
J6-5
J6-1
J6-15
J6-4
J6-13
J6-12
J5-30
J5-40
J5-51
J5-38
J5-39
J5-61
SERVO AMP TEST POINT LO
MG LO
SERVO AMP OUTPUT MON OG LO
IG LO
PITCH CDU ATT ERROR
YAW CDU ATT ERROR
ROLL CDU ATT ERROR
IG FINE ERROR
IG COARSE ERROR
MG FINE ERROR
MG COARSE ERROR
OG FINE ERROR
OG COARSE ERROR
TRUNNION FINE ERROR
SHAFT FINE ERROR
SXT SHAFT MDA P/A MON HI
LO
TACH
SXT TRUNNION MDA P/A MON HI
LO
TACH
SXT SHAFT MDA TACH MON HI
SXT TRUNNION MDA TACH MON HI

2900220 REV. LTR. D SH 1

17 2900220

REVISIONS TDRR-202					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
		SEE SHEET I FOR REVISION RECORD			
D	D-12	REVISED PER TDRR 28348		2 MAY 66	



+28 VDC IMU STANDBY NOISE BIAS (H)
+28 VDC IMU STBY - DC LEVEL
+28 VDC IMU STANDBY - NOISE PEAKS
+28 VDC CGC OPER BUSS - NOISE RMS (HI)
+28 VDC CGC OPER BUSS - DC LEVEL
+28 VDC CGC OPER BUSS - NOISE PEAKS
+28 VDC OPTICS OPER - NOISE RMS (HI)
+28 VDC OPTICS OPER DC LEVEL
+28 VDC OPTICS OPER - NOISE PEAKS
+20 VDC PIPA SUPPLY - NOISE RMS (HI)
+20 VDC PIPA SUPPLY - DC LEVEL
-20 VDC PIPA SUPPLY - DC LEVEL
-28 VDC SUPP - DC LEVEL
IMU 28V 800 CPS 5% -90° RMS
IMU 28V 800 CPS 5% 0° RMS
OPTICS 28V 800 CPS 1% -0° RMS
OPTICS 28V 800 CPS 5% -90° RMS
PH DIFF OPTX 1%, IMU 1%
PH DIFF IMU 5% 0°, -90°
IG SERVO ERROR IN PH
MG SERVO ERROR IN PH
OG SERVO ERROR IN PH
IG SERVO ERROR, QUAD
MG SERVO ERROR, QUAD
OG SERVO ERROR, QUAD
HI
LO
J2-39
J1-33
J1-17
J2-37
J2-20
J1-6
J1-18
J1-7
J2-36
J2-19
J1-19
J1-20
J1-8
J2-35
J2-18
J1-38
J1-61
J1-37
J1-64
J1-39
J1-79
J1-55
J2-81
J2-80
J2-55
J2-32
J2-78
J2-53
J2-52
J2-31
J1-53
J1-31
J1-78
J1-54
J1-26
J1-46
J1-25
J1-45
J1-70
J1-71
J1-65
J1-40
J1-41
J1-22
J1-21
J1-9
R6
R7
R8
GL 5
GL 6
GL 7
GL 8
PSD 1
PSD 2
PSD 3
PSD 4
PSD 5
PSD 6
PSD 7
PSD 8
FIXED +90° φ SHIFTER
PSD REF 2
PSD REF 3
PSD REF 1
PSD REF 4
PSD REF 5
AC 2
AC 3
AC 4
AC 5
AC 6
AC 15
AC 16
AC 17
ATTEN 2 K=5/28
ATTEN 3 K=5/28
ATTEN 4 K=5/28
ATTEN 5 K=5/28
ATTEN 6 R12
1
2
3
4
5
6
7
(1)
(2)
(3)
(4)
(5)
(6)
(7)
SEE SHEET I
J5-5
J6-41
J5-6
J5-16
J6-31
J6-53
J6-52
J6-16
J6-33
J5-18
J5-7
J5-17
J5-58
J5-34
J5-35
J5-59
J5-60
J5-33
J5-55
J5-54
J5-32
+28 VDC IMU STANDBY T.P.
+28 VDC COMPUTER T.P.
OPTICS +28VDC T.P.
OVDC
+20 VDC T.R HI
±20 VDC RETURN
-20 VDC T.R HI
-28 VDC T.R HI
LO
800 CPS 28V 5% PHB IMU MON HI
PH A&B COMMON
800 CPS 28V 5% PH A-IMU MON HI
800 CPS 28V 1% - OPT MON HI
LO
800 CPS 28V 5% - OPT MON HI
800 CPS 28V 1% - IMU MON HI
LO
IG & Y IRIG ERROR, BUFFERED
OVDC IMU
MG IRIG ERROR, BUFFERED
OG IRIG ERROR, BUFFERED

2900220 REV LTR D SH 2

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON 2 PLACE DECIMALS + − 3 PLACE DECIMALS + − ANGLES + −	AC ELECTRONICS DIVISION GENERAL MOTORS CORP MILWAUKEE WIS.	MANNED SPACECRAFT CENTER HOUSTON, TEXAS	
DO NOT SCALE THIS DRAWING	DRAWN Jenquino DATE 24 JAN 66 CHECKED R E Voeppner 24 JAN 66 APPROVAL CONTRACT NAS 9 497	MECHANIZATION DIAGRAM- PSA ADAPTER MODULE (BLOCK II)	
MATERIAL —	NASA APPROVAL J McTarney 3/7/66	SIZE J2	CODE IDENT NO. 99974
APPROVAL	MIT APPROVAL	SCALE —	2900220 SHEET 2 OF 2

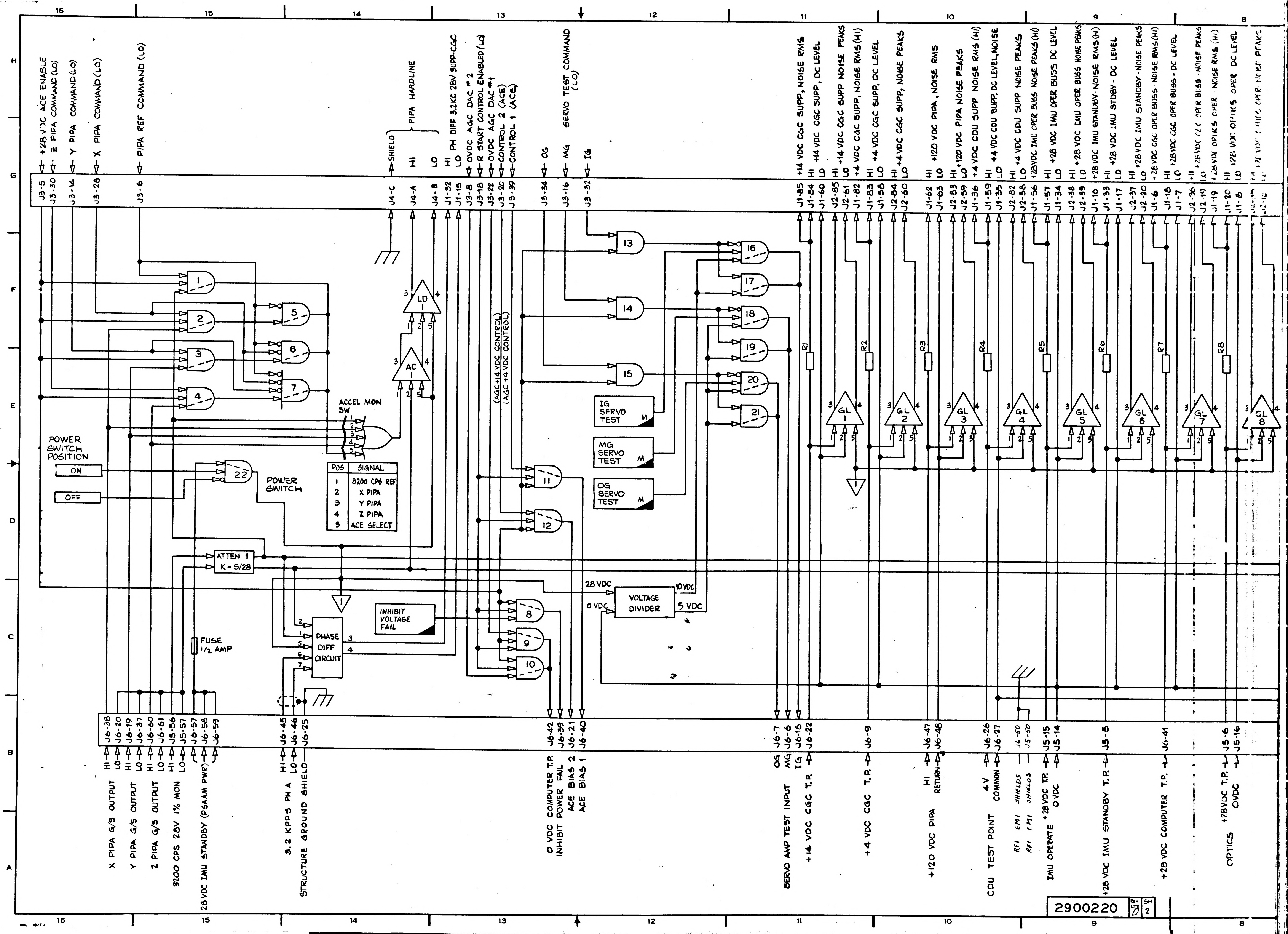
2900220 D

2900220

SD0055 A

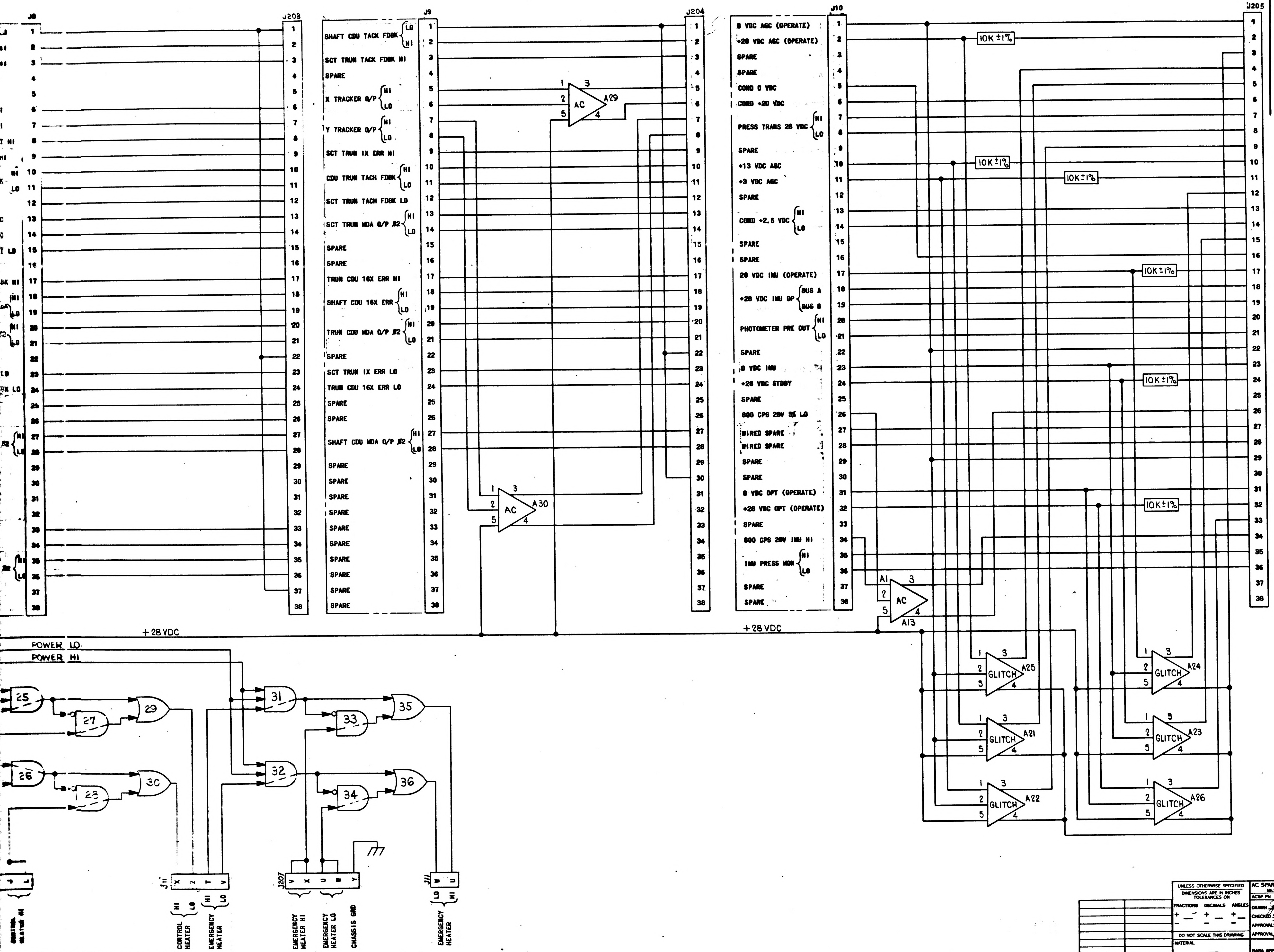
2H

27 2900220


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
+28 VDC ACE ENABLE
Z PIPA COMMAND (LO)
Y PIPA COMMAND (LO)
X PIPA COMMAND (LO)
PIPA REF COMMAND (LO)
J3-5
J3-30
J3-14
J3-28
J3-6
SHIELD
HI
LO
PIPA HARDLINE
J4-C
J4-A
J4-B
HI
LO
PH DIFF 3.2KC 28V SUPP-CGC
J1-32
J1-15
OVDC AGC DAC #2
R START CONTROL ENABLED (LO)
OVDC AGC DAC #1
CONTROL 2 (ACE)
CONTROL 1 (ACE)
J3-8
J3-18
J3-22
J3-20
J3-39
OG
MG
IG
SERVO TEST COMMAND (LO)
J3-34
J3-16
J3-32
+14 VDC CGC SUPP, NOISE RMS
HI
+14 VDC CGC SUPP, DC LEVEL
LO
HI
+14 VDC CGC SUPP NOISE PEAKS
LO
+4 VDC CGC SUPP, NOISE RMS (HI)
HI
+4 VDC CGC SUPP, DC LEVEL
LO
HI
+4 VDC CGC SUPP, NOISE PEAKS
LO
HI
+120 VDC PIPA, NOISE RMS
LO
HI
+120 VDC PIPA NOISE PEAKS
LO
+4 VDC CDU SUPP NOISE RMS (HI)
HI
+4 VDC CDU SUPP, DC LEVEL, NOISE
LO
HI
+4 VDC CDU SUPP NOISE PEAKS
LO
+28VDC IMU OPER BUSS NOISE PEAKS (HI)
HI
+28 VDC IMU OPER BUSS DC LEVEL
LO
HI
+28 VDC IMU OPER BUSS NOISE PEAKS
LO
+28 VDC IMU STANDBY-NOISE RMS (HI)
HI
+28 VDC IMU STDBY - DC LEVEL
LO
HI
+28 VDC IMU STANDBY - NOISE PEAKS
LO
+28 VDC CGC OPER BUSS NOISE RMS (HI)
HI
+28 VDC CGC OPER BUSS - DC LEVEL
LO
HI
+28 VDC CGC OPER BUSS - NOISE PEAKS
LO
+28 VDC OPTICS OPER - NOISE RMS (HI)
HI
+28 VDC OPTICS OPER DC LEVEL
LO
HI
+28 VDC OPTICS, OPER NOISE PEAKS
LO
J1-85
J1-84
J1-60
J2-85
J2-61
J1-82
J1-83
J1-58
J2-84
J2-60
J1-62
J1-63
J2-83
J2-59
J1-36
J1-59
J1-35
J2-82
J2-58
J1-56
J1-57
J1-34
J2-38
J2-39
J1-16
J1-33
J1-17
J2-37
J2-20
J1-6
J1-18
J1-7
J2-36
J2-19
J1-19
J1-20
J1-8
1
2
3
4
5
6
7
LD 1
AC 1
(AGC +14 VDC CONTROL)
(AGC +4 VDC CONTROL)
13
14
15
16
17
18
19
20
21
IG SERVO TEST
MG SERVO TEST
OG SERVO TEST
M
R1
R2
R3
R4
R5
R6
R7
R8
GL 1
GL 2
GL 3
GL 4
GL 5
GL 6
GL 7
GL 8
ACCEL MON SW
POWER SWITCH POSITION
ON
OFF
22
POWER SWITCH
POS
SIGNAL
1
3200 CPS REF
2
X PIPA
3
Y PIPA
4
Z PIPA
5
ACE SELECT
11
12
ATTEN 1
K = 5/28
28 VDC
0 VDC
VOLTAGE DIVIDER
10 VDC
5 VDC
INHIBIT VOLTAGE FAIL
8
9
10
PHASE DIFF CIRCUIT
FUSE 1/2 AMP
J6-38
J6-20
J6-19
J6-37
J6-60
J6-61
J5-56
J5-57
J6-57
J6-58
J6-59
HI
LO
X PIPA G/S OUTPUT
Y PIPA G/S OUTPUT
Z PIPA G/S OUTPUT
3200 CPS 28V 1% MON
28 VDC IMU STANDBY (PSAAM PWR)
J6-45
J6-46
J6-25
3.2 KPPS PH A
STRUCTURE GROUND SHIELD
J6-42
J6-39
J6-21
J6-40
0 VDC COMPUTER T.P.
INHIBIT POWER FAIL
ACE BIAS 2
ACE BIAS 1
J6-7
J6-6
J6-18
J6-22
OG
MG
IG
SERVO AMP TEST INPUT
+14 VDC CGC T.P.
J6-9
+4 VDC CGC T.P.
J6-47
J6-48
HI
RETURN
+120 VDC PIPA
J6-26
J6-27
4 V
COMMON
CDU TEST POINT
J6-50
J5-50
RFI EMI SHIELDS
RFI EMI SHIELDS
J5-15
J5-14
+28 VDC T.P.
0 VDC
IMU OPERATE
J5-5
+28 VDC IMU STANDBY T.P.
J6-41
+28 VDC COMPUTER T.P.
J5-6
J5-16
+28VDC T.P.
OVDC
OPTICS
2900220
REV LTR D
SH 2
MIL 1077J

1/2900220

REVISIONS TCRR 5875					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.C. 60451	—	14 MAY 65	J.J. C.F.


J8
J203
J9
SHAFT CDU TACK FDBK LO HI
SCT TRUN TACK FDBK HI
SPARE
X TRACKER O/P HI LO
Y TRACKER O/P HI LO
SCT TRUN IX ERR HI
CDU TRUN TACH FDBK HI LO
SCT TRUN TACH FDBK LO
SCT TRUN MDA O/P Ø2 HI LO
TRUN CDU 16X ERR HI
SHAFT CDU 16X ERR HI LO
TRUN CDU MDA O/P Ø2 HI LO
SCT TRUN IX ERR LO
TRUN CDU 16X ERR LO
SHAFT CDU MDA O/P Ø2 HI LO
AC A29
AC A30
J204
J10
0 VDC AGC (OPERATE)
+28 VDC AGC (OPERATE)
COND 0 VDC
COND +20 VDC
PRESS TRANS 28 VDC HI LO
+13 VDC AGC
+3 VDC AGC
COND +2.5 VDC HI LO
28 VDC IMU (OPERATE)
+28 VDC IMU OP BUS A BUS B
PHOTOMETER PRE OUT HI LO
0 VDC IMU
+28 VDC STDBY
800 CPS 28V 5% LO
WIRED SPARE
0 VDC OPT (OPERATE)
+28 VDC OPT (OPERATE)
800 CPS 28V IMU HI
IMU PRESS MON HI LO
J205
10K ±1%
A1 AC A13
+28 VDC
POWER LO
POWER HI
GLITCH A25
GLITCH A21
GLITCH A22
GLITCH A24
GLITCH A23
GLITCH A26
25 26 27 28 29 30 31 32 33 34 35 36
HEATER HI
J11 X Z T V
HI LO HI LO
CONTROL HEATER
EMERGENCY HEATER
J207 V X U W Y
EMERGENCY HEATER HI
EMERGENCY HEATER LO
CHASSIS GRD
J11 W U
LO HI
EMERGENCY HEATER

A	A
SHEET 1	SHEET 2
REVISION STATUS OF SHEETS	

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

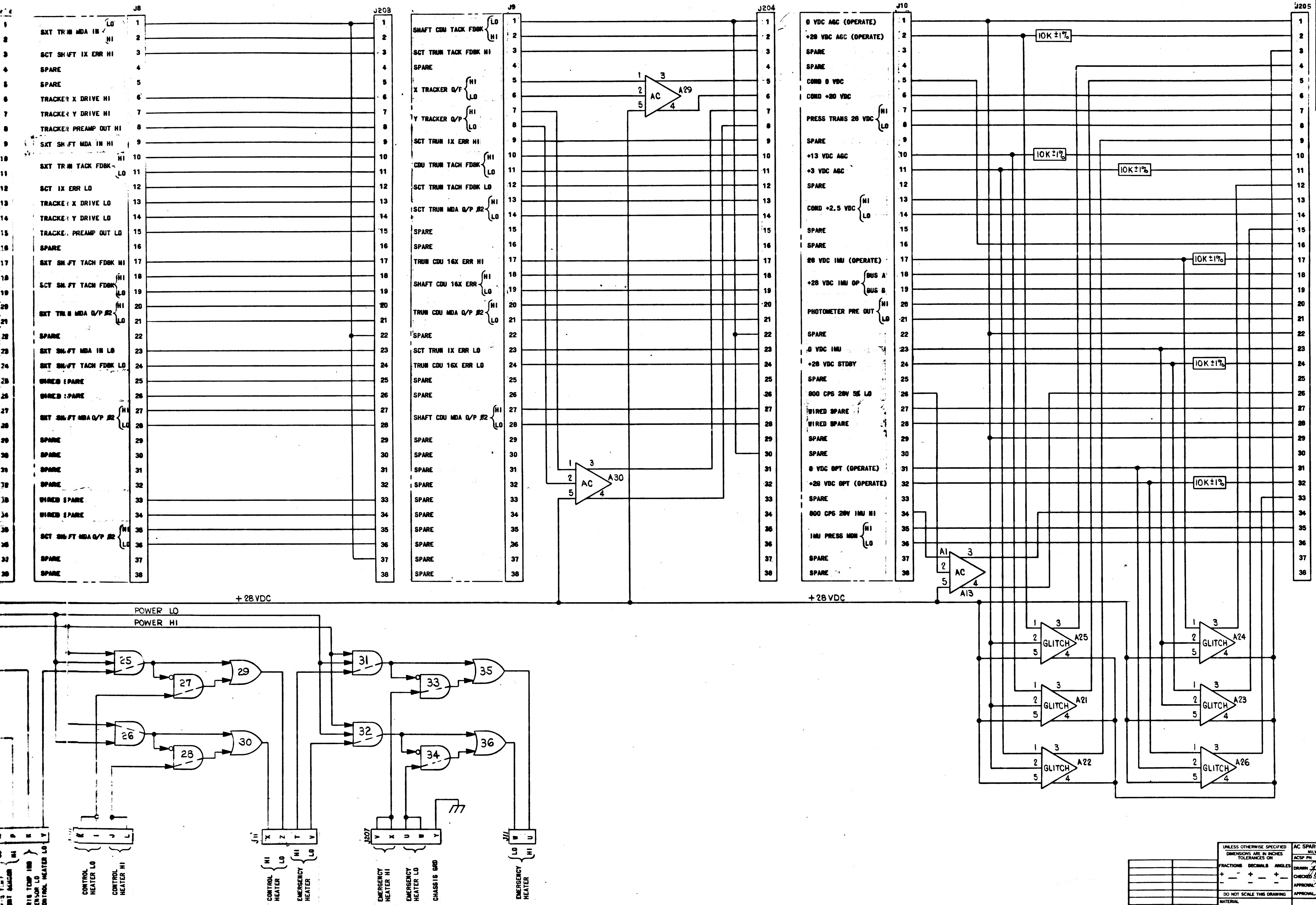
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Wolski DATE 30 APR 65
CHECKED Ed Foster 7 MAY 65
APPROVAL M.P. 7 May 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
ADAPTER MODULE, PSA
(BLOCK I - SERIES 100)

CODE IDENT NO. 99974 SIZE J2 2900221
SCALE — SHEET 1 OF 2

2900221 REV A SH 1



J8
SXT TRIM MDA IN LO HI
SCT SHAFT IX ERR HI
SPARE
TRACKER X DRIVE HI
TRACKER Y DRIVE HI
TRACKER PREAMP OUT HI
SXT SHAFT MDA IN HI
SXT TRIM TACK FDBK HI LO
SCT IX ERR LO
TRACKER X DRIVE LO
TRACKER Y DRIVE LO
TRACKER PREAMP OUT LO
SXT SHAFT TACH FDBK HI
SCT SHAFT TACH FDBK HI LO
SXT TRIM MDA O/P Ø2 HI LO
SXT SHAFT MDA IN LO
SXT SHAFT TACH FDBK LO
WIRED SPARE
SXT SHAFT MDA O/P Ø2 HI LO
SCT SHAFT MDA O/P Ø2 HI LO
J203
J9
SHAFT CDU TACK FDBK LO HI
SCT TRUN TACK FDBK HI
X TRACKER O/P HI LO
Y TRACKER O/P HI LO
SCT TRUN IX ERR HI
CDU TRUN TACH FDBK HI LO
SCT TRUN TACH FDBK LO
SCT TRUN MDA O/P Ø2 HI LO
TRUN CDU 16X ERR HI
SHAFT CDU 16X ERR HI LO
TRUN CDU MDA O/P Ø2 HI LO
SCT TRUN IX ERR LO
TRUN CDU 16X ERR LO
SHAFT CDU MDA O/P Ø2 HI LO
J204
J10
0 VDC AGC (OPERATE)
+28 VDC AGC (OPERATE)
COND 0 VDC
COND +20 VDC
PRESS TRANS 28 VDC HI LO
+13 VDC AGC
+3 VDC AGC
COND +2.5 VDC HI LO
28 VDC IMU (OPERATE)
+28 VDC IMU OP BUS A BUS B
PHOTOMETER PRE OUT HI LO
0 VDC IMU
+28 VDC STDBY
800 CPS 28V 5% LO
WIRED SPARE
0 VDC OPT (OPERATE)
+28 VDC OPT (OPERATE)
800 CPS 28V IMU HI
IMU PRESS MON HI LO
J205
10K ±1%
AC A29
AC A30
AC A13
GLITCH A25
GLITCH A21
GLITCH A22
GLITCH A24
GLITCH A23
GLITCH A26
+28 VDC
POWER LO
POWER HI
25
26
27
28
29
30
31
32
33
34
35
36
IRIG TEMP IND SENSOR LO
CONTROL HEATER LO
CONTROL HEATER HI
J11
CONTROL HEATER HI LO
EMERGENCY HEATER HI LO
J207
EMERGENCY HEATER HI
EMERGENCY HEATER LO
CHASSIS GRD
EMERGENCY HEATER LO HI

2900221 REV A SH 1

REVISIONS TLR2					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.C. 6045:	—	7 MAY 65	

A	A
SHEET 1	SHEET 2

REVISION STATUS OF SHEETS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN G. Nolski DATE 30 APR 65
CHECKED Ed Foster 7 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

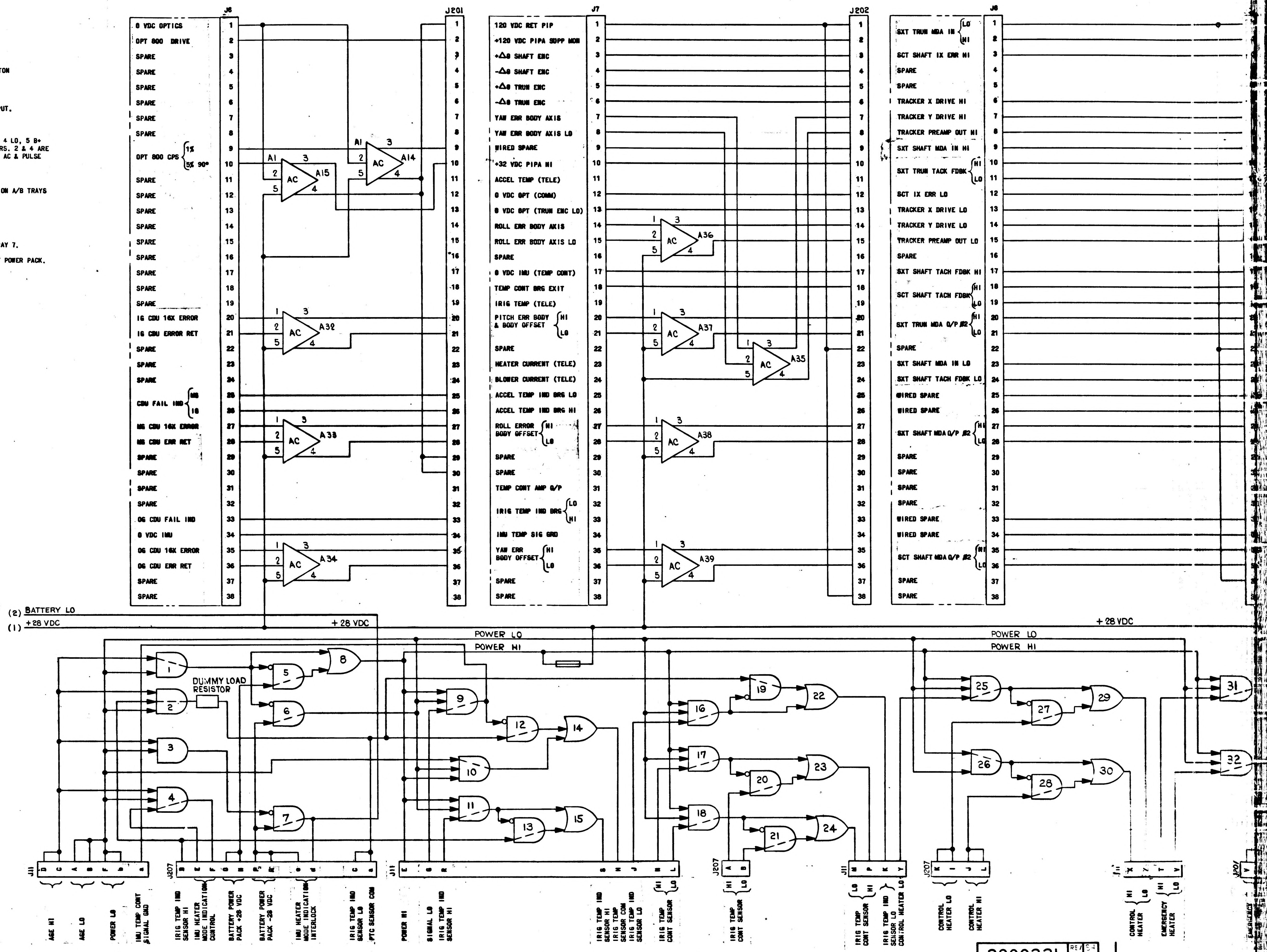
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
ADAPTER MODULE, PSA
(BLOCK I-SERIES 100)

CODE IDENT NO. 99974
SIZE J2
2900221
SCALE —
SHEET 1 OF 2

NOTES:

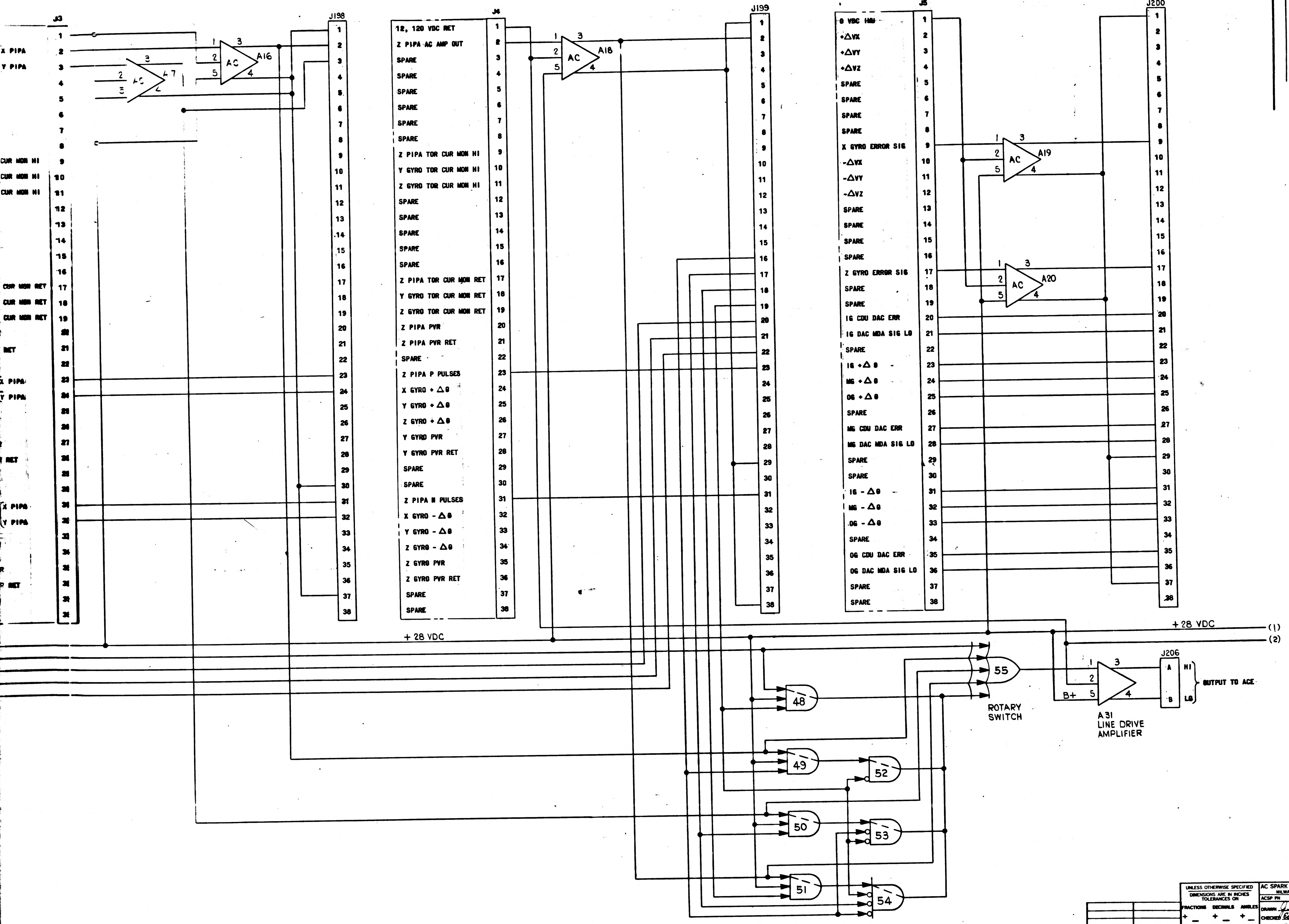
1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS PER MIL-STD-806.
3. NON STANDARD SYMBOLS
   - INDICATES "AND" GATE WITH SWITCHED SIGNAL.
   - NAME — INDICATES UNLIGHTED PUSHBUTTON (MOMENTARY ACTION).
   - A1 INDICATES ATTENUATED INPUT.
   - INDICATES A1, 1 & 3 HI, 2 & 4 LO, 5 B+ APPLICABLE FOR ALL AMPLIFIERS. 2 & 4 ARE INTERNALLY CONNECTED ON ALL AC & PULSE AMPLIFIERS.
4. J1 THRU J10 MATE WITH 45A1J1 THRU 45A10J1 ON A/B TRAYS 1 THRU 10.
5. J196 THRU J205 MATE WITH NAA ACE CABLE.
6. J206 MATES WITH NAA ACE LINE DRIVE CABLE.
7. J11 MATES WITH CABLE CONNECTING TO PSA, TRAY 7.
8. J207 MATES WITH CABLE CONNECTING TO BATTERY POWER PACK.


J6
1 0 VDC OPTICS
2 OPT 800 DRIVE
3 SPARE
4 SPARE
5 SPARE
6 SPARE
7 SPARE
8 SPARE
9 OPT 800 CPS 1%
10 5% 90°
11 SPARE
12 SPARE
13 SPARE
14 SPARE
15 SPARE
16 SPARE
17 SPARE
18 SPARE
19 SPARE
20 IG CDU 16X ERROR
21 IG CDU ERROR RET
22 SPARE
23 SPARE
24 SPARE
25 CDU FAIL IND MG
26 IG
27 MG CDU 16X ERROR
28 MG CDU ERR RET
29 SPARE
30 SPARE
31 SPARE
32 SPARE
33 OG CDU FAIL IND
34 0 VDC IMU
35 OG CDU 16X ERROR
36 OG CDU ERR RET
37 SPARE
38 SPARE
A1 3 2 5 AC A15 4
A1 3 2 5 AC A14 4
1 3 2 5 AC A32 4
1 3 2 5 AC A33 4
1 3 2 5 AC A34 4
J201
J7
1 120 VDC RET PIP
2 +120 VDC PIPA SUPP MON
3 +Δθ SHAFT ENC
4 -Δθ SHAFT ENC
5 +Δθ TRUN ENC
6 -Δθ TRUN ENC
7 YAW ERR BODY AXIS
8 YAW ERR BODY AXIS LO
9 WIRED SPARE
10 +32 VDC PIPA HI
11 ACCEL TEMP (TELE)
12 0 VDC OPT (COMM)
13 0 VDC OPT (TRUN ENC LO)
14 ROLL ERR BODY AXIS
15 ROLL ERR BODY AXIS LO
16 SPARE
17 0 VDC IMU (TEMP CONT)
18 TEMP CONT BRG EXIT
19 IRIG TEMP (TELE)
20 PITCH ERR BODY & BODY OFFSET HI
21 LO
22 SPARE
23 HEATER CURRENT (TELE)
24 BLOWER CURRENT (TELE)
25 ACCEL TEMP IND BRG LO
26 ACCEL TEMP IND BRG HI
27 ROLL ERROR BODY OFFSET HI
28 LO
29 SPARE
30 SPARE
31 TEMP CONT AMP O/P
32 IRIG TEMP IND BRG LO
33 HI
34 IMU TEMP SIG GRD
35 YAW ERR BODY OFFSET HI
36 LO
37 SPARE
38 SPARE
1 3 2 5 AC A36 4
1 3 2 5 AC A37 4
1 3 2 5 AC A35 4
1 3 2 5 AC A38 4
1 3 2 5 AC A39 4
J202
J8
1 SXT TRUN MDA IN LO
2 HI
3 SCT SHAFT 1X ERR HI
4 SPARE
5 SPARE
6 TRACKER X DRIVE HI
7 TRACKER Y DRIVE HI
8 TRACKER PREAMP OUT HI
9 SXT SHAFT MDA IN HI
10 SXT TRUN TACK FDBK HI
11 LO
12 SCT 1X ERR LO
13 TRACKER X DRIVE LO
14 TRACKER Y DRIVE LO
15 TRACKER PREAMP OUT LO
16 SPARE
17 SXT SHAFT TACH FDBK HI
18 SCT SHAFT TACH FDBK HI
19 LO
20 SXT TRUN MDA O/P #2 HI
21 LO
22 SPARE
23 SXT SHAFT MDA IN LO
24 SXT SHAFT TACH FDBK LO
25 WIRED SPARE
26 WIRED SPARE
27 SXT SHAFT MDA O/P #2 HI
28 LO
29 SPARE
30 SPARE
31 SPARE
32 SPARE
33 WIRED SPARE
34 WIRED SPARE
35 SCT SHAFT MDA O/P #2 HI
36 LO
37 SPARE
38 SPARE
(2) BATTERY LO
(1) +28 VDC
+ 28 VDC
+ 28 VDC
POWER LO
POWER HI
POWER LO
POWER HI
DUMMY LOAD RESISTOR
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
J11 D C A B F b a
J207 D E F G H P R e d C a
J11 E G R S H J M L
J207 A B
J11 M P K Y
J207 K I J L
J11 X Z T V
J201 V
AGE HI
AGE LO
POWER LO
IMU TEMP CONT SIGNAL GND
IRIG TEMP IND SENSOR HI
IMU HEATER MODE INDICATION CONTROL
BATTERY POWER PACK +28 VDC
BATTERY POWER PACK -28 VDC
IMU HEATER MODE INDICATION INTERLOCK
IRIG TEMP IND SENSOR LO
PTC SENSOR COM
POWER HI
SIGNAL LO
IRIG TEMP IND SENSOR HI
IRIG TEMP IND SENSOR HI
IRIG TEMP SENSOR COM
IRIG TEMP IND SENSOR LO
HI LO
IRIG TEMP CONT SENSOR
HI LO
IRIG TEMP CONT SENSOR
LO HI
IRIG TEMP CONT SENSOR
IRIG TEMP IND SENSOR LO
CONTROL HEATER LO
CONTROL HEATER LO
CONTROL HEATER HI
HI LO
CONTROL HEATER
HI LO
EMERGENCY HEATER
EMERGENCY

2900221 REV L SH 1

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.O. 60451	—	17 MAY 65	SF

REVISIONS 19835



J3
X PIPA
Y PIPA
CUR MON HI
CUR MON HI
CUR MON HI
CUR MON RET
CUR MON RET
CUR MON RET
RET
X PIPA
Y PIPA
RET
X PIPA
Y PIPA
RET
AC A17
AC A16
J198
J4
12, 120 VDC RET
Z PIPA AC AMP OUT
SPARE
Z PIPA TOR CUR MON HI
Y GYRO TOR CUR MON HI
Z GYRO TOR CUR MON HI
Z PIPA TOR CUR MON RET
Y GYRO TOR CUR MON RET
Z GYRO TOR CUR MON RET
Z PIPA PVR
Z PIPA PVR RET
Z PIPA P PULSES
X GYRO + Δθ
Y GYRO + Δθ
Z GYRO + Δθ
Y GYRO PVR
Y GYRO PVR RET
Z PIPA N PULSES
X GYRO - Δθ
Y GYRO - Δθ
Z GYRO - Δθ
Z GYRO PVR
Z GYRO PVR RET
AC A18
J199
J5
6 VDC HMU
+ΔVX
+ΔVY
+ΔVZ
X GYRO ERROR SIG
-ΔVX
-ΔVY
-ΔVZ
Z GYRO ERROR SIG
IG CDU DAC ERR
IG DAC MDA SIG LO
IG +Δθ
MG +Δθ
OG +Δθ
MG CDU DAC ERR
MG DAC MDA SIG LO
IG -Δθ
MG -Δθ
OG -Δθ
OG CDU DAC ERR
OG DAC MDA SIG LO
AC A19
AC A20
J200
+28 VDC
+ 28 VDC
(1)
(2)
55
48
49
50
51
52
53
54
ROTARY SWITCH
B+
A31 LINE DRIVE AMPLIFIER
J206
A HI
B LO
OUTPUT TO ACE

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Woloski DATE 30 APR 65
CHECKED Ed Foster 6 MAY 65
APPROVAL M.R. Cannon 7 MAY
APPROVAL W. Watson
NASA APPROVAL
MIT APPROVAL MG Mueller 6-8-65

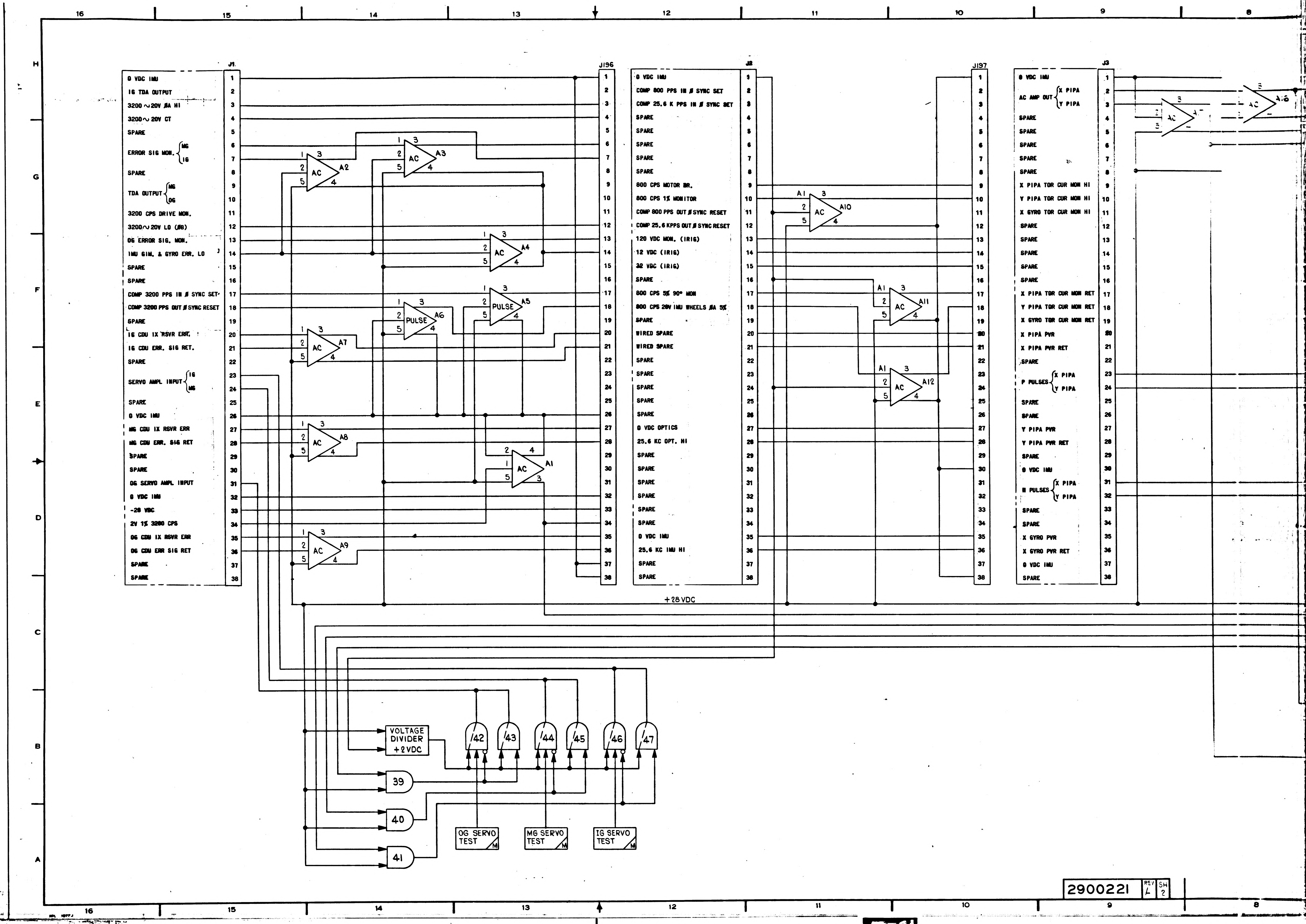
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

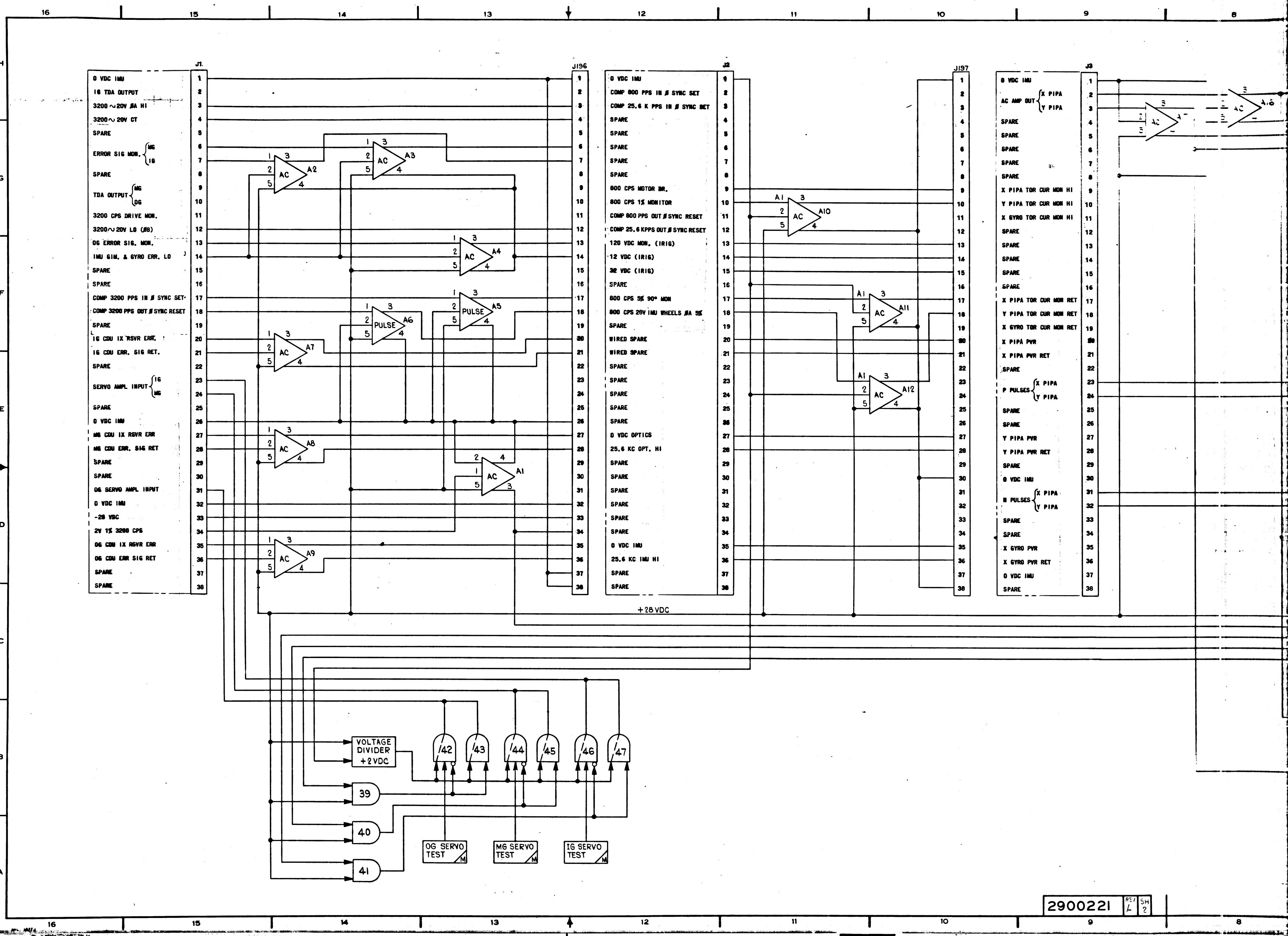
MECHANIZATION DIAGRAM ADAPTER MODULE, PSA (BLOCK I-SERIES 100)

CODE IDENT NO. 99974 SIZE J2 2900221
SCALE — SHEET 2 OF 2

2900221 REV A SH 2

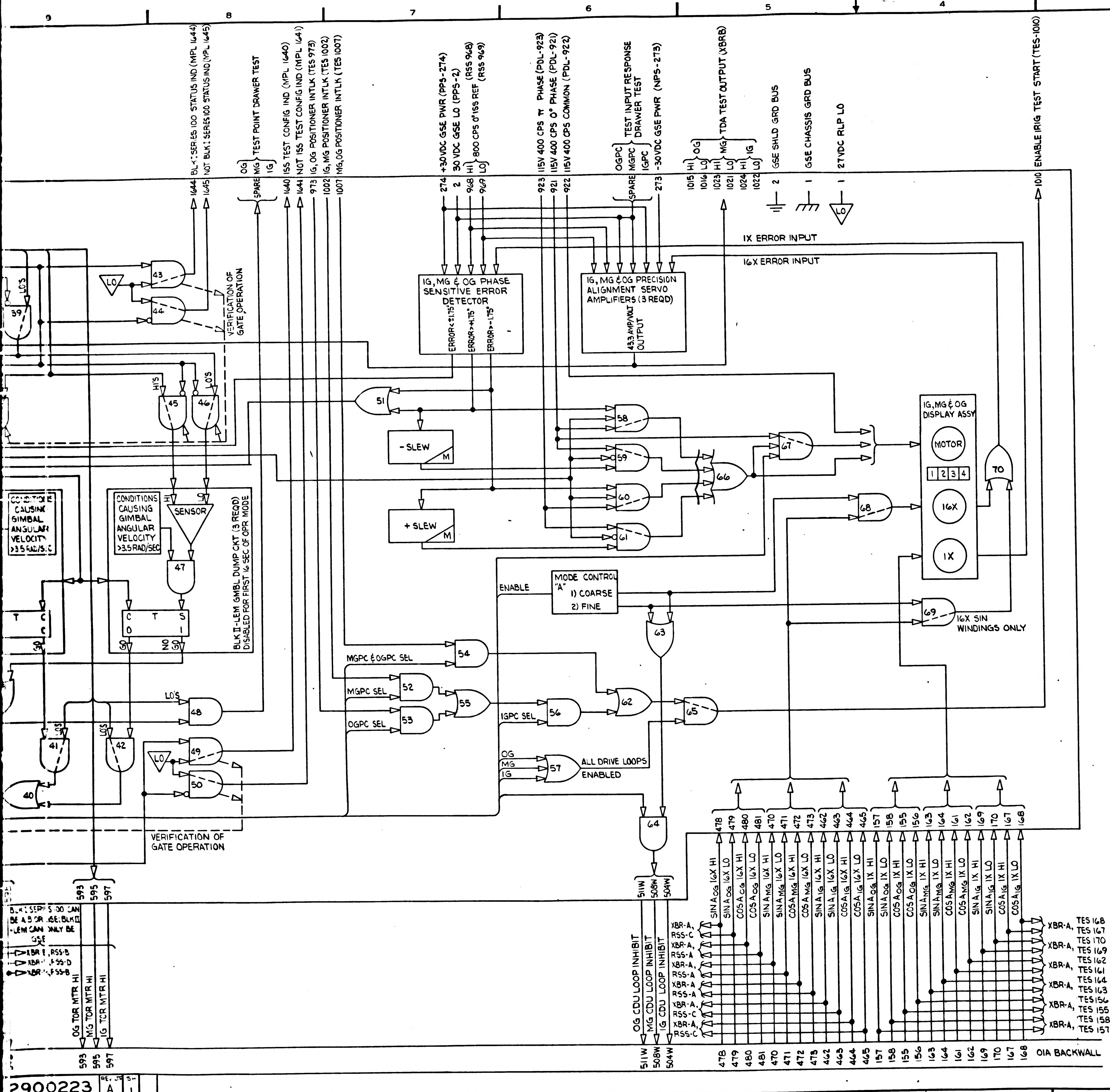
2H


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
J1
1 0 VDC IMU
2 IG TDA OUTPUT
3 3200 ~ 20V ØA HI
4 3200 ~ 20V CT
5 SPARE
6 ERROR SIG MON. MG
7 IG
8 SPARE
9 TDA OUTPUT MG
10 OG
11 3200 CPS DRIVE MON.
12 3200 ~ 20V LO (ØB)
13 OG ERROR SIG. MON.
14 IMU GIM. & GYRO ERR. LO
15 SPARE
16 SPARE
17 COMP 3200 PPS IN Ø SYNC SET
18 COMP 3200 PPS OUT Ø SYNC RESET
19 SPARE
20 IG CDU 1X RSVR ERR.
21 IG CDU ERR. SIG RET.
22 SPARE
23 SERVO AMPL INPUT IG
24 MG
25 SPARE
26 0 VDC IMU
27 MG CDU 1X RSVR ERR
28 MG CDU ERR. SIG RET
29 SPARE
30 SPARE
31 OG SERVO AMPL INPUT
32 0 VDC IMU
33 -28 VDC
34 2V 1% 3200 CPS
35 OG CDU 1X RSVR ERR
36 OG CDU ERR SIG RET
37 SPARE
38 SPARE
J196
J2
1 0 VDC IMU
2 COMP 800 PPS IN Ø SYNC SET
3 COMP 25.6 K PPS IN Ø SYNC SET
4 SPARE
5 SPARE
6 SPARE
7 SPARE
8 SPARE
9 800 CPS MOTOR DR.
10 800 CPS 1% MONITOR
11 COMP 800 PPS OUT Ø SYNC RESET
12 COMP 25.6 KPPS OUT Ø SYNC RESET
13 120 VDC MON. (IRIG)
14 12 VDC (IRIG)
15 32 VDC (IRIG)
16 SPARE
17 800 CPS 5% 90° MON
18 800 CPS 28V IMU WHEELS ØA 5%
19 SPARE
20 WIRED SPARE
21 WIRED SPARE
22 SPARE
23 SPARE
24 SPARE
25 SPARE
26 SPARE
27 0 VDC OPTICS
28 25.6 KC OPT. HI
29 SPARE
30 SPARE
31 SPARE
32 SPARE
33 SPARE
34 SPARE
35 0 VDC IMU
36 25.6 KC IMU HI
37 SPARE
38 SPARE
J197
J3
1 0 VDC IMU
2 AC AMP OUT X PIPA
3 Y PIPA
4 SPARE
5 SPARE
6 SPARE
7 SPARE
8 SPARE
9 X PIPA TOR CUR MON HI
10 Y PIPA TOR CUR MON HI
11 X GYRO TOR CUR MON HI
12 SPARE
13 SPARE
14 SPARE
15 SPARE
16 SPARE
17 X PIPA TOR CUR MON RET
18 Y PIPA TOR CUR MON RET
19 X GYRO TOR CUR MON RET
20 X PIPA PVR
21 X PIPA PVR RET
22 SPARE
23 P PULSES X PIPA
24 Y PIPA
25 SPARE
26 SPARE
27 Y PIPA PVR
28 Y PIPA PVR RET
29 SPARE
30 0 VDC IMU
31 N PULSES X PIPA
32 Y PIPA
33 SPARE
34 SPARE
35 X GYRO PVR
36 X GYRO PVR RET
37 0 VDC IMU
38 SPARE
AC A1
AC A2
AC A3
AC A4
PULSE A5
PULSE A6
AC A7
AC A8
AC A9
AC A10
AC A11
AC A12
AC A16
+28 VDC
VOLTAGE DIVIDER +2 VDC
39
40
41
42
43
44
45
46
47
OG SERVO TEST M
MG SERVO TEST M
IG SERVO TEST M
2900221
REV L
SH 2

16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
J1.
0 VDC IMU 1
IG TDA OUTPUT 2
3200 ~ 20V ØA HI 3
3200 ~ 20V CT 4
SPARE 5
ERROR SIG MON. MG 6
ERROR SIG MON. IG 7
SPARE 8
TDA OUTPUT MG 9
TDA OUTPUT OG 10
3200 CPS DRIVE MON. 11
3200 ~ 20V LO (ØB) 12
OG ERROR SIG. MON. 13
IMU GIM. & GYRO ERR. LO 14
SPARE 15
SPARE 16
COMP 3200 PPS IN Ø SYNC SET 17
COMP 3200 PPS OUT Ø SYNC RESET 18
SPARE 19
IG CDU IX RSVR ERR. 20
IG CDU ERR. SIG RET. 21
SPARE 22
SERVO AMPL. INPUT IG 23
SERVO AMPL. INPUT MG 24
SPARE 25
0 VDC IMU 26
MG CDU IX RSVR ERR 27
MG CDU ERR. SIG RET 28
SPARE 29
SPARE 30
OG SERVO AMPL. INPUT 31
0 VDC IMU 32
-28 VDC 33
2V 1% 3200 CPS 34
OG CDU IX RSVR ERR 35
OG CDU ERR SIG RET 36
SPARE 37
SPARE 38
J196
J2
0 VDC IMU 1
COMP 800 PPS IN Ø SYNC SET 2
COMP 25.6 K PPS IN Ø SYNC SET 3
SPARE 4
SPARE 5
SPARE 6
SPARE 7
SPARE 8
800 CPS MOTOR DR. 9
800 CPS 1% MONITOR 10
COMP 800 PPS OUT Ø SYNC RESET 11
COMP 25.6 KPPS OUT Ø SYNC RESET 12
120 VDC MON. (IRIG) 13
12 VDC (IRIG) 14
32 VDC (IRIG) 15
SPARE 16
800 CPS 5% 90° MON 17
800 CPS 28V IMU WHEELS ØA 5% 18
SPARE 19
WIRED SPARE 20
WIRED SPARE 21
SPARE 22
SPARE 23
SPARE 24
SPARE 25
SPARE 26
0 VDC OPTICS 27
25.6 KC OPT. HI 28
SPARE 29
SPARE 30
SPARE 31
SPARE 32
SPARE 33
SPARE 34
0 VDC IMU 35
25.6 KC IMU HI 36
SPARE 37
SPARE 38
J197
J3
0 VDC IMU 1
AC AMP OUT X PIPA 2
AC AMP OUT Y PIPA 3
SPARE 4
SPARE 5
SPARE 6
SPARE 7
SPARE 8
X PIPA TOR CUR MON HI 9
Y PIPA TOR CUR MON HI 10
X GYRO TOR CUR MON HI 11
SPARE 12
SPARE 13
SPARE 14
SPARE 15
SPARE 16
X PIPA TOR CUR MON RET 17
Y PIPA TOR CUR MON RET 18
X GYRO TOR CUR MON RET 19
X PIPA PVR 20
X PIPA PVR RET 21
SPARE 22
P PULSES X PIPA 23
P PULSES Y PIPA 24
SPARE 25
SPARE 26
Y PIPA PVR 27
Y PIPA PVR RET 28
SPARE 29
0 VDC IMU 30
N PULSES X PIPA 31
N PULSES Y PIPA 32
SPARE 33
SPARE 34
X GYRO PVR 35
X GYRO PVR RET 36
0 VDC IMU 37
SPARE 38
AC A1
AC A2
AC A3
AC A4
PULSE A5
PULSE A6
AC A7
AC A8
AC A9
AC A10
AC A11
AC A12
AC A16
1 2 3 4 5
+28 VDC
VOLTAGE DIVIDER +2VDC
39
40
41
42
43
44
45
46
47
OG SERVO TEST M
MG SERVO TEST M
IG SERVO TEST M
2900221 REV L SH 2

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		31 AUG 65	2L

G254



BLK I SERIES 100 STATUS IND (MPL 1644)
NOT BLK I SERIES 100 STATUS IND (MPL 1645)
OG
MG
IG
SPARE
TEST POINT DRAWER TEST
ISS TEST CONFIG IND (MPL 1640)
NOT ISS TEST CONFIG IND (MPL 1641)
IG, OG POSITIONER INTLK (TES 973)
IG, MG POSITIONER INTLK (TES 1002)
MG, OG POSITIONER INTLK (TES 1007)
+30VDC GSE PWR (PPS-274)
30 VDC GSE LO (PPS-2)
800 CPS 0° ISS REF (RSS 968) (RSS 969)
HI
LO
115V 400 CPS π PHASE (PDL-923)
115V 400 CPS 0° PHASE (PDL-921)
115V 400 CPS COMMON (PDL-922)
OGPC
MGPC
IGPC
TEST INPUT RESPONSE DRAWER TEST
-30VDC GSE PWR (NPS-273)
TDA TEST OUTPUT (XBRB)
GSE SHLD GRD BUS
GSE CHASSIS GRD BUS
27VDC RLP LO
ENABLE IRIG TEST START (TES-1010)
1644
1645
1640
1641
973
1002
1007
274
2
968
969
923
921
922
273
1015
1016
1023
1021
1024
1022
1
1010
1X ERROR INPUT
16X ERROR INPUT
IG, MG & OG PHASE SENSITIVE ERROR DETECTOR
ERROR<±1.15°
ERROR>+1.15°
ERROR>-1.15°
IG, MG & OG PRECISION ALIGNMENT SERVO AMPLIFIERS (3 REQD)
43.3 AMP/VOLT OUTPUT
LO
LO'S
HI'S
VERIFICATION OF GATE OPERATION
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
-SLEW
+SLEW
M
SENSOR
CONDITIONS CAUSING GIMBAL ANGULAR VELOCITY >3.5 RAD/SEC
BLK II-LEM GMBL DUMP CKT (3 REQD) DISABLED FOR FIRST 16 SEC OF OPR MODE
C
T
S
D
NO
IG, MG & OG DISPLAY ASSY
MOTOR
1 2 3 4
16X
1X
MODE CONTROL "A"
1) COARSE
2) FINE
ENABLE
16X SIN WINDINGS ONLY
MGPC & OGPC SEL
MGPC SEL
OGPC SEL
IGPC SEL
OG
MG
IG
ALL DRIVE LOOPS ENABLED
VERIFICATION OF GATE OPERATION
BLK I SERIES 100 CAN BE A SOURCE; BLK II LEM CAN ONLY BE GSE
XBR-I, RSS-B
XBR-I, RSS-D
XBR-I, RSS-B
OG TOR MTR HI
MG TOR MTR HI
IG TOR MTR HI
593
595
597
OG CDU LOOP INHIBIT
MG CDU LOOP INHIBIT
IG CDU LOOP INHIBIT
511W
508W
504W
SIN A OG 16X HI
SIN A OG 16X LO
COS A OG 16X HI
COS A OG 16X LO
SIN A MG 16X HI
SIN A MG 16X LO
COS A MG 16X HI
COS A MG 16X LO
SIN A IG 16X HI
SIN A IG 16X LO
COS A IG 16X HI
COS A IG 16X LO
SIN A OG 1X HI
SIN A OG 1X LO
COS A OG 1X HI
COS A OG 1X LO
SIN A MG 1X HI
SIN A MG 1X LO
COS A MG 1X HI
COS A MG 1X LO
SIN A IG 1X HI
SIN A IG 1X LO
COS A IG 1X HI
COS A IG 1X LO
478
479
480
481
470
471
472
473
462
463
464
465
157
158
155
156
163
164
161
162
169
170
167
168
XBR-A, RSS-C
XBR-A, RSS-A
XBR-A, RSS-A
XBR-A, RSS-A
XBR-A, RSS-C
XBR-A, RSS-C
XBR-A, TES 168
TES 167
XBR-A, TES 170
TES 169
XBR-A, TES 162
TES 161
XBR-A, TES 164, MPL 164
TES 163, MPL 163
XBR-A, TES 156
TES 155
XBR-A, TES 158
TES 157
01A BACKWALL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	AC SPARK PLUG DIVISION, GMC MILWAUKEE WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
FRACTIONS ± — DECIMALS ± — ANGLES ± —	ACSP PN DRAWN Lockman DATE 4 MAY 65 CHECKED Ed [illegible] APPROVAL [illegible] APPROVAL	MECHANIZATION DIAGRAM- GIMBAL POSITION CONTROL (BLOCK I SERIES 100, BLOCK II & LEM)
DO NOT SCALE THIS DRAWING MATERIAL —	NASA APPROVAL [illegible]	CODE IDENT NO 99974 SIZE J2 2900223
CONTRACT NAS 9-497	MIT APPROVAL [illegible]	SCALE — SHEET 1 OF 4

2900223 REV. A SH 1

2H

27 2900223

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM):

		AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR)
	RLP	RELAY & LAMP POWER SUPPLY
	PPS	+30 VDC POWER SUPPLY
	NPS	-30 VDC POWER SUPPLY
2900208		POWER & DUMMY LOAD PANEL-PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL)
2900207		MONITOR PANEL (MPL)
		TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900201		TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
		TEST SELECTOR PANEL (TES)
2900217		SIGNAL SELECTION & MEASUREMENT
	XBR-A	CROSSBAR- AC SIGNALS
	XBR-B	CROSSBAR- DC SIGNALS
2900218		OSCILLOGRAPH SIGNAL SELECTION
	RSS-B	TO FIXED DC CHANNEL
	RSS-C	TO SWITCHABLE AC CHANNEL
	RSS-D	TO SWITCHABLE DC CHANNEL
2900215		MEASUREMENT REFERENCE POWER SUPPLIES
	RSS	OSCILLOGRAPH SIGNAL SELECTOR
		GSE GROUNDING (BLOCK I SERIES 100)
		GSE GROUNDING (BLOCK II & LEM)

4. NONSTANDARD SYMBOLOGY

INDICATES "AND" GATE WITH SWITCHED SIGNAL

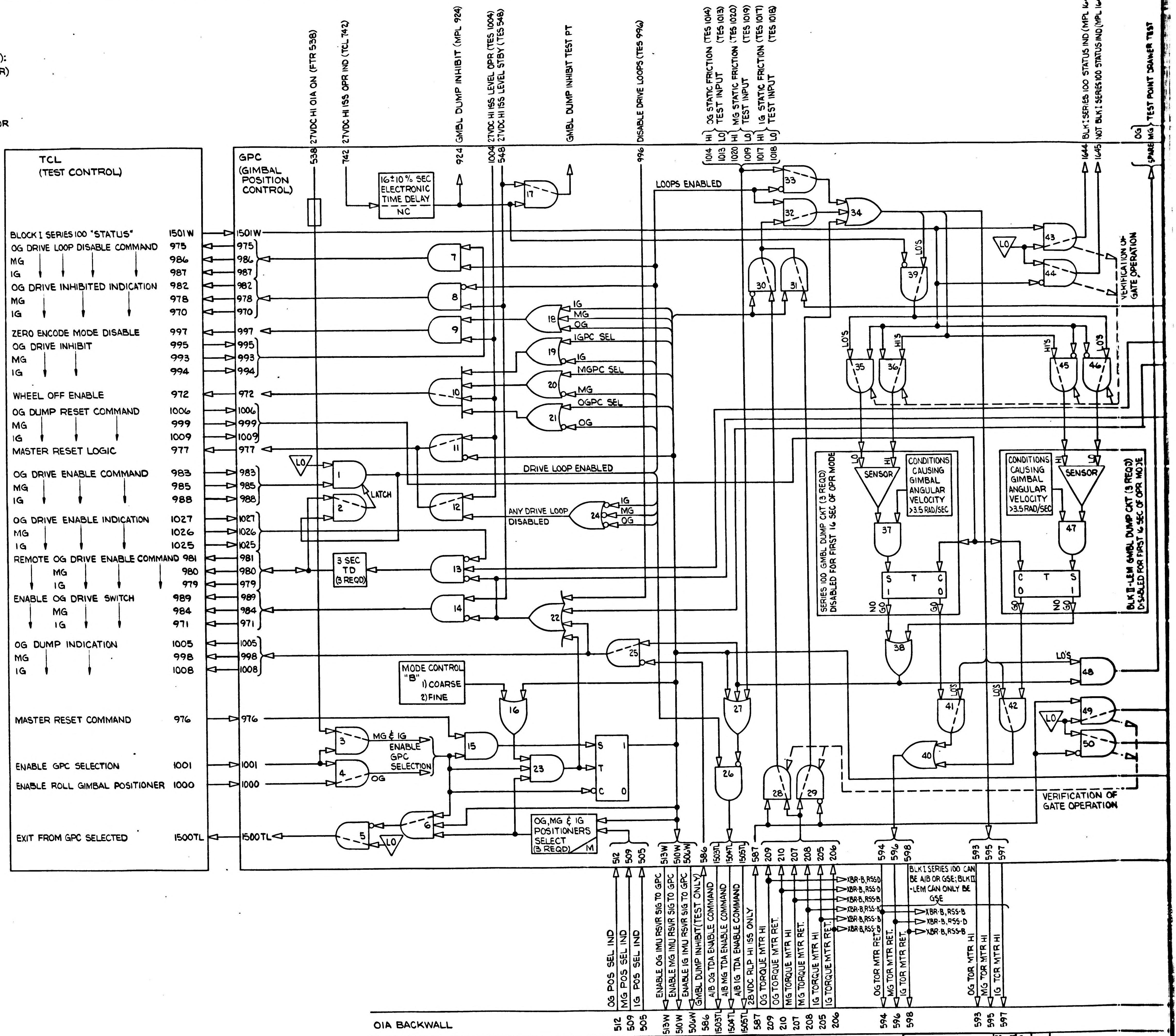
NAME M INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G/N CONFIGURATIONS
   - E. TW, TL OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

6. SIGNAL FLOW FOR THE INNER, MIDDLE & OUTER GIMBAL LOOPS IS SHOWN FLOWING THROUGH THE SAME LOGIC SYMBOLOGY DUE TO SIMILARITY OF THE THREE LOOPS. ANY INDIVIDUAL LOOP CAN BE EXAMINED BY USING ONLY THE RESPECTIVE LOOP SIGNALS AND DISREGARDING THE OTHERS.

7. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK I SERIES 100	SH 1 SH 2
BLOCK II	SH 1 SH 3
LEM	SH 1 SH 4

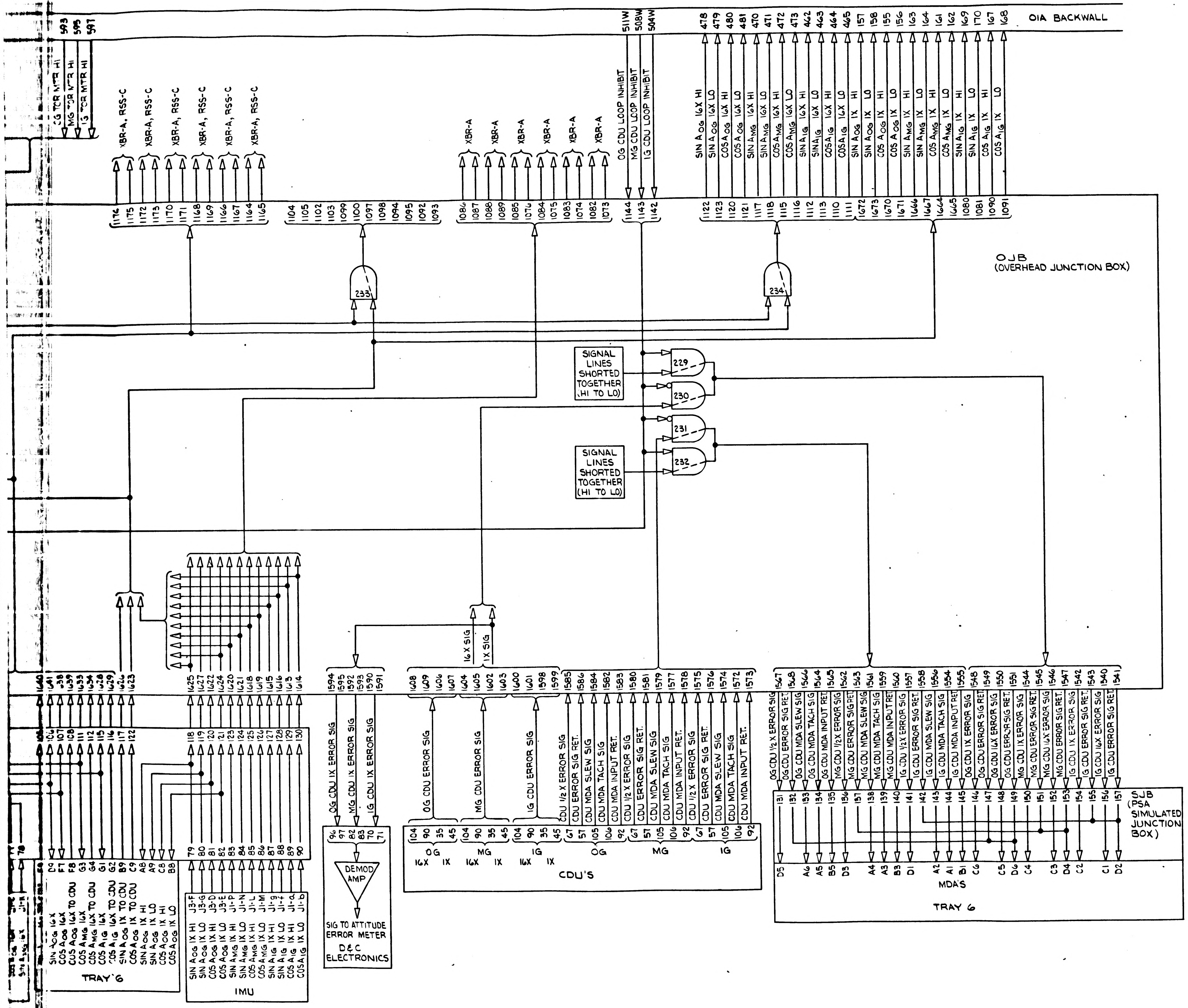

TCL
(TEST CONTROL)
BLOCK I SERIES 100 "STATUS" 1501W
OG DRIVE LOOP DISABLE COMMAND 975
MG 986
IG 987
OG DRIVE INHIBITED INDICATION 982
MG 978
IG 970
ZERO ENCODE MODE DISABLE 997
OG DRIVE INHIBIT 995
MG 993
IG 994
WHEEL OFF ENABLE 972
OG DUMP RESET COMMAND 1006
MG 999
IG 1009
MASTER RESET LOGIC 977
OG DRIVE ENABLE COMMAND 983
MG 985
IG 988
OG DRIVE ENABLE INDICATION 1027
MG 1026
IG 1025
REMOTE OG DRIVE ENABLE COMMAND 981
MG 980
IG 979
ENABLE OG DRIVE SWITCH 989
MG 984
IG 971
OG DUMP INDICATION 1005
MG 998
IG 1008
MASTER RESET COMMAND 976
ENABLE GPC SELECTION 1001
ENABLE ROLL GIMBAL POSITIONER 1000
EXIT FROM GPC SELECTED 1500TL
GPC
(GIMBAL POSITION CONTROL)
538 27VDC HI OIA ON (FTR 538)
742 27VDC HI ISS OPR IND (TCL 742)
924 GMBL DUMP INHIBIT (MPL 924)
1004 27VDC HI ISS LEVEL OPR (TES 1004)
548 27VDC HI ISS LEVEL STBY (TES 548)
GMBL DUMP INHIBIT TEST PT
996 DISABLE DRIVE LOOPS (TES 996)
1014 HI OG STATIC FRICTION (TES 1014)
1013 LO TEST INPUT (TES 1013)
1020 HI MG STATIC FRICTION (TES 1020)
1019 LO TEST INPUT (TES 1019)
1017 HI IG STATIC FRICTION (TES 1017)
1018 LO TEST INPUT (TES 1018)
1644 BLK I SERIES 100 STATUS IND (MPL 1644)
1645 NOT BLK I SERIES 100 STATUS IND (MPL 1645)
SPARE OG MG TEST POINT DRAWER TEST
16±10% SEC ELECTRONIC TIME DELAY NC
LOOPS ENABLED
LO
LO'S
HI'S
VERIFICATION OF GATE OPERATION
IG MG OG
IGPC SEL
MGPC SEL
OGPC SEL
DRIVE LOOP ENABLED
ANY DRIVE LOOP DISABLED
LATCH
3 SEC TD (3 REQD)
MODE CONTROL "B" 1) COARSE 2) FINE
MG & IG ENABLE GPC SELECTION
OG
OG, MG & IG POSITIONERS SELECT (3 REQD) M
S T C
1 0
SENSOR
CONDITIONS CAUSING GIMBAL ANGULAR VELOCITY >3.5 RAD/SEC
NO GO
SERIES 100 GMBL DUMP CKT (3 REQD) DISABLED FOR FIRST 16 SEC OF OPR MODE
BLK II-LEM GMBL DUMP CKT (3 REQD) DISABLED FOR FIRST 16 SEC OF OPR MODE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
512 OG POS SEL IND
509 MG POS SEL IND
505 IG POS SEL IND
513W ENABLE OG IMU RSVR SIG TO GPC
510W ENABLE MG IMU RSVR SIG TO GPC
506W ENABLE IG IMU RSVR SIG TO GPC
586 GMBL DUMP INHIBIT (TEST ONLY)
1503TL A/B OG TDA ENABLE COMMAND
1504TL A/B MG TDA ENABLE COMMAND
1505TL A/B IG TDA ENABLE COMMAND
587 28VDC RLP HI ISS ONLY
209 OG TORQUE MTR HI
210 OG TORQUE MTR RET.
207 MG TORQUE MTR HI
208 MG TORQUE MTR RET.
205 IG TORQUE MTR HI
206 IG TORQUE MTR RET.
XBR-B, RSS-D
XBR-B, RSS-D
XBR-B, RSS-B
XBR-B, RSS-B
XBR-B, RSS-B
XBR-B, RSS-B
594 OG TOR MTR RET.
596 MG TOR MTR RET.
598 IG TOR MTR RET.
XBR-B, RSS-B
XBR-B, RSS-D
XBR-B, RSS-B
BLK I SERIES 100 CAN BE A/B OR GSE; BLK II -LEM CAN ONLY BE GSE
593 OG TOR MTR HI
595 MG TOR MTR HI
597 IG TOR MTR HI
OIA BACKWALL

2900223	REV A	SH 1

1/2900223

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		31 AUG 65	RLP

19254

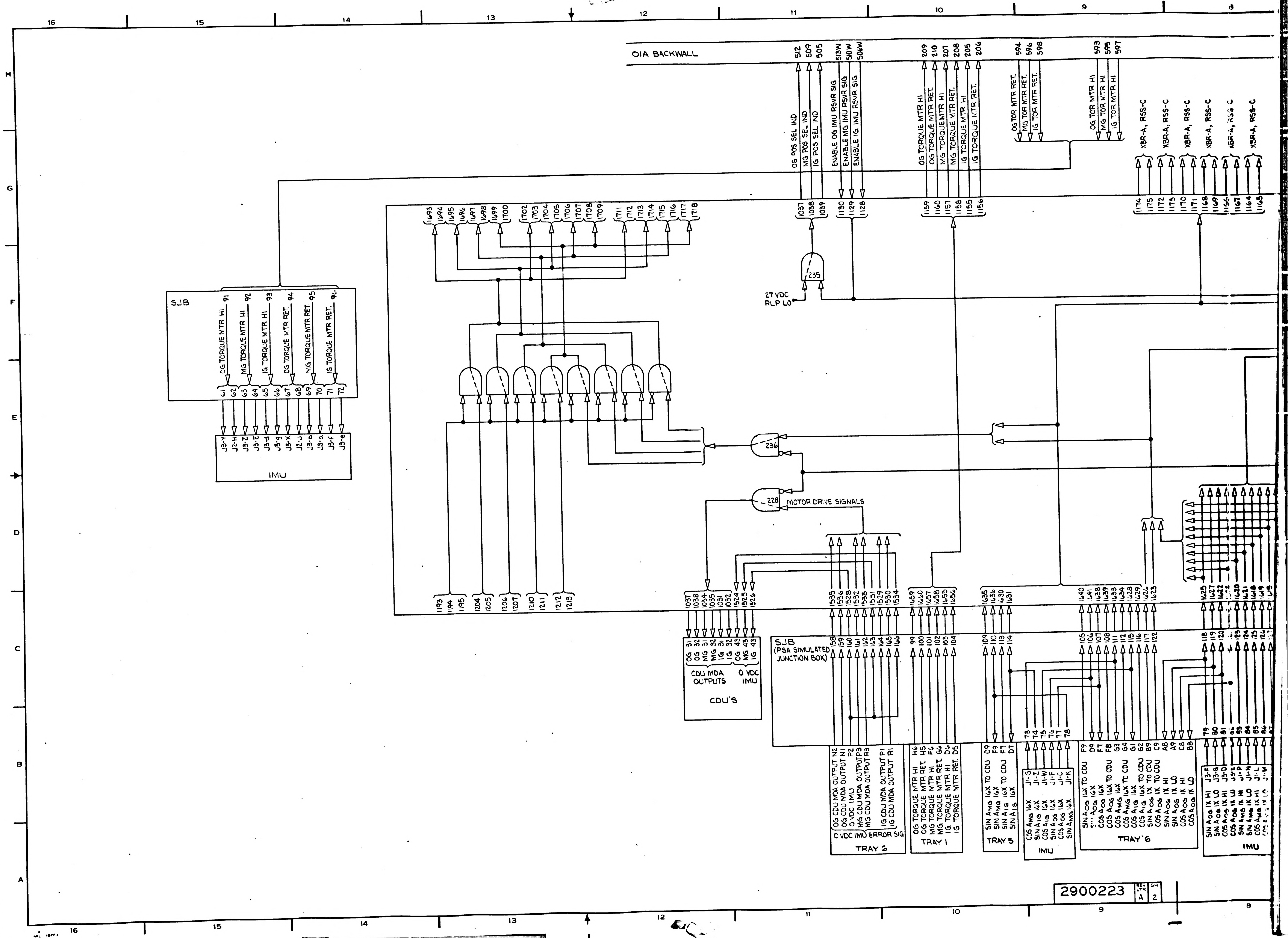


OIA BACKWALL
593
595
597
OG TQR MTR HI
MG TQR MTR HI
IG TQR MTR HI
XBR-A, RSS-C
XBR-A
511W
508W
504W
OG CDU LOOP INHIBIT
MG CDU LOOP INHIBIT
IG CDU LOOP INHIBIT
SIN A OG 16X HI
SIN A OG 16X LO
COS A OG 16X HI
SIN A MG 16X HI
COS A MG 16X HI
SIN A IG 16X HI
COS A IG 16X HI
SIN A OG 1X HI
COS A OG 1X HI
SIN A MG 1X HI
COS A MG 1X HI
SIN A IG 1X HI
COS A IG 1X HI
OJB
(OVERHEAD JUNCTION BOX)
233
234
229
230
231
232
SIGNAL LINES SHORTED TOGETHER (HI TO LO)
16X SIG
1X SIG
OG CDU 1X ERROR SIG
MG CDU 1X ERROR SIG
IG CDU 1X ERROR SIG
OG CDU ERROR SIG
MG CDU ERROR SIG
IG CDU ERROR SIG
CDU 1/2 X ERROR SIG
CDU ERROR SIG RET.
CDU MDA SLEW SIG
CDU MDA TACH SIG
CDU MDA INPUT RET.
DEMOD AMP
SIG TO ATTITUDE ERROR METER
D&C ELECTRONICS
OG
MG
IG
16X
1X
CDU'S
OG CDU 1/2 X ERROR SIG
OG CDU ERROR SIG RET.
OG CDU MDA SLEW SIG
OG CDU MDA TACH SIG
MG CDU 1/2 X ERROR SIG
MG CDU ERROR SIG RET.
MG CDU MDA SLEW SIG
MG CDU MDA TACH SIG
MG CDU MDA INPUT RET.
IG CDU 1/2 X ERROR SIG
IG CDU ERROR SIG RET.
IG CDU MDA SLEW SIG
IG CDU MDA TACH SIG
IG CDU MDA INPUT RET.
OG CDU 1X ERROR SIG
OG CDU 16X ERROR SIG
MG CDU 1X ERROR SIG
MG CDU 16X ERROR SIG RET.
IG CDU 1X ERROR SIG
IG CDU 16X ERROR SIG
SJB (PSA SIMULATED JUNCTION BOX)
MDA'S
TRAY 6
SIN A OG 16X
COS A OG 16X
COS A MG 16X TO CDU
SIN A IG 16X TO CDU
COS A IG 16X TO CDU
SIN A OG 1X TO CDU
COS A OG 1X TO CDU
SIN A OG 1X HI
SIN A OG 1X LO
TRAY 6
J3-F
J3-G
J3-D
J3-E
J1-P
J1-N
J1-L
J1-M
J1-9
J1-a
J1-b
SIN A OG 1X HI
SIN A OG 1X LO
COS A OG 1X HI
COS A OG 1X LO
SIN A MG 1X HI
COS A MG 1X HI
SIN A IG 1X HI
COS A IG 1X HI
COS A IG 1X LO
IMU

2900223 REV LTR A SH 2

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON	AC SPARK PLUG DIVISION. GMC MILWAUKEE WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
FRACTIONS ± — DECIMALS ± — ANGLES ± —	ACSP PN DRAWN Cookman DATE 8 MAY 25 CHECKED APPROVAL APPROVAL	MECHANIZATION DIAGRAM - GIMBAL POSITION CONTROL (BLOCK I SERIES 100).
DO NOT SCALE THIS DRAWING MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974 SIZE J_2 2900223
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — SHEET 2 OF 4

2729 00223


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
OIA BACKWALL
512
509
505
513W
510W
506W
209
210
207
208
205
206
594
596
598
593
595
597
OG POS SEL IND
MG POS SEL IND
IG POS SEL IND
ENABLE OG IMU RSVR SIG
ENABLE MG IMU RSVR SIG
ENABLE IG IMU RSVR SIG
OG TORQUE MTR HI
OG TORQUE MTR RET.
MG TORQUE MTR HI
MG TORQUE MTR RET.
IG TORQUE MTR HI
IG TORQUE MTR RET.
OG TOR MTR RET.
MG TOR MTR RET.
IG TOR MTR RET.
OG TOR MTR HI
MG TOR MTR HI
IG TOR MTR HI
XBR-A, RSS-C
1693
1694
1695
1696
1697
1698
1699
1700
1702
1703
1704
1705
1706
1707
1708
1709
1711
1712
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1714
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1716
1717
1718
1037
1038
1039
1130
1129
1128
1159
1160
1157
1158
1155
1156
1174
1175
1172
1173
1170
1171
1168
1169
1166
1167
1164
1165
235
27 VDC
RLP LO
SJB
91
92
93
94
95
96
OG TORQUE MTR HI
MG TORQUE MTR HI
IG TORQUE MTR HI
OG TORQUE MTR RET.
MG TORQUE MTR RET.
IG TORQUE MTR RET.
61
62
63
64
65
66
67
68
69
70
71
72
J3-Y
J2-H
J3-Z
J3-c
J3-d
J3-g
J3-X
J2-J
J3-b
J3-a
J3-f
J3-e
IMU
236
228
MOTOR DRIVE SIGNALS
1193
1194
1195
1204
1205
1206
1207
1210
1211
1212
1213
1037
1038
1034
1035
1031
1032
1524
1525
1526
OG 31
OG 32
MG 31
MG 32
IG 31
IG 32
OG 43
MG 43
IG 43
CDU MDA OUTPUTS
0 VDC IMU
CDU'S
1535
1536
1528
1532
1533
1531
1529
1530
1534
1659
1660
1657
1658
1655
1656
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1636
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1633
1634
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1629
1626
1623
1625
1627
1622
1620
1621
1618
1619
1615
SJB
(PSA SIMULATED
JUNCTION BOX)
158
159
160
161
162
163
164
165
166
99
100
101
102
103
104
109
110
113
114
105
106
107
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111
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115
116
117
122
118
119
120
123
124
125
126
73
74
75
76
77
78
79
80
81
OG CDU MDA OUTPUT N2
OG CDU MDA OUTPUT N1
0 VDC IMU P2
MG CDU MDA OUTPUT P3
MG CDU MDA OUTPUT R3
IG CDU MDA OUTPUT P1
IG CDU MDA OUTPUT R1
0 VDC IMU ERROR SIG
TRAY 6
OG TORQUE MTR HI H6
OG TORQUE MTR RET. H5
MG TORQUE MTR HI F6
MG TORQUE MTR RET. G6
IG TORQUE MTR HI D6
IG TORQUE MTR RET. D5
TRAY 1
SIN AMG 16X TO CDU D9
SIN AMG 16X F9
SIN AIG 16X TO CDU F7
SIN AIG 16X D7
TRAY 5
COS AMG 16X J1-G
SIN AIG 16X J1-Z
COS AIG 16X J1-W
SIN AOG 16X J1-F
COS AOG 16X J1-C
SIN AMG 16X J1-K
IMU
SIN AOG 16X TO CDU F9
SIN AOG 16X D9
COS AOG 16X F7
COS AOG 16X TO CDU F8
COS AMG 16X G3
COS AMG 16X TO CDU G4
COS AIG 16X G1
COS AIG 16X TO CDU G2
SIN AOG 1X TO CDU B9
COS AOG 1X TO CDU C9
SIN AOG 1X HI A8
SIN AOG 1X LO A9
COS AOG 1X HI C8
COS AOG 1X LO B8
TRAY 6
SIN AOG 1X HI J3-F
SIN AOG 1X LO J3-G
COS AOG 1X HI J3-D
COS AOG 1X LO J3-E
SIN AMG 1X HI J1-P
SIN AMG 1X LO J1-N
COS AMG 1X HI J1-L
COS AMG 1X LO J1-M
IMU

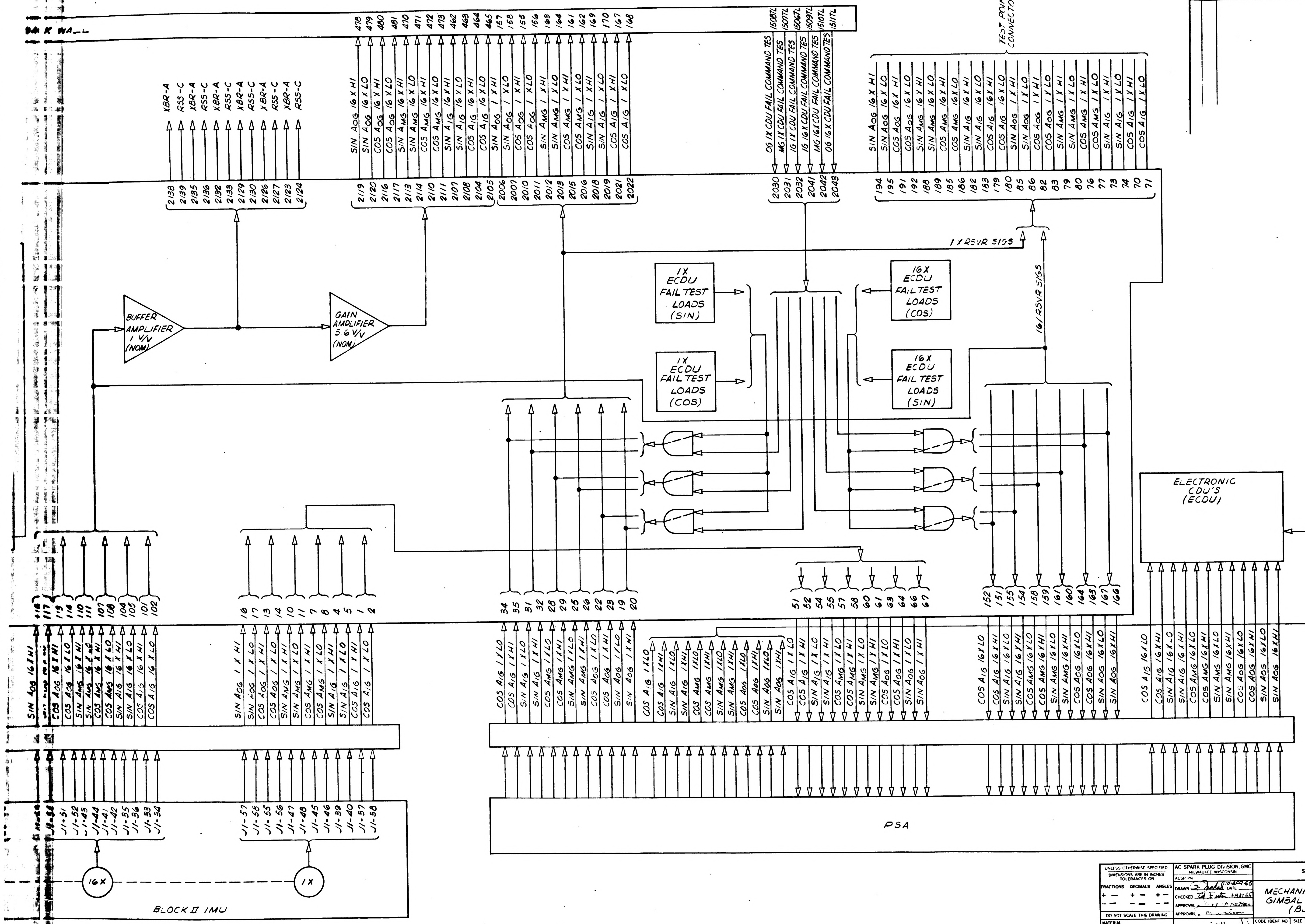
2900223 REV LTR A SH 2

LH

ES3005

1/2900223

REVISIONS 19254					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21917		31 AUG 65	



BACK WALL
XBR-A
RSS-C
SIN AOG 16X HI
SIN AOG 16X LO
COS AOG 16X HI
COS AOG 16X LO
SIN AMG 16X HI
SIN AMG 16X LO
COS AMG 16X HI
COS AMG 16X LO
SIN AIG 16X HI
SIN AIG 16X LO
COS AIG 16X HI
COS AIG 16X LO
SIN AOG 1X HI
SIN AOG 1X LO
COS AOG 1X HI
COS AOG 1X LO
SIN AMG 1X HI
SIN AMG 1X LO
COS AMG 1X HI
COS AMG 1X LO
SIN AIG 1X HI
SIN AIG 1X LO
COS AIG 1X HI
COS AIG 1X LO
OG 1X CDU FAIL COMMAND TES
MG 1X CDU FAIL COMMAND TES
IG 1X CDU FAIL COMMAND TES
IG 16X CDU FAIL COMMAND TES
MG 16X CDU FAIL COMMAND TES
OG 16X CDU FAIL COMMAND TES
15087L
15077L
15067L
15097L
15107L
15117L
TEST POINT CONNECTOR
2138 2139 2135 2136 2132 2133 2129 2130 2126 2127 2123 2124
2119 2120 2116 2117 2113 2114 2110 2111 2107 2108 2104 2105
2006 2007 2010 2011 2012 2013 2015 2016 2018 2019 2021 2022
2030 2031 2032 2041 2042 2043
194 195 191 192 188 189 185 186 182 183 179 180 85 86 82 83 79 80 76 77 73 74 70 71
478 479 480 481 470 471 472 473 462 463 464 465 157 158 155 156 163 164 161 162 169 170 167 168
1X RSVR SIGS
16X RSVR SIGS
BUFFER AMPLIFIER 1 V/V (NOM)
GAIN AMPLIFIER 5.6 V/V (NOM)
1X ECDU FAIL TEST LOADS (SIN)
1X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (SIN)
ELECTRONIC CDU'S (ECDU)
118 117 119 114 110 111 107 108 104 105 101 102
16 17 13 14 10 11 7 8 4 5 1 2
34 35 31 32 28 29 25 26 22 23 19 20
51 52 54 55 57 58 60 61 63 64 66 67
152 151 155 154 158 159 161 160 164 165 167 166
SIN AOG 16X HI
SIN AOG 16X LO
COS AOG 16X HI
SIN AMG 16X HI
SIN AMG 16X LO
COS AMG 16X HI
SIN AIG 16X HI
SIN AIG 16X LO
COS AIG 16X LO
SIN AOG 1X HI
SIN AOG 1X LO
COS AOG 1X LO
COS AMG 1X HI
COS AMG 1X LO
SIN AMG 1X HI
SIN AIG 1X HI
SIN AIG 1X LO
COS AIG 1X HI
COS AIG 1X LO
J1-51 J1-52 J1-43 J1-44 J1-41 J1-42 J1-35 J1-36 J1-33 J1-34
J1-57 J1-58 J1-55 J1-56 J1-47 J1-48 J1-45 J1-46 J1-39 J1-40 J1-37 J1-38
16X
1X
BLOCK II IMU
PSA

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN G. Nahal DATE 10 APR 65
CHECKED Ed Foster 4 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

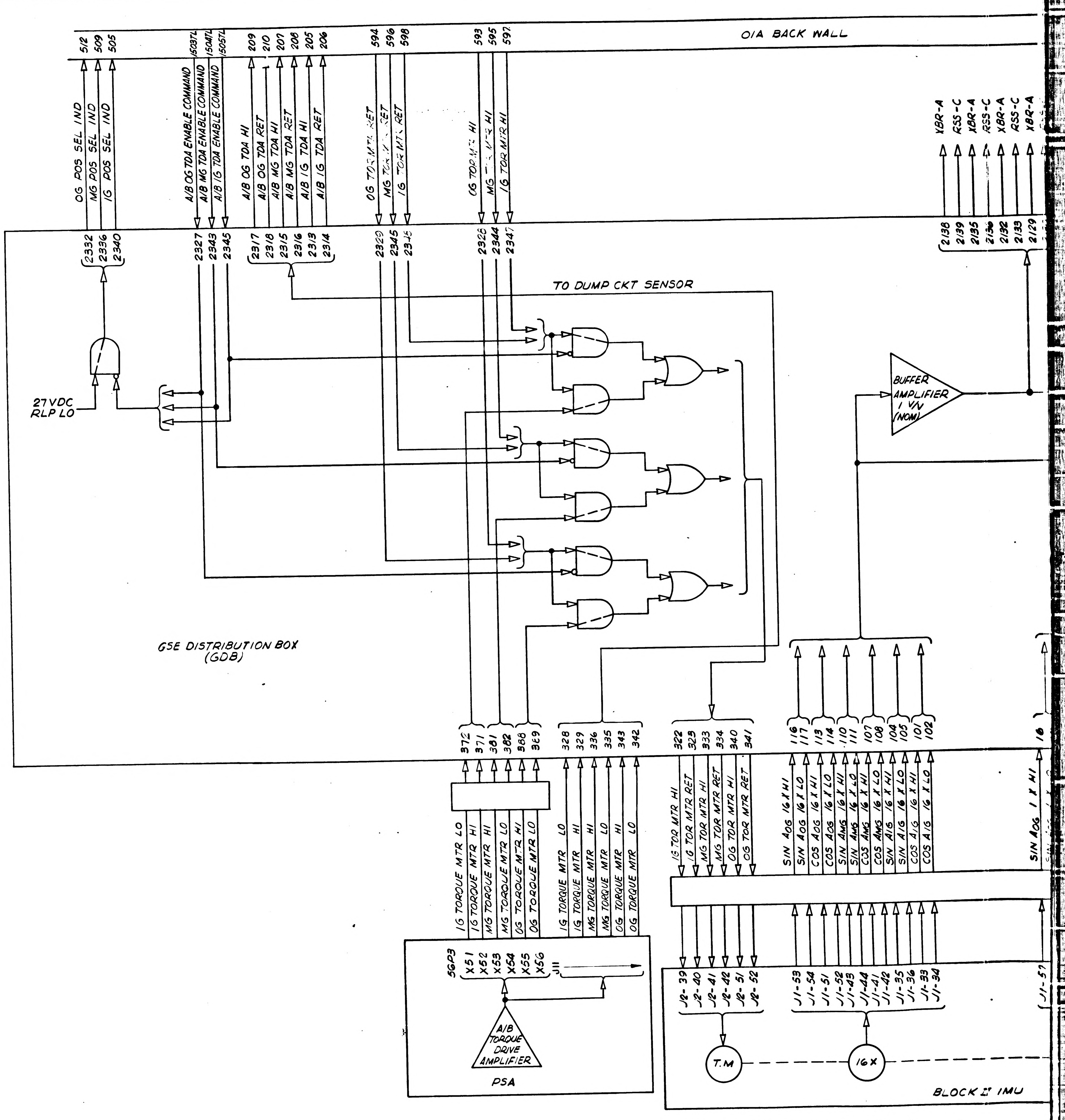
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
GIMBAL POSITION CONTROL
(BLOCK II)

CODE IDENT NO 99974
SIZE
2900223
SCALE NONE
SHEET 3 OF 4

2900223 A 3

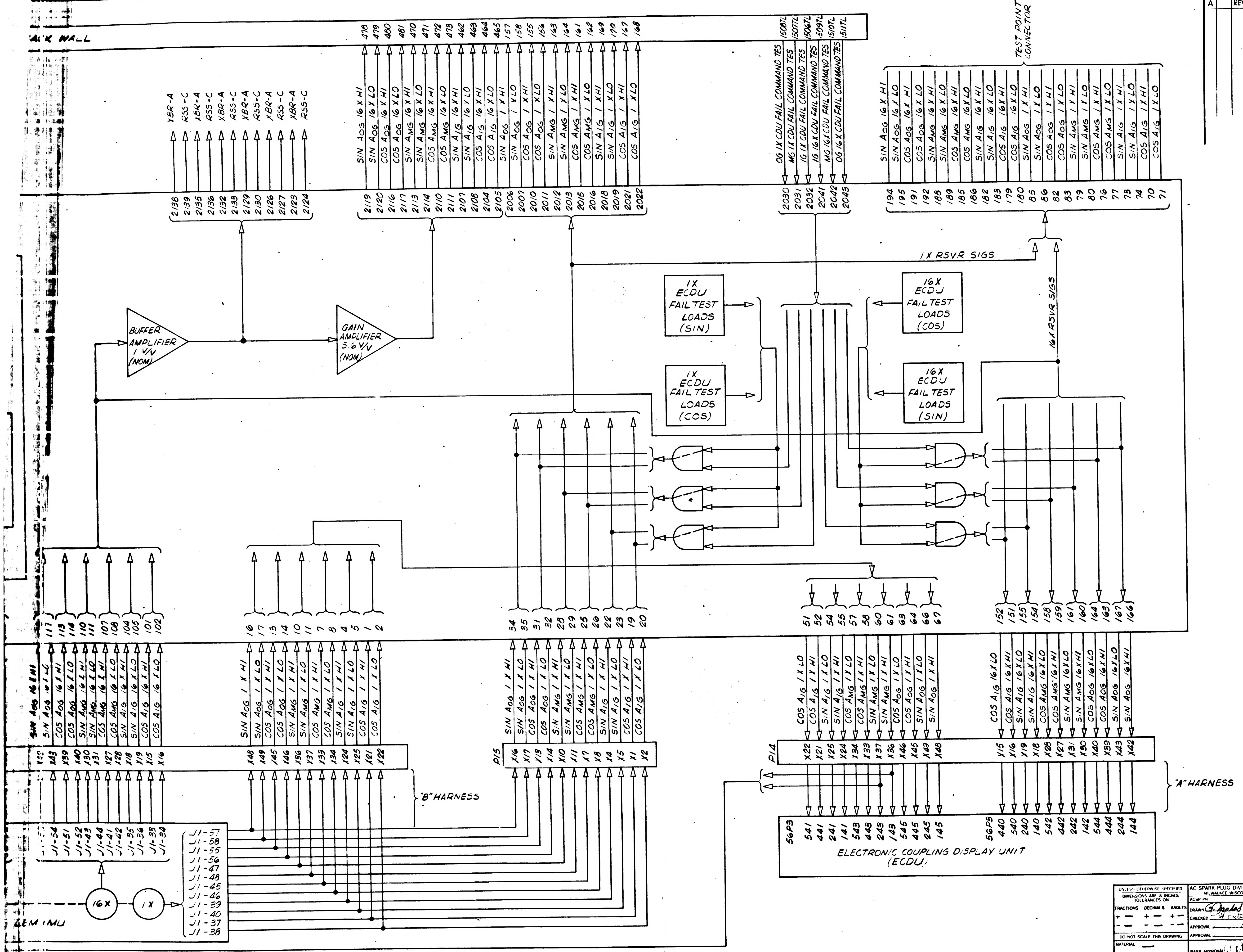
27 2900223


O/A BACK WALL
5/2
509
505
OG POS SEL IND
MG POS SEL IND
IG POS SEL IND
1503TL
1504TL
1505TL
A/B OG TDA ENABLE COMMAND
A/B MG TDA ENABLE COMMAND
A/B IG TDA ENABLE COMMAND
209
210
207
208
205
206
A/B OG TDA HI
A/B OG TDA RET
A/B MG TDA HI
A/B MG TDA RET
A/B IG TDA HI
A/B IG TDA RET
594
596
598
OG TOR MTR RET
MG TOR MTR RET
IG TOR MTR RET
593
595
597
OG TOR MTR HI
MG TOR MTR HI
IG TOR MTR HI
2332
2336
2340
2327
2343
2345
2317
2318
2315
2316
2313
2314
2329
2345
2346
2328
2344
2347
TO DUMP CKT SENSOR
27VDC RLP LO
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
XBR-A
2138
2139
2135
2136
2132
2133
2129
BUFFER AMPLIFIER 1 V/V (NOM)
GSE DISTRIBUTION BOX (GDB)
372
371
381
382
388
389
328
329
336
335
343
342
322
323
333
334
340
341
116
117
113
114
110
111
107
108
104
105
101
102
16
IG TORQUE MTR LO
IG TORQUE MTR HI
MG TORQUE MTR HI
MG TORQUE MTR LO
OG TORQUE MTR HI
OG TORQUE MTR LO
IG TORQUE MTR LO
IG TORQUE MTR HI
MG TORQUE MTR HI
MG TORQUE MTR LO
OG TORQUE MTR HI
OG TORQUE MTR LO
IG TOR MTR HI
IG TOR MTR RET
MG TOR MTR HI
MG TOR MTR RET
OG TOR MTR HI
OG TOR MTR RET
SIN AOG 16X HI
SIN AOG 16X LO
COS AOG 16X HI
COS AOG 16X LO
SIN AMG 16X HI
SIN AMG 16X LO
COS AMG 16X HI
COS AMG 16X LO
SIN AIG 16X HI
SIN AIG 16X LO
COS AIG 16X HI
COS AIG 16X LO
SIN AOG 1X HI
5GP3
X51
X52
X53
X54
X55
X56
J11
A/B TORQUE DRIVE AMPLIFIER
PSA
J2-39
J2-40
J2-41
J2-42
J2-51
J2-52
J1-53
J1-54
J1-51
J1-52
J1-43
J1-44
J1-41
J1-42
J1-35
J1-36
J1-33
J1-34
J1-57
T.M
16X
BLOCK II IMU

2900223 REV LT A SH 3

1/2900223

SYM	ZONE	REVISIONS DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21917		31 Aug 65	



...K WALL
TEST POINT CONNECTOR
XBR-A
RSS-C
SIN AOG 16X HI
SIN AOG 16X LO
COS AOG 16X HI
COS AOG 16X LO
SIN AMG 16X HI
COS AMG 16X HI
SIN AIG 16X HI
SIN AIG 16X LO
COS AIG 16X HI
COS AIG 16X LO
SIN AOG 1X HI
SIN AOG 1X LO
COS AOG 1X HI
COS AOG 1X LO
SIN AMG 1X HI
SIN AMG 1X LO
COS AMG 1X HI
COS AMG 1X LO
SIN AIG 1X HI
SIN AIG 1X LO
COS AIG 1X HI
COS AIG 1X LO
OG 1X CDU FAIL COMMAND TES
MG 1X CDU FAIL COMMAND TES
IG 1X CDU FAIL COMMAND TES
OG 16X CDU FAIL COMMAND TES
MG 16X CDU FAIL COMMAND TES
IG 16X CDU FAIL COMMAND TES
1508TL
1507TL
1504TL
1509TL
1510TL
1511TL
478 479 480 481 470 471 472 473 463 464 465 157 158 155 156 163 164 161 162 169 170 167 168
2138 2139 2135 2136 2132 2133 2129 2130 2126 2127 2123 2124
2119 2120 2116 2117 2113 2114 2110 2111 2107 2108 2104 2105 2006 2007 2010 2011 2012 2013 2015 2016 2018 2019 2021 2022
2030 2031 2032 2041 2042 2043
194 195 191 192 188 189 185 186 182 183 179 180 85 86 82 83 79 80 76 77 73 74 70 71
1X RSVR SIGS
16X RSVR SIGS
BUFFER AMPLIFIER 1 V/V (NOM)
GAIN AMPLIFIER 3.6 V/V (NOM)
1X ECDU FAIL TEST LOADS (SIN)
1X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (SIN)
117 118 113 114 110 111 107 108 104 105 101 102
16 17 13 14 10 11 7 8 4 5 1 2
34 35 31 32 28 29 25 26 22 23 19 20
51 52 54 55 57 58 60 61 63 64 66 67
152 151 155 154 158 159 161 160 164 163 167 166
SIN AOG 16X HI
SIN AOG 16X LO
COS AOG 16X HI
SIN AMG 16X HI
SIN AMG 16X LO
COS AMG 16X LO
SIN AIG 16X HI
SIN AIG 16X LO
COS AIG 16X LO
X32 X43 X39 X40 X30 X31 X27 X28 X18 X19 X15 X16
X48 X49 X45 X46 X36 X37 X33 X34 X24 X25 X21 X22
P15
X16 X17 X13 X14 X10 X11 X7 X8 X4 X5 X1 X2
P14
X22 X21 X25 X24 X34 X33 X37 X36 X46 X45 X49 X48
X15 X16 X19 X18 X28 X27 X31 X30 X40 X39 X43 X42
"B" HARNESS
"A" HARNESS
J1-54 J1-51 J1-52 J1-49 J1-44 J1-41 J1-42 J1-35 J1-36 J1-33 J1-34
J1-57 J1-58 J1-55 J1-56 J1-47 J1-48 J1-45 J1-46 J1-39 J1-40 J1-37 J1-38
16X
1X
LEM IMU
56P3
541 441 241 141 543 443 243 143 545 445 245 145
56P3
440 540 240 140 542 442 242 142 544 444 244 144
ELECTRONIC COUPLING DISPLAY UNIT (ECDU)

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN G. Drake DATE 8-APR-65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

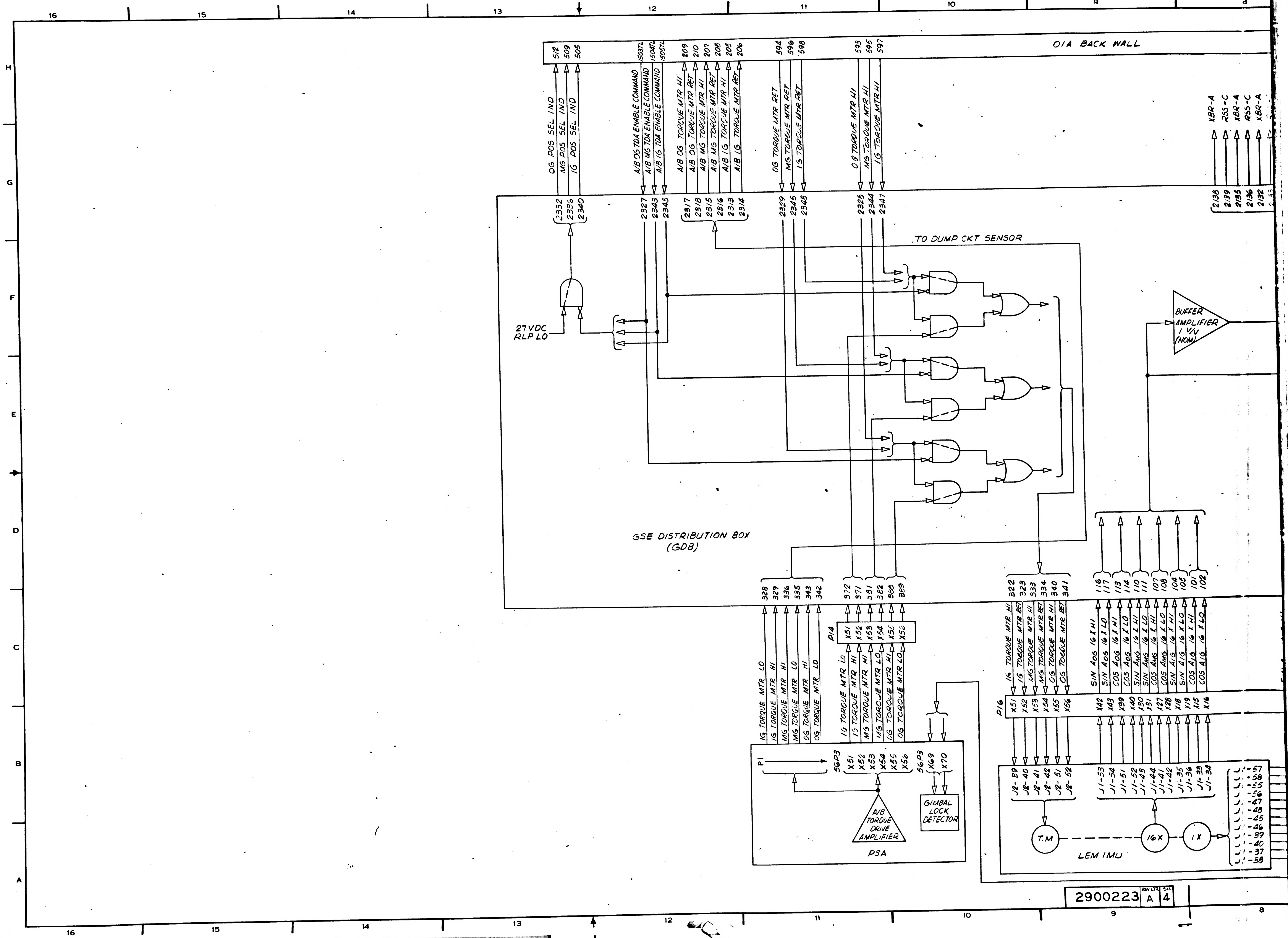
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
GIMBAL POSITION CONTROL
(LEM)

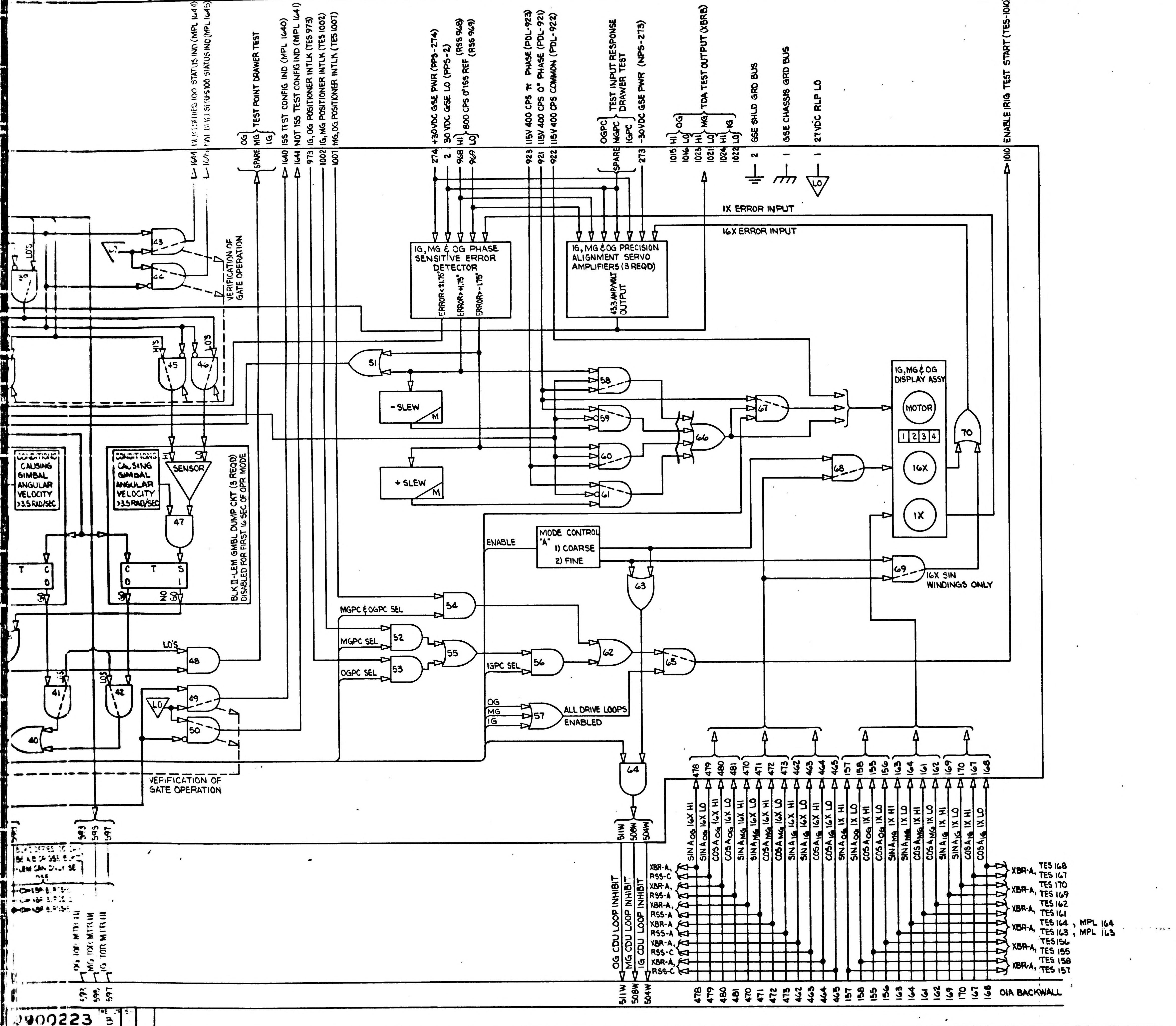
CODE IDENT NO. 99974
SIZE
2900223
SCALE —
SHEET 4 OF 4

2900223 | REV LTR A | SH 4

27 2900223


O/A BACK WALL
512
509
505
1503TL
1504TL
1505TL
209
210
207
208
205
206
594
596
598
593
595
597
OG POS SEL IND
MG POS SEL IND
IG POS SEL IND
A/B OG TDA ENABLE COMMAND
A/B MG TDA ENABLE COMMAND
A/B IG TDA ENABLE COMMAND
A/B OG TORQUE MTR HI
A/B OG TORQUE MTR RET
A/B MG TORQUE MTR HI
A/B MG TORQUE MTR RET
A/B IG TORQUE MTR HI
A/B IG TORQUE MTR RET
OG TORQUE MTR RET
MG TORQUE MTR RET
IG TORQUE MTR RET
OG TORQUE MTR HI
MG TORQUE MTR HI
IG TORQUE MTR HI
2332
2336
2340
2327
2343
2345
2317
2318
2315
2316
2313
2314
2329
2345
2348
2328
2344
2347
YBR-A
RSS-C
XBR-A
RSS-C
XBR-A
2138
2139
2135
2136
2132
TO DUMP CKT SENSOR
27VDC
RLP LO
BUFFER AMPLIFIER
1 V/V
(NOM)
GSE DISTRIBUTION BOX
(GDB)
328
329
336
335
343
342
372
371
381
382
388
389
322
323
333
334
340
341
116
117
113
114
110
111
107
108
104
105
101
102
IG TORQUE MTR LO
IG TORQUE MTR HI
MG TORQUE MTR HI
MG TORQUE MTR LO
OG TORQUE MTR HI
OG TORQUE MTR LO
P14
X51
X52
X53
X54
X55
X56
IG TORQUE MTR LO
IG TORQUE MTR HI
MG TORQUE MTR HI
MG TORQUE MTR LO
OG TORQUE MTR HI
OG TORQUE MTR LO
IG TORQUE MTR HI
IG TORQUE MTR RET
MG TORQUE MTR HI
MG TORQUE MTR RET
OG TORQUE MTR HI
OG TORQUE MTR RET
SIN AOG 16 X HI
SIN AOG 16 X LO
COS AOG 16 X HI
COS AOG 16 X LO
SIN AMG 16 X HI
SIN AMG 16 X LO
COS AMG 16 X HI
COS AMG 16 X LO
SIN AIG 16 X HI
SIN AIG 16 X LO
COS AIG 16 X HI
COS AIG 16 X LO
P16
X51
X52
X53
X54
X55
X56
X42
X43
X39
X40
X30
X31
X27
X28
X18
X19
X15
X16
P1
56P3
X51
X52
X53
X54
X55
X56
56P3
X69
X70
A/B TORQUE DRIVE AMPLIFIER
GIMBAL LOCK DETECTOR
PSA
J2-39
J2-40
J2-41
J2-42
J2-51
J2-52
J1-53
J1-54
J1-51
J1-52
J1-43
J1-44
J1-41
J1-42
J1-35
J1-36
J1-33
J1-34
J1-57
-58
-55
-56
-47
-48
-45
-46
-39
-40
-37
-38
T.M
16X
1X
LEM IMU
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
2900223
REV LTR
A
SH
4

1/2900223


TEST POINT DRAWER TEST
ISS TEST CONFIG IND (MPL 1640)
NOT ISS TEST CONFIG IND (MPL 1641)
IG, OG POSITIONER INTLK (TES 973)
IG, MG POSITIONER INTLK (TES 1002)
MG, OG POSITIONER INTLK (TES 1007)
+30VDC GSE PWR (PPS-274)
30 VDC GSE LO (PPS-2)
800 CPS 0° ISS REF (RSS 968)
115V 400 CPS π PHASE (PDL-923)
115V 400 CPS 0° PHASE (PDL-921)
115V 400 CPS COMMON (PDL-922)
TEST INPUT RESPONSE DRAWER TEST
-30VDC GSE PWR (NPS-273)
TDA TEST OUTPUT (XBR6)
GSE SHILD GRD BUS
GSE CHASSIS GRD BUS
27VDC RLP LO
ENABLE IRIG TEST START (TES-1010)
1X ERROR INPUT
16X ERROR INPUT
IG, MG & OG PHASE SENSITIVE ERROR DETECTOR
IG, MG & OG PRECISION ALIGNMENT SERVO AMPLIFIERS (3 REQD)
VERIFICATION OF GATE OPERATION
-SLEW
+SLEW
IG, MG & OG DISPLAY ASSY
MOTOR
16X
1X
CONDITIONS CAUSING GIMBAL ANGULAR VELOCITY >3.5 RAD/SEC
SENSOR
BLK II-LEM GMBL DUMP CKT (3 REQD) DISABLED FOR FIRST 16 SEC OF OPR MODE
MODE CONTROL "A" 1) COARSE 2) FINE
ENABLE
16X SIN WINDINGS ONLY
MGPC & OGPC SEL
MGPC SEL
OGPC SEL
IGPC SEL
ALL DRIVE LOOPS ENABLED
OG CDU LOOP INHIBIT
MG CDU LOOP INHIBIT
IG CDU LOOP INHIBIT
XBR-A, TES 168
TES 167
XBR-A, TES 170
TES 169
XBR-A, TES 162
TES 161
XBR-A, TES 164, MPL 164
TES 163, MPL 163
XBR-A, TES 156
TES 155
XBR-A, TES 158
TES 157
01A BACKWALL

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		31 AUG 65	
B		REVISION STATUS CHANGED		2 SEP 65	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Cookman DATE 4 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
GIMBAL POSITION CONTROL
(BLOCK I SERIES 100, BLOCK II & LEM)

CODE IDENT NO. 99974
SIZE J2
2900223
SCALE —
SHEET 1 OF 4

2/2900223

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM):

		AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR)
	RLP	RELAY & LAMP POWER SUPPLY
	PPS	+30 VDC POWER SUPPLY
	NPS	-30 VDC POWER SUPPLY
2900208		POWER & DUMMY LOAD PANEL-PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL)
2900207		MONITOR PANEL (MPL)
		TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
290020		TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
		TEST SELECTOR PANEL (TES)
29002 7		SIGNAL SELECTION & MEASUREMENT
	XBR-A	CROSSBAR- AC SIGNALS
	XBR-B	CROSSBAR- DC SIGNALS
2900218		OSCILLOGRAPH SIGNAL SELECTION
	RSS-B	TO FIXED DC CHANNEL
	RSS-C	TO SWITCHABLE AC CHANNEL
	RSS-D	TO SWITCHABLE DC CHANNEL
2900215		MEASUREMENT REFERENCE POWER SUPPLIES
	RSS	OSCILLOGRAPH SIGNAL SELECTOR
		GSE GROUNDING (BLOCK I SERIES 100)
		GSE GROUNDING (BLOCK II & LEM)

4. NONSTANDARD SYMBOLOGY

INDICATES "AND" GATE WITH SWITCHED SIGNAL

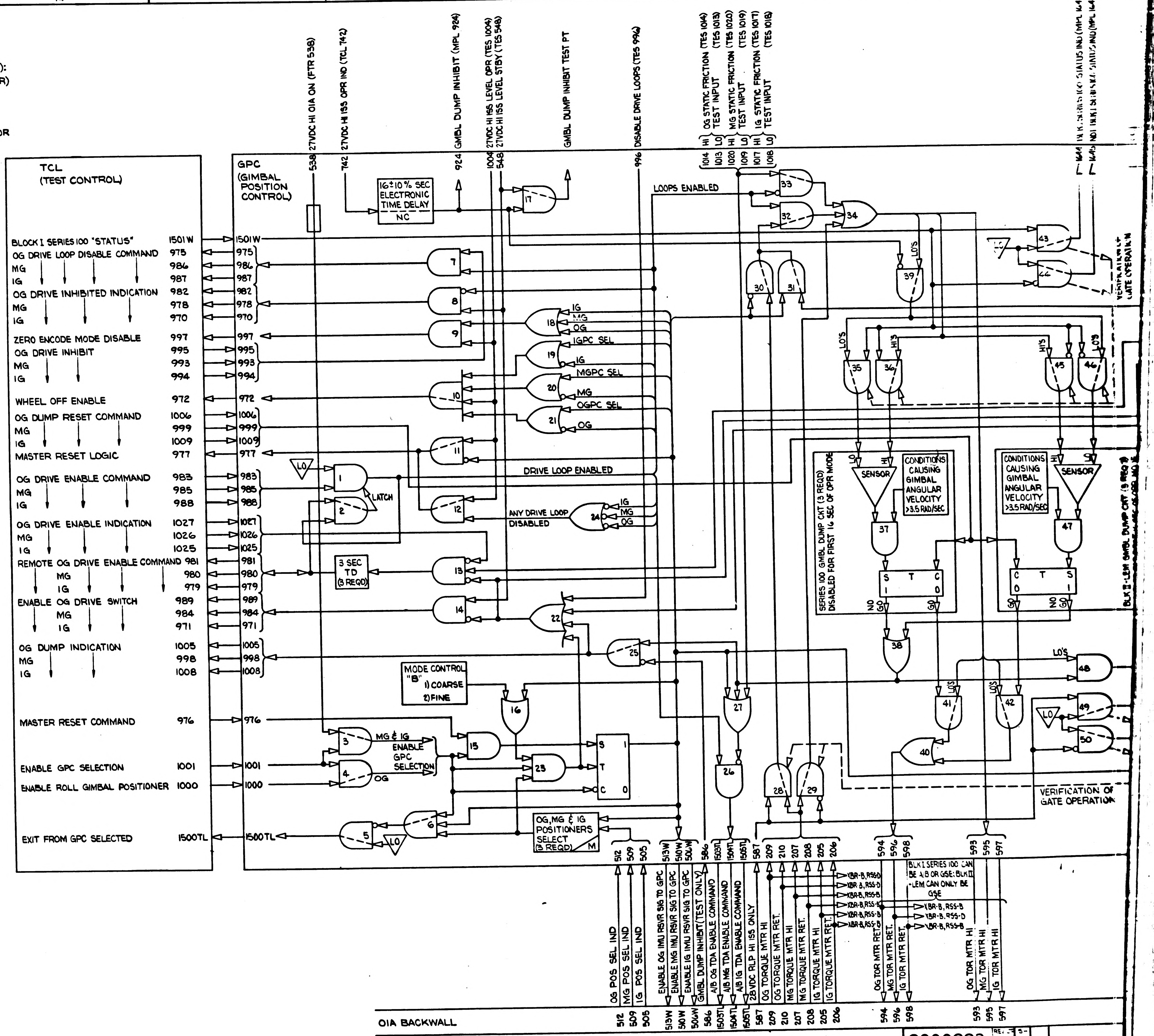
NAME INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G/N CONFIGURATIONS
   - E. TW, TL OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

6. SIGNAL FLOW FOR THE INNER, MIDDLE & OUTER GIMBAL LOOPS IS SHOWN FLOWING THROUGH THE SAME LOGIC SYMBOLOGY DUE TO SIMILARITY OF THE THREE LOOPS. ANY INDIVIDUAL LOOP CAN BE EXAMINED BY USING ONLY THE RESPECTIVE LOOP SIGNALS AND DISREGARDING THE OTHERS.

7. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK I SERIES 100	SH 1 SH 2
BLOCK II	SH 1 SH 3
LEM	SH 1 SH 4



TCL (TEST CONTROL)
BLOCK I SERIES 100 "STATUS" 1501W
OG DRIVE LOOP DISABLE COMMAND 975
MG 986
IG 987
OG DRIVE INHIBITED INDICATION 982
MG 978
IG 970
ZERO ENCODE MODE DISABLE 997
OG DRIVE INHIBIT 995
MG 993
IG 994
WHEEL OFF ENABLE 972
OG DUMP RESET COMMAND 1006
MG 999
IG 1009
MASTER RESET LOGIC 977
OG DRIVE ENABLE COMMAND 983
MG 985
IG 988
OG DRIVE ENABLE INDICATION 1027
MG 1026
IG 1025
REMOTE OG DRIVE ENABLE COMMAND 981
MG 980
IG 979
ENABLE OG DRIVE SWITCH 989
MG 984
IG 971
OG DUMP INDICATION 1005
MG 998
IG 1008
MASTER RESET COMMAND 976
ENABLE GPC SELECTION 1001
ENABLE ROLL GIMBAL POSITIONER 1000
EXIT FROM GPC SELECTED 1500TL
GPC (GIMBAL POSITION CONTROL)
538 27VDC HI OIA ON (FTR 538)
742 27VDC HI ISS OPR IND (TCL 742)
IG ±10% SEC ELECTRONIC TIME DELAY NC
924 GMBL DUMP INHIBIT (MPL 924)
1004 27VDC HI ISS LEVEL OPR (TES 1004)
548 27VDC HI ISS LEVEL STBY (TES 548)
GMBL DUMP INHIBIT TEST PT
996 DISABLE DRIVE LOOPS (TES 996)
1014 HI 1013 LO OG STATIC FRICTION TEST INPUT (TES 1014) (TES 1013)
1020 HI 1019 LO MG STATIC FRICTION TEST INPUT (TES 1020) (TES 1019)
1017 HI 1018 LO IG STATIC FRICTION TEST INPUT (TES 1017) (TES 1018)
1644 1645 STATUS IND (MPL 1644) (MPL 1645)
LOOPS ENABLED
DRIVE LOOP ENABLED
ANY DRIVE LOOP DISABLED
IG MG OG
IGPC SEL
MGPC SEL
OGPC SEL
LATCH
LO
3 SEC TD (3 REQD)
MODE CONTROL "B" 1) COARSE 2) FINE
MG & IG ENABLE GPC SELECTION
OG
OG, MG & IG POSITIONERS SELECT (3 REQD) M
S I T C O
LO'S HI'S
SENSOR
CONDITIONS CAUSING GIMBAL ANGULAR VELOCITY >3.5 RAD/SEC
SERIES 100 GMBL DUMP CKT (3 REQD) DISABLED FOR FIRST 16 SEC OF OPR MODE
BLK II-LEM GMBL DUMP CKT (3 REQD)
NO GO
VERIFICATION OF GATE OPERATION
BLK I SERIES 100 CAN BE A/B OR GSE: BLK II-LEM CAN ONLY BE GSE
XBR-B, RSS-D
XBR-B, RSS-B
512 OG POS SEL IND
509 MG POS SEL IND
505 IG POS SEL IND
513W ENABLE OG IMU RSVR SIG TO GPC
510W ENABLE MG IMU RSVR SIG TO GPC
506W ENABLE IG IMU RSVR SIG TO GPC
586 GMBL DUMP INHIBIT (TEST ONLY)
1503TL A/B OG TDA ENABLE COMMAND
1504TL A/B MG TDA ENABLE COMMAND
1505TL A/B IG TDA ENABLE COMMAND
587 28VDC RLP HI ISS ONLY
209 OG TORQUE MTR HI
210 OG TORQUE MTR RET.
207 MG TORQUE MTR HI
208 MG TORQUE MTR RET.
205 IG TORQUE MTR HI
206 IG TORQUE MTR RET.
594 OG TOR MTR RET.
596 MG TOR MTR RET.
598 IG TOR MTR RET.
593 OG TOR MTR HI
595 MG TOR MTR HI
597 IG TOR MTR HI
OIA BACKWALL

2900223 REV. 3

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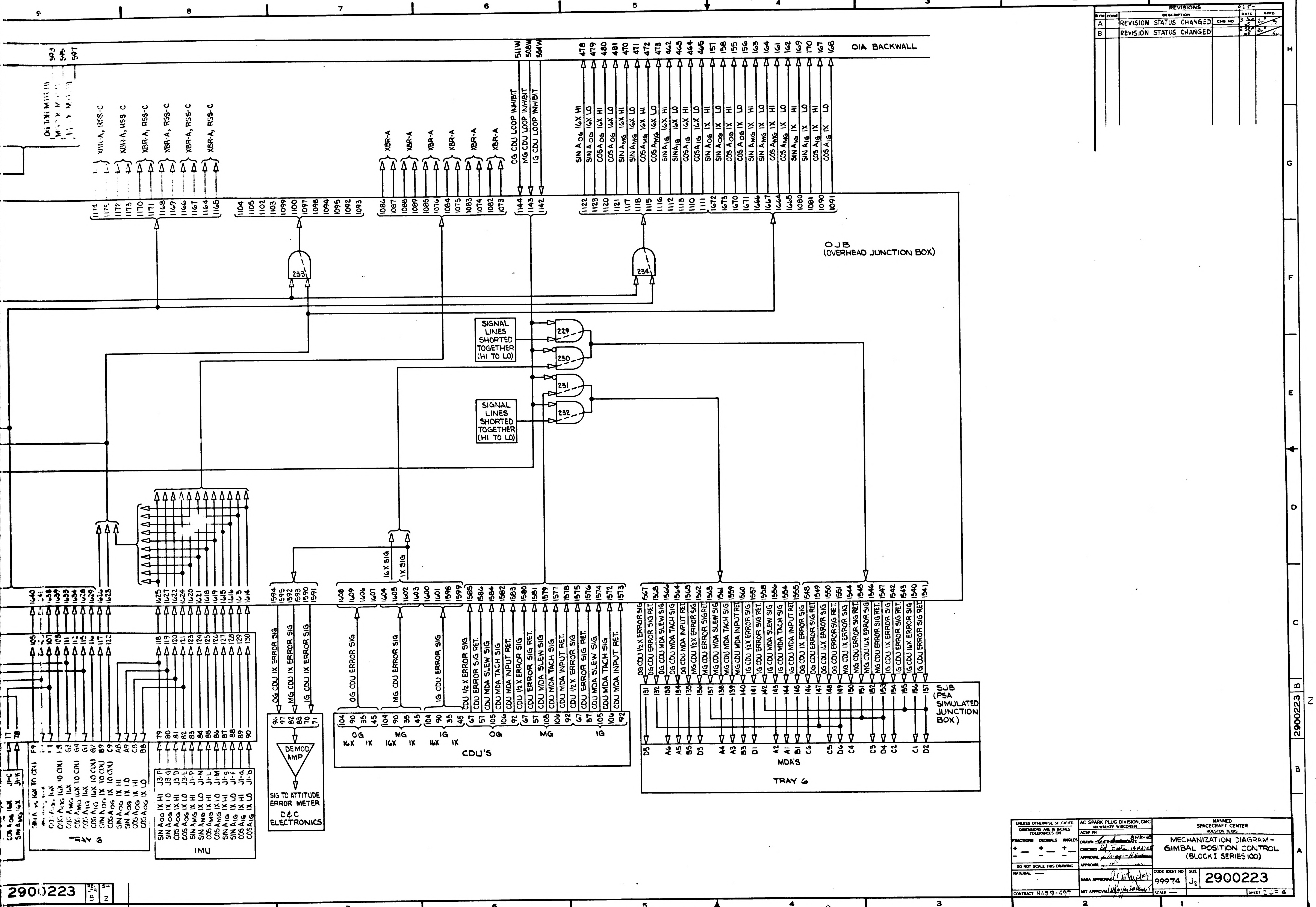

OIA BACKWALL
OJB (OVERHEAD JUNCTION BOX)
511W
508W
504W
OG CDU LOOP INHIBIT
MG CDU LOOP INHIBIT
IG CDU LOOP INHIBIT
XBR-A, RSS-C
XBR-A, RSS C
XBR-A
233
234
229
230
231
232
SIGNAL LINES SHORTED TOGETHER (HI TO LO)
SIN A OG 16X HI
SIN A OG 16X LO
COS A OG 16X HI
COS A OG 16X LO
SIN A MG 16X HI
SIN A MG 16X LO
COS A MG 16X HI
COS A MG 16X LO
SIN A IG 16X HI
SIN A IG 16X LO
COS A IG 16X HI
COS A IG 16X LO
SIN A OG 1X LO
SIN A OG 1X HI
COS A OG 1X LO
COS A OG 1X HI
16X SIG
1X SIG
OG CDU 1X ERROR SIG
MG CDU 1X ERROR SIG
IG CDU 1X ERROR SIG
DEMOD AMP
SIG TO ATTITUDE ERROR METER
D&C ELECTRONICS
OG CDU ERROR SIG
MG CDU ERROR SIG
IG CDU ERROR SIG
CDU 1/2 X ERROR SIG
CDU ERROR SIG RET.
CDU MDA SLEW SIG
CDU MDA TACH SIG
CDU MDA INPUT RET.
OG
MG
IG
16X
1X
CDU'S
OG CDU 1/2 X ERROR SIG
OG CDU ERROR SIG RET.
OG CDU MDA SLEW SIG
OG CDU MDA TACH SIG
OG CDU MDA INPUT RET.
MG CDU 1/2X ERROR SIG
MG CDU ERROR SIG RET.
MG CDU MDA SLEW SIG
MG CDU MDA TACH SIG
MG CDU MDA INPUT RET.
IG CDU 1/2X ERROR SIG
IG CDU ERROR SIG RET.
IG CDU MDA SLEW SIG
IG CDU MDA TACH SIG
IG CDU MDA INPUT RET.
OG CDU 1X ERROR SIG
OG CDU 16X ERROR SIG
IG CDU 1X ERROR SIG
IG CDU 16X ERROR SIG
SJB (PSA SIMULATED JUNCTION BOX)
MDA'S
TRAY 6
IMU
SIN A OG 1X HI
SIN A OG 1X LO
COS A OG 1X HI
COS A OG 1X LO
SIN A MG 1X HI
SIN A MG 1X LO
COS A MG 1X HI
COS A MG 1X LO
SIN A IG 1X HI
SIN A IG 1X LO
COS A IG 1X HI
COS A IG 1X LO
2900223

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED			
B		REVISION STATUS CHANGED			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL
CONTRACT NAS9-497

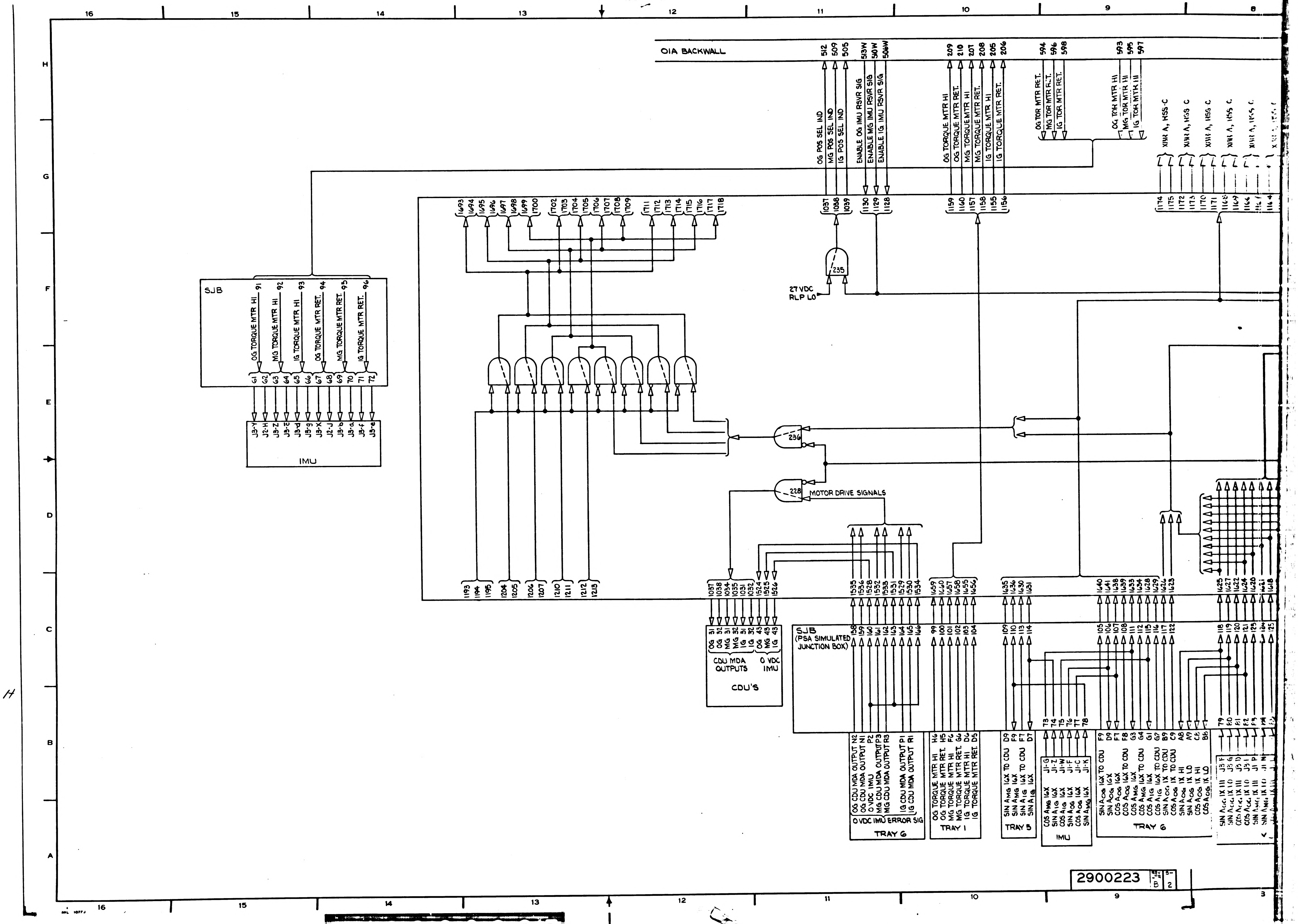
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

MANNED SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM - GIMBAL POSITION CONTROL (BLOCK I SERIES 100)

CODE IDENT NO 99974
SIZE J2
2900223
SHEET 3 OF 4

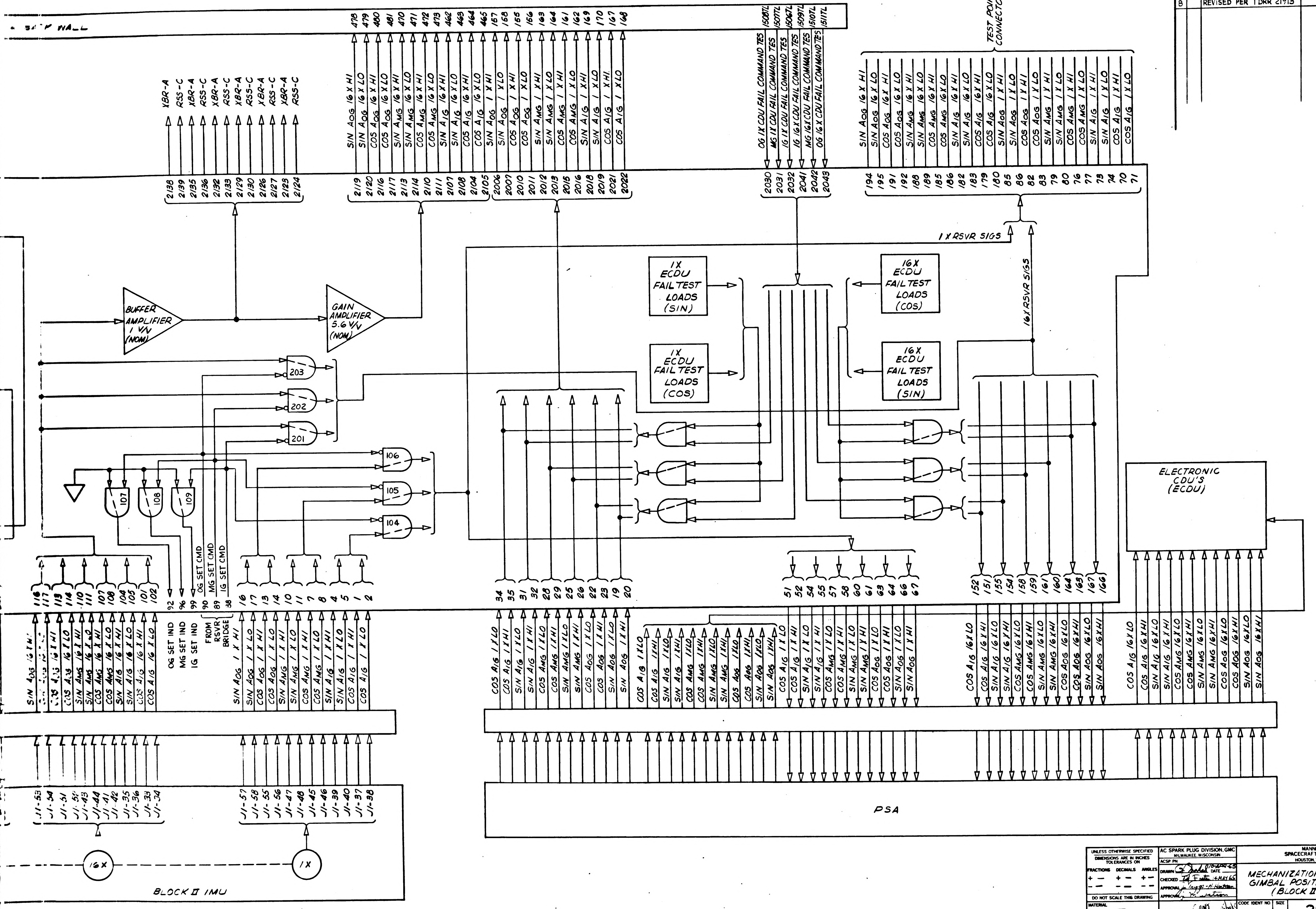
27 2900223


OIA BACKWALL
512 509 505 513W 510W 506W
OG POS SEL IND
MG POS SEL IND
IG POS SEL IND
ENABLE OG IMU RSVR SIG
ENABLE MG IMU RSVR SIG
ENABLE IG IMU RSVR SIG
209 210 207 208 205 206
OG TORQUE MTR HI
OG TORQUE MTR RET.
MG TORQUE MTR HI
MG TORQUE MTR RET.
IG TORQUE MTR HI
IG TORQUE MTR RET.
594 596 598
OG TOR MTR RET.
MG TOR MTR RET.
IG TOR MTR RET.
593 595 597
OG TOR MTR HI
MG TOR MTR HI
IG TOR MTR HI
XIRR A, HSS-C
1037 1038 1039
1130 1129 1128
1159 1160 1157 1158 1155 1156
1174 1175 1172 1173 1170 1171 1168 1169 1164
1693 1694 1695 1696 1697 1698 1699 1700
1702 1703 1704 1705 1706 1707 1708 1709
1711 1712 1713 1714 1715 1716 1717 1718
235
27 VDC
RLP LO
SJB
91 92 93 94 95 96
OG TORQUE MTR HI
MG TORQUE MTR HI
IG TORQUE MTR HI
OG TORQUE MTR RET.
MG TORQUE MTR RET.
IG TORQUE MTR RET.
61 62 63 64 65 66 67 68 69 70 71 72
J3-Y J2-H J3-Z J3-c J3-d J3-g J3-X J2-J J3-b J3-a J3-f J3-e
IMU
236
228
MOTOR DRIVE SIGNALS
1193 1194 1195 1204 1205 1206 1207 1210 1211 1212 1213
1037 1038 1034 1035 1031 1032 1524 1525 1526
OG 31 OG 32 MG 31 MG 32 IG 31 IG 32 OG 43 MG 43 IG 43
CDU MDA OUTPUTS
0 VDC IMU
CDU'S
1535 1536 1528 1532 1533 1531 1529 1530 1534
1659 1660 1657 1658 1655 1656
1635 1636 1630 1631
1640 1641 1638 1639 1633 1634 1628 1629 1626 1623
1625 1627 1622 1624 1620 1621 1618
SJB
(PSA SIMULATED JUNCTION BOX)
158 159 160 161 162 163 164 165 166
99 100 101 102 103 104
109 110 113 114
105 106 107 108 111 112 115 116 117 122
118 119 120 121 123 124 125
N2 N1 P2 P3 R3 P1 R1
OG CDU MDA OUTPUT N2
OG CDU MDA OUTPUT N1
0 VDC IMU
MG CDU MDA OUTPUT P3
MG CDU MDA OUTPUT R3
IG CDU MDA OUTPUT P1
IG CDU MDA OUTPUT R1
0 VDC IMU ERROR SIG
TRAY 6
H6 H5 F6 G6 D6 D5
OG TORQUE MTR HI
OG TORQUE MTR RET.
MG TORQUE MTR HI
MG TORQUE MTR RET.
IG TORQUE MTR HI
IG TORQUE MTR RET.
TRAY 1
D9 F9 F7 D7
SIN A_MG 16X TO CDU
SIN A_MG 16X
SIN A_IG 16X TO CDU
SIN A_IG 16X
TRAY 5
73 74 75 76 77 78
COS A_MG 16X J1-G
SIN A_IG 16X J1-Z
COS A_IG 16X J1-W
SIN A_OG 16X J1-F
COS A_OG 16X J1-C
SIN A_MG 16X J1-K
IMU
F9 D9 F7 F8 G3 G4 G1 G7 B9 C9 A8 A9 C8 B8
SIN A_OG 16X TO CDU
SIN A_OG 16X
COS A_OG 16X
COS A_OG 16X TO CDU
COS A_MG 16X
COS A_MG 16X TO CDU
COS A_IG 16X
COS A_IG 16X TO CDU
SIN A_OG 1X TO CDU
COS A_OG 1X TO CDU
SIN A_OG 1X HI
SIN A_OG 1X LO
COS A_OG 1X HI
COS A_OG 1X LO
TRAY 6
79 80 81 82 83
SIN A_OG 1X 111 J3-F
SIN A_OG 1X 10 J3-G
COS A_OG 1X 111 J3-D
COS A_OG 1X 10 J3-1
SIN A_MG 1X 111 J1-P
SIN A_MG 1X 10 J1-N
16 15 14 13 12 11 10 9 8
H G F E D C B A
2900223 B 2

LH

1/2900223

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21917		31 AUG 65	
B		REVISED PER TDRR 21913		2 SEP 65	



WALL
TEST POINT CONNECTOR
XBR-A
RSS-C
BUFFER AMPLIFIER 1 V/V (NOM)
GAIN AMPLIFIER 5.6 V/V (NOM)
1 X RSVR SIGS
16 X RSVR SIGS
1X ECDU FAIL TEST LOADS (SIN)
1X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (SIN)
OG 1X CDU FAIL COMMAND TES
MG 1X CDU FAIL COMMAND TES
IG 1X CDU FAIL COMMAND TES
OG 16X CDU FAIL COMMAND TES
MG 16X CDU FAIL COMMAND TES
IG 16X CDU FAIL COMMAND TES
SIN AOG 16X HI
SIN AOG 16X LO
COS AOG 16X LO
COS AOG 16X HI
SIN AMG 16X LO
SIN AMG 16X HI
COS AMG 16X LO
COS AMG 16X HI
SIN AIG 16X HI
SIN AIG 16X LO
COS AIG 16X HI
COS AIG 16X LO
SIN AOG 1X HI
SIN AOG 1X LO
COS AOG 1X HI
COS AOG 1X LO
SIN AMG 1X HI
SIN AMG 1X LO
COS AMG 1X HI
COS AMG 1X LO
SIN AIG 1X HI
SIN AIG 1X LO
COS AIG 1X HI
COS AIG 1X LO
OG SET CMD
MG SET CMD
IG SET CMD
OG SET IND
MG SET IND
IG SET IND
FROM RSVR BRIDGE
201
202
203
104
105
106
107
108
109
ELECTRONIC CDU'S (ECDU)
PSA
16X
1X
BLOCK II IMU
J1-53
J1-54
J1-51
J1-52
J1-43
J1-44
J1-41
J1-42
J1-35
J1-36
J1-33
J1-34
J1-57
J1-58
J1-55
J1-56
J1-47
J1-48
J1-45
J1-46
J1-39
J1-40
J1-37
J1-38
9
8
7
6
5
4
3
2
1
H
G
F
E
D
C
B
A

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN 10-APR-65 DATE
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

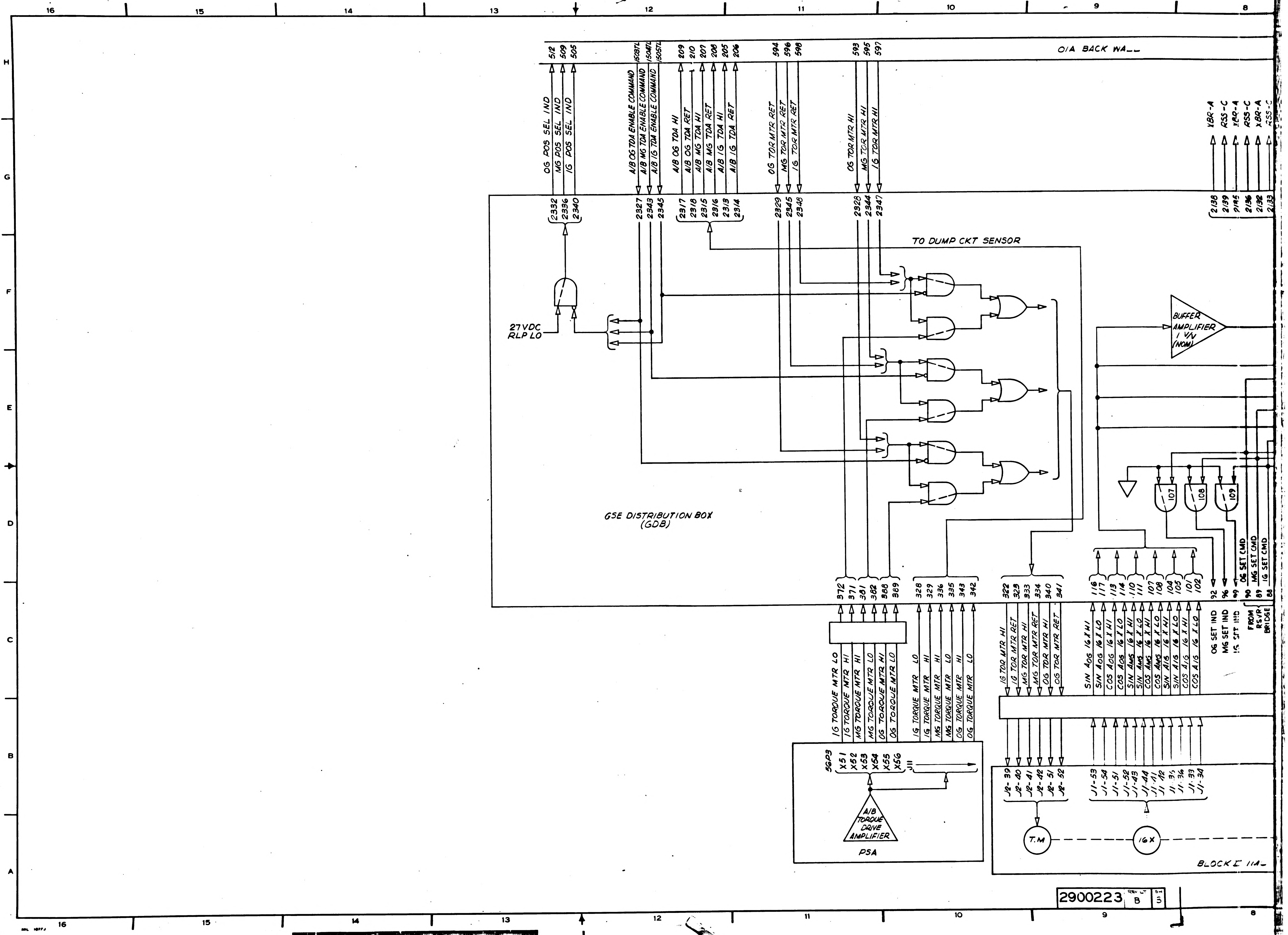
MECHANIZATION DIAGRAM
GIMBAL POSITION CONTROL
(BLOCK II)

CODE IDENT NO. 99974
SIZE
2900223
SCALE NONE
SHEET 3 OF 4

2900223 B SH 3

2900223 B

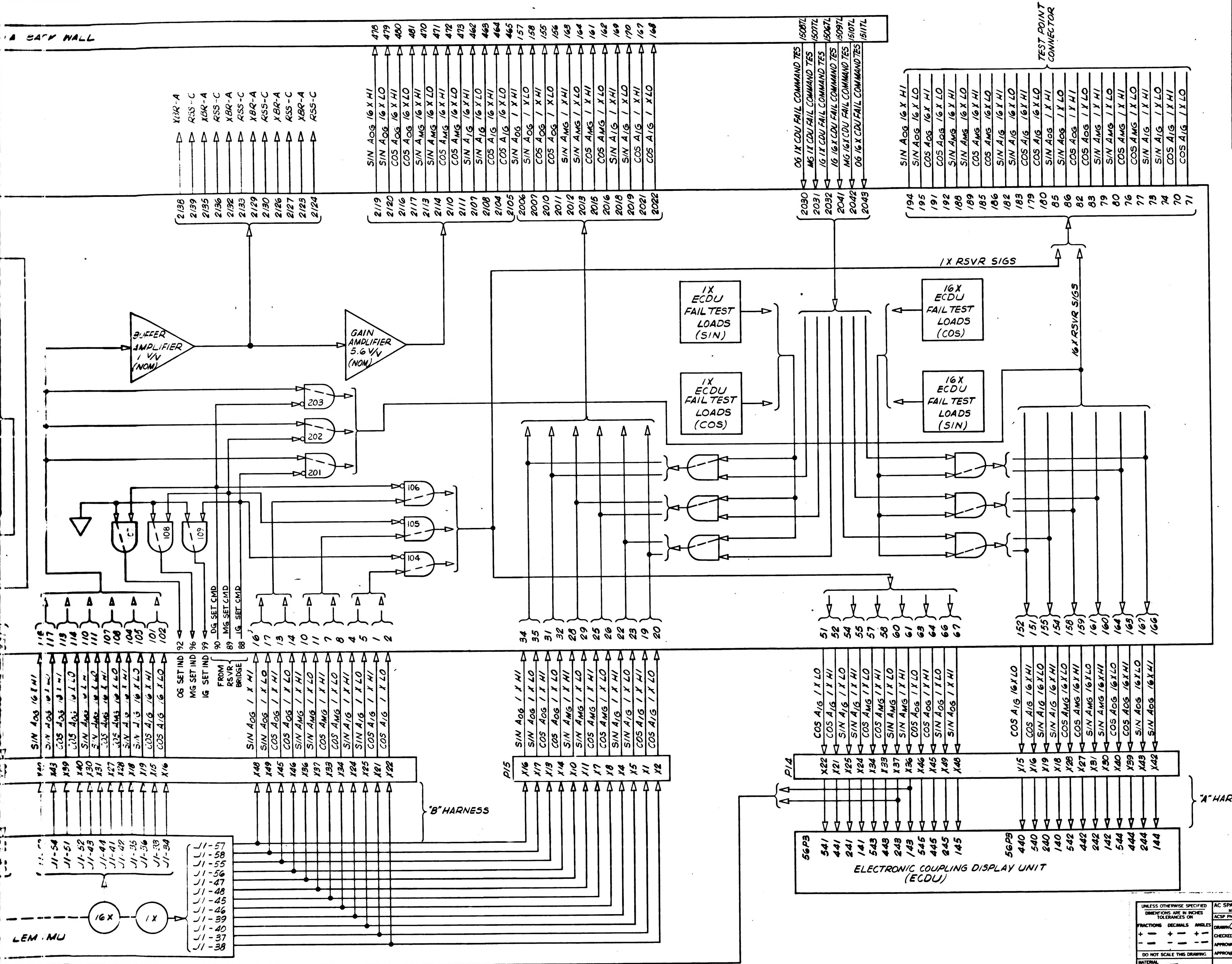
2900223



O/A BACK WA__
512
509
505
1503TL
1504TL
1505TL
209
210
207
208
205
206
594
596
598
593
595
597
OG POS SEL IND
MG POS SEL IND
IG POS SEL IND
A/B OG TDA ENABLE COMMAND
A/B MG TDA ENABLE COMMAND
A/B IG TDA ENABLE COMMAND
A/B OG TDA HI
A/B OG TDA RET
A/B MG TDA HI
A/B MG TDA RET
A/B IG TDA HI
A/B IG TDA RET
OG TOR MTR RET
MG TOR MTR RET
IG TOR MTR RET
OG TOR MTR HI
MG TOR MTR HI
IG TOR MTR HI
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
RSS-C
2332
2336
2340
2327
2343
2345
2317
2318
2315
2316
2313
2314
2329
2345
2348
2328
2344
2347
2138
2139
2145
2136
2132
2133
TO DUMP CKT SENSOR
27VDC
RLP LO
BUFFER AMPLIFIER 1 V/V (NOM)
107
108
109
GSE DISTRIBUTION BOX (GDB)
372
371
381
382
388
389
328
329
336
335
343
342
322
323
333
334
340
341
116
117
113
114
110
111
107
108
104
105
101
102
92
96
91
90
89
88
OG SET CMD
MG SET CMD
IG SET CMD
FROM RSVR BRIDGE
OG SET IND
MG SET IND
IG SET IND
IG TORQUE MTR LO
IG TORQUE MTR HI
MG TORQUE MTR HI
MG TORQUE MTR LO
OG TORQUE MTR HI
OG TORQUE MTR LO
IG TORQUE MTR LO
IG TORQUE MTR HI
MG TORQUE MTR HI
MG TORQUE MTR LO
OG TORQUE MTR HI
OG TORQUE MTR LO
IG TOR MTR HI
IG TOR MTR RET
MG TOR MTR HI
MG TOR MTR RET
OG TOR MTR HI
OG TOR MTR RET
SIN AOG IG X HI
SIN AOG IG X LO
COS AOG IG X LO
COS AOG IG X HI
SIN AMS IG X HI
SIN AMS IG X LO
COS AMS IG X LO
COS AMS IG X HI
SIN AIG IG X HI
SIN AIG IG X LO
COS AIG IG X HI
COS AIG IG X LO
5GP3
X51
X52
X53
X54
X55
X56
J11
A/B TORQUE DRIVE AMPLIFIER
PSA
J2-39
J2-40
J2-41
J2-42
J2-51
J2-52
J1-53
J1-54
J1-51
J1-52
J1-44
J1-41
J1-42
J1-35
J1-36
J1-33
J1-34
T.M
IG X
BLOCK II IA_
2900223
REV LT B
SH 3
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

1729 00223

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21917		3 AUG 65	
B		REVISED PER TDRR 21913		2 SEP 65	


A BACK WALL
XBR-A
RSS-C
SIN AOG 16 X HI
SIN AOG 16 X LO
COS AOG 16 X HI
COS AOG 16 X LO
SIN AMG 16 X HI
SIN AMG 16 X LO
COS AMG 16 X HI
COS AMG 16 X LO
SIN AIG 16 X HI
SIN AIG 16 X LO
COS AIG 16 X HI
COS AIG 16 X LO
SIN AOG 1 X HI
SIN AOG 1 X LO
COS AOG 1 X HI
COS AOG 1 X LO
SIN AMG 1 X HI
SIN AMG 1 X LO
COS AMG 1 X HI
COS AMG 1 X LO
SIN AIG 1 X HI
SIN AIG 1 X LO
COS AIG 1 X HI
COS AIG 1 X LO
OG 1X CDU FAIL COMMAND TES
MG 1X CDU FAIL COMMAND TES
IG 1X CDU FAIL COMMAND TES
IG 16X CDU FAIL COMMAND TES
MG 16X CDU FAIL COMMAND TES
OG 16X CDU FAIL COMMAND TES
1508TL
1507TL
1506TL
1509TL
1510TL
1511TL
TEST POINT CONNECTOR
BUFFER AMPLIFIER 1 V/V (NOM)
GAIN AMPLIFIER 5.6 V/V (NOM)
1X ECDU FAIL TEST LOADS (SIN)
1X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (SIN)
1X RSVR SIGS
16X RSVR SIGS
203
202
201
106
105
104
107
108
109
OG SET CMD
MG SET CMD
IG SET CMD
OG SET IND
MG SET IND
IG SET IND
FROM RSVR BRIDGE
"B" HARNESS
"A" HARNESS
P15
P14
56P3
ELECTRONIC COUPLING DISPLAY UNIT (ECDU)
J1-57
J1-58
J1-55
J1-56
J1-47
J1-48
J1-45
J1-46
J1-39
J1-40
J1-37
J1-38
J1-54
J1-51
J1-52
J1-53
J1-44
J1-41
J1-42
J1-43
J1-36
J1-35
J1-33
J1-34
16X
1X
LEM IMU

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± — ± — ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN G. Opahle DATE 8 APR 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
GIMBAL POSITION CONTROL
(LEM)

CODE IDENT NO. 99974
SIZE
2900223
SCALE —
SHEET 4 OF 4

2900223 B 4

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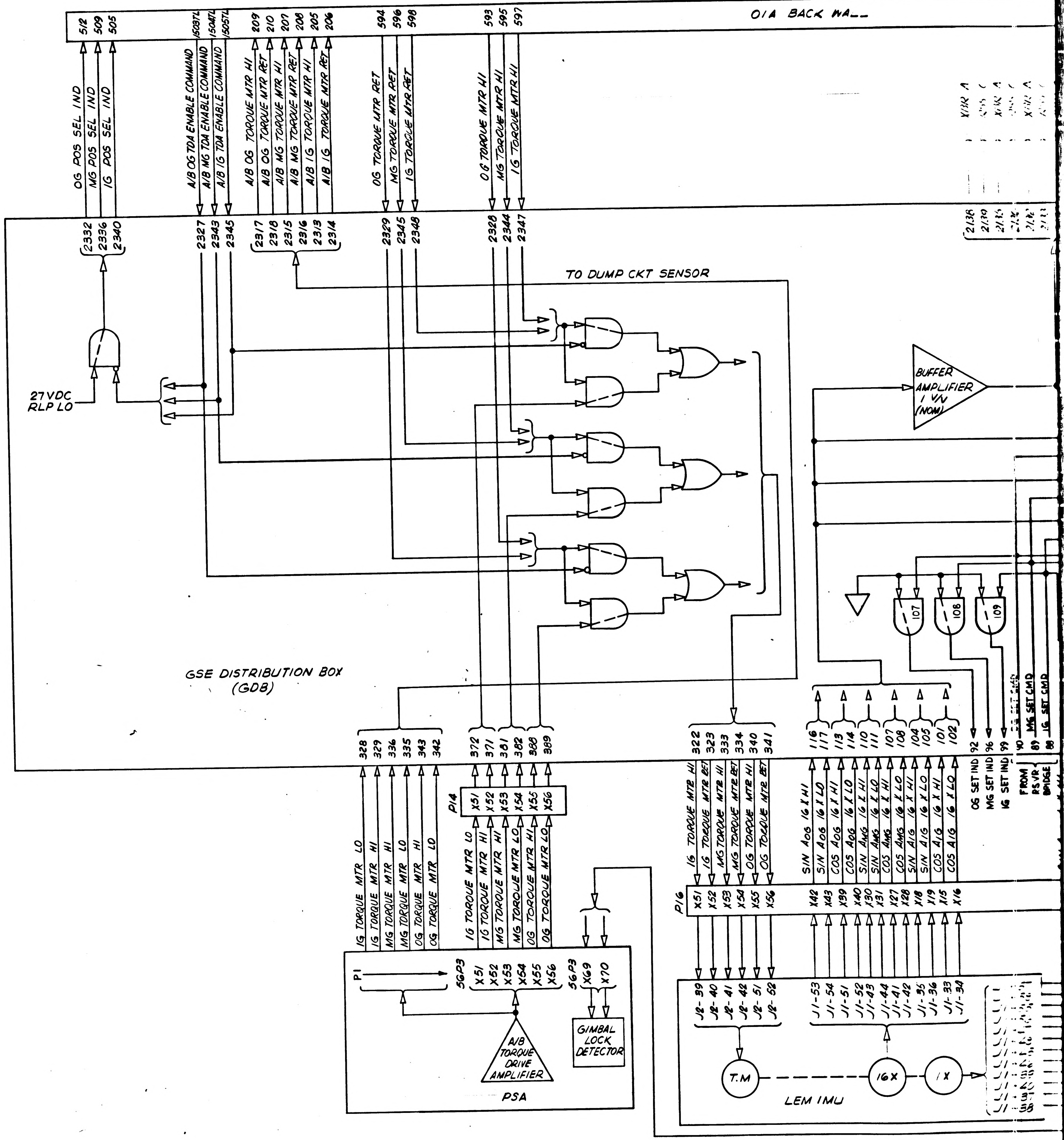
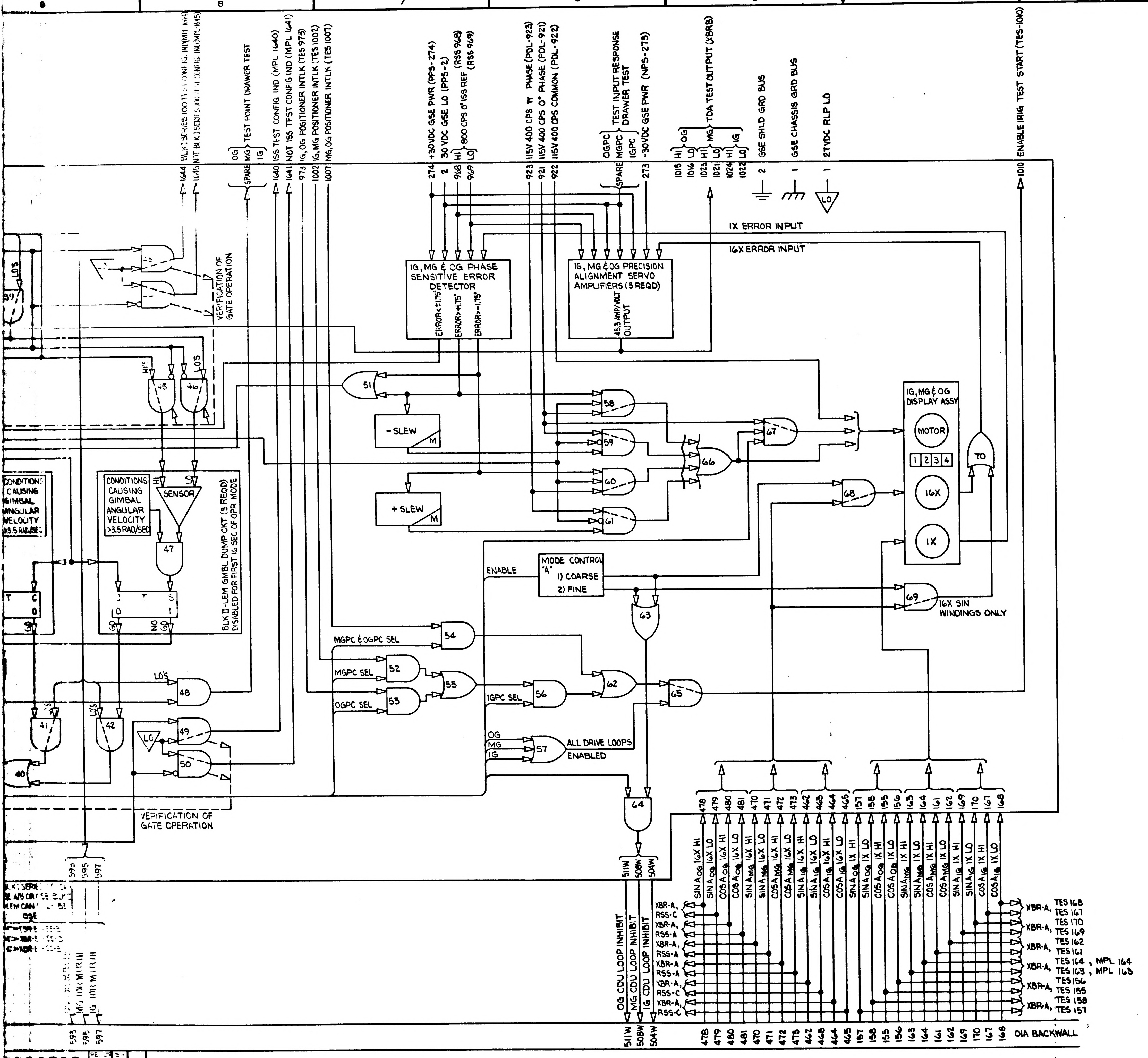

O/A BACK WA__
512
509
505
1503TL
1504TL
1505TL
209
210
207
208
205
206
594
596
598
593
595
597
OG POS SEL IND
MG POS SEL IND
IG POS SEL IND
A/B OG TDA ENABLE COMMAND
A/B MG TDA ENABLE COMMAND
A/B IG TDA ENABLE COMMAND
A/B OG TORQUE MTR HI
A/B OG TORQUE MTR RET
A/B MG TORQUE MTR HI
A/B MG TORQUE MTR RET
A/B IG TORQUE MTR HI
A/B IG TORQUE MTR RET
OG TORQUE MTR RET
MG TORQUE MTR RET
IG TORQUE MTR RET
OG TORQUE MTR HI
MG TORQUE MTR HI
IG TORQUE MTR HI
2332
2336
2340
2327
2343
2345
2317
2318
2315
2316
2313
2314
2329
2345
2348
2328
2344
2347
TO DUMP CKT SENSOR
27VDC
RLP LO
BUFFER
AMPLIFIER
1 V/V
(NOM)
107
108
109
GSE DISTRIBUTION BOX
(GDB)
328
329
336
335
343
342
372
371
381
382
388
389
322
323
333
334
340
341
116
117
113
114
110
111
107
108
104
105
101
102
92
96
99
90
89
88
OG SET IND
MG SET IND
IG SET IND
FROM
RSVR
BRIDGE
MG SET CMD
IG SET CMD
P14
X51
X52
X53
X54
X55
X56
IG TORQUE MTR LO
IG TORQUE MTR HI
MG TORQUE MTR HI
MG TORQUE MTR LO
OG TORQUE MTR HI
OG TORQUE MTR LO
IG TORQUE MTR LO
IG TORQUE MTR HI
MG TORQUE MTR HI
MG TORQUE MTR LO
OG TORQUE MTR HI
OG TORQUE MTR LO
IG TORQUE MTR HI
IG TORQUE MTR RET
MG TORQUE MTR HI
MG TORQUE MTR RET
OG TORQUE MTR HI
OG TORQUE MTR RET
SIN AOG 16X HI
SIN AOG 16X LO
COS AOG 16X HI
COS AOG 16X LO
SIN AMG 16X HI
SIN AMG 16X LO
COS AMG 16X HI
COS AMG 16X LO
SIN AIG 16X HI
SIN AIG 16X LO
COS AIG 16X HI
COS AIG 16X LO
P16
X51
X52
X53
X54
X55
X56
X42
X43
X39
X40
X30
X31
X27
X28
X18
X19
X15
X16
P1
56P3
X51
X52
X53
X54
X55
X56
56P3
X69
X70
A/B
TORQUE
DRIVE
AMPLIFIER
GIMBAL
LOCK
DETECTOR
PSA
J2-39
J2-40
J2-41
J2-42
J2-51
J2-52
J1-53
J1-54
J1-51
J1-52
J1-43
J1-44
J1-41
J1-42
J1-35
J1-36
J1-33
J1-34
T.M
16X
1X
LEM IMU
J1-38

2900223 REV LTR B SH. 4

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		31 AUG 65	
B		REVISION STATUS CHANGED		2 SEP 65	
C		REVISED PER TDRR 23762		4 NOV 65	


1644 BLK I SERIES 100 TEST CONFIG. IND (MPL-1644)
1645 NOT BLK I SERIES 100 TEST CONFIG. IND (MPL-1645)
SPARE OG MG IG TEST POINT DRAWER TEST
1640 ISS TEST CONFIG IND (MPL 1640)
1641 NOT ISS TEST CONFIG IND (MPL 1641)
973 IG, OG POSITIONER INTLK (TES 973)
1002 IG, MG POSITIONER INTLK (TES 1002)
1007 MG, OG POSITIONER INTLK (TES 1007)
274 +30VDC GSE PWR (PPS-274)
2 30 VDC GSE LO (PPS-2)
968 HI 800 CPS 0° ISS REF (RSS 968)
969 LO (RSS 969)
923 115V 400 CPS π PHASE (PDL-923)
921 115V 400 CPS 0° PHASE (PDL-921)
922 115V 400 CPS COMMON (PDL-922)
SPARE OGPC MGPC IGPC TEST INPUT RESPONSE DRAWER TEST
273 -30VDC GSE PWR (NPS-273)
1015 HI 1016 LO OG
1023 HI 1021 LO MG
1024 HI 1022 LO IG
TDA TEST OUTPUT (XBRB)
2 GSE SHLD GRD BUS
1 GSE CHASSIS GRD BUS
1 27VDC RLP LO
LO
1010 ENABLE IRIG TEST START (TES-1010)
1X ERROR INPUT
16X ERROR INPUT
IG, MG & OG PHASE SENSITIVE ERROR DETECTOR
ERROR<±1.75°
ERROR>+1.75°
ERROR>-1.75°
IG, MG & OG PRECISION ALIGNMENT SERVO AMPLIFIERS (3 REQD)
43.3 AMP/VOLT OUTPUT
VERIFICATION OF GATE OPERATION
LO'S
HI'S
43
44
45
46
39
51
-SLEW
+SLEW
M
58
59
60
61
66
67
68
69
70
IG, MG & OG DISPLAY ASSY
MOTOR
1 2 3 4
16X
1X
16X SIN WINDINGS ONLY
CONDITIONS CAUSING GIMBAL ANGULAR VELOCITY >3.5 RAD/SEC
SENSOR
HI
LO
47
S T S
0 1
NO
BLK II-LEM GMBL DUMP CKT (3 REQD) DISABLED FOR FIRST 16 SEC OF OPR MODE
T C
0
MODE CONTROL "A"
1) COARSE
2) FINE
ENABLE
63
MGPC & OGPC SEL
MGPC SEL
OGPC SEL
IGPC SEL
52
53
54
55
56
62
65
OG
MG
IG
57
ALL DRIVE LOOPS ENABLED
LO'S
48
41
42
40
49
50
LO
VERIFICATION OF GATE OPERATION
64
511W 508W 504W
OG CDU LOOP INHIBIT
MG CDU LOOP INHIBIT
IG CDU LOOP INHIBIT
478 SIN A OG 16X HI
479 SIN A OG 16X LO
480 COS A OG 16X HI
481 COS A OG 16X LO
470 SIN A MG 16X HI
471 SIN A MG 16X LO
472 COS A MG 16X HI
473 COS A MG 16X LO
462 SIN A IG 16X HI
463 SIN A IG 16X LO
464 COS A IG 16X HI
465 COS A IG 16X LO
157 SIN A OG 1X HI
158 SIN A OG 1X LO
155 COS A OG 1X HI
156 COS A OG 1X LO
163 SIN A MG 1X HI
164 SIN A MG 1X LO
161 COS A MG 1X HI
162 COS A MG 1X LO
169 SIN A IG 1X HI
170 SIN A IG 1X LO
167 COS A IG 1X HI
168 COS A IG 1X LO
XBR-A, RSS-C
XBR-A, RSS-A
XBR-A, RSS-A
XBR-A RSS-A
XBR-A, RSS-C
XBR-A, RSS-C
XBR-A, TES 168 TES 167
XBR-A, TES 170 TES 169
XBR-A, TES 162 TES 161
XBR-A, TES 164, MPL 164 TES 163, MPL 163
XBR-A, TES 156 TES 155
XBR-A, TES 158 TES 157
593 595 597
OIA BACKWALL
9
8
7
6
5
4
3
2
1

2H

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES +_ +_ +_ - - -	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Cookman DATE 6 MAY 65 CHECKED Ed Foster 14 MAY 65 APPROVAL APPROVAL	MECHANIZATION DIAGRAM- GIMBAL POSITION CONTROL (BLOCK I SERIES 100, BLOCK II & LEM)
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J2 · 2900223
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — · SHEET 1 OF 4

2900223 C 1

2/2900223

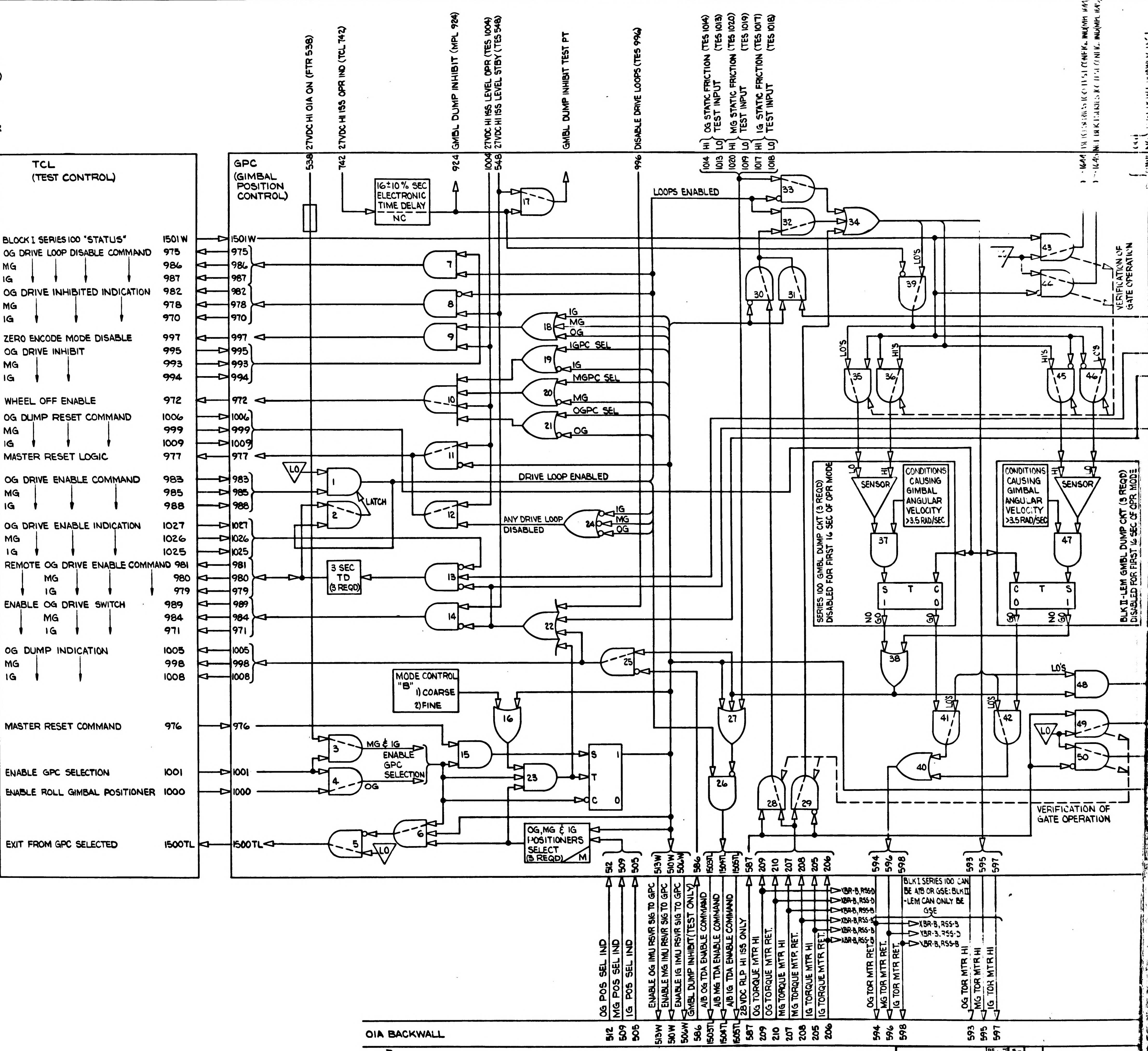
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM):

	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR)
RLP	RELAY & LAMP POWER SUPPLY
PPS	+30 VDC POWER SUPPLY
NPS	-30 VDC POWER SUPPLY
2900208	POWER & DUMMY LOAD PANEL-PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL)
2900207	MONITOR PANEL (MPL)
	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900220	TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
	TEST SELECTOR PANEL (TES)
2900217	SIGNAL SELECTION & MEASUREMENT
XBR-A	CROSSBAR- AC SIGNALS
XBR-B	CROSSBAR- DC SIGNALS
2900218	OSCILLOGRAPH SIGNAL SELECTION
RSS-B	TO FIXED DC CHANNEL
RSS-C	TO SWITCHABLE AC CHANNEL
RSS-D	TO SWITCHABLE DC CHANNEL
2900215	MEASUREMENT REFERENCE POWER SUPPLIES
RSS	OSCILLOGRAPH SIGNAL SELECTOR
	GSE GROUNDING (BLOCK I SERIES 100)
	GSE GROUNDING (BLOCK II & LEM)

4. NONSTANDARD SYMBOLOGY
   - INDICATES "AND" GATE WITH SWITCHED SIGNAL
   - NAME M INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM O
   - D. BLANK - ALL G/N CONFIGURATIONS
   - E. TW, TL OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.
6. SIGNAL FLOW FOR THE INNER, MIDDLE & OUTER GIMBAL LOOPS IS SHOWN FLOWING THROUGH THE SAME LOGIC SYMBOLOGY DUE TO SIMILARITY OF THE THREE LOOPS. ANY INDIVIDUAL LOOP CAN BE EXAMINED BY USING ONLY THE RESPECTIVE LOOP SIGNALS AND DISREGARDING THE OTHERS.
7. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK I SERIES 100	SH 1 SH 2
BLOCK II	SH 1 SH 3
LEM	SH 1 SH 4


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
TCL
(TEST CONTROL)
BLOCK I SERIES 100 "STATUS" 1501W
OG DRIVE LOOP DISABLE COMMAND 975
MG 986
IG 987
OG DRIVE INHIBITED INDICATION 982
MG 978
IG 970
ZERO ENCODE MODE DISABLE 997
OG DRIVE INHIBIT 995
MG 993
IG 994
WHEEL OFF ENABLE 972
OG DUMP RESET COMMAND 1006
MG 999
IG 1009
MASTER RESET LOGIC 977
OG DRIVE ENABLE COMMAND 983
MG 985
IG 988
OG DRIVE ENABLE INDICATION 1027
MG 1026
IG 1025
REMOTE OG DRIVE ENABLE COMMAND 981
MG 980
IG 979
ENABLE OG DRIVE SWITCH 989
MG 984
IG 971
OG DUMP INDICATION 1005
MG 998
IG 1008
MASTER RESET COMMAND 976
ENABLE GPC SELECTION 1001
ENABLE ROLL GIMBAL POSITIONER 1000
EXIT FROM GPC SELECTED 1500TL
GPC
(GIMBAL POSITION CONTROL)
538 27VDC HI OIA ON (FTR 538)
742 27VDC HI ISS OPR IND (TCL 742)
924 GMBL DUMP INHIBIT (MPL 924)
1004 27VDC HI ISS LEVEL OPR (TES 1004)
548 27VDC HI ISS LEVEL STBY (TES 548)
GMBL DUMP INHIBIT TEST PT
996 DISABLE DRIVE LOOPS (TES 996)
1014 HI OG STATIC FRICTION (TES 1014)
1013 LO TEST INPUT (TES 1013)
1020 HI MG STATIC FRICTION (TES 1020)
1019 LO TEST INPUT (TES 1019)
1017 HI IG STATIC FRICTION (TES 1017)
1018 LO TEST INPUT (TES 1018)
16±10% SEC ELECTRONIC TIME DELAY
NC
LOOPS ENABLED
LO'S
HI'S
VERIFICATION OF GATE OPERATION
IG
MG
OG
IGPC SEL
MGPC SEL
OGPC SEL
DRIVE LOOP ENABLED
ANY DRIVE LOOP DISABLED
LO
LATCH
3 SEC TD (3 REQD)
MODE CONTROL "B"
1) COARSE
2) FINE
MG & IG ENABLE GPC SELECTION
OG,MG & IG POSITIONERS SELECT (3 REQD)
M
S
T
C
I
O
SENSOR
CONDITIONS CAUSING GIMBAL ANGULAR VELOCITY >3.5 RAD/SEC
SERIES 100 GMBL DUMP CKT (3 REQD) DISABLED FOR FIRST 16 SEC OF OPR MODE
BLK II-LEM GMBL DUMP CKT (3 REQD) DISABLED FOR FIRST 16 SEC OF OPR MODE
NO GO
GO
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
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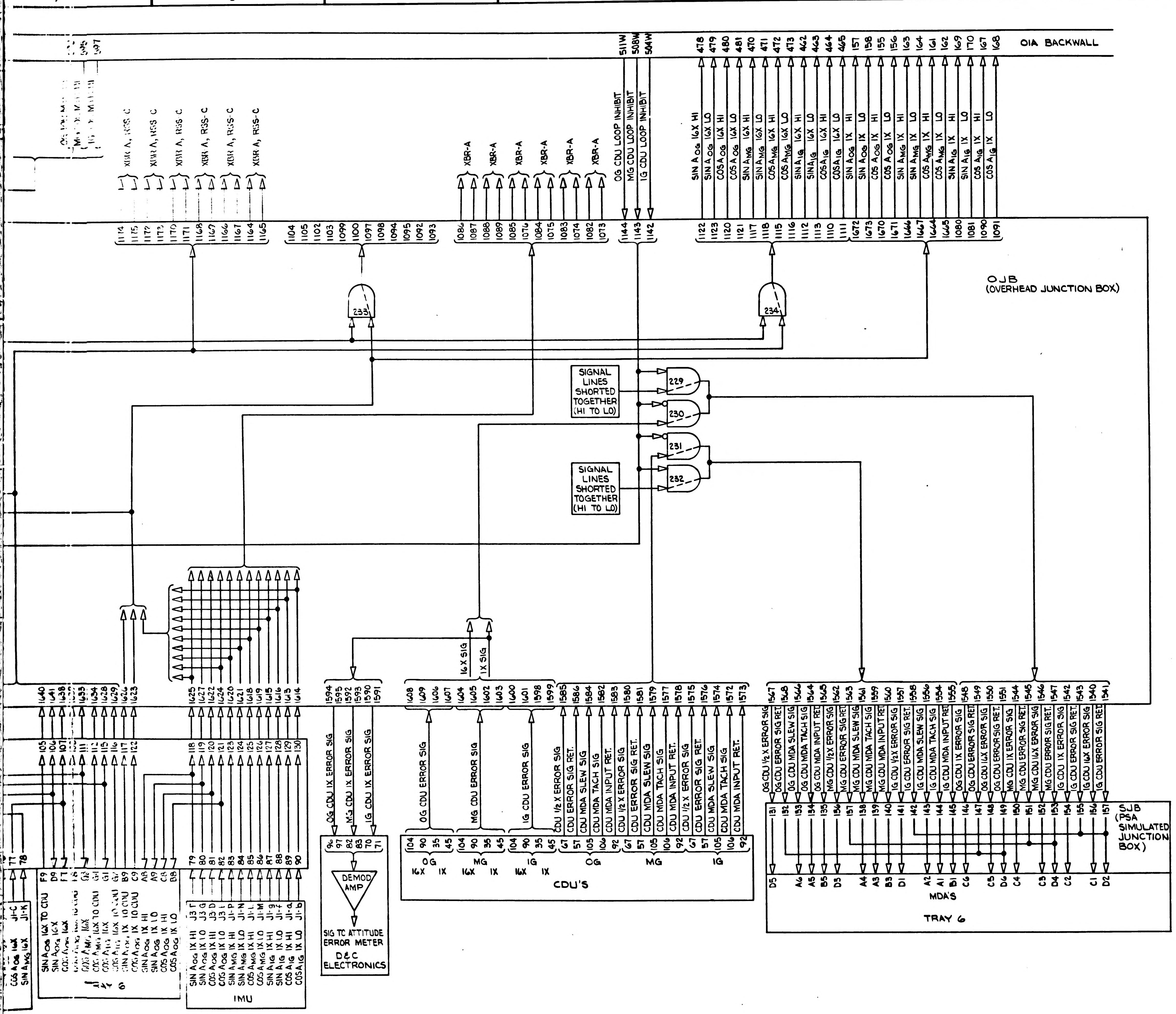
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
512 OG POS SEL IND
509 MG POS SEL IND
505 IG POS SEL IND
513W ENABLE OG IMU RSVR SIG TO GPC
510W ENABLE MG IMU RSVR SIG TO GPC
506W ENABLE IG IMU RSVR SIG TO GPC
586 GMBL DUMP INHIBIT (TEST ONLY)
1503TL A/B OG TDA ENABLE COMMAND
1504TL A/B MG TDA ENABLE COMMAND
1505TL A/B IG TDA ENABLE COMMAND
587 28VDC RLP HI ISS ONLY
209 OG TORQUE MTR HI
210 OG TORQUE MTR RET.
207 MG TORQUE MTR HI
208 MG TORQUE MTR. RET.
205 IG TORQUE MTR HI
206 IG TORQUE MTR RET.
XBR-B, RSS-D
XBR-B, RSS-D
XBR-B, RSS-B
XBR-B, RSS-B
XBR-B, RSS-B
XBR-B, RSS-B
594 OG TOR MTR RET.
596 MG TOR MTR RET.
598 IG TOR MTR RET.
XBR-B, RSS-B
XBR-3, RSS-D
XBR-B, RSS-B
BLK I SERIES 100 CAN BE A/B OR GSE: BLK II -LEM CAN ONLY BE GSE
593 OG TOR MTR HI
595 MG TOR MTR HI
597 IG TOR MTR HI
OIA BACKWALL

2900223 REV C S-1

MIL 1077J

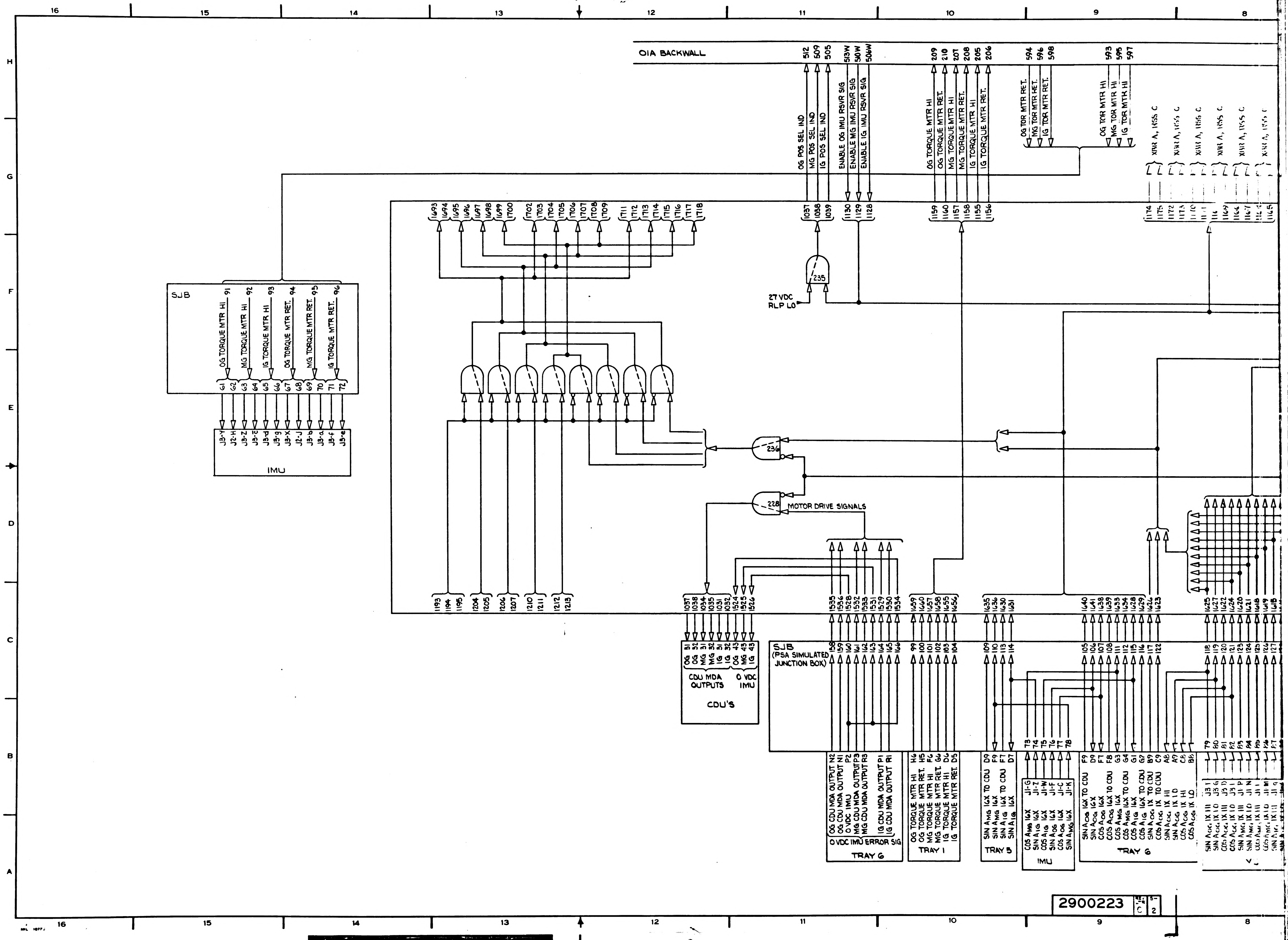
1/2900223

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		31 JUL 65	
B		REVISION STATUS CHANGED		2 SEP 65	
C		REVISION STATUS CHANGED		11 NOV 65	

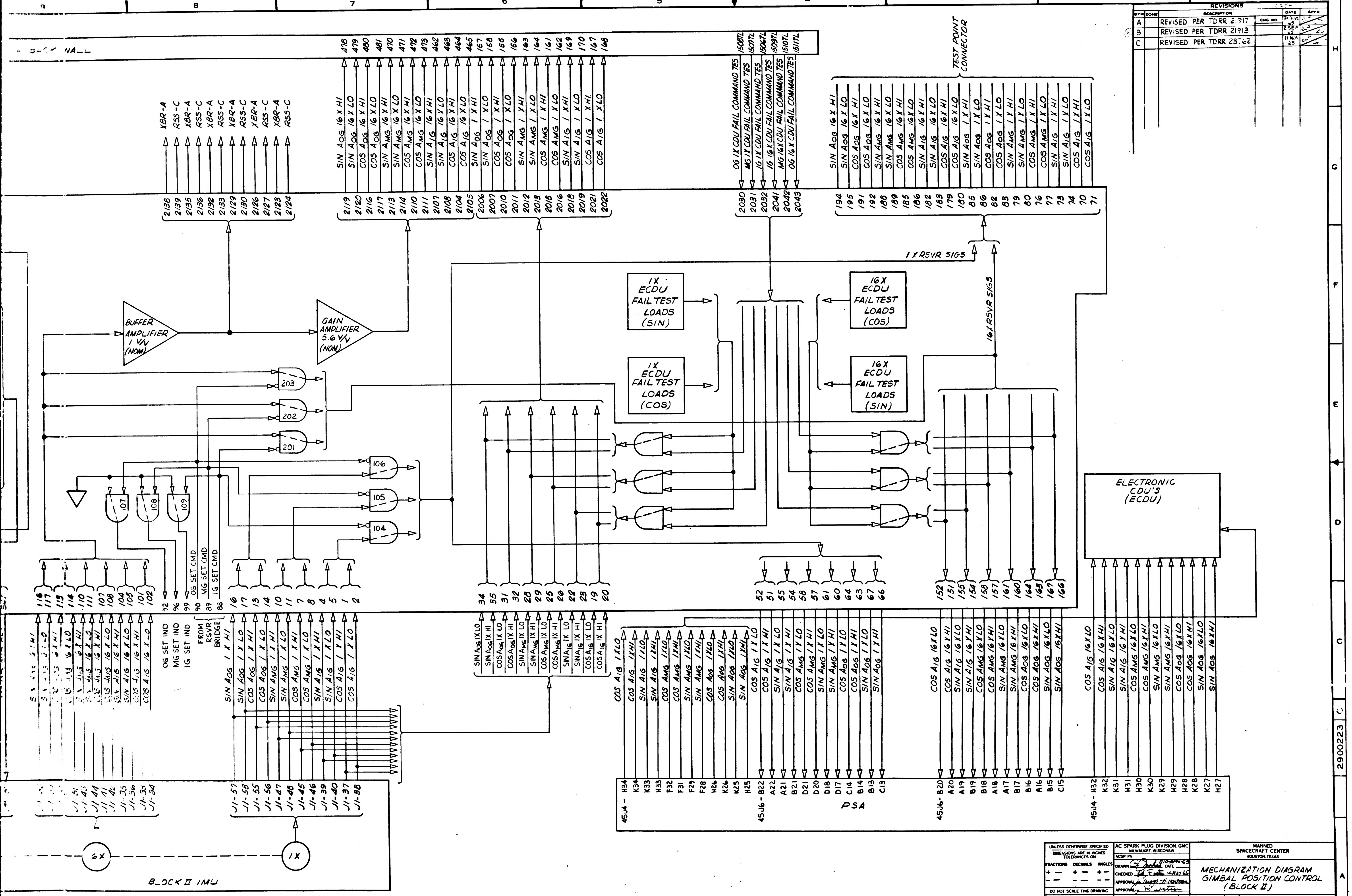

OIA BACKWALL
511W
508W
504W
OG CDU LOOP INHIBIT
MG CDU LOOP INHIBIT
IG CDU LOOP INHIBIT
XBR A, RGS-C
XBR-A
SIN A OG 16X HI
SIN A OG 16X LO
COS A OG 16X HI
COS A OG 16X LO
SIN A MG 16X HI
SIN A MG 16X LO
COS A MG 16X HI
COS A MG 16X LO
SIN A IG 16X HI
SIN A IG 16X LO
COS A IG 16X HI
COS A IG 16X LO
SIN A OG 1X HI
COS A OG 1X HI
COS A OG 1X LO
SIN A MG 1X HI
SIN A MG 1X LO
COS A MG 1X LO
SIN A IG 1X HI
SIN A IG 1X LO
COS A IG 1X HI
COS A IG 1X LO
OJB
(OVERHEAD JUNCTION BOX)
233
234
229
230
231
232
SIGNAL LINES SHORTED TOGETHER (HI TO LO)
SIGNAL LINES SHORTED TOGETHER (HI TO LO)
16X SIG
1X SIG
OG CDU 1X ERROR SIG
MG CDU 1X ERROR SIG
IG CDU 1X ERROR SIG
OG CDU ERROR SIG
MG CDU ERROR SIG
IG CDU ERROR SIG
CDU 1/2 X ERROR SIG
CDU ERROR SIG RET.
CDU MDA SLEW SIG
CDU MDA TACH SIG
CDU MDA INPUT RET.
OG CDU 1/2 X ERROR SIG
OG CDU MDA SLEW SIG
OG CDU MDA TACH SIG
OG CDU MDA INPUT RET.
MG CDU 1/2 X ERROR SIG
MG CDU MDA SLEW SIG
MG CDU MDA TACH SIG
MG CDU MDA INPUT RET.
IG CDU 1/2 X ERROR SIG
IG CDU MDA SLEW SIG
IG CDU MDA TACH SIG
IG CDU MDA INPUT RET.
OG CDU 1X ERROR SIG
OG CDU 16X ERROR SIG
MG CDU 1X ERROR SIG
MG CDU 16X ERROR SIG
IG CDU 1X ERROR SIG
IG CDU 16X ERROR SIG
SJB (PSA SIMULATED JUNCTION BOX)
DEMOD AMP
SIG TO ATTITUDE ERROR METER
D&C ELECTRONICS
OG
MG
IG
16X
1X
CDU'S
MDA'S
TRAY 6
IMU
COS A OG 16X
SIN A MG 16X
SIN A OG 16X TO CDU
SIN A OG 1X HI
SIN A OG 1X LO
COS A OG 1X HI
COS A OG 1X LO
SIN A MG 1X HI
SIN A MG 1X LO
COS A MG 1X HI
COS A MG 1X LO
SIN A IG 1X HI
SIN A IG 1X LO
COS A IG 1X HI
COS A IG 1X LO
TRAY 6
2900223

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± —, DECIMALS ± —, ANGLES ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS		
	ACSP PN			
DO NOT SCALE THIS DRAWING	DRAWN [illegible] DATE 8 MAY 65 CHECKED Ed Foster 14 MAY 65 APPROVAL [illegible] APPROVAL	MECHANIZATION DIAGRAM - GIMBAL POSITION CONTROL (BLOCK I SERIES 100).		
MATERIAL —	NASA APPROVAL [illegible]	CODE IDENT NO. 99974	SIZE J2	2900223
CONTRACT NAS 9-497	MIT APPROVAL [illegible] 20 May 65	SCALE —		SHEET 2 OF 4

27 2900223


OIA BACKWALL
OG POS SEL IND
MG POS SEL IND
IG POS SEL IND
ENABLE OG IMU RSVR SIG
ENABLE MG IMU RSVR SIG
ENABLE IG IMU RSVR SIG
OG TORQUE MTR HI
OG TORQUE MTR RET.
MG TORQUE MTR HI
MG TORQUE MTR RET.
IG TORQUE MTR HI
IG TORQUE MTR RET.
OG TOR MTR RET.
MG TOR MTR RET.
IG TOR MTR RET.
OG TOR MTR HI
MG TOR MTR HI
IG TOR MTR HI
SJB
IMU
235
27 VDC RLP LO
236
228
MOTOR DRIVE SIGNALS
CDU MDA OUTPUTS
0 VDC IMU
CDU'S
SJB (PSA SIMULATED JUNCTION BOX)
OG CDU MDA OUTPUT N2
OG CDU MDA OUTPUT N1
0 VDC IMU P2
MG CDU MDA OUTPUT P3
MG CDU MDA OUTPUT R3
IG CDU MDA OUTPUT P1
IG CDU MDA OUTPUT R1
0 VDC IMU ERROR SIG
TRAY 6
TRAY 1
SIN AMG 16X TO CDU
SIN AMG 16X
SIN AIG 16X TO CDU
SIN AIG 16X
TRAY 5
COS AMG 16X
SIN AIG 16X
COS AIG 16X
SIN AOG 16X
COS AOG 16X
SIN AMG 16X
IMU
SIN AOG 16X TO CDU
COS AOG 16X TO CDU
COS AMG 16X TO CDU
COS AIG 16X TO CDU
SIN AOG 1X TO CDU
COS AOG 1X TO CDU
SIN AOG 1X HI
SIN AOG 1X LO
COS AOG 1X HI
COS AOG 1X LO
2900223
C
2

17/2900223


SIN AOG 16 X HI
SIN AOG 16 X LO
COS AOG 16 X HI
COS AOG 16 X LO
SIN AMG 16 X HI
SIN AMG 16 X LO
COS AMG 16 X HI
COS AMG 16 X LO
SIN AIG 16 X HI
SIN AIG 16 X LO
COS AIG 16 X HI
COS AIG 16 X LO
SIN AOG 1 X HI
SIN AOG 1 X LO
COS AOG 1 X HI
COS AOG 1 X LO
SIN AMG 1 X HI
SIN AMG 1 X LO
COS AMG 1 X HI
COS AMG 1 X LO
SIN AIG 1 X HI
SIN AIG 1 X LO
COS AIG 1 X HI.
COS AIG 1 X LO
478 479 480 481 470 471 472 473 462 463 464 465 157 158 155 156 163 164 161 162 169 170 167 168
2119 2120 2116 2117 2113 2114 2110 2111 2107 2108 2104 2105 2006 2007 2010 2011 2012 2013 2015 2016 2018 2019 2021 2022
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
RSS-C
RSS-C
XBR-A
RSS-C
2138 2139 2135 2136 2132 2133 2129 2130 2126 2127 2123 2124
OG 1X CDU FAIL COMMAND TES
MG 1X CDU FAIL COMMAND TES
IG 1X CDU FAIL COMMAND TES
IG 16X CDU FAIL COMMAND TES
MG 16X CDU FAIL COMMAND TES
OG 16 X CDU FAIL COMMAND TES
1508TL 1507TL 1506TL 1509TL 1510TL 1511TL
2030 2031 2032 2041 2042 2043
TEST POINT CONNECTOR
194 195 191 192 188 189 185 186 182 183 179 180 85 86 82 83 79 80 76 77 73 74 70 71
1 X RSVR SIGS
16 X RSVR SIGS
BUFFER AMPLIFIER 1 V/V (NOM)
GAIN AMPLIFIER 5.6 V/V (NOM)
1X ECDU FAIL TEST LOADS (SIN)
1X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (SIN)
203
202
201
106
105
104
107
108
109
ELECTRONIC CDU'S (ECDU)
116 117 119 114 110 111 107 108 104 105 101 102
92 96 99
OG SET CMD
MG SET CMD
IG SET CMD
90 89 88
FROM RSVR BRIDGE
OG SET IND
MG SET IND
IG SET IND
16 17 13 14 10 11 7 8 4 5 1 2
SIN AOG 1 X HI
SIN AOG 1 X LO
COS AOG 1 X HI
COS AOG 1 X LO
SIN AMG 1 X HI
SIN AMG 1 X LO
COS AMG 1 X HI
COS AMG 1 X LO
SIN AIG 1 X HI
SIN AIG 1 X LO
COS AIG 1 X HI
COS AIG 1 X LO
SIN AMG 16 X HI
SIN AMG 16 X LO
COS AMG 16 X HI
SIN AIG 16 X LO
SIN AIG 16 X HI
SIN AIG 16 X LO
COS AIG 16 X HI
COS AIG 16 X LO
J1-43 J1-44 J1-41 J1-42 J1-35 J1-36 J1-33 J1-34
J1-57 J1-58 J1-55 J1-56 J1-47 J1-48 J1-45 J1-46 J1-39 J1-40 J1-37 J1-38
16X
1X
BLOCK II IMU
34 35 31 32 28 29 25 26 22 23 19 20
SIN AOG 1X LO
SIN AOG 1X HI
COS AOG 1X LO
COS AOG 1X HI
SIN AMG 1X LO
SIN AMG 1X HI
COS AMG 1X LO
COS AMG 1X HI
SIN AIG 1X LO
SIN AIG 1X HI
COS AIG 1X LO
COS AIG 1X HI
52 51 55 54 58 57 61 60 64 63 67 66
COS AIG 1XLO
COS AIG 1XHI
SIN AIG 1XLO
SIN AIG 1XHI
COS AMG 1XLO
COS AMG 1XHI
SIN AMG 1XLO
SIN AMG 1XHI
COS AOG 1XLO
COS AOG 1XHI
SIN AOG 1XLO
SIN AOG 1XHI
45J4 - H34 K34 K33 H33 F32 F31 F29 F28 H26 K26 K25 H25
COS AIG 1 X LO
COS AIG 1 X HI
SIN AIG 1 X LO
SIN AIG 1 X HI
COS AMG 1 X LO
COS AMG 1 X HI
SIN AMG 1 X LO
SIN AMG 1 X HI
COS AOG 1 X LO
COS AOG 1 X HI
SIN AOG 1 X LO
SIN AOG 1 X HI
45J6 - B22 A22 A21 B21 D21 D20 D18 D17 C14 B14 B13 C13
PSA
152 151 155 154 158 157 161 160 164 163 167 166
COS AIG 16X LO
COS AIG 16X HI
SIN AIG 16X LO
SIN AIG 16X HI
COS AMG 16X LO
COS AMG 16X HI
SIN AMG 16X LO
SIN AMG 16X HI
COS AOG 16X LO
COS AOG 16X HI
SIN AOG 16X LO
SIN AOG 16X HI
45J6 - B20 A20 A19 B19 B18 A18 A17 B17 B16 A16 B15 C15
45J4 - H32 K32 K31 H31 H30 K30 K29 H29 H28 K28 K27 H27
9 8 7 6 5 4 3 2 1
H G F E D C A

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21917		31 AUG 65	
B		REVISED PER TDRR 21913		2 SEP 65	
C		REVISED PER TDRR 23762		11 NOV 65	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
+ — + — + —
— — — — — —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN G. Dahl DATE 10-APR-65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

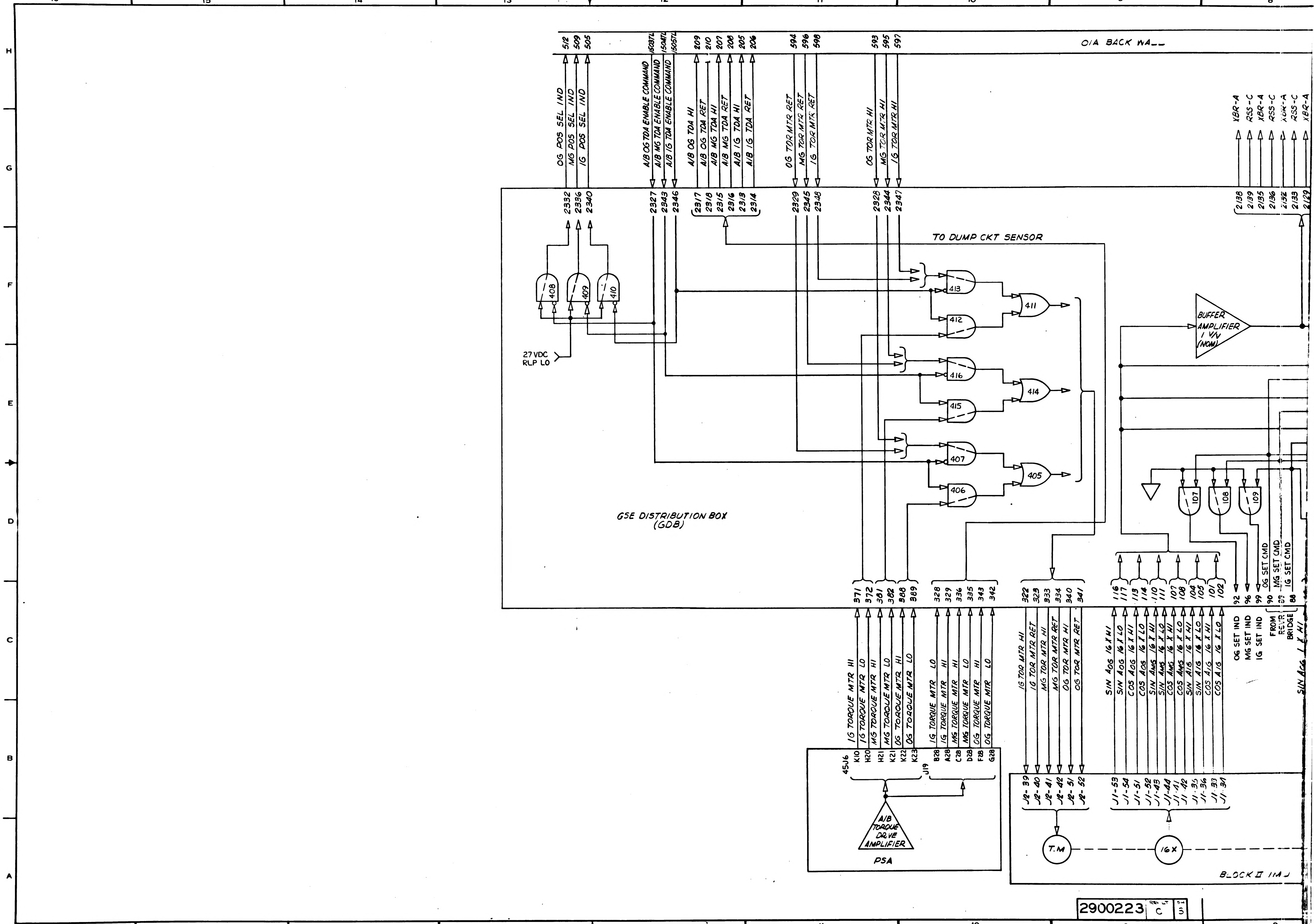
MECHANIZATION DIAGRAM
GIMBAL POSITION CONTROL
(BLOCK II)

CODE IDENT NO. 99974
SIZE
2900223
SCALE NONE
SHEET 3 OF 6

2900223 C 3

2900223 C

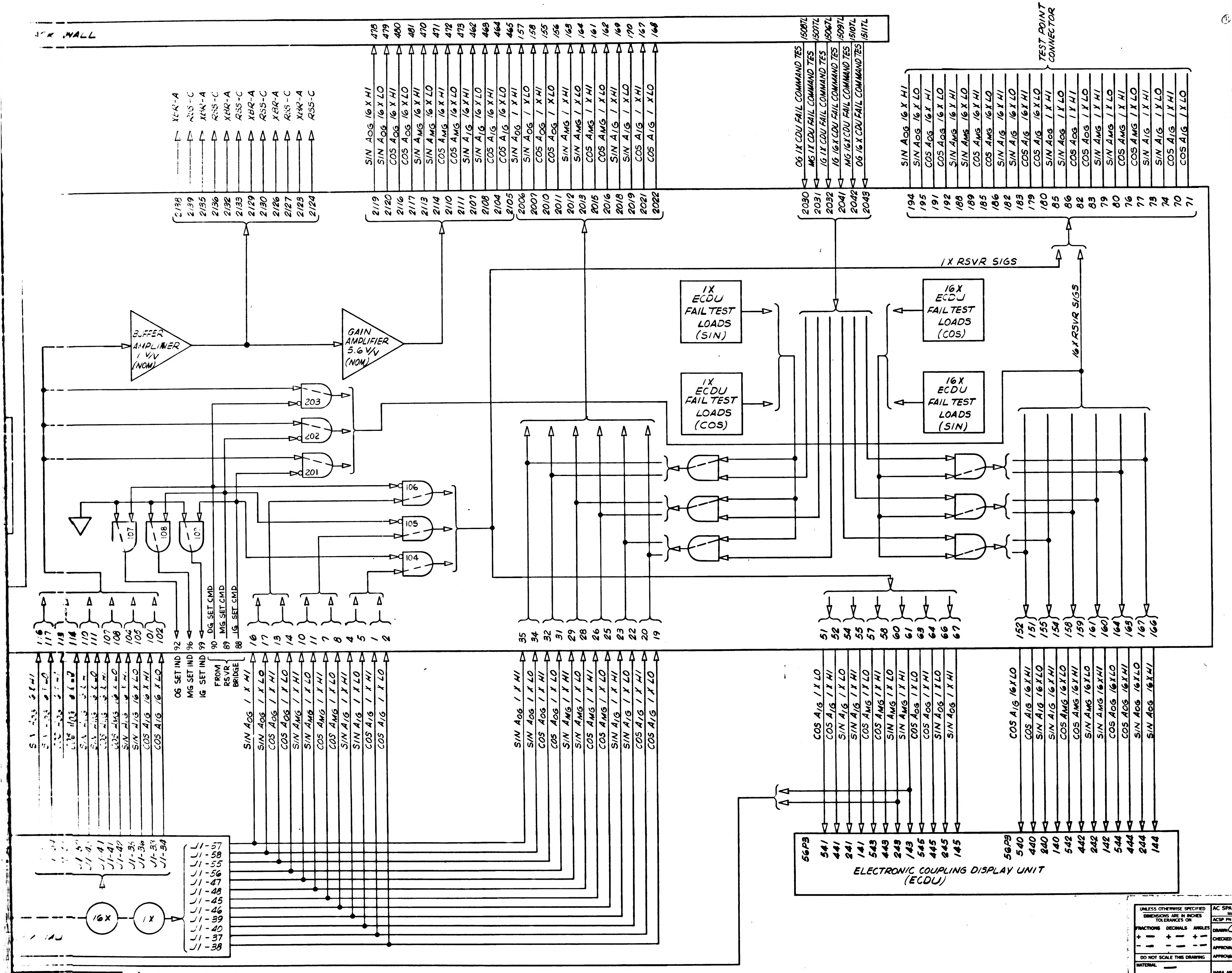
2/2900223


O/A BACK WA__
512
509
505
1503TL
1504TL
1505TL
209
210
207
208
205
206
594
596
598
593
595
597
OG POS SEL IND
MG POS SEL IND
IG POS SEL IND
A/B OG TDA ENABLE COMMAND
A/B MG TDA ENABLE COMMAND
A/B IG TDA ENABLE COMMAND
A/B OG TDA HI
A/B OG TDA RET
A/B MG TDA HI
A/B MG TDA RET
A/B IG TDA HI
A/B IG TDA RET
OG TOR MTR RET
MG TOR MTR RET
IG TOR MTR RET
OG TOR MTR HI
MG TOR MTR HI
IG TOR MTR HI
2332
2336
2340
2327
2343
2346
2317
2318
2315
2316
2313
2314
2329
2345
2348
2328
2344
2347
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
2138
2139
2135
2136
2132
2133
2129
TO DUMP CKT SENSOR
408
409
410
27 VDC
RLP LO
413
412
411
416
415
414
407
406
405
BUFFER
AMPLIFIER
1 V/V
(NOM)
107
108
109
GSE DISTRIBUTION BOX
(GDB)
371
372
381
382
388
389
328
329
336
335
343
342
322
323
333
334
340
341
116
117
113
114
110
111
107
108
104
105
101
102
92
96
99
90
89
88
OG SET CMD
MG SET CMD
IG SET CMD
OG SET IND
MG SET IND
IG SET IND
FROM
REVR
BRIDGE
IG TORQUE MTR HI
IG TORQUE MTR LO
MG TORQUE MTR HI
MG TORQUE MTR LO
OG TORQUE MTR HI
OG TORQUE MTR LO
IG TORQUE MTR LO
IG TORQUE MTR HI
MG TORQUE MTR HI
MG TORQUE MTR LO
OG TORQUE MTR HI
OG TORQUE MTR LO
IG TOR MTR HI
IG TOR MTR RET
MG TOR MTR HI
MG TOR MTR RET
OG TOR MTR HI
OG TOR MTR RET
SIN AOG 16X HI
SIN AOG 16X LO
COS AOG 16X HI
COS AOG 16X LO
SIN AMS 16X HI
SIN AMS 16X LO
COS AMG 16X HI
COS AMS 16X LO
SIN AIG 16X HI
SIN AIG 16X LO
COS AIG 16X HI
COS AIG 16X LO
SIN AOG 1X HI
45J6
K10
H20
H21
K21
K22
K23
J19
B28
A28
C28
D28
F28
G28
A/B
TORQUE
DRIVE
AMPLIFIER
PSA
J2-39
J2-40
J2-41
J2-42
J2-51
J2-52
J1-53
J1-54
J1-51
J1-52
J1-43
J1-44
J1-41
J1-42
J1-35
J1-36
J1-33
J1-31
T.M
16X
BLOCK II IMU
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

2900223 REV C SH 3

1Z2900223

REVISIONS					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21917		31 AUG 65	
B		REVISED PER TDRR 21913		2 SEP 65	
C		REVISED PER TDRR 23762		10 NOV 65	



WALL
TEST POINT CONNECTOR
XBR-A
RSS-C
BUFFER AMPLIFIER 1 V/V (NOM)
GAIN AMPLIFIER 5.6 V/V (NOM)
1X ECDU FAIL TEST LOADS (SIN)
1X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (SIN)
1X RSVR SIGS
16X RSVR SIGS
OG 1X CDU FAIL COMMAND TES
MG 1X CDU FAIL COMMAND TES
IG 1X CDU FAIL COMMAND TES
IG 16X CDU FAIL COMMAND TES
MG 16X CDU FAIL COMMAND TES
OG 16X CDU FAIL COMMAND TES
SIN AOG 16X HI
SIN AOG 16X LO
COS AOG 16X LO
SIN AMG 16X HI
SIN AMG 16X LO
COS AMG 16X HI
COS AMG 16X LO
SIN AIG 16X HI
SIN AIG 16X LO
COS AIG 16X HI
COS AIG 16X LO
SIN AOG 1X HI
SIN AOG 1X LO
COS AOG 1X HI
COS AOG 1X LO
SIN AMG 1X HI
SIN AMG 1X LO
COS AMG 1X HI
COS AMG 1X LO
SIN AIG 1X HI
SIN AIG 1X LO
COS AIG 1X HI
COS AIG 1X LO
201
202
203
104
105
106
107
108
109
OG SET CMD
MG SET CMD
IG SET CMD
OG SET IND
MG SET IND
IG SET IND
FROM RSVR BRIDGE
ELECTRONIC COUPLING DISPLAY UNIT (ECDU)
56P3
56P9
J1-57
J1-58
J1-55
J1-56
J1-47
J1-48
J1-45
J1-46
J1-39
J1-40
J1-37
J1-38
J1-41
J1-42
J1-35
J1-36
J1-33
J1-34
16X
1X

2900223 C 4

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN G. Oeschle DATE 8 APR 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

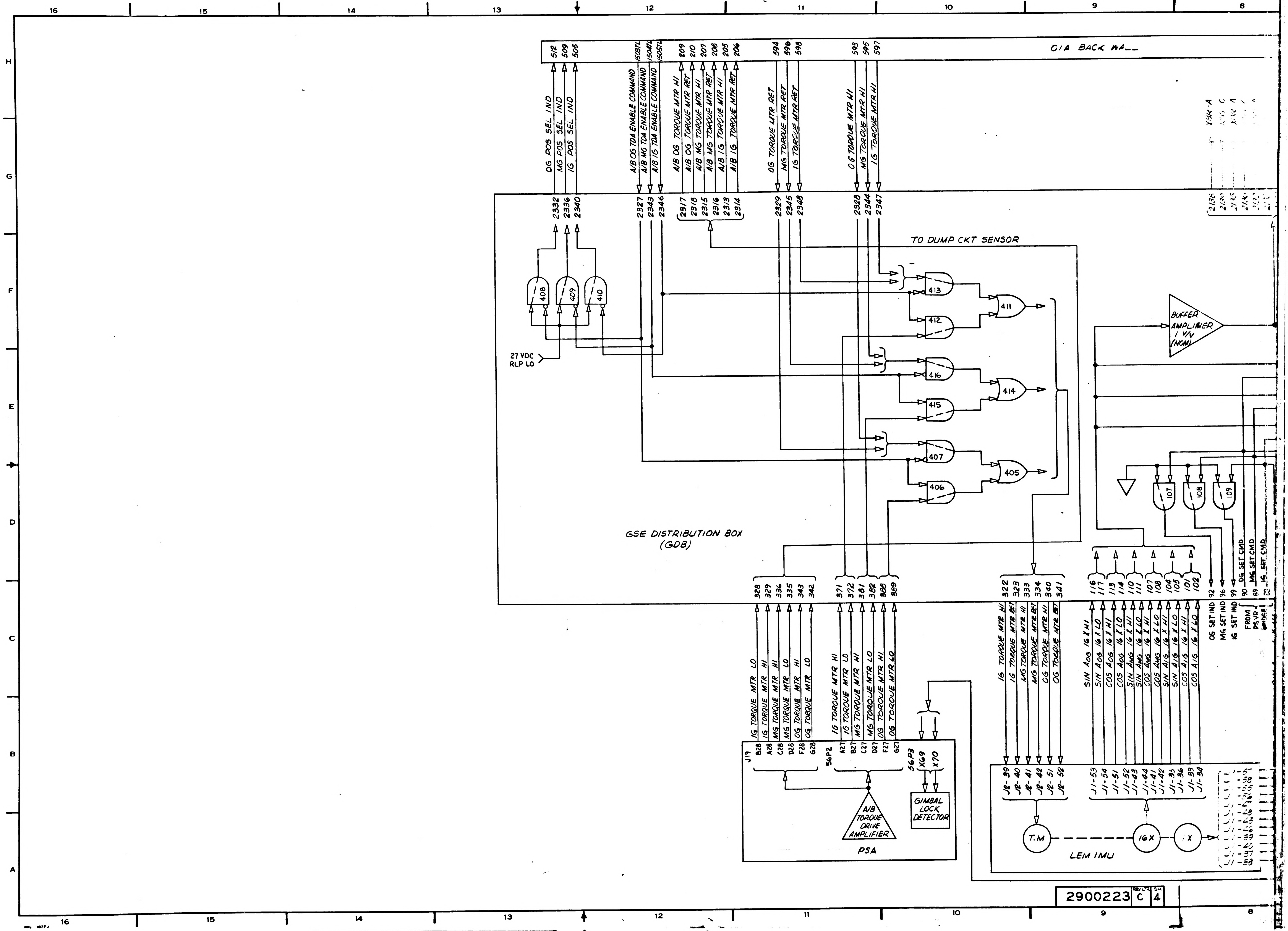
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-GIMBAL POSITION CONTROL (LEM)

CODE IDENT NO. 99974
SIZE
2900223
SCALE —
SHEET 4 OF 4

2900223 C

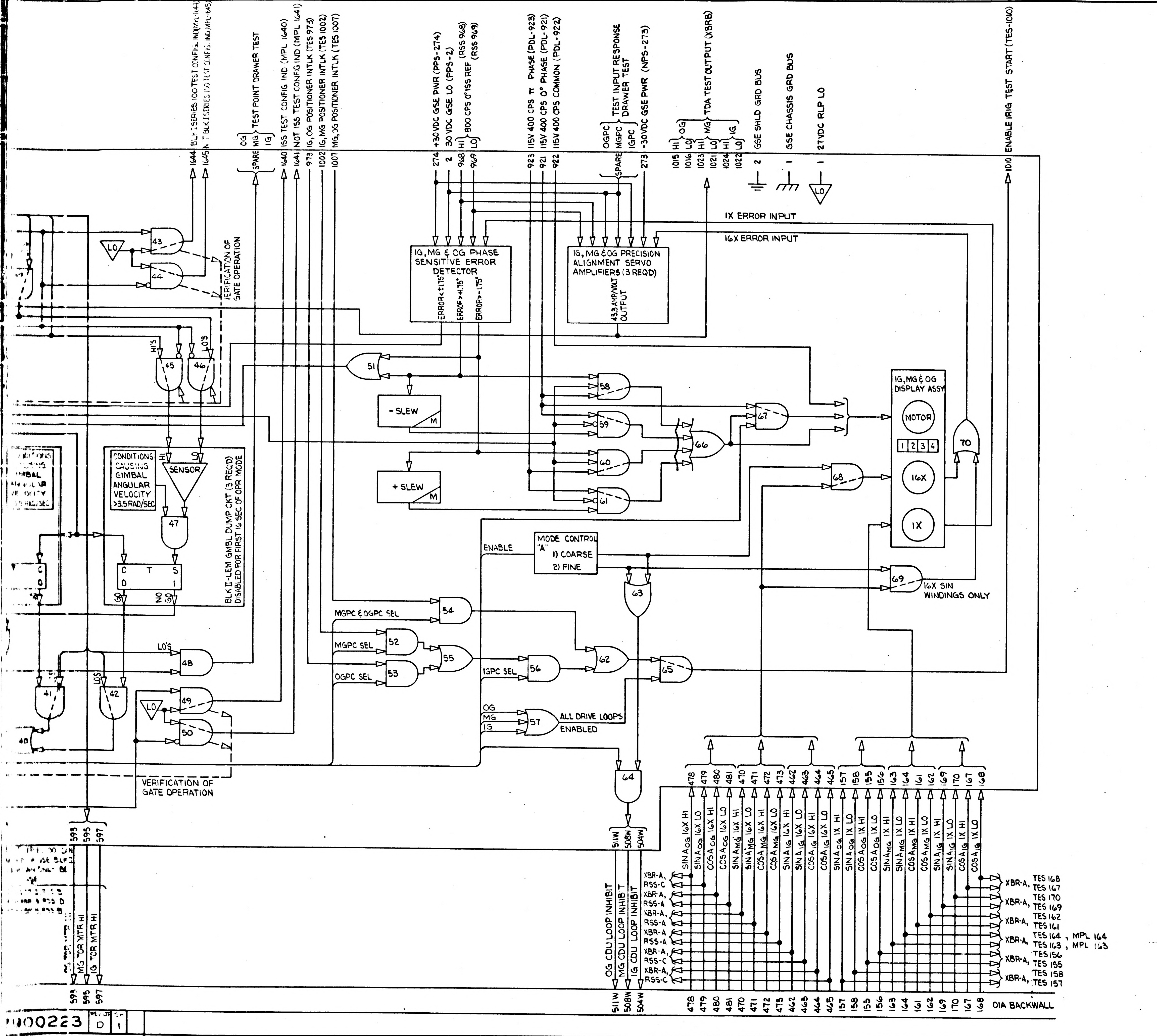
2J,2900223


O/A BACK WA--
512 509 505
OG POS SEL IND
MG POS SEL IND
IG POS SEL IND
1503TL 1504TL 1505TL
A/B OG TDA ENABLE COMMAND
A/B MG TDA ENABLE COMMAND
A/B IG TDA ENABLE COMMAND
209 210 207 208 205 206
A/B OG TORQUE MTR HI
A/B OG TORQUE MTR RET
A/B MG TORQUE MTR HI
A/B MG TORQUE MTR RET
A/B IG TORQUE MTR HI
A/B IG TORQUE MTR RET
594 596 598
OG TORQUE MTR RET
MG TORQUE MTR RET
IG TORQUE MTR RET
593 595 597
OG TORQUE MTR HI
MG TORQUE MTR HI
IG TORQUE MTR HI
2332 2336 2340
2327 2343 2346
2317 2318 2315 2316 2313 2314
2329 2345 2348
2328 2344 2347
TO DUMP CKT SENSOR
408 409 410
27 VDC
RLP LO
413 412 411
416 415 414
407 406 405
BUFFER AMPLIFIER 1 V/V (NOM)
107 108 109
GSE DISTRIBUTION BOX
(GDB)
328 329 336 335 343 342
371 372 381 382 388 389
322 323 333 334 340 341
116 117 113 114 110 111 107 108 104 105 101 102
92 96 99 90 89
OG SET IND
MG SET IND
IG SET IND
OG SET CMD
MG SET CMD
IG SET CMD
FROM PSVR BRIDGE
IG TORQUE MTR LO
IG TORQUE MTR HI
MG TORQUE MTR HI
MG TORQUE MTR LO
OG TORQUE MTR HI
OG TORQUE MTR LO
IG TORQUE MTR HI
IG TORQUE MTR LO
MG TORQUE MTR HI
MG TORQUE MTR LO
OG TORQUE MTR HI
OG TORQUE MTR LO
IG TORQUE MTR HI
IG TORQUE MTR RET
MG TORQUE MTR HI
MG TORQUE MTR RET
OG TORQUE MTR HI
OG TORQUE MTR RET
SIN AOG 16X HI
SIN AOG 16X LO
COS AOG 16X HI
COS AOG 16X LO
SIN AMG 16X HI
SIN AMG 16X LO
COS AMG 16X HI
COS AMG 16X LO
SIN AIG 16X HI
SIN AIG 16X LO
COS AIG 16X HI
COS AIG 16X LO
J19
B28 A28 C28 D28 F28 G28
56P2
A27 B27 C27 D27 F27 G27
56P3
X69 X70
A/B TORQUE DRIVE AMPLIFIER
GIMBAL LOCK DETECTOR
PSA
J2-39 J2-40 J2-41 J2-42 J2-51 J2-52
J1-53 J1-54 J1-51 J1-52 J1-43 J1-44 J1-41 J1-42 J1-35 J1-36 J1-33 J1-34
T.M
16X
1X
LEM IMU
J1-39
J1-40
J1-37
J1-38
16 15 14 13 12 11 10 9 8
H G F E D C B A

2900223 C 4

1/2900223

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		31 AUG 65	RLP
B		REVISION STATUS CHANGED		2 SEP 65	RLP AU
C		REVISED PER TDRR 23762		11 NOV 65	RLP
D		REVISION STATUS CHANGED		1 MAR 66	DKD CW



1644 BLK I SERIES 100 TEST CONFIG IND (MPL 1644)
1645 NOT BLK I SERIES 100 TEST CONFIG IND (MPL 1645)
OG MG IG SPARE TEST POINT DRAWER TEST
1640 ISS TEST CONFIG IND (MPL 1640)
1641 NOT ISS TEST CONFIG IND (MPL 1641)
973 IG, OG POSITIONER INTLK (TES 973)
1002 IG, MG POSITIONER INTLK (TES 1002)
1007 MG, OG POSITIONER INTLK (TES 1007)
274 +30VDC GSE PWR (PPS-274)
2 30 VDC GSE LO (PPS-2)
968 HI 800 CPS 0° ISS REF (RSS 968)
969 LO (RSS 969)
923 115V 400 CPS π PHASE (PDL-923)
921 115V 400 CPS 0° PHASE (PDL-921)
922 115V 400 CPS COMMON (PDL-922)
OGPC MGPC IGPC SPARE TEST INPUT RESPONSE DRAWER TEST
273 -30VDC GSE PWR (NPS-273)
1015 HI 1016 LO OG
1023 HI 1021 LO MG TDA TEST OUTPUT (XBRB)
1024 HI 1022 LO IG
2 GSE SHLD GRD BUS
1 GSE CHASSIS GRD BUS
1 27VDC RLP LO
1010 ENABLE IRIG TEST START (TES-1010)
LO
43
44
VERIFICATION OF GATE OPERATION
IG, MG & OG PHASE SENSITIVE ERROR DETECTOR
ERROR<±1.75°
ERROR>+1.75°
ERROR>-1.75°
IG, MG & OG PRECISION ALIGNMENT SERVO AMPLIFIERS (3 REQD)
43.3 AMP/VOLT OUTPUT
1X ERROR INPUT
16X ERROR INPUT
HI'S
LO'S
45
46
51
- SLEW
M
58
59
60
61
+ SLEW
66
67
68
IG, MG & OG DISPLAY ASSY
MOTOR
1 2 3 4
16X
1X
70
CONDITIONS CAUSING GIMBAL ANGULAR VELOCITY >3.5 RAD/SEC
SENSOR
47
C T S
O I
SO NO SO
BLK II-LEM GMBL DUMP CKT (3 REQD) DISABLED FOR FIRST 16 SEC OF OPR MODE
ENABLE
MODE CONTROL "A"
1) COARSE
2) FINE
63
69
16X SIN WINDINGS ONLY
MGPC & OGPC SEL
54
MGPC SEL
52
OGPC SEL
53
55
IGPC SEL
56
62
65
LO'S
48
41
42
40
LO
49
50
OG
MG
IG
57
ALL DRIVE LOOPS ENABLED
64
VERIFICATION OF GATE OPERATION
593 595 597
MG TOR MTR HI
IG TOR MTR HI
511W 508W 504W
OG CDU LOOP INHIBIT
MG CDU LOOP INHIBIT
IG CDU LOOP INHIBIT
478 479 480 481 470 471 472 473 462 463 464 465 157 158 155 156 163 164 161 162 169 170 167 168
SIN A OG 16X HI
SIN A OG 16X LO
COS A OG 16X HI
COS A OG 16X LO
SIN A MG 16X HI
SIN A MG 16X LO
COS A MG 16X HI
COS A MG 16X LO
SIN A IG 16X HI
SIN A IG 16X LO
COS A IG 16X HI
COS A IG 16X LO
SIN A OG 1X HI
SIN A OG 1X LO
COS A OG 1X HI
COS A OG 1X LO
SIN A MG 1X HI
SIN A MG 1X LO
COS A MG 1X HI
COS A MG 1X LO
SIN A IG 1X HI
SIN A IG 1X LO
COS A IG 1X HI
COS A IG 1X LO
XBR-A, RSS-C
XBR-A, RSS-A
XBR-A, RSS-A
XBR-A RSS-A
XBR-A, RSS-C
XBR-A, RSS-C
XBR-A, TES 168 TES 167
XBR-A, TES 170 TES 169
XBR-A, TES 162 TES 161
XBR-A, TES 164, MPL 164 TES 163, MPL 163
XBR-A, TES 156 TES 155
XBR-A, TES 158 TES 157
OIA BACKWALL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
DO NOT SCALE THIS DRAWING	DRAWN Cookman DATE 4 MAY 65 CHECKED Ed [illegible] 14 MAY 65 APPROVAL [illegible] APPROVAL	MECHANIZATION DIAGRAM- GIMBAL POSITION CONTROL (BLOCK I SERIES 100, BLOCK II & LEM)
MATERIAL —	NASA APPROVAL [illegible]	CODE IDENT NO. 99974 SIZE J_2 2900223
CONTRACT NAS 9-497	MIT APPROVAL [illegible]	SCALE — SHEET 1 OF 4

2900223 REV D SH 1

2/2900223

NOTES:

INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED
MIL-D-70327.

SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM):

	AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR)
RLP	RELAY & LAMP POWER SUPPLY
PPS	+30 VDC POWER SUPPLY
NPS	-30 VDC POWER SUPPLY
2900208	POWER & DUMMY LOAD PANEL - PRIMARY SIGNAL SELECTOR GYRO CAGING FUNCTIONS (PDL)
2900207	MONITOR PANEL (MPL)
	TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
2900201	TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
	TEST SELECTOR PANEL (TES)
2900217	SIGNAL SELECTION & MEASUREMENT
XBR-A	CROSSBAR - AC SIGNALS
XBR-B	CROSSBAR - DC SIGNALS
2900218	OSCILLOGRAPH SIGNAL SELECTION
RSS-B	TO FIXED DC CHANNEL
RSS-C	TO SWITCHABLE AC CHANNEL
RSS-D	TO SWITCHABLE DC CHANNEL
2900215	MEASUREMENT REFERENCE POWER SUPPLIES
RSS	OSCILLOGRAPH SIGNAL SELECTOR
	GSE GROUNDING (BLOCK I SERIES 100)
	GSE GROUNDING (BLOCK II & LEM)

4. NONSTANDARD SYMBOLOGY

INDICATES "AND" GATE WITH SWITCHED SIGNAL

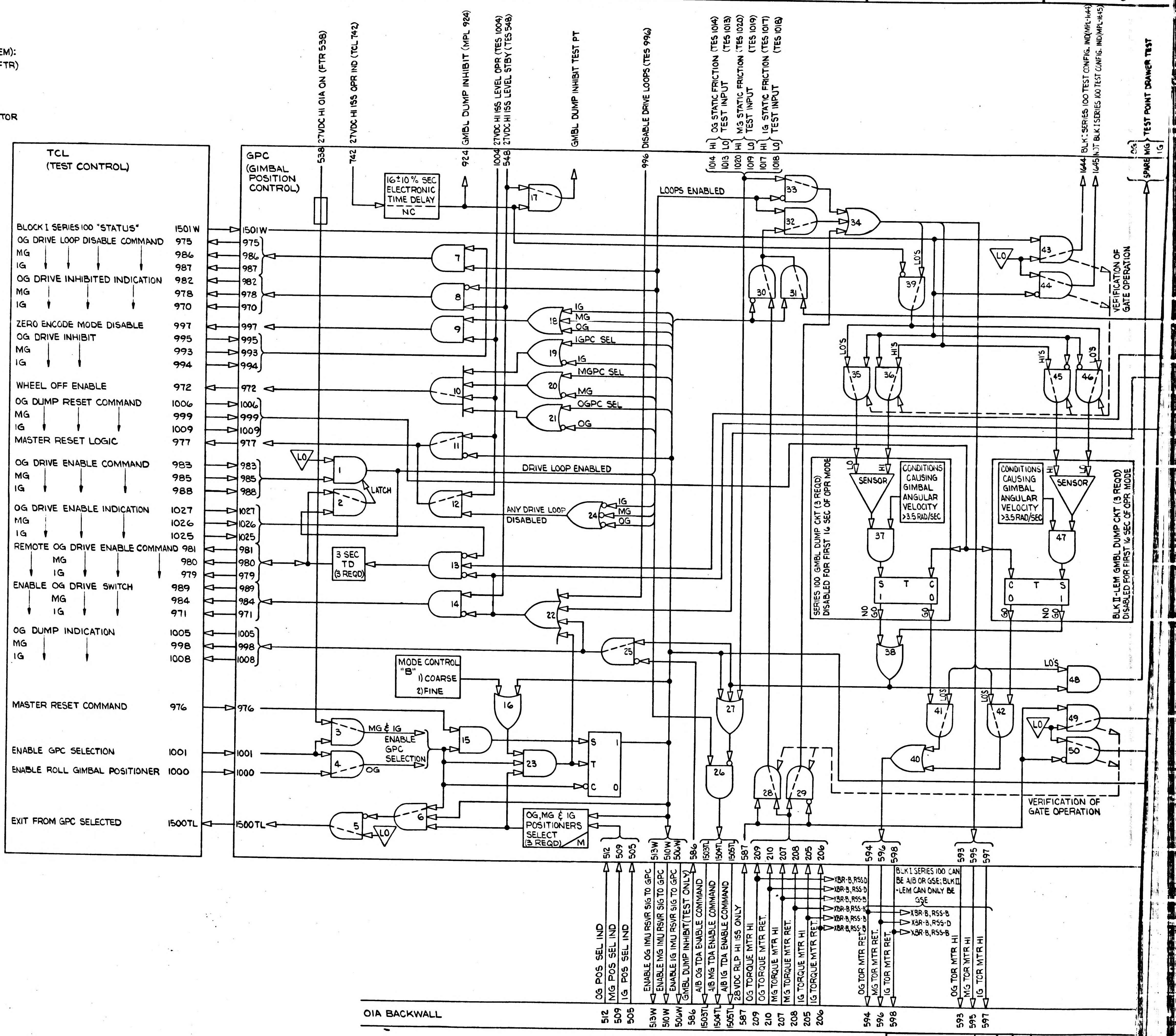
NAME INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:
   - A. W - BLOCK I SERIES 100 ONLY
   - B. T - BLOCK II ONLY
   - C. L - LEM ONLY
   - D. BLANK - ALL G/N CONFIGURATIONS
   - E. TW, TL OR WL - USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

6. SIGNAL FLOW FOR THE INNER, MIDDLE & OUTER GIMBAL LOOPS IS SHOWN FLOWING THROUGH THE SAME LOGIC SYMBOLOGY DUE TO SIMILARITY OF THE THREE LOOPS. ANY INDIVIDUAL LOOP CAN BE EXAMINED BY USING ONLY THE RESPECTIVE LOOP SIGNALS AND DISREGARDING THE OTHERS.

7. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

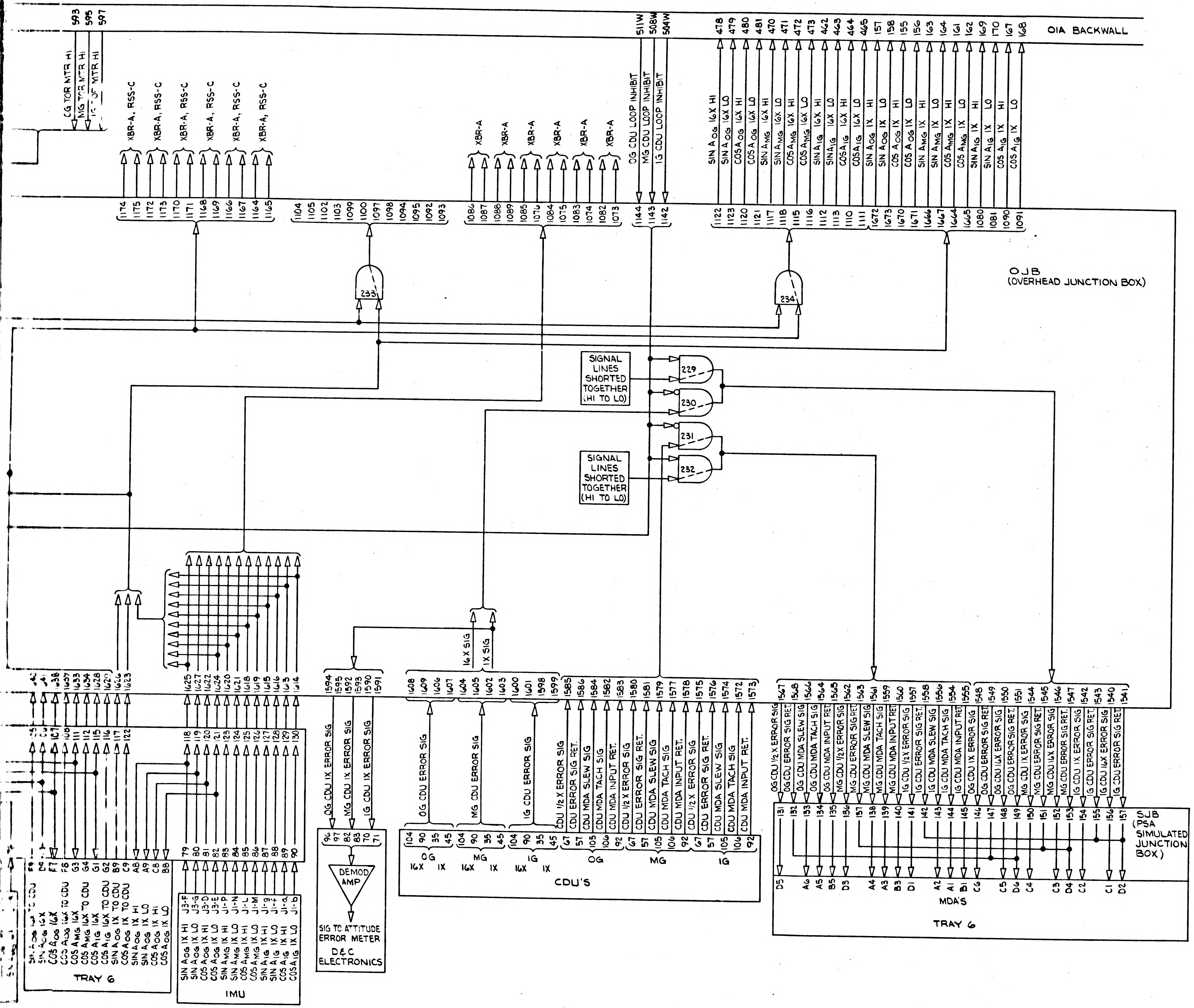
BLOCK I SERIES 100	SH 1 SH 2
BLOCK II	SH 1 SH 3
LEM	SH 1 SH 4


TCL
(TEST CONTROL)
BLOCK I SERIES 100 "STATUS" 1501W
OG DRIVE LOOP DISABLE COMMAND 975
MG 986
IG 987
OG DRIVE INHIBITED INDICATION 982
MG 978
IG 970
ZERO ENCODE MODE DISABLE 997
OG DRIVE INHIBIT 995
MG 993
IG 994
WHEEL OFF ENABLE 972
OG DUMP RESET COMMAND 1006
MG 999
IG 1009
MASTER RESET LOGIC 977
OG DRIVE ENABLE COMMAND 983
MG 985
IG 988
OG DRIVE ENABLE INDICATION 1027
MG 1026
IG 1025
REMOTE OG DRIVE ENABLE COMMAND 981
MG 980
IG 979
ENABLE OG DRIVE SWITCH 989
MG 984
IG 971
OG DUMP INDICATION 1005
MG 998
IG 1008
MASTER RESET COMMAND 976
ENABLE GPC SELECTION 1001
ENABLE ROLL GIMBAL POSITIONER 1000
EXIT FROM GPC SELECTED 1500TL
GPC
(GIMBAL POSITION CONTROL)
538 27VDC HI OIA ON (FTR 538)
742 27VDC HI ISS OPR IND (TCL 742)
924 GMBL DUMP INHIBIT (MPL 924)
1004 27VDC HI ISS LEVEL OPR (TES 1004)
548 27VDC HI ISS LEVEL STBY (TES 548)
GMBL DUMP INHIBIT TEST PT
996 DISABLE DRIVE LOOPS (TES 996)
1014 HI OG STATIC FRICTION (TES 1014)
1013 LO TEST INPUT (TES 1013)
1020 HI MG STATIC FRICTION (TES 1020)
1019 LO TEST INPUT (TES 1019)
1017 HI IG STATIC FRICTION (TES 1017)
1018 LO TEST INPUT (TES 1018)
1644 BLK I SERIES 100 TEST CONFIG. IND (MPL 1644)
1645 NOT BLK I SERIES 100 TEST CONFIG. IND (MPL 1645)
SPARE MG IG TEST POINT DRAWER TEST
16±10% SEC ELECTRONIC TIME DELAY
NC
LOOPS ENABLED
DRIVE LOOP ENABLED
ANY DRIVE LOOP DISABLED
IG MG OG
IGPC SEL
MGPC SEL
OGPC SEL
LATCH
3 SEC TD (3 REQD)
MG & IG ENABLE GPC SELECTION
OG
LO
LO'S
HI'S
MODE CONTROL "B"
1) COARSE
2) FINE
OG, MG & IG POSITIONERS SELECT (3 REQD) M
S T C O
SENSOR
CONDITIONS CAUSING GIMBAL ANGULAR VELOCITY >3.5 RAD/SEC
SERIES 100 GMBL DUMP CKT (3 REQD) DISABLED FOR FIRST 16 SEC OF OPR MODE
BLK II-LEM GMBL DUMP CKT (3 REQD) DISABLED FOR FIRST 16 SEC OF OPR MODE
NO SO
VERIFICATION OF GATE OPERATION
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
XBR-B, RSS-D
XBR-B, RSS-B
BLK I SERIES 100 CAN BE A/B OR GSE; BLK II-LEM CAN ONLY BE GSE
OIA BACKWALL
512 OG POS SEL IND
509 MG POS SEL IND
505 IG POS SEL IND
513W ENABLE OG IMU RSVR SIG TO GPC
510W ENABLE MG IMU RSVR SIG TO GPC
506W ENABLE IG IMU RSVR SIG TO GPC
586 A/B GMBL DUMP INHIBIT (TEST ONLY)
1503TL A/B OG TDA ENABLE COMMAND
1504TL A/B MG TDA ENABLE COMMAND
1505TL A/B IG TDA ENABLE COMMAND
587 28 VDC RLP HI ISS ONLY
209 OG TORQUE MTR HI
210 OG TORQUE MTR RET.
207 MG TORQUE MTR HI
208 MG TORQUE MTR RET.
205 IG TORQUE MTR HI
206 IG TORQUE MTR RET.
594 OG TOR MTR RET.
596 MG TOR MTR RET.
598 IG TOR MTR RET.
593 OG TOR MTR HI
595 MG TOR MTR HI
597 IG TOR MTR HI

2900223 REV LTR D SH 1

1/2900223

SYM	ZONE	REVISIONS DESCRIPTION	CHG NO	DATE	APPD
A		REVISION STATUS CHANGED		31 AUG 65	RLP
B		REVISION STATUS CHANGED		2 SEP 65	RLP AU
C		REVISION STATUS CHANGED		11 NOV 65	RLP
D		REVISION STATUS CHANGED		1 MAR 66	DKD



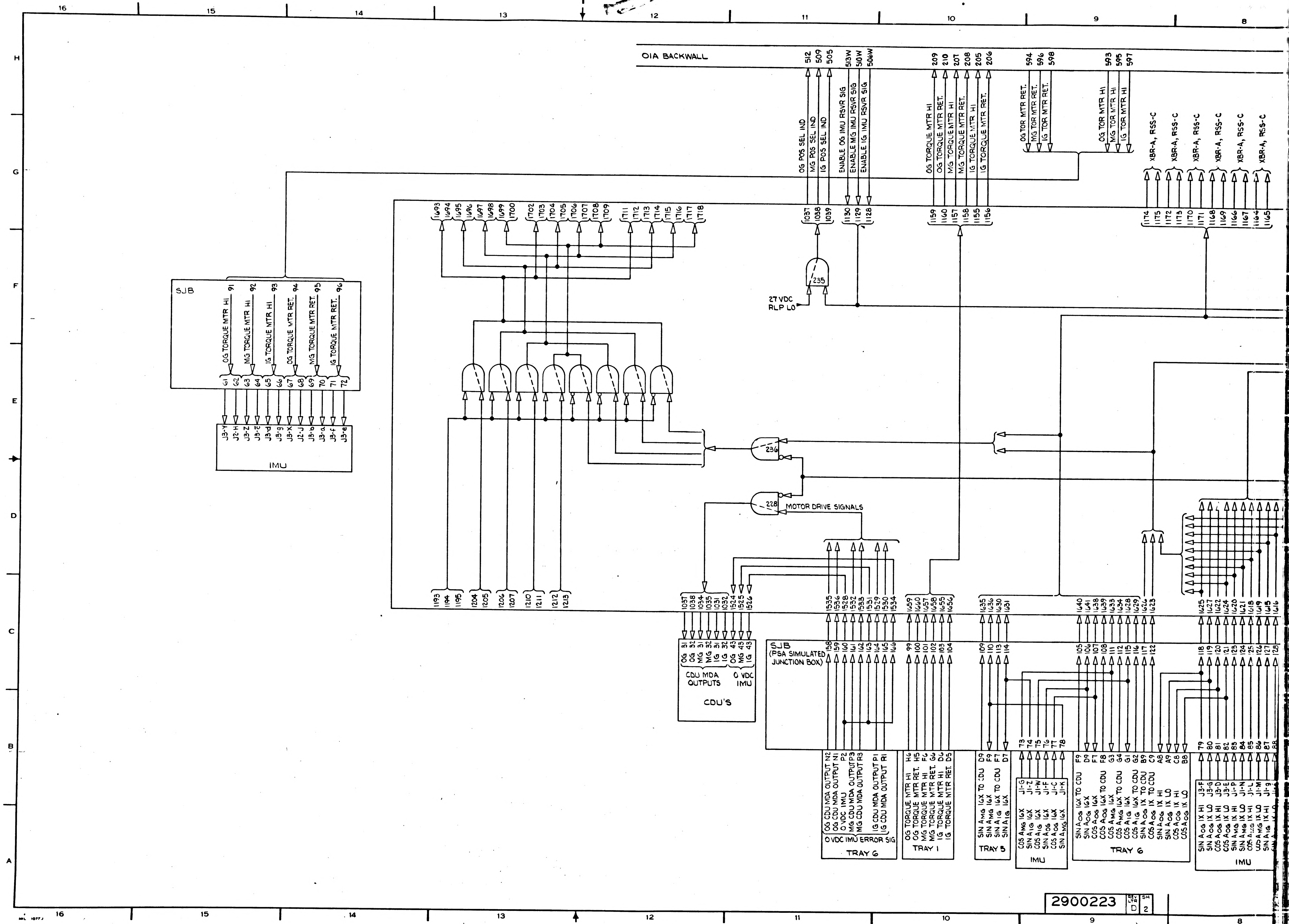
593
595
597
CG TQR MTR HI
MG TQR MTR HI
IG TQR MTR HI
XBR-A, RSS-C
XBR-A
511W
508W
504W
OG CDU LOOP INHIBIT
MG CDU LOOP INHIBIT
IG CDU LOOP INHIBIT
OIA BACKWALL
SIN A OG 16X HI
SIN A OG 16X LO
COS A OG 16X HI
COS A OG 16X LO
SIN A MG 16X HI
SIN A MG 16X LO
COS A MG 16X HI
COS A MG 16X LO
SIN A IG 16X HI
SIN A IG 16X LO
COS A IG 16X HI
COS A IG 16X LO
SIN A OG 1X LO
SIN A OG 1X HI
COS A OG 1X LO
COS A OG 1X HI
SIN A MG 1X HI
SIN A MG 1X LO
COS A MG 1X HI
COS A MG 1X LO
SIN A IG 1X HI
SIN A IG 1X LO
COS A IG 1X LO
OJB
(OVERHEAD JUNCTION BOX)
233
234
229
230
231
232
SIGNAL LINES SHORTED TOGETHER (HI TO LO)
16X SIG
1X SIG
OG CDU 1X ERROR SIG
MG CDU 1X ERROR SIG
IG CDU 1X ERROR SIG
DEMOD AMP
SIG TO ATTITUDE ERROR METER
D&C ELECTRONICS
OG CDU ERROR SIG
MG CDU ERROR SIG
IG CDU ERROR SIG
CDU 1/2 X ERROR SIG
CDU ERROR SIG RET.
CDU MDA SLEW SIG
CDU MDA TACH SIG
CDU MDA INPUT RET.
OG
MG
IG
16X
1X
CDU'S
OG CDU 1/2 X ERROR SIG
OG CDU MDA SLEW SIG
OG CDU MDA TACH SIG
OG CDU MDA INPUT RET.
MG CDU 1/2X ERROR SIG
MG CDU ERROR SIG RET.
MG CDU MDA SLEW SIG
MG CDU MDA TACH SIG
MG CDU MDA INPUT RET.
IG CDU 1/2X ERROR SIG
IG CDU ERROR SIG RET.
IG CDU MDA SLEW SIG
IG CDU MDA TACH SIG
IG CDU MDA INPUT RET.
OG CDU 1X ERROR SIG
OG CDU ERROR SIG RET.
OG CDU 16X ERROR SIG
MG CDU 1X ERROR SIG
MG CDU ERROR SIG RET.
MG CDU 16X ERROR SIG
IG CDU 1X ERROR SIG
IG CDU ERROR SIG RET.
IG CDU 16X ERROR SIG
SJB (PSA SIMULATED JUNCTION BOX)
MDA'S
TRAY 6
SIN A OG 16X TO CDU
COS A OG 16X TO CDU
SIN A MG 16X TO CDU
COS A MG 16X TO CDU
SIN A IG 16X TO CDU
COS A IG 16X TO CDU
SIN A OG 1X HI
SIN A OG 1X LO
IMU
J3-F
J3-G
J3-D
J3-E
J1-P
J1-N
J1-L
J1-M
J1-K
J1-J
J1-a
J1-b

290C 223 D 2

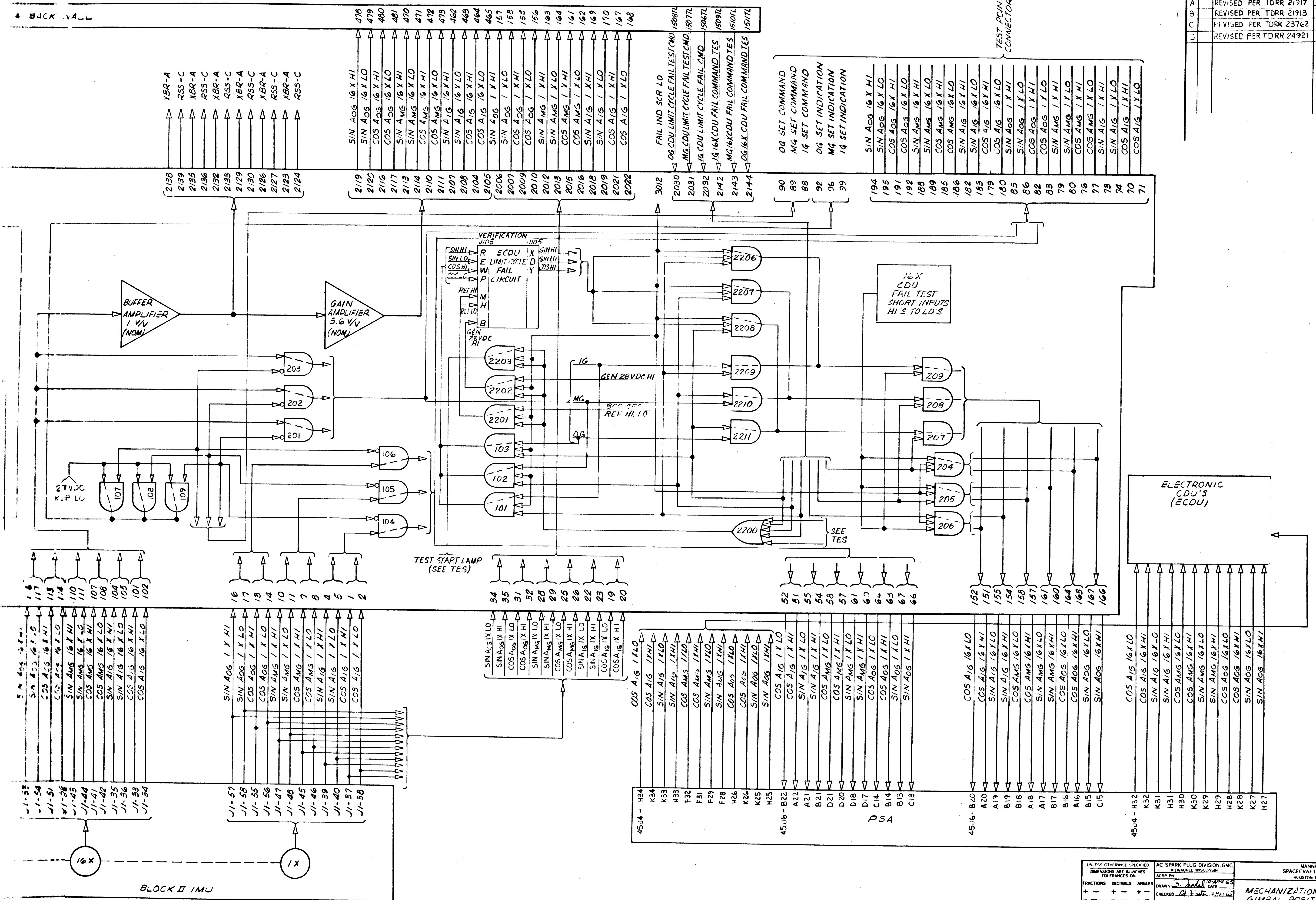
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± — ± — ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	MECHANIZATION DIAGRAM - GIMBAL POSITION CONTROL (BLOCK I SERIES 100).
	DRAWN Cookman DATE 8 MAY 65 CHECKED Ed Foster 14 MAY 65 APPROVAL APPROVAL	
DO NOT SCALE THIS DRAWING		
MATERIAL —	NASA APPROVAL	CODE IDENT NO 99974 · SIZE J_2 · 2900223
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — · SHEET 2 OF 4

2900223 D

2/29002223


OIA BACKWALL
512 509 505 513W 510W 506W
OG POS SEL IND
MG POS SEL IND
IG POS SEL IND
ENABLE OG IMU RSVR SIG
ENABLE MG IMU RSVR SIG
ENABLE IG IMU RSVR SIG
209 210 207 208 205 206
OG TORQUE MTR HI
OG TORQUE MTR RET.
MG TORQUE MTR HI
MG TORQUE MTR RET.
IG TORQUE MTR HI
IG TORQUE MTR RET.
594 596 598
OG TOR MTR RET.
MG TOR MTR RET.
IG TOR MTR RET.
593 595 597
OG TOR MTR HI
MG TOR MTR HI
IG TOR MTR HI
XBR-A, RSS-C
1693 1694 1695 1696 1697 1698 1699 1700 1702 1703 1704 1705 1706 1707 1708 1709 1711 1712 1713 1714 1715 1716 1717 1718
1037 1038 1039 1130 1129 1128
1159 1160 1157 1158 1155 1156
1174 1175 1172 1173 1170 1171 1168 1169 1166 1167 1164 1165
235
27 VDC RLP LO
SJB
91 92 93 94 95 96
OG TORQUE MTR HI
MG TORQUE MTR HI
IG TORQUE MTR HI
OG TORQUE MTR RET.
MG TORQUE MTR RET.
IG TORQUE MTR RET.
61 62 63 64 65 66 67 68 69 70 71 72
J3-Y J2-H J3-Z J3-c J3-d J3-g J3-X J2-J J3-b J3-a J3-f J3-e
IMU
236
228
MOTOR DRIVE SIGNALS
1193 1194 1195 1204 1205 1206 1207 1210 1211 1212 1213
1037 1038 1034 1035 1031 1032 1524 1525 1526
OG 31 OG 32 MG 31 MG 32 IG 31 IG 32 OG 43 MG 43 IG 43
CDU MDA OUTPUTS
0 VDC IMU
CDU'S
1535 1536 1528 1532 1533 1531 1529 1530 1534
1659 1660 1657 1658 1655 1656
1635 1636 1630 1631
1640 1641 1638 1639 1634 1633 1628 1629 1626 1627 1624 1623
1625 1627 1622 1624 1621 1620 1619 1618 1617 1615 1614 1616
SJB (PSA SIMULATED JUNCTION BOX)
158 159 160 161 162 163 164 165 166
99 100 101 102 103 104
109 110 113 114
105 106 107 108 111 112 115 116 117 122
118 119 120 121 123 124 125 126 127 128
OG CDU MDA OUTPUT N2
OG CDU MDA OUTPUT N1
0 VDC IMU P2
MG CDU MDA OUTPUT P3
MG CDU MDA OUTPUT R3
IG CDU MDA OUTPUT P1
IG CDU MDA OUTPUT R1
0 VDC IMU ERROR SIG
TRAY 6
OG TORQUE MTR HI H6
OG TORQUE MTR RET. H5
MG TORQUE MTR HI F6
MG TORQUE MTR RET. G6
IG TORQUE MTR HI D6
IG TORQUE MTR RET. D5
TRAY 1
SIN AMG 16X TO CDU D9
SIN AMG 16X F9
SIN AIG 16X TO CDU F7
SIN AIG 16X D7
TRAY 5
73 74 75 76 77 78
COS AMG 16X J1-G
SIN AIG 16X J1-Z
COS AIG 16X J1-W
SIN AOG 16X J1-F
COS AOG 16X J1-C
SIN AMG 16X J1-K
IMU
SIN AOG 16X TO CDU F9
SIN AOG 16X D9
COS AOG 16X F7
COS AOG 16X TO CDU F8
COS AMG 16X G3
COS AMG 16X TO CDU G4
COS AIG 16X G1
COS AIG 16X TO CDU G2
SIN AOG 1X TO CDU B9
COS AOG 1X TO CDU C9
SIN AOG 1X HI A8
SIN AOG 1X LO A9
COS AOG 1X HI C8
COS AOG 1X LO B8
TRAY 6
79 80 81 82 83 84 85 86 87 88
SIN AOG 1X HI J3-F
SIN AOG 1X LO J3-G
COS AOG 1X HI J3-D
COS AOG 1X LO J3-E
SIN AMG 1X HI J1-P
SIN AMG 1X LO J1-N
COS AMG 1X HI J1-L
COS AMG 1X LO J1-M
SIN AIG 1X HI J1-g
IMU
LH
2900223 REV LTR D SH 2
16 15 14 13 12 11 10 9 8
H G F E D C B A
1Z2900223

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21917		31 AUG 65	RLP
B		REVISED PER TDRR 21913		2 SEP 65	RLP AU
C		REVISED PER TDRR 23762		11 NOV 65	RLP
D		REVISED PER TDRR 24921		1 MAR 66	DKD


BACK WALL
TEST POINT CONNECTOR
XBR-A
RSS-C
SIN AOG 16X HI
SIN AOG 16X LO
COS AOG 16X HI
SIN AMG 16X HI
COS AMG 16X LO
SIN AIG 16X HI
COS AIG 16X LO
SIN AOG 1X HI
COS AOG 1X LO
SIN AMG 1X HI
SIN AIG 1X HI
COS AIG 1X LO
FAIL IND SCR LO
OG CDU LIMIT CYCLE FAIL TEST CMD
MG CDU LIMIT CYCLE FAIL TEST CMD
IG CDU LIMIT CYCLE FAIL CMD
IG 16X CDU FAIL COMMAND TES
MG 16X CDU FAIL COMMAND TES
OG 16X CDU FAIL COMMAND TES
OG SET COMMAND
MG SET COMMAND
IG SET COMMAND
OG SET INDICATION
MG SET INDICATION
IG SET INDICATION
VERIFICATION
J105
ECDU LIMIT CYCLE FAIL CIRCUIT
SIN HI
SIN LO
COS HI
COS LO
REF HI
REF LO
GEN 28VDC HI
BUFFER AMPLIFIER 1 V/V (NOM)
GAIN AMPLIFIER 5.6 V/V (NOM)
16X CDU FAIL TEST SHORT INPUTS HI'S TO LO'S
IG
MG
OG
GEN 28VDC HI
800 CPS REF HI, LO
27VDC K.P LO
TEST START LAMP (SEE TES)
SEE TES
ELECTRONIC CDU'S (ECDU)
2206
2207
2208
2209
2210
2211
2203
2202
2201
2200
203
202
201
106
105
104
107
108
109
103
102
101
209
208
207
204
205
206
PSA
45J4 - H34
45J6 - B22
45J6 - B20
45J4 - H32
BLOCK II IMU
16X
1X

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 10-APR-65
CHECKED Ed Foster 4MAY65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
GIMBAL POSITION CONTROL
(BLOCK II)

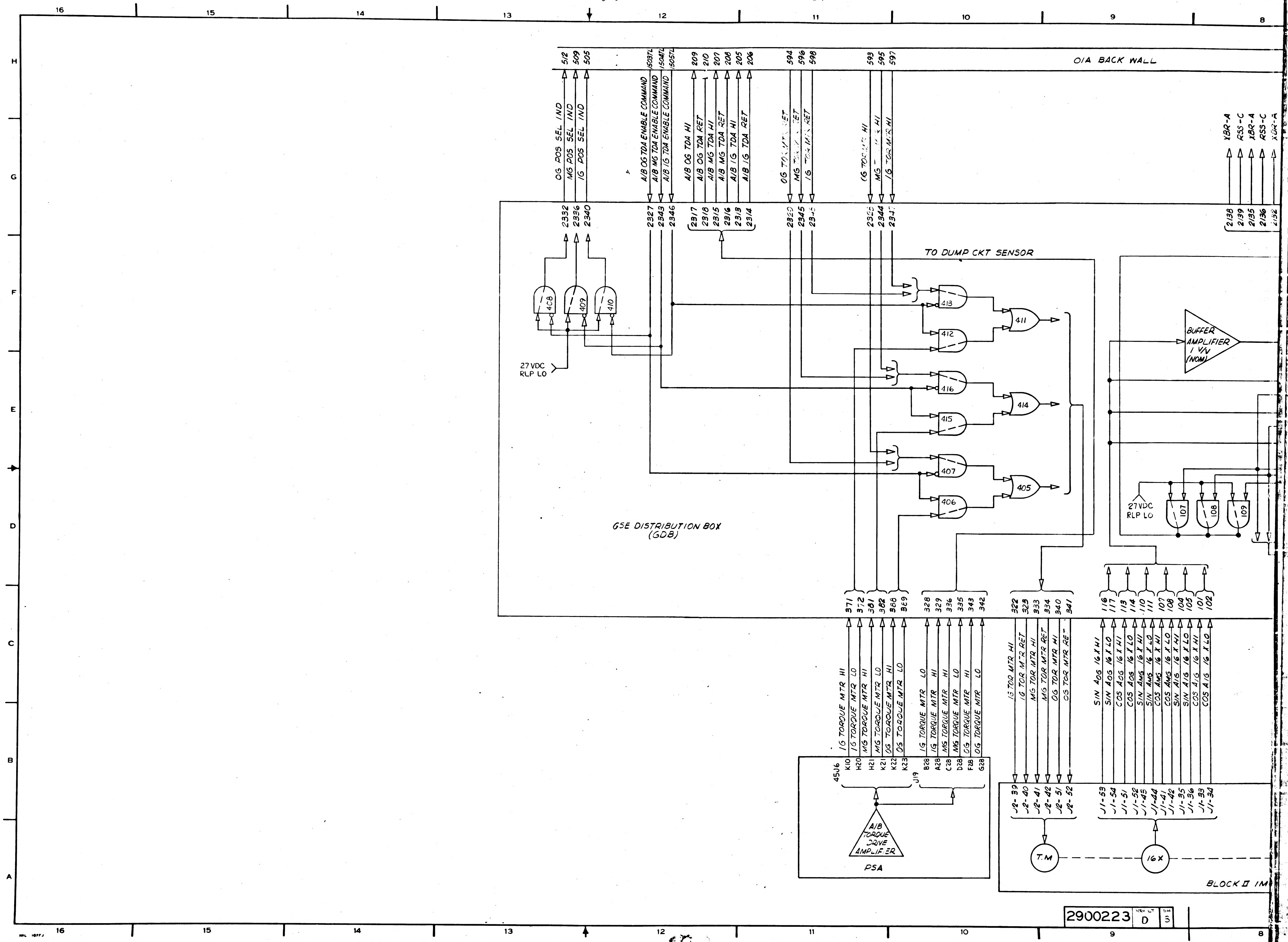
CODE IDENT NO 99974
SIZE
2900223
SCALE NONE
SHEET 3 OF 4

00223 D 3

2900223 D

2H

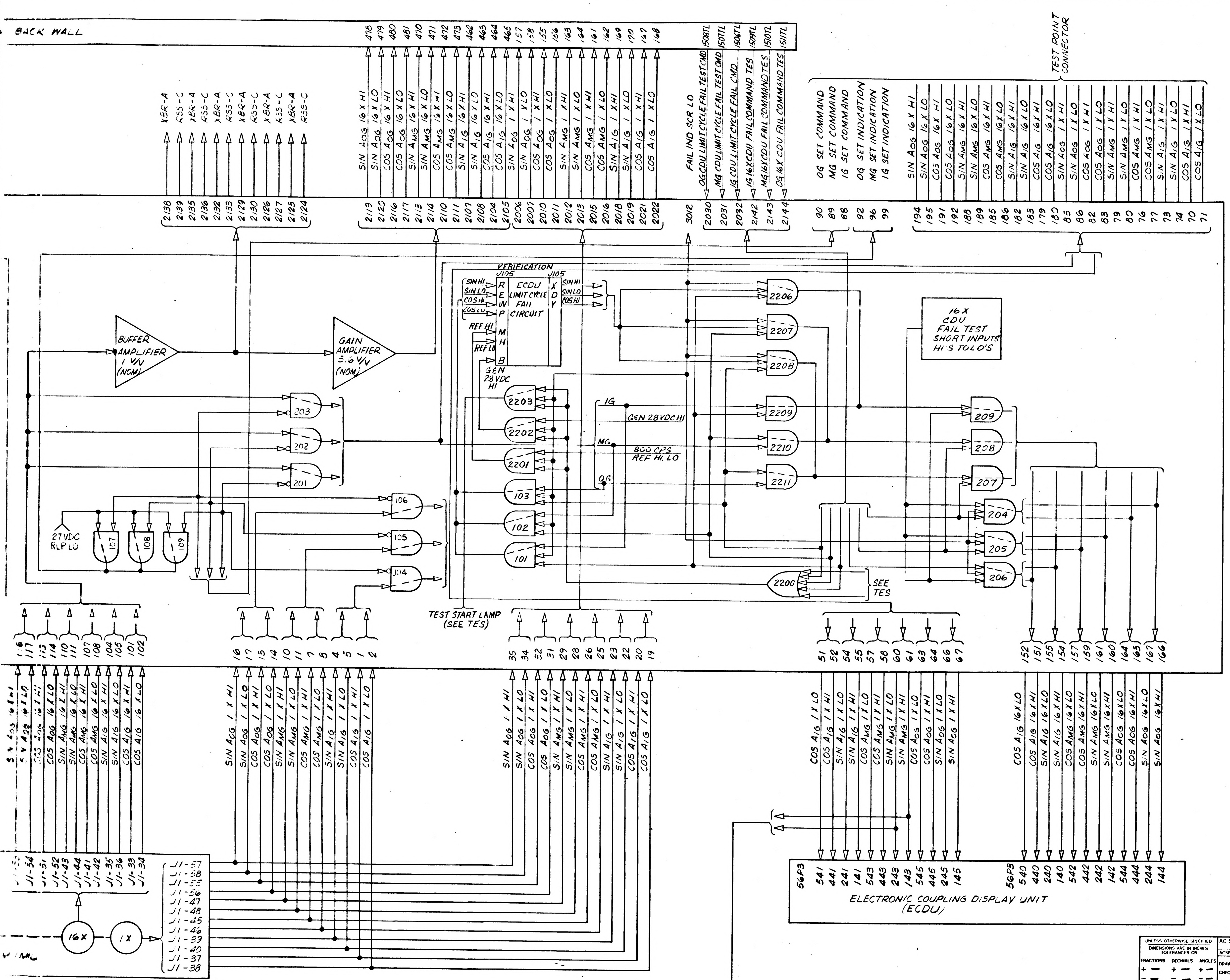
2/2900223


O/A BACK WALL
512
509
505
1503TL
1504TL
1505TL
209
210
207
208
205
206
594
596
598
593
595
597
OG POS SEL IND
MG POS SEL IND
IG POS SEL IND
A/B OG TDA ENABLE COMMAND
A/B MG TDA ENABLE COMMAND
A/B IG TDA ENABLE COMMAND
A/B OG TDA HI
A/B OG TDA RET
A/B MG TDA HI
A/B MG TDA RET
A/B IG TDA HI
A/B IG TDA RET
XBR-A
RSS-C
XBR-A
RSS-C
2332
2336
2340
2327
2343
2346
2317
2318
2315
2316
2313
2314
2345
2344
2138
2139
2135
2136
TO DUMP CKT SENSOR
408
409
410
413
412
411
416
415
414
407
406
405
27 VDC
RLP LO
BUFFER
AMPLIFIER
1 V/N
(NOM)
107
108
109
GSE DISTRIBUTION BOX
(GDB)
371
372
381
382
368
369
328
329
336
335
343
342
322
323
333
334
340
341
116
117
113
114
110
111
107
108
104
105
101
102
IG TORQUE MTR HI
IG TORQUE MTR LO
MG TORQUE MTR HI
MG TORQUE MTR LO
OG TORQUE MTR HI
OG TORQUE MTR LO
IG TORQUE MTR LO
IG TORQUE MTR HI
MG TORQUE MTR HI
MG TORQUE MTR LO
OG TORQUE MTR HI
OG TORQUE MTR LO
IG TOR MTR HI
IG TOR MTR RET
MG TOR MTR HI
MG TOR MTR RET
OG TOR MTR HI
OG TOR MTR RET
SIN AOG 16X HI
SIN AOG 16X LO
COS AOG 16X HI
COS AOG 16X LO
SIN AMG 16X HI
SIN AMG 16X LO
COS AMG 16X HI
COS AMG 16X LO
SIN AIG 16X HI
SIN AIG 16X LO
COS AIG 16X HI
COS AIG 16X LO
45J6
K10
H20
H21
K21
K22
K23
J19
B28
A28
C28
D28
F28
G28
A/B
TORQUE
DRIVE
AMPLIFIER
PSA
J2-39
J2-40
J2-41
J2-42
J2-51
J2-52
J1-53
J1-54
J1-51
J1-52
J1-43
J1-44
J1-41
J1-42
J1-35
J1-36
J1-33
J1-34
T.M
16X
BLOCK II IM
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

2900223 D 3

1/729002223

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 21917		31 AUG 65	RLP
B		REVISED PER TDRR 21913		2 SEP 65	RLP AU
C		REVISED PER TDRR 23762		10 NOV 65	RLP
D		REVISED PER TDRR 24921		1 MAR 66	OKD



BACK WALL
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
RSS-C
2138 2139 2135 2136 2132 2133 2129 2130 2126 2127 2123 2124
478 479 480 481 470 471 472 473 462 463 464 465 157 158 155 156 163 164 161 162 169 170 167 168
SIN AOG 16X HI
SIN AOG 16X LO
COS AOG 16X HI
COS AOG 16X LO
SIN AMG 16X HI
SIN AMG 16X LO
COS AMG 16X HI
COS AMG 16X LO
SIN AIG 16X HI
SIN AIG 16X LO
COS AIG 16X HI
COS AIG 16X LO
SIN AOG 1X HI
SIN AOG 1X LO
COS AOG 1X HI
COS AOG 1X LO
SIN AMG 1X HI
SIN AMG 1X LO
COS AMG 1X HI
COS AMG 1X LO
SIN AIG 1X HI
SIN AIG 1X LO
COS AIG 1X HI
COS AIG 1X LO
2119 2120 2116 2117 2113 2114 2110 2111 2107 2108 2104 2105 2006 2007 2010 2011 2012 2013 2015 2016 2018 2019 2021 2022
1508TL 1507TL 1506TL 1509TL 1510TL 1511TL
FAIL IND SCR LO
OG CDU LIMIT CYCLE FAIL TEST CMD
MG CDU LIMIT CYCLE FAIL TEST CMD
IG CDU LIMIT CYCLE FAIL CMD
IG 16X CDU FAIL COMMAND TES
MG 16X CDU FAIL COMMAND TES
OG 16X CDU FAIL COMMAND TES
3012 2030 2031 2032 2142 2143 2144
OG SET COMMAND
MG SET COMMAND
IG SET COMMAND
OG SET INDICATION
MG SET INDICATION
IG SET INDICATION
90 89 88 92 96 99
TEST POINT CONNECTOR
194 195 191 192 188 189 185 186 182 183 179 180 85 86 82 83 79 80 76 77 73 74 70 71
VERIFICATION
J105
SIN HI
SIN LO
COS HI
COS LO
R E W P M H B
ECDU LIMIT CYCLE FAIL CIRCUIT
REF HI
REF LO
GEN 28 VDC HI
X D Y
BUFFER AMPLIFIER 1 V/V (NOM)
GAIN AMPLIFIER 3.6 V/V (NOM)
16X CDU FAIL TEST SHORT INPUTS HI'S TO LO'S
2206 2207 2208 2209 2210 2211
2203 2202 2201 103 102 101
2200
203 202 201
106 105 104
107 108 109
209 208 207 204 205 206
IG
MG
OG
GEN 28VDC HI
800 CPS REF HI, LO
27 VDC RLP LO
SEE TES
TEST START LAMP (SEE TES)
116 117 113 114 110 111 107 108 104 105 101 102
16 17 13 14 10 11 7 8 4 5 1 2
35 34 31 32 29 28 26 25 23 22 20 19
51 52 54 55 57 58 60 61 63 64 66 67
152 151 155 154 157 159 161 160 164 163 167 166
SIN AOG 16X HI
SIN AOG 16X LO
COS AOG 16X HI
COS AOG 16X LO
SIN AMG 16X HI
SIN AMG 16X LO
COS AMG 16X HI
COS AMG 16X LO
SIN AIG 16X HI
SIN AIG 16X LO
COS AIG 16X HI
COS AIG 16X LO
SIN AOG 1X HI
SIN AOG 1X LO
COS AOG 1X HI
COS AOG 1X LO
SIN AMG 1X HI
SIN AMG 1X LO
COS AMG 1X HI
COS AMG 1X LO
SIN AIG 1X HI
SIN AIG 1X LO
COS AIG 1X HI
COS AIG 1X LO
COS AIG 1X LO
COS AIG 1X HI
SIN AIG 1X LO
SIN AIG 1X HI
COS AMG 1X HI
COS AMG 1X LO
SIN AMG 1X HI
SIN AMG 1X LO
COS AOG 1X LO
COS AOG 1X HI
SIN AOG 1X LO
SIN AOG 1X HI
COS AIG 16X LO
COS AIG 16X HI
SIN AIG 16X LO
SIN AIG 16X HI
COS AMG 16X HI
COS AMG 16X LO
SIN AMG 16X HI
SIN AMG 16X LO
COS AOG 16X LO
COS AOG 16X HI
SIN AOG 16X LO
SIN AOG 16X HI
J1-53 J1-54 J1-52 J1-43 J1-44 J1-42 J1-41 J1-35 J1-36 J1-33 J1-34
J1-57 J1-58 J1-55 J1-56 J1-47 J1-48 J1-45 J1-46 J1-39 J1-40 J1-37 J1-38
16X
1X
56P3
541 441 241 141 543 443 243 143 545 445 245 145
56P3
540 440 240 140 542 442 242 142 544 444 244 144
ELECTRONIC COUPLING DISPLAY UNIT (ECDU)

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN G. Drake DATE 8 APR 65
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

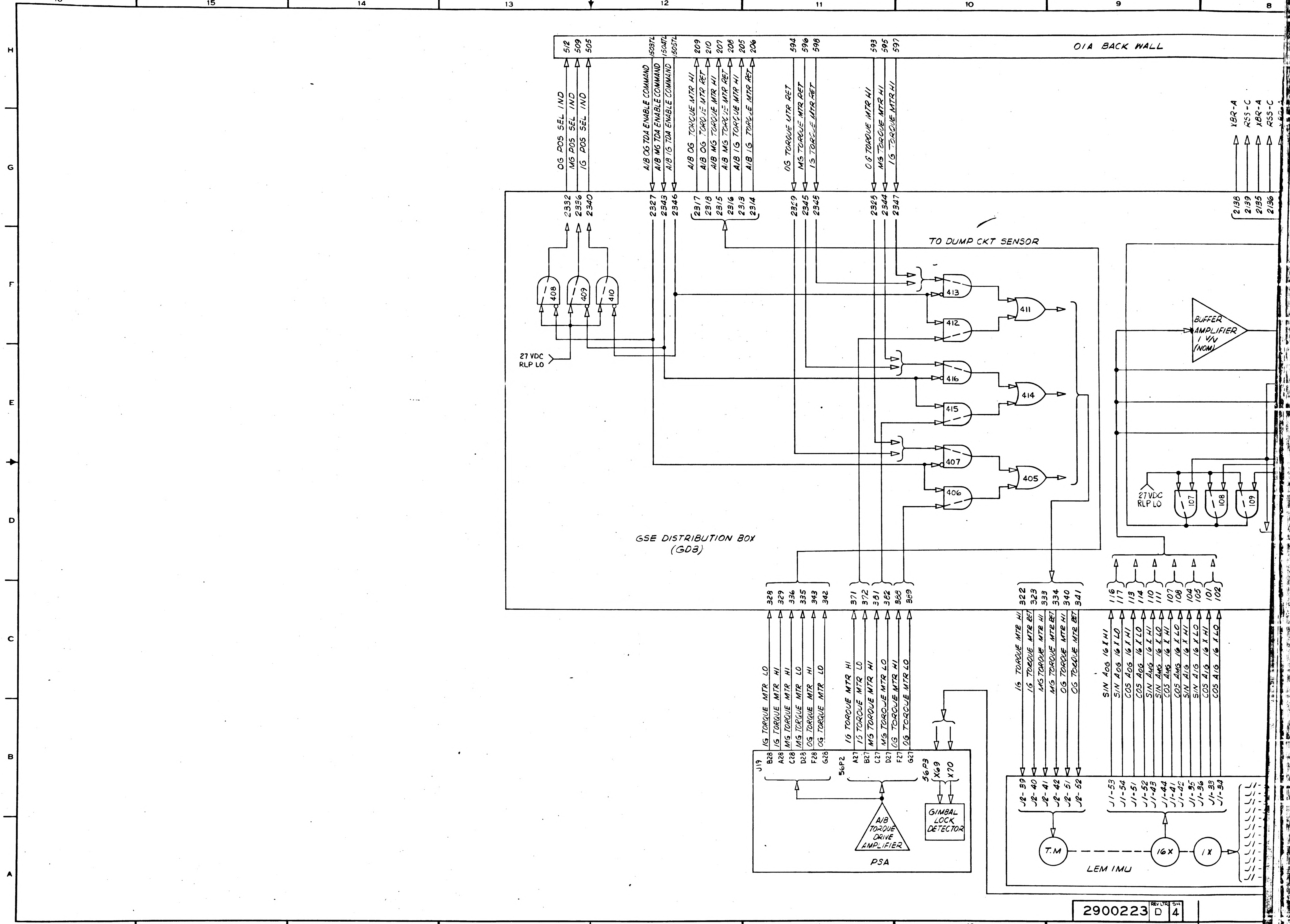
MECHANIZATION DIAGRAM - GIMBAL POSITION CONTROL (LEM)

CODE IDENT NO. 99974
SIZE
2900223
SCALE —
SHEET 4 OF 4

2900223 D 4

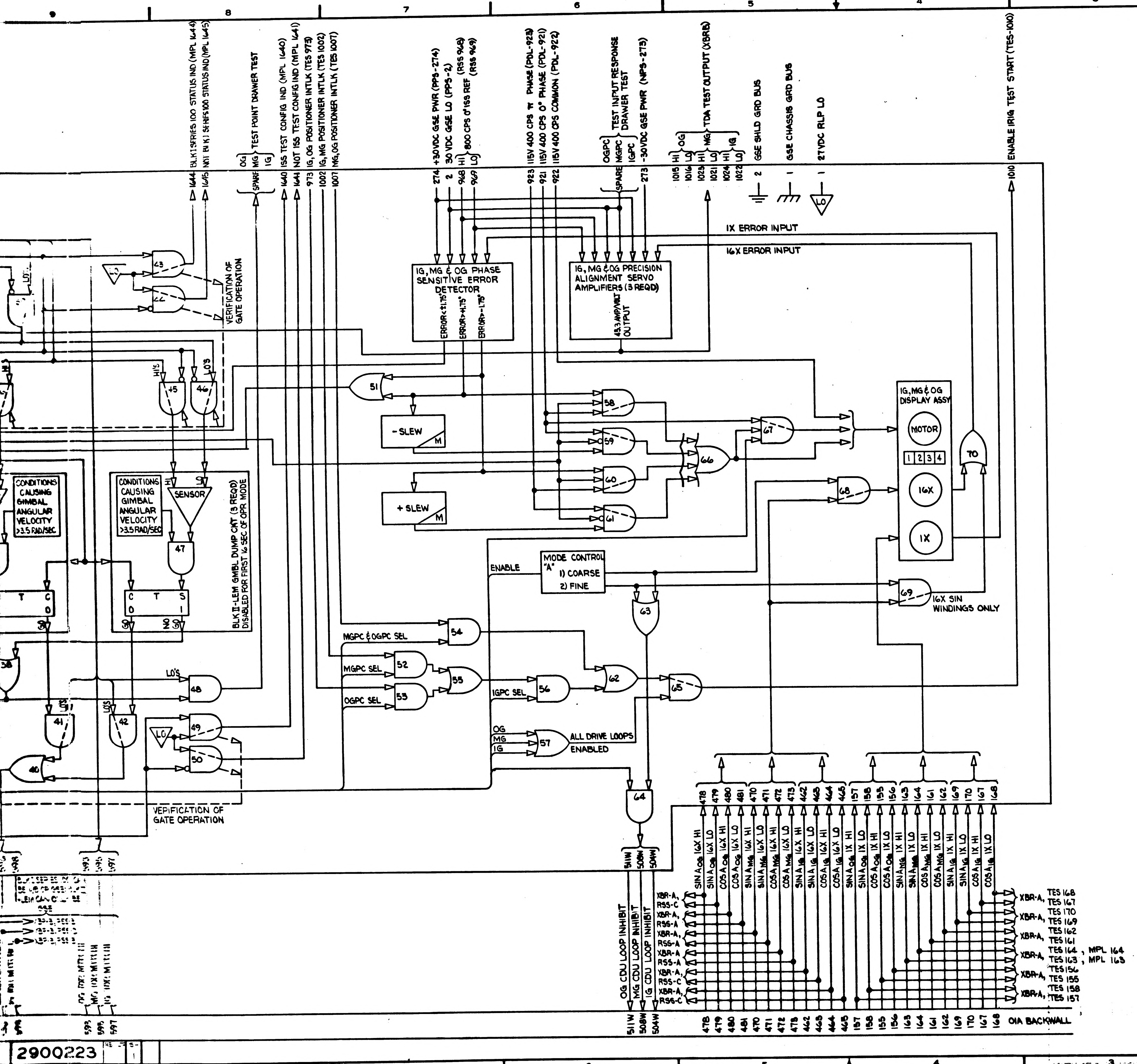
2H

27-2900223


O/A BACK WALL
512
509
505
1503TL
1504TL
1505TL
209
210
207
208
205
206
594
596
598
593
595
597
OG POS SEL IND
MG POS SEL IND
IG POS SEL IND
A/B OG TDA ENABLE COMMAND
A/B MG TDA ENABLE COMMAND
A/B IG TDA ENABLE COMMAND
A/B OG TORQUE MTR HI
A/B OG TORQUE MTR RET
A/B MG TORQUE MTR HI
A/B MG TORQUE MTR RET
A/B IG TORQUE MTR HI
A/B IG TORQUE MTR RET
OG TORQUE MTR RET
MG TORQUE MTR RET
IG TORQUE MTR RET
OG TORQUE MTR HI
MG TORQUE MTR HI
IG TORQUE MTR HI
XBR-A
RSS-C
XBR-A
RSS-C
2332
2336
2340
2327
2343
2346
2317
2318
2315
2316
2313
2314
2329
2345
2349
2325
2344
2347
2138
2139
2135
2136
TO DUMP CKT SENSOR
408
409
410
27 VDC RLP LO
413
412
411
416
415
414
407
406
405
BUFFER AMPLIFIER 1 V/V (NOM)
27 VDC RLP LO
107
108
109
GSE DISTRIBUTION BOX (GDB)
328
329
336
335
343
342
371
372
381
382
388
389
322
323
333
334
340
341
116
117
113
114
110
111
107
108
104
105
101
102
76
IG TORQUE MTR LO
IG TORQUE MTR HI
MG TORQUE MTR HI
MG TORQUE MTR LO
OG TORQUE MTR HI
OG TORQUE MTR LO
IG TORQUE MTR HI
IG TORQUE MTR LO
MG TORQUE MTR HI
MG TORQUE MTR LO
OG TORQUE MTR HI
OG TORQUE MTR LO
IG TORQUE MTR HI
IG TORQUE MTR RET
MG TORQUE MTR HI
MG TORQUE MTR RET
OG TORQUE MTR HI
OG TORQUE MTR RET
SIN AOG 16X HI
SIN AOG 16X LO
COS AOG 16X HI
COS AOG 16X LO
SIN AMG 16X HI
SIN AMG 16X LO
COS AMG 16X HI
COS AMG 16X LO
SIN AIG 16X HI
SIN AIG 16X LO
COS AIG 16X HI
COS AIG 16X LO
J19
B28
A28
C28
D28
F28
G28
56P2
A27
B27
C27
D27
F27
G27
56P3
X69
X70
A/B TORQUE DRIVE AMPLIFIER
PSA
GIMBAL LOCK DETECTOR
J2-39
J2-40
J2-41
J2-42
J2-51
J2-52
J1-53
J1-54
J1-51
J1-52
J1-43
J1-44
J1-41
J1-42
J1-35
J1-36
J1-33
J1-34
T.M
16X
1X
LEM IMU
2900223
REV LTR D
SH 4
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

1-42900223

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD



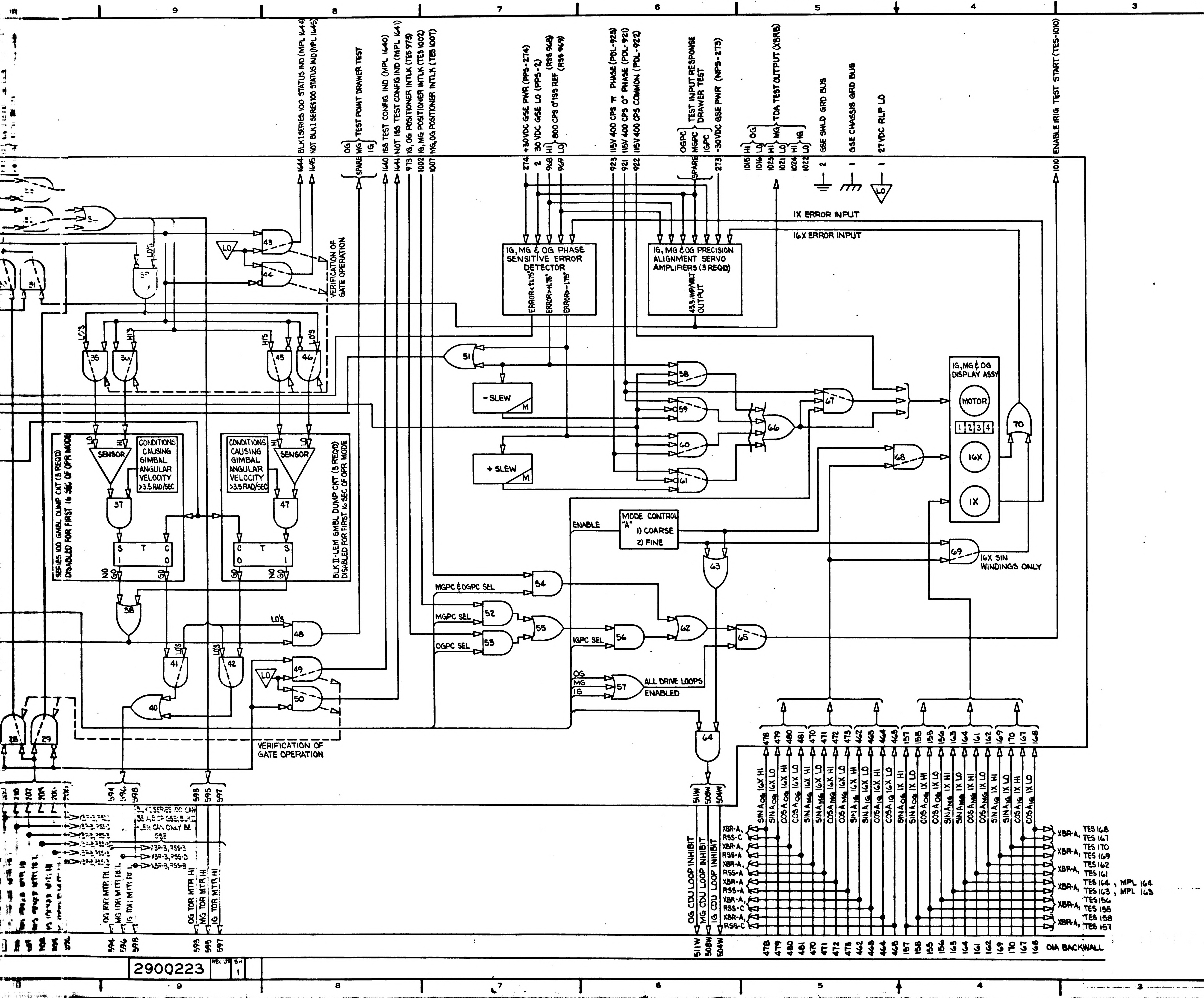
BLK I SERIES 100 STATUS IND (MPL 1644)
NOT BLK I SERIES 100 STATUS IND (MPL 1645)
1644
1645
OG
MG
IG
SPARE
TEST POINT DRAWER TEST
1640
155 TEST CONFIG IND (MPL 1640)
1641
NOT 155 TEST CONFIG IND (MPL 1641)
973
IG, OG POSITIONER INTLK (TES 973)
1002
IG, MG POSITIONER INTLK (TES 1002)
1007
MG, OG POSITIONER INTLK (TES 1007)
274
+30 VDC GSE PWR (PPS-274)
2
30 VDC GSE LO (PPS-2)
968
969
HI
LO
800 CPS 0° ISS REF (RSS 968) (RSS 969)
923
115V 400 CPS π PHASE (PDL-923)
921
115V 400 CPS 0° PHASE (PDL-921)
922
115V 400 CPS COMMON (PDL-922)
OGPC
MGPC
IGPC
SPARE
TEST INPUT RESPONSE DRAWER TEST
273
-30VDC GSE PWR (NPS-273)
1015 HI
1016 LO
OG
1023 HI
1021 LO
MG
1024 HI
1022 LO
IG
TDA TEST OUTPUT (XBR8)
2
GSE SHLD GRD BUS
1
GSE CHASSIS GRD BUS
1
27VDC RLP LO
LO
1010
ENABLE IRIG TEST START (TES-100)
1X ERROR INPUT
16X ERROR INPUT
IG, MG & OG PHASE SENSITIVE ERROR DETECTOR
ERROR<±1.75°
ERROR>+1.75°
ERROR>-1.75°
IG, MG & OG PRECISION ALIGNMENT SERVO AMPLIFIERS (3 REQD)
43.3 AMP/VOLT OUTPUT
VERIFICATION OF GATE OPERATION
43
44
LO'S
HI'S
45
46
51
-SLEW
M
+SLEW
M
58
59
60
61
66
67
68
69
70
IG, MG & OG DISPLAY ASSY
MOTOR
1
2
3
4
16X
1X
16X SIN WINDINGS ONLY
MODE CONTROL "A"
1) COARSE
2) FINE
ENABLE
63
CONDITIONS CAUSING GIMBAL ANGULAR VELOCITY >3.5 RAD/SEC
CONDITIONS CAUSING GIMBAL ANGULAR VELOCITY >3.5 RAD/SEC
HI
SENSOR
47
T
C
S
C
T
O
1
O
BLK II-LEM GMBL DUMP CKT (3 REQD) DISABLED FOR FIRST 16 SEC OF OPR MODE
38
48
LO'S
41
42
LO'S
LO'S
40
49
50
LO
VERIFICATION OF GATE OPERATION
MGPC & OGPC SEL
54
MGPC SEL
52
55
OGPC SEL
53
IGPC SEL
56
62
65
OG
MG
IG
57
ALL DRIVE LOOPS ENABLED
64
511W
508W
504W
OG CDU LOOP INHIBIT
MG CDU LOOP INHIBIT
IG CDU LOOP INHIBIT
478
479
480
481
470
471
472
473
462
463
464
465
157
158
155
156
163
164
161
162
169
170
167
168
SIN A OG 16X HI
SIN A OG 16X LO
COS A OG 16X HI
COS A OG 16X LO
SIN A MG 16X HI
SIN A MG 16X LO
COS A MG 16X HI
COS A MG 16X LO
SIN A IG 16X HI
SIN A IG 16X LO
COS A IG 16X HI
COS A IG 16X LO
SIN A OG 1X HI
SIN A OG 1X LO
COS A OG 1X HI
COS A OG 1X LO
SIN A MG 1X HI
SIN A MG 1X LO
COS A MG 1X HI
COS A MG 1X LO
SIN A IG 1X HI
SIN A IG 1X LO
COS A IG 1X HI
COS A IG 1X LO
XBR-A, RSS-C
XBR-A, RSS-A
XBR-A, RSS-A
XBR-A, RSS-A
XBR-A, RSS-C
XBR-A, RSS-C
XBR-A, TES 168, TES 167
XBR-A, TES 170, TES 169
XBR-A, TES 162, TES 161
XBR-A, TES 164, MPL 164, TES 163, MPL 163
XBR-A, TES 156, TES 155
XBR-A, TES 158, TES 157
OIA BACKWALL
593
595
597
9
8
7
6
5
4
3
H
G
F
E
D
C
B
A

2900223

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN Cookman DATE 4 MAY 65 CHECKED Ed Foster 14 MAY 65 APPROVAL APPROVAL	MANNED SPACECRAFT CENTER HOUSTON, TEXAS MECHANIZATION DIAGRAM- GIMBAL POSITION CONTROL (BLOCK I SERIES 100, BLOCK II & LEM)
DO NOT SCALE THIS DRAWING MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 SIZE J_2 2900223
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — SHEET 1 OF 4

2900223

214


1644 BLK I SERIES 100 STATUS IND (MPL 1644)
1645 NOT BLK I SERIES 100 STATUS IND (MPL 1645)
SPARE OG MG IG TEST POINT DRAWER TEST
1640 ISS TEST CONFIG IND (MPL 1640)
1641 NOT ISS TEST CONFIG IND (MPL 1641)
973 IG, OG POSITIONER INTLK (TES 973)
1002 IG, MG POSITIONER INTLK (TES 1002)
1007 MG, OG POSITIONER INTLK (TES 1007)
274 +30VDC GSE PWR (PPS-274)
2 30 VDC GSE LO (PPS-2)
968 HI 800 CPS 0° ISS REF (RSS 968)
969 LO (RSS 969)
923 115V 400 CPS π PHASE (PDL-923)
921 115V 400 CPS 0° PHASE (PDL-921)
922 115V 400 CPS COMMON (PDL-922)
SPARE OGPC MGPC IGPC TEST INPUT RESPONSE DRAWER TEST
273 -30VDC GSE PWR (NPS-273)
1015 HI 1016 LO OG
1023 HI 1021 LO MG
1024 HI 1022 LO IG
TDA TEST OUTPUT (XBRB)
2 GSE SHLD GRD BUS
1 GSE CHASSIS GRD BUS
1 27VDC RLP LO
1010 ENABLE IRIG TEST START (TES-1010)
IX ERROR INPUT
16X ERROR INPUT
IG, MG & OG PHASE SENSITIVE ERROR DETECTOR
ERROR>±1.75°
ERROR>+1.75°
ERROR>-1.75°
IG, MG & OG PRECISION ALIGNMENT SERVO AMPLIFIERS (3 REQD)
453 MP/VOLT OUTPUT
LO
43
44
VERIFICATION OF GATE OPERATION
LO'S
HI'S
35
36
45
46
51
-SLEW
M
+SLEW
M
58
59
60
61
66
67
68
69
70
IG, MG & OG DISPLAY ASSY
MOTOR
1 2 3 4
16X
1X
16X SIN WINDINGS ONLY
SENSOR
CONDITIONS CAUSING GIMBAL ANGULAR VELOCITY >3.5 RAD/SEC
37
47
S T C
1 0
C T S
0 1
NO GO
GO
SERIES 100 GMBL DUMP CKT (3 REQD) DISABLED FOR FIRST 16 SEC OF OPR MODE
BLK II-LEM GMBL DUMP CKT (3 REQD) DISABLED FOR FIRST 16 SEC OF OPR MODE
38
LO'S
48
41
42
40
49
50
LO
VERIFICATION OF GATE OPERATION
28
29
ENABLE
MODE CONTROL "A"
1) COARSE
2) FINE
63
54
MGPC & OGPC SEL
52
MGPC SEL
53
OGPC SEL
55
IGPC SEL
56
62
65
OG
MG
IG
57
ALL DRIVE LOOPS ENABLED
64
511W 508W 504W
OG CDU LOOP INHIBIT
MG CDU LOOP INHIBIT
IG CDU LOOP INHIBIT
478 SIN A OG 16X HI
479 SIN A OG 16X LO
480 COS A OG 16X HI
481 COS A OG 16X LO
470 SIN A MG 16X HI
471 SIN A MG 16X LO
472 COS A MG 16X HI
473 COS A MG 16X LO
462 SIN A IG 16X HI
463 SIN A IG 16X LO
464 COS A IG 16X HI
465 COS A IG 16X LO
157 SIN A OG 1X HI
158 SIN A OG 1X LO
155 COS A OG 1X HI
156 COS A OG 1X LO
163 SIN A MG 1X HI
164 SIN A MG 1X LO
161 COS A MG 1X HI
162 COS A MG 1X LO
169 SIN A IG 1X HI
170 SIN A IG 1X LO
167 COS A IG 1X HI
168 COS A IG 1X LO
XBR-A, RSS-C
XBR-A, RSS-A
XBR-A, RSS-A
XBR-A RSS-A
XBR-A, RSS-C
XBR-A, RSS-C
XBR-A, TES 168 TES 167
XBR-A, TES 170 TES 169
XBR-A, TES 162 TES 161
XBR-A, TES 164, MPL 164 TES 163, MPL 163
XBR-A, TES 156 TES 155
XBR-A, TES 158 TES 157
OIA BACKWALL
594 596 598
593 595 597
BLK I SERIES 100 CAN BE A, B OR GSE; BLK II LEM CAN ONLY BE GSE
XBR-B, RSS-B
XBR-B, RSS-D
XBR-B, RSS-B
OG TOR MTR HI
MG TOR MTR HI
IG TOR MTR HI
OG TOR MTR HI
MG TOR MTR HI
IG TOR MTR HI
2900223
REV LTR
SH 1
9 8 7 6 5 4 3
H G F E D C B A

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

2900223

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN Cochrane DATE 4 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL M. Wilson
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM -
GIMBAL POSITION CONTROL
(BLOCK I SERIES 100, BLOCK II LEM)

CODE IDENT NO. 99974
SIZE J2
2900223
SCALE —
SHEET 1 OF 4

S800553

NOTES:

1. INTERPPET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.

2. LOGIC SYMBOLS ARE PER MIL-STD-806.

3. REFERENCE MECHANIZATION DIAGRAMS (BLOCK I SERIES 100, BLOCK II & LEM):

AC POWER PROTECTION PANEL & POWER DISTRIBUTION (FTR)
P_P RELAY & LAMP POWER SUPPLY
PPS +30 VDC POWER SUPPLY
NPS -30 VDC POWER SUPPLY
2900208 POWER & DUMMY LOAD PANEL-PRIMARY SIGNAL SELECTOR
GYRO CAGING FUNCTIONS (PDL)
2900207 MONITOR PANEL (MPL)
TEST CONTROL PANEL (BLOCK I SERIES 100) (TCL)
290020 TEST CONTROL PANEL (BLOCK II & LEM) (TCL)
TEST SELECTOR PANEL (TES)
29002 7 SIGNAL SELECTION & MEASUREMENT
XBR-A CROSSBAR- AC SIGNALS
XBR-B CROSSBAR- DC SIGNALS
2900218 OSCILLOGRAPH SIGNAL SELECTION
RSS-B TO FIXED DC CHANNEL
RSS-C TO SWITCHABLE AC CHANNEL
RSS-D TO SWITCHABLE DC CHANNEL
2900215 MEASUREMENT REFERENCE POWER SUPPLIES
RSS OSCILLOGRAPH SIGNAL SELECTOR
GSE GROUNDING (BLOCK I SERIES 100)
GSE GROUNDING (BLOCK II & LEM)

4. NONSTANDARD SYMBOLOGY

INDICATES "AND" GATE WITH SWITCHED SIGNAL

NAME INDICATES LIGHTED PUSHBUTTON (MOMENTARY ACTION)

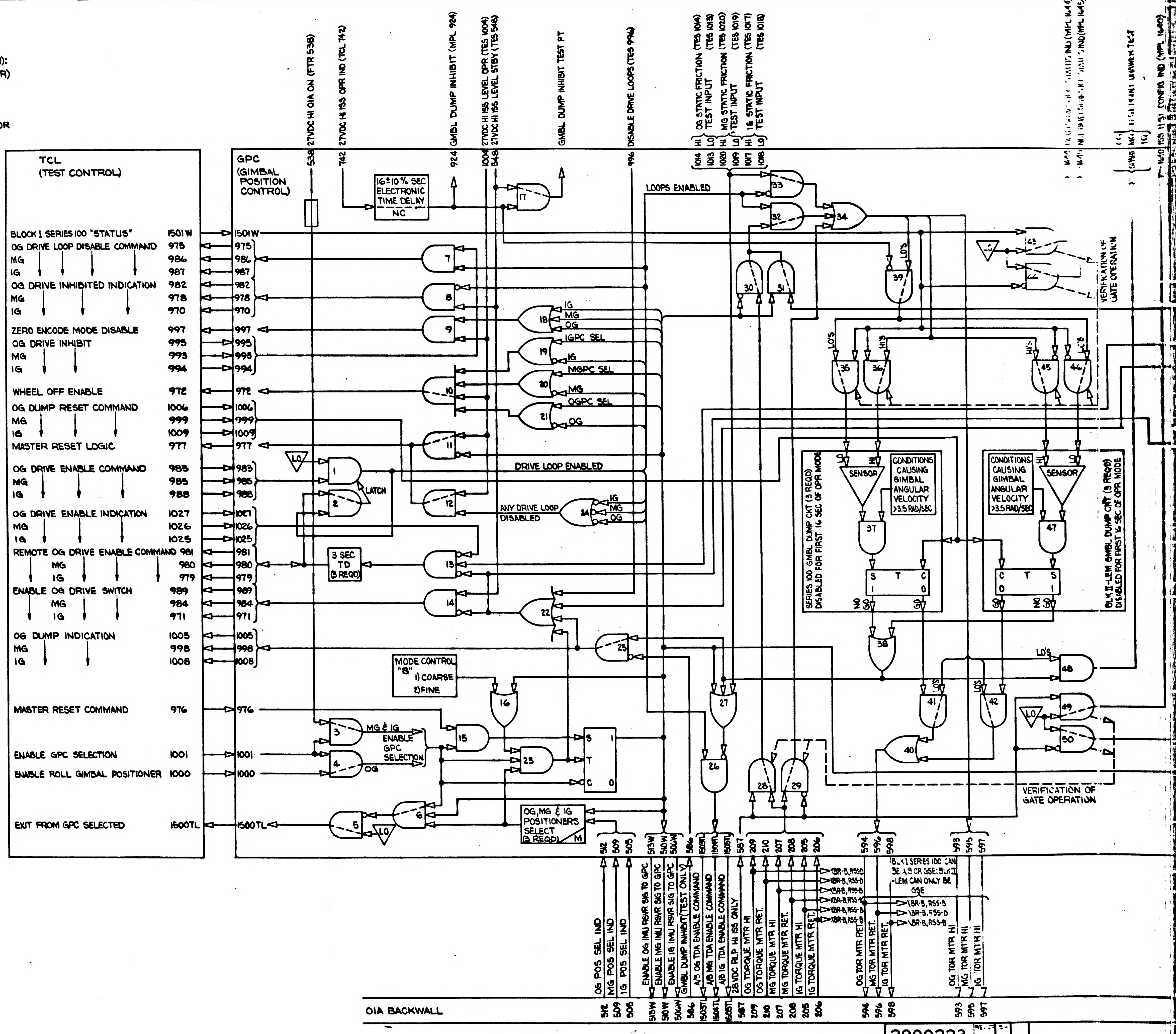
5. ALL INTERFACE NUMBERS SUFFIXED BY THE FOLLOWING MEAN:

A. W – BLOCK I SERIES 100 ONLY
B. T – BLOCK II ONLY
C. L – LEM ONLY
D. BLANK – ALL G/N CONFIGURATIONS
E. TW, TL OR WL – USED IN MORE THAN ONE CONFIGURATION AS SHOWN.

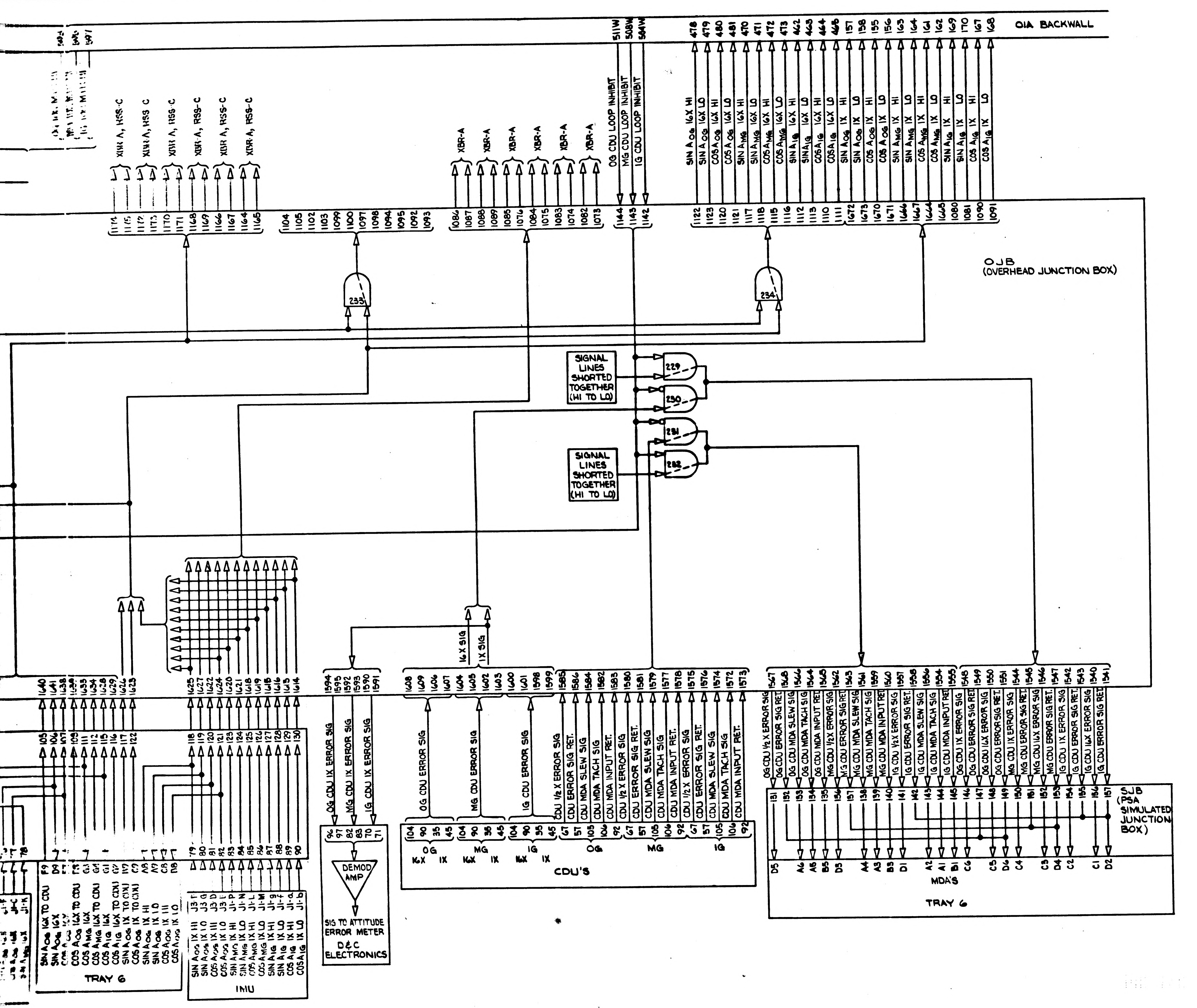
6. SIGNAL FLOW FOR THE INNER, MIDDLE & OUTER GIMBAL LOOPS IS SHOWN FLOWING THROUGH THE SAME LOGIC SYMBOLOGY DUE TO SIMILARITY OF THE THREE LOOPS. ANY INDIVIDUAL LOOP CAN BE EXAMINED BY USING ONLY THE RESPECTIVE LOOP SIGNALS AND DISREGARDING THE OTHERS.

7. SHEET LAYOUT FOR DIFFERENT CONFIGURATIONS:

BLOCK I SERIES 100	SH 1 SH 2
BLOCK II	SH 1 SH 3
LEM	SH 1 SH 4


TCL
(TEST CONTROL)
BLOCK I SERIES 100 "STATUS" 1501W
OG DRIVE LOOP DISABLE COMMAND 975
MG 986
IG 987
OG DRIVE INHIBITED INDICATION 982
MG 978
IG 970
ZERO ENCODE MODE DISABLE 997
OG DRIVE INHIBIT 995
MG 993
IG 994
WHEEL OFF ENABLE 972
OG DUMP RESET COMMAND 1006
MG 999
IG 1009
MASTER RESET LOGIC 977
OG DRIVE ENABLE COMMAND 983
MG 985
IG 988
OG DRIVE ENABLE INDICATION 1027
MG 1026
IG 1025
REMOTE OG DRIVE ENABLE COMMAND 981
MG 980
IG 979
ENABLE OG DRIVE SWITCH 989
MG 984
IG 971
OG DUMP INDICATION 1005
MG 998
IG 1008
MASTER RESET COMMAND 976
ENABLE GPC SELECTION 1001
ENABLE ROLL GIMBAL POSITIONER 1000
EXIT FROM GPC SELECTED 1500TL
GPC
(GIMBAL POSITION CONTROL)
538 27VDC HI OIA ON (FTR 538)
742 27VDC HI ISS OPR IND (TCL 742)
924 GMBL DUMP INHIBIT (MPL 924)
1004 27VDC HI ISS LEVEL OPR (TES 1004)
548 27VDC HI ISS LEVEL STBY (TES 548)
GMBL DUMP INHIBIT TEST PT
996 DISABLE DRIVE LOOPS (TES 996)
1014 HI OG STATIC FRICTION (TES 1014)
1013 LO TEST INPUT (TES 1013)
1020 HI MG STATIC FRICTION (TES 1020)
1019 LO TEST INPUT (TES 1019)
1017 HI IG STATIC FRICTION (TES 1017)
1018 LO TEST INPUT (TES 1018)
16±10% SEC ELECTRONIC TIME DELAY
NC
LOOPS ENABLED
LO'S
HI'S
VERIFICATION OF GATE OPERATION
IG
MG
OG
IGPC SEL
MGPC SEL
OGPC SEL
DRIVE LOOP ENABLED
ANY DRIVE LOOP DISABLED
LATCH
LO
3 SEC TD (3 REQD)
MODE CONTROL "B"
1) COARSE
2) FINE
MG & IG ENABLE GPC SELECTION
OG
OG, MG & IG POSITIONERS SELECT (3 REQD)
M
S I
T
C O
SENSOR
CONDITIONS CAUSING GIMBAL ANGULAR VELOCITY >3.5 RAD/SEC
SERIES 100 GMBL DUMP CKT (3 REQD) DISABLED FOR FIRST 16 SEC OF OPR MODE
BLK II-LEM GMBL DUMP CKT (3 REQD) DISABLED FOR FIRST 16 SEC OF OPR MODE
S T C
I O
C T S
O I
NO GO
GO
NO GO
512 OG POS SEL IND
509 MG POS SEL IND
505 IG POS SEL IND
513W ENABLE OG IMU RSVR SIG TO GPC
510W ENABLE MG IMU RSVR SIG TO GPC
506W ENABLE IG IMU RSVR SIG TO GPC
586 GMBL DUMP INHIBIT (TEST ONLY)
1503TL A/B OG TDA ENABLE COMMAND
1504TL A/B MG TDA ENABLE COMMAND
1505TL A/B IG TDA ENABLE COMMAND
587 28 VDC RLP HI ISS ONLY
209 OG TORQUE MTR HI
210 OG TORQUE MTR RET.
207 MG TORQUE MTR HI
208 MG TORQUE MTR RET.
205 IG TORQUE MTR HI
206 IG TORQUE MTR RET.
XBR-B, RSS-D
XBR-B, RSS-D
XBR-B, RSS-B
XBR-B, RSS-B
XBR-B, RSS-B
XBR-B, RSS-B
594 OG TOR MTR RET.
596 MG TOR MTR RET.
598 IG TOR MTR RET.
XBR-B, RSS-B
XBR-B, RSS-D
XBR-B, RSS-B
•BLK I SERIES 100 CAN BE A/B OR GSE: BLK II
•LEM CAN ONLY BE GSE
593 OG TOR MTR HI
595 MG TOR MTR HI
597 IG TOR MTR HI
OIA BACKWALL

2900223


OIA BACKWALL
511W
508W
504W
478 479 480 481 470 471 472 473 462 463 464 465 157 158 155 156 163 164 161 162 169 170 167 168
OG CDU LOOP INHIBIT
MG CDU LOOP INHIBIT
IG CDU LOOP INHIBIT
SIN A OG 16X HI
SIN A OG 16X LO
COS A OG 16X HI
COS A OG 16X LO
SIN A MG 16X HI
SIN A MG 16X LO
COS A MG 16X HI
COS A MG 16X LO
SIN A IG 16X HI
SIN A IG 16X LO
COS A IG 16X HI
COS A IG 16X LO
SIN A OG 1X HI
SIN A OG 1X LO
COS A OG 1X HI
COS A OG 1X LO
SIN A MG 1X HI
SIN A MG 1X LO
COS A MG 1X HI
COS A MG 1X LO
SIN A IG 1X HI
SIN A IG 1X LO
COS A IG 1X HI
COS A IG 1X LO
XBR A, RSS-C
XBR-A
1174 1175 1172 1173 1170 1171 1168 1169 1166 1167 1164 1165
1104 1105 1102 1103 1099 1100 1097 1098 1094 1095 1092 1093
1086 1087 1088 1089 1085 1076 1084 1075 1083 1074 1082 1073
1144 1143 1142
1122 1123 1120 1121 1117 1118 1115 1116 1112 1113 1110 1111
1672 1673 1670 1671 1666 1667 1664 1665 1080 1081 1090 1091
233
234
OJB
(OVERHEAD JUNCTION BOX)
SIGNAL LINES SHORTED TOGETHER (HI TO LO)
229
230
231
232
SIGNAL LINES SHORTED TOGETHER (HI TO LO)
1640 1641 1638 1633 1634 1628 1629 1626 1623
1625 1627 1622 1624 1620 1621 1618 1619 1615 1616 1613 1614
105 106 107 109 111 112 115 116 117 122
118 119 120 121 123 124 125 126 127 128 129 130
77 78
79 80 81 82 83 84 85 86 87 88 89 90
F9 D9 G3 G4 G1 G7 C9 A8 A7 C8 B8
SIN A OG 16X TO CDU
SIN A OG 16X
COS A OG 16X TO CDU
COS A MG 16X
COS A MG 16X TO CDU
COS A IG 16X
COS A IG 16X TO CDU
SIN A OG 1X TO CDU
COS A OG 1X TO CDU
SIN A OG 1X HI
SIN A OG 1X LO
COS A OG 1X HI
COS A OG 1X LO
TRAY 6
J3-F J3-G J3-D J3-E J1-P J1-N J1-L J1-M J1-g J1-f J1-a J1-b
J1-C J1-K
SIN A OG 1X HI
SIN A OG 1X LO
COS A OG 1X HI
COS A OG 1X LO
SIN A MG 1X HI
SIN A MG 1X LO
COS A MG 1X HI
COS A MG 1X LO
SIN A IG 1X HI
SIN A IG 1X LO
COS A IG 1X HI
COS A IG 1X LO
IMU
1594 1595 1592 1593 1590 1591
OG CDU 1X ERROR SIG
MG CDU 1X ERROR SIG
IG CDU 1X ERROR SIG
96 97 82 83 70 71
DEMOD AMP
SIG TO ATTITUDE ERROR METER
D&C ELECTRONICS
16X SIG
1X SIG
1608 1609 1606 1607 1604 1605 1602 1603 1600 1601 1598 1599
OG CDU ERROR SIG
MG CDU ERROR SIG
IG CDU ERROR SIG
1585 1586 1584 1582 1583 1580 1581 1579 1577 1578 1575 1576 1574 1572 1573
CDU 1/2 X ERROR SIG
CDU ERROR SIG RET.
CDU MDA SLEW SIG
CDU MDA TACH SIG
CDU MDA INPUT RET.
104 90 35 45
67 57 105 106 92
OG
MG
IG
16X 1X
CDU'S
1567 1568 1566 1564 1565 1562 1563 1561 1559 1560 1557 1558 1556 1554 1555
1548 1549 1550 1551 1544 1545 1546 1547 1542 1543 1540 1541
OG CDU 1/2 X ERROR SIG
OG CDU ERROR SIG RET.
OG CDU MDA SLEW SIG
OG CDU MDA TACH SIG
OG CDU MDA INPUT RET.
MG CDU 1/2X ERROR SIG
MG CDU ERROR SIG RET.
MG CDU MDA SLEW SIG
MG CDU MDA TACH SIG
MG CDU MDA INPUT RET.
IG CDU 1/2X ERROR SIG
IG CDU ERROR SIG RET.
IG CDU MDA SLEW SIG
IG CDU MDA TACH SIG
IG CDU MDA INPUT RET.
OG CDU 1X ERROR SIG
OG CDU ERROR SIG RET.
OG CDU 16X ERROR SIG
OG CDU ERROR SIG RET.
MG CDU 1X ERROR SIG
MG CDU ERROR SIG RET.
MG CDU 16X ERROR SIG
MG CDU ERROR SIG RET.
IG CDU 1X ERROR SIG
IG CDU ERROR SIG RET.
IG CDU 16X ERROR SIG
IG CDU ERROR SIG RET.
131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157
SJB
(PSA SIMULATED JUNCTION BOX)
D5 A6 A5 B5 D3 A4 A3 B3 D1 A2 A1 B1 C6 C5 D6 C4 C3 D4 C2 C1 D2
MDA'S
TRAY 6

REVISIONS

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN DATE 8 MAY 65
CHECKED Ed Foster 14 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL 20 May 65

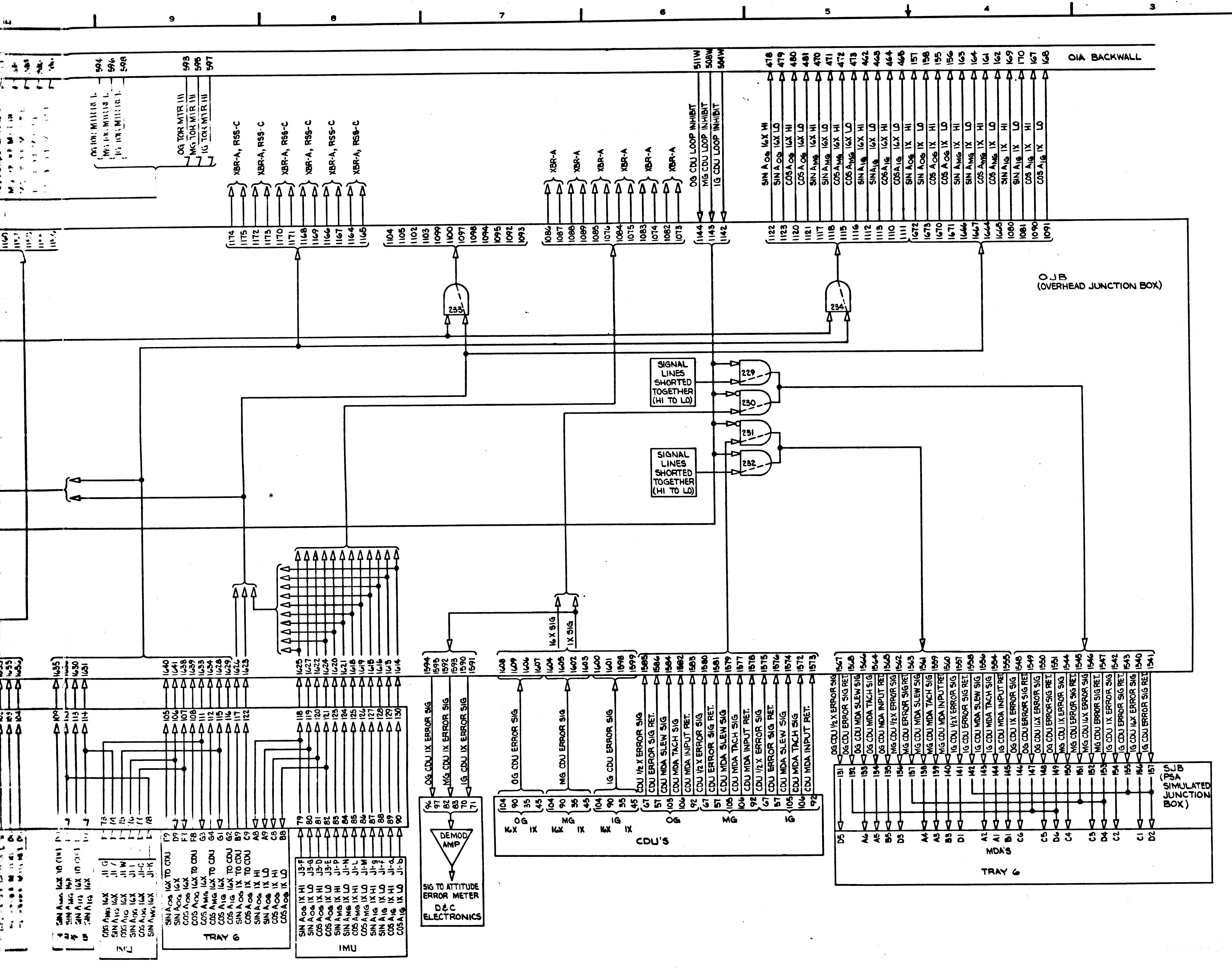
MANNED
SPACECRAFT CENTER
HOUSTON TEXAS

MECHANIZATION DIAGRAM - GIMBAL POSITION CONTROL (BLOCK I SERIES 100)

CODE IDENT NO. 99974
SIZE J2
2900223
SCALE —
SHEET 2 OF 4

2900223

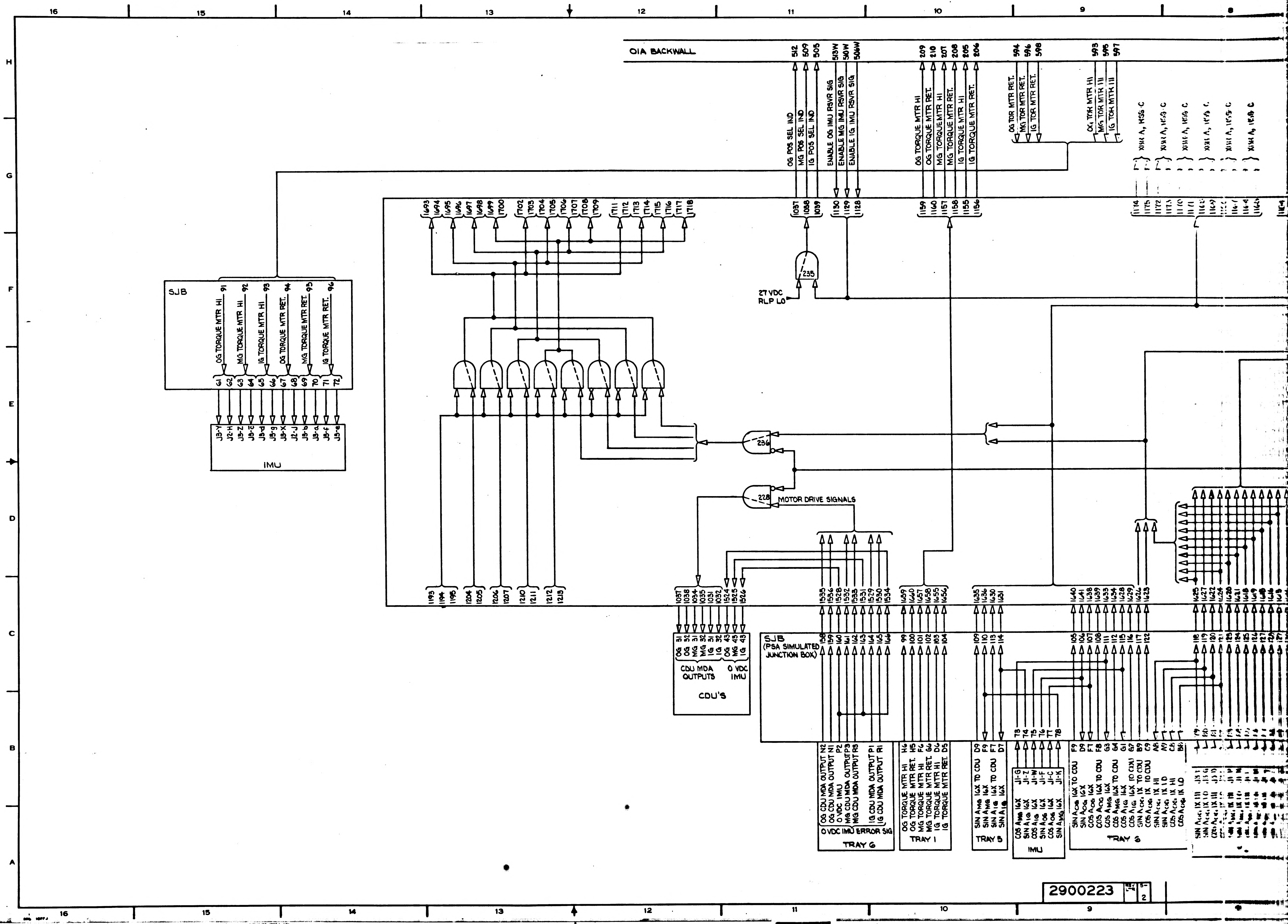
2900223


OIA BACKWALL
OG TOR MTR III
MG TOR MTR III
IG TOR MTR III
XBR-A, RSS-C
XBR-A
OG CDU LOOP INHIBIT
MG CDU LOOP INHIBIT
IG CDU LOOP INHIBIT
511W
508W
504W
SIN A OG 16X HI
SIN A OG 16X LO
COS A OG 16X HI
COS A OG 16X LO
SIN A MG 16X HI
SIN A MG 16X LO
COS A MG 16X HI
COS A MG 16X LO
SIN A IG 16X HI
SIN A IG 16X LO
COS A IG 16X HI
COS A IG 16X LO
SIN A OG 1X HI
SIN A OG 1X LO
COS A OG 1X HI
COS A OG 1X LO
SIN A MG 1X HI
SIN A MG 1X LO
COS A MG 1X HI
COS A MG 1X LO
SIN A IG 1X HI
SIN A IG 1X LO
COS A IG 1X HI
COS A IG 1X LO
OJB
(OVERHEAD JUNCTION BOX)
233
234
229
230
231
232
SIGNAL LINES SHORTED TOGETHER (HI TO LO)
SIGNAL LINES SHORTED TOGETHER (HI TO LO)
16X SIG
1X SIG
OG CDU 1X ERROR SIG
MG CDU 1X ERROR SIG
IG CDU 1X ERROR SIG
DEMOD AMP
SIG TO ATTITUDE ERROR METER
D&C ELECTRONICS
OG CDU ERROR SIG
MG CDU ERROR SIG
IG CDU ERROR SIG
CDU 1/2 X ERROR SIG
CDU ERROR SIG RET.
CDU MDA SLEW SIG
CDU MDA TACH SIG
CDU MDA INPUT RET.
OG
MG
IG
16X
1X
CDU'S
OG CDU 1/2 X ERROR SIG
OG CDU ERROR SIG RET.
OG CDU MDA SLEW SIG
OG CDU MDA TACH SIG
OG CDU MDA INPUT RET.
MG CDU 1/2 X ERROR SIG
MG CDU ERROR SIG RET.
MG CDU MDA SLEW SIG
MG CDU MDA TACH SIG
MG CDU MDA INPUT RET.
IG CDU 1/2 X ERROR SIG
IG CDU ERROR SIG RET.
IG CDU MDA SLEW SIG
IG CDU MDA TACH SIG
IG CDU MDA INPUT RET.
OG CDU 1X ERROR SIG
OG CDU ERROR SIG RET.
OG CDU 16X ERROR SIG
OG CDU ERROR SIG RET.
MG CDU 1X ERROR SIG
MG CDU ERROR SIG RET.
MG CDU 16X ERROR SIG
MG CDU ERROR SIG RET.
IG CDU 1X ERROR SIG
IG CDU ERROR SIG RET.
IG CDU 16X ERROR SIG
IG CDU ERROR SIG RET.
SJB (PSA SIMULATED JUNCTION BOX)
MDA'S
TRAY 6
SIN A OG 16X TO CDU
SIN A OG 16X
COS A OG 16X
COS A OG 16X TO CDU
COS A MG 16X
COS A MG 16X TO CDU
COS A IG 16X
COS A IG 16X TO CDU
SIN A OG 1X TO CDU
COS A OG 1X TO CDU
SIN A OG 1X HI
SIN A OG 1X LO
COS A OG 1X HI
COS A OG 1X LO
TRAY 6
COS A MG 16X
SIN A IG 16X
COS A IG 16X
SIN A OG 16X
COS A OG 16X
SIN A MG 16X
IMU
SIN A OG 1X HI
SIN A OG 1X LO
COS A OG 1X HI
COS A OG 1X LO
SIN A MG 1X HI
SIN A MG 1X LO
COS A MG 1X HI
COS A MG 1X LO
SIN A IG 1X HI
SIN A IG 1X LO
COS A IG 1X HI
COS A IG 1X LO
J3-F
J3-G
J3-D
J3-E
J1-P
J1-N
J1-L
J1-M
J1-g
J1-f
J1-a
J1-b
IMU
9
8
7
6
5
4
3
2
1
G
F
E
D
C
B
A

REVISIONS

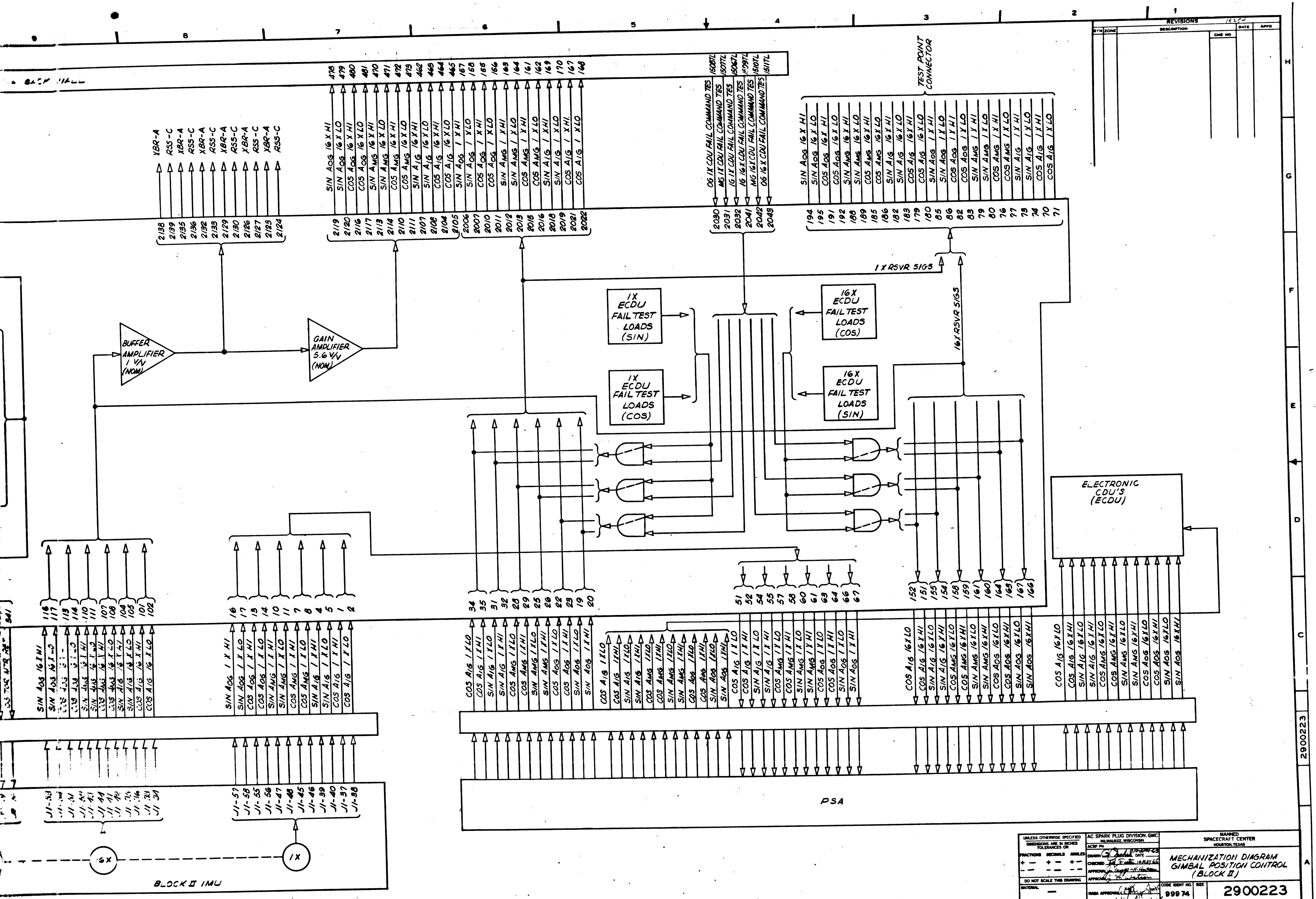
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + — + — + — - - -	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN ACSP PN DRAWN DATE 8 MAY 65 CHECKED Ed Foster 14 MAY 65 APPROVAL APPROVAL	MANNED SPACECRAFT CENTER HOUSTON TEXAS MECHANIZATION DIAGRAM - GIMBAL POSITION CONTROL (BLOCK I SERIES 100)
DO NOT SCALE THIS DRAWING MATERIAL —	NASA APPROVAL	CODE IDENT NO. 09974 · SIZE J2 · 2900223
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — · SHEET 2 OF 4



OIA BACKWALL
512 509 505 513W 510W 506W
OG POS SEL IND
MG POS SEL IND
IG POS SEL IND
ENABLE OG IMU RSVR SIG
ENABLE MG IMU RSVR SIG
ENABLE IG IMU RSVR SIG
209 210 207 208 205 206
OG TORQUE MTR HI
OG TORQUE MTR RET.
MG TORQUE MTR HI
MG TORQUE MTR RET.
IG TORQUE MTR HI
IG TORQUE MTR RET.
594 596 598
OG TOR MTR RET.
MG TOR MTR RET.
IG TOR MTR RET.
593 595 597
OG TOR MTR HI
MG TOR MTR HI
IG TOR MTR HI
XIII A, 1155 C
XIII A, 1159 C
XIII A, 1156 C
XIII A, 1153 C
XIII A, 1159 C
XIII A, 1158 C
1693 1694 1695 1696 1697 1698 1699 1700
1702 1703 1704 1705 1706 1707 1708 1709
1711 1712 1713 1714 1715 1716 1717 1718
1037 1038 1039
1130 1129 1128
1159 1160 1157 1158 1155 1156
1174 1175 1172 1173 1170 1171 1168 1169 1166 1167 1164 1165
SJB
OG TORQUE MTR HI 91
MG TORQUE MTR HI 92
IG TORQUE MTR HI 93
OG TORQUE MTR RET. 94
MG TORQUE MTR RET. 95
IG TORQUE MTR RET. 96
61 62 63 64 65 66 67 68 69 70 71 72
J3-Y J2-H J3-Z J3-c J3-d J3-g J3-X J2-J J3-b J3-a J3-f J3-e
IMU
235
27 VDC
RLP LO
236
228
MOTOR DRIVE SIGNALS
1193 1194 1195 1204 1205 1206 1207 1210 1211 1212 1213
1037 1038 1034 1035 1031 1032 1524 1525 1526
OG 31 OG 32 MG 31 MG 32 IG 31 IG 32 OG 43 MG 43 IG 43
CDU MDA OUTPUTS
0 VDC IMU
CDU'S
1535 1536 1528 1532 1533 1531 1529 1530 1534
1659 1660 1657 1658 1655 1656
1635 1636 1630 1631
1640 1641 1638 1639 1633 1634 1628 1629 1626 1623
1625 1627 1622 1624 1620 1621 1618 1619 1616 1646 1615
SJB
(PSA SIMULATED JUNCTION BOX)
158 159 160 161 162 163 164 165 166
99 100 101 102 103 104
109 110 113 114
105 106 107 108 111 112 115 116 117 122
118 119 120 121 123 124 125 126 127 129
73 74 75 76 77 78
N2 OG CDU MDA OUTPUT N2
N1 OG CDU MDA OUTPUT N1
P2 0 VDC IMU
P3 MG CDU MDA OUTPUT P3
R3 MG CDU MDA OUTPUT R3
P1 IG CDU MDA OUTPUT P1
R1 IG CDU MDA OUTPUT R1
0 VDC IMU ERROR SIG
TRAY 6
H6 OG TORQUE MTR HI
H5 OG TORQUE MTR RET.
F6 MG TORQUE MTR HI
G6 MG TORQUE MTR RET.
D6 IG TORQUE MTR HI
D5 IG TORQUE MTR RET.
TRAY 1
D9 SIN AMG 16X TO CDU
F9 SIN AMG 16X
F7 SIN AIG 16X TO CDU
D7 SIN AIG 16X
TRAY 5
J1-G COS AMG 16X
J1-Z SIN AIG 16X
J1-W COS AIG 16X
J1-F SIN AOG 16X
J1-C COS AOG 16X
J1-K SIN AMG 16X
IMU
F9 SIN AOG 16X TO CDU
D9 SIN AOG 16X
F7 COS AOG 16X
F8 COS AOG 16X TO CDU
G3 COS AMG 16X
G4 COS AMG 16X TO CDU
G1 COS AIG 16X
G7 COS AIG 16X TO CDU
B9 SIN AOG 1X TO CDU
C9 COS AOG 1X TO CDU
A8 SIN AOG 1X HI
A9 SIN AOG 1X LO
C8 COS AOG 1X HI
B8 COS AOG 1X LO
TRAY 6
SIN AOG 1X HI
SIN AOG 1X LO
COS AOG 1X HI
2900223
2
16 15 14 13 12 11 10 9 8
H G F E D C B A

ZH


REVISIONS
SYM
ZONE
DESCRIPTION
CHG NO
DATE
APPD
TEST POINT CONNECTOR
XBR-A
RSS-C
2138
2139
2135
2136
2132
2133
2129
2130
2126
2127
2123
2124
SIN AOG 16X HI
SIN AOG 16X LO
COS AOG 16X LO
SIN AMG 16X HI
SIN AMG 16X LO
COS AMG 16X HI
SIN AIG 16X HI
SIN AIG 16X LO
COS AIG 16X HI
SIN AOG 1X HI
COS AOG 1X HI
SIN AMG 1X HI
SIN AMG 1X LO
COS AMG 1X LO
SIN AIG 1X HI
COS AIG 1X HI
COS AIG 1X LO
478
479
480
481
470
471
472
473
462
463
464
465
157
158
155
156
163
164
161
162
169
170
167
168
2119
2120
2116
2117
2113
2114
2110
2111
2107
2108
2104
2105
2006
2007
2010
2011
2012
2013
2016
2015
2018
2019
2021
2022
OG 1X CDU FAIL COMMAND TES
MG 1X CDU FAIL COMMAND TES
IG 1X CDU FAIL COMMAND TES
IG 16X CDU FAIL COMMAND TES
MG 16X CDU FAIL COMMAND TES
OG 16X CDU FAIL COMMAND TES
1508TL
1507TL
1506TL
1509TL
1510TL
1511TL
2030
2031
2032
2041
2042
2043
SIN AOG 16X HI
SIN AOG 16X LO
COS AOG 16X HI
COS AOG 16X LO
SIN AMG 16X HI
SIN AMG 16X LO
SIN AIG 16X LO
COS AIG 16X LO
SIN AOG 1X HI
COS AOG 1Y HI
COS AOG 1X LO
SIN AMG 1X LO
COS AMG 1X LO
SIN AIG 1X HI
COS AIG 1X HI
COS AIG 1X LO
194
195
191
192
188
189
186
182
183
179
180
185
86
82
83
79
80
76
77
73
74
70
71
1X RSVR SIGS
16X RSVR SIGS
BUFFER AMPLIFIER 1 V/V (NOM)
GAIN AMPLIFIER 5.6 V/V (NOM)
1X ECDU FAIL TEST LOADS (SIN)
1X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (SIN)
ELECTRONIC CDU'S (ECDU)
116
117
113
114
110
111
107
108
104
105
101
102
16
17
13
14
10
11
7
8
4
5
1
2
34
35
31
32
28
29
25
26
22
23
19
20
51
52
54
55
57
58
60
61
63
64
66
67
152
151
155
154
158
159
161
160
164
165
167
166
SIN AOG 1X HI
SIN AOG 1X LO
COS AOG 1X LO
SIN AMG 1X HI
SIN AMG 1X LO
COS AMG 1X LO
SIN AIG 1X HI
SIN AIG 1X LO
COS AIG 1X LO
COS AIG 1X HI
COS AIG 16X LO
COS AIG 16X HI
SIN AIG 16X LO
SIN AIG 16X HI
COS AMG 16X LO
COS AMG 16X HI
SIN AMG 16X LO
SIN AMG 16X HI
COS AOG 16X LO
COS AOG 16X HI
SIN AOG 16X LO
SIN AOG 16X HI
J1-57
J1-58
J1-55
J1-56
J1-47
J1-48
J1-45
J1-46
J1-39
J1-40
J1-37
J1-38
PSA
16X
1X
BLOCK II IMU

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ –	+ –	+ –
– –	– –	– –

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

ACSP PN

DRAWN G. Drabek 10-APR-65 DATE

CHECKED Ed Foster 14 MAY 65

APPROVAL J. Tuggo - H. Hartman

APPROVAL J. W. Watson

NASA APPROVAL

MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
GIMBAL POSITION CONTROL
(BLOCK II)

CODE IDENT NO. 99974

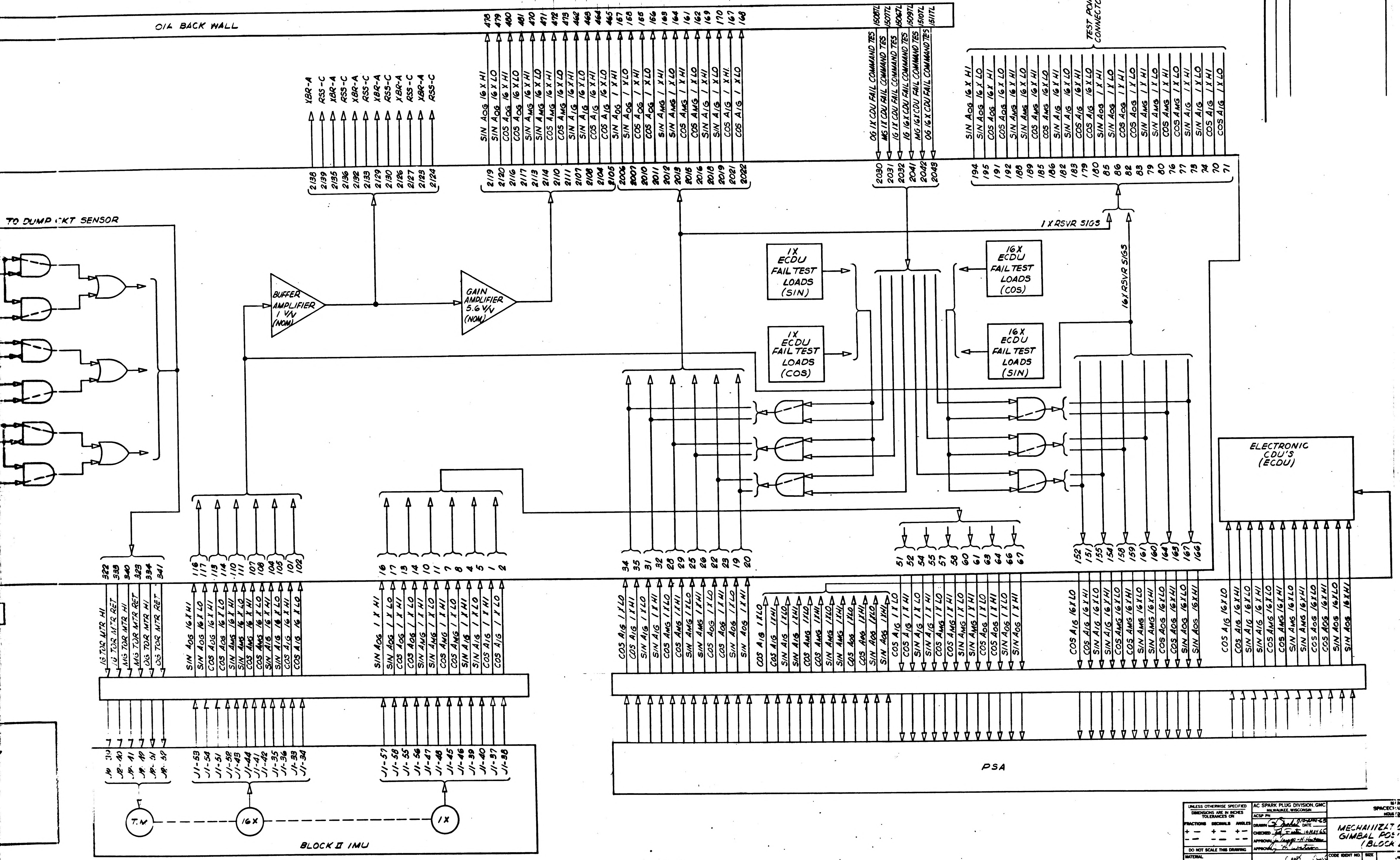
SIZE

2900223

SCALE NONE

SHEET 3 OF 4

2900223


OIL BACK WALL
TO DUMP CKT SENSOR
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
XBR-A
RSS-C
2138
2139
2135
2136
2132
2133
2129
2126
2127
2123
2124
BUFFER AMPLIFIER 1 V/V (NOM)
GAIN AMPLIFIER 5.6 V/V (NOM)
478
479
480
481
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471
472
473
462
463
464
465
157
158
155
156
163
164
161
162
169
170
167
168
SIN AOG 16 X HI
SIN AOG 16 X LO
COS AOG 16 X HI
COS AOG 16 X LO
SIN AMG 16 X HI
SIN AMG 16 X LO
COS AMG 16 X HI
COS AMG 16 X LO
SIN AIG 16 X HI
SIN AIG 16 X LO
COS AIG 16 X HI
COS AIG 16 X LO
SIN AOG 1 X HI
SIN AOG 1 X LO
COS AOG 1 X HI
COS AOG 1 X LO
SIN AMG 1 X HI
SIN AMG 1 X LO
COS AMG 1 X HI
COS AMG 1 X LO
SIN AIG 1 X HI
SIN AIG 1 X LO
COS AIG 1 X HI.
COS AIG 1 X LO
2119
2120
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2110
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2107
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2019
2021
2022
1508TL
1507TL
1506TL
1509TL
1510TL
1511TL
OG 1X CDU FAIL COMMAND TES
MG 1X CDU FAIL COMMAND TES
IG 1X CDU FAIL COMMAND TES
IG 16X CDU FAIL COMMAND TES
MG 16X CDU FAIL COMMAND TES
OG 16 X CDU FAIL COMMAND TES
2030
2031
2032
2041
2042
2043
TEST POINT CONNECTOR
SIN AOG 16 X HI
SIN AOG 16 X LO
COS AOG 16X HI
COS AOG 16 X LO
SIN AMG 16 X HI
SIN AMG 16 X LO
COS AMG 16X HI
COS AMG 16X LO
SIN AIG 16X HI
SIN AIG 16 X LO
COS AIG 16X HI
COS AIG 16 X LO
SIN AOG 1 X HI
SIN AOG 1 X LO
COS AOG 1 X HI
COS AOG 1 X LO
SIN AMG 1 X HI
SIN AMG 1 X LO
COS AMG 1 X HI
COS AMG 1 X LO
SIN AIG 1 X HI
SIN AIG 1 X LO
COS AIG 1 X HI
COS AIG 1 X LO
194
195
191
192
188
189
185
186
182
183
179
180
85
86
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83
79
80
76
77
73
74
70
71
1 X RSVR SIGS
16 X RSVR SIGS
1X ECDU FAIL TEST LOADS (SIN)
1X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (SIN)
ELECTRONIC CDU'S (ECDU)
322
338
340
323
334
341
IG TOR MTR HI
IG TOR MTR RET
MG TOR MTR HI
MG TOR MTR RET
OG TOR MTR HI
OG TOR MTR RET
116
117
113
114
110
111
107
108
104
105
101
102
SIN AOG 16 X HI
SIN AOG 16 X LO
COS AOG 16 X HI
COS AOG 16 X LO
SIN AMG 16 X HI
SIN AMG 16 X LO
COS AMG 16 X HI
COS AMG 16 X LO
SIN AIG 16 X HI
SIN AIG 16 X LO
COS AIG 16 X HI
COS AIG 16 X LO
16
17
13
14
10
11
7
8
4
5
1
2
SIN AOG 1 X HI
SIN AOG 1 X LO
COS AOG 1 X HI
COS AOG 1 X LO
SIN AMG 1 X HI
SIN AMG 1 X LO
COS AMG 1 X HI
COS AMG 1 X LO
SIN AIG 1 X HI
SIN AIG 1 X LO
COS AIG 1 X HI
COS AIG 1 X LO
J2-39
J2-40
J2-41
J2-49
J2-51
J2-52
J1-53
J1-54
J1-51
J1-52
J1-43
J1-44
J1-41
J1-42
J1-35
J1-36
J1-33
J1-34
J1-57
J1-58
J1-55
J1-56
J1-47
J1-48
J1-45
J1-46
J1-39
J1-40
J1-37
J1-38
T.M
16X
1X
BLOCK II IMU
34
35
31
32
28
29
25
26
22
23
19
20
COS AIG 1 X LO
COS AIG 1 X HI
SIN AIG 1 X LO
SIN AIG 1 X HI
COS AMG 1 X LO
COS AMG 1 X HI
SIN AMG 1 X LO
SIN AMG 1 X HI
COS AOG 1 X LO
COS AOG 1 X HI
SIN AOG 1 X LO
SIN AOG 1 X HI
COS AIG 1 X LO
COS AIG 1 X HI
SIN AIG 1 X LO
SIN AIG 1 X HI
COS AMG 1 X LO
COS AMG 1 X HI
SIN AMG 1 X LO
SIN AMG 1 X HI
COS AOG 1 X LO
COS AOG 1 X HI
SIN AOG 1 X LO
SIN AOG 1 X HI
51
52
54
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57
58
60
61
63
64
66
67
COS AIG 1 X LO
COS AIG 1 X HI
SIN AIG 1 X LO
SIN AIG 1 X HI
COS AMG 1 X LO
COS AMG 1 X HI
SIN AMG 1 X LO
SIN AMG 1 X HI
COS AOG 1 X LO
COS AOG 1 X HI
SIN AOG 1 X LO
SIN AOG 1 X HI
152
151
155
154
158
159
161
160
164
163
167
166
COS AIG 16 X LO
COS AIG 16 X HI
SIN AIG 16 X LO
SIN AIG 16 X HI
COS AMG 16 X LO
COS AMG 16 X HI
SIN AMG 16 X LO
SIN AMG 16 X HI
COS AOG 16 X LO
COS AOG 16 X HI
SIN AOG 16 X LO
SIN AOG 16 X HI
COS AIG 16 X LO
COS AIG 16 X HI
SIN AIG 16 X LO
SIN AIG 16 X HI
COS AMG 16 X LO
COS AMG 16 X HI
SIN AMG 16 X LO
SIN AMG 16 X HI
COS AOG 16 X LO
COS AOG 16 X HI
SIN AOG 16 X LO
SIN AOG 16 X HI
PSA

REVISIONS

SYM ZONE DESCRIPTION CHK NO

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES ± ± ±	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN
	ACSP PN
	DRAWN S. Daskal 10 MAY 65 DATE
	CHECKED Ed Foster 14 MAY 65
	APPROVAL Trapp - H. Hartman
	APPROVAL R. Watson
DO NOT SCALE THIS DRAWING	
MATERIAL —	NASA APPROVAL
CONTRACT NAS9-497	MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM GIMBAL POSITION CONTROL
(BLOCK II)

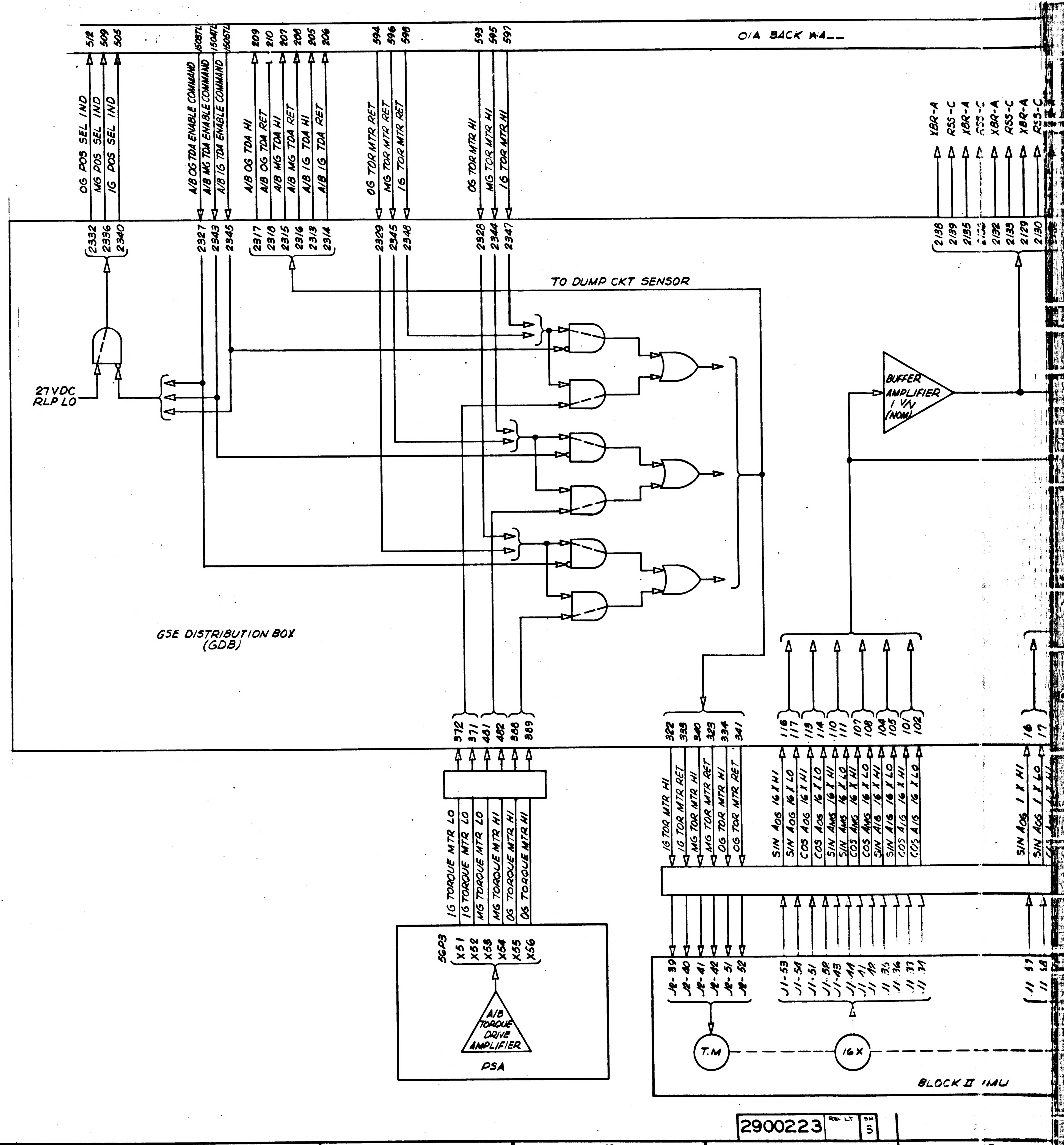
CODE IDENT NO. 99974

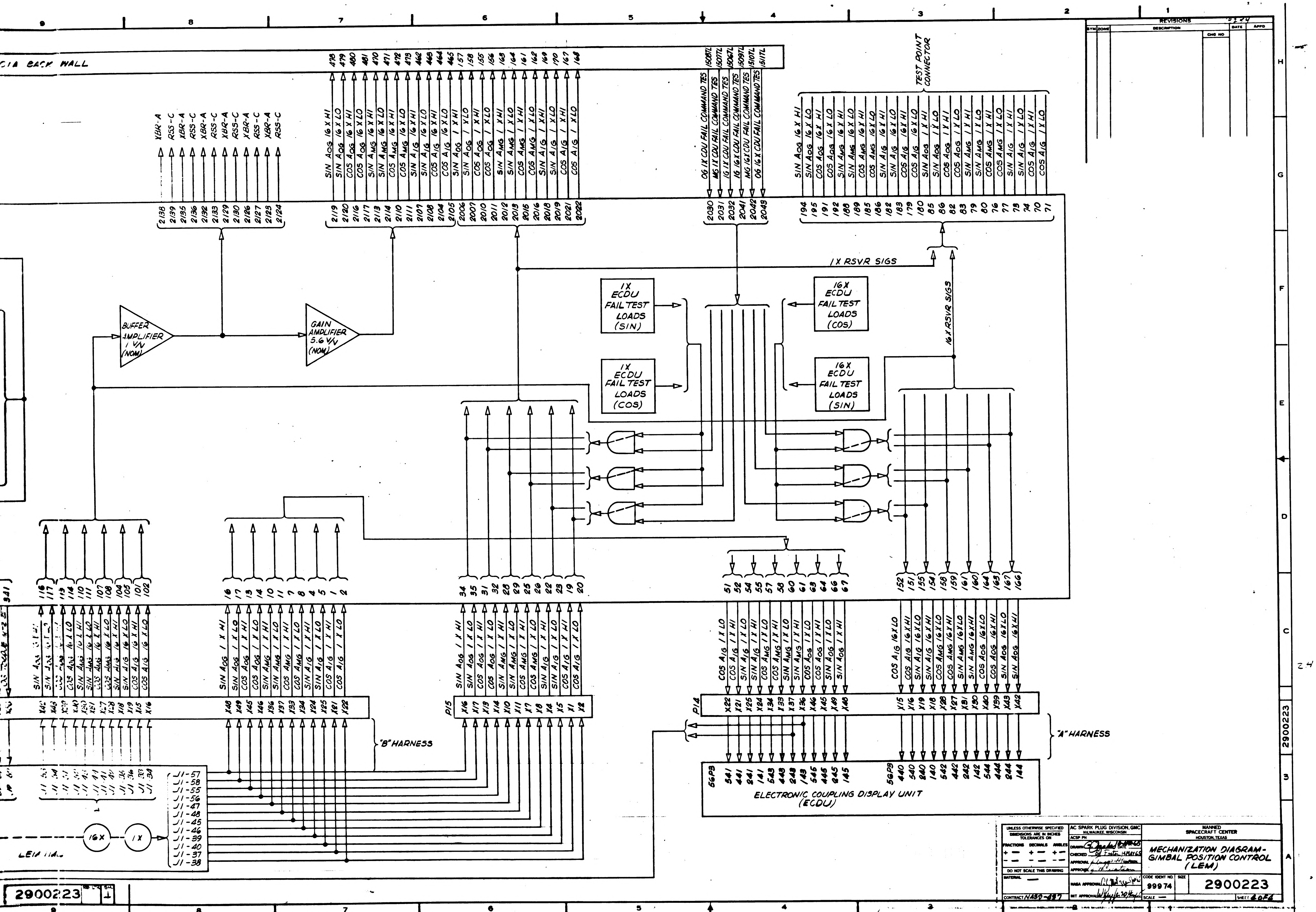
SIZE

2900223

SCALE 1.0:1

2900223 REV LT SH 3


O/A BACK WALL
512
509
505
OG POS SEL IND
MG POS SEL IND
IG POS SEL IND
2332
2336
2340
1508TL
1504TL
1505TL
A/B OG TDA ENABLE COMMAND
A/B MG TDA ENABLE COMMAND
A/B IG TDA ENABLE COMMAND
2327
2343
2345
209
210
207
208
205
206
A/B OG TDA HI
A/B OG TDA RET
A/B MG TDA HI
A/B MG TDA RET
A/B IG TDA HI
A/B IG TDA RET
2317
2318
2315
2316
2313
2314
594
596
598
OG TOR MTR RET
MG TOR MTR RET
IG TOR MTR RET
2329
2345
2348
593
595
597
OG TOR MTR HI
MG TOR MTR HI
IG TOR MTR HI
2328
2344
2347
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
RSS-C
2138
2139
2135
2136
2132
2133
2129
2130
TO DUMP CKT SENSOR
27VDC
RLP LO
BUFFER
AMPLIFIER
1 V/V
(NOM)
GSE DISTRIBUTION BOX
(GDB)
372
371
461
462
388
389
IG TORQUE MTR LO
IG TORQUE MTR LO
MG TORQUE MTR LO
MG TORQUE MTR HI
OG TORQUE MTR HI
OG TORQUE MTR HI
5GP3
X51
X52
X53
X54
X55
X56
A/B
TORQUE
DRIVE
AMPLIFIER
PSA
322
339
340
323
334
341
IG TOR MTR HI
IG TOR MTR RET
MG TOR MTR HI
MG TOR MTR RET
OG TOR MTR HI
OG TOR MTR RET
116
117
113
114
110
111
107
108
104
105
101
102
SIN AOG 16 X HI
SIN AOG 16 X LO
COS AOG 16 X HI
COS AOG 16 X LO
SIN AMG 16 X HI
SIN AMG 16 X LO
COS AMG 16 X HI
COS AMG 16 X LO
SIN AIG 16 X HI
SIN AIG 16 X LO
COS AIG 16 X HI
COS AIG 16 X LO
16
17
SIN AOG 1 X HI
SIN AOG 1 X LO
J2-39
J2-40
J2-41
J2-42
J2-51
J2-52
J1-53
J1-54
J1-51
J1-52
J1-13
J1-14
J1-11
J1-12
J1-35
J1-36
J1-33
J1-34
J1-57
J1-58
T.M
16X
BLOCK II IMU
2900223
REV LT
SH 3


C/A BACK WALL
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
RSS-C
XBR-A
RSS-C
2138 2139 2135 2136 2132 2133 2129 2130 2126 2127 2123 2124
478 479 480 481 470 471 472 473 462 463 464 465 157 158 155 156 163 164 161 162 169 170 167 168
SIN AOG 16 X HI
SIN AOG 16 X LO
COS AOG 16 X HI
COS AOG 16 X LO
SIN AMG 16 X HI
SIN AMG 16 X LO
COS AMG 16 X HI
COS AMG 16 X LO
SIN AIG 16 X HI
SIN AIG 16 X LO
COS AIG 16 X HI
COS AIG 16 X LO
SIN AOG 1 X HI
SIN AOG 1 X LO
COS AOG 1 X HI
COS AOG 1 X LO
SIN AMG 1 X HI
SIN AMG 1 X LO
COS AMG 1 X HI
COS AMG 1 X LO
SIN AIG 1 X HI
SIN AIG 1 X LO
COS AIG 1 X HI
COS AIG 1 X LO
2119 2120 2116 2117 2113 2114 2110 2111 2107 2108 2104 2105 2006 2007 2010 2011 2012 2013 2015 2016 2018 2019 2021 2022
1508TL 1507TL 1506TL 1509TL 1510TL 1511TL
OG 1X CDU FAIL COMMAND TES
MG 1X CDU FAIL COMMAND TES
IG 1X CDU FAIL COMMAND TES
IG 16X CDU FAIL COMMAND TES
MG 16X CDU FAIL COMMAND TES
OG 16X CDU FAIL COMMAND TES
2030 2031 2032 2041 2042 2043
TEST POINT CONNECTOR
194 195 191 192 188 189 185 186 182 183 179 180 85 86 82 83 79 80 76 77 73 74 70 71
1X RSVR SIGS
16X RSVR SIGS
BUFFER AMPLIFIER 1 V/V (NOM)
GAIN AMPLIFIER 5.6 V/V (NOM)
1X ECDU FAIL TEST LOADS (SIN)
1X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (SIN)
341
116 117 113 114 110 111 107 108 104 105 101 102
16 17 13 14 10 11 7 8 4 5 1 2
34 35 31 32 28 29 25 26 22 23 19 20
51 52 54 55 57 58 60 61 63 64 66 67
152 151 155 154 158 159 161 160 164 163 167 166
X42 X43 X39 X40 X30 X31 X27 X28 X18 X19 X15 X16
X48 X49 X45 X46 X36 X37 X33 X34 X24 X25 X21 X22
P15
X16 X17 X13 X14 X10 X11 X7 X8 X4 X5 X1 X2
P14
X22 X21 X25 X24 X34 X33 X37 X36 X46 X45 X49 X48
X15 X16 X19 X18 X28 X27 X31 X30 X40 X39 X43 X42
COS AIG 1 X LO
COS AIG 1 X HI
SIN AIG 1 X LO
SIN AIG 1 X HI
COS AMG 1 X LO
COS AMG 1 X HI
SIN AMG 1 X LO
SIN AMG 1 X HI
COS AOG 1 X LO
COS AOG 1 X HI
SIN AOG 1 X LO
SIN AOG 1 X HI
COS AIG 16X LO
COS AIG 16X HI
SIN AIG 16X LO
SIN AIG 16X HI
COS AMG 16X LO
COS AMG 16X HI
SIN AMG 16X LO
SIN AMG 16X HI
COS AOG 16X LO
COS AOG 16X HI
SIN AOG 16X LO
SIN AOG 16X HI
"B" HARNESS
"A" HARNESS
J1-57
J1-58
J1-55
J1-56
J1-47
J1-48
J1-45
J1-46
J1-39
J1-40
J1-37
J1-38
16X
1X
56P3
541 441 241 141 543 443 243 143 545 445 245 145
56P3
440 540 240 140 542 442 242 142 544 444 244 144
ELECTRONIC COUPLING DISPLAY UNIT (ECDU)
2900223
REVISIONS
SYM ZONE DESCRIPTION CHG NO DATE APPD
9 8 7 6 5 4 3 2 1
H G F E D C B A

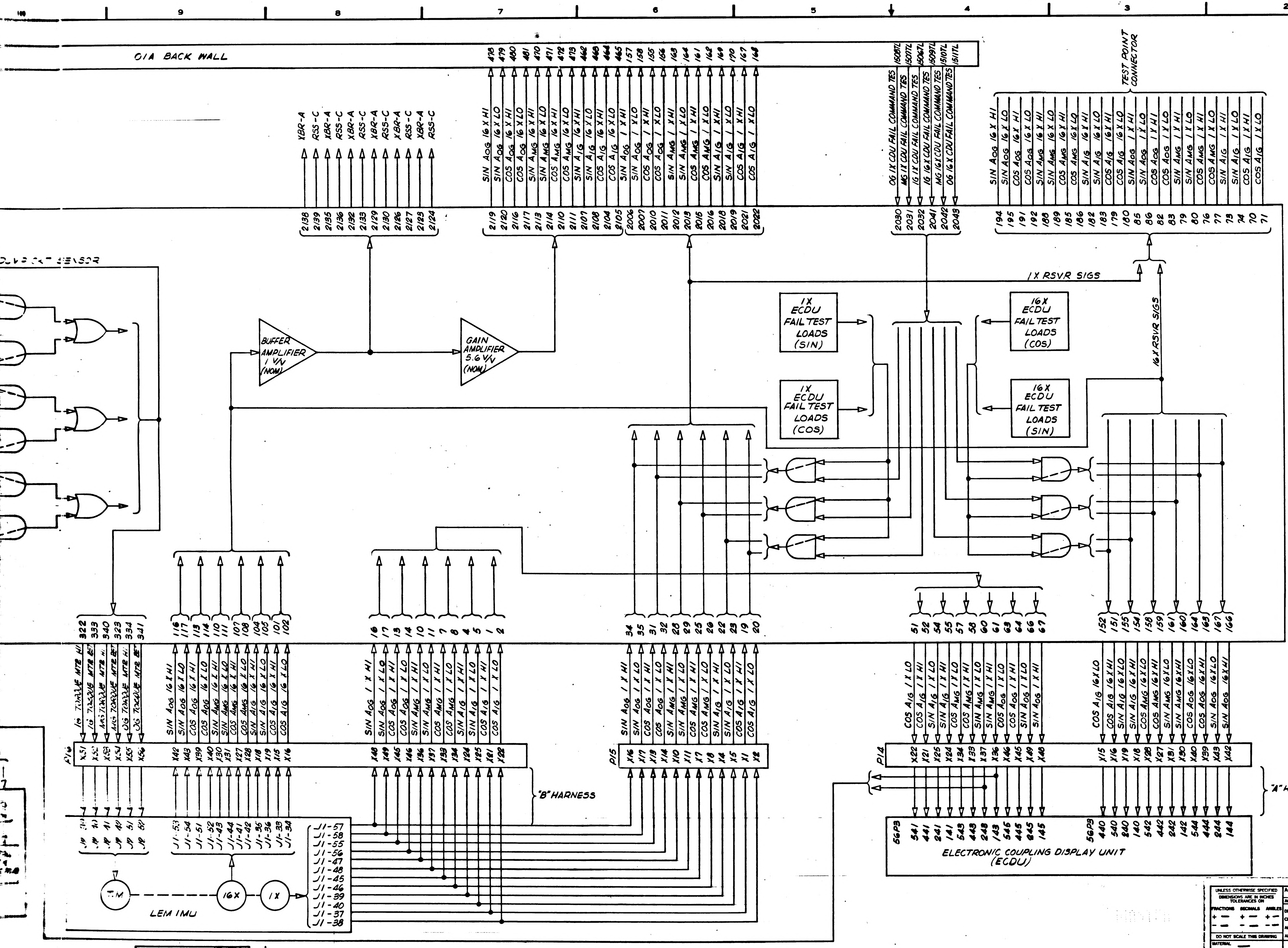
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN G. Opake DATE
CHECKED Ed Foster 14MAY65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM-
GIMBAL POSITION CONTROL
(LEM)

CODE IDENT NO. 99974
SIZE
2900223
SCALE —
SHEET 4 OF 4



O/A BACK WALL
TEST POINT CONNECTOR
REVISIONS
SYM ZONE DESCRIPTION CHG NO DATE APPD
XBR-A RSS-C XBR-A RSS-C XBR-A RSS-C XBR-A RSS-C XBR-A RSS-C XBR-A RSS-C
SIN AOG 16 X HI
SIN AOG 16 X LO
COS AOG 16 X HI
COS AOG 16 X LO
SIN AMG 16 X HI
SIN AMG 16 X LO
COS AMG 16 X HI
COS AMG 16 X LO
SIN AIG 16 X HI
SIN AIG 16 X LO
COS AIG 16 X HI
COS AIG 16 X LO
SIN AOG 1 X HI
SIN AOG 1 X LO
COS AOG 1 X HI
COS AOG 1 X LO
SIN AMG 1 X HI
SIN AMG 1 X LO
COS AMG 1 X HI
COS AMG 1 X LO
SIN AIG 1 X HI
SIN AIG 1 X LO
COS AIG 1 X HI
COS AIG 1 X LO
OG 1X CDU FAIL COMMAND TES
MG 1X CDU FAIL COMMAND TES
IG 1X CDU FAIL COMMAND TES
IG 16X CDU FAIL COMMAND TES
MG 16X CDU FAIL COMMAND TES
OG 16X CDU FAIL COMMAND TES
1508TL 1507TL 1506TL 1509TL 1510TL 1511TL
2030 2031 2032 2041 2042 2043
1X RSVR SIGS
16X RSVR SIGS
BUFFER AMPLIFIER 1 V/V (NOM)
GAIN AMPLIFIER 5.6 V/V (NOM)
1X ECDU FAIL TEST LOADS (SIN)
1X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (COS)
16X ECDU FAIL TEST LOADS (SIN)
IG TORQUE MTR HI
IG TORQUE MTR RET
MG TORQUE MTR HI
MG TORQUE MTR RET
OG TORQUE MTR HI
OG TORQUE MTR RET
P16
P15
P14
"B" HARNESS
"A" HARNESS
J1-57 J1-58 J1-55 J1-56 J1-47 J1-48 J1-45 J1-46 J1-39 J1-40 J1-37 J1-38
J1-53 J1-54 J1-52 J1-43 J1-44 J1-42 J1-35 J1-36 J1-33 J1-34
T.M
16X
1X
LEM IMU
56P3
ELECTRONIC COUPLING DISPLAY UNIT (ECDU)

2900223 | REV LTR | SH 4

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
+ —	+ —	+ —
- —	- —	- —

DO NOT SCALE THIS DRAWING

MATERIAL —

CONTRACT NAS9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN

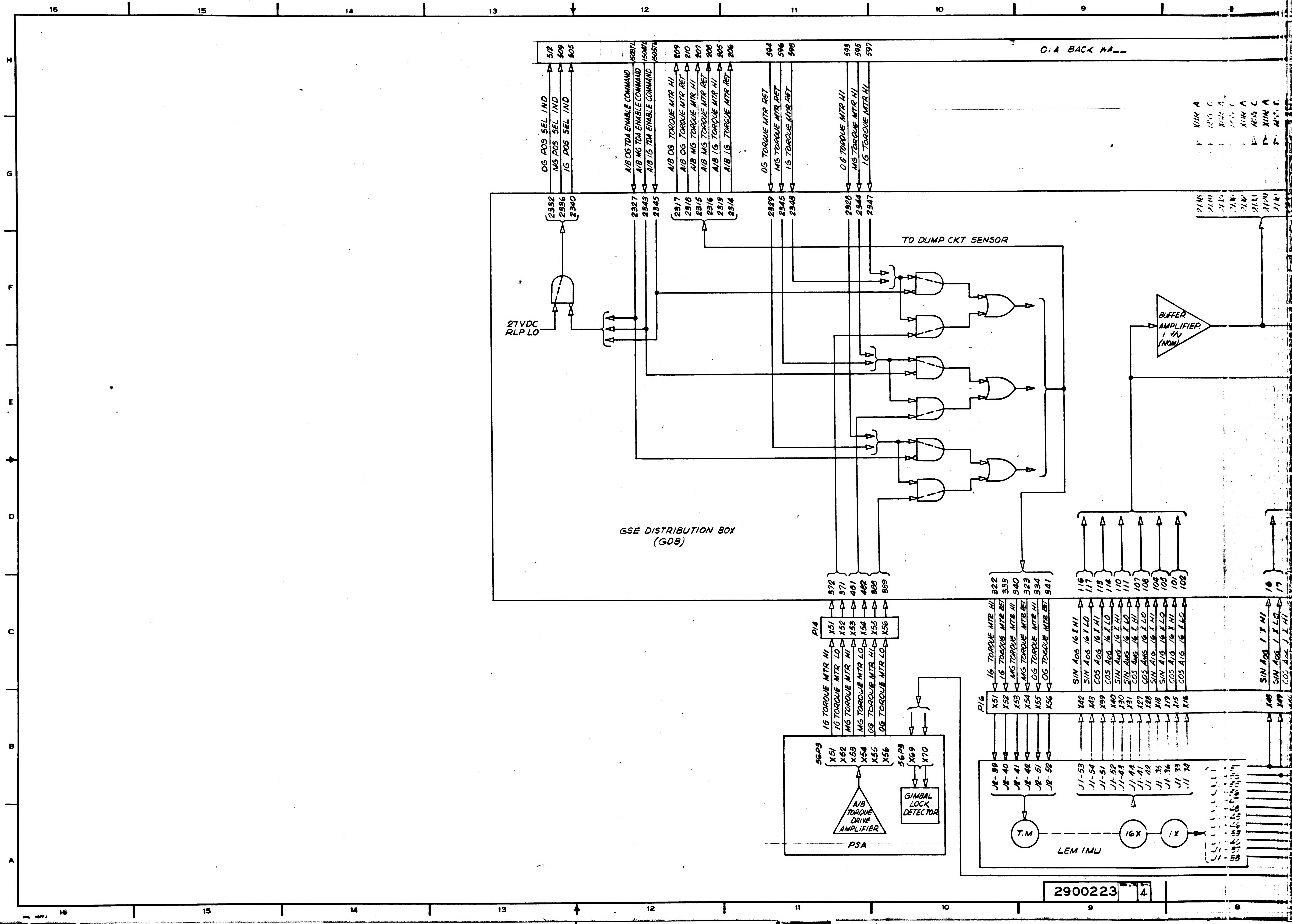
ACSP PN

DRAWN G. Quarles DATE 14 Apr 65
CHECKED R. Foster 14 May 65
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

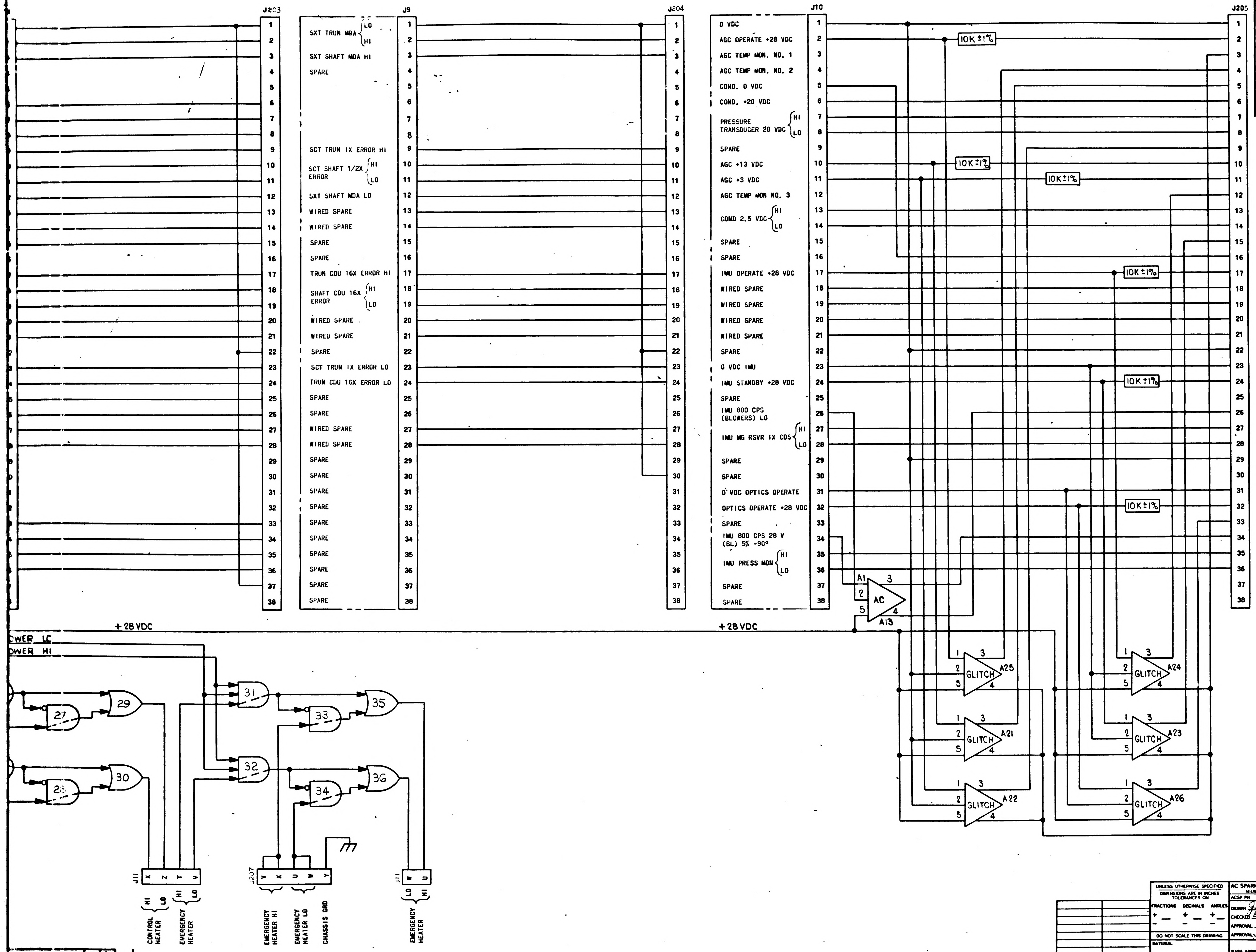
MECHANIZATION DIAGRAM-
GIMBAL POSITION CONTROL
(LEM)

CODE IDENT NO. 99974
SIZE
2900223
SCALE —


O/A BACK WA__
512
509
505
OG POS SEL IND
MG POS SEL IND
IG POS SEL IND
1508TL
1504TL
1505TL
A/B OG TDA ENABLE COMMAND
A/B MG TDA ENABLE COMMAND
A/B IG TDA ENABLE COMMAND
209
210
207
208
205
206
A/B OG TORQUE MTR HI
A/B OG TORQUE MTR RET
A/B MG TORQUE MTR HI
A/B MG TORQUE MTR RET
A/B IG TORQUE MTR HI
A/B IG TORQUE MTR RET
594
596
598
OG TORQUE MTR RET
MG TORQUE MTR RET
IG TORQUE MTR RET
593
595
597
OG TORQUE MTR HI
MG TORQUE MTR HI
IG TORQUE MTR HI
2332
2336
2340
2327
2343
2345
2317
2318
2315
2316
2313
2314
2329
2345
2348
2328
2344
2347
TO DUMP CKT SENSOR
27VDC RLP LO
BUFFER AMPLIFIER 1 V/V (NOM)
GSE DISTRIBUTION BOX (GDB)
372
371
481
482
388
389
322
333
340
323
334
341
116
117
113
114
110
111
107
108
104
105
101
102
16
17
P14
X51
X52
X53
X54
X55
X56
IG TORQUE MTR HI
IG TORQUE MTR LO
MG TORQUE MTR HI
MG TORQUE MTR LO
OG TORQUE MTR HI
OG TORQUE MTR LO
IG TORQUE MTR HI
IG TORQUE MTR RET
MG TORQUE MTR HI
MG TORQUE MTR RET
OG TORQUE MTR HI
OG TORQUE MTR RET
SIN AOG 16 X HI
SIN AOG 16 X LO
COS AOG 16 X HI
COS AOG 16 X LO
SIN AMG 16 X HI
SIN AMG 16 X LO
COS AMG 16 X HI
COS AMG 16 X LO
SIN AIG 16 X HI
SIN AIG 16 X LO
COS AIG 16 X HI
COS AIG 16 X LO
SIN AOG 1 X HI
SIN AOG 1 X LO
P16
X51
X52
X53
X54
X55
X56
X42
X43
X39
X40
X30
X31
X27
X28
X18
X19
X15
X16
X48
X49
56P3
X51
X52
X53
X54
X55
X56
56P3
X69
X70
A/B TORQUE DRIVE AMPLIFIER
GIMBAL LOCK DETECTOR
PSA
J2-39
J2-40
J2-41
J2-42
J2-51
J2-52
J1-53
J1-54
J1-51
J1-52
J1-43
J1-44
J1-41
J1-42
J1-35
J1-36
J1-33
J1-34
J1-37
J1-38
T.M
16X
1X
LEM IMU
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

2900223 4

SYM	ZONE	REVISIONS --19875 DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.O. 60451		4 MAY 65	JJJ EF
B		REVISED PER TDRR 22390		20 SEP 65	JHP


J203
J9
J204
J10
J205
SXT TRUN MDA LO
SXT TRUN MDA HI
SXT SHAFT MDA HI
SPARE
SCT TRUN 1X ERROR HI
SCT SHAFT 1/2X ERROR HI
SCT SHAFT 1/2X ERROR LO
SXT SHAFT MDA LO
WIRED SPARE
WIRED SPARE
SPARE
SPARE
TRUN CDU 16X ERROR HI
SHAFT CDU 16X ERROR HI
SHAFT CDU 16X ERROR LO
WIRED SPARE
WIRED SPARE
SPARE
SCT TRUN 1X ERROR LO
TRUN CDU 16X ERROR LO
SPARE
SPARE
WIRED SPARE
WIRED SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
0 VDC
AGC OPERATE +28 VDC
AGC TEMP MON. NO. 1
AGC TEMP MON. NO. 2
COND. 0 VDC
COND. +20 VDC
PRESSURE TRANSDUCER 28 VDC HI
PRESSURE TRANSDUCER 28 VDC LO
SPARE
AGC +13 VDC
AGC +3 VDC
AGC TEMP MON NO. 3
COND 2.5 VDC HI
COND 2.5 VDC LO
SPARE
SPARE
IMU OPERATE +28 VDC
WIRED SPARE
WIRED SPARE
WIRED SPARE
WIRED SPARE
SPARE
0 VDC IMU
IMU STANDBY +28 VDC
SPARE
IMU 800 CPS (BLOWERS) LO
IMU MG RSVR IX COS HI
IMU MG RSVR IX COS LO
SPARE
SPARE
0 VDC OPTICS OPERATE
OPTICS OPERATE +28 VDC
SPARE
IMU 800 CPS 28 V (BL) 5% -90°
IMU PRESS MON HI
IMU PRESS MON LO
SPARE
SPARE
10K ±1%
10K ±1%
10K ±1%
10K ±1%
10K ±1%
10K ±1%
A1
AC
A13
GLITCH A25
GLITCH A21
GLITCH A22
GLITCH A24
GLITCH A23
GLITCH A26
+28 VDC
+28 VDC
OWER LO
OWER HI
27
28
29
30
31
32
33
34
35
36
J11 X Z T V
HI LO CONTROL HEATER
HI LO EMERGENCY HEATER
J207 V X U W Y
EMERGENCY HEATER HI
EMERGENCY HEATER LO
CHASSIS GRD
J11 W U
LO HI EMERGENCY HEATER

B	B
A	A
SHEET 1	SHEET 2

REVISION STATUS OF SHEETS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
± ± ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-491

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Wolski DATE 7 MAY 65
CHECKED Ed Foster 10 MAY 65
APPROVAL
APPROVAL M. Watson
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
ADAPTER MODULE, PSA
(BLOCK I SERIES 0 & 50)

CODE IDENT NO. 99974
SIZE J2
2900224
SCALE —
SHEET 1 OF 2

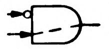
2900224 B

00224 REV B SH 1

2/2900224

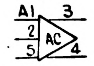
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS PER MIL-STD-806.
3. NON STANDARD SYMBOLS

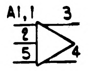


INDICATES "AND" GATE WITH SWITCHED SIGNAL.

INDICATES UNLIGHTED PUSHBUTTON (MOMENTARY ACTION).

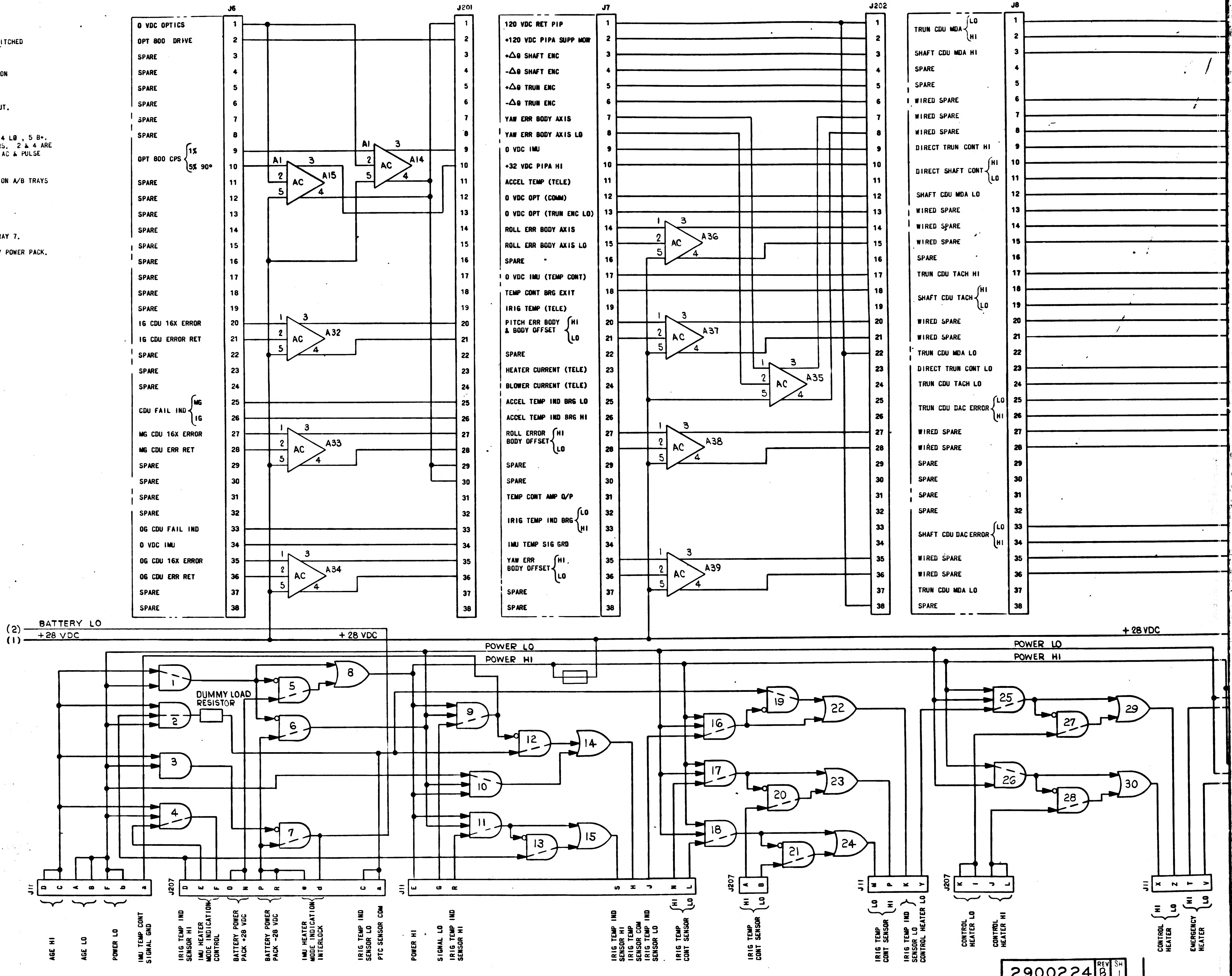


A1 INDICATES ATTENUATED INPUT.



INDICATES A1, 1 & 3 HI, 2 & 4 L0, 5 B+. APPLICABLE FOR ALL AMPLIFIERS. 2 & 4 ARE INTERNALLY CONNECTED ON ALL AC & PULSE AMPLIFIERS.

4. J1 THRU J10 MATE WITH 45A1J1 THRU 45A10J1 ON A/B TRAYS 1 THRU 10.
5. J196 THRU J205 MATE WITH NAA ACE CABLE.
6. J206 MATES WITH NAA ACE LINE DRIVE CABLE.
7. J11 MATES WITH CABLE CONNECTING TO PSA, TRAY 7.
8. J207 MATES WITH CABLE CONNECTING TO BATTERY POWER PACK.

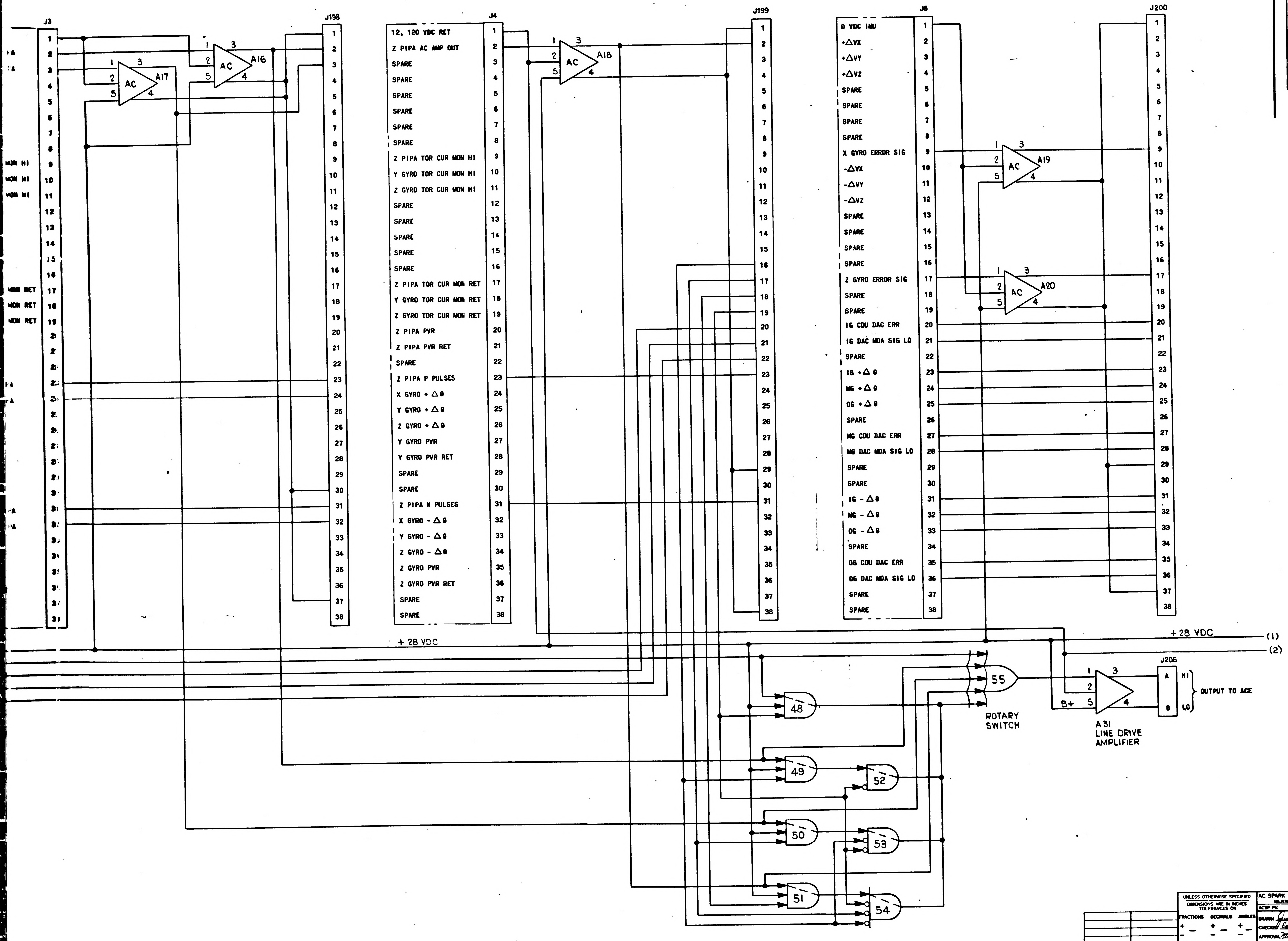


J6
0 VDC OPTICS
OPT 800 DRIVE
SPARE
OPT 800 CPS
1%
5% 90°
IG CDU 16X ERROR
IG CDU ERROR RET
CDU FAIL IND
MG
IG
MG CDU 16X ERROR
MG CDU ERR RET
OG CDU FAIL IND
0 VDC IMU
OG CDU 16X ERROR
OG CDU ERR RET
J201
A1
AC
A15
A14
A32
A33
A34
J7
120 VDC RET PIP
+120 VDC PIPA SUPP MON
+Δθ SHAFT ENC
-Δθ SHAFT ENC
+Δθ TRUN ENC
-Δθ TRUN ENC
YAW ERR BODY AXIS
YAW ERR BODY AXIS LO
0 VDC IMU
+32 VDC PIPA HI
ACCEL TEMP (TELE)
0 VDC OPT (COMM)
0 VDC OPT (TRUN ENC LO)
ROLL ERR BODY AXIS
ROLL ERR BODY AXIS LO
0 VDC IMU (TEMP CONT)
TEMP CONT BRG EXIT
IRIG TEMP (TELE)
PITCH ERR BODY & BODY OFFSET
HI
LO
HEATER CURRENT (TELE)
BLOWER CURRENT (TELE)
ACCEL TEMP IND BRG LO
ACCEL TEMP IND BRG HI
ROLL ERROR BODY OFFSET
TEMP CONT AMP O/P
IRIG TEMP IND BRG
IMU TEMP SIG GRD
YAW ERR BODY OFFSET
A36
A37
A35
A38
A39
J202
J8
TRUN CDU MDA
SHAFT CDU MDA HI
WIRED SPARE
DIRECT TRUN CONT HI
DIRECT SHAFT CONT
SHAFT CDU MDA LO
TRUN CDU TACH HI
SHAFT CDU TACH
TRUN CDU MDA LO
DIRECT TRUN CONT LO
TRUN CDU TACH LO
TRUN CDU DAC ERROR
SHAFT CDU DAC ERROR
(2) BATTERY LO
(1) +28 VDC
+28 VDC
POWER LO
POWER HI
DUMMY LOAD RESISTOR
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
J11
D C A B F b a
AGE HI
AGE LO
POWER LO
IMU TEMP CONT SIGNAL GND
J207
D E F O N P R e d C a
IRIG TEMP IND SENSOR HI
IMU HEATER MODE INDICATION CONTROL
BATTERY POWER PACK +28 VDC
BATTERY POWER PACK -28 VDC
IMU HEATER MODE INDICATION INTERLOCK
IRIG TEMP IND SENSOR LO
PTC SENSOR COM
J11
E G R S H J N L
POWER HI
SIGNAL LO
IRIG TEMP IND SENSOR HI
IRIG TEMP IND SENSOR HI
IRIG TEMP SENSOR COM
IRIG TEMP IND SENSOR LO
IRIG TEMP CONT SENSOR
J207
A B
IRIG TEMP CONT SENSOR
J11
M P K Y
IRIG TEMP CONT SENSOR
IRIG TEMP IND SENSOR LO
CONTROL HEATER LO
J207
K I J L
CONTROL HEATER LO
CONTROL HEATER HI
J11
X Z T V
CONTROL HEATER
EMERGENCY HEATER
16 15 14 13 12 11 10 9 8
H G F E D C B A

2900224 REV B SH 1

1/2900224

REVISIONS 19875					
SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.O. 60451		MAY 65	J J J E
B		REVISED PER TDRR 22390		21 SEP 65	J.H.P. JK


J3
PA
PA
MON HI
MON HI
MON HI
MON RET
MON RET
MON RET
PA
PA
PA
PA
AC
A17
AC
A16
J198
J4
12, 120 VDC RET
Z PIPA AC AMP OUT
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
Z PIPA TOR CUR MON HI
Y GYRO TOR CUR MON HI
Z GYRO TOR CUR MON HI
SPARE
SPARE
SPARE
SPARE
SPARE
Z PIPA TOR CUR MON RET
Y GYRO TOR CUR MON RET
Z GYRO TOR CUR MON RET
Z PIPA PVR
Z PIPA PVR RET
SPARE
Z PIPA P PULSES
X GYRO + Δθ
Y GYRO + Δθ
Z GYRO + Δθ
Y GYRO PVR
Y GYRO PVR RET
SPARE
SPARE
Z PIPA N PULSES
X GYRO - Δθ
Y GYRO - Δθ
Z GYRO - Δθ
Z GYRO PVR
Z GYRO PVR RET
SPARE
SPARE
AC
A18
J199
J5
0 VDC IMU
+ΔVX
+ΔVY
+ΔVZ
SPARE
SPARE
SPARE
SPARE
X GYRO ERROR SIG
-ΔVX
-ΔVY
-ΔVZ
SPARE
SPARE
SPARE
SPARE
Z GYRO ERROR SIG
SPARE
SPARE
IG CDU DAC ERR
IG DAC MDA SIG LO
SPARE
IG +Δθ
MG +Δθ
OG +Δθ
SPARE
MG CDU DAC ERR
MG DAC MDA SIG LO
SPARE
SPARE
IG - Δθ
MG - Δθ
OG - Δθ
SPARE
OG CDU DAC ERR
OG DAC MDA SIG LO
SPARE
SPARE
AC
A19
AC
A20
J200
+ 28 VDC
+ 28 VDC
(1)
(2)
48
49
50
51
52
53
54
55
ROTARY SWITCH
B+
A31
LINE DRIVE AMPLIFIER
J206
A
B
HI
LO
OUTPUT TO ACE

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Wolski DATE 7 MAY 65
CHECKED Ed Foster 10 MAY 65
APPROVAL M. Coskin 11 MAY 65
APPROVAL J. M. Walton
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
ADAPTER MODULE, PSA
(BLOCK I SERIES 0 & 50)

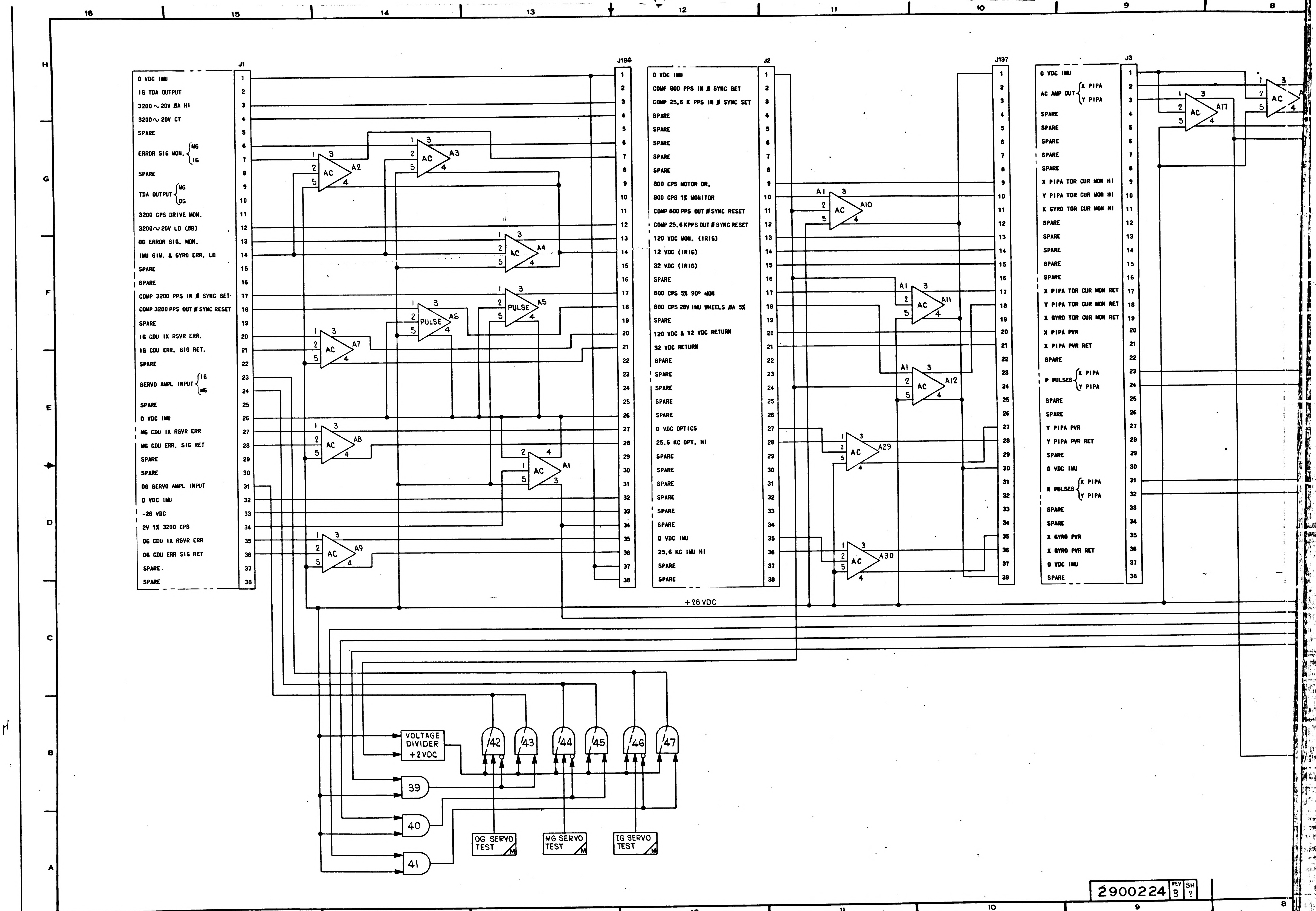
CODE IDENT NO. 99974
SIZE J2
2900224
SCALE —
SHEET 2 OF 2

2900224 B

2H

2900224 REV B SH 2

2/2900224



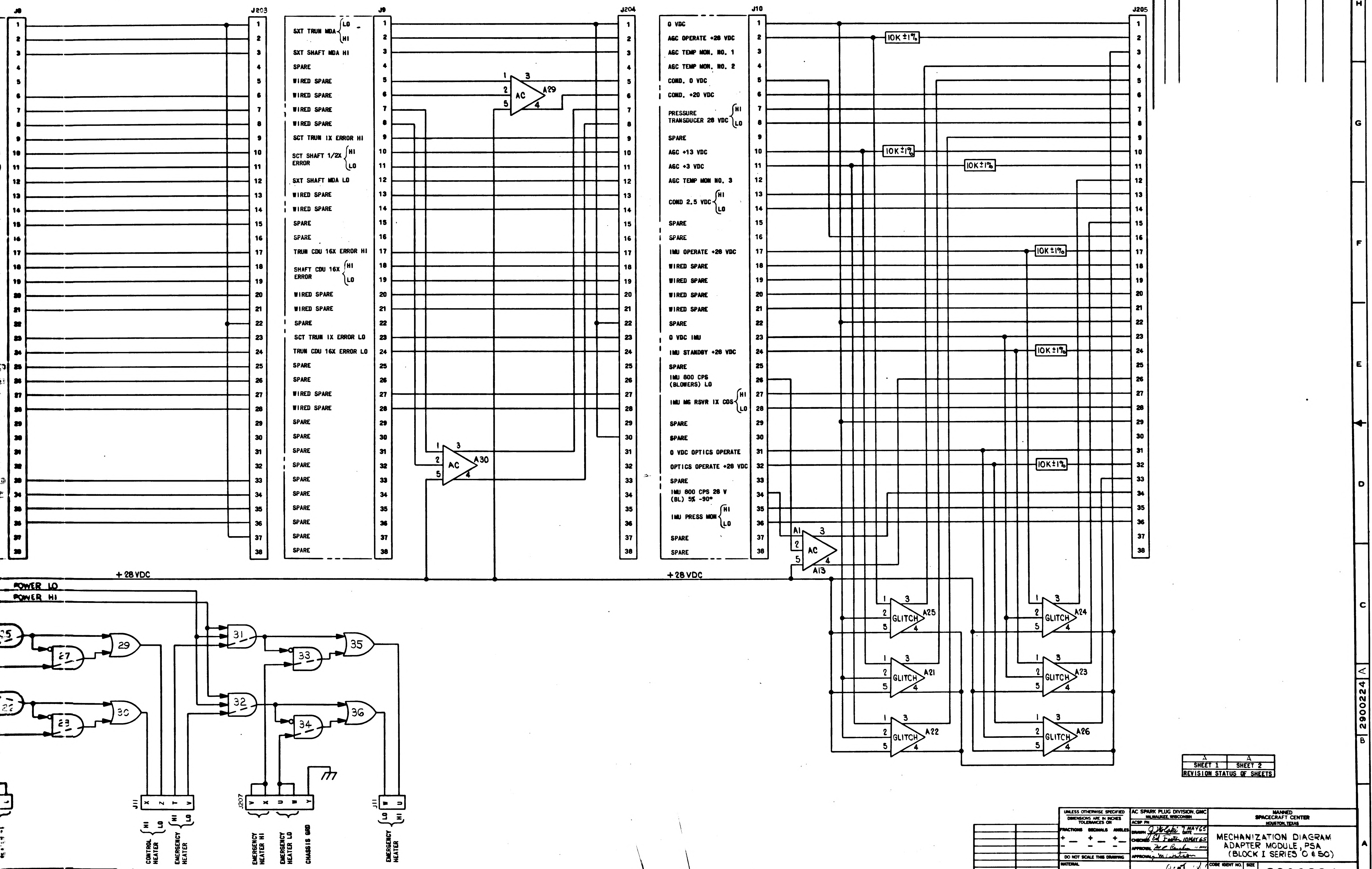
J1
0 VDC IMU
IG TDA OUTPUT
3200 ~ 20V ØA HI
3200 ~ 20V CT
SPARE
ERROR SIG MON. MG IG
SPARE
TDA OUTPUT MG OG
3200 CPS DRIVE MON.
3200 ~ 20V LO (ØB)
OG ERROR SIG. MON.
IMU GIM. & GYRO ERR. LO
SPARE
SPARE
COMP 3200 PPS IN Ø SYNC SET
COMP 3200 PPS OUT Ø SYNC RESET
SPARE
IG CDU IX RSVR ERR.
IG CDU ERR. SIG RET.
SPARE
SERVO AMPL INPUT IG MG
SPARE
0 VDC IMU
MG CDU IX RSVR ERR
MG CDU ERR. SIG RET
SPARE
SPARE
OG SERVO AMPL INPUT
0 VDC IMU
-28 VDC
2V 1% 3200 CPS
OG CDU IX RSVR ERR
OG CDU ERR SIG RET
SPARE
SPARE
J196
J2
0 VDC IMU
COMP 800 PPS IN Ø SYNC SET
COMP 25.6 K PPS IN Ø SYNC SET
SPARE
SPARE
SPARE
SPARE
SPARE
800 CPS MOTOR DR.
800 CPS 1% MONITOR
COMP 800 PPS OUT Ø SYNC RESET
COMP 25.6 KPPS OUT Ø SYNC RESET
120 VDC MON. (IRIG)
12 VDC (IRIG)
32 VDC (IRIG)
SPARE
800 CPS 5% 90° MON
800 CPS 28V IMU WHEELS ØA 5%
SPARE
120 VDC & 12 VDC RETURN
32 VDC RETURN
SPARE
SPARE
SPARE
SPARE
SPARE
0 VDC OPTICS
25.6 KC OPT. HI
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
0 VDC IMU
25.6 KC IMU HI
SPARE
SPARE
J197
J3
0 VDC IMU
AC AMP OUT X PIPA Y PIPA
SPARE
SPARE
SPARE
SPARE
SPARE
X PIPA TOR CUR MON HI
Y PIPA TOR CUR MON HI
X GYRO TOR CUR MON HI
SPARE
SPARE
SPARE
SPARE
SPARE
X PIPA TOR CUR MON RET
Y PIPA TOR CUR MON RET
X GYRO TOR CUR MON RET
X PIPA PVR
X PIPA PVR RET
SPARE
P PULSES X PIPA Y PIPA
SPARE
SPARE
Y PIPA PVR
Y PIPA PVR RET
SPARE
0 VDC IMU
N PULSES X PIPA Y PIPA
SPARE
SPARE
X GYRO PVR
X GYRO PVR RET
0 VDC IMU
SPARE
AC
PULSE
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A17
A29
A30
+28 VDC
VOLTAGE DIVIDER +2 VDC
39
40
41
/42
/43
/44
/45
/46
/47
OG SERVO TEST M
MG SERVO TEST M
IG SERVO TEST M
16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A

2900224 REV B SH 2

1/2900224

REVISIONS -19875

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.C. 60451		7 MAY 65	



J8
J203
J9
SXT TRUN MDA LO
SXT TRUN MDA HI
SXT SHAFT MDA HI
SPARE
WIRED SPARE
WIRED SPARE
WIRED SPARE
WIRED SPARE
SCT TRUN 1X ERROR HI
SCT SHAFT 1/2X ERROR HI
SCT SHAFT 1/2X ERROR LO
SXT SHAFT MDA LO
WIRED SPARE
WIRED SPARE
SPARE
SPARE
TRUN CDU 16X ERROR HI
SHAFT CDU 16X ERROR HI
SHAFT CDU 16X ERROR LO
WIRED SPARE
WIRED SPARE
SPARE
SCT TRUN 1X ERROR LO
TRUN CDU 16X ERROR LO
SPARE
SPARE
WIRED SPARE
WIRED SPARE
SPARE
J204
J10
0 VDC
AGC OPERATE +28 VDC
AGC TEMP MON. NO. 1
AGC TEMP MON. NO. 2
COND. 0 VDC
COND. +20 VDC
PRESSURE TRANSDUCER 28 VDC HI
PRESSURE TRANSDUCER 28 VDC LO
SPARE
AGC +13 VDC
AGC +3 VDC
AGC TEMP MON NO. 3
COND 2.5 VDC HI
COND 2.5 VDC LO
SPARE
SPARE
IMU OPERATE +28 VDC
WIRED SPARE
WIRED SPARE
WIRED SPARE
WIRED SPARE
SPARE
0 VDC IMU
IMU STANDBY +28 VDC
SPARE
IMU 800 CPS (BLOWERS) LO
IMU MG RSVR 1X COS HI
IMU MG RSVR 1X COS LO
SPARE
SPARE
0 VDC OPTICS OPERATE
OPTICS OPERATE +28 VDC
SPARE
IMU 800 CPS 28 V (BL) 5% -90°
IMU PRESS MON HI
IMU PRESS MON LO
SPARE
SPARE
J205
AC A29
AC A30
AC A13
GLITCH A25
GLITCH A21
GLITCH A22
GLITCH A24
GLITCH A23
GLITCH A26
10K ±1%
+28 VDC
POWER LO
POWER HI
29
27
30
23
31
32
33
34
35
36
J11 X Z T V
HI LO CONTROL HEATER
HI LO EMERGENCY HEATER
J207 V X U W Y
EMERGENCY HEATER HI
EMERGENCY HEATER LO
CHASSIS GRD
J11 W U
LO HI EMERGENCY HEATER

SHEET 1	SHEET 2
A	A

REVISION STATUS OF SHEETS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
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DO NOT SCALE THIS DRAWING
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CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Kolski DATE 7 MAY 65
CHECKED Ed Foster 10 MAY 65
APPROVAL
APPROVAL
NASA APPROVAL
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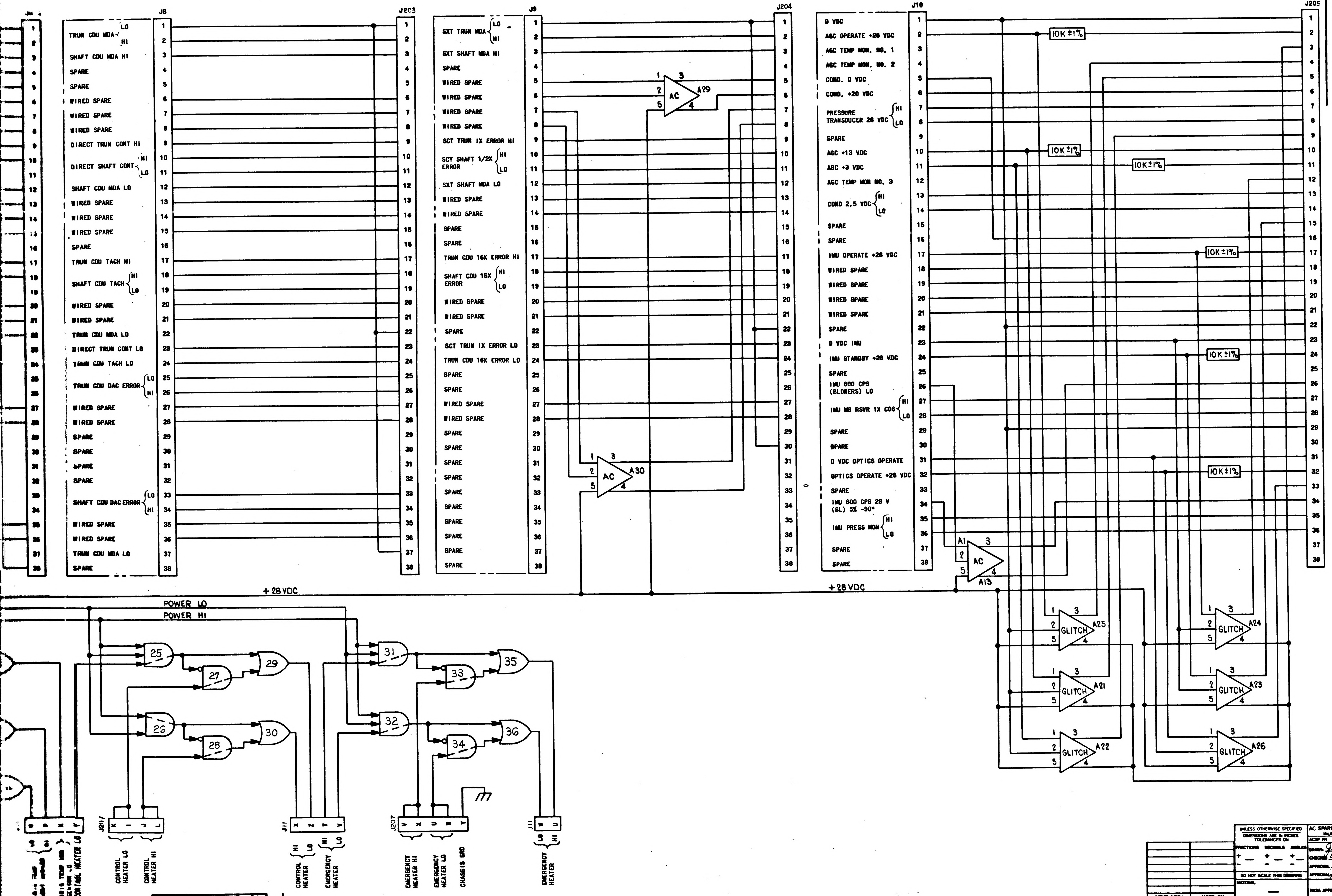
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
ADAPTER MODULE, PSA
(BLOCK I SERIES 0 & 50)

CODE IDENT NO. 99974
SIZE J2
2900224
SCALE —
SHEET 1 OF 2

SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD
A		REVISED PER D.C. 60451		14 MAY 65	


J8
TRUN CDU MDA LO
HI
SHAFT CDU MDA HI
SPARE
WIRED SPARE
DIRECT TRUN CONT HI
DIRECT SHAFT CONT HI
LO
SHAFT CDU MDA LO
TRUN CDU TACH HI
SHAFT CDU TACH HI
LO
TRUN CDU MDA LO
DIRECT TRUN CONT LO
TRUN CDU TACH LO
TRUN CDU DAC ERROR LO
HI
SHAFT CDU DAC ERROR LO
HI
J203
J9
SXT TRUN MDA LO
HI
SXT SHAFT MDA HI
SCT TRUN 1X ERROR HI
SCT SHAFT 1/2X ERROR HI
LO
SXT SHAFT MDA LO
TRUN CDU 16X ERROR HI
SHAFT CDU 16X ERROR HI
LO
SCT TRUN 1X ERROR LO
TRUN CDU 16X ERROR LO
J204
J10
0 VDC
AGC OPERATE +28 VDC
AGC TEMP MON. NO. 1
AGC TEMP MON. NO. 2
COND. 0 VDC
COND. +20 VDC
PRESSURE TRANSDUCER 28 VDC HI
LO
AGC +13 VDC
AGC +3 VDC
AGC TEMP MON NO. 3
COND 2.5 VDC HI
LO
IMU OPERATE +28 VDC
0 VDC IMU
IMU STANDBY +28 VDC
IMU 800 CPS (BLOWERS) LO
IMU MG RSVR 1X COS HI
LO
0 VDC OPTICS OPERATE
OPTICS OPERATE +28 VDC
IMU 800 CPS 28 V (BL) 5% -90°
IMU PRESS MON HI
LO
J205
10K ±1%
AC
A29
A30
A1
A13
GLITCH
A25
A21
A22
A24
A23
A26
+28 VDC
POWER LO
POWER HI
25
26
27
28
29
30
31
32
33
34
35
36
J211
J11
J207
CONTROL HEATER LO
CONTROL HEATER HI
CONTROL HEATER
EMERGENCY HEATER
EMERGENCY HEATER HI
EMERGENCY HEATER LO
CHASSIS GND
1016 TEMP MON
SENSOR LO
CONTROL HEATER LO

2900224 REV A SH

SHEET 1	SHEET 2
A	A

REVISION STATUS OF SHEETS

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
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TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
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AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Wolski DATE 7 MAY 65
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APPROVAL
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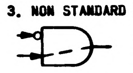
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
ADAPTER MODULE, PSA
(BLOCK I SERIES 0 & 50)

CODE IDENT NO. 99974 SIZE J2 2900224
SCALE — SHEET 1 OF 2

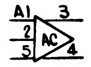
NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS PER MIL-STD-806.
3. NON STANDARD SYMBOLS

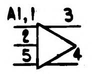


INDICATES "AND" GATE WITH SWITCHED SIGNAL.

INDICATES UNLIGHTED PUSHBUTTON (MOMENTARY ACTION).

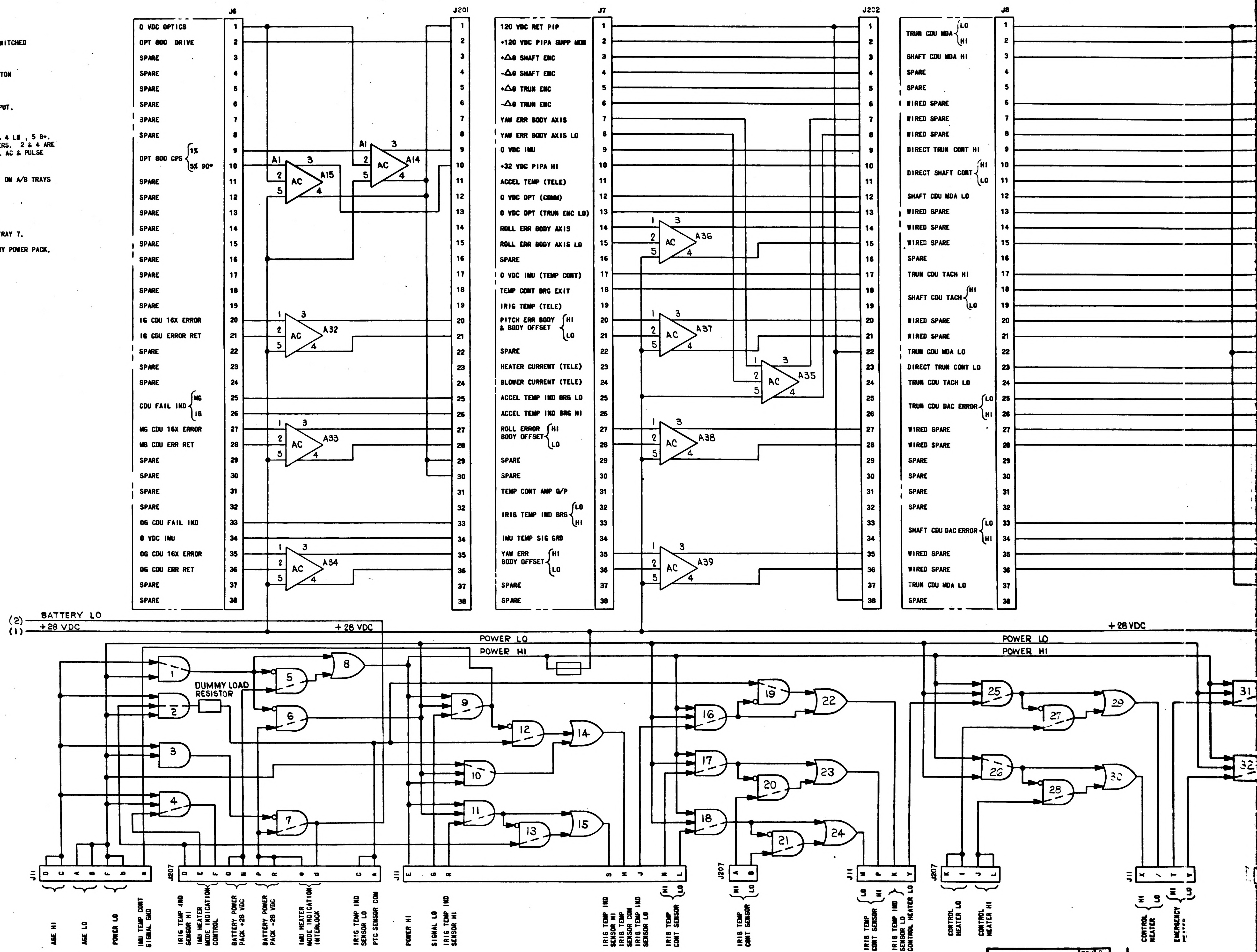


A1 INDICATES ATTENUATED INPUT.

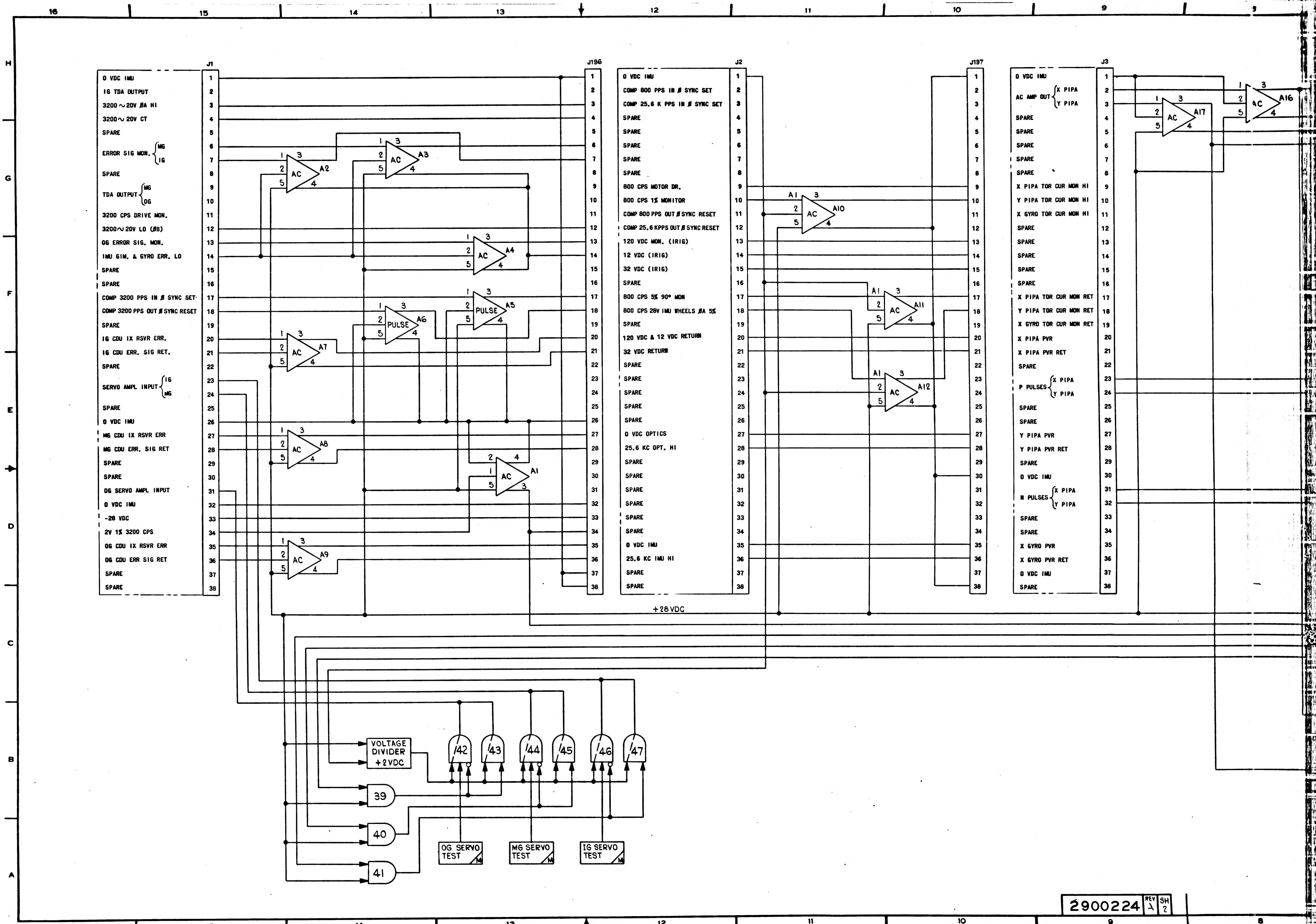


INDICATES A1, 1 & 3 HI, 2 & 4 LO , 5 B+. APPLICABLE FOR ALL AMPLIFIERS. 2 & 4 ARE INTERNALLY CONNECTED ON ALL AC & PULSE AMPLIFIERS.

4. J1 THRU J10 MATE WITH 45A1J1 THRU 45A10J1 ON A/B TRAYS 1 THRU 10.
5. J196 THRU J205 MATE WITH NAA ACE CABLE.
6. J206 MATES WITH NAA ACE LINE DRIVE CABLE.
7. J11 MATES WITH CABLE CONNECTING TO PSA, TRAY 7.
8. J207 MATES WITH CABLE CONNECTING TO BATTERY POWER PACK.

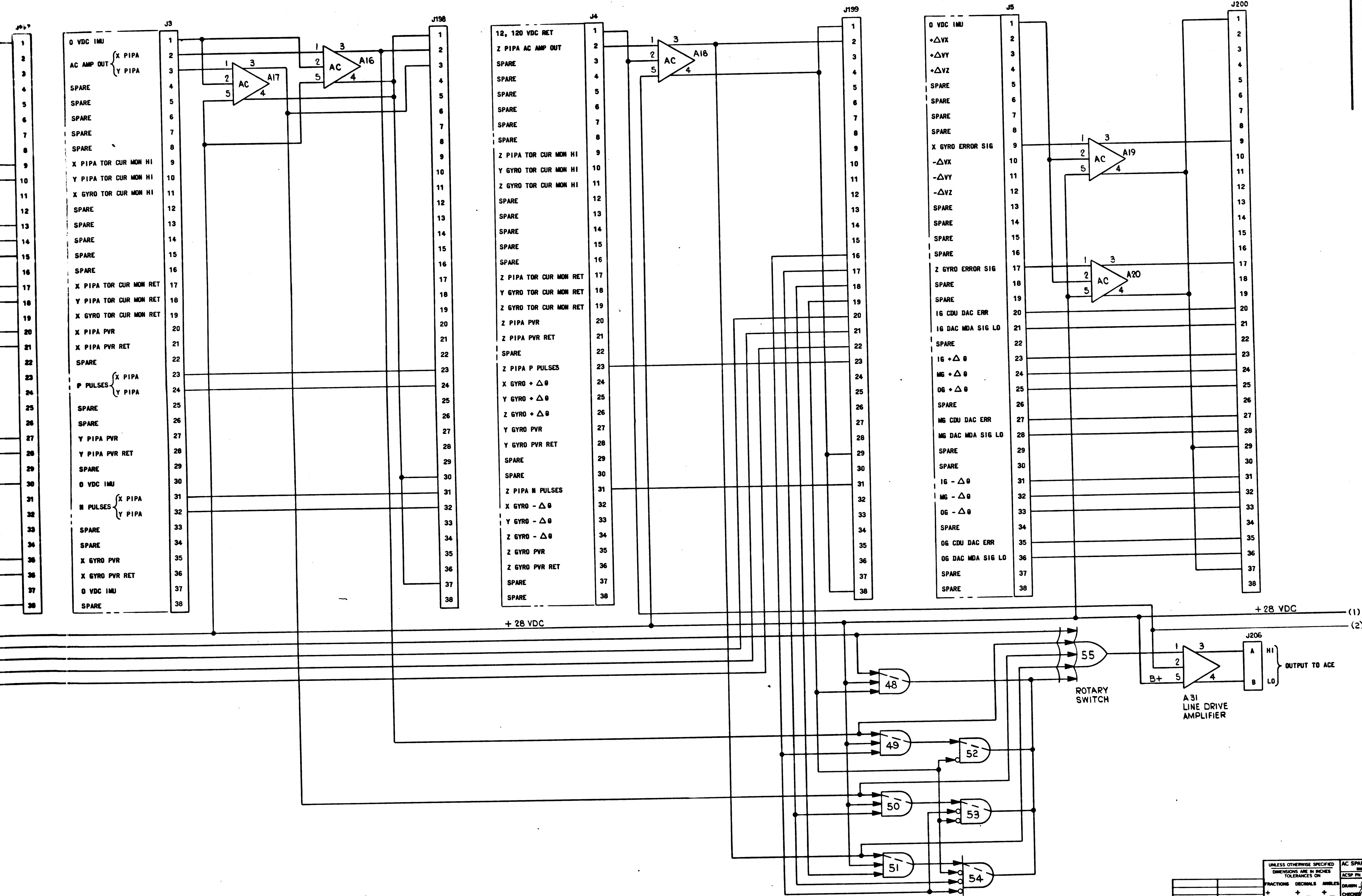

J6
0 VDC OPTICS 1
OPT 800 DRIVE 2
SPARE 3
SPARE 4
SPARE 5
SPARE 6
SPARE 7
SPARE 8
OPT 800 CPS 1% 9
5% 90° 10
SPARE 11
SPARE 12
SPARE 13
SPARE 14
SPARE 15
SPARE 16
SPARE 17
SPARE 18
SPARE 19
IG CDU 16X ERROR 20
IG CDU ERROR RET 21
SPARE 22
SPARE 23
SPARE 24
CDU FAIL IND MG 25
IG 26
MG CDU 16X ERROR 27
MG CDU ERR RET 28
SPARE 29
SPARE 30
SPARE 31
SPARE 32
OG CDU FAIL IND 33
0 VDC IMU 34
OG CDU 16X ERROR 35
OG CDU ERR RET 36
SPARE 37
SPARE 38
J201
A1
AC
A15
A14
A32
A33
A34
J7
120 VDC RET PIP 1
+120 VDC PIPA SUPP MON 2
+Δθ SHAFT ENC 3
-Δθ SHAFT ENC 4
+Δθ TRUN ENC 5
-Δθ TRUN ENC 6
YAW ERR BODY AXIS 7
YAW ERR BODY AXIS LO 8
0 VDC IMU 9
+32 VDC PIPA HI 10
ACCEL TEMP (TELE) 11
0 VDC OPT (COMM) 12
0 VDC OPT (TRUN ENC LO) 13
ROLL ERR BODY AXIS 14
ROLL ERR BODY AXIS LO 15
SPARE 16
0 VDC IMU (TEMP CONT) 17
TEMP CONT BRG EXIT 18
IRIG TEMP (TELE) 19
PITCH ERR BODY & BODY OFFSET HI 20
LO 21
SPARE 22
HEATER CURRENT (TELE) 23
BLOWER CURRENT (TELE) 24
ACCEL TEMP IND BRG LO 25
ACCEL TEMP IND BRG HI 26
ROLL ERROR BODY OFFSET HI 27
LO 28
SPARE 29
SPARE 30
TEMP CONT AMP O/P 31
IRIG TEMP IND BRG LO 32
HI 33
IMU TEMP SIG GRD 34
YAW ERR BODY OFFSET HI 35
LO 36
SPARE 37
SPARE 38
A36
A37
A35
A38
A39
J202
J8
TRUN CDU MDA LO 1
HI 2
SHAFT CDU MDA HI 3
SPARE 4
SPARE 5
WIRED SPARE 6
WIRED SPARE 7
WIRED SPARE 8
DIRECT TRUN CONT HI 9
DIRECT SHAFT CONT HI 10
LO 11
SHAFT CDU MDA LO 12
WIRED SPARE 13
WIRED SPARE 14
WIRED SPARE 15
SPARE 16
TRUN CDU TACH HI 17
SHAFT CDU TACH HI 18
LO 19
WIRED SPARE 20
WIRED SPARE 21
TRUN CDU MDA LO 22
DIRECT TRUN CONT LO 23
TRUN CDU TACH LO 24
TRUN CDU DAC ERROR LO 25
HI 26
WIRED SPARE 27
WIRED SPARE 28
SPARE 29
SPARE 30
SPARE 31
SPARE 32
SHAFT CDU DAC ERROR LO 33
HI 34
WIRED SPARE 35
WIRED SPARE 36
TRUN CDU MDA LO 37
SPARE 38
(2) BATTERY LO
(1) +28 VDC
+28 VDC
POWER LO
POWER HI
DUMMY LOAD RESISTOR
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
J11 D C A B F b a
AGE HI
AGE LO
POWER LO
IMU TEMP CONT SIGNAL GND
J207 D E F O N P R e d C a
IRIG TEMP IND SENSOR HI
IMU HEATER MODE INDICATION CONTROL
BATTERY POWER PACK +28 VDC
BATTERY POWER PACK -28 VDC
IMU HEATER MODE INDICATION INTERLOCK
IRIG TEMP IND SENSOR LO
PTC SENSOR COM
J11 E G R S H J N L
POWER HI
SIGNAL LO
IRIG TEMP IND SENSOR HI
IRIG TEMP IND SENSOR HI
IRIG TEMP SENSOR COM
IRIG TEMP IND SENSOR LO
HI LO
IRIG TEMP CONT SENSOR
J207 A B
HI LO
IRIG TEMP CONT SENSOR
J11 M P K Y
LO HI
IRIG TEMP CONT SENSOR
IRIG TEMP IND SENSOR LO
CONTROL HEATER LO
J207 K I J L
CONTROL HEATER LO
CONTROL HEATER HI
J11 X / T V
HI LO
CONTROL HEATER
HI LO
EMERGENCY HEATER

2900224 REV A SH 1


16
15
14
13
12
11
10
9
8
H
G
F
E
D
C
B
A
J1
0 VDC IMU
IG TDA OUTPUT
3200 ~ 20V ØA HI
3200 ~ 20V CT
SPARE
ERROR SIG MON. MG
IG
SPARE
TDA OUTPUT MG
OG
3200 CPS DRIVE MON.
3200 ~ 20V LO (ØB)
OG ERROR SIG. MON.
IMU GIM. & GYRO ERR. LO
SPARE
SPARE
COMP 3200 PPS IN Ø SYNC SET
COMP 3200 PPS OUT Ø SYNC RESET
SPARE
IG CDU IX RSVR ERR.
IG CDU ERR. SIG RET.
SPARE
SERVO AMPL INPUT IG
MG
SPARE
0 VDC IMU
MG CDU IX RSVR ERR
MG CDU ERR. SIG RET
SPARE
SPARE
OG SERVO AMPL INPUT
0 VDC IMU
-28 VDC
2V 1% 3200 CPS
OG CDU IX RSVR ERR
OG CDU ERR SIG RET
SPARE
SPARE
J196
J2
0 VDC IMU
COMP 800 PPS IN Ø SYNC SET
COMP 25.6 K PPS IN Ø SYNC SET
SPARE
SPARE
SPARE
SPARE
SPARE
800 CPS MOTOR DR.
800 CPS 1% MONITOR
COMP 800 PPS OUT Ø SYNC RESET
COMP 25.6 KPPS OUT Ø SYNC RESET
120 VDC MON. (IRIG)
12 VDC (IRIG)
32 VDC (IRIG)
SPARE
800 CPS 5% 90° MON
800 CPS 28V IMU WHEELS ØA 5%
SPARE
120 VDC & 12 VDC RETURN
32 VDC RETURN
SPARE
SPARE
SPARE
SPARE
SPARE
0 VDC OPTICS
25.6 KC OPT. HI
SPARE
SPARE
SPARE
SPARE
SPARE
SPARE
0 VDC IMU
25.6 KC IMU HI
SPARE
SPARE
J197
J3
0 VDC IMU
AC AMP OUT X PIPA
Y PIPA
SPARE
SPARE
SPARE
SPARE
SPARE
X PIPA TOR CUR MON HI
Y PIPA TOR CUR MON HI
X GYRO TOR CUR MON HI
SPARE
SPARE
SPARE
SPARE
SPARE
X PIPA TOR CUR MON RET
Y PIPA TOR CUR MON RET
X GYRO TOR CUR MON RET
X PIPA PVR
X PIPA PVR RET
SPARE
P PULSES X PIPA
Y PIPA
SPARE
SPARE
Y PIPA PVR
Y PIPA PVR RET
SPARE
0 VDC IMU
N PULSES X PIPA
Y PIPA
SPARE
SPARE
X GYRO PVR
X GYRO PVR RET
0 VDC IMU
SPARE
AC A2
AC A3
AC A4
PULSE A6
PULSE A5
AC A7
AC A8
AC A1
AC A9
AC A10
AC A11
AC A12
AC A17
AC A16
+28 VDC
VOLTAGE DIVIDER +2VDC
42
43
44
45
46
47
39
40
41
OG SERVO TEST
MG SERVO TEST
IG SERVO TEST
M

2900224 REV A SH 2

SYM	ZONE	REVISIONS DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.C. 80451		65	JJ



J3
1 0 VDC IMU
2 AC AMP OUT X PIPA
3 Y PIPA
4 SPARE
5 SPARE
6 SPARE
7 SPARE
8 SPARE
9 X PIPA TOR CUR MON HI
10 Y PIPA TOR CUR MON HI
11 X GYRO TOR CUR MON HI
12 SPARE
13 SPARE
14 SPARE
15 SPARE
16 SPARE
17 X PIPA TOR CUR MON RET
18 Y PIPA TOR CUR MON RET
19 X GYRO TOR CUR MON RET
20 X PIPA PVR
21 X PIPA PVR RET
22 SPARE
23 P PULSES X PIPA
24 Y PIPA
25 SPARE
26 SPARE
27 Y PIPA PVR
28 Y PIPA PVR RET
29 SPARE
30 0 VDC IMU
31 N PULSES X PIPA
32 Y PIPA
33 SPARE
34 SPARE
35 X GYRO PVR
36 X GYRO PVR RET
37 0 VDC IMU
38 SPARE
AC A17
AC A16
J198
J4
1 12, 120 VDC RET
2 Z PIPA AC AMP OUT
3 SPARE
4 SPARE
5 SPARE
6 SPARE
7 SPARE
8 SPARE
9 Z PIPA TOR CUR MON HI
10 Y GYRO TOR CUR MON HI
11 Z GYRO TOR CUR MON HI
12 SPARE
13 SPARE
14 SPARE
15 SPARE
16 SPARE
17 Z PIPA TOR CUR MON RET
18 Y GYRO TOR CUR MON RET
19 Z GYRO TOR CUR MON RET
20 Z PIPA PVR
21 Z PIPA PVR RET
22 SPARE
23 Z PIPA P PULSES
24 X GYRO + Δθ
25 Y GYRO + Δθ
26 Z GYRO + Δθ
27 Y GYRO PVR
28 Y GYRO PVR RET
29 SPARE
30 SPARE
31 Z PIPA N PULSES
32 X GYRO - Δθ
33 Y GYRO - Δθ
34 Z GYRO - Δθ
35 Z GYRO PVR
36 Z GYRO PVR RET
37 SPARE
38 SPARE
AC A18
J199
J5
1 0 VDC IMU
2 +ΔVX
3 +ΔVY
4 +ΔVZ
5 SPARE
6 SPARE
7 SPARE
8 SPARE
9 X GYRO ERROR SIG
10 -ΔVX
11 -ΔVY
12 -ΔVZ
13 SPARE
14 SPARE
15 SPARE
16 SPARE
17 Z GYRO ERROR SIG
18 SPARE
19 SPARE
20 IG CDU DAC ERR
21 IG DAC MDA SIG LO
22 SPARE
23 IG +Δθ
24 MG +Δθ
25 OG +Δθ
26 SPARE
27 MG CDU DAC ERR
28 MG DAC MDA SIG LO
29 SPARE
30 SPARE
31 IG - Δθ
32 MG - Δθ
33 OG - Δθ
34 SPARE
35 OG CDU DAC ERR
36 OG DAC MDA SIG LO
37 SPARE
38 SPARE
AC A19
AC A20
J200
+ 28 VDC
+ 28 VDC
(1)
(2)
55
ROTARY SWITCH
48
49
50
51
52
53
54
B+
A31 LINE DRIVE AMPLIFIER
J206
A HI
B LO
OUTPUT TO ACE

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

NEXT ASSY | USED ON
APPLICATION

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Wolski DATE 7 MAY 65
CHECKED Ed Foster 10 MAY 65
APPROVAL 11 MAY 65
APPROVAL
NASA APPROVAL
MIT APPROVAL

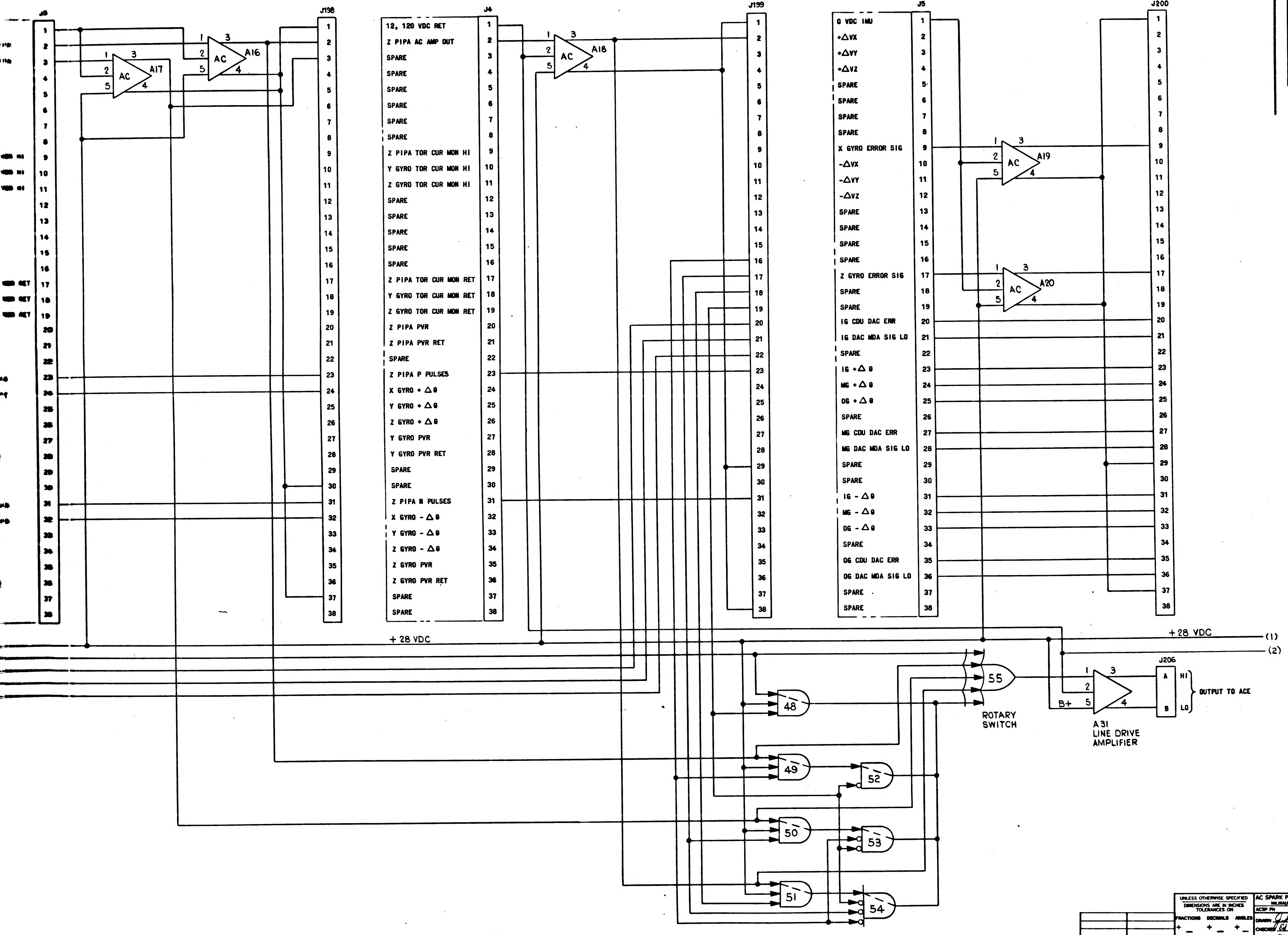
MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

MECHANIZATION DIAGRAM
ADAPTER MODULE, PSA
(BLOCK I SERIES C & 50)

CODE IDENT NO. 99974
SIZE J_2
2900224
SCALE —
SHEET 2 OF 2

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER D.O. 60451		7 Jun 65	JJJ EF

REVISIONS 19875



J3
J198
J4
J199
J5
J200
1 12, 120 VDC RET
2 Z PIPA AC AMP OUT
3 SPARE
4 SPARE
5 SPARE
6 SPARE
7 SPARE
8 SPARE
9 Z PIPA TOR CUR MON HI
10 Y GYRO TOR CUR MON HI
11 Z GYRO TOR CUR MON HI
12 SPARE
13 SPARE
14 SPARE
15 SPARE
16 SPARE
17 Z PIPA TOR CUR MON RET
18 Y GYRO TOR CUR MON RET
19 Z GYRO TOR CUR MON RET
20 Z PIPA PVR
21 Z PIPA PVR RET
22 SPARE
23 Z PIPA P PULSES
24 X GYRO + Δθ
25 Y GYRO + Δθ
26 Z GYRO + Δθ
27 Y GYRO PVR
28 Y GYRO PVR RET
29 SPARE
30 SPARE
31 Z PIPA N PULSES
32 X GYRO - Δθ
33 Y GYRO - Δθ
34 Z GYRO - Δθ
35 Z GYRO PVR
36 Z GYRO PVR RET
37 SPARE
38 SPARE
1 0 VDC IMU
2 +ΔVX
3 +ΔVY
4 +ΔVZ
5 SPARE
6 SPARE
7 SPARE
8 SPARE
9 X GYRO ERROR SIG
10 -ΔVX
11 -ΔVY
12 -ΔVZ
13 SPARE
14 SPARE
15 SPARE
16 SPARE
17 Z GYRO ERROR SIG
18 SPARE
19 SPARE
20 IG CDU DAC ERR
21 IG DAC MDA SIG LO
22 SPARE
23 IG + Δθ
24 MG + Δθ
25 OG + Δθ
26 SPARE
27 MG CDU DAC ERR
28 MG DAC MDA SIG LO
29 SPARE
30 SPARE
31 IG - Δθ
32 MG - Δθ
33 OG - Δθ
34 SPARE
35 OG CDU DAC ERR
36 OG DAC MDA SIG LO
37 SPARE
38 SPARE
AC A16
AC A17
AC A18
AC A19
AC A20
+28 VDC
+28 VDC
(1)
(2)
48
49
50
51
52
53
54
55
ROTARY SWITCH
B+
A31 LINE DRIVE AMPLIFIER
J206
A HI
B LO
OUTPUT TO ACE

2H

NEXT ASSY	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN J. Wolski DATE 7 MAY 65
CHECKED Ed Foster 10 MAY 65
APPROVAL M. [illegible] 11 MAY 65
APPROVAL J. M. Walton
NASA APPROVAL
MIT APPROVAL M G Manley 6-8-65

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

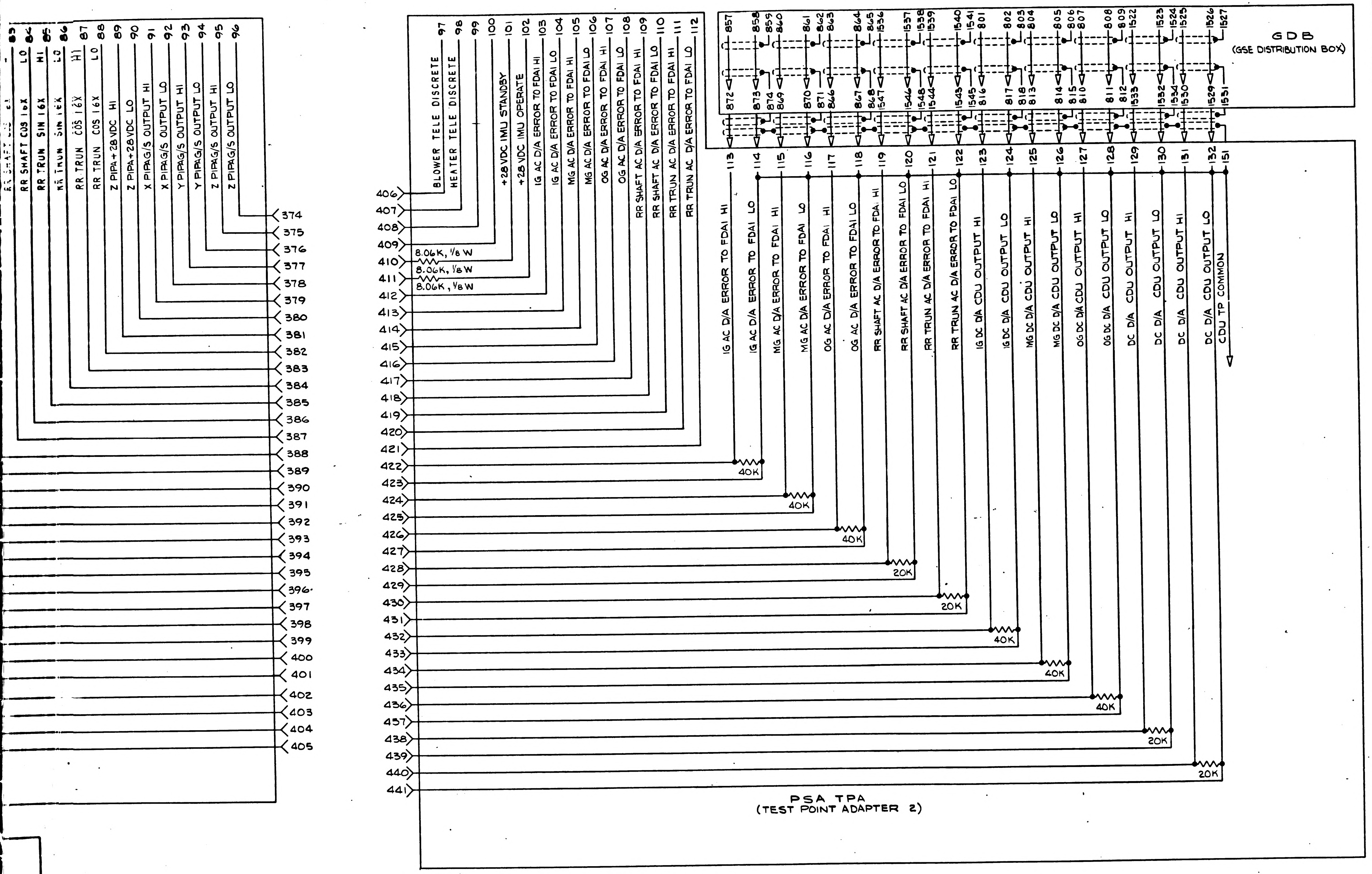
MECHANIZATION DIAGRAM
ADAPTER MODULE, PSA
(BLOCK I SERIES 0 & 50)

CODE IDENT NO. 99974
SIZE J_2
2900224
SCALE —
SHEET 2 of 2

2900224 REV A SH 2

SYM	ZONE	DESCRIPTION	CHG NO	DATE	APPD
A		REVISED PER TDRR 22391		22 SEP 65	J.H.P.

REVISIONS TDRR 21552


RR SHAFT COS 16X HI
RR SHAFT COS 16X LO
RR TRUN SIN 16X HI
RR TRUN SIN 16X LO
RR TRUN COS 16X HI
RR TRUN COS 16X LO
Z PIPA+28VDC HI
Z PIPA+28VDC LO
X PIPAG/S OUTPUT HI
X PIPAG/S OUTPUT LO
Y PIPAG/S OUTPUT HI
Y PIPAG/S OUTPUT LO
Z PIPAG/S OUTPUT HI
Z PIPAG/S OUTPUT LO
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BLOWER TELE DISCRETE
HEATER TELE DISCRETE
+28 VDC IMU STANDBY
+28 VDC IMU OPERATE
IG AC D/A ERROR TO FDAI HI
IG AC D/A ERROR TO FDAI LO
MG AC D/A ERROR TO FDAI HI
MG AC D/A ERROR TO FDAI LO
OG AC D/A ERROR TO FDAI HI
OG AC D/A ERROR TO FDAI LO
RR SHAFT AC D/A ERROR TO FDAI HI
RR SHAFT AC D/A ERROR TO FDAI LO
RR TRUN AC D/A ERROR TO FDAI HI
RR TRUN AC D/A ERROR TO FDAI LO
97
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103
104
105
106
107
108
109
110
111
112
8.06K, 1/8 W
8.06K, 1/8 W
8.06K, 1/8 W
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GDB
(GSE DISTRIBUTION BOX)
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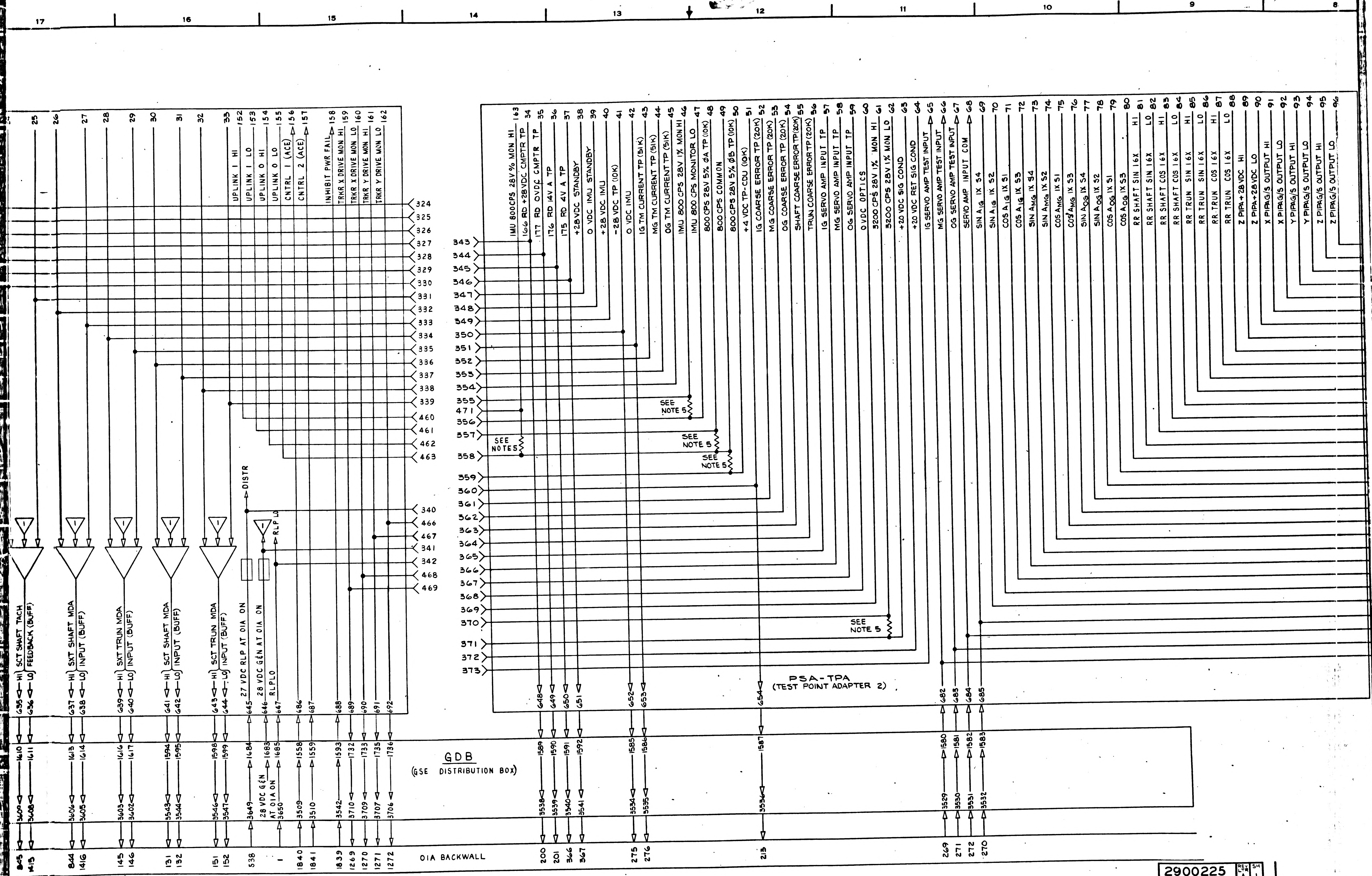
IG AC D/A ERROR TO FDAI HI
IG AC D/A ERROR TO FDAI LO
MG AC D/A ERROR TO FDAI HI
MG AC D/A ERROR TO FDAI LO
OG AC D/A ERROR TO FDAI HI
OG AC D/A ERROR TO FDAI LO
RR SHAFT AC D/A ERROR TO FDAI HI
RR SHAFT AC D/A ERROR TO FDAI LO
RR TRUN AC D/A ERROR TO FDAI HI
RR TRUN AC D/A ERROR TO FDAI LO
IG DC D/A CDU OUTPUT HI
IG DC D/A CDU OUTPUT LO
MG DC D/A CDU OUTPUT HI
MG DC D/A CDU OUTPUT LO
OG DC D/A CDU OUTPUT HI
OG DC D/A CDU OUTPUT LO
DC D/A CDU OUTPUT HI
DC D/A CDU OUTPUT LO
DC D/A CDU OUTPUT HI
DC D/A CDU OUTPUT LO
CDU TP COMMON
40K
40K
40K
20K
20K
40K
40K
40K
20K
20K
PSA TPA
(TEST POINT ADAPTER 2)

417

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON TEXAS
DO NOT SCALE THIS DRAWING	ACSP PN	
MATERIAL —	DRAWN Lookman DATE 12 JUN 65 CHECKED APPROVAL APPROVAL	MECHANIZATION DIAGRAM- TEST POINT ADAPTERS (BLOCK II & LEM)
	NASA APPROVAL	CODE IDENT NO 99974 SIZE J3 2900225
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — SHEET 1 OF 3

2900225 REV LTR A SH 1



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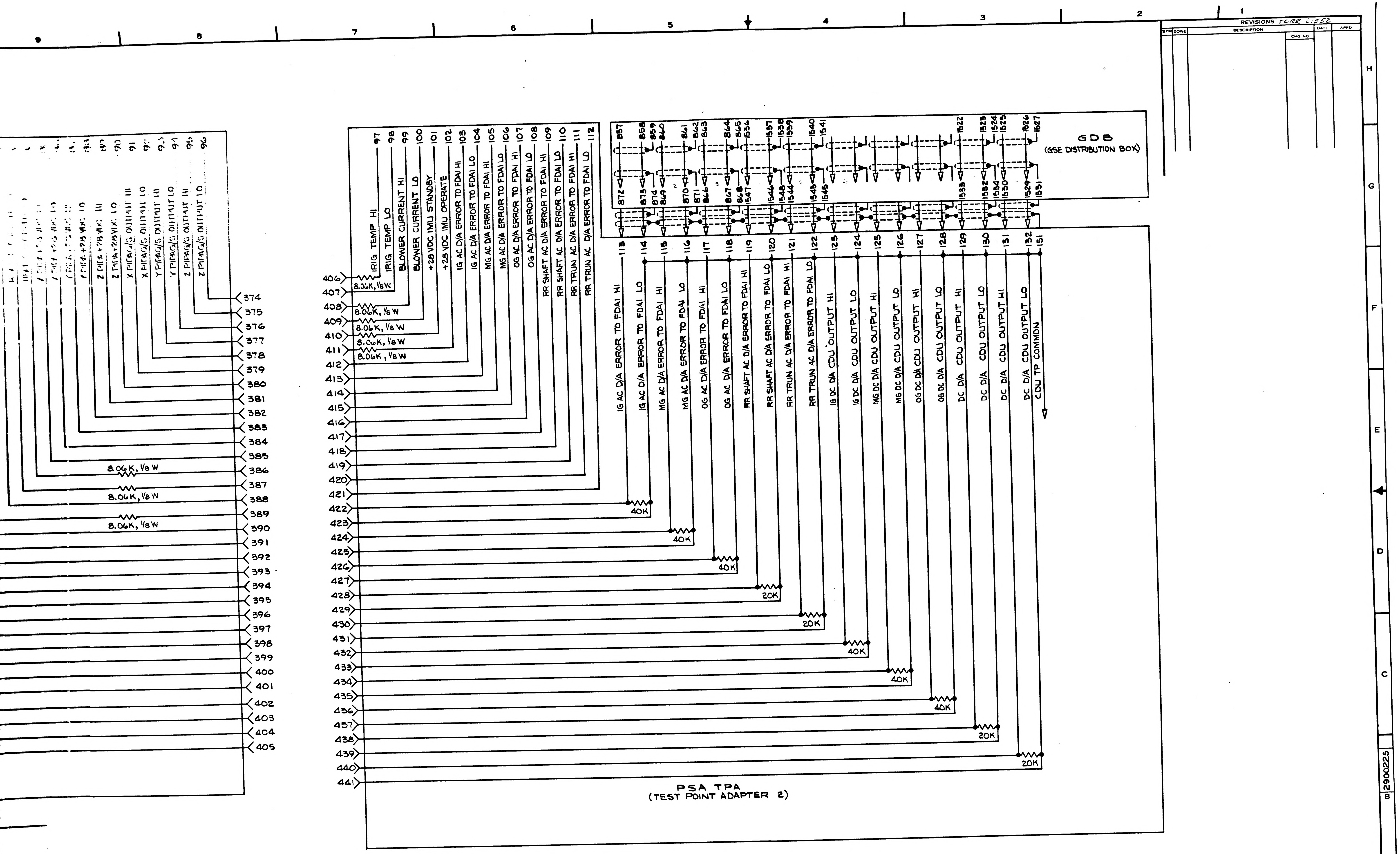
UPLINK I HI
UPLINK I LO
UPLINK O HI
UPLINK O LO
CNTRL 1 (ACE)
CNTRL 2 (ACE)
INHIBIT PWR FAIL
TRKR X DRIVE MON HI
TRKR X DRIVE MON LO
TRKR Y DRIVE MON HI
TRKR Y DRIVE MON LO
IMU 800CPS 28V% MON HI
166 RD +28VDC CMPTR TP
177 RD OVDC CMPTR TP
176 RD 14V A TP
175 RD 4V A TP
+28VDC STANDBY
0 VDC IMU STANDBY
+28 VDC IMU
-28 VDC TP (10K)
0 VDC IMU
IG TM CURRENT TP (51K)
MG TM CURRENT TP (51K)
OG TM CURRENT TP (51K)
IMU 800 CPS 28V 1% MON HI
IMU 800 CPS MONITOR LO
800 CPS 28V 5% ØA TP (10K)
800 CPS COMMON
800 CPS 28V 5% ØB TP (10K)
+4 VDC TP-CDU (10K)
IG COARSE ERROR TP (20K)
MG COARSE ERROR TP (20K)
OG COARSE ERROR TP (20K)
SHAFT COARSE ERROR TP (20K)
TRUN COARSE ERROR TP (20K)
IG SERVO AMP INPUT TP
MG SERVO AMP INPUT TP
OG SERVO AMP INPUT TP
0 VDC OPTICS
3200 CPS 28V 1% MON HI
3200 CPS 28V 1% MON LO
+20 VDC RET SIG COND
+20 VDC SIG COND
IG SERVO AMP TEST INPUT
MG SERVO AMP TEST INPUT
OG SERVO AMP TEST INPUT
SERVO AMP INPUT COM
SIN AIG 1X S4
SIN AIG 1X S2
COS AIG 1X S1
COS AIG 1X S3
SIN AMG 1X S4
SIN AMG 1X S2
COS AMG 1X S1
COS AMG 1X S3
SIN AOG 1X S4
SIN AOG 1X S2
COS AOG 1X S1
COS AOG 1X S3
RR SHAFT SIN 16X HI
RR SHAFT SIN 16X LO
RR SHAFT COS 16X HI
RR SHAFT COS 16X LO
RR TRUN SIN 16X HI
RR TRUN SIN 16X LO
RR TRUN COS 16X HI
RR TRUN COS 16X LO
Z PIPA +28 VDC HI
Z PIPA +28 VDC LO
X PIPA G/S OUTPUT HI
X PIPA G/S OUTPUT LO
Y PIPA G/S OUTPUT HI
Y PIPA G/S OUTPUT LO
Z PIPA G/S OUTPUT HI
Z PIPA G/S OUTPUT LO
SEE NOTE 5
SEE NOTES 5
DISTR
RLP LO
SCT SHAFT TACH FEEDBACK (BUFF)
SXT SHAFT MDA INPUT (BUFF)
SXT TRUN MDA INPUT (BUFF)
SCT SHAFT MDA INPUT (BUFF)
SCT TRUN MDA INPUT (BUFF)
HI
LO
27 VDC RLP AT 01A ON
28 VDC GEN AT 01A ON
RLPLO
28 VDC GEN AT 01A ON
PSA-TPA (TEST POINT ADAPTER 2)
GDB (GSE DISTRIBUTION BOX)
01A BACKWALL

2900225 REV LTR A SH 1


REVISIONS TCRR 21552
SYM
ZONE
DESCRIPTION
CHG NO
DATE
APPD
GDB
(GSE DISTRIBUTION BOX)
857
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X PIPA G/S OUTPUT HI
Y PIPA G/S OUTPUT HI
Y PIPA G/S OUTPUT LO
Z PIPA G/S OUTPUT HI
Z PIPA G/S OUTPUT LO
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8.06K, 1/8W
8.06K, 1/8W
8.06K, 1/8W
97
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112
IRIG TEMP HI
IRIG TEMP LO
BLOWER CURRENT HI
BLOWER CURRENT LO
+28 VDC IMU STANDBY
+28 VDC IMU OPERATE
IG AC D/A ERROR TO FDAI HI
IG AC D/A ERROR TO FDAI LO
MG AC D/A ERROR TO FDAI HI
MG AC D/A ERROR TO FDAI LO
OG AC D/A ERROR TO FDAI HI
OG AC D/A ERROR TO FDAI LO
RR SHAFT AC D/A ERROR TO FDAI HI
RR SHAFT AC D/A ERROR TO FDAI LO
RR TRUN AC D/A ERROR TO FDAI HI
RR TRUN AC D/A ERROR TO FDAI LO
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8.06K, 1/8W
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8.06K, 1/8W
8.06K, 1/8W
8.06K, 1/8W
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IG AC D/A ERROR TO FDAI HI
IG AC D/A ERROR TO FDAI LO
MG AC D/A ERROR TO FDAI HI
MG AC D/A ERROR TO FDAI LO
OG AC D/A ERROR TO FDAI HI
OG AC D/A ERROR TO FDAI LO
RR SHAFT AC D/A ERROR TO FDAI HI
RR SHAFT AC D/A ERROR TO FDAI LO
RR TRUN AC D/A ERROR TO FDAI HI
RR TRUN AC D/A ERROR TO FDAI LO
IG DC D/A CDU OUTPUT HI
IG DC D/A CDU OUTPUT LO
MG DC D/A CDU OUTPUT HI
MG DC D/A CDU OUTPUT LO
OG DC D/A CDU OUTPUT HI
OG DC D/A CDU OUTPUT LO
DC D/A CDU OUTPUT HI
DC D/A CDU OUTPUT LO
DC D/A CDU OUTPUT HI
DC D/A CDU OUTPUT LO
CDU TP COMMON
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PSA TPA
(TEST POINT ADAPTER 2)
H
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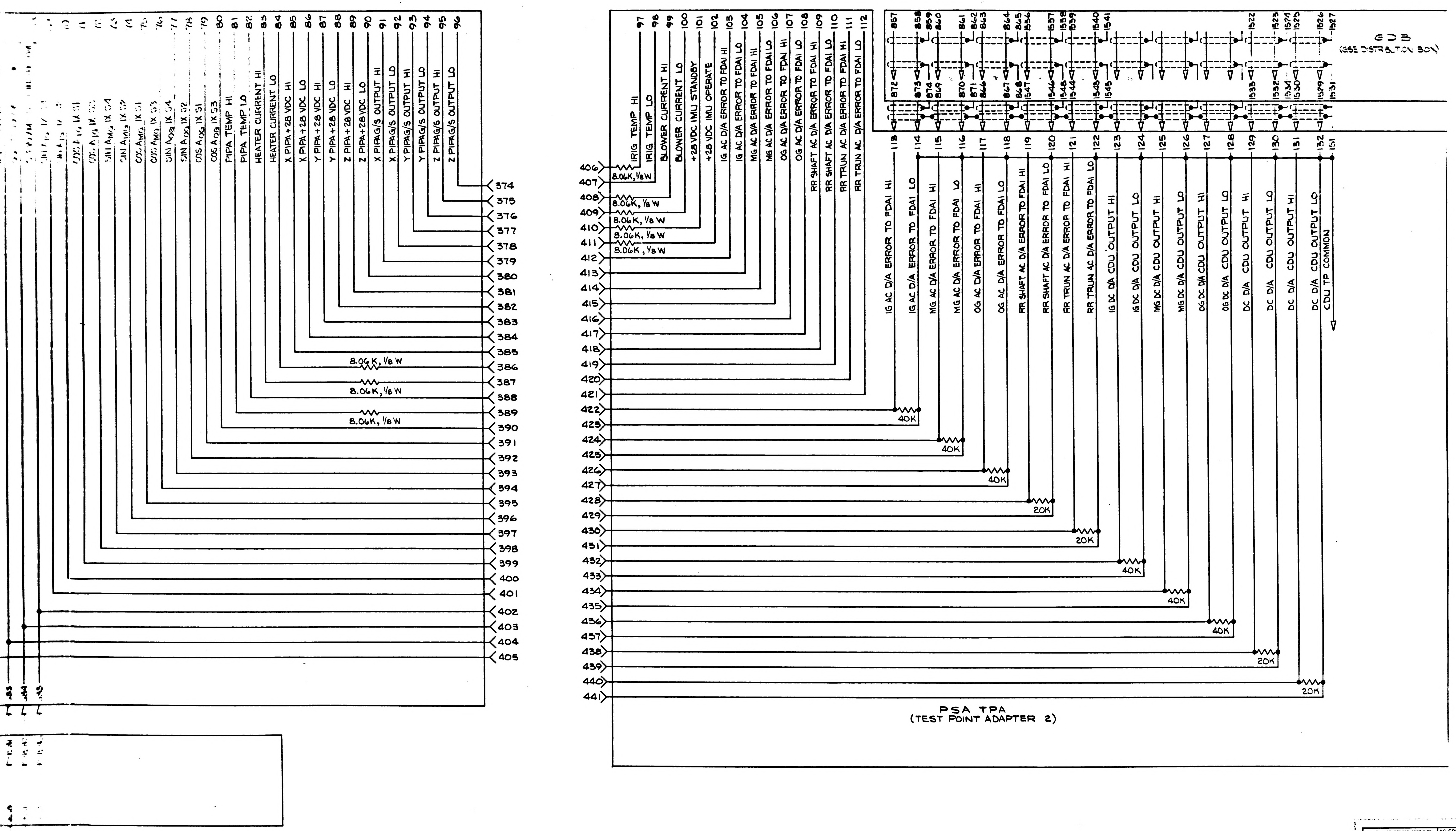
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± — DECIMALS ± — ANGLES ± —	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN Lookman DATE 12 JUN 65	MECHANIZATION DIAGRAM- TEST POINT ADAPTERS (BLOCK II & LEM)
	CHECKED	
	APPROVAL	
DO NOT SCALE THIS DRAWING	APPROVAL	
MATERIAL —	NASA APPROVAL	CODE IDENT NO. 99974 · SIZE J3 · 2900225
CONTRACT NAS 9-497	MIT APPROVAL	SCALE — · SHEET 1 OF 3

2900225


IRIG TEMP HI
IRIG TEMP LO
BLOWER CURRENT HI
BLOWER CURRENT LO
+28 VDC IMU STANDBY
+28 VDC IMU OPERATE
IG AC D/A ERROR TO FDAI HI
IG AC D/A ERROR TO FDAI LO
MG AC D/A ERROR TO FDAI HI
MG AC D/A ERROR TO FDAI LO
OG AC D/A ERROR TO FDAI HI
OG AC D/A ERROR TO FDAI LO
RR SHAFT AC D/A ERROR TO FDAI HI
RR SHAFT AC D/A ERROR TO FDAI LO
RR TRUN AC D/A ERROR TO FDAI HI
RR TRUN AC D/A ERROR TO FDAI LO
IG DC D/A CDU OUTPUT HI
IG DC D/A CDU OUTPUT LO
MG DC D/A CDU OUTPUT HI
MG DC D/A CDU OUTPUT LO
OG DC D/A CDU OUTPUT HI
OG DC D/A CDU OUTPUT LO
DC D/A CDU OUTPUT HI
DC D/A CDU OUTPUT LO
CDU TP COMMON
COS A DG 1X S3
SIN A DG 1X S2
SIN A DG 1X S1
COS A DG 1X S1
PIPA TEMP HI
PIPA TEMP LO
HEATER CURRENT HI
HEATER CURRENT LO
X PIPA +28 VDC HI
X PIPA +28 VDC LO
Y PIPA +28 VDC HI
Y PIPA +28 VDC LO
Z PIPA +28 VDC HI
Z PIPA +28 VDC LO
X PIPAG/S OUTPUT HI
X PIPAG/S OUTPUT LO
Y PIPAG/S OUTPUT HI
Y PIPAG/S OUTPUT LO
Z PIPAG/S OUTPUT HI
Z PIPAG/S OUTPUT LO
8.06K, 1/8 W
40K
20K
GDB
(GSE DISTRIBUTION BOX)
PSA TPA
(TEST POINT ADAPTER 2)
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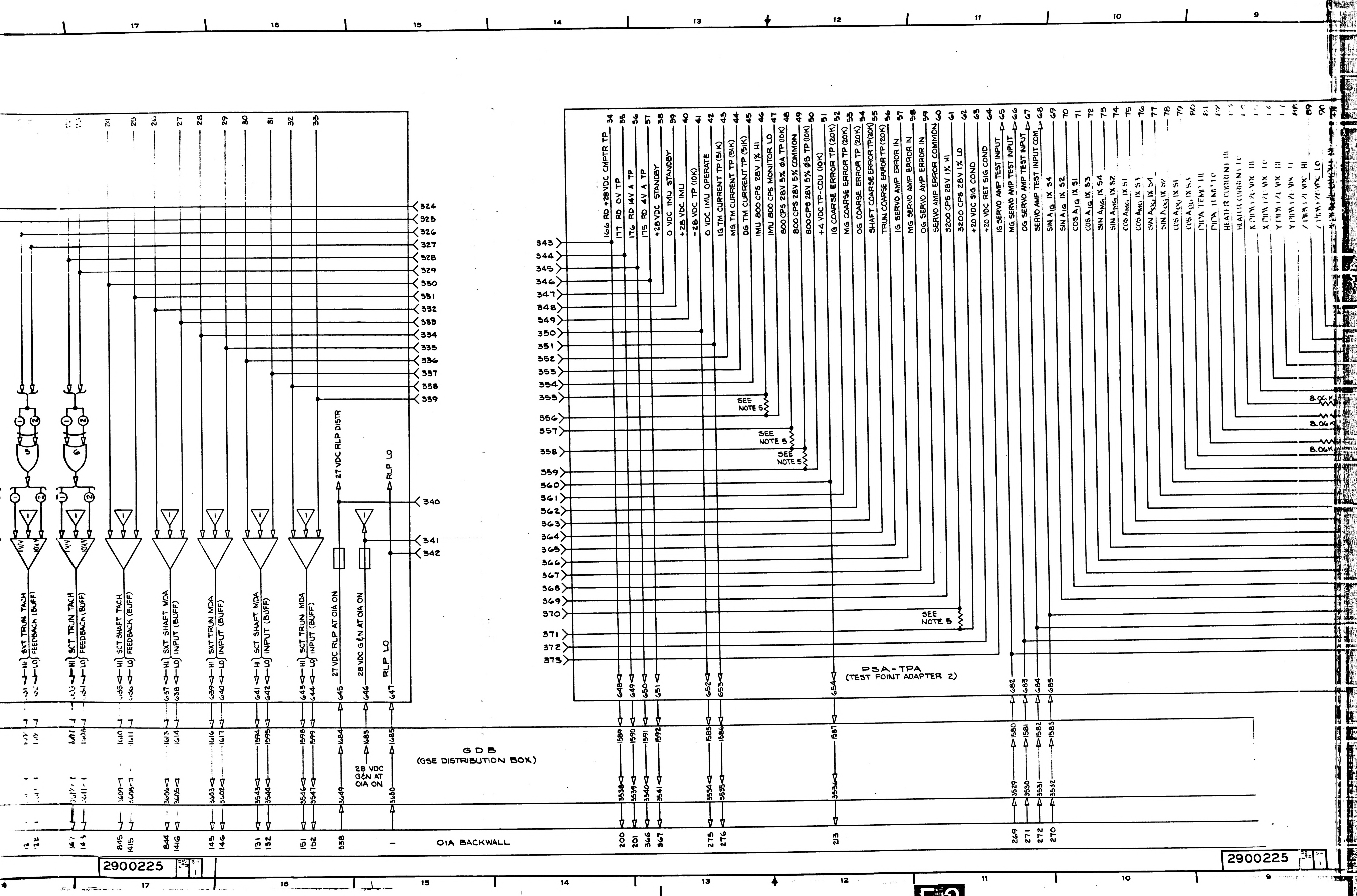
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS DECIMALS ANGLES
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

AC SPARK PLUG DIVISION. GMC
MILWAUKEE. WISCONSIN
ACSP PN
DRAWN Cookman DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MECHAN
TEST PO
(BLO

CODE IDENT NO 99974
J3
SCALE —

2900225



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166 RD +28VDC CMPTR TP
177 RD 0V TP
176 RD 14V A TP
175 RD 4V A TP
+28VDC STANDBY
0 VDC IMU STANDBY
+28 VDC IMU
-28 VDC TP (10K)
0 VDC IMU OPERATE
IG TM CURRENT TP (51K)
MG TM CURRENT TP (51K)
OG TM CURRENT TP (51K)
IMU 800 CPS 28V 1% HI
IMU 800 CPS MONITOR LO
800 CPS 28V 5% ØA TP (10K)
800 CPS 28V 5% COMMON
800 CPS 28V 5% ØB TP (10K)
+4 VDC TP-CDU (10K)
IG COARSE ERROR TP (20K)
MG COARSE ERROR TP (20K)
OG COARSE ERROR TP (20K)
SHAFT COARSE ERROR TP (20K)
TRUN COARSE ERROR TP (20K)
IG SERVO AMP ERROR IN
MG SERVO AMP ERROR IN
OG SERVO AMP ERROR IN
SERVO AMP ERROR COMMON
3200 CPS 28V 1% HI
3200 CPS 28V 1% LO
+20 VDC SIG COND
+20 VDC RET SIG COND
IG SERVO AMP TEST INPUT
MG SERVO AMP TEST INPUT
OG SERVO AMP TEST INPUT
SERVO AMP TEST INPUT COM
SIN A IG 1X S4
SIN A IG 1X S2
COS A IG 1X S1
COS A IG 1X S3
SIN A MG 1X S4
SIN A MG 1X S2
COS A MG 1X S1
COS A MG 1X S3
SIN A OG 1X S4
SIN A OG 1X S2
COS A OG 1X S1
COS A OG 1X S3
PIPA TEMP HI
PIPA TEMP LO
HEATER CURRENT LO
X PIPA 12 VDC HI
X PIPA 12 VDC LO
Y PIPA 12 VDC HI
Y PIPA 12 VDC LO
Z PIPA 12 VDC HI
Z PIPA 12 VDC LO
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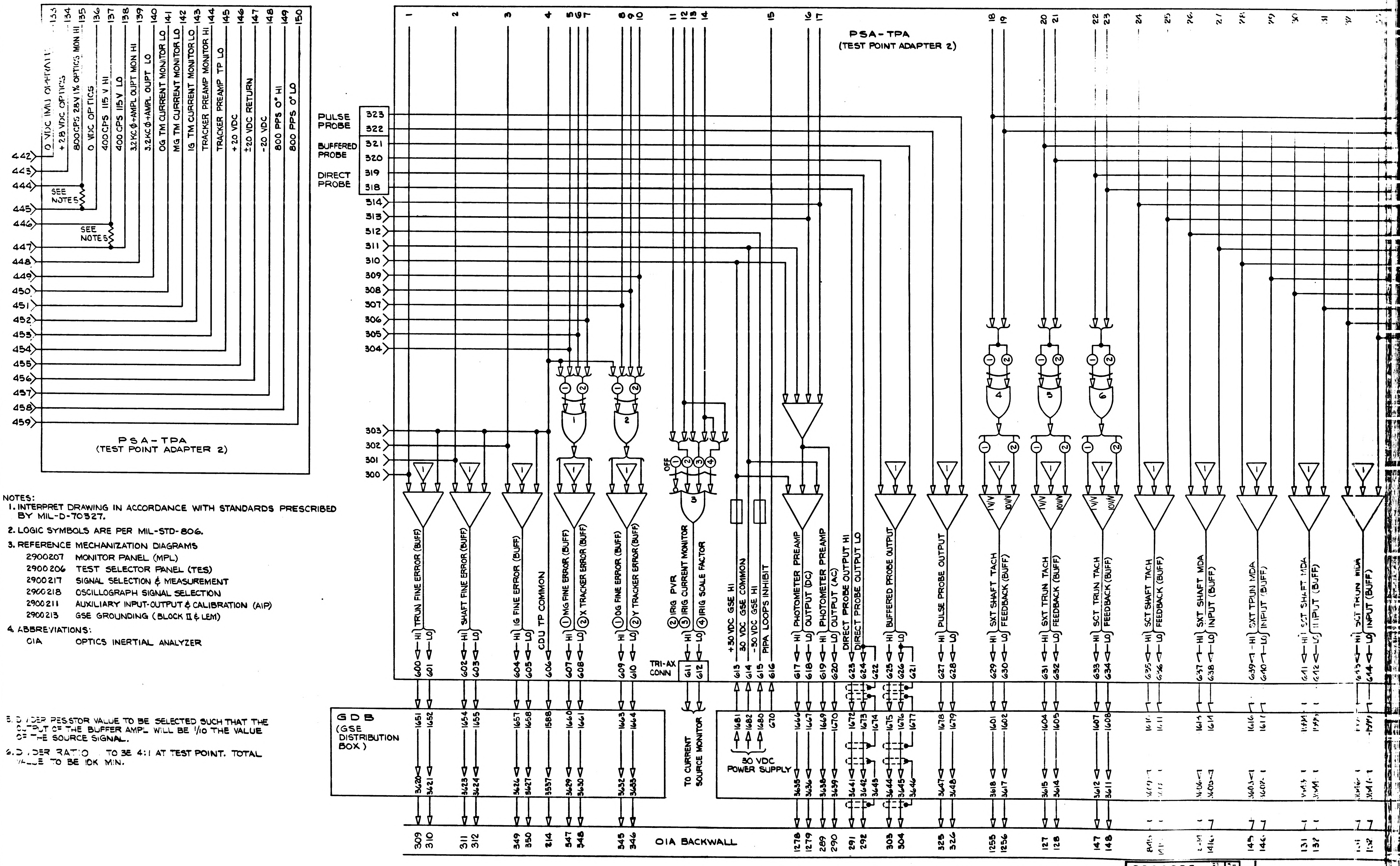
SEE NOTE 5
SEE NOTE 5
SEE NOTE 5
SEE NOTE 5
8.06K
8.06K
8.06K
27 VDC RLP DISTR
RLP LO
SXT TRUN TACH FEEDBACK (BUFF)
SCT TRUN TACH FEEDBACK (BUFF)
SCT SHAFT TACH FEEDBACK (BUFF)
SXT SHAFT MDA INPUT (BUFF)
SXT TRUN MDA INPUT (BUFF)
SCT SHAFT MDA INPUT (BUFF)
SCT TRUN MDA INPUT (BUFF)
27 VDC RLP AT OIA ON
28 VDC G&N AT OIA ON
RLP LO
HI
LO
PSA-TPA
(TEST POINT ADAPTER 2)
G D B
(GSE DISTRIBUTION BOX)
28 VDC G&N AT OIA ON
OIA BACKWALL
635 636 637 638 639 640 641 642 643 644 645 646 647
648 649 650 651 652 653 654 682 683 684 685
1610 1611 1613 1614 1616 1617 1594 1595 1598 1599 1684 1683 1685
1589 1590 1591 1592 1585 1586 1587 1580 1581 1582 1583
3609 3608 3606 3605 3603 3602 3543 3544 3546 3547 3649 3650
3538 3539 3540 3541 3534 3535 3536 3529 3530 3531 3532
815 1415 844 1416 145 146 131 132 151 152 538
200 201 366 367 275 276 213 269 271 272 270
2900225
E-2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B
A
0 VDC IMU OPERATE
+ 28 VDC OPTICS
800CPS 28V 1% OPTICS MON HI
0 VDC OPTICS
400CPS 115 V HI
400 CPS 115V LO
3.2KC Φ+AMPL OUPT MON HI
3.2KC Φ+AMPL OUPT LO
OG TM CURRENT MONITOR LO
MG TM CURRENT MONITOR LO
IG TM CURRENT MONITOR LO
TRACKER PREAMP MONITOR HI
TRACKER PREAMP TP LO
+ 20 VDC
±20 VDC RETURN
-20 VDC
800 PPS 0° HI
800 PPS 0° LO
133
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SEE NOTES
SEE NOTES
PSA-TPA
(TEST POINT ADAPTER 2)
PULSE PROBE
BUFFERED PROBE
DIRECT PROBE
323
322
321
320
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318
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313
312
311
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PSA-TPA
(TEST POINT ADAPTER 2)
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11 12 13 14
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16 17
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OFF
TRUN FINE ERROR (BUFF)
SHAFT FINE ERROR (BUFF)
IG FINE ERROR (BUFF)
CDU TP COMMON
① MG FINE ERROR (BUFF)
② X TRACKER ERROR (BUFF)
① OG FINE ERROR (BUFF)
② Y TRACKER ERROR (BUFF)
② IRIG PVR
③ IRIG CURRENT MONITOR
④ IRIG SCALE FACTOR
+30 VDC GSE HI
30 VDC GSE COMMON
-30 VDC GSE HI
PIPA LOOPS INHIBIT
PHOTOMETER PREAMP OUTPUT (DC)
PHOTOMETER PREAMP OUTPUT (AC)
DIRECT PROBE OUTPUT HI
DIRECT PROBE OUTPUT LO
BUFFERED PROBE OUTPUT
PULSE PROBE OUTPUT
SXT SHAFT TACH FEEDBACK (BUFF)
SXT TRUN TACH FEEDBACK (BUFF)
SCT TRUN TACH FEEDBACK (BUFF)
SCT SHAFT TACH FEEDBACK (BUFF)
SXT SHAFT MDA INPUT (BUFF)
SXT TRUN MDA INPUT (BUFF)
SCT SHAFT MDA INPUT (BUFF)
SCT TRUN MDA INPUT (BUFF)
HI
LO
1V/V
10V/V
TRI-AX CONN
600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 623 624 622 625 626 621 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644
GDB
(GSE DISTRIBUTION BOX)
1651 1652 1654 1655 1657 1658 1588 1660 1661 1663 1664 1681 1682 1680 670 1666 1667 1669 1670 1672 1673 1674 1675 1676 1677 1678 1679 1601 1602 1604 1605 1607 1608 1610 1611 1613 1614 1616 1617
TO CURRENT SOURCE MONITOR
30 VDC POWER SUPPLY
3620 3621 3623 3624 3626 3627 3557 3629 3630 3632 3633 3635 3636 3638 3639 3641 3642 3643 3644 3645 3646 3647 3648 3618 3617 3615 3614 3612 3611
309 310 311 312 349 350 814 547 548 545 546 1278 1279 289 290 291 292 303 304 325 326 1255 1256 127 128 147 148
OIA BACKWALL
1
2
3
4
5
6

NOTES:

1. INTERPRET DRAWING IN ACCORDANCE WITH STANDARDS PRESCRIBED BY MIL-D-70327.
2. LOGIC SYMBOLS ARE PER MIL-STD-806.
3. REFERENCE MECHANIZATION DIAGRAMS

2900207	MONITOR PANEL (MPL)
2900206	TEST SELECTOR PANEL (TES)
2900217	SIGNAL SELECTION & MEASUREMENT
2900218	OSCILLOGRAPH SIGNAL SELECTION
2900211	AUXILIARY INPUT-OUTPUT & CALIBRATION (AIP)
2900213	GSE GROUNDING (BLOCK II & LEM)

4. ABBREVIATIONS:

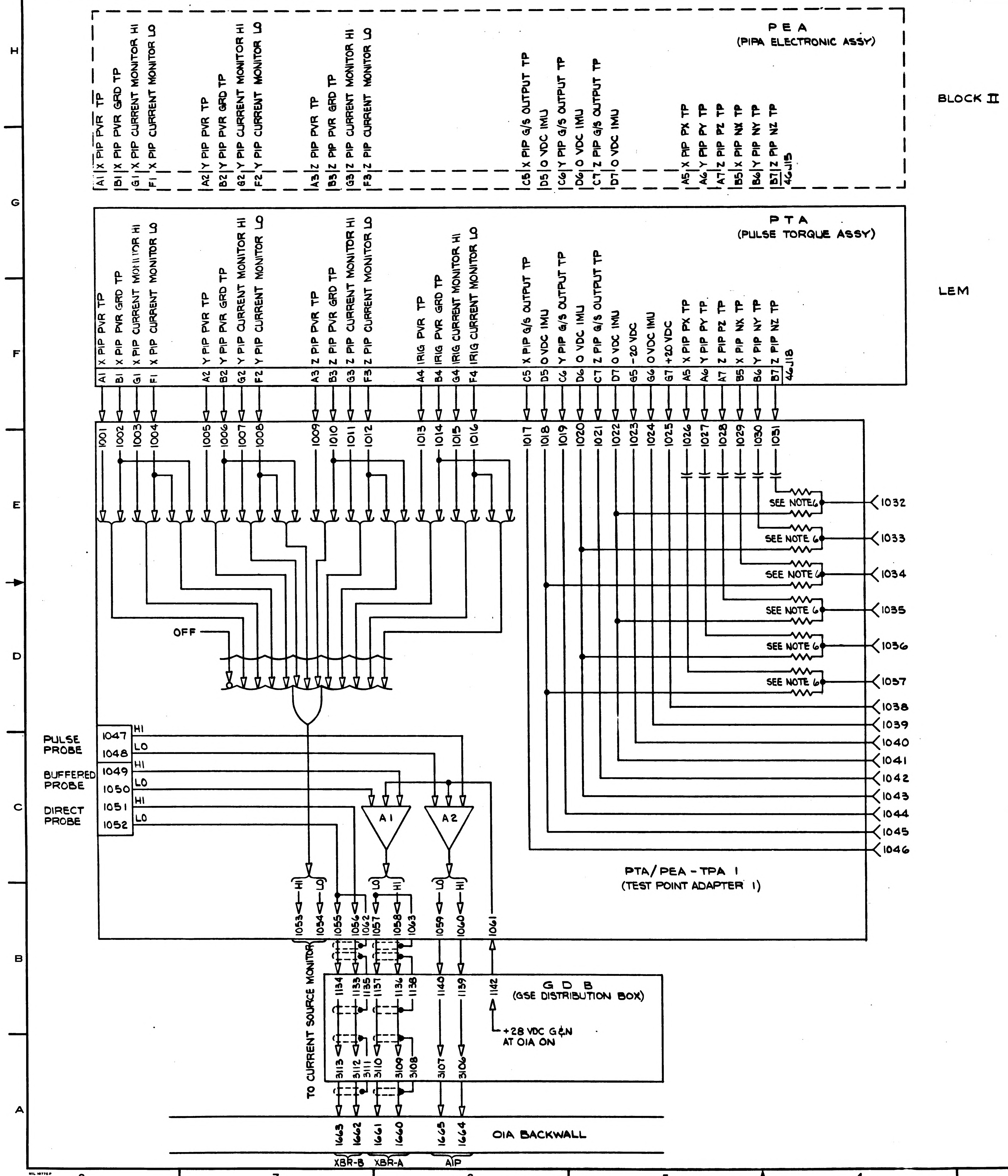
OIA	OPTICS INERTIAL ANALYZER

5. DIVIDER RESISTOR VALUE TO BE SELECTED SUCH THAT THE OUTPUT OF THE BUFFER AMPL WILL BE 1/10 THE VALUE OF THE SOURCE SIGNAL.
6. DIVIDER RATIO TO BE 4:1 AT TEST POINT. TOTAL VALUE TO BE 10K MIN.

MIL FORM 1050 J3

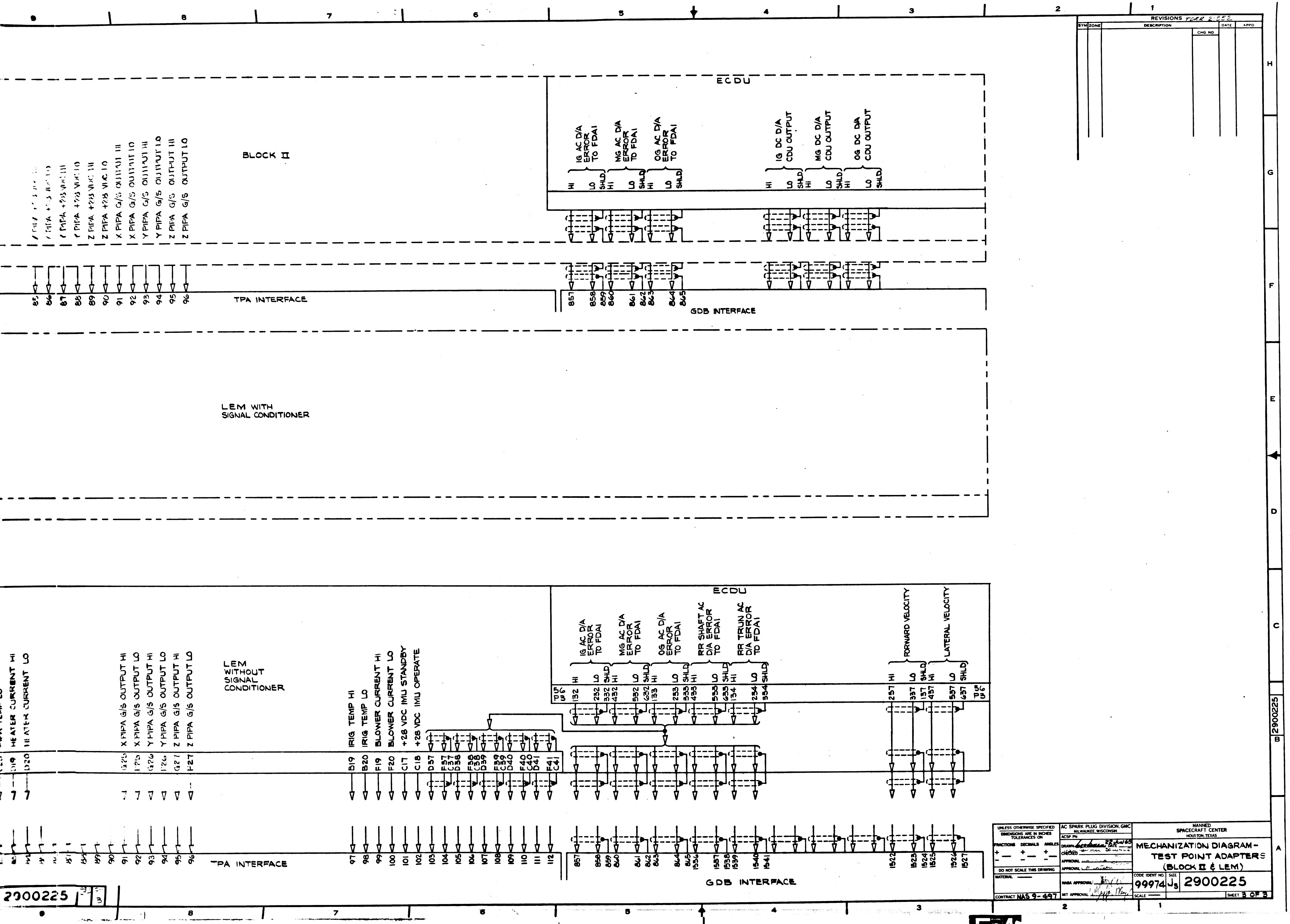
2900225

REVISIONS TORR 21552					
SYM	ZONE	DESCRIPTION	CHG NO.	DATE	APPD.


PEA
(PIPA ELECTRONIC ASSY)
A1 X PIP PVR TP
B1 X PIP PVR GRD TP
G1 X PIP CURRENT MONITOR HI
F1 X PIP CURRENT MONITOR LO
A2 Y PIP PVR TP
B2 Y PIP PVR GRD TP
G2 Y PIP CURRENT MONITOR HI
F2 Y PIP CURRENT MONITOR LO
A3 Z PIP PVR TP
B3 Z PIP PVR GRD TP
G3 Z PIP CURRENT MONITOR HI
F3 Z PIP CURRENT MONITOR LO
C5 X PIP G/S OUTPUT TP
D5 0 VDC IMU
C6 Y PIP G/S OUTPUT TP
D6 0 VDC IMU
C7 Z PIP G/S OUTPUT TP
D7 0 VDC IMU
A5 X PIP PX TP
A6 Y PIP PY TP
A7 Z PIP PZ TP
B5 X PIP NX TP
B6 Y PIP NY TP
B7 Z PIP NZ TP
46J15
BLOCK II
PTA
(PULSE TORQUE ASSY)
A1 X PIP PVR TP
B1 X PIP PVR GRD TP
G1 X PIP CURRENT MONITOR HI
F1 X PIP CURRENT MONITOR LO
A2 Y PIP PVR TP
B2 Y PIP PVR GRD TP
G2 Y PIP CURRENT MONITOR HI
F2 Y PIP CURRENT MONITOR LO
A3 Z PIP PVR TP
B3 Z PIP PVR GRD TP
G3 Z PIP CURRENT MONITOR HI
F3 Z PIP CURRENT MONITOR LO
A4 IRIG PVR TP
B4 IRIG PVR GRD TP
G4 IRIG CURRENT MONITOR HI
F4 IRIG CURRENT MONITOR LO
C5 X PIP G/S OUTPUT TP
D5 0 VDC IMU
C6 Y PIP G/S OUTPUT TP
D6 0 VDC IMU
C7 Z PIP G/S OUTPUT TP
D7 0 VDC IMU
G5 -20 VDC
G6 0 VDC IMU
G7 +20 VDC
A5 X PIP PX TP
A6 Y PIP PY TP
A7 Z PIP PZ TP
B5 X PIP NX TP
B6 Y PIP NY TP
B7 Z PIP NZ TP
46J18
LEM
1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031
SEE NOTE 6
1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044 1045 1046
OFF
PULSE PROBE
1047 HI
1048 LO
BUFFERED PROBE
1049 HI
1050 LO
DIRECT PROBE
1051 HI
1052 LO
A1
A2
HI LO
PTA/PEA - TPA 1
(TEST POINT ADAPTER 1)
1053 1054 1055 1056 1062 1057 1058 1063 1059 1060 1061
TO CURRENT SOURCE MONITOR
GDB
(GSE DISTRIBUTION BOX)
1134 1133 1135 1137 1136 1138 1140 1139 1142
+28 VDC G&N AT OIA ON
3113 3112 3111 3110 3109 3108 3107 3106
OIA BACKWALL
1663 1662 1661 1660 1665 1664
XBR-B XBR-A AIP

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	MANNED SPACECRAFT CENTER HOUSTON, TEXAS
	ACSP PN	
	DRAWN Lockman DATE 14 JUN 65 CHECKED 30 JUN 65 APPROVAL Wm. J. Hanke MRC 1 JUL 65 APPROVAL J. M. Watson 7-26-65	MECHANIZATION DIAGRAM - TEST POINT ADAPTERS (BLOCK II & LEM)
DO NOT SCALE THIS DRAWING		
MATERIAL ___	NASA APPROVAL	CODE IDENT NO. 99974 SIZE E 2900225
CONTRACT NAS 9-497	MIT APPROVAL	SCALE ___ SHEET 2 OF 3

2900225


REVISIONS TDRR 21552
SYM
ZONE
DESCRIPTION
CHG NO
DATE
APPD
ECDU
BLOCK II
IG AC D/A ERROR TO FDAI
MG AC D/A ERROR TO FDAI
OG AC D/A ERROR TO FDAI
IG DC D/A CDU OUTPUT
MG DC D/A CDU OUTPUT
OG DC D/A CDU OUTPUT
HI
LO
SHLD
Y PIPA +28 VDC HI
Z PIPA +28 VDC LO
Z PIPA +28 VDC HI
Z PIPA +28 VDC LO
X PIPA G/S OUTPUT HI
X PIPA G/S OUTPUT LO
Y PIPA G/S OUTPUT HI
Y PIPA G/S OUTPUT LO
Z PIPA G/S OUTPUT HI
Z PIPA G/S OUTPUT LO
85
86
87
88
89
90
91
92
93
94
95
96
TPA INTERFACE
857
858
859
860
861
862
863
864
865
GDB INTERFACE
LEM WITH SIGNAL CONDITIONER
LEM WITHOUT SIGNAL CONDITIONER
HEATER CURRENT HI
HEATER CURRENT LO
B19
D20
X PIPA G/S OUTPUT HI
X PIPA G/S OUTPUT LO
Y PIPA G/S OUTPUT HI
Y PIPA G/S OUTPUT LO
Z PIPA G/S OUTPUT HI
Z PIPA G/S OUTPUT LO
G25
H25
G26
H26
G27
F27
IRIG TEMP HI
IRIG TEMP LO
BLOWER CURRENT HI
BLOWER CURRENT LO
+28 VDC IMU STANDBY
+28 VDC IMU OPERATE
B19
B20
F19
F20
C17
C18
D37
F37
C37
D38
F38
C38
D39
F39
C39
D40
F40
C40
D41
F41
C41
ECDU
IG AC D/A ERROR TO FDAI
MG AC D/A ERROR TO FDAI
OG AC D/A ERROR TO FDAI
RR SHAFT AC D/A ERROR TO FDAI
RR TRUN AC D/A ERROR TO FDAI
FORWARD VELOCITY
LATERAL VELOCITY
P5
U5
P6
U6
132
232
332
432
532
632
133
233
333
433
533
633
134
234
334
257
337
137
437
537
637
85
86
87
88
89
90
91
92
93
94
95
96
TPA INTERFACE
97
98
99
100
101
102
103
104
105
106
107
108
109
110
111
112
857
858
859
860
861
862
863
864
865
1536
1537
1538
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1540
1541
1522
1523
1524
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1527
GDB INTERFACE
2900225
H
G
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1

4H

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± — DECIMALS ± — ANGLES ± —
DO NOT SCALE THIS DRAWING
MATERIAL —
CONTRACT NAS 9-497

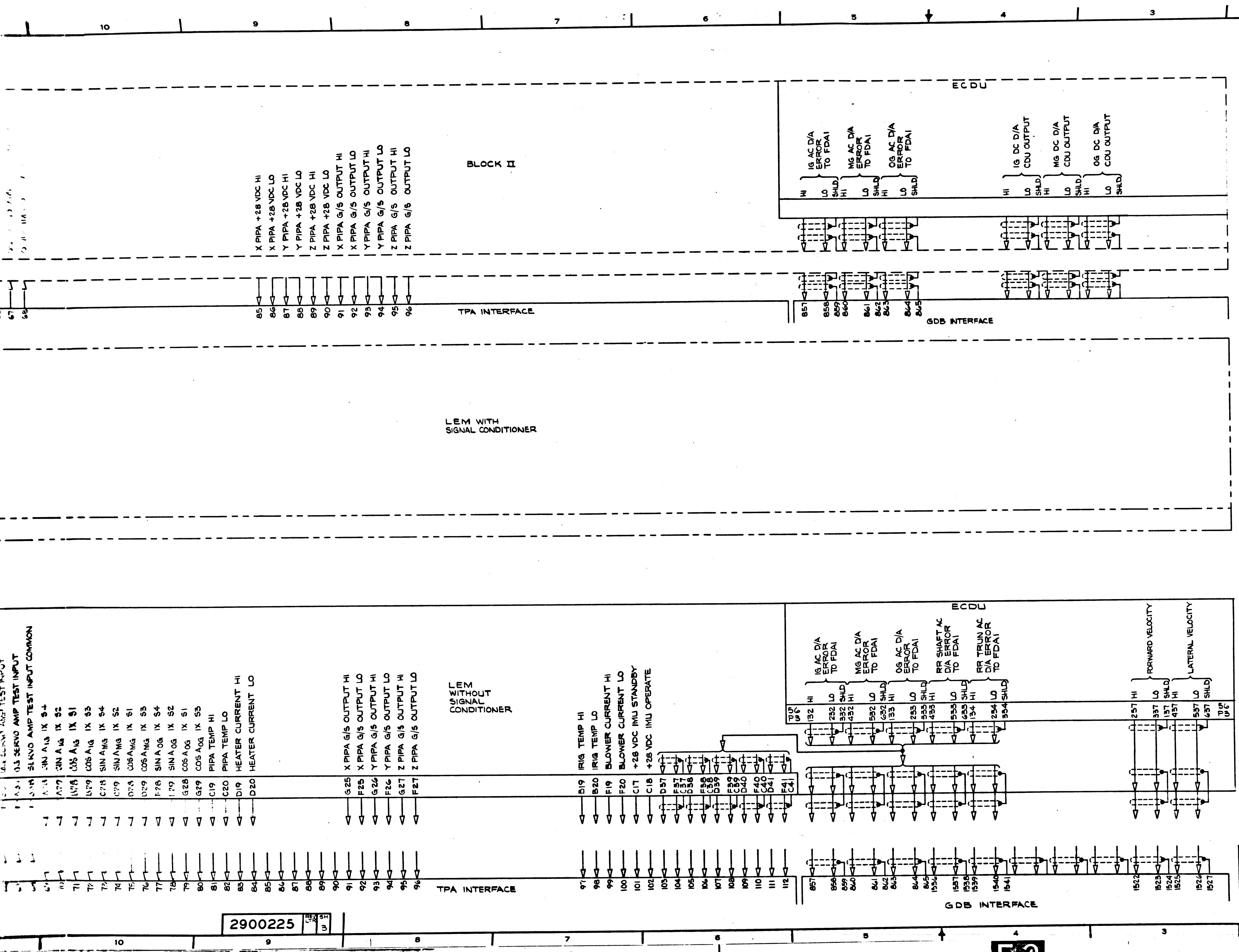
AC SPARK PLUG DIVISION, GMC
MILWAUKEE, WISCONSIN
ACSP PN
DRAWN 22 Jun 65 DATE
CHECKED
APPROVAL
APPROVAL
NASA APPROVAL
MIT APPROVAL

MANNED
SPACECRAFT CENTER
HOUSTON, TEXAS

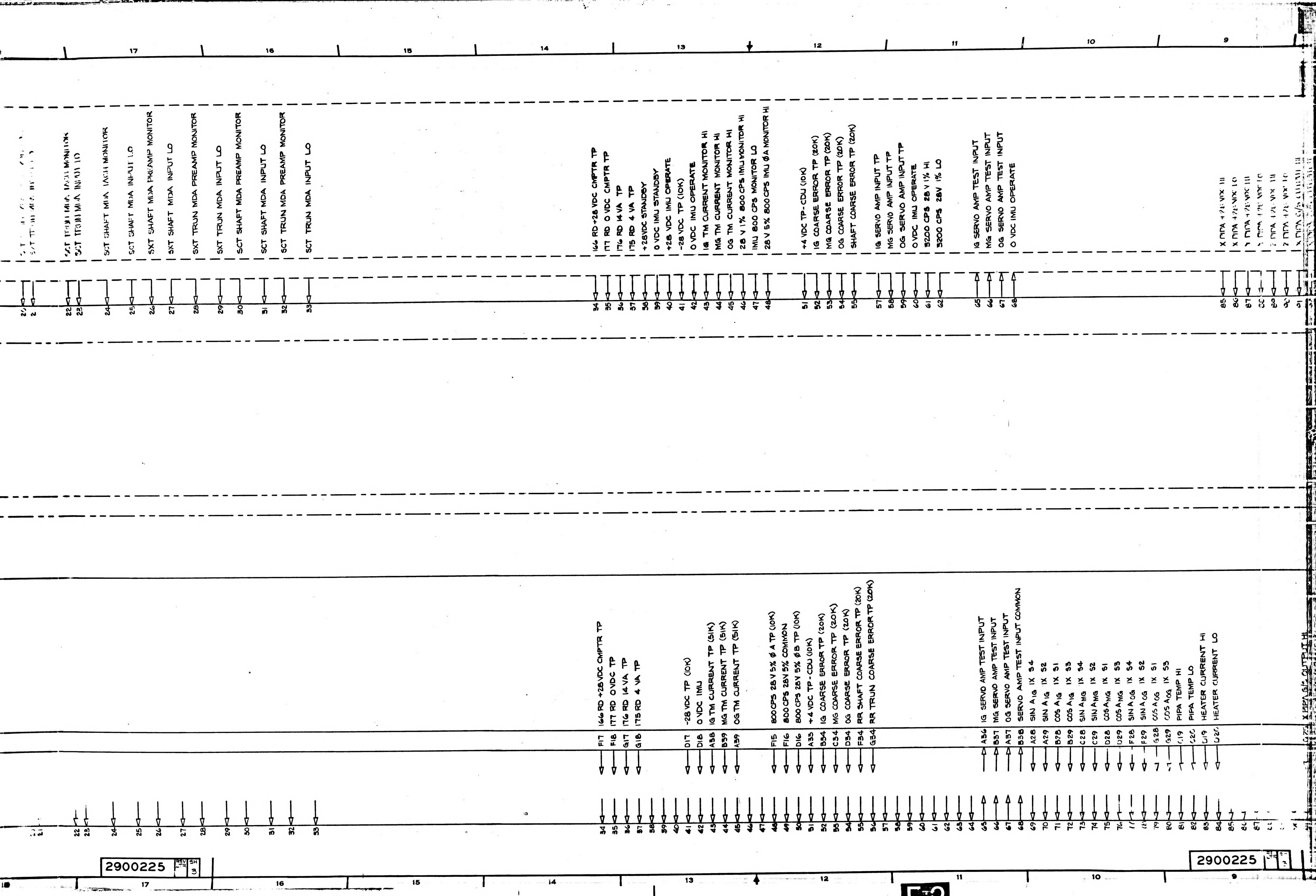
MECHANIZATION DIAGRAM -
TEST POINT ADAPTERS
(BLOCK II & LEM)

CODE IDENT NO. 99974
SIZE J3
2900225
SCALE —
SHEET 3 OF 3

2900225 3


ECDU
IG AC D/A ERROR TO FDAI
MG AC D/A ERROR TO FDAI
OG AC D/A ERROR TO FDAI
IG DC D/A CDU OUTPUT
MG DC D/A CDU OUTPUT
OG DC D/A CDU OUTPUT
HI
LO
SHLD
BLOCK II
X PIPA +28 VDC HI
X PIPA +28 VDC LO
Y PIPA +28 VDC HI
Y PIPA +28 VDC LO
Z PIPA +28 VDC HI
Z PIPA +28 VDC LO
X PIPA G/S OUTPUT HI
X PIPA G/S OUTPUT LO
Y PIPA G/S OUTPUT HI
Y PIPA G/S OUTPUT LO
Z PIPA G/S OUTPUT HI
Z PIPA G/S OUTPUT LO
TPA INTERFACE
GDB INTERFACE
LEM WITH SIGNAL CONDITIONER
LEM WITHOUT SIGNAL CONDITIONER
RR SHAFT AC D/A ERROR TO FDAI
RR TRUN AC D/A ERROR TO FDAI
FORWARD VELOCITY
LATERAL VELOCITY
OG SERVO AMP TEST INPUT
OG SERVO AMP TEST INPUT COMMON
PIPA TEMP HI
PIPA TEMP LO
HEATER CURRENT HI
HEATER CURRENT LO
IRIG TEMP HI
IRIG TEMP LO
BLOWER CURRENT HI
BLOWER CURRENT LO
+28 VDC IMU STANDBY
+28 VDC IMU OPERATE
2900225
REV LTR
SH 3

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS DECIMALS ANGLES + + + - - -	AC SPARK PLUG DIVISION, GMC MILWAUKEE, WISCONSIN	
	ACSP PN	MECHANIZ TEST (BLO
	DRAWN DATE 22 Jun 65	
	CHECKED	
	APPROVAL	
DO NOT SCALE THIS DRAWING	APPROVAL	
MATERIAL	NASA APPROVAL	CODE IDENT NO 99974 J
CONTRACT NAS 9-497	MIT APPROVAL	SCALE

17
16
15
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SXT TRUN MDA INPUT
22 SCT TRUN MDA TACH MONITOR
23 SCT TRUN MDA INPUT LO
24 SCT SHAFT MDA TACH MONITOR
25 SCT SHAFT MDA INPUT LO
26 SXT SHAFT MDA PREAMP MONITOR
27 SXT SHAFT MDA INPUT LO
28 SXT TRUN MDA PREAMP MONITOR
29 SXT TRUN MDA INPUT LO
30 SCT SHAFT MDA PREAMP MONITOR
31 SCT SHAFT MDA INPUT LO
32 SCT TRUN MDA PREAMP MONITOR
33 SCT TRUN MDA INPUT LO
34 166 RD +28 VDC CMPTR TP
35 177 RD 0 VDC CMPTR TP
36 176 RD 14 VA TP
37 175 RD 4 VA TP
38 +28VDC STANDBY
39 0 VDC IMU STANDBY
40 +28 VDC IMU OPERATE
41 -28 VDC TP (10K)
42 0 VDC IMU OPERATE
43 IG TM CURRENT MONITOR HI
44 MG TM CURRENT MONITOR HI
45 OG TM CURRENT MONITOR HI
46 28 V 1% 800 CPS IMU MONITOR HI
47 IMU 800 CPS MONITOR LO
48 28 V 5% 800 CPS IMU ØA MONITOR HI
51 +4 VDC TP-CDU (10K)
52 IG COARSE ERROR TP (20K)
53 MG COARSE ERROR TP (20K)
54 OG COARSE ERROR TP (20K)
55 SHAFT COARSE ERROR TP (20K)
57 IG SERVO AMP INPUT TP
58 MG SERVO AMP INPUT TP
59 OG SERVO AMP INPUT TP
60 0 VDC IMU OPERATE
61 3200 CPS 28 V 1% HI
62 3200 CPS 28V 1% LO
65 IG SERVO AMP TEST INPUT
66 MG SERVO AMP TEST INPUT
67 OG SERVO AMP TEST INPUT
68 0 VDC IMU OPERATE
85 X PIPA +28 VDC HI
86 X PIPA +28 VDC LO
87 Y PIPA +28 VDC HI
88 Y PIPA +28 VDC LO
89 Z PIPA +28 VDC HI
90 Z PIPA +28 VDC LO
91 X PIPA C/S OUTPUT HI
F17 166 RD +28 VDC CMPTR TP
F18 177 RD 0 VDC TP
G17 176 RD 14 VA TP
G18 175 RD 4 VA TP
D17 -28 VDC TP (10K)
D18 0 VDC IMU
A38 IG TM CURRENT TP (51K)
B39 MG TM CURRENT TP (51K)
A39 OG TM CURRENT TP (51K)
F15 800 CPS 28 V 5% Ø A TP (10K)
F16 800 CPS 28V 5% COMMON
D16 800 CPS 28V 5% ØB TP (10K)
A33 +4 VDC TP-CDU (10K)
B34 IG COARSE ERROR TP (20K)
C34 MG COARSE ERROR TP (20K)
D34 OG COARSE ERROR TP (20K)
F34 RR SHAFT COARSE ERROR TP (20K)
G34 RR TRUN COARSE ERROR TP (20K)
A36 IG SERVO AMP TEST INPUT
B37 MG SERVO AMP TEST INPUT
A37 OG SERVO AMP TEST INPUT
B38 SERVO AMP TEST INPUT COMMON
A28 SIN A IG 1X S4
A29 SIN A IG 1X S2
B28 COS A IG 1X S1
B29 COS A IG 1X S3
C28 SIN A MG 1X S4
C29 SIN A MG 1X S2
D28 COS A MG 1X S1
D29 COS A MG 1X S3
F28 SIN A OG 1X S4
F29 SIN A OG 1X S2
G28 COS A OG 1X S1
G29 COS A OG 1X S3
C19 PIPA TEMP HI
C20 PIPA TEMP LO
D19 HEATER CURRENT HI
D20 HEATER CURRENT LO
G21 X PIPA C/S OUTPUT HI
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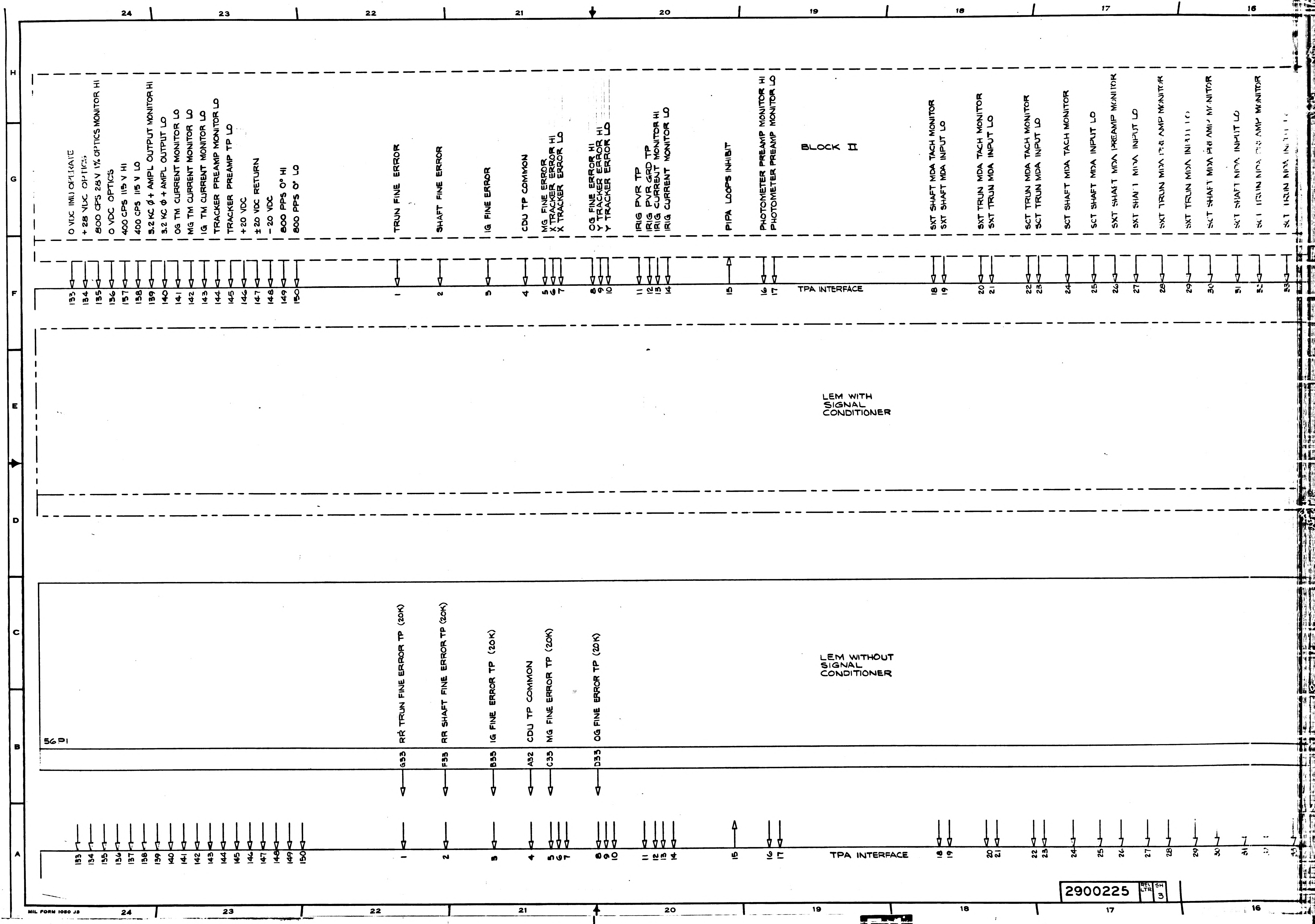
24
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18
17
16
H
G
F
E
D
C
B
A
0 VDC IMU OPERATE
+28 VDC OPTICS
800 CPS 28 V 1% OPTICS MONITOR HI
0 VDC OPTICS
400 CPS 115 V HI
400 CPS 115 V LO
3.2 KC ϕ + AMPL OUTPUT MONITOR HI
3.2 KC ϕ + AMPL OUTPUT LO
OG TM CURRENT MONITOR LO
MG TM CURRENT MONITOR LO
IG TM CURRENT MONITOR LO
TRACKER PREAMP MONITOR LO
TRACKER PREAMP TP LO
+20 VDC
±20 VDC RETURN
-20 VDC
800 PPS 0° HI
800 PPS 0° LO
TRUN FINE ERROR
SHAFT FINE ERROR
IG FINE ERROR
CDU TP COMMON
MG FINE ERROR
X TRACKER ERROR HI
X TRACKER ERROR LO
OG FINE ERROR HI
Y TRACKER ERROR HI
Y TRACKER ERROR LO
IRIG PVR TP
IRIG PVR GRD TP
IRIG CURRENT MONITOR HI
IRIG CURRENT MONITOR LO
PIPA LOOPS INHIBIT
PHOTOMETER PREAMP MONITOR HI
PHOTOMETER PREAMP MONITOR LO
BLOCK II
SXT SHAFT MDA TACH MONITOR
SXT SHAFT MDA INPUT LO
SXT TRUN MDA TACH MONITOR
SXT TRUN MDA INPUT LO
SCT TRUN MDA TACH MONITOR
SCT TRUN MDA INPUT LO
SCT SHAFT MDA TACH MONITOR
SCT SHAFT MDA INPUT LO
SXT SHAFT MDA PREAMP MONITOR
SXT SHAFT MDA INPUT LO
SXT TRUN MDA PRE AMP MONITOR
SXT TRUN MDA INPUT LO
SCT SHAFT MDA PRE AMP MONITOR
SCT SHAFT MDA INPUT LO
SCT TRUN MDA PRE AMP MONITOR
SCT TRUN MDA INPUT LO
133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
TPA INTERFACE
18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33
LEM WITH SIGNAL CONDITIONER
LEM WITHOUT SIGNAL CONDITIONER
RR TRUN FINE ERROR TP (20K)
RR SHAFT FINE ERROR TP (20K)
IG FINE ERROR TP (20K)
CDU TP COMMON
MG FINE ERROR TP (20K)
OG FINE ERROR TP (20K)
56P1
G33
F33
B33
A32
C33
D33
133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
TPA INTERFACE
18 19 20 21 22 23 24 25 26 27 28 29 30 31
2900225
REV LTR
SH 3
MIL FORM 1050 JB